

This file is part of the following work:

Simmons, Lisa Maree (2025) *The what and how of evaluation: measuring performance in student-led healthcare services*. PhD Thesis, James Cook University.

Access to this file is available from:

<https://doi.org/10.25903/acxp%2Dxc71>

Copyright © 2025 Lisa Maree Simmons

The author has certified to JCU that they have made a reasonable effort to gain permission and acknowledge the owners of any third party copyright material included in this document. If you believe that this is not the case, please email

researchonline@jcu.edu.au

The What and How of Evaluation:

Measuring Performance in Student-led Healthcare Services

Submitted by

Lisa Maree Simmons

In fulfilment of the requirements for the degree of

Doctor of Philosophy (Health)

College of Healthcare Sciences

James Cook University

June, 2025



Statement of Access

I, the undersigned author of this work, understand that James Cook University will make this thesis available for use within the University library and via the Australian Digital Thesis Network for use elsewhere. I understand that as an unpublished work, a thesis has significant copyright protection under the Copyright Act.

20/06/2025

Lisa Simmons

Date

Statement of Sources

I declare that this thesis is my own work and has not been submitted in any form for another degree or diploma at any university or other institution of tertiary education. I declare that I have stated clearly and fully in the thesis the extent of any collaboration with others. To the best of my knowledge and belief, the thesis contains no material previously published by any other person except where due acknowledgement has been made. Every reasonable effort has been made to gain permission and acknowledge the owners of copyright material. I would be pleased to hear from any copyright owner who has been omitted or incorrectly acknowledged.

20/06/2025

Lisa Simmons

Date

Declaration of Ethics

The research presented and reported in this thesis was conducted in accordance with the National Health and Medical Research Council National Statement on Ethical Conduct in Human Research (2007). The proposed research methodology received human research ethics approval from the James Cook University Human Research Ethics Committee (approval numbers H7541 and H9592)

20/06/2025

Lisa Simmons

Date

Acknowledgements

This thesis represents the culmination of a journey that would not have been possible without the support, encouragement, and generosity of many people. I would like to take this opportunity to express my deepest gratitude.

To my principal supervisors, Associate Professor Fiona Barnett and Professor Ruth Barker, thank you for your unwavering guidance, patience, and belief in this work. Your expertise, thoughtful critique, and encouragement have been invaluable throughout every phase of this project. You persevered with me when many did not. To Dr Teneale McGuckin, thank you for your support, particularly in the final stages, and for helping me maintain momentum and confidence in the finish line. To Associate Professor Emily Callander, thank you for your early guidance on research design and critical appraisal. Your insights helped shape the foundational stages of this research and provided clarity in framing evaluation across the Triple Aim.

To the College of Healthcare Sciences at James Cook University (JCU), thank you for the academic and professional opportunities, as well as the collegial support that helped me balance this PhD alongside my teaching and clinic management roles. I also gratefully acknowledge the Graduate Research School and the JCU Library for their assistance, particularly during the consolidation of my thesis and publications. I would also like to acknowledge the DTHM Cohort Doctorate Studies Program, which provided a valuable foundation for connection, encouragement, and shared experience. Through this program, I met many fellow HDR students on similar paths. We supported each other through the highs and lows of research, offering advice, perspective, and often just the reassurance of knowing we weren't alone. The impact of those relationships has extended far beyond the program itself, and I remain deeply grateful for the camaraderie and solidarity it fostered.

To the clinical educators, placement coordinators, and recent graduates who participated in my research, thank you. Your time, honesty, and insights were instrumental in shaping this work and its real-world relevance.

Finally, a heartfelt thank you to my family. To my son Aiden, thank you for your patience when my desk light was still on long after yours was off. To my daughter Maya, my late-night companion, you kept me company during countless quiet hours and somehow

made it feel a little less lonely. But most of all, thank you both for allowing me to believe that, even amidst the chaos, I was never falling short of being a good mum. To my late mother-in-law, her presence in those formative moments of the JCU Exercise Physiology Clinic remains a lasting reminder of the community support we built and the heart that underpinned this work. And to my husband Mark, thank you for holding everything together when I could not, for the steady supply of Diet Coke, and for always reminding me that I was capable, even when I doubted it. I am certain you are looking forward to finally having your wife back and I am looking forward to being her again.

This thesis is dedicated to the belief that clinical education can serve both the community and our students. I hope the findings contribute meaningfully to the continued development and support for Student-led Healthcare Services across Australia.

Statement on the Contributions of Others

I recognise the financial and infrastructural contribution of James Cook University through providing me with a workstation, access to resources, equipment for data collection and assisting with the funding of data collection and attending conferences. Below is an account of other's contribution to the completion of this thesis.

Nature of Assistance	Contribution	Names, Titles and Affiliations of Co-Contributors
Intellectual support	N/A	N/A
Financial support	• \$3,285 from the College of Healthcare Sciences Scholarship of Learning and Teaching (SoLT) Grant to support conference presentation at ANZAHPE 2024 • \$1,800 from the HDR Enhancement Scheme (HES) to support open-access publication fees.	College of Healthcare Sciences, James Cook University
Data collection	N/A	N/A

Contribution of Others in Published Material

Chapter 2

Simmons, L. M., Callander, E., Barker, R., & Barnett, F. (2022). Measuring health outcomes, experience of care and cost of healthcare in student-led healthcare services: A literature review. *Focus on Health Professional Education*, 23(1), 37–64.

<https://doi.org/10.11157/fohpe.v23i1.389>

Name and affiliation A/Prof Emily Callander, Griffith University and James Cook University Prof Ruth Barker, James Cook University A/Prof Fiona Barnett, James Cook University	Lisa Simmons (75% contribution) led the literature review design, database searching, screening and selection of articles, data extraction, critical appraisal, synthesis of findings, and drafting of the manuscript. A/Prof Emily Callander (10% contribution) provided conceptual guidance on appropriate evaluation frameworks and economic evaluation in healthcare and reviewed the final manuscript. Prof Ruth Barker (10% contribution) contributed to the framing of allied health education relevance, supported interpretation of findings, and reviewed all drafts. A/Prof Fiona Barnett (5% contribution) assisted in the refinement of the review scope and critical appraisal strategy and reviewed and revised the manuscript.

Chapter 3

Simmons, L., Barker, R., & Barnett, F. (2023). Evaluating allied health clinical placement performance: Protocol for a modified Delphi study. *JMIR Research Protocols*, 12, e44020.

<https://doi.org/10.2196/44020>

Name and affiliation	Lisa Simmons (80% contribution) was responsible for protocol development,

Prof Ruth Barker, James Cook University A/Prof Fiona Barnett, James Cook University	expert panel recruitment, data collection design, and manuscript preparation. Prof Ruth Barker and A/Prof Fiona Barnett (10% contribution each) provided advice on Delphi methodology, participant recruitment, and reviewed all manuscript drafts.

Chapter 4

Simmons, L., Barker, R., Barnett, F., & McGuckin, T. (2024). Evaluating clinical placement performance: What is important to measure? In *ANZAHPE 2024: Cultivating Innovation Abstract Book* (p. 183). ANZAHPE. <https://www.anzahpe.org/>

Simmons, L., Barker, R., Barnett, F., & McGuckin, T. (2025). Evaluating clinical placement performance in allied health student-led healthcare services: A modified Delphi study. *Australian Journal of Clinical Education*, 14(1), 19–45.
<https://doi.org/10.53300/001c.136339>

Name and affiliation Prof Ruth Barker, James Cook University A/Prof Fiona Barnett, James Cook University Dr Teneale McGuckin, James Cook University	Lisa Simmons (70% contribution) led all stages of the modified Delphi study including panel recruitment, questionnaire design, data collection and analysis, and manuscript writing. Prof Ruth Barker (15% contribution) and A/Prof Fiona Barnett (10% contribution) provided methodological oversight and feedback throughout the Delphi rounds and manuscript revisions. Prof Ruth Barker also participated in triangulation in the thematic analysis. Dr Teneale McGuckin (5% contribution) participation in triangulation in the thematic analysis and assisted in final manuscript preparation.

Chapter 5

Simmons, L., Barker, R., Barnett, F., & McGuckin, T. (2025). Consensus challenges in clinical placement evaluation: Insights from a modified Delphi study. Abstract presented at the 16th National Allied Health Conference, 11–13 August, Adelaide, SA, Australia. Available at <https://nahc.com.au/consensus-challenges-in-clinical-placement-evaluation-insights-from-a-modified-delphi-study/>

Name and affiliation Prof Ruth Barker, James Cook University A/Prof Fiona Barnett, James Cook University Dr Teneale McGuckin, James Cook University	Lisa Simmons (70% contribution) was responsible for protocol development, expert panel recruitment, data collection design, abstract and poster preparation. Prof Ruth Barker and A/Prof Fiona Barnett (10% contribution each) provided advice on Delphi methodology, participant recruitment, thematic analysis and reviewed all drafts. Dr Teneale McGuckin (10% contribution) provided advice on methodology, thematic analysis, and assisted with poster development.

Statement of the use of Generative AI

During the preparation of this thesis, I acknowledge the use of ChatGPT (developed by OpenAI) to support my learning and technical development in specific areas. ChatGPT was used primarily as an educational and drafting aid to enhance understanding of technical processes, including how to use programs such as QGIS and manage shapefiles and geographical data for the purpose of generating maps of Australia and associated postcode regions. Prompt examples included requests for clarification of software functions (e.g., “How to visualise postcode-level data in QGIS”) and support with coding or scripting tasks (e.g., “How to join shapefile data with CSV attributes in QGIS”). The outputs from these prompts were used solely for the purposes of learning, technical exploration, and draft development.

Additionally, ChatGPT was used to assist with formatting reference lists in accordance with APA 7th edition guidelines, helping to ensure accuracy and consistency in citations throughout the thesis. A specific prompt used to undertake this included: “Correct this reference in APA 7th formatting style”.

All content presented in the final thesis, including text, figures, and data analysis, was critically reviewed, refined, and finalised using a range of academic tools (e.g., Microsoft Excel, Lucidchart, Grammarly and Endnote). The final submission has been carefully verified to maintain standards of accuracy, originality, and academic integrity.

20/06/2025

Lisa Simmons

Date

Abstract

Student-led Healthcare Services (SLHS) represent an innovative model at the intersection of health professional education and healthcare delivery. Designed to increase placement capacity and provide care to underserved communities, SLHS operate with varying degrees of health system integration. Despite their growing prevalence in Australia and internationally, SLHS evaluation remains inconsistent and narrow in focus, often limited to student satisfaction or discrete learning outcomes, with limited consideration of broader service impacts.

This thesis aims to develop an evidence-informed framework for evaluating SLHS performance, accounting for their dual role in education and healthcare service delivery. Three interconnected studies were conducted: a systematic literature review, a modified Delphi study, and a Knowledge, Attitudes and Practices (KAP) survey. Findings from each study contributed to the development of the HELP-C Guiding Framework, a proposed multidimensional model for consistent, meaningful, and stakeholder-informed evaluation of SLHS.

The literature review and an updated literature review identified 30 studies and revealed significant gaps in evaluation practices. While health outcomes and experience of care were commonly assessed, few evaluations addressed cost or used validated, multidimensional tools. To address limitations identified in the literature review, a modified Delphi study involving Australian clinical placement stakeholders (n=18) reached consensus on 43 priority indicators across four domains: learning outcomes, placement experience, cost, and research. Building on these results, a KAP survey (n = 31) explored how these indicators are currently applied in SLHS settings. Findings revealed inconsistent use of evaluation tools and highlighted challenges including limited institutional support, unclear expectations, and variation across sectors and regions.

The HELP-C Guiding Framework was conceptualised from the synthesised findings from all three studies. It is composed of the five integrated domains of SLHS performance evaluation that were identified in the earlier studies: Health Outcomes, Experience of Care, Learning Outcomes, Placement Experience, and Cost. Grounded in stakeholder priorities and existing literature, the framework acknowledges SLHS as complex systems requiring tailored

evaluation strategies that balance educational and service delivery goals. The framework also highlights the importance of embedding research and reflective practice to support continuous improvement and long-term viability.

The conclusions of this thesis are threefold. First, while SLHS are widely viewed as beneficial models for education and healthcare service delivery, their long-term viability and impact cannot be assessed without a structured, multidimensional evaluation approach. Second, evaluation practices within SLHS are currently variable and often under-resourced, limiting the ability of stakeholders to demonstrate value or advocate for sustained investment. Third, the HELP-C Guiding Framework offers a practical and evidence-informed pathway forward. It supports the development of consistent evaluation strategies aligned to both educational and healthcare system outcomes and provides a shared language for stakeholders from academia, health services, and policy.

This thesis advances the field of health professional education by positioning SLHS not just as placement opportunities but as integrated educational-healthcare systems worthy of rigorous evaluation. It provides a foundation for future research focused on refining domain-specific tools, validating the HELP-C Guiding Framework in practice, and assessing long-term impacts on student learning, community health, and workforce readiness. As SLHS continue to evolve, robust and adaptable evaluation models will be essential for ensuring their quality, equity, and contribution to sustainable healthcare systems.

Table of Contents

Statement of Access	ii
Statement of Sources.....	iii
Declaration of Ethics.....	iv
Acknowledgements	v
Statement of Contribution of Others.....	vii
Statement of the use of Generative AI	xi
Abstract	xii
Table of Contents	xiv
List of Tables	xix
List of Figures.....	xx
Chapter 1: Challenges, Opportunities, and the Need for Comprehensive Evaluation.....	01
1.1 The Role of Work Integrated Learning in Health Professional Education	02
1.2 SLHS as an Innovative Solution	04
1.3 Challenges Faced by Student-led Healthcare Services.....	05
1.4 The Need for Comprehensive Evaluation of SLHS	06
1.5 Evaluating Healthcare Performance	07
1.6 The Triple Aim	09
1.7 Strengths and Limitations of the Triple Aim.....	10
1.8 Evaluating Clinical Placement	12
1.9 Thesis Aim	14
1.9.1 Perspective One: SLHS as Providers of Healthcare	14
1.9.2 Perspective Two: Evaluating SLHS as Providers of Clinical Placement.....	14
1.10 Thesis Structure.....	15
1.11 Researcher’s Perspective and Background	17
1.12 Research Significance.....	18
Chapter 2: Measuring Health Outcomes, Experience of Care and Cost of Healthcare in Student-led Healthcare Services: A Literature Review	19
2.1 Abstract.....	21
2.2 Introduction.....	21
2.3 Methods	25
2.3.1 Search Strategy	25
2.3.2 Study Selection	25
2.3.3 Critical Appraisal.....	25

2.3.4 Data Extraction.....	26
2.4 Results.....	30
2.4.1 Alignment with Triple Aim Measurement Principles	30
2.4.2 Dimensions of the Triple Aim	36
2.5 Discussion	41
2.6 Limitations	44
2.7 Conclusion	45
2.8 Updated Literature Review Findings	45
2.8.1 Methods.....	45
2.8.2 Results.....	46
2.8.3 Updated Review Conclusion.....	63
Chapter 3: Evaluating Allied Health Clinical Placement Performance: Protocol for a Modified Delphi Study.	64
3.1 Abstract.....	66
3.2 Introduction.....	67
3.3 Methods	69
3.3.1 The Delphi Method.....	69
3.3.2 Expert Panel Members.....	71
3.3.3 Expert Panel Member Recruitment	72
3.3.4 Panel Characteristics.....	73
3.3.5 Survey Design and Facilitation within Delphi Rounds	73
3.3.6 Data Collection.....	75
3.3.7 Data Analysis.....	75
3.3.8 Ethical Considerations	76
3.4 Discussion	76
3.5 Conclusion	78
Chapter 4: Evaluating Clinical Placement Performance in Allied Health Student-led Healthcare Services: A modified Delphi.	79
4.1 Abstract.....	81
4.2 Introduction.....	81
4.3 Methods	83
4.3.1 Modified Delphi Rounds.....	83
4.3.2 Data Collection.....	84
4.3.3 Data Analysis.....	85
4.3.4 Ethical Considerations	85

4.4 Results.....	86
4.4.1 Expert Characteristics	86
4.4.2 Round 1	89
4.4.3 Round 2	93
4.4.4 Round 3	100
4.4.5 Areas of Measurement not Achieving Consensus	101
4.4.6 Finalised Areas of Measurement	103
4.5 Discussion	105
4.6 Conclusion	109
Chapter 5: Consensus Challenges in Clinical Placement Evaluation: Insights from a Modified Delphi Study	110
5.1 Abstract	112
5.2 Introduction	112
5.3 Methods	115
5.4 Results	115
5.4.1 Measuring Learning Outcomes in Clinical Placement	116
5.4.2 Measuring Experience of Placement	130
5.5 Discussion	143
5.6 Conclusion	145
Chapter 6: Measuring Clinical Placement Performance: Knowledge, Attitudes and Practices in Student-led Healthcare Services	147
6.1 Abstract	149
6.2 Introduction	149
6.3 Method	152
6.3.1 The Knowledge, Attitudes, and Practices survey method	152
6.3.2 Survey Development	153
6.3.3 Survey Recruitment	155
6.3.4 Data Collection	155
6.3.5 Data Analysis	156
6.4 Results	157
6.4.1 Survey Response	157
6.4.2 Demographic Representation	159
6.4.3 Knowledge of Quality Clinical Placement Frameworks or Guidelines	159
6.4.4 Attitudes Towards the Evaluation of Student-led Healthcare Services	160
6.4.5 Current Evaluation Practices in SLHS	160

6.5 Discussion	167
6.6 Limitations	171
6.7 Conclusion	172
Chapter 7: Toward a Comprehensive Evaluation Strategy for Student-led Healthcare Services: The HELP-C Guiding Framework.....	173
7.1 Defining the Need for SLHS Evaluation	175
7.1.1 The Purpose of the HELP-C Guiding Framework	175
7.2 The Evolution of the HELP-C Guiding Framework	178
7.3 Measuring SLHS Performance Across Key Domains.....	179
7.3.1 Measuring Health Outcomes (H).....	180
7.3.2 Measuring Experience of Healthcare (E).....	180
7.3.3 Measuring Learning Outcomes (L)	181
7.3.4 Measuring Placement Experience (P).....	183
7.3.5 Measuring the Cost of SLHS (C)	185
7.4 Improving Research Opportunities and Capacity in SLHS	187
7.4.1 Build Placement Supervisor and Placement Coordinator Capacity	189
7.4.2 Establish Research-Practice Partnerships	189
7.4.3 Develop Dedicated Research and Academic Leadership Roles.....	189
7.4.4 Integrate Research Training into Student Placements	190
7.5 Summary, Significance and Future Development Needs	190
Chapter 8: Reflections and Future Directions for Evaluating Student-led Healthcare Service Performance.....	191
8.1 Reflections on the Research Journey.....	192
8.2 Thesis Contribution to Knowledge.....	193
8.2.1 A Conceptual Reframing of SLHS Performance.....	194
8.2.2 An Empirical Basis for What Should be Measured	194
8.2.3 A Diagnostic Insight into Current SLHS Evaluation Practices	194
8.2.4 A Novel, Conceptual Evaluation Framework.....	195
8.3 Limitations	195
8.4 Directions for Future Research	196
8.4.1 Refining and Prioritising Areas of Measurement	196
8.4.2 Identifying and Validating Preferred Tools	197
8.4.3 Advancing Economic Evaluation	197
8.4.4 Comparative Studies with Other Placement Models.....	197
8.5 Conclusion: Strengthening Evaluation in SLHS.....	198

9.0 References.....	200
10.0 Appendices.....	244
10.1 Appendix 1: Publication 1.....	245
10.2 Appendix 2: Critical Appraisal Tool.....	274
10.3 Appendix 3: Publication 2.....	281
10.4 Appendix 4: Publication 3.....	291
10.5 Appendix 5: Publication 4.....	294
10.6 Appendix 6: Publication 5.....	323
10.7 Appendix 7: HELP-C Domains, Measures, and Recommendations.....	326

List of Tables

Chapter 2:

Table 1: Study Characteristics	27
Table 2: Analysis of Articles Against the Triple Aim Measurement Principles	33
Table 3: Analysis of Articles Against the Dimensions of the Triple Aim	39
Table 4. Updated Study Characteristics	48
Table 5. Updated Analysis of Articles Against the Triple Aim Measurement Principles.....	53
Table 6. Updated Analysis of Articles Against the Dimensions of the Triple Aim.....	60

Chapter 3:

Table 1. Selection Criteria and Considerations for Variation in Expert Panel Members.	73
Table 2. Proposed Round One Survey Questions	74

Chapter 4:

Table 1. Characteristics of Expert Members	87
Table 2. Frequency of Areas of Measurement Referenced in Expert's Responses.....	90
Table 3. Round Two Level of Agreement on Importance	94
Table 4. Round Three Level of Agreement on Importance	100

Chapter 5:

Table 1. Consensus Outcomes on Tool Effectiveness for Measuring Student Learning Outcomes.....	117
Table 2. Consensus Outcomes on Tool Effectiveness for Measuring Placement Experience	131

Chapter 6:

Table 1. Survey Respondents' Understanding of Clinical Placement Performance Evaluation.....	160
Table 2. Evaluation of Student Learning Outcomes in SLHS.....	162
Table 3. Evaluation of Experience of Placement in SLHS.....	164
Table 4. Evaluation of Cost of Placement in SLHS.....	166

List of Figures

Chapter 1:

Figure 1. The IHI Triple Aim.....	10
Figure 2. Adapted BPCLE Framework	13
Figure 3. Overview of Research Questions, Corresponding Methods, and Alignment with the Thesis Aim and Perspectives	16

Chapter 2:

Figure 1. Thesis Structure Highlighting the Focus of Chapter 2 and Research Question 1....	20
Figure 2. PRISMA Flow Diagram of Article Inclusion Process.....	32
Figure 3. Updated PRISMA Flow Diagram of Article Inclusion Process.....	47

Chapter 3:

Figure 1. Thesis Structure Highlighting the Focus of Chapter 3 and Research Question 2....	65

Chapter 4:

Figure 1. Thesis Structure Highlighting the Focus of Chapter 4 and Research Question.....	80
Figure 2. Flow of Participants and Surveys Through the Study.....	88
Figure 3. Sub Themes and Areas of Measurement Identified in Round 1	92
Figure 4A. Decision Making Process Supporting Inclusion/Exclusion of Areas of Measurement: Learning Outcomes	96
Figure 4B. Decision Making Process Supporting Inclusion/Exclusion of Areas of Measurement: Experience of Placement	97
Figure 4C. Decision Making Process Supporting Inclusion/Exclusion of Areas of Measurement: Cost of Placement and Research in Clinical Placement.....	98
Figure 5. Statements Collated from Expert Opinion Supporting Importance (Cost and Research in Clinical Placement)	99
Figure 6. Finalised Areas of Measurement Related to the Themes of ‘Learning Outcomes’, ‘Experience of Placement’, ‘Cost of Placement’ and ‘Research in Clinical Placement.....	104

Chapter 5:

Figure 1. Thesis Structure Highlighting the Focus of Chapter 5 and Research Question 2...111	
Figure 2. Tools Achieving Consensus Aligned with Student Learning Outcomes.....	129
Figure 3. Tools Achieving Consensus Aligned with Experience of Placement.	142

Chapter 6:

Figure 1. Thesis Structure Highlighting the Focus of Chapter 6 and Research Question 3..	148
Figure 2. Survey Questions and Respondent Participation	158

Chapter 7:

Figure 1. Convergence of Study Findings and Development of the HELP-C Guiding Framework.....	174

Measuring Performance in Student-led Healthcare Services

Figure 2. The HELP-C Guiding Framework for Evaluating SLHS Performance 177

Figure 3. Key Performance Domains and Research Opportunities 188

Chapter 1: Student-led Healthcare Services in Context: Challenges, Opportunities, and the Need for Comprehensive Evaluation

Student-led Healthcare Services (SLHS) have emerged as innovative models responding to growing healthcare demands, workforce shortages, and the need for immersive, practice-based student learning experiences (Beckman et al., 2022; Hulme et al., 2024). Operating within a Work-Integrated Learning (WIL) framework, SLHS allow students to engage in supervised, real-world service delivery that enhances clinical competence and professional readiness (Cooper et al., 2010; Billett, 2001). These services also contribute to improved healthcare access, particularly in rural and underserved communities, by extending the reach of interprofessional care (Broman et al., 2022; Channa et al., 2024). Despite their recognised dual value in healthcare delivery and education, SLHS remain under-evaluated, especially regarding their cost-effectiveness and viability. Recent studies have highlighted the need for clearer understanding of the financial implications of SLHS models for students, institutions, and healthcare systems (Mitchell et al., 2025; Beks et al., 2024).

In this first chapter, the need for a comprehensive evaluation framework to assess SLHS that includes service quality, patient outcomes, cost-effectiveness, and student learning experiences is emphasised. This chapter explores WIL, the development of SLHS, their associated benefits and challenges, and outlines the research objectives and structure of the thesis.

1.1 The Role of Work Integrated Learning in Health Professional Education

Work Integrated Learning (WIL) integrates theoretical knowledge with practical experience, embedding students in real-world environments to enhance professional readiness and adaptability (Patrick et al., 2008). In healthcare, where the dynamic and complex nature of the industry demands "work-ready" graduates, WIL is critical for preparing students to contribute immediately to service delivery (Billett et al., 2013). Increasing healthcare demands and workforce shortages have further amplified its importance in producing skilled professionals (Priksat et al., 2019).

For health professional education, WIL is, in most cases, a mandatory requirement for course accreditation to ensure that graduates acquire the practical skills and competencies necessary for safe and effective practice, which traditional classroom learning alone cannot provide (Cooper et al., 2010). For instance, disciplines such as Nursing, Physiotherapy, Clinical Exercise Physiology and Occupational Therapy are mandated to incorporate WIL in the form of clinical placements as part of their curriculum. This allows students to engage directly with patients and healthcare teams, thereby gaining the hands-on experience needed for professional readiness (Rodger et al., 2008). These requirements reflect the importance of immersive, real-world training for preparing graduates to navigate complex healthcare environments and respond to the dynamic needs of patient care (Health Workforce Australia [HWA], 2013).

Clinical placements remain the predominant WIL strategy in the allied health disciplines, offering immersive experiences crucial for developing clinical competencies (Sheepway et al., 2013). A traditional clinical placement model sees students located external to the university in established healthcare organisations such as hospitals, where services are coordinated around the practitioners who lead them (McCloughen et al., 2020; Patrick et al., 2008). When placed within established healthcare organisations, students gain exposure to authentic clinical environments, beginning with observation and gradually transitioning to more hands-on roles (Harrison et al., 2020; Patrick et al., 2008).

Quality clinical placements depend on effective supervision, diverse learning opportunities, supportive environments, clear communication, collaboration, and sufficient resources (Zhang et al., 2022). Diverse learning opportunities are gained through exposure to various clinical cases and hands-on experiences that align with students' educational needs

and career goals (Channa et al., 2024; Green et al., 2022). Furthermore, a positive, inclusive environment that values education is essential for fostering comprehensive learning (Zhang et al., 2022; Zulu et al., 2021).

Achieving quality placements is often hindered by various challenges. Variability in standards across institutions and healthcare settings creates inconsistent student experiences, while occupational stress and workplace incivility can disrupt the learning environment (Galletta et al., 2017; Wolfgang et al., 2019). Although rural placements offer unique opportunities to engage with diverse clinical cases, they also present distinct challenges, such as inadequate access to resources and facilities, limited clinical diversity, and insufficient support for learners (Koedyk et al., 2021; Webster et al., 2010). Furthermore, successful clinical placements in authentic healthcare environments require both the capacity and willingness of the healthcare workforce to supervise students effectively, ensuring the achievement of desired learning outcomes (Martin et al., 2022; Sealey et al., 2015).

Universities face challenges in sourcing and securing clinical placements for health professional students (Frakes et al., 2011; McAllister et al., 2013). Traditional healthcare settings can struggle to accommodate students due to operational pressures, with supervisors citing concerns with workload, availability of resources, and the time commitment required to train students (Frakes et al., 2011; Sealey et al., 2015). Recent studies suggest that healthcare environments and supervisor perceptions are shifting, with students increasingly seen as making a tangible contribution to service delivery and, in some cases, viewed as an asset rather than a burden (Bourne et al., 2019). This reflects the evolving pressures of workforce sustainability and the growing recognition of students' value in addressing service gaps. Such changing perceptions strengthen the case for, and demonstrates a growing willingness to adopt, innovative models of clinical placement that can address earlier concerns about supervision and productivity raised in the literature. This evolution is consistent with broader industry and academic efforts to develop new clinical placement models and evaluation tools that improve supervision quality and sustainability (McAllister et al., 2018; Cooper et al., 2020; Siggins Miller Consultants, 2012). However, challenges do remain.

The added cost associated with some placement sites requesting payment for hosting students is also a concern for health disciplines and puts further strain on universities and their ability to secure quality placements for students (Bowles et al., 2014; Hughes & Desbrow, 2010; Patrick et al., 2008). As a result, innovative strategies to provide high-quality

student placements must be considered to ensure universities can continue providing work-ready graduates and remain competitive in today's higher education environment.

1.2 Student-led Healthcare Services as an Innovative Solution

Student-led Healthcare Services (SLHS) have gained traction for their potential to increase placement capacity, enhance student learning, and provide healthcare to underserved populations (Stuhlmiller & Tolchard, 2017). These models have been adopted across Europe, Australia, and other regions, with over 110 student-run free clinics operating in the United States as of 2014 (Seif et al., 2014; Stuhlmiller & Tolchard, 2015; Swartz, 2012). In Australia, universities have increasingly invested in SLHS, particularly in rural and regional areas where access to healthcare is limited (Larkins et al., 2014). These services provide health professional students with the opportunity to engage in clinical practice earlier and more frequently than traditional placements allow, fostering deeper experiential learning and preparing students to transition smoothly into professional practice upon graduation (Frakes et al., 2014; Nicole et al., 2016; Tokolahi et al., 2021).

Student-led Healthcare Services vary in structure, patient population, healthcare delivery, and financial models, ranging from free clinics to fee-based operations (Suen et al., 2020). Many operate within established facilities, integrating students into supervised multidisciplinary teams (Snowdon et al., 2017), while others collaborate with community organisations to address patient needs and ensure continuity of care (Bird et al., 2022; Hulme et al., 2024; Stuhlmiller & Tolchard, 2015). Beyond traditional healthcare environments, SLHS have also been established in educational settings, such as schools, where allied health students work alongside teachers and support staff to deliver services (Jones et al., 2015). Collectively, this diversity demonstrates the adaptability of SLHS across a wide range of contexts, including rural, urban, and international models of care (Snowdon et al., 2017; Suen et al., 2020).

Some SLHS are structured as student-run clinics without direct supervision, enabling students to provide services to disadvantaged populations autonomously (Peoples & Ubel, 2024). While these clinics offer critical healthcare services to underserved communities and allow students to develop independence in decision-making, the absence of structured supervision can lead to inconsistent healthcare quality (Simpson & Long, 2007; Smith et al.,

2014). Furthermore, students may face difficulties managing complex cases, potentially compromising patient safety and the educational value of the experience (Suen et al., 2020).

Despite their variations, SLHS share common goals, notably enhancing student learning through real-world clinical experiences, providing affordable or accessible healthcare to underserved populations, and fostering interprofessional collaboration among students from diverse health disciplines (Beckman et al., 2022). These models are valuable in regional, rural, and remote areas where healthcare professional shortages persist (Hulme et al., 2024; Liu, 2007). Additionally, exposing students to the distinct challenges of rural healthcare also increases the likelihood that students will choose to stay and work in these areas after graduation (Larkins et al., 2014).

1.3 Challenges Faced by Student-led Healthcare Services

While SLHS offer substantial benefits, they also present unique challenges related to clinical governance, sustainability, and educational consistency. Ensuring that students receive adequate supervision and services meet the same standards as traditional healthcare settings is essential for maintaining quality care and positive learning outcomes (Bennington, 2010; Flott & Linden, 2016). Additionally, ensuring educational consistency in clinical placement is essential to providing students with uniform learning experiences, meeting curriculum objectives, and maintaining high standards of competence across different healthcare settings (Birks et al., 2017).

Often structured around academic calendars, SLHS may result in patients encountering a rotation of students throughout their care period. This turnover can disrupt the continuity of care for patients, making it difficult to provide consistent, long-term treatment, particularly for those with chronic conditions requiring ongoing management (Bourne et al., 2019). Without robust governance structures, there is a risk that care provided by students may not meet the standards required in professional settings, potentially compromising patient safety and quality of care (Tokolahi et al., 2021). Moreover, students' varying levels of experience and competence can make it challenging to maintain a consistent quality of care across student clinical placements (Atakro et al., 2019; Simmons et al., 2009).

Financial viability is another critical challenge for SLHS (Frakes et al., 2014; Kent et al., 2014; Ojeda et al., 2014). Generally, SLHS require continuous funding, resources, and staffing to remain operational. Many SLHS operate in underserved or resource-poor regions, where funding is limited, and the financial model may rely on grants, donations, or minimal patient fees (Frakes et al., 2014; Peoples et al., 2024). Without a stable financial base, these services risk closure, disrupting student education and the communities that depend on these services for affordable healthcare (Nicole et al., 2016).

Ethical considerations surrounding the cost of SLHS are complex and have sparked debate among educators and healthcare professionals (Peoples et al., 2024). While some argue that charging patients for services provided by students undermines the educational purpose of these clinics, others contend that fees are necessary to cover operational costs and ensure the sustainability of the service (Min et al., 2023; Tokolahi et al., 2021). It has also been said that SLHS should prioritise education and community service, emphasising the role of the clinic as a learning environment rather than a revenue-generating entity (Peoples et al., 2024) and that the value received from such endeavours, far outweighs the cost (Mazander et al., 2024). These issues highlight the need for clear frameworks and guidelines to govern the operation of SLHS and ensure that educational and healthcare delivery goals are met (Jiang et al., 2024).

1.4 The Need for Comprehensive Evaluation of SLHS

Despite the growing implementation of SLHS, their evaluation remains limited, with research often focusing on specific outcomes (e.g. student satisfaction, clinical skill development) rather than their broader purpose and context (e.g. community health outcomes, interprofessional collaboration). Factors such as student satisfaction and clinical skill development have been previously explored but not the holistic impact of SLHS on community health, interprofessional collaboration, or comprehensive student learning outcomes. For example, a qualitative study of a regional Australian SLHS identified factors associated with student satisfaction, providing insights into patient experiences, but did not examine the clinic's overall impact on community health and student learning outcomes (Heales et al., 2021). Similarly, research on a UK-based SLHS explored students' perceptions of clinical skill development but did not evaluate the clinic's role in addressing community

health needs or fostering interprofessional collaboration (Wynne & Cooper, 2023). While reviews of SLHS models emphasise the importance of interprofessional education and collaboration, there is a clear need for more comprehensive evaluation approaches that account for both educational outcomes and community health benefits (Tokolahi et al., 2021). Addressing this gap will enable practical evaluation of SLHS across key dimensions, including student learning outcomes, patient health outcomes, and cost-effectiveness, ensuring their broader purpose is fully understood and optimised.

Evaluating student learning outcomes confirms the development of skills and competencies required for effective healthcare (Suen et al., 2020). This experiential learning is crucial for preparing future healthcare professionals to meet system demands. Comprehensive evaluations also need to highlight the impact of SLHS on patient care, particularly for underserved populations reliant on these services (Ouyang et al., 2013). Assessing the cost-effectiveness of SLHS supports program viability, demonstrating potential cost savings by reducing expensive healthcare interventions while improving outcomes (Stuhlmiller & Tolchard, 2018), aligning with overarching health system goals of balancing patient-centred care and fiscal responsibility (Berezowski et al., 2023).

Comprehensive evaluation strategies will enable universities to improve the quality of clinical placements and provide valuable insights into the broader impact of SLHS on the healthcare system (Jiang et al., 2024; Tokolahi et al., 2021). Evaluating the performance of SLHS is essential for ensuring that they fulfil their objectives in providing meaningful, high-quality learning opportunities for students (Jiang et al., 2024) while also delivering compassionate and quality care to patients (Gorrindo et al., 2014; Nuffer et al., 2012). By measuring educational outcomes and the standard of healthcare provided, SLHS can ensure they meet the dual goals of enhancing student learning and improving community health (Broman et al., 2022; Jiang et al., 2024; Tokolahi et al., 2021).

1.5 Evaluating Healthcare Performance

Healthcare evaluations are designed to assess multiple dimensions of healthcare delivery, with a strong focus on effectiveness, efficiency, and equity (Jiang et al., 2024; Lovaglio, 2012; Williams et al., 2016). Healthcare evaluations may assess responsiveness of systems, ensuring that patient care is delivered in a timely and culturally sensitive manner

(Abuosi et al., 2022; Reeve, et al., 2015). Evaluations may provide a comprehensive picture of how well a healthcare service functions in terms of improving health outcomes, maintaining efficient operations, and ensuring fairness and accessibility (World Health Organization [WHO], 2007). Elements such as health improvement and patient experience, cost and financial viability may also be considered (Frakes et al., 2014). Hence, to assess the multiple dimensions of healthcare performance when evaluating SLHS, it is essential to select an appropriate conceptual framework.

Several evaluation models have emerged as relevant when considering a suitable healthcare evaluation framework for SLHS. These frameworks can provide structured approaches to assess the quality, effectiveness, and viability of SLHS, ensuring that they meet the healthcare needs of the communities they serve. The Donabedian model offers a simple evaluation framework for assessing healthcare quality, across three key elements: structure, process, and outcomes (Donabedian, 1988). This model has been widely adopted in healthcare quality evaluations due to its systematic approach to understanding the various dimensions of care (Barry, 2017). However, several limitations of the model influence its effectiveness in evaluating healthcare services (Cohen & Shang, 2015; Hall et al., 2013). The unclear relationship between structure and process in the model limits its effectiveness in guiding evaluations, making it difficult to establish clear causal links between structural elements and healthcare processes (Cohen & Shang, 2015). Additionally, the model's emphasis on structure may oversimplify the complexities of healthcare delivery, highlighting the need for a more nuanced understanding of these interactions to enable comprehensive evaluations (Hall et al., 2013).

Quality Improvement (QI) frameworks, such as the Plan-Do-Study-Act (PDSA) cycle, can be effectively utilised by SLHS to implement changes and evaluate their impact on healthcare delivery (Reid et al., 2024). These frameworks promote ongoing assessment and adaptation, enabling student-led initiatives to address the evolving needs of the populations they serve (Shea et al., 2018). These models offer flexibility in testing and refining interventions, integrating insights from local improvement efforts, and seamlessly transitioning from localised QI initiatives to broader applications (Portela et al., 2015). However, the generalisability of findings is challenging due to the absence of a structured explanation of change mechanisms, limited standardisation, and insufficient clarity on key

areas requiring measurement, which limit the effectiveness of these models in evaluation (Portela et al., 2015).

Various evaluation frameworks have been proposed to evaluate sustainability of healthcare programs, emphasising the importance of long-term viability and impact (Braithwaite et al., 2020; Lennox et al., 2018). Theoretically based evaluation frameworks guide the assessment of healthcare program viability (Braithwaite et al., 2020), which can be beneficial for SLHS for ensuring that their initiatives are viable and managed in a way that offers ongoing services to the community. However, their limitations include overemphasising long-term outcomes over immediate impacts, high resource demands, and limited adaptability to dynamic settings (Walugembe et al., 2019). Additionally, their theoretical focus often lacks practical tools for real-world application and there are constraints in defining and measuring relevant metrics, such as health outcomes, which are critical to comprehensive evaluation (Hall et al., 2022; Lennox et al., 2018).

In Australia, the Australian Health Performance Framework (AHPF) supports system-wide reporting on population health and healthcare performance, the assessment and evaluation of value and sustainability, as well as to support the identification of priorities for improvement and development (National Health Information and Performance Principal Committee [NHIPPC], 2017). The AHPF draws upon several healthcare evaluation frameworks and requires evaluation to occur across the totality of healthcare services to inform judgment on the performance of the Australian Healthcare system as a whole (Dixit & Sambasivan, 2018). Conversely, many existing frameworks provide valuable guidance for evaluating specific aspects of healthcare delivery, by focusing on distinct areas, limiting their ability to comprehensively assess healthcare operation and delivery to achieve whole system reporting requirements (Braithwaite et al., 2020; Walugembe et al., 2019).

1.6 The Triple Aim

The Triple Aim is a conceptual framework offering a systematic approach to evaluating healthcare services that may be appropriate for the evaluation of SLHS. The Triple Aim framework, initially introduced by Berwick et al. (2008), provides an integrated approach to simultaneously improving health outcomes, enhancing patient experiences, and reducing healthcare costs. The Institute of Healthcare Improvement (IHI) later adopted this

concept into a performance framework to guide healthcare systems for improving quality while managing costs (Stiefel & Nolan, 2012). By encouraging healthcare providers and systems to simultaneously target these three areas (Figure 1), this framework ensures a balanced and sustainable approach to healthcare delivery. The IHI Triple Aim's focus on patient-centred care, population health, and cost-efficiency makes it particularly relevant for evaluating both traditional healthcare systems and alternative models of care (Kokko, 2022). Student-led Healthcare Services offer alternate models of care, as they aim to provide both high-quality, affordable care and valuable learning experiences for students (Jiang et al., 2024; Tokolahi et al., 2021), often to meet the needs of underserved populations (Stuhlmiller & Tolchard, 2017). Hence, the Triple Aim framework offers an important performance framework to evaluate whether SLHS achieve that purpose.

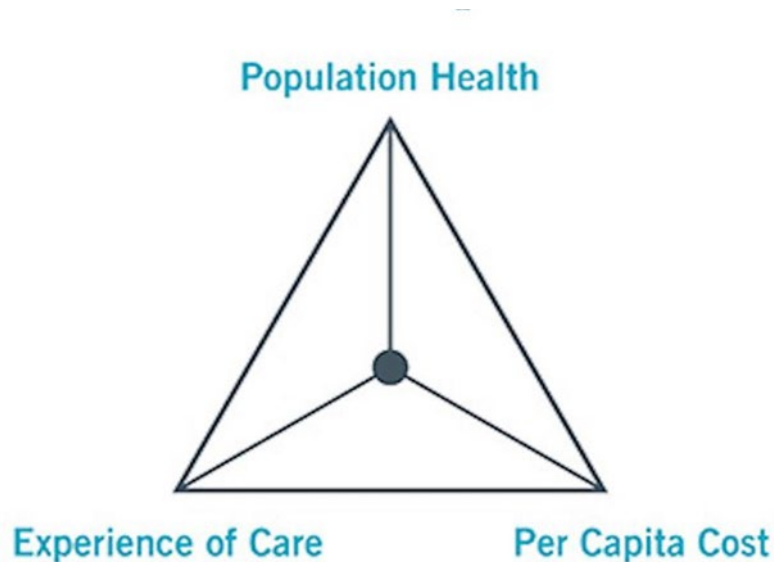


Figure 1. The IHI Triple Aim from “A Guide to Measuring the Triple Aim: Population Health, Experience of Care, and Per Capita Cost”, by M. Stiefel & D. Nolan, 2012, p. 1. Copyright 2012 by the Institute for Healthcare Improvement.

1.7 Strengths and Limitations of the Triple Aim

The IHI Triple Aim offers a framework for evaluating healthcare systems across three core domains that operate in unison: improving population health, enhancing the experience of care, and managing per capita costs (Stiefel & Nolan, 2012).

To enable meaningful evaluation using the Triple Aim, the IHI outlines a series of core measurement principles. These include identifying a defined population of focus, collecting data longitudinally to observe trends and improvements, distinguishing between outcome and process indicators, and using benchmark data to inform comparison and quality improvement (Stiefel & Nolan, 2012). The IHI's recommendations align with broader standards for healthcare quality measurement, such as those endorsed by the National Quality Forum (NQF), which call for relevance, rigour, and system-wide applicability (NQF, 2016).

Each Triple Aim domain has its own hierarchy of metrics. Population health outcomes are grounded in a conceptual model by Evans and Stoddart (1990), which frames health as influenced by a continuum of determinants, from upstream factors like behaviours and social environments to downstream measures like functional health status and life expectancy. The patient experience domain prioritises individual perspectives on care quality, while also incorporating established system-level benchmarks such as safety, equity, and responsiveness (Martin et al., 2016). Cost is measured from multiple angles, capturing not only the cost to service providers, but also the economic impact on patients and system intermediaries, including insurers and funders (Stiefel & Nolan, 2012).

Despite its strengths, the Triple Aim does not directly account for factors that are central to education-based models of healthcare delivery, such as SLHS. Notably, it lacks explicit indicators for evaluating educational quality, student learning outcomes, and supervision; elements critical to ensuring SLHS fulfil their dual role in providing both healthcare and clinical education (Tokolahi et al., 2021; Jiang et al., 2024). Additionally, the provider experience, in terms of workload and satisfaction, is not addressed within the original framework, despite growing recognition of its importance in workforce retention and system sustainability (Bodenheimer & Sinsky, 2014; Sikka et al., 2015; West, 2015).

While the Triple Aim remains a valuable starting point for considering evaluation in SLHS, its original design focuses solely on healthcare service delivery. In the context of SLHS, where placements serve both educational and healthcare functions, it is necessary to adapt or extend this framework to account for educational outcomes and placement-specific factors.

1.8 Evaluating Clinical Placement

While evaluating healthcare performance is important for ensuring quality care delivery, evaluating clinical placements is equally critical in allied health education. This ensures the quality and effectiveness of the experiential learning that students undergo in real-world clinical settings (Jones et al., 2022). Evaluation of clinical placements has evolved significantly over the past century, influenced by changes in educational theories, healthcare needs, and regulatory requirements. The emergence of competency-based education marked a significant shift, focusing on specific skills and knowledge students must acquire when undertaking clinical placement (Ross et al., 2018). This shift highlighted the importance of assessing the effectiveness of clinical training programs (Ragsdale et al., 2020), driving an intensified focus on quality and measurable outcomes within clinical education.

Achieving quality in clinical placements is highly sought after, with the development of comprehensive best practice guidelines and frameworks designed to ensure quality in clinical education (Siggins Miller Consultants, 2012). A significant contribution to this effort in Australia was the 2012 report *Promoting Quality in Clinical Placements: Literature Review and National Stakeholder Consultation*, commissioned by Health Workforce Australia (HWA). This report drew upon an extensive review of over 500 records and consultations with 19 stakeholders from diverse sectors and regions across Australia. It analysed 23 existing quality frameworks, including ten international and 13 Australian, to determine their strengths and limitations. While no single framework comprehensively addressed all necessary elements, the Best Practice Clinical Learning Environments (BPCLE) framework, developed by Darcy Associates (2013a) for the Victorian Government, was identified as the most robust, with advanced implementation and evaluation features (Siggins Miller Consultants, 2012).

Among the findings was the identification of effective supervision as a critical enabler of placement quality. Subsequent adaptations to the BPCLE framework have integrated supervision as a core element (McAllister et al., 2018), reflecting recommendations that recognised supervision as essential to a quality placement experience (Cusick et al., 2014). Empirical research has further reinforced this position, demonstrating that high-quality supervision enhances learning outcomes, improves student satisfaction, and contributes to overall placement effectiveness (Borralló-Riego et al., 2021; Farnan et al., 2012; Zhang et al.,

2022). Figure 2 illustrates the key elements of quality clinical placements described in the adapted BPCLE framework.



Figure 2. Adapted BPCLE Framework from “Developing Measures of Placement Quality in Allied Health, Dentistry, Medicine, and Pharmacy,” by L. McAllister, S. Nagarajan, L. Scott, L. Smith, & K. Thomson, 2018, *International Journal of Practice-Based Learning in Health and Social Care*, 6(2), p. 33. Copyright 2018 by the authors. Licensed under CC BY-NC 4.0.

Due to their dual purpose, SLHS have unique needs in clinical placement evaluations. Evaluating SLHS requires a framework that captures both the healthcare and educational outcomes, ensuring that student learning, patient care, system and program costs are addressed. The adapted BPCLE framework does provide a structured approach for evaluating clinical placements by focusing on key areas of quality such as effective supervision, student support, diversity of learning experiences, and resource availability (O'Sullivan et al., 2021). However, despite being well regarded, the BPCLE does fall short in addressing the broader

goals of SLHS, highlighting the need to expand the BCPLP framework to include patient care outcomes and the cost of healthcare delivery and clinical placement.

1.9 Thesis Aim

The aim of this thesis was to explore and strengthen current approaches to evaluating SLHS, recognising their dual roles as providers of healthcare and as clinical placement environments. Central to this objective was a commitment to methodological flexibility and the generation of actionable, stakeholder-informed knowledge (Morgan, 2007; Shannon-Baker, 2023). This research addresses current gaps in how SLHS are evaluated, seeking to identify meaningful, stakeholder-informed indicators and develop a conceptual and practical framework to support comprehensive and consistent evaluation. This aim is explored through two key perspectives:

1.9.1 Perspective One: SLHS as Providers of Healthcare

Research Question 1: What are the current practices in evaluating healthcare service performance in SLHS?

This question focuses on understanding how SLHS are evaluated as healthcare providers and whether these evaluations align with the Triple Aim framework, particularly in terms of patient outcomes, care experience, and cost. It forms the foundation for identifying gaps in current evaluation strategies for SLHS in the context of healthcare delivery.

1.9.2 Perspective Two: SLHS as Providers of Clinical Placement

Research Question 2: What is important to measure when evaluating allied health clinical placement performance?

Research Question 3: What are the current practices in evaluating clinical placement performance in SLHS?

These questions explore which areas stakeholders consider most important to evaluate within SLHS as placement environments, and whether current evaluation practices adequately reflect those priorities. Together, they address both what should be measured and how those measures are currently implemented.

1.10 Thesis Structure

The structure of this thesis reflects the alignment between its overarching aim, research questions, dual perspectives, and associated methods. This alignment is visually represented in Figure 3.

Chapter 2 applies a structured review using the Triple Aim framework to identify gaps in SLHS evaluation (Berwick et al., 2008; Biesta, 2010); Chapters 3–5 utilise a modified Delphi study to build consensus through qualitative and quantitative convergence (Morgan, 2007; Patton, 2015); Chapter 6 employs a Knowledge, Attitudes and Practices (KAP) survey to explore the practical relevance of the Delphi findings (Andrade et al., 2020; Zarei et al., 2024); and Chapter 7 synthesises all prior insights to develop the HELP-C Guiding Framework, a conceptual but practical, theory-informed tool for evaluating SLHS (Shannon-Baker, 2023; Teddlie & Tashakkori, 2009).

While the research questions and methods provide a structured approach to investigating SLHS, the motivation for this study stems from a combination of professional experience in healthcare delivery, leadership and clinical education within SLHS.

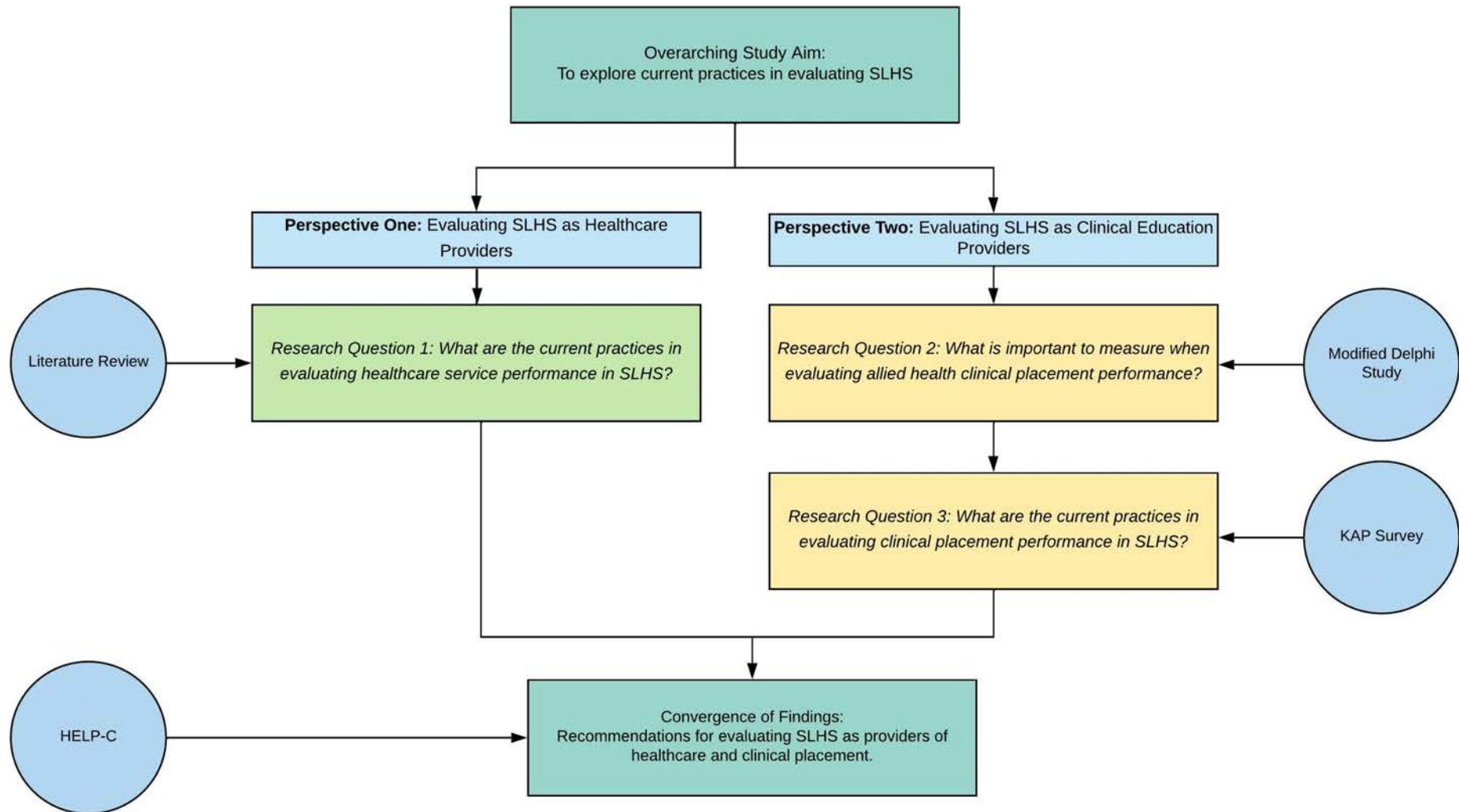


Figure 3: Overview of Research Questions, Corresponding Methods, and Alignment with the Thesis Aim and Perspectives

1.11 Researcher's Perspective and Background

My academic and professional journey has profoundly shaped my interest in evaluating SLHS. With over a decade of experience developing and operating SLHS within a university-supported setting, I gained practical insights into the complexities of integrating healthcare delivery and clinical education. This dual role informed my understanding of the challenges and opportunities these models present for both student learning and community service delivery.

My background as a clinical exercise physiologist and former health professional student has shaped my approach to health education and service delivery. My experiences have highlighted the importance of experiential learning, structured supervision, and interdisciplinary collaboration. They also strengthened my commitment to creating high-quality clinical education environments that prepare students for real-world challenges while delivering meaningful care.

Throughout my career, I have faced recurring questions and growing pressure to demonstrate the performance and value of SLHS in terms of their success, quality, and long-term viability. Because SLHS models pursue dual objectives, healthcare delivery and clinical education, traditional evaluation frameworks, which typically assess each domain in isolation, have proven inadequate. This practical dilemma motivated my current research and this thesis, focusing on developing an evaluation framework tailored to the unique needs of SLHS.

This work is grounded in a deep commitment to improving healthcare access and fostering positive learner outcomes. By drawing on my experience in health professional education and healthcare leadership, this thesis brings together practical and scholarly insights to support the future development and evaluation of SLHS. Equipping educators and researchers with appropriate tools will strengthen SLHS as viable models for addressing health workforce and service delivery challenges.

1.12 Research Significance

The significance of this research lies in its potential to create a robust, multi-dimensional approach to SLHS evaluation, considering the complexity of student clinical placement outcomes, patient care, and cost. Research findings will significantly contribute to academic knowledge and practical applications in evaluating SLHS.

Academically, the research addresses a critical gap in the literature by providing comprehensive evaluation recommendations that will be the first to integrate healthcare delivery and educational outcomes. Policymakers will benefit from these evidence-based recommendations, identifying key evaluation measures that can be used to understand cost-effectiveness, as well as provide an approach for allocating resources and supporting SLHS as a critical component of national healthcare strategies (Gizaw et al., 2022).

From an educational perspective, this research will inform best clinical placement design and evaluation practices. By identifying areas of measurement associated with clinical placement, educators can enhance student learning experiences, ensuring graduates who had placement within SLHS are well-prepared for real-world healthcare challenges (Channa et al., 2024; Ross et al., 2018). For placement coordinators and other stakeholders, the findings provide actionable insights into potential challenges to providing good clinical placement, helping education institutions improve the quality and consistency of clinical placements and fostering environments that optimise student learning and placement experience (Channa et al., 2024).

This research contributions will ensure a standardised approach to evaluation that supports SLHS performance as both educational platforms and healthcare providers, addressing gaps in service delivery while advancing health professional education.

Chapter 2: Measuring Health Outcomes, Experience of Care and Cost of Healthcare in Student-led Healthcare Services: A Literature Review

Building on the need for comprehensive evaluation outlined in Chapter 1, Chapter 2 presents a systematic literature review to examine how Student-led Healthcare Services (SLHS) have been evaluated to date. It explores the extent to which existing SLHS evaluations align with the Triple Aim framework. The review identifies gaps and inconsistencies that inform the subsequent development of a new, integrated evaluation framework. This chapter focuses on evaluating SLHS as healthcare providers and addresses Research Question 1, as illustrated in the overall thesis structure (Figure 1).

Presented in this chapter is the original review, conducted in 2021 and published in 2022. An updated version of the review, completed in 2025, is also included to reflect the most current evidence.

Chapter 2 is based on the following published work:

Simmons, L. M., Callander, E., Barker, R., & Barnett, F. (2022). Measuring health outcomes, experience of care and cost of healthcare in student-led healthcare services: A literature review. *Focus on Health Professional Education*, 23(1), 37–64.

<https://doi.org/10.11157/fohpe.v23i1.389> (see 10.1 Appendix 1 for publication).

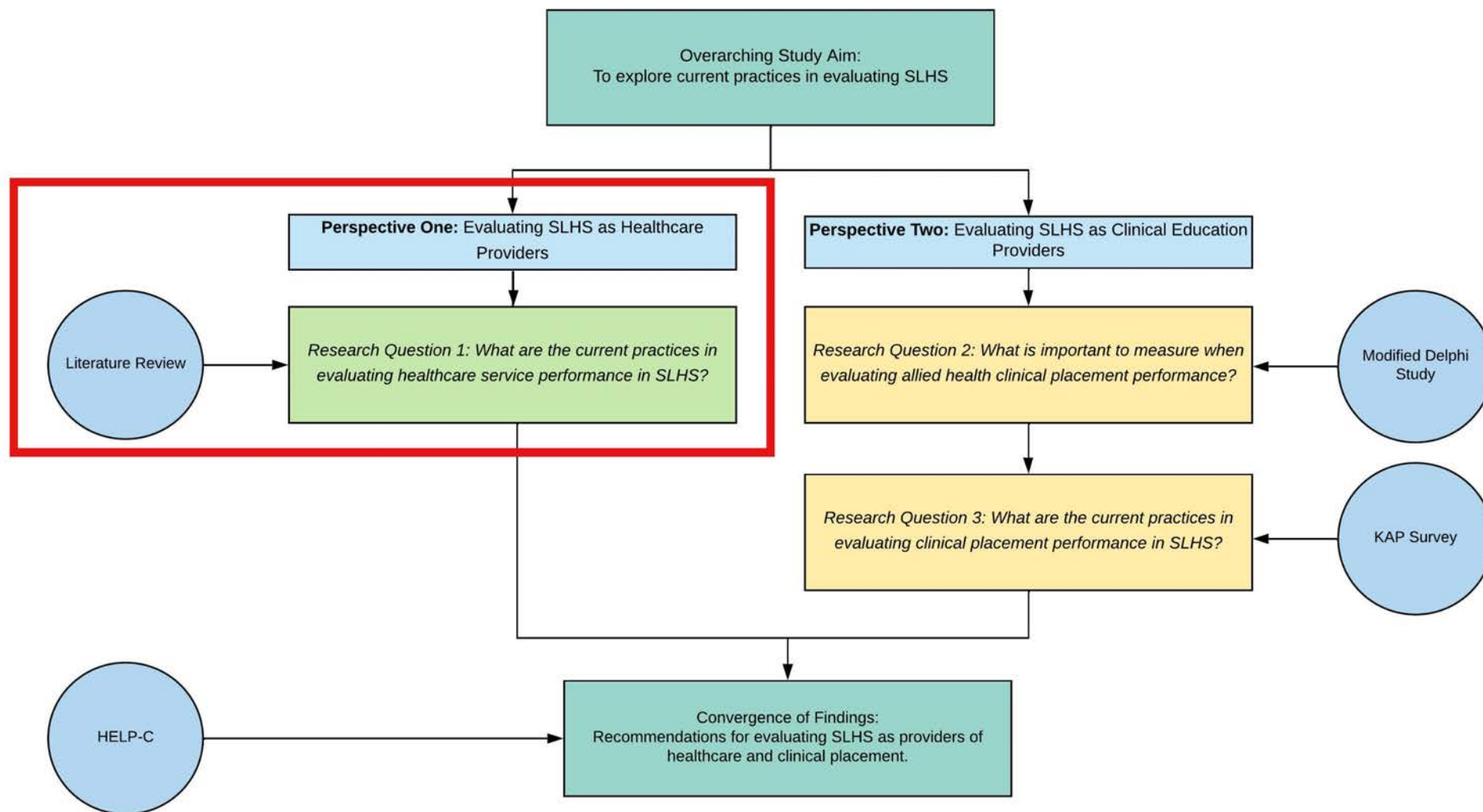


Figure 1. Thesis Structure Highlighting the Focus of Chapter 2 and Research Question 1

2.1 Abstract

Introduction: In Student-led Healthcare Services (SLHS), health students take responsibility for the management and delivery of health services as part of clinical training. Like all healthcare services, SLHS need to be evaluated to ensure they provide high quality, safe and cost-effective services. The aim of this literature review was to understand how SLHS have been evaluated to date and to assess alignment of previous evaluations with the Triple Aim framework. The Triple Aim is a conceptual framework offering a systematic approach to evaluating healthcare services that may be appropriate for evaluation of student-led services.

Methods: Electronic databases were searched for articles describing a SLHS and were screened for studies that evaluated the impact of a student- led healthcare service on patient outcomes. Critical appraisal was informed by Stiefel and Nolan’s (2012) IHI white paper A Guide to Measuring the “Triple Aim”, and each article was appraised against the Triple Aim measurement principles and dimensions of care.

Results: Fourteen of 211 identified articles met the inclusion criteria. All 14 studies met the Triple Aim measurement principles of “a defined population”, “gather data over time” and “distinguish between measures”, while only eight of the 14 studies achieved “comparison data”. All 14 studies measured at least one or more of the Triple Aim dimensions.

Conclusions: There was little consistency across the evaluations of SLHS, limiting the extent to which the benefits of SLHS can be shown to be a valuable resource to the healthcare system. Further investigation is required to determine a suitable evaluation framework for SLHS.

2.2 Introduction

In Australia, there are hard to reach and underserved communities who experience inadequate access to healthcare (Stuhlmiller & Tolchard, 2018). People living in rural and remote areas of Australia generally experience lower life expectancy, higher rates of disease and injury and poorer access to healthcare services than people living in metropolitan areas

of Australia (Australian Institute of Health and Welfare [AIHW], 2020). There are growing concerns over differences in health outcomes for these communities, and there is a need to identify unique models of healthcare delivery that will address health disparities (Kenny et al., 2013). Student-led Healthcare Services (SLHS) are one possible solution to an “increasingly fractured health system, rising costs, huge needs of underserved populations, and limited access to care” (Stuhlmiller & Tolchard, 2018, p. 193).

In SLHS, health students take responsibility for the management and delivery of healthcare services as part of their clinical training (Stuhlmiller & Tolchard, 2018; Suen et al., 2020). Student-led Healthcare Services vary from other forms of service-based learning in that they are purposely designed to provide continuous healthcare services to the community. Exposure to real-life clinical environments through clinical placement is integral to preparing healthcare students for practice (Atakro et al., 2019).

Authentic environments such as those provided within SLHS allow students to improve their understanding of the social determinants of health and other barriers to healthcare access (Rockey et al., 2021), while contributing to the development of competency within the healthcare systems they intend to practise in (Froberg et al., 2018). However, to substantiate SLHS as quality providers of clinical education and promote their use as clinical placements, SLHS must be first substantiated as quality providers of healthcare.

Another purpose of SLHS is to fill the gaps in healthcare service provision in areas where attracting healthcare professionals may be difficult (Stuhlmiller & Tolchard, 2015). This is crucial in regional, rural and remote areas, where retaining healthcare professionals with varying levels of expertise is difficult, supporting the need for healthcare systems to move away from traditional models of healthcare and adopt innovative systems of healthcare practice (Panzera et al., 2016). Despite the potential benefits that SLHS can provide to underserved communities, there are challenges in successfully establishing and operating these unique healthcare services. Primarily, students on placement within SLHS may not have the knowledge or experience necessary to care for patients effectively (Atakro et al., 2019; Simmons et al., 2009). However, when a student is provided with support and gradual exposure to the healthcare environment, competence can improve, influencing the overall quality of the services they provide (Manoochchetri et al., 2015; Simmons et al., 2009).

To justify and validate SLHS as both providers of care and clinical education, evaluation of SLHS is growing. Initial studies have found that SLHS contribute to student learning and result in health improvements and patient satisfaction (Clark et al., 2014; Ouyang et al., 2012; Schutte et al., 2018). However, whether SLHS produce equivalent health outcomes when compared to their professional counterparts is still unknown, with many studies lacking the research design to answer this question (Clark et al., 2014).

Student-led Healthcare Services also face challenges of financial viability (Frakes et al., 2014; Kent et al., 2014; Ojeda et al., 2014). A potential risk to the sustainability of SLHS is the ongoing need to demonstrate their feasibility to funders, with a successful bid being sensitive to stakeholders' powers and priorities (Frakes et al., 2014). Threats to service continuity are a concern for under-resourced regions relying on SLHS. Accordingly, consideration must be given to financial sustainability in the ongoing management of SLHS. Like all healthcare services, SLHS should also be subject to rigorous performance assessment through audit and evaluation processes to ensure services provided to the community are delivered at a professional standard. To ensure SLHS maintain high standards of care and operation, an evaluation framework used to ensure quality of mainstream healthcare services is also applicable to SLHS.

The Institute of Healthcare Improvement (IHI) adopted the "Triple Aim" as a performance framework to reinvigorate a focus on quality in healthcare (Stiefel & Nolan, 2012) and is an overarching framework that guides healthcare services on what is important to measure when evaluating healthcare. The Triple Aim includes three domains of measurement: population health, experience of care and per capita cost (Stiefel & Nolan, 2012). To measure population health, the Triple Aim stipulates factors influencing health as either upstream or downstream determinants—with individual factors such as behavioural and psychological factors describing upstream factors, disease burden and health and function demonstrating more intermediate outcomes and quality of life (QoL) and mortality demonstrating more downstream health outcomes (Evans & Stoddart, 1990). To measure experience of care, the Triple Aim promotes the patient as being best placed to assess their experience of care and recommends the use of patient satisfaction surveys looking at likelihood to recommend, quality and satisfaction of healthcare received (Stiefel & Nolan, 2012). To assess experience of care from a provider's perspective, the Triple Aim promotes using the Institute of Medicine's (IOM) (2001) six aims of improvement,

focusing on safe, effective, patient-centred, equitable, timely and efficient healthcare.

The Triple Aim considers three perspectives when measuring per capita cost: the supply lens (hospitals, community healthcare services, etc.), the demand lens (consumers and/or purchasers of services) and the intermediary lens (health insurers). The summation of costs from all three lenses is the total cost of care (Stiefel & Nolan, 2012). The Triple Aim framework allows different healthcare services to use different methods of evaluation to achieve the Triple Aim while providing consistent information about healthcare service performance. The benefit of using the Triple Aim framework in comparison to other approaches to healthcare service evaluation is that it can be applied across a healthcare system, providing opportunities for comparison regardless of service structure and therapeutic focus. Additionally, the Triple Aim has been operationalised within healthcare services across the United States of America, the United Kingdom, Canada, Germany, Spain, New Zealand and Australia (IHI, 2017; Obucina et al., 2018), supporting its international relevance and allowing comparison of healthcare services and systems across countries.

A common aim of SLHS is to support healthcare systems in meeting the needs of underserved populations (Stuhlmiller & Tolchard, 2018). To prove their legitimacy as authentic healthcare providers, SLHS need an appropriate evaluation framework, focusing on healthcare quality, patient experience and cost effectiveness (Clark et al., 2014; Frakes et al., 2014; Kent et al., 2016; Simmons et al., 2009). The Triple Aim is a framework that is designed to address these identified needs of SLHS through its assessment of health outcomes, patient experience and cost of healthcare, enabling comparison between services and providing evidence of their true impact within the healthcare system.

This literature review aims to determine the extent to which the evaluation of SLHS currently aligns with the recommendations of the IHI Triple Aim of Healthcare Improvement.

2.3 Methods

2.3.1 Search Strategy

Three databases were searched using Ovid Medline, Cumulative Index to Nursing and Allied Health Literature (CINAHL) and Scopus from inception to August 2021. The development of the search strategy was undertaken by one author (LS) with the guidance of an independent research librarian. A combination of subject headings (MESH terms) and keywords were used in each search. Search terms were divided into three groups: the type of healthcare service (e.g., student-led, student-assisted), study design (e.g., evaluation study) and study outcome measures (e.g., health outcomes, patient experience, cost of healthcare). The Boolean phrase “AND” was used between groups and the phrase “OR” was used within groups. Search results were collated and duplicates removed (see 10.1 Appendix 1: Literature search strategy). Additional articles were identified through pearling, whereby citations and reference lists of included studies were scanned to identify studies for inclusion. One reviewer applied the search strategy and screened titles (LS). Abstracts and full texts were reviewed by authors (LS, RB, EC) to identify studies for inclusion. An independent reviewer was also enlisted to ensure consensus against the eligibility criteria.

2.3.2 Study Selection

Studies that met the inclusion criteria were limited to those describing established SLHS providing services to the community on an ongoing basis; articles applying measures that align with the Triple Aim domains (i.e., health outcomes, patient experience and cost effectiveness), even if the Triple Aim framework was not explicitly referred to; and those that used either a pre-post intervention design or a comparative analysis as their method to evaluating outcomes (see 10.1 Appendix 1: Student-led Healthcare Service evaluations inclusion criteria).

2.3.3 Critical Appraisal

The Triple Aim framework was chosen to guide the critical appraisal due to its alignment with the evaluation needs of SLHS. The methodology of each study was assessed using a critical appraisal tool (CAT) that was developed specifically for this review and based on Stiefel and Nolan’s (2012) IHI White Paper: A Guide to Measuring

the “Triple Aim” and uses a similar approach to critical appraisals conducted by Prior et al. (2014) and Obucina et al. (2018) (see 10.2 Appendix 2: A Critical Appraisal Tool for assessing health service evaluations using the Triple Aim Framework). The critical appraisal tool assessed each article based on its ability to achieve the Triple Aim measurement principles of “defining the population”, “gathering data over time”, “distinguishing between measures” and incorporating “comparison data”, in addition to the Triple Aim dimensions of “population health”, “experience of care” and “per capita cost”. One reviewer (LS) completed the critical appraisal, with additional reviewers (RB, EC, FB) contributing to the overall analysis and conclusions of the appraisal.

2.3.4 Data Extraction

Data extraction involved use of a review matrix where one reviewer (LS) extracted data from the included studies and additional reviewers (RB, EC, FB) confirmed the accuracy of the data. Reviewers deliberated regularly throughout the data extraction phase, re-evaluating and amending review matrices to ensure the accuracy of the data extracted.

Data synthesis and critical appraisal also followed a process of continual review to ensure the resulting outcome and recommendations remained true to the overall aims of the literature review. Table 1 summarises characteristics of the included studies.

Table 1. *Study Characteristics*

Author	Study Type	Student Profession/s	No. of Patients	Type of Service/Intervention
Adams et al. (2015)	Pre and post intervention measures; comparative analysis	Pharmacy	200	A student-led pharmacy intervention based inside a professionally led general practice in Norwich, United Kingdom; third-year pharmacy students from the University of East Anglia conducted supervised medication reviews for patients with type 2 diabetes mellitus in primary care settings.
Butala et al. (2013)	Comparative analysis	Pre-clinical health professions	469	HAVEN Free Clinic, a student-led, free clinic affiliated with local university & community health centre located in New Haven, Connecticut, USA; provides uninsured adults with primary care, wellness education and assistance in securing healthcare; implemented a student medical records specialist role to improve service's adherence to national preventative service guidelines.
Clark et al. (2014)	Comparative analysis	Medical	43	Jackson Free Clinic (JFC), a student-led, free clinic located in Jackson, Mississippi, USA; provides care to uninsured, unemployed and homeless patients; student services involve providing patient interviews and physical exams, deliberation at the team level and developing treatment plans.
Gorrindo et al. (2014)	Pre and post intervention measures	Medical	45	Shade Tree Clinic, a student-led, free clinic affiliated with Vanderbilt University School of Medicine, located in Nashville, Tennessee, USA; provides medications, laboratory services, immunisations, social services and disease management to uninsured and underserved patients.
Lawrence et al. (2015)	Comparative analysis	Nurse practitioner and medical	127	Case Western Reserve University (CWRU) student-led healthcare service; free clinic affiliated with CWRU School of Medicine, located in Cleveland, Ohio, USA; provides acute care services to the underserved populations.

Measuring Performance in Student-led Healthcare Services

Lee et al. (2017)	Pre and post intervention measures	Medical	Not reported	The Keeping Neighbors in Good Health Through Service (KNIGHTS) Clinic, a student-led, free clinic coordinated and staffed by medical students from the University of Central Florida, providing services to the underserved community of Orlando, Florida, USA.
Liberman et al. (2011)	Comparative analysis	Medical	49	The East Harlem Health Outreach Partnership (EHHOP) student-led, free clinic, affiliated with Mount Sinai School of Medicine, located in New York City, USA.
Mann et al. (2019)	Comparative analysis	Medical	79	Provides primary healthcare and mental healthcare for highly disadvantaged residents, predominantly indigent, immigrant, Hispanic and uninsured; offers both a primary care (PC) clinic and a mental health (MH) clinic.
Martin et al. (2015)	Pre and post intervention measures	Pharmacy	48	Penobscot Nation Health Centre, a student-led service within established centre, affiliated with Husson University School of Pharmacy, located in Bangor, Maine, USA; provides diabetes management services.
Meek et al. (2013)	Comparative analysis	Medical and nursing	734	Dandenong Hospital Emergency Department (ED), a student-led healthcare program affiliated with Monash University, located in Melbourne, Victoria, Australia; student teams manage four ED beds.
Nuffer et al. (2012)	Pre and post intervention measures	Pharmacy	417	Twelve student-led healthcare service sites affiliated with University of Colorado, located in rural Colorado, USA; provides self-care management education to patients with diabetes.
Stuhlmiller & Tolchard (2018)	Comparative analysis	Student professions not defined	2,086	A student-led healthcare service serving a population living in an underserved region located in West Tamworth, New South Wales Australia; provides primary health, social care, health education, harm minimisation and mental health services.

Measuring Performance in Student-led Healthcare Services

Thakkar et al. (2019)	Pre and post intervention measures	Medical	796	The Crimson Care Collaborative (CCC), a Harvard Medical School-affiliated network of seven student-led healthcare services providing after hours primary care to residents in Boston, Massachusetts, USA.
Wahle et al. (2017)	Pre and post intervention measures; comparative analysis	Medical	64	The Indiana University Student Outreach Clinic (IUSOC), a student-led free clinic providing services to Indianapolis, Indiana, USA; allows professional students training in pharmacy, law, dentistry, social work, physical therapy, occupational therapy, public health and nursing through contributions in patient care.

2.4 Results

The database and pearling search generated 211 articles, with 105 full texts reviewed (Figure 2). Fourteen articles met the inclusion criteria. Eleven studies were conducted in the United States (Butala et al., 2013; Clark et al., 2014; Gorrindo et al., 2014; Lawrence et al., 2015; Lee et al., 2017; Liberman et al., 2011; Mann et al., 2019; Martin et al., 2015; Nuffer et al., 2012; Thakkar et al., 2019; Wahle et al., 2017), two studies were conducted in Australia (Meek et al., 2013; Stuhlmiller & Tolchard, 2018) and one study was conducted in the United Kingdom (UK) (Adams et al., 2015). Study design and intervention characteristics are shown in Table 1.

2.4.1 Alignment with Triple Aim Measurement Principles

All 14 studies focused on evaluating outcomes of a sub-population, which was defined either as the local population in which the healthcare service was located or by a specific health condition/disease (Table 2). Sample sizes in the included studies were not calculated statistically to determine power. Instead, sample size was commonly determined as all patients receiving care from the healthcare service, whether that was calculated at a single time-point (e.g., all patients of the service up until a point in time) or over a specified period (e.g., all patients between 2009 and 2016) (Table 2). Mann et al. (2019) reported broadening their inclusion criteria to increase power however did not include a power calculation or a population size required to be met. Being a pilot study, Adams et al. (2015) did not undertake a power calculation however, instead, calculated sample size through estimating the effect of the intervention based on 95% CI and difference in means of the continuous variable (i.e., glycosylated hemoglobin A1c (HbA1c)) between intervention and control groups. Additionally, Lee et al. (2017) did not provide clear information about the number of patient encounters reviewed when analysing patient visit times in their study.

Data in included studies were gathered over different periods using different study methods (Table 2). Eight of the 14 studies gathered data by analysing patient records retrospectively (Butala et al., 2013; Gorrindo et al., 2014; Liberman et al., 2011; Mann et al., 2019; Meek et al., 2013; Stuhlmiller & Tolchard, 2018; Thakkar et al., 2019; Wahle et al., 2017). Three studies used a combination of retrospective and prospective techniques (Lee et al., 2017; Martin et al., 2015; Nuffer et al., 2012). The remaining three

studies administered outcome measures and/or collected data prospectively (Adams et al., 2015; Clark et al., 2014; Lawrence et al., 2015). Timeframes for data collection varied amongst studies, with eight studies reviewing data from 12 months or more (Butala et al., 2013; Gorrindo et al., 2014; Lee et al., 2017; Liberman et al., 2011; Mann et al., 2019; Stuhlmiller & Tolchard, 2018; Thakkar et al., 2019; Wahle et al., 2017), five studies collecting data over approximately 6 to 10 months (Adams et al., 2015; Clark et al., 2014; Lawrence et al., 2015; Nuffer et al., 2012) and one study reviewing data over 6 weeks (Meek et al., 2013) (Table 2).

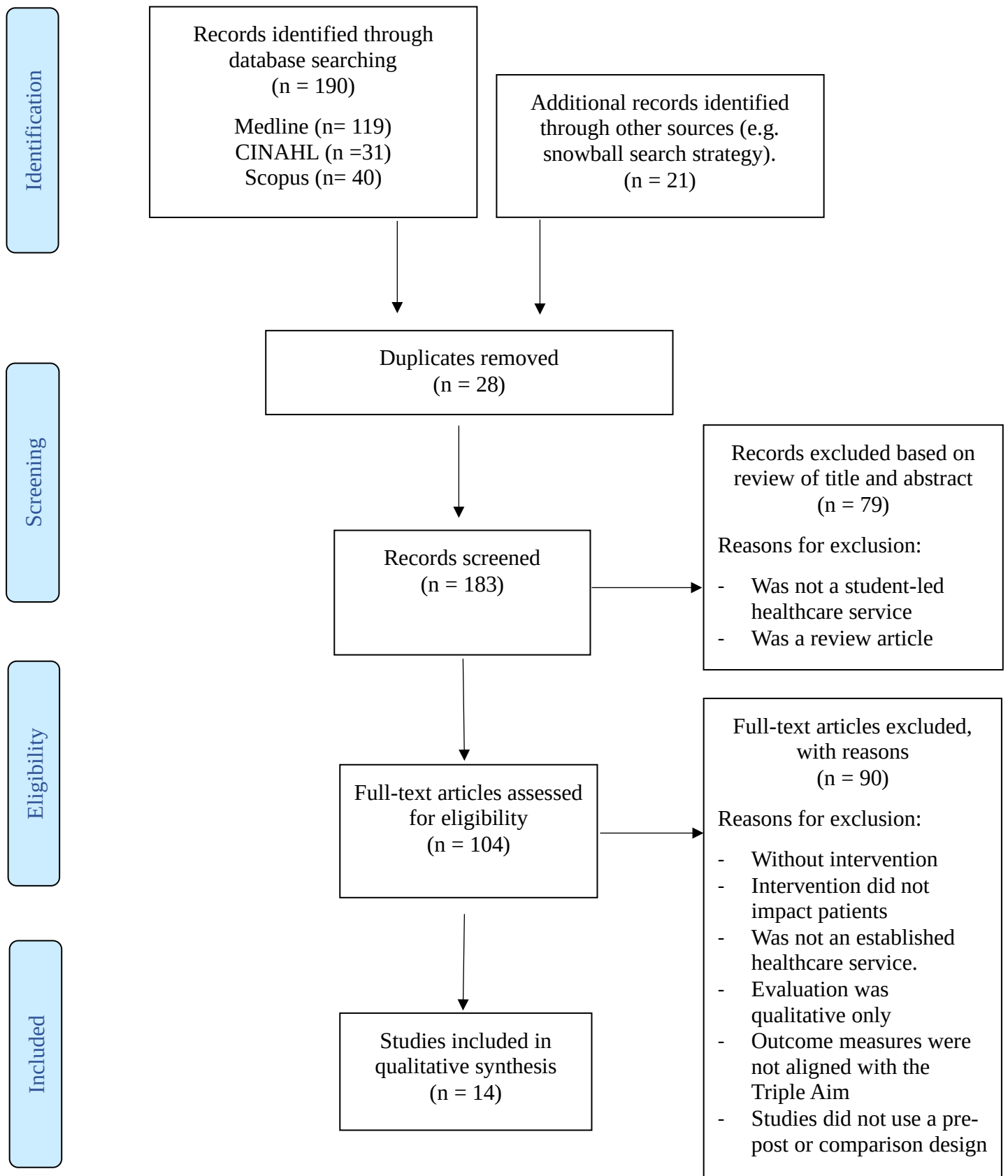


Figure 2. PRISMA Flow Diagram of Article Inclusion Process

Table 2. *Analysis of Articles Against the Triple Aim Measurement Principles*

Authors	A defined population	Gather data over time	Distinguish between measures	Comparison data
Adams et al. (2015)	Patients (n = 200) with a diagnosis of type 2 diabetes attending one of five Norfolk medical practices	Measures were taken at baseline and at 6 months post intervention	Diabetes-related clinical data (glycosylated hemoglobin A1c (HbA1c), blood pressure and lipid profile), quality of life (EQ-5D), patient reported beliefs (The Beliefs and Medicines Questionnaire), adherence (MARS) and satisfaction with medicines (DTSQ) collected; patient behavioural characteristics recorded	Not included in study design
Butala et al. (2013)	Uninsured adults living in New Haven Connecticut in receipt of preventive healthcare services; demographic data collected for pre- and post- intervention analysis	Retrospective patient record reviews conducted pre intervention (2008– 2009) and post intervention (2010–2011)	Number of screening/preventative tests and appropriateness of screening based on patient characteristics	Comparison data comprised of patients receiving services from HAVEN 12 months prior to the implementation of the intervention.
Clark et al. (2014)	Uninsured, unemployed and homeless population living in Jackson and receiving care from the JFC, with 16 examined by physicians and 27 examined by student groups	Weekly patient satisfaction surveys for 6 months; each patient completed only one questionnaire throughout the study period; surveys completed on site prior to consultation completion	PCAS aligned IOM formal definition of primary care	Patient experience of care with student group compared to care with a trained physician; PCAS were administered at the same time for physician consults
Gorrindo et al. (2014)	All patients with established care at Shade Tree Clinic after 2008 with a diabetes diagnosis	Retrospective patient record reviews of diabetic patients conducted	HbA1c collected at initial presentation and post (12 ± 3 months); presence/absence of required HbA1c measures within the 12-month measurement period; student– patient relationship examined by reviewing documented patient encounters	Not included in study design

Measuring Performance in Student-led Healthcare Services

Lawrence et al. (2015)	Patients receiving healthcare services at CWRU student-led healthcare service (n = 87) and a professionally led free medical service (n = 40)	Patient surveys facilitated over 10-month period; Different facilitation methods used between intervention and control	Two separate surveys developed based on Health Centre Patient Satisfaction Survey developed by the US Department of Health & Human Services: 28-item student-led survey; 21-question professionally led survey	A professionally led free medical service, dually located with the student-led healthcare service
Lee et al. (2017)	All patients receiving care from KNIGHTS Clinic in 2014/2015 following implementation of a quality improvement intervention; all patients receiving care in 2015/2016	Pre-intervention data collected retrospectively; post-intervention data collected prospectively	Process measures include availability and variety of services provided and patient wait and consultation times	Not included in study design
Liberman et al. (2011)	Disadvantaged adult patients living in East Harlem receiving healthcare services from EHHOP who have a diagnosis of depression	Conducted a point-in-time retrospective patient record review; all patient records reviewed to identify those who met inclusion criteria.	Data analysed based on HEDIS; parameters included demographics; diagnosis method; pharmacological treatment type; referral to specialty care; and patient adherence to follow-up care and pharmacologic treatment	Available HEDIS data on Medicaid and commercially insured populations in New York City and New York State (NYS) available from NYS Managed Care Plan Performance 2007 dataset
Mann et al. (2019)	Disadvantaged patients living in East Harlem with a diagnosis of major depression, adjustment disorder, dysthymia or depressive disorder not otherwise specified (NOS) receiving care from the MH Clinic within EHHOP	Conducted a point-in-time retrospective patient record review; all patient records were reviewed between 2009 and 2016 to identify those who met inclusion criteria	Data analysed based on HEDIS; adherence to antidepressant medication at 3 and 6 months was analysed against treatment response	Patients receiving care from the EHHOP PC Clinic, Liberman et al. (2011) data and available 2014 HEDIS data on Medicaid and commercially insured populations in NYS accessed from NYS Department of Health
Martin et al. (2015)	Penobscot Nation members with diabetes receiving healthcare services at Penobscot Nation Healthcare Centre; sample included patients with controlled diabetes (HbA1c < 7%; n = 30)	Retrospective patient record reviews to identify pre HbA1c values; patient experience surveys completed after each visit with healthcare provider	Pre-measures identified from previous HbA1c values and post HbA1c measures; patient satisfaction surveys completed	Not included in study design

Measuring Performance in Student-led Healthcare Services

and uncontrolled diabetes
(HbA1c > 7%; n = 18)

Meek et al. (2013)	Patients presenting to Dandenong Hospital Emergency Department (ED) over a 10-week period in 2012; patients triaged based on presenting need, allocated to the next available bed: a student-led bed (n = 369) or standard care (n = 365)	Retrospective data accessed from patient records over five 2-week blocks May–September 2012; outcome measure data for all patients who had a length of stay (LOS) of at least 1 hour, assigned to either a student-led bed or standard care	ATS and Commonwealth Department of Health and Ageing ED access targets; ATS measures included time to nurse, time to doctor, time to inpatient referral and time to inpatient	Four control beds matched for patient acuity and managed as per usual care (professionals)
Nuffer et al. (2012)	Adults with a diagnosis of diabetes receiving care at one of the 12 student-led clinics in rural Colorado	Retrospective patient record review over a 6-month period	HbA1c, BP, fasting total cholesterol (TC) and blood lipids; values obtained at visit 1 (pre measure) and 6 (post measure)	Not included in study design
Stuhlmiller & Tolchard (2018)	All patients receiving healthcare services from the Coledale student-led clinic	Data gathered through a point-in-time review of patient records	Behavioural factors such as smoking and drinking; physiological health outcome measures such as BMI, BP, body circumference, BGL and blood lipids	Two patient groups were compared: those receiving care for ≤ 12 months and those receiving care for > 12 months
Thakkar et al. (2019)	All adult patient receiving care from CCC	Retrospective patient record review over a 5-year period	ED utilisation rates obtained; socioeconomic status approximated and CCI used for health status	Not included in study design
Wahle et al. (2017)	Patients being treated for hypertension at IUSOC between January 2013 and March 2014 (n = 64) with > 3 visits at the clinic	Retrospective patient record review over 13-month period	Physiological health outcome measures such as BMI and BP; Data on behavioural factors, such as smoking and drinking, also collected	Hypertension control data collected from patients receiving care from the IUSOC Clinic and compared to available NHANES datasets

Nine of the included studies used outcomes measures either through patient experience surveys (Clark et al., 2014; Meek et al., 2013) or by measuring physiological parameters, behavioural characteristics or health and functional status (Adams et al., 2015; Gorrindo et al., 2014; Martin et al., 2015; Nuffer et al., 2012; Stuhlmiller & Tolchard, 2018; Thakkar et al., 2019; Wahle et al., 2017). Interestingly, Adams et al. (2015) reported changing the version of the QoL tool used to assess health and functional status from the five-level adaptation (i.e., EQ-5D) at baseline to the three-level adaptation (i.e., EQ-3D) at 6 months post-intervention follow up. Consequently, the authors acknowledged that any change in QoL cannot be attributed to the intervention. Six studies used process measures such as the Healthcare Effectiveness Data and Information Set (HEDIS), emergency department (ED) utilisation rates, the Australian Triage Scale (ATS) guidelines and visit duration (Butala et al., 2013; Clark et al., 2014; Gorrindo et al., 2014; Lee et al., 2017; Liberman et al., 2011; Mann et al., 2019) (Table 2).

Eight studies incorporated a comparison into their research design, such as a control group, standard care or available population health datasets (Table 2). Two studies had a sample size in the intervention group that was approximately double that within the control/standard care group (Clark et al., 2014; Lawrence et al., 2015). One of these studies (Lawrence et al., 2015) also used different adaptations of their patient satisfaction survey between comparison groups, wording questions differently between surveys as well as omitting some questions altogether. Two studies (Liberman et al., 2011; Mann et al., 2019) compared their intervention data to HEDIS, however the comparison data was not appropriate as population characteristics such as age, race, gender and diagnosis were not matched. One study (Wahle et al., 2017) compared hypertension control data to the National Center for Health Statistics, National Health and Nutrition Examination Survey (NHANES) datasets.

2.4.2 Dimensions of the Triple Aim

Eight studies measured the Triple Aim dimension of population health, predominantly using measures focused on evaluating upstream health outcomes (Table 3). Evans and Stoddart's (1990) "Model of Population Health Components and Relationships" distinguishes between health determinants and health outcomes. Health determinants include both upstream factors (socioeconomic factors and physical environment) and individual factors (genetic endowment, behavioural and psychological factors), while health outcomes include intermediate health outcomes (disease burden and injury) and downstream health outcomes (QoL and mortality) (Evans & Stoddart, 1990). In this review, one study (Clark et al., 2014)

relied on demographic and socioeconomic data as their sole measure of population health. Four studies (Adams et al., 2015; Gorrindo et al., 2014; Martin et al., 2015; Nuffer et al., 2012) measured physiological factors, including HbA1c, blood pressure (BP), body mass index (BMI) and blood lipids. Two studies (Stuhlmiller & Tolchard, 2018; Wahle et al., 2017) gathered data on patient demographic information, behavioural traits such as smoking and drinking and physiological measures such as BMI and BP, with Stuhlmiller & Tolchard (2018) also measuring body circumference, blood glucose levels (BGL) and blood lipids. Two studies (Adams et al., 2015; Thakker et al., 2019) measured downstream factors influencing health either via a QoL tool or by estimating mortality through a comorbidity index. The remaining six studies did not measure population health (Table 3). The combined results of the studies that measured health outcomes show improvements in health outcomes through physiological measures such as blood glucose, blood pressure, waist circumference and lipid values (Adams et al., 2015; Butala et al., 2013; Gorrindo et al., 2014; Martin et al., 2015; Nuffer et al., 2012; Stuhlmiller & Tolchard, 2015), as well as behavioural characteristics such as smoking and drinking (Adams et al., 2015; Stuhlmiller & Tolchard, 2018).

Three studies (Adams et al., 2015; Lawrence et al., 2015; Martin et al., 2015) evaluated the experience of care from the perspective of the patient. In one study (Lawrence et al., 2015), the Health Centre Patient Satisfaction Survey was used to measure patient experience. These domains were grouped into three themes: accessibility, licensed provider and facility quality. The patient satisfaction survey used by Martin et al. (2015) was poorly defined, with patients being provided with the opportunity to rate their healthcare providers as being helpful, respectful or knowledgeable, in addition to providing an overall rating of satisfaction of the healthcare service. The remaining study (Adams et al., 2015) used the Diabetes Treatment Satisfaction Questionnaire (DTSQ) to measure patient experience and asked global patient satisfaction questions related to willingness to refer and continue accessing services.

Nine of the included studies measured the experience of care through the perspective of the provider (Table 3), four of which (Butala et al., 2013; Gorrindo et al., 2014; Liberman et al., 2011; Thakker et al., 2019) measured service effectiveness. Furthermore, one study (Adams et al., 2015) measured timeliness and effectiveness, and one study (Clark et al., 2014) measured effectiveness, timeliness, affordability and patient-centredness. Additionally, two studies (Lee et al., 2017; Meek et al., 2013) measured efficiency and timeliness, and two studies (Stuhlmiller & Tolchard, 2018; Thakker et al., 2019) measured equity.

Many of the SLHS described in the current literature review provided healthcare services free of charge to the patient and were funded by either government or an affiliated university and, in some cases, were funded by both. Interestingly, 12 out of the 14 studies did not incorporate any type of economic evaluation into their measures. Adams et al. (2015) and Thakkar et al. (2019) were the only studies that incorporated a cost analysis into their research design, focusing on measuring cost of healthcare from a supply lens. By measuring resource utilisation costs, Adams et al. (2015) were able to determine the cost of a student-led service per patient, taking into account costs such as student training requirements and preceptor time to oversee service provision. However, Adams et al. (2015) did not undertake a similar analysis of cost for a professional service or a standard care option, and therefore, cost effectiveness was not determined. Similarly, Thakker et al. (2019) calculated costs saved due to ED visits voided as a result of attending the SLHS. However, without calculating the costs associated with resourcing the SLHS, cost effectiveness of such services cannot be determined.

Table 3. *Analysis of Articles Against the Dimensions of the Triple Aim*

Authors	Population health	Experience of care	Cost of healthcare
Adams et al. (2015)	Upstream measures, including behavioural characteristics, i.e., exercise, diet and smoking status, and physiological measures i.e., HbA1c, blood pressure and lipid profile included; EQ-5D used to measure downstream measure of QoL	Global experience of care was assessed using the DTSQ, which also measures timeliness of services; treatment effectiveness was measured using MARS	Measures cost from a supply lens, calculating resource utilisation costs
Butala et al. (2013)	Not assessed	Service effectiveness assessed via adherence to National Preventive Service guidelines for HIV testing, fasting lipid panel, fasting blood glucose and Pap smear; every patient file assessed for indicators of specific preventative services (as per a defined criteria) and delivery of that service	Not assessed
Clark et al. (2014)	Upstream health outcomes assessed via patient demographic and socioeconomic data	Service effectiveness, timeliness, patient-centredness and affordability assessed via the PCAS	Not assessed
Gorrindo et al. (2014)	Physiological health outcomes assessed by HbA1c	Service effectiveness measured via the process measure of the presence/absence of required HbA1c measures; every patient file assessed for indicators of specific services (as per a defined criteria) and delivery of that service; patient-centredness assessed via review of patient interactions	Not assessed
Lawrence et al. (2015)	Not assessed	Service timeliness and global experience of care assessed via a modified version of the Centre Patient Satisfaction Survey	Not assessed
Lee et al. (2017)	Not assessed	Service efficiency/timeliness assessed through increased consultation availability and variety, as well as change in patient wait times/total visit duration	Not assessed

Measuring Performance in Student-led Healthcare Services

Liberman et al. (2011)	Not assessed	Service effectiveness assessed via HEDIS measures	Not assessed
Mann et al. (2019)	Not assessed	Service effectiveness assessed via HEDIS measures	Not assessed
Martin et al. (2015)	Physiological health outcomes assessed by HbA1c	Global experience of care assessed using a patient experience survey	Not assessed
Meek et al. (2013)	Not assessed	Service efficiency and timeliness assessed via measures aligned with the ATS and Commonwealth Department of Health and Ageing ED access targets	Not assessed
Nuffer et al. (2012)	Physiological health outcomes measures of HbA1c, BP and blood lipids	Not assessed	Not assessed
Stuhlmiller & Tolchard (2018)	Physiological health outcomes assessed by BMI, BP, body circumference, BGL and blood lipids; behavioural characteristics assessed via smoking and drinking	Equity assessed by stratifying all measures into identified subpopulations differentiated by gender, age and racial groupings	Not assessed
Thakkar et al. (2019)	Upstream health outcomes assessed via patient demographic data and estimated socioeconomic status; downstream health outcomes estimated using Deyo et al. (1992) adaptation of the CCI	Effectiveness of service measured through change in ED utilisation rates; equity assessed by stratifying all measures into identified subpopulations differentiated by gender, age and racial groupings	Estimation of cost savings through the median cost per ED visit for each visit avoided (accounting for inflation)
Wahle et al. (2017)	Upstream health outcomes assessed through patient demographic data and insurance status; physiological health outcomes assessed by BMI and BP; behavioural characteristics assessed via smoking and drinking behaviours	Not assessed	Not assessed

2.5 Discussion

The findings of this review indicate that, currently, the evaluations of SLHS do not consistently align with the recommendations of the IHI Triple Aim of Healthcare Improvement. Out of the 14 studies appraised, only two studies (Adams et al., 2015; Thakker et al., 2019) successfully achieved all three domains of the Triple Aim. It is promising, however, that a total of 12 studies included in this review applied a focus on experience of care, either by measuring experience of care from the perspective of the patient or from the perspective of the provider. In contrast, cost of healthcare was the least measured domain. Furthermore, this literature review has demonstrated that there is a lack of consistency in the measures used to evaluate SLHS and in the quality of research design. This suggests that any findings demonstrating that SLHS lead to an improvement in health outcomes or experience of care are preliminary, and further investigation of SLHS is required.

With respect to calculating the sample sizes, the included studies did not undertake a statistical calculation determining power, suggesting inadequately powered samples (Nayak, 2010). Even in pilot designs, sample size justification supporting the reasons for choosing a particular size is required (Whitehead et al., 2016). The timeframes of measurement also varied between studies. It is recommended to collect data at multiple points to gain insight into the relationship between interventions and effects and to better understand time lags between cause and effect (Stiefel & Nolan, 2012). Limiting points of measurement before and after the intervention weakens a study's ability to assign causality (Portela et al., 2015). Comparing outcome data to other healthcare services or using available benchmark data is advocated for within the Triple Aim framework (Stiefel & Nolan, 2012). Due to identified limitations in study design across many of the studies in this review, overall validity of their data is compromised, influencing the comparability of their findings across groups (Portela et al., 2015).

Concerning the measurement of population health outcomes, priority was given to measuring socioeconomic factors, behavioural traits and physiological outcomes. Such factors are considered upstream factors influencing population health (Braveman & Gottlieb, 2014), whereas measuring more downstream factors, such as mortality, QoL, health and functional status and their combination (i.e., healthy life expectancy), allows for comparison of alternative practices, evaluation of disparities and allocation of resources to be guided (Stiefel & Nolan, 2012). Adams et al. (2015) was one of two studies that measured downstream factors through the use of a QoL tool. However, any observed changes in QoL could not be attributed to the intervention due to a change in the version of the tool from baseline to post intervention. Thakker et al. (2019) also measured downstream factors

influencing health using an adaptation of the Charlson Comorbidity Index (CCI), a popular index used to assign mortality risk (Deyo et al., 1992; Hall et al., 2019). Being derived from administrative databases, the utility of a comorbidity score is dependent on the quality of information used (Hall et al., 2019), and some authors suggest that continuous measures of disease might outperform the CCI (Austin et al., 2015). There are challenges to implementing measures of downstream influences in healthcare service evaluations, as no one healthcare service is the same and, thus, tools of measurement may vary greatly between services. In contrast, using more universal functional health and QoL tools that can be applied across populations and disease groups does provide opportunity for comparability across services (Chen et al., 2005; Stiefel & Nolan, 2012; Frendl & Ware, 2014).

The experience of care is best measured using global questions in patient satisfaction surveys (Stiefel & Nolan, 2012). Incorporating the patient's perspective into quality improvement initiatives is critical in achieving patient-centred care (Al-Abri & Al-Balushi, 2014). Additionally, evidence supports a correlation between measuring patient satisfaction, continuity of care and improved health behaviour (Mohan & Kumar, 2011; Schoenfelder et al., 2011), as well as being a reflection of health practitioner communication (Schoenfelder et al., 2011). While most of the included studies in this review measured the experience of care, only three studies focused on evaluating the experience of care from the patient's perspective. The remaining 11 studies either solely examined experience of care from that of the healthcare provider's perspective or did not measure experience of care, demonstrating limited input from patients in the quality appraisal of SLHS. This also doesn't address potential safety concerns patients and professional providers of care may hold when a student independently coordinates and delivers care.

The concept of equity is in relation to access and use of services and is directly related to need of care (Levesque et al., 2013). Despite all reviewed studies describing SLHS providing healthcare to underserved or disadvantaged populations, Stuhlmiller and Tolchard (2018) and Thakkar et al. (2019) were the only studies that measured equity. Without specifically measuring equity, the impact of SLHS on the underserved and/or disadvantaged populations they intend to serve will not be able to be understood. Student-led models of healthcare have enormous potential to supplement the healthcare system in areas where healthcare professional retention is low and health services are sparse (Frakes et al., 2011). This is particularly important in a world responding to increased healthcare demand due to the COVID-19 pandemic, where now more than ever, healthcare services are experiencing shortages in capacity to deliver care (Rasmussen et al., 2020). As healthcare services struggle to adapt to increases in demand, student-led services are appropriately

placed to adequately address patient care requirements (Vahidi et al., 2020). However, without having a clear understanding of the true impact of student-led services and concerns being raised around potential safety risks in a COVID-19 world (Vahidi et al., 2020), there is still some work required to understand the value of SLHS. Additionally, there is little work around the cost or economic value involved in delivering services through SLHS models. As many of the studies included in this literature review were funded either through government or an affiliated university, justification of cost efficiency or cost effectiveness is essential to securing ongoing funding and ensuring continued operation (Boxall, 2011; Cowing et al., 2009). As a result, SLHS will continue to face difficulties in demonstrating their contribution to the healthcare system from an economic perspective (Frakes et al., 2014; Kent et al., 2014; Ojeda et al., 2014).

Since its proposal in 2008, the Triple Aim has sought to simultaneously improve population health, enhance experience of care and reduce the cost of healthcare (Whittington et al., 2015). Following on from this, the IHI has recruited over 140 organisations worldwide involving healthcare systems, hospitals, healthcare insurers and other organisations involved in providing healthcare in their quest to improve healthcare quality (Whittington et al., 2015). Nonetheless, the Triple Aim has received criticism for its inability to consider the provider and their experience and how this influences overall quality of care (Bodenheimer & Sinsky, 2014). As such, authors have suggested introducing a fourth aim, which acknowledges providers of care as the backbone of the healthcare system, to be included (Bodenheimer & Sinsky, 2014; Valaitis et al., 2020). When considering how SLHS are resourced, it is also important to consider the experience of the provider. Students are developing healthcare professionals, and their experiences have significant influence on their skills and future provision of care (Burgess & Mellis, 2015). The evidence supporting the use of SLHS as clinical placement providers is mixed, and although students value the exposure to authentic healthcare environments (Fröberg et al., 2018), the learning experience is highly dependent on the student's sense of responsibility to their patient and an effective collaboration between the student and the healthcare professional (Schutte et al., 2018). The Triple Aim is designed to specifically evaluate healthcare services as providers of care and doesn't consider that these healthcare services hold additional roles, such as providers of clinical placement. For this reason, the Triple Aim is not comprehensive in its current form to effectively evaluate SLHS. An evaluation framework that not only considers the impact on the community but also the experience and learning needs of the student is required to effectively evaluate SLHS and the benefits they provide.

In Australia, the Australian Health Performance Framework (AHPF) is designed to support system-wide reporting on population health and healthcare performance, the assessment and evaluation of value and sustainability, as well as the identification of priorities for improvement and development (NHIPPC, 2017). The AHPF houses five domains, including the determinants of health, the health system, health status, the health system context and equity, most of which align to the Triple Aim domains of population health, experience of care and cost of healthcare. However, in contrast to the Triple Aim, the AHPF does place emphasis on the health system context in which workforce, infrastructure, governance, structure and the sustainability of the Australian health system are acknowledged as additional factors influencing population health outcomes (NHIPPC, 2017). Nevertheless, as SLHS are unique both in their model and workforce, further investigation is required to ensure all elements of SLHS performance and impact are considered, in addition to identifying appropriate measures for comprehensive evaluation.

To identify a comprehensive evaluation framework, consensus needs to be reached on how to evaluate SLHS, not just from the perspective of healthcare provision but also provision of clinical education. If researchers used a common set of measures and gathered data at agreed time-points, results could be compared across different types of services and placement types, pooling data for meta-analyses (Bernhardt et al., 2017). For SLHS to become authentic and credible models of care within the broader healthcare system, it is crucial to prescribe to a set of standards similar to that utilised in mainstream healthcare but specific enough to consider the needs of the students.

2.6 Limitations

The findings of this review must be considered in light of its limitations. In this review, medical and healthcare databases (i.e., Ovid Medline, CINAHL and Scopus) were searched. It is possible that additional articles may have been identified had an educational database been considered. However, pearling of included articles was conducted to minimise the likelihood of missing eligible articles.

2.7 Conclusion

Currently, evaluation of SLHS does not consistently align with the recommendations of the Triple Aim, and the current literature needs to be strengthened to support SLHS as a valuable resource to the healthcare system. Student-led Healthcare Services need to pursue a broader system of linked goals to ensure their accountability to the community they serve, as well as their comparability to the healthcare system they support. Clearly, when adopting the Triple Aim framework, there will be elements of SLHS that will go unmeasured. Therefore, consensus on what is an appropriate evaluation framework for SLHS needs to be achieved before their value within the healthcare system can be demonstrated.

2.8 Measuring Health Outcomes, Experience of Care and Cost of Healthcare in Student-led Healthcare Services: Updated Literature Review Findings

2.8.1 Methods

An updated search was conducted in February 2025 to capture new publications since the original review on measuring health outcomes, care experience, and healthcare costs in SLHS was completed. A search for empirical studies contained in peer reviewed journals was conducted using the databases of CINAHL, Medline, and Scopus. Identical subject headings (MESH terms) and keywords were used in the original searches. Only articles published after 2021 were identified to capture those studies published following completion of the original review.

The inclusion criteria mirrored that of the original literature review in that only studies describing an established SLHS, providing services to the community on an ongoing basis and articles applying measures that align with the Triple Aim domains (i.e., health outcomes, patient experience and cost effectiveness) were included. The methodology and outcomes of each included study was then assessed using the critical appraisal tool (CAT) developed specifically for the original review and based on Stiefel and Nolan's (2012) IHI White Paper: A Guide to Measuring the "Triple Aim".

2.8.2 Results

The updated search generated 89 new articles, with 51 full texts reviewed (Figure 3). Sixteen articles met the inclusion criteria. Eleven studies were conducted in the United States (Abdelwahab et al., 2023; Abdelwahab et al., 2022; Bliss et al., 2022; Curran et al., 2023; Jiang et al., 2024; Lee et al., 2023; Park et al., 2023; Powell et al., 2021; Powell et al., 2022; Simon et al., 2022; Zhou et al., 2022), two studies were conducted in Australia (March et al., 2023; Miller et al., 2024) and one study conducted in each of the United Kingdom (UK) (Chin et al., 2024), Saudi Arabia (Bawazeer et al., 2021) and Netherlands (Sultan et al., 2022). Study design and intervention characteristics are shown in Table 4.

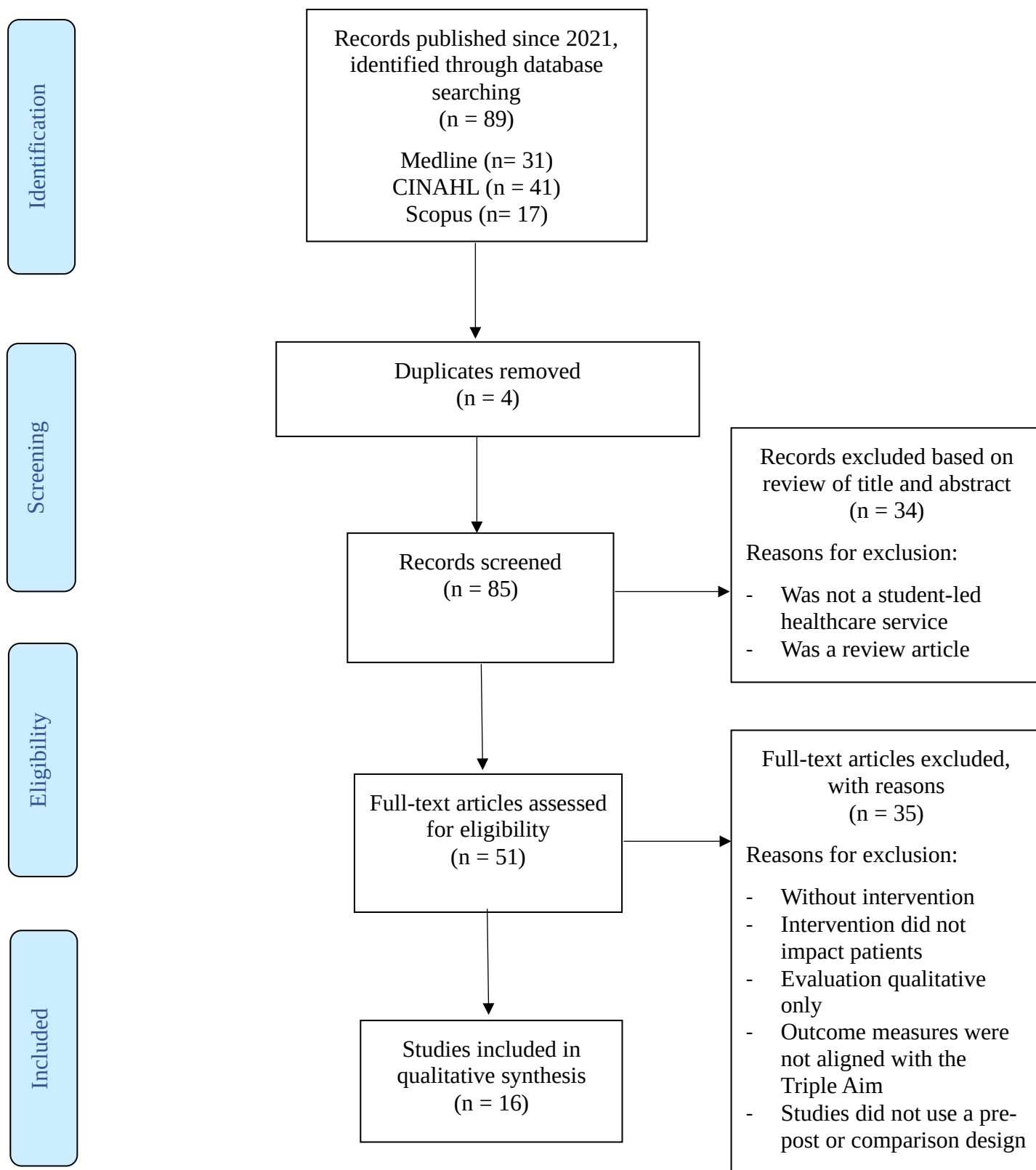


Figure 3. Updated PRISMA Flow Diagram of Article Inclusion Process

Table 4. *Updated Study Characteristics*

Author	Study Type	Student Profession/s	No. of Patients	Type of Service/Intervention
Abdelwahab et al. (2022)	Pre and post intervention measures	Medical	229	Crimson Care Collaborative (CCC), a student-faculty collaborative clinic in Chelsea, Massachusetts, USA, affiliated with Harvard Medical School; provides primary care services to underserved populations, including refugees, immigrants, and post-incarceration patients; study examines the influence of clinic visits on patients' trust in healthcare professionals and their health-seeking behaviours over time.
Abdelwahab et al. (2023)	Pre and post intervention measures	Medical	229	CCC; Study evaluated changes in self-reported emergency department (ED) utilization before and after engagement with CCC.
Bawazeer et al. (2021)	Comparative analysis	Pharmacy	98	King Saud Khalid University Hospital (KKUH), a tertiary teaching hospital in Riyadh, Saudi Arabia; student-led transition of care (TOC) program involving medication reconciliation, structured medication counselling, and post-discharge follow-up for patients discharged on high-risk medications (warfarin, insulin, or both).
Bliss et al. (2022)	Pre and post intervention measures	Medical	562	Weill Cornell Community Clinic (WCCC), a student-run free clinic (SRFC) in New York City serving uninsured patients earning less than 400% of the Federal Poverty Line (FPL). Due to the COVID-19 pandemic, WCCC transitioned from in-person visits to a hybrid telehealth model, using Zoom and Doximity Dialer.
Chin et al. (2024)	Pre and post intervention measures	Pharmacy	154	Young@Heart Clinic, a student-led preventative healthcare clinic run by pharmacy students at Newcastle University, UK. Provides cardiovascular disease (CVD) risk assessments, including blood pressure, blood glucose, cholesterol checks, and healthy lifestyle counselling.

Measuring Performance in Student-led Healthcare Services

Curran et al. (2023)	Pre and Post Intervention Measures	Athletic training	388	Integrated Sports Medicine and Rehabilitative Therapy (ISMaRT) Clinic, a student-run athletic training clinic at the University of Idaho, USA. Provides injury prevention, evaluation, rehabilitation, and pain management services for musculoskeletal conditions.
Jiang et al. (2024)	Comparative analysis	Medical	238	East Harlem Health Outreach Partnership (EHHOP), a student-run free clinic affiliated with the Icahn School of Medicine at Mount Sinai, serving uninsured adults in East Harlem, New York City.
Lee et al. (2023)	Pre and Post Intervention Measures	Medical, Pharmacy	232	Shade Tree Clinic (STC), a student-run free clinic in Nashville, Tennessee, facilitating access to high-cost medications for uninsured and underinsured patients through Pharmaceutical Assistance Programs (PAPs).
March et al. (2023)	Pre and Post Intervention Measures	Dental	Not reported	Student-led oral health services provided at an Aboriginal and Torres Strait Islander Community Controlled Health Service (ATSICCHS) in Dalby, Queensland.
Miller et al. (2024)	Pre and post intervention measures	Occupational Therapy	33	A student-led Activities of Daily Living (ADL) group program implemented in an inpatient rehabilitation setting at Camden Hospital, Australia.
Park et al. (2023)	Pre and post intervention measures	Medical	224	WCCC implemented universal depression screening for uninsured patients.
Powell et al. (2021)	Pre and post intervention measures	Medical	102	The EHHOP Mental Health Clinic; The study evaluates changes in self-reported medication adherence, depression severity and anxiety severity.

Measuring Performance in Student-led Healthcare Services

Powell et al. (2022)	Comparative analysis	Medical	69	The EHHOP Mental Health Clinic; The study evaluates longitudinal psychiatric symptom outcomes using, medication adherence, and follow-up rates.
Simon et al. (2022)	Pre and post intervention measures	Medical	29	The MedZou Community Health Center, located in Columbia, is a student-run free clinic affiliated with the University of Missouri School of Medicine, providing diabetes management services for uninsured patients.
Sultan et al. (2022)	Comparative analysis	Pharmacy, Medical	216	A student-led Interprofessional Student-run Program (ISP) located in Amsterdam, Netherlands, implemented within a geriatric memory outpatient clinic at a tertiary academic hospital. The intervention involved a medication review using the STOPP/START criteria, a validated tool for detecting inappropriate prescribing in older adults.
Zhou et al. (2022)	Pre and post intervention measures	Medical	49	The Weill Cornell Medicine Wellness Qlinic, a student-run mental health clinic, providing psychiatric care for uninsured and underinsured LGBTQ+ individuals in New York City.

Alignment with Triple Aim measurement principles

The newly reviewed studies highlight the continued evaluation of SLHS, predominately achieving the Triple Aim measurement principles. The current research assesses health outcomes in specific sub-populations, employing diverse data collection methods, incorporating both outcome and process measures. However, gaps remain in the utilisation of a control group or benchmark data to compare findings to the broader population. Table 5 summarises key methodological trends and measurement approaches of the most recently identified articles.

All studies identified in the updated review focus on evaluating outcomes of a sub-population, either defined by the local population served by the SLHS or by a specific health condition. As noted in the original systematic review (Simmons et al., 2022), sample sizes were not determined through formal statistical power calculations. Instead, the number of participants was typically based on all patients receiving care from the clinic within a given timeframe. Some studies reviewed all patient encounters over a multi-year period (Abdelwahab et al., 2023; Abdelwahab et al., 2022; Bliss et al., 2022; Jiang et al., 2024; Lee et al., 2023; March et al., 2023; Park et al., 2023; Powell et al., 2021; Powell et al., 2022; Simon et al., 2022), while others assessed cohorts over a shorter duration. For example, data collection occurred at 10, 11 (Bawazeer et al., 2021; Sultan et al., 2022) and 30 days (Zhou et al., 2022), as well as at 6 and 12 weeks (Chin et al., 2024; Curran et al., 2023) following service provision.

Data collection methods varied among studies but remained consistent with those identified in the original systematic review (Simmons et al., 2022). Thirteen studies gathered data retrospectively through reviewing patient records (Abdelwahab et al., 2023; Bawazeer et al., 2021; Chin et al., 2024; Jiang et al., 2024; Lee et al., 2023; March et al., 2023; Miller et al., 2024; Park et al., 2023; Powell et al., 2021; Powell et al., 2022; Simon et al., 2022; Sultan et al., 2022; Zhou et al., 2022). Two studies collected data exclusively through prospective methods (Abdelwahab et al., 2022; Bliss et al., 2022) and one study combined retrospective and prospective methods of data collection (Curran et al., 2023).

In terms of measurement approaches, the majority of studies utilised a combination of outcome and process measures. Nine studies incorporated patient-reported outcomes, including satisfaction surveys, quality-of-life assessments, and self-reported health

behaviours (Abdelwahab et al., 2022; Bawazeer et al., 2021; Chin et al., 2024; Curran et al., 2023; Jiang et al., 2024; Miller et al., 2024; Park et al., 2023; Powell et al., 2021; Powell et al., 2022). Twelve studies assessed physiological or clinical outcomes, such as HbA1c levels, blood pressure control, treatment adherence, or reductions in emergency department visits (Bawazeer et al., 2021; Chin et al., 2024; Curran et al., 2023; Jiang et al., 2024; Lee et al., 2023; March et al., 2023; Park et al., 2023; Powell et al., 2021; Powell et al., 2022; Simon et al., 2022; Sultan et al., 2022; Zhou et al., 2022). Furthermore, seven studies employed process measures, such as adherence to clinical guidelines, healthcare utilisation rates, and medication dispensing rates (Abdelwahab et al., 2023; Bliss et al., 2022; Jiang et al., 2024; Lee et al., 2023; Simon et al., 2022; Sultan et al., 2022; Zhou et al., 2022).

Regarding study design, six studies incorporated some form of comparative analysis, either using control groups or comparisons with population-level health data, or assessments against standard care (Bawazeer et al., 2021; Jiang et al., 2024; Lee et al., 2023; Powell et al., 2022; Simon et al., 2022; Sultan et al., 2022). For example, one study (Jiang et al., 2024) compared patient health outcomes to HEDIS benchmarks, while another study (Sultan et al., 2022) conducted a controlled clinical trial evaluating medication review effectiveness. However, many studies lacked a formal control group and instead analysed pre and post intervention patient outcomes (Abdelwahab et al., 2023; Abdelwahab et al., 2022; Bliss et al., 2022; Chin et al., 2024; Curran et al., 2023; March et al., 2023; Park et al., 2023; Powell et al., 2021; Zhou et al., 2022).

Overall, the newly reviewed studies align with the findings of the original literature review by demonstrating a continued use of diverse measurement approaches to evaluate the impact of SLHS. Consistent with the earlier review, these studies reinforce the feasibility and potential effectiveness of such clinics in improving healthcare access, managing population health, and enhancing care quality. However, as previously noted, methodological limitations, such as small sample sizes, limited follow-up, and inconsistent outcome measures, persist, restricting the generalisability of findings to broader populations (Ross & Bibler Zaidi, 2019).

Table 5. *Updated Analysis of Articles Against the Triple Aim Measurement Principles*

Authors	A defined population	Gather data over time	Distinguish between measures	Comparison data
Abdelwahab et al. (2022)	Patients (n = 229) attending the CCC-Chelsea clinic, serving underserved populations, including refugees, immigrants, post-incarceration patients, and Latinx individuals.	Retrospective analysis of six years of patient survey data (2013–2019); surveys collected at multiple time points per patient.	Measured changes in health-seeking behaviours, specifically trust in healthcare providers. Data categorised into reliable (e.g., doctors, healthcare providers) and less reliable sources (e.g., internet, family, friends).	Not included in study.
Abdelwahab et al. (2023)	Patients (n = 229) attending the CCC-Chelsea clinic, serving underserved populations, including immigrants, refugees, and Latinx individuals.	Prospective analysis over five years (2013–2018); patients who presented for two or more visits at least one year apart.	Emergency department (ED) utilisation before and after engagement with CCC was assessed as a primary outcome. Secondary analysis examined the association between insurance status and ED use.	Not included in study.
Bawazeer et al. (2021)	Patients (n = 98) discharged from KCUH on warfarin, insulin, or both.	Patients followed for 30 days post-discharge, with outcome measures recorded at baseline, 72-hour follow-up, and 30-day follow-up.	Primary outcome: 30-day hospital readmission rates. Secondary outcomes: medication adherence, disease-specific measures (HbA1c, INR), and patient satisfaction.	Patients in the intervention group were compared to a control group receiving usual discharge education.
Bliss et al. (2022)	Uninsured patients (n = 195) receiving care at the WCCC, serving patients earning $\leq 400\%$ of the Federal Poverty Line.	Retrospective analysis comparing 8 months of telehealth visits (May–December 2020) with 12 months of in-person visits (2019) to assess changes in attendance rates.	Primary outcome: clinic no-show rates pre- and post-telehealth implementation. Secondary measures: patient access to technology for telehealth, modality of care (video vs. audio-only), and language barriers.	Not included in study.

Measuring Performance in Student-led Healthcare Services

Chin et al. (2024)	Members of the public (n = 154) accessing the Young@Heart Clinic.	Pre and post-intervention survey collected during a 10-day evaluation period.	Outcome measures included self-reported knowledge, competence, and motivation for healthier lifestyle choices. Physiological measures included BP, cholesterol, blood glucose. Process measures included patient satisfaction.	Not included in study.
Curran et al. (2023)	Patients (n = 388) receiving care at the ISMaRT Clinic.	Pre–post intervention measures collected at baseline, follow-up (average 11 days later), and discharge.	Outcome measures included pain reduction (Numeric Pain Rating Scale, NPRS), functional improvement (Patient-Specific Functional Scale, PSFS), and quality of life (Disablement in the Physically Active Scale Short Form-8, DPA SF-8). Process measures included treatment adherence and patient satisfaction surveys.	Not included in study.
Jiang et al. (2024)	Uninsured adults (n = 238) receiving primary care services from the EHHOP. Patients are primarily immigrants ineligible for health insurance.	Retrospective analysis of patient records from 2020, evaluating chronic disease screening and management.	Outcome measures included HbA1c control, blood pressure regulation, cancer screening adherence, and flu vaccination rates. Process measures assessed adherence to preventive health guidelines and continuity of care.	Comparison made to national HEDIS benchmarks, particularly Medicaid and Medicare populations.

Measuring Performance in Student-led Healthcare Services

Lee et al. (2023)	Patients (n = 232 in 2021, longitudinal data from 2012–2021) who were uninsured or underinsured and enrolled in a Pharmaceutical Assistance Program (PAP) at STC.	Retrospective review of PAP enrolment and medication cost savings over a 10-year period (2012–2021).	Outcome measures included number of PAP enrolments, medications secured, and estimated cost savings. Process measures included student-led facilitation of PAP applications and medication distribution workflow.	Comparison to national medication affordability trends through references to commercial pharmacy pricing (GoodRx) and supplier pricing (McKesson Connect).
March et al. (2023)	Patients receiving student-led oral health services (2017–2019) at ATSI CCHS. The study focuses on Indigenous and non-Indigenous populations accessing care.	Retrospective analysis of service utilisation data over three years (2017–2019), comparing changes in patient numbers, service mix (preventive vs. emergency care), and wait times.	Outcome measures included shifts from emergency-based to preventive dental care and reductions in wait times. Process measures included student-led service provision and the role of Indigenous health partnerships.	Not included in study.
Miller et al. (2024)	Patients (n = 33) receiving inpatient rehabilitation and attended at least one student-led Activities of Daily Living (ADL) group session.	Pre–post intervention data collected over the course of patient admission.	Outcome measures included self-reported ADL performance improvements and Functional Independence Measure (FIM) scores. Process measures included student-led service provision and patient participation in ADL group sessions.	Not included in study.
Park et al. (2023)	Patients (n = 224) receiving universal depression screening at the WCC. The study focuses on uninsured and underinsured adults with potential unmet psychiatric needs.	Retrospective review of depression screening and referral data over five years (2017–2022).	Outcome measures included PHQ-9 depression severity scores, psychiatric referral rates, and follow-up adherence. Process measures included implementation of universal screening, student-led patient navigation, and referral success.	Not included in study.

Measuring Performance in Student-led Healthcare Services

Powell et al. (2021)	Patients (n = 102; 79 pre-intervention, 23 post-intervention) receiving antidepressant therapy at the EHHOP Mental Health Clinic. The population is uninsured and primarily Hispanic.	Retrospective pre–post intervention analysis (July 2016–January 2018), tracking antidepressant adherence rates before and after the implementation of on-site prescription dispensing.	Outcome measures included self-reported medication adherence, PHQ-9 depression severity scores, and GAD-7 anxiety severity scores. Process measures included student-led medication dispensing, patient engagement, and adherence counselling.	Not included in study.
Powell et al. (2022)	Patients (n = 69) receiving psychiatric care at the EHHOP Mental Health Clinic. The study focuses on patients diagnosed with depression and/or anxiety disorders.	Retrospective analysis of psychiatric symptom severity and treatment adherence over an 11-year period (2009–2020).	Outcome measures included changes in PHQ-9 and GAD-7 scores, medication adherence, and psychiatric appointment follow-up rates. Process measures included student-led psychiatric evaluations, prescription monitoring, and coordination of care.	Comparison made to New York State (NYS) Medicaid, PPO, and HMO populations using HEDIS behavioural health benchmarks.
Simon et al. (2022)	Patients (n = 29) receiving diabetes care at MedZou Community Health Center. The study focuses on uninsured individuals diagnosed with Type II diabetes.	Pre–post analysis comparing pre-pandemic (March 2019–March 2020) and pandemic (March 2020–March 2021) diabetes quality measures.	Outcome measures included changes in HbA1c levels, blood pressure control, and adherence to preventive screenings. Process measures included telehealth adoption, appointment attendance, and frequency of care interactions.	Diabetes-related clinical quality measures from the Merit-Based Incentive Payment System (MIPS) was used to benchmark outcomes.
Sultan et al. (2022)	Patients aged 70 years and older receiving outpatient geriatric medication review through ISP + standard care (n=100) or standard care alone (n=116).	Retrospective analysis of medication prescribing and changes at baseline and six-week follow-up.	Outcome measures included number of medication changes, implementation of STOPP/START recommendations, and inappropriate medication reduction. Process measures included no. of student-led medication reviews, GP	Control group receiving standard care without student-led medication review.

Measuring Performance in Student-led Healthcare Services

correspondence, and pharmacy engagement.

Zhou et al. (2022)	Patients (n = 49) identifying as LGBTQ+ who accessed mental health services at the Weill Cornell Medicine Wellness Qlinic.	Pre-post analysis tracking mental health outcomes over a 12-week treatment period.	Outcome measures included reductions in PHQ-9 and GAD-7 scores, retention in therapy, and engagement with psychiatric services. Process measures included service utilisation and volunteer participation.	Not included in study.

Dimensions of the Triple Aim

The newly reviewed studies align with the Compared to the original literature review, the latest research places a stronger emphasis on functional and behavioural health outcomes and medication management programs. This shift likely reflects the growing maturity and scope of SLHS models, which have evolved from primarily educational platforms into integrated, patient-centred services with a greater focus on measurable healthcare outcomes (Beckman et al., 2022; Broman et al., 2022; Channa et al., 2024). However, comprehensive economic evaluations remain rare, highlighting a continued gap in assessing the full cost-effectiveness of SLHS. Table 6 presents an analysis of all the new articles, summarising how each study aligns with the three dimensions of the Triple Aim: population health, experience of care, and cost of healthcare.

Similar to the original literature review (Simmons et al., 2022), the current literature places a strong emphasis on chronic disease management by measuring physiological markers such as HbA1c, blood pressure, cholesterol, and BMI (Bawazeer et al., 2021; Chin et al., 2024; Jiang et al., 2024; Simon et al., 2022). However, an emerging trend is the inclusion of functional and behavioural health measures, broadening the scope beyond traditional physiological assessments. For example, one study (Miller et al., 2024) examined activities of daily living (ADL) among patients undergoing inpatient rehabilitation, while another study (Curran et al., 2023) focused on musculoskeletal function and rehabilitation progress. Similarly, two studies (Powell et al., 2021; Powell et al., 2022) assessed adherence to antidepressant treatment as an indicator of mental health management and overall well-being. The inclusion of preventative healthcare was another notable trend. This approach was implemented in one study (Chin et al., 2024), where a pharmacy SLHS provided preventative screenings and patient education to reduce cardiovascular disease risk. The updated review indicates a higher proportion of studies incorporating at least one health outcome measure. This shift suggests an increased commitment to comprehensive assessments of both physiological and behavioural health factors within SLHS.

The evaluation of patient and provider experiences remains a strong focus in the current literature, reflecting previous findings (Simmons et al., 2022). Patient-reported satisfaction surveys remain a key measure for assessing experience of care from the patients' perspective (Bawazeer et al., 2021; Chin et al., 2024; Curran et al., 2023; Miller et al., 2024), which is a key approach within the Triple Aim. From the providers perspective, new trends

are emerging with Lee et al. (2023) assessing access to high-cost medications through pharmaceutical assistance programs, focusing on the affordability and accessibility of essential treatments. Similarly, Sultan et al. (2022) assessed medication safety and interdisciplinary collaboration while Bawazeer et al. (2021) examined student-led discharge counselling and its impact on medication adherence and patient education.

Economic evaluations in the current SLHS literature remains limited with this updated review only identifying three studies conducting some form of cost analysis. One of the more robust approaches to cost analysis was conducted by Lee et al. (2023), which involved evaluating access to high-cost medications through pharmaceutical assistance programs, providing indirect insights into potential cost savings. March et al. (2023) relied on cost estimations related to reductions in emergency dental procedures and hospital wait times, suggesting a shift in resource allocation that may lead to long-term cost reductions. Furthermore, Abdelwahab et al. (2023) suggested that given the median ED visit cost was approximated at \$1,200, that SLHS may contribute to cost reductions by diverting non-urgent cases from the ED to primary care settings. However, this study did not conduct a formal economic evaluation or cost-effectiveness analysis, relying instead on self-reported reductions in ED use as a proxy for potential cost benefits (Abdelwahab et al., 2023). Despite these examples, comprehensive economic evaluations of SLHS remain rare. While some studies provided rough estimations of cost savings, none conducted a full cost-effectiveness analysis, reinforcing a persistent gap in understanding the financial viability of SLHS (Mitchell et al., 2025).

Table 6. *Updated Analysis of Articles Against the Dimensions of the Triple Aim*

Authors	Population health	Experience of care	Cost of healthcare
Abdelwahab et al. (2022)	Upstream measures assessed via patient demographic and socioeconomic data, including income, race, and education level. Behavioural health outcomes assessed through changes in health-seeking behaviours.	Global experience of care indirectly assessed by evaluating whether patients increasingly trust healthcare providers as their primary source of medical information. Service effectiveness measured through changes in patient-reported health information-seeking behaviour.	Not assessed.
Abdelwahab et al. (2023)	Upstream measures assessed via patient demographic and socioeconomic data, including income, race, and insurance status. Downstream measures assessed through self-reported ED utilisation before and after engagement with CCC-Chelsea clinic.	Service effectiveness assessed via changes in ED utilisation. Equity considered by focusing on underserved populations, including immigrants and refugees.	Cost implications inferred from reduced ED visits, with estimated cost savings based on the median ED visit cost (\$1200 per visit).
Bawazeer et al. (2021)	Physiological health outcomes assessed via HbA1c and International Normalised Ratio (INR) for anticoagulation therapy. Patient medication adherence and drug-related problems (DRPs) identified during medication reconciliation also assessed.	Global experience of care assessed using the Patient Satisfaction with Pharmacist Services Questionnaire (PSPS.Q.20). Service effectiveness measured through 30-day readmission rates and follow-up clinic visits.	Not assessed.
Bliss et al. (2022)	Upstream factors assessed via patient demographic data, including race/ethnicity, language, and income level.	Service effectiveness assessed through clinic attendance rates before and after telehealth implementation.	Not assessed.
Chin et al. (2024)	Physiological health outcomes assessed through BP, cholesterol, and BGL readings. Behavioural characteristics assessed through self-reported motivation, knowledge, and competence in making healthier lifestyle choices.	Global experience of care assessed via patient satisfaction surveys and qualitative interviews. Service effectiveness measured through pre-post changes in self-reported knowledge and motivation.	Not assessed.

Measuring Performance in Student-led Healthcare Services

Curran et al. (2023)	Physiological health outcomes assessed through pain reduction (NPRS), functional improvement (PSFS), and quality of life (DPA SF-8).	Patient experience assessed through satisfaction surveys. Service effectiveness measured via pre–post changes in pain, function, and quality of life.	Not assessed.
Jiang et al. (2024)	Upstream factors assessed via patient demographic data, including race/ethnicity, primary language, food insecurity, employment, and insurance status. Physiological health measures included hypertension control, HbA1c levels, BMI screening, and cancer screenings.	Service effectiveness assessed via patient adherence to preventive care guidelines, including cancer screening rates, depression screening, and flu vaccination uptake. Equity of care assessed by stratifying results by language, race/ethnicity, and socioeconomic status.	Not assessed.
Lee et al. (2023)	Upstream factors assessed via patient demographic data, including insurance status and financial barriers to medication access.	Service effectiveness assessed via number of patients enrolled in PAPs, medication availability, and continued access to essential treatments.	Estimated cost savings calculated based on GoodRx and McKesson Connect pricing.
March et al. (2023)	Upstream factors assessed via patient demographic data, including Indigenous vs. non-Indigenous status, rural location, and access to oral health services.	Service effectiveness assessed via changes in service utilisation trends. Patient access was measured via wait times and increased engagement with services.	Estimated financial value of services provided (~AUD \$1 million over three years).
Miller et al. (2024)	Individual health outcomes assessed via self-reported ADL performance, FIM score and cognitive subscales.	Service effectiveness assessed via patient satisfaction survey focusing on accessibility, task relevance, and student interactions.	Not assessed.
Park et al. (2023)	Individual health outcomes assessed via depression screening (PHQ-9 scores).	Service effectiveness assessed via patient referral success rate and engagement with psychiatric services.	Not assessed.
Powell et al. (2021)	Individual health outcomes assessed via depression severity scores (PHQ-9), and anxiety severity scores (GAD-7).	Service effectiveness assessed via increased medication adherence following on-site dispensing. Patient experience captured through qualitative interviews, assessing barriers to medication adherence and perceived benefits of on-site dispensing.	Not assessed.
Powell et al. (2022)	Individual health outcomes assessed via PHQ-9 and GAD-7 scores to track depression and	Service effectiveness assessed via HEDIS performance benchmarks comparing the clinic’s mental health services to NYS Medicaid, PPO, and HMO	Not assessed.

Measuring Performance in Student-led Healthcare Services

	anxiety symptom severity. Medication adherence was also measured.	populations. Patient experience measured through satisfaction surveys evaluating provider communication and perceived quality of care.	
Simon et al. (2022)	Physiological health outcomes assessed via HbA1c levels, BP monitoring, and adherence to preventive screenings (kidney function, eye exams, flu vaccination, and statin therapy).	Service effectiveness assessed through comparison of pre-pandemic and pandemic diabetes care quality measures.	Not assessed.
Sultan et al. (2022)	Physiological health outcomes assessed through medication appropriateness using the STOPP/START criteria.	Service effectiveness assessed through comparison of medication review outcomes between the student-led intervention group and standard care control group.	Not assessed.
Zhou et al. (2022)	Physiological health outcomes assessed through changes in depression severity (PHQ-9 scores) and anxiety severity (GAD-7 scores).	Service effectiveness assessed through retention in therapy, engagement in psychiatric services, and pre-post symptom reduction in PHQ-9 and GAD-7 scores.	Not assessed.

2.8.3 *Updated Review Conclusion*

Overall, the conclusions of the original review remain valid; however, the updated review provides new insights that further refine and expand upon these findings. Methodological limitations persist, though there is greater use of comparative designs and prospective data collection. Experience of care is now more frequently measured from the patient's perspective, but safety concerns and continuity of care assessments remain absent. Equity remains underexplored, though some studies indirectly address disparities. Cost evaluation remains a major gap, despite slight improvements in cost estimation. Finally, the Triple Aim framework remains insufficient for fully evaluating SLHS, reinforcing the need for a more comprehensive evaluation model that integrates student learning outcomes and placement experiences. Future research should prioritise economic evaluations, standardised equity measures, and long-term patient tracking, while also addressing student learning experiences within SLHS.

Chapter 3: Evaluating Allied Health Clinical Placement Performance: Protocol for a Modified Delphi Study.

In recognition that the Triple Aim framework does not sufficiently consider the provider perspective in care delivery, Chapter 3 outlines the protocol for a modified Delphi study to gain the placement provider perspective. In the context of Student-led Healthcare Services (SLHS), the provider's perspective includes both students and supervisors, whose experiences are central to placement performance. The Delphi study was designed to generate consensus on the most important areas of measurement for evaluating clinical placement performance from this broader provider perspective, expanding on the Triple Aim framework. Establishing a rigorous protocol was essential to ensuring the credibility and relevance of the Delphi process detailed in the subsequent chapter. This stage of the research addresses Research Question 2 and is highlighted in the overall thesis structure (Figure 1).

Chapter 3 is based on the following published work:

Simmons, L., Barker, R., & Barnett, F. (2023). Evaluating allied health clinical placement performance: Protocol for a modified Delphi study. *JMIR Research Protocols*, 12, e44020. <https://doi.org/10.2196/44020> (see 10.3 Appendix 3 for publication).

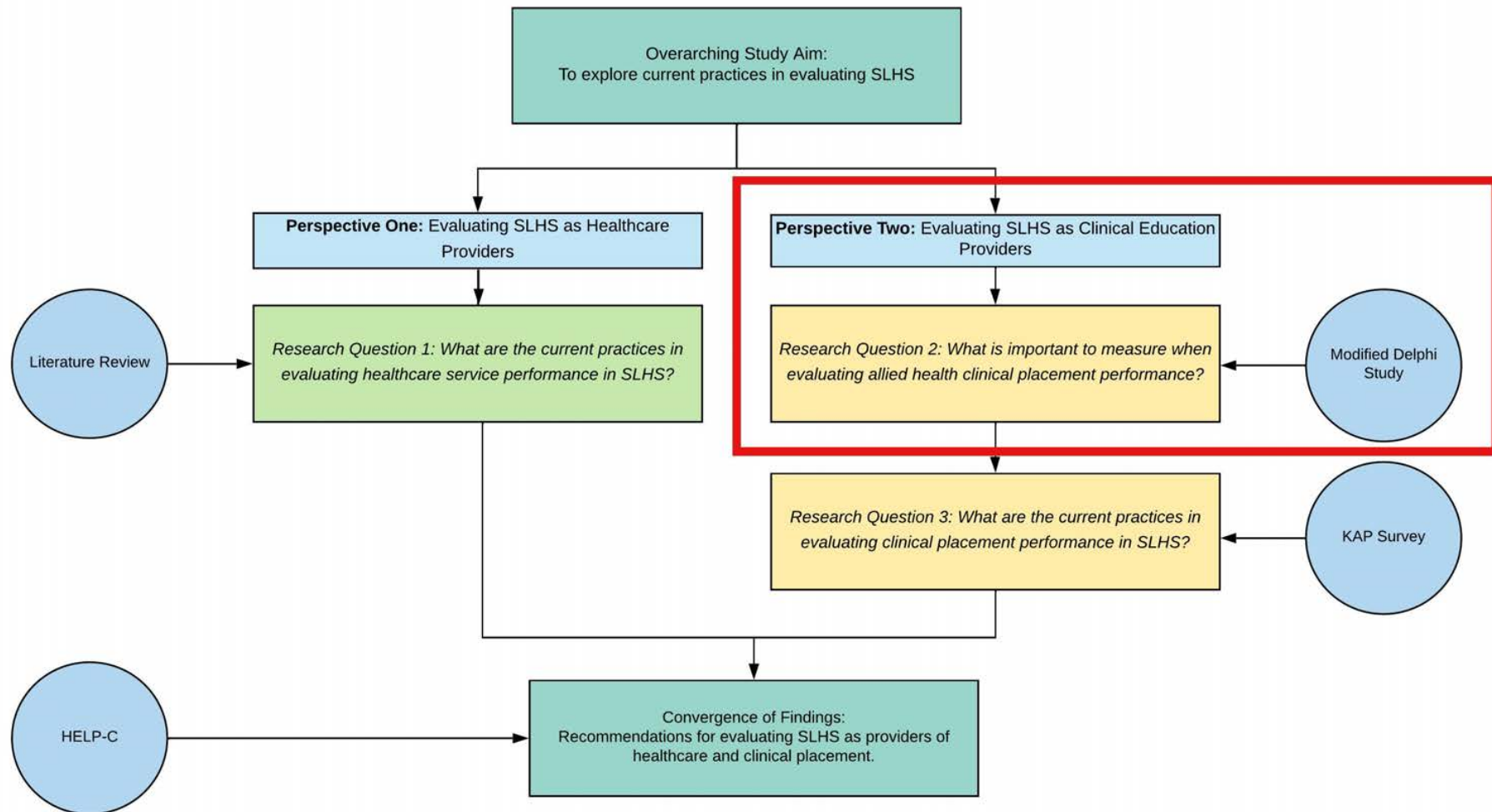


Figure 1. Thesis Structure Highlighting the Focus of Chapter 3 and Research Question 2

3.1 Abstract

Background: University affiliated Student-led Healthcare Services (SLHS) have emerged in response to the challenges faced by universities in securing quality clinical placements for healthcare students. Evidence of the healthcare benefits and challenges of SLHS is growing, while evidence of clinical placement performance remains variable and not generalizable. Though there have been previous attempts to develop a framework for evaluation of clinical placement performance, concerns have been raised about the applicability of these frameworks across the various placement settings. Additionally, the perspectives of all key stakeholders on the critical areas of clinical placement performance have yet to be considered. Hence the aim of this paper is to outline a protocol for a modified Delphi study designed to gain consensus on what is important to measure when evaluating an allied health student clinical placement performance.

Objective: Our study objective is to gather information on areas of measurement related to student learning outcomes, experience of placement and costs of placement and then develop consensus on which of those areas need to be included in a framework for evaluation of clinical placement performance within the context of SLHS. The aim of this paper is to outline a protocol for a modified Delphi study designed to gain consensus on what is important to measure when evaluating an allied health clinical placement.

Methods: In a modified Delphi study, up to 30 experts will be recruited to a heterogeneous expert panel. Experts will consist of those with firsthand experience either coordinating, supervising or undertaking clinical placement. Purposive sampling will be used to ensure maximum variation in expert panel member characteristics. Experts' opinion will be sought on measuring student learning outcomes, student experience and cost of clinical placement, and other areas of clinical placement performance that are considered important. Three rounds will be conducted to establish consensus on what is important to measure when evaluating clinical placement. In each round, quantitative data will be analysed descriptively and used to determine consensus which will be defined as $\geq 75\%$ agreement. Qualitative responses will be analysed thematically and used to inform the subsequent round. Findings of each round will be presented, both consensus data and qualitative responses in each subsequent round, to inform expert panel members and to elicit further rankings on areas of measurement yet to achieve consensus.

Conclusions: The modified Delphi approach, supported by existing research and its ability to gain consensus through multi-round expert engagement, provides an appropriate methodology to inform the development of a framework for the evaluation of clinical placement performance in allied health service.

3.2 Introduction

Universities face many challenges in sourcing and securing clinical placements for health professional students (Frakes et al., 2011). For regional universities, there is the added pressure of limited healthcare services from which to secure sufficient clinical placements (Barker et al., 2017). The cost associated with paid placements is also a major concern, as paid placements can potentially create issues around placement outcomes and add to the financial burden on universities (Copeland, 2020; Patrick et al., 2008). For example, the question for universities securing paid placements is whether the student learning outcomes or the student experiences achieved in these placements are equivalent to the amount paid. Conversely, the question may be whether an equivalent or greater outcome could be achieved through an alternate clinical placement. Placement providers also report increased costs associated with supervising students on clinical placement including loss of productivity when working with inexperienced students; increased recruitment requirements to manage the additional workload; supervision of students on top of clinical workloads and procuring and maintaining state of the art equipment for teaching (Bowles, et al, 2014). Cost of clinical placement to the clinical placement provider has been estimated to be an average of \$34,326 (AUD) per year for one student (Bowles, et al., 2014), influencing a healthcare provider's ability to offer placements without compensation (Patrick et al., 2008). As a result, university-affiliated Student-led Healthcare Services (SLHS) have emerged to address the many challenges faced by universities in securing quality clinical placements for health professional students (Stuhlmiller & Tolchard, 2015).

Student-led Healthcare Services are often seen as innovative healthcare models providing much needed services to disadvantaged or underserved populations (Stuhlmiller & Tolchard, 2018). There is mounting evidence supporting the benefits of SLHS as both adequate providers of care and attractive educational opportunities (Beckman et al., 2022). In a recent study, allied health students co-designed and implemented a health service in a

remote Aboriginal community in northern Australia, where students learnt how to adapt their skills and approaches to the cultural needs of the Aboriginal community (Bird et al., 2022). However recent reviews of the outcomes of SLHS more broadly, indicate the need for more rigorous reporting (Suen et al., 2020), with more specific attention to students' skill development, knowledge and behaviour required (Schutte et al., 2015). If students are not adequately prepared to operate in a fashion similar to that of qualified healthcare professionals, then it is possible that undertaking placement in a SLHS may be detrimental to their learning outcomes and overall experience of placement. Conversely, providing students with the ability to operate in authentic clinical environments where they can collaborate and regulate their own learning needs, may improve overall student experience. Current findings from evaluations of SLHS as providers of clinical placement lack generalisability (Marsh et al., 2015; Schutte et al., 2015) and there is little consensus on the most critical educational outcomes that need to be measured when students are on placement within these settings (Marsh et al., 2015). Therefore, further research is needed to establish a consensus on how to evaluate SLHS as clinical placement providers.

Clinical placement evaluation has typically been specific to a single element of student experience, for example student confidence (Wright et al., 2018) or student satisfaction (Froberg et al., 2018); or alternatively, a specific learning outcome related to a single health profession, such as clinical competency of Physiotherapy students. To effectively evaluate the performance of SLHS as providers of clinical placement, all elements of the experience that are deemed to be important must be considered together. Furthermore, an evaluation framework that can be applied to SLHS, which includes elements of placement performance specific to the needs and expectations of the student, the placement supervisor, the placement co-ordinator and to the profession is required.

Applying an evaluation framework across various health professions and healthcare services, is not without its challenges. Previous national stakeholder consultation on use of a universal framework indicated that disciplinary and contextual differences in supervision would impact on the effectiveness of such a framework (Siggins Miller Consultants, 2012). Therefore, any framework used to evaluate the quality of clinical placement needs to be consultative, collaborative and comprehensive, so that it can accurately assess clinical placement performance across different healthcare settings. In addition, the framework needs to be all-encompassing and flexible so that it can be applied across different clinical

placement models and different health professions (Siggins Miller Consultants, 2012). A framework that can be used to effectively evaluate all clinical placement will offer the opportunity for standardisation and comparability, but more importantly measure the quality of placement experience, enable quality improvement and enhance educational opportunities (Cooper et al., 2020; McAllister et al., 2018).

Previous studies that have utilised a Delphi approach to evaluate clinical placement, or to identify factors influencing clinical placement quality, predominately exist within the medical, nursing and allied health literature. For example, the Delphi approach has been used to engage clinical placement key stakeholders to revise clinical placement evaluation tools in Physiotherapy (Mori et al., 2019), as well as to generate expert consensus between Nurse Clinical Educators to identify important factors influencing student learning during clinical placement (McTier et al., 2023). Additionally, a modified Delphi approach was adopted to identify key features within a quality measures framework to guide clinical placement in Allied Health, Dentistry, Medicine and Pharmacy (McAllister et al., 2018). These studies support previous notions that current tools and approaches to evaluating clinical placement quality are limited in their generalisability and that key factors influencing performance in clinical placement need to be considered i.e. student learning outcomes, experience of placement and cost of placement.

The aim of this chapter is to outline a protocol for a modified Delphi study designed to gain consensus on what is important to measure when evaluating an allied health clinical placement. Our study objective is to gather information on areas of measurement related to student learning outcomes, experience of placement and cost of placement and then reach consensus on which of those areas need to be included in a framework for evaluation of clinical placement performance within the context of SLHS.

3.3 Methods

3.3.1 *The Delphi Method*

A three-round modified Delphi study design will be conducted to establish consensus on what is important to measure when evaluating clinical placement, from the perspective of

students, placement supervisors and co-ordinators, as experts with firsthand experiences of clinical placement.

The Delphi is a mixed methods approach to systematically collect judgments and opinions on a topic, through sequential questionnaires to gain respondents feedback on responses from earlier rounds of questioning (Murry & Hammons, 1995). The primary aim of the Delphi technique is to obtain consensus amongst a selected panel of 'experts'. This approach will allow for drilling down into common areas of clinical placement through multiple rounds of questioning, as well as analysis of conflicting and common viewpoints through statistical methods (Rowe & Wright, 2001). The Delphi technique has been used extensively in higher education, health and social sciences to inform the development of criteria, forecasting, issue prioritisation, policy formation and framework development (Efsthathiou et al., 2008; Veugelers et al., 2020).

Approaches to using the Delphi technique have evolved over time, which has led to some criticism on the validity of this approach. At the heart of the Delphi technique, is the ability to form consensus between experts within a particular field. However, there is currently no set level for consensus (Veugelers et al., 2020), with consensus previously set anywhere from 51% to 100% (Keeney et al., 2011). Additionally, previous studies indicate that panel size and the area of investigation influences consensus (von der Gracht, 2012) and consideration needs to be given to achieving an expert panel of an appropriate size and make up (Keeney et al., 2011).

Anonymity, iteration, controlled feedback, and statistical stability of consensus are essential components of the Delphi approach (Nasa et al., 2021). However, the time it takes to complete these types of studies is often under-predicted (Veugelers et al., 2020) and has been found to influence low response rates in later rounds (Keeney et al., 2011; Veugelers et al., 2020; von der Gracht, 2012). The several adaptations of the Delphi technique have also received criticism, as many Delphi studies lack detailed methodologies, influencing their reproducibility (Nasa et al., 2021; Veugelers et al., 2020). Additionally, the relevance of using 'experts' to inform research has been questioned (Keeney et al., 2011; von der Gracht, 2012), as expert opinion is considered inferior to higher regarded evidence-based methods (Evans, 2003; Nasa et al., 2021). The term expert has also broadened over time and is now not only used to refer to an individual's scientific/professional expertise, but can include patients or users of an intervention to create diversity within the expert panel (Niederberger &

Spranger, 2020). It is not clear what the effects of a heterogeneous expert panel has on consensus building (Niederberger & Spranger, 2020), however this has become a defining feature within the Delphi technique (Barrett & Heale, 2020).

Currently, no proven quality indicators for Delphi studies exist (Niederberger & Spranger, 2020). However, the Delphi technique does provide an opportunity to draw on the experiences and expertise of a range of key stakeholders with a diverse set of perspectives in an iterative process where complex ideas can be examined and built on to form consensus. Therefore, considering the limitations of this approach, it is crucial to plan and set standards prior to commencing the process to improve the robustness of the Delphi technique (Nasa et al., 2021).

3.3.2 Expert Panel Members

A minimum of 18 and maximum of 30 experts will be recruited to the expert panel, with a minimum of six members (hereafter referred to as ‘the experts’) for each identified group (i.e., recent allied health graduates, placement supervisors and placement coordinators). This panel size is viewed as manageable, where available resources can be applied to vigorously promote high response rates within rounds (de Villiers et al., 2005). To achieve heterogeneity within the panel, purposive sampling to ensure maximum variation in expert characteristics will be undertaken. Experts will consist of those with firsthand experience either coordinating placement, supervising placement or undertaking clinical placement. All experts will be aged over 18 years, be an Australian resident and English speaking. Additionally, clinical placement coordinators will be required to be employed within an Australian university allied health program, with involvement in coordinating or undertaking assessment of clinical placement within the last 2 years; clinical placement supervisors will be required to be located within Australia and have had supervised allied health students from Australian based universities within the last 2 years; and graduates will be required to have completed their allied health program within the last 12 months from an Australian university, successfully completing a clinical placement subject of an applied or immersive nature (e.g. not solely an observational placement).

Consistent with the Delphi technique, the aforementioned approach to sampling will elicit expert opinion on the topic in question, and the disciplinary areas of expertise required (Hsu & Sandford, 2007). Suitability of panel membership has been generally based on a

background or experience concerning the target issue and an ability to contribute helpful inputs to the questions being asked (Hsu & Sandford, 2007). Heterogeneity of the expert panel, as a critical feature within the Delphi technique (Hsu & Sandford, 2007), is required to maintain quality in research design and uncover the entire spectrum of opinion on the topic (Keeney et al., 2011).

3.3.3 Expert Panel Member Recruitment

Potential experts will be identified, and if interested, will be invited to register via an electronic short survey sent via email. In the survey, they will be asked to confirm their interest to take part in the study or to forward to other potential experts meeting the target group criteria. The eligibility of potential experts who have registered will be assessed and if deemed to meet the target group criteria, will be invited to participate in the study.

Placement supervisors will be identified based on their previous or current involvement in hosting allied health students on clinical placement. Placement supervisor information from across Australia will be identified via the James Cook University (JCU) placement software database (InPlace) and by snowball sampling. InPlace is an online software application developed by QuantumIT Pty Ltd to enable universities to identify supervisors for a given site, coordinate and manage clinical placements and store data on placement contact information (InPlace software, <https://quantumit.com.au/>).

Placement coordinators will be identified by their previous or current involvement in coordinating clinical placement within Australian universities. Placement coordinator information will be identified through academic role descriptions on Australian university websites and membership details within discipline specific clinical placement committees.

Recent graduates will be identified by their past enrolment in a placement subject within an Australian university allied health program. This information will be identified through JCU alumni networks and snowball sampling whereby contact will be made with key people within clinical placement partnerships and those who hold key positions within Australian universities to identify members of the target groups who meet the inclusion criteria. Key people within clinical partnerships will include national clinical placement committed groups within professional registration bodies (e.g. Exercise and Sport Science Australia, Australian Health Practitioner Regulation Agency, Occupational Therapy Australia,

Speech Pathology Australia, etc.) and existing placement arrangements with external clinical placement sites.

3.3.4 Panel Characteristics

Purposive sampling of experts to ensure equal representation across placement coordinators, placement supervisors and recent graduates and to achieve maximum variation in expert characteristics, will be conducted using a matrix method to gain representation based on geographical location, experience and exposure to clinical placement, as well as the allied health profession they represent. Table 1 outlines the expert panel selection criteria and the specific factors of variation intended to be achieved through purposive sampling techniques.

Table 1. *Selection Criteria and Considerations for Variation in Expert Panel Members.*

Placement Coordinators	Placement Supervisors	Recent Graduates
Duration in the role of placement coordinator.	Level of experience supervising students on clinical placement.	Level of exposure to areas of practice while on placement.
Geographical locations of placements coordinated i.e., rural/remote, regional or metropolitan areas.	Geographical locations of previous and current employment i.e., rural/remote, regional or metropolitan areas	Geographical locations of placements completed i.e., rural/remote, regional or metropolitan areas.
Types of clinical placement coordinated e.g., student-led, role-emerging, traditional, interdisciplinary, etc.	Types of clinical placement supervised e.g., student-led, role-emerging, traditional, interdisciplinary, etc.	Types of clinical placement completed e.g., student-led, role-emerging, traditional, interdisciplinary, etc.
Allied health discipline for which they coordinate placement.	Allied health discipline for which they currently supervise.	Allied health discipline from which they graduated.

3.3.5 Survey Design and Facilitation within Delphi Rounds

The Delphi technique employs several “rounds” whereby a series of questionnaires are provided to experts until consensus is reached (Keeney et al., 2011). Following each

round, a summary of results from the previous round is provided to the experts to either gain consensus or elicit further discussion (Keeney et al., 2011). In this study, three or more consensus rounds will be conducted with survey questionnaires sent to each expert electronically.

Like that of a classical Delphi, the survey design will utilise open ended questions, aimed at facilitating idea generation and eliciting opinion (Keeney et al., 2011). Three overarching themes, predetermined via a review of the literature, will be used to identify common areas of measurement when evaluating SLHS and clinical placement. These overarching themes include: 'Learning Outcomes', 'Student Experience' and 'Cost of Placement'.

A pilot questionnaire for round one will be tested with a small sample of people including one allied health placement supervisor, one recent graduate and one allied health academic to ensure clarity of each question (Müllersdorf & Ivarsson, 2011). Table 2 outlines open-ended questions 1 to 5 that will be included in the round one questionnaire.

Table 2. *Proposed Round One Survey Questions.*

Question 1: Reflecting on previous experience, what is important to measure when evaluating clinical placement?

Question 2: When evaluating learning outcomes of clinical placement, please describe what variables to measure. (Provide an example where necessary)

Question 3: When evaluating student experiences of clinical placement, please describe what variables are essential to measure. (Provide an example where necessary)

Question 4: When evaluating costs associated with clinical placement, please describe what variables are essential to measure. (Provide an example where necessary)

Question 5: Is there any additional information that you would like to provide in relation to what is important to measure when evaluating clinical placement?

Question 1 is designed to set the scene and encourage the experts to respond to the question more broadly, without leading their responses. Questions 2 to 4 are designed to solicit information around specific areas of clinical placement related to the predetermined themes and to direct experts to consider what specific areas of clinical placement, or 'sub

themes' of measurement, exist when evaluating clinical placement. The final question in the survey will allow experts to discuss other areas of clinical placement evaluation, not yet covered.

Round 2 will include a structured questionnaire that will focus on areas of measurement identified in round one and relate to the overarching themes of Learning Outcomes, Experience of Placement and Cost of Placement. Experts will rank the level of importance for each area of measurement using a four-point Likert scale ranging from (1) not very important to (4) very important (Müllersdorf & Ivarsson, 2011). Experts will be given the opportunity to provide suggestions on any current methods of measurement for each of the proposed areas of measurement, which then will be analysed and presented in subsequent rounds (Che Daud et al., 2015).

In Round 3, a list of prioritised areas of measurement from the previous round will be presented. Experts will be asked to rank their level of agreement on the areas of measurement required, using two options; agree or disagree. Additionally, any specific methods of measurement identified in round 2 will be ranked using a five-point Likert scale ranging from (1) least effective to (5) most effective (Müllersdorf & Ivarsson, 2011). Once again, experts will be invited to provide free text comments to further explain their position.

3.3.6 Data Collection

All responses will be captured using the Qualtrics online survey platform (Qualtrics software, Version 2009. <https://www.qualtrics.com>). For each round, each expert will be sent a unique web link to access the surveys. Expert panel members will be provided with a minimum of 4 weeks to complete all surveys within each round, with only those who participated in prior rounds being invited to participate in subsequent rounds. Weekly reminder emails will be sent to each expert until each round is completed. Once the final deadline is reached, surveys will be closed to all experts and responses will be analysed prior to commencing the next round. Each survey will take no more than 40 minutes to complete and all responses will be de-identified and coded to maintain anonymity between experts.

3.3.7 Data Analysis

Round 1 responses will be analysed using thematic analysis to generate themes related to 'Learning Outcomes', 'Experience of Placement' and 'Cost of Placement', as well as any

additional themes identified through the process. The thematic analysis will follow Braun & Clark's six-phase framework for analysing qualitative data (Braun & Clarke, 2012). These steps include becoming familiar with the data, generating initial codes, searching for themes, reviewing and defining themes, as well as the final write up (Braun & Clarke, 2012).

Qualitative data analysis software, NVivo, will be used to code and group data (Nvivo software, Version 12, <https://www.qsrinternational.com>). Additionally, triangulation will occur between the main research team (LS, FB and RB) and an independent researcher with experience in thematic analysis to ensure validity of our assumptions through the convergence of themes from different sources (Carter et al., 2014).

Round 2 and 3 quantitative data will be analysed using percentage of agreement to confirm whether consensus had been achieved. As identified in other Delphi protocols within health and education fields, combined scores of importance and agreement must equal $\geq 75\%$ to achieve consensus (Havers et al., 2019). In accordance with Round 1, qualitative data from Round 2 and 3 will be analysed thematically, where common themes will be identified and presented as statements in subsequent rounds.

3.3.8 Ethical Considerations

Informed consent will be obtained prior to participating in the research project via a unique electronic link, which will form the first page of the questionnaire in round one. Expert anonymity will be maintained through coding of participant responses and any identifying information will not be linked with any research materials or questionnaires developed through the modified Delphi process or in the outputs that result from this research. Additionally, no compensation will be offered to selected experts for their participation in this study.

Ethical approval has been obtained through the James Cook Human Research Ethics Committee (approval number H7541).

3.4 Discussion

The aim of this modified Delphi study is to obtain consensus from a panel of experts on how to measure the salient areas of student learning outcomes, student experience and cost

of clinical placement and to gain valuable insight into the important areas of clinical placement measurement. The outcomes of this project are intended to inform development of a framework for evaluation of clinical placement performance.

The strength of using a modified Delphi study design for this proposed study, is that it will allow for multiple perspectives from the range of stakeholders whose experiences are influenced by clinical placement performance. As a result, experts will be drawn from a variety of backgrounds to produce heterogeneity and will ensure investigation of the full scope of opinions associated with the topic (Keeney et al., 2011). The Delphi principle of anonymity also provides strength to this study's design, as it offers an equal chance for each expert to respond in a fashion that is unbiased by the identities of the other panel members (Mannix et al., 2009). By maintaining communication through electronic means and providing de-identified results in each subsequent round, this study will ensure each expert can react independently, eliminating subject bias and avoiding the potential of power influenced dynamics between experts (Barrett & Heale, 2020).

Within the Delphi approach the notion exists that members of the panel are experts in the area of interest, where the term 'expert' has been defined as a group of 'informed individuals', or as 'specialists' in their field, or someone who is knowledgeable in a specific subject (Keeney et al., 2011). Within the current study the definition of 'expert' is based on key stakeholders of clinical placement, which is commonly identified as students, universities, placement supervisors and the organisations in which placement takes place (Ecken et al., 2011; Patrick et al., 2008), all of which, significantly influence clinical placement quality and performance. Incorporating the knowledge, views and experiences of key stakeholders is critical to determining a best practice approach to the evaluation of clinical placement performance. Criticism of the expert opinion sought within the Delphi approach applies to the terminology used, determining who is an expert and what degree of expertise is required to offer opinion (Keeney et al., 2011). Expert opinion has also been criticised as a poor basis for making judgements on a topic and that researchers should consider whether the research question could be better answered through a systematic review (Critcher & Gladstone, 1998). However current systematic reviews on clinical placement performance in SLHS identified limitations in the overall quality and generalisability of the research (Dekker et al., 2015; Marsh et al., 2015; Suen et al., 2020). Therefore, this study will

inform the critical appraisal of studies that intend to evaluate SLHS as providers of clinical placement and whether this is aligned to key stakeholder perspectives.

Consensus will be determined in this study using percentage of agreement, where scores of importance, effectiveness and agreement must equal $\geq 75\%$ to be deemed consensus. As seen in similarly designed studies (de Villiers et al., 2005; Havers et al., 2019), this approach favours the majority, but also allows for the anticipated variability in opinion from a heterogeneous expert panel. As a group of experts are unlikely to demonstrate 100% agreement, consensus forming is the essence of the Delphi technique, wherein an appropriate level of consensus needs to be determined to avoid bias (Critcher & Gladstone, 1998). Determining consensus remains a contentious issue with critics of the Delphi approach (de Villiers et al., 2005; Keeney et al., 2011), however most Delphi researchers agree that the approach needs to be determined in advance and that resistance to consensus needs to be considered carefully, as this will yield new perspectives on the topic in question and will require further investigation (Critcher & Gladstone, 1998; de Villiers et al., 2005).

3.5 Conclusion

This protocol paper describes a modified Delphi study design, to explore key stakeholder perspectives on important areas of clinical placement performance measurement, related to Learning Outcomes, Experience of Placement and Cost of Placement. Despite the limitations of the Delphi approach, existing research and its ability to gain consensus through multi-round expert engagement supports this methodology as appropriate to inform the development of a framework for the evaluation of clinical placement performance. As such, the outcomes of this study are intended to form part of a framework for the evaluation of allied health SLHS.

Chapter 4: Evaluating Clinical Placement Performance in Allied Health Student-led Healthcare Services: A Modified Delphi

Following the presentation of the Delphi protocol in Chapter 3, Chapter 4 reports the findings of the modified Delphi study. This chapter details how stakeholder priorities were identified and refined across multiple rounds, culminating in a set of important areas of measurement that will form the basis to expanding the Triple Aim framework. As in the previous chapter, this component of the research addresses Research Question 2, focusing on what is important to measure when evaluating allied health clinical placement performance. The corresponding section of the thesis structure is illustrated in Figure 1.

Chapter 4 is based on the following two publications:

Simmons, L., Barker, R., Barnett, F., & McGuckin, T. (2024). Evaluating clinical placement performance: What is important to measure? In *ANZAHPE 2024: Cultivating Innovation Abstract Book* (p. 183). ANZAHPE. Abstract presented at the ANZAHPE 2024 Festival, 1–4 July, Adelaide, SA, Australia (see 10.4: Appendix 4 for publication).

Simmons, L., Barker, R., Barnett, F., & McGuckin, T. (2025). Evaluating clinical placement performance in allied health student-led healthcare services: A modified Delphi study. *Australian Journal of Clinical Education*, 14(1), 19–45.
<https://doi.org/10.53300/001c.136339> (see 10.5 Appendix 5 for publication)

Measuring Performance in Student-led Healthcare Services

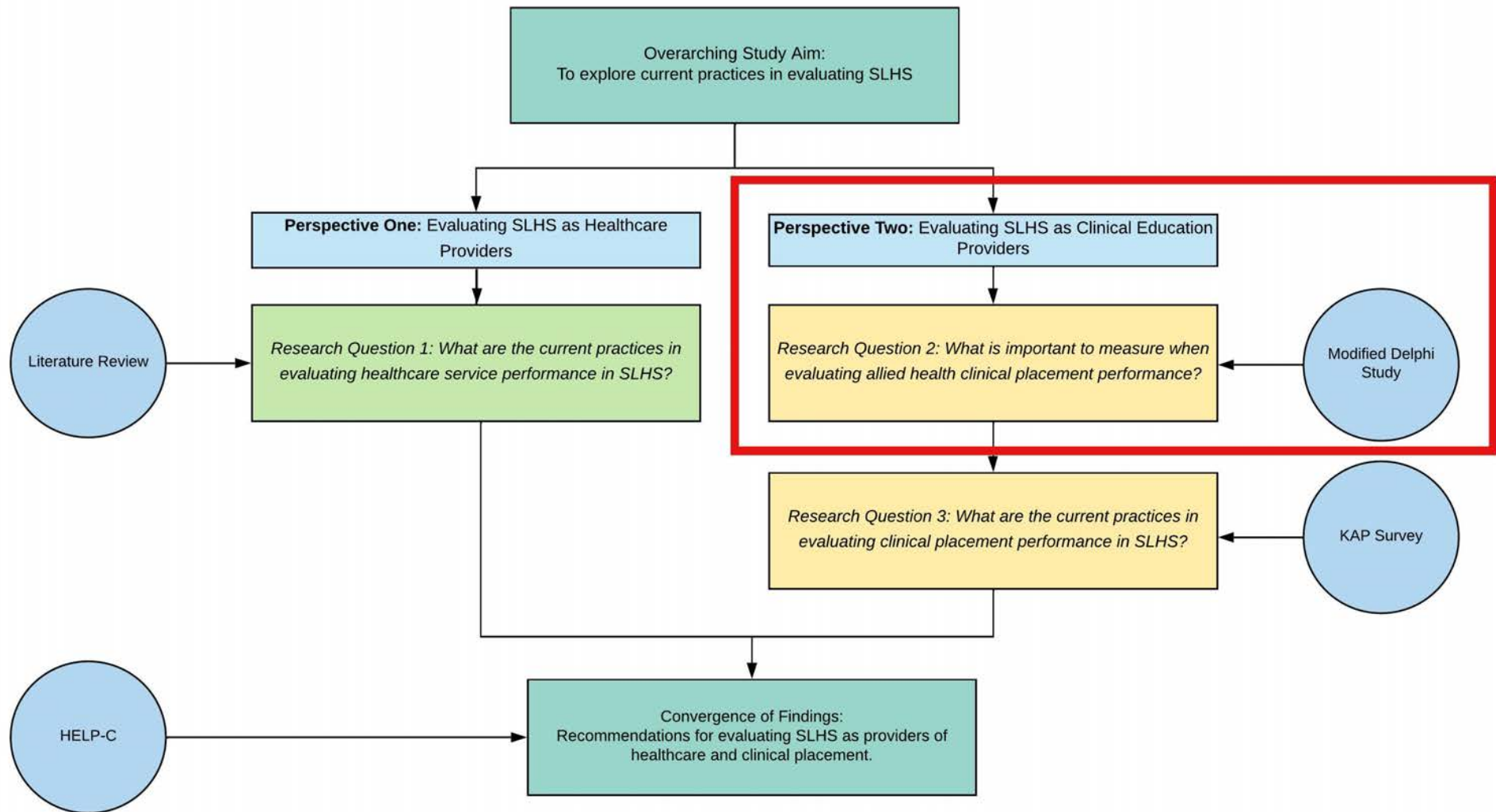


Figure 1. Thesis Structure Highlighting the Focus of Chapter 4 and Research Question 2

4.1 Abstract

Introduction: University-affiliated Student-led Healthcare Services (SHS) have emerged to address challenges in securing quality clinical placements. As the benefits and challenges of SLHS emerge in recent literature, it is important to identify key measurement areas that will help stakeholders evaluate placements, allowing for standardisation, comparability, and quality improvement. This study aims to achieve consensus among key stakeholders on important areas of measurement for evaluating clinical placement performance in SLHS.

Methods: A three-round modified Delphi study was conducted with 18 experts using purposive sampling to ensure diverse firsthand experience in clinical placements. Each round yielded quantitative (e.g. percentage of agreement) and qualitative (e.g. free text responses) data. Quantitative data were analysed to determine consensus with $\geq 75\%$ agreement, and qualitative responses thematically analysed.

Results: Round one identified 47 areas of measurement for evaluating clinical placement. In rounds two and three, consensus was established on 43 areas of measurement related to four overarching themes: Learning Outcomes, Experience of Placement, Cost of Placement, and Research in Clinical Placement.

Conclusions: The findings provide a solid foundation for evaluating clinical placements across various models, including SLHS, and offer valuable insights to guide future research into evaluating clinical placements.

4.2 Introduction

Ensuring access to high-quality clinical placements remains a persistent challenge for universities, particularly those in regions with limited healthcare infrastructure (Barker et al., 2017; Frakes et al., 2011). Paid placements exacerbate this issue by imposing financial burdens on universities, and they often fail to deliver student outcomes that justify the costs, leading institutions to explore alternative models (Copeland, 2020; Patrick et al., 2008). Additionally, placement providers face increased costs due to reduced productivity, recruitment demands, and the need for additional supervision (Forbes, 2022). Compounding

the problem, students face financial hardship from travel and limited income, negatively impacting their placement experience (Wray & McCall, 2007).

To address these challenges, university-affiliated Student-led Healthcare Services (SLHS) have emerged as an alternative placement model. These services offer essential care in resource-limited areas while providing students with authentic, immersive learning opportunities (Larkins et al., 2014; Stuhlmiller & Tolchard, 2015). Recent research has affirmed the dual benefits of SLHS for both education and service delivery (Beckman et al., 2022; Bird et al., 2022). However, recent reviews highlight the need for a more rigorous evaluation of student skills and professional readiness (Schutte et al., 2015; Suen et al., 2020), as current assessments lack generalisability and consensus on key educational outcomes (Marsh et al., 2015; Schutte et al., 2015). To evaluate SLHS, a comprehensive strategy that considers the needs of students, supervisors, coordinators, and their professions is required.

Evaluating clinical placement performance across diverse health disciplines and service contexts requires frameworks that extend beyond discipline-specific tools. Previous national consultations emphasised that supervision models and professional expectations vary considerably across health professions (Siggins Miller Consultants, 2012). Consequently, while universal frameworks provide a starting point, their effectiveness depends on adaptability, inclusivity, and the ability to reflect placement-specific contextual factors. An evaluation model must strike a balance between standardisation and responsiveness to local variations in practice, supervision, and service delivery (Cooper et al., 2020).

Although the literature contains numerous studies that attempt to define and improve clinical placement quality, most have focused on specific professions or learning domains (McTier et al., 2023; Mori et al., 2019;). These initiatives continue to highlight the need for more integrated models that account for student learning outcomes, placement experience, and economic factors. While universal frameworks for clinical placement evaluation are available, they too often fall short in comprehensively assessing specific aspects of clinical placement performance. The Best Practice Clinical Learning Environment (BPCLE) framework (Darcy Associates, 2013a) is supported as providing structured guidance on effective learning within authentic clinical environments, but it inadequately addresses specific requirements for effective clinical supervision (McAllister et al., 2018; Siggins Miller Consultants, 2012;), patient care outcomes or cost considerations critical for models

like SLHS (Suen, 2020). Similarly, competency-based approaches emphasise skill acquisition but often overlook broader experiential factors such as learning environment diversity and equity in clinical placements (Ross et al., 2018; Zhang et al., 2022).

This chapter presents the findings of a modified Delphi study designed to establish consensus on the most important areas for measuring clinical placement performance. Building on the protocol outlined in Chapter 3, it reports the consensus process and results that inform a more comprehensive, stakeholder-driven framework for evaluating placements, particularly within the SLHS context.

4.3 Methods

A three-round modified Delphi study was conducted to gather information and achieve consensus on the important factors to measure when evaluating clinical placements. The expert panel (hereafter referred to as ‘experts’) comprised of individuals with diverse expertise and perspectives (i.e. students, placement supervisors, and placement coordinators), which served as the primary source of insights and opinions in the study. Ensuring equal representation from each stakeholder group allowed for a comprehensive understanding of clinical placement performance, integrating the unique perspectives of those coordinating, supervising, and directly participating in clinical placements. Please refer to the published protocol for detailed information on expert recruitment and survey design for this study (Simmons et al., 2023).

4.3.1 Modified Delphi Rounds

In Round 1 of this modified Delphi, the primary goal was to gather a broad range of ideas and perspectives from the expert panel regarding the overarching themes of Learning Outcomes, Experience of Placement, and Cost of Placement. One survey questionnaire was distributed to the panel, involving open-ended questions, to generate initial input on areas that should be considered when evaluating clinical placements. To ensure clarity of each question, a pilot questionnaire was tested with a small sample of people including one allied health placement supervisor, one recent graduate and one allied health academic to ensure clarity of each question (Müllersdorf & Ivarsson, 2011). Responses were analysed thematically and presented in Round 2 (Che Daud et al., 2015).

Round 2 involved three survey questionnaires, each pertaining to one or more overarching themes. Survey 1 focused on presenting themes and areas of measurement associated with Learning Outcomes, Survey 2 explored Experience of Placement, and Survey 3 focused on presenting areas of measurement associated with Cost of Placement and Research in Clinical Placement. Experts were asked to rank the level of importance for each area of measurement using a four-point Likert scale ranging from (1) not very important to (4) very important (Müllersdorf & Ivarsson, 2011). Experts were also given the opportunity to provide free text responses, which were analysed thematically and presented in subsequent rounds (Che Daud et al., 2015).

In Round 3, two survey questionnaires were sent to the experts. Survey 1 focused on presenting areas of measurement associated with experience of placement and Survey 2 focused on Cost of Placement and Research in Clinical Placement. In Survey 1, consensus data for the two areas of measurement that did not reach consensus in Round 2 were presented. Experts were then asked to indicate whether they agreed or disagreed with the area of measurement as not being important to measure. In Survey 2, statements that were collated from Round 2 were presented. Experts were asked to rank their level of agreement for each statement presented, using either agree or disagree. Furthermore, experts were invited to provide free text comments to explain their position further.

4.3.2 Data Collection

All responses were captured using the Qualtrics online survey platform (Qualtrics software, Version 2009, <https://www.qualtrics.com>). For each round, each expert was sent a unique web link to access the surveys questionnaires. Experts were provided at least four weeks to complete all surveys within each round, with only those who participated in prior rounds invited to participate in subsequent rounds.

Weekly reminder emails were sent to each expert until the round was completed. Once the final deadline was reached, surveys were closed and responses were analysed before commencing the next round. Each survey was designed to take no more than 40 minutes to complete, and all responses were de-identified and coded to maintain anonymity between experts

4.3.3 Data Analysis

Round 1 responses were analysed using deductive thematic analysis to generate themes related to 'Learning Outcomes', 'Experience of Placement' and 'Cost of Placement', as well as inductively to identify any additional themes within the data. Thematic analysis followed Braun & Clarke's (2021) six phase framework to qualitatively analysing data. The initial coding and theme generation was carried out by the first author, who systematically coded the data and identified preliminary themes. All authors collaboratively reviewed the coding and themes, working together to refine, define, and name each theme as part of the collective analysis process. Themes were then finalised and presented to experts in subsequent rounds. Qualitative data analysis software, NVivo, was used to code and group data (Nvivo software, Version 12, <https://www.qsrinternational.com>). Additionally, triangulation occurred between the leading research team and an independent researcher with experience in thematic analysis to ensure the validity of our assumptions through the convergence of themes from different sources (Carter et al., 2014).

Round 2 and 3 quantitative data were analysed using percentages of agreement to confirm whether consensus had been achieved. The level for consensus was set in a manner similar to Maguire and Delahunt (2017), whereby combined scores of importance and agreement must equal $\geq 75\%$ to achieve consensus. In accordance with Round 1, qualitative data from Rounds 2 and 3 were analysed inductively, where common themes were identified and triangulated between three researchers and presented as statements in subsequent rounds.

To address attrition within the study, participation rates were tracked and characteristics of participants in each round were compared to identify any potential shifts in representation. Furthermore, the consensus threshold of 75% agreement was applied to ensure that only areas with broad support across the panel were included. This threshold aligns with recommendations for achieving rigor in Delphi studies (Hsu & Sandford, 2007; Maguire & Delahunt, 2017).

4.3.4 Ethical Considerations

Informed consent was obtained from all experts before participating in the research project via a unique electronic link, which formed the first page of the questionnaire in round one. Expert anonymity was maintained by assigning unique identifiers to each expert. This identifier was used to track survey completion and summarise expert responses for

subsequent rounds. Additionally, selected experts were not compensated for participating in this study. Ethical approval was obtained through the institutional Human Research Ethics Committee (approval number H7541).

4.4 Results

4.4.1 *Expert Characteristics*

A total of 36 potential expert panellists responded to the recruitment survey; from which 18 experts were selected (i.e. six Placement Coordinators, six Placement Supervisors and six Recent Graduates). Characteristics of experts are outlined in Table 1. Participation by experts in Round 1 was 94% (17 experts), 83% in Round 2 (15 experts) and 64% in Round 3 (11 experts). Figure 2 provides an overview of recruitment, the participation of experts in each round, and the outcomes of consensus after each round.

Table 1. *Characteristics of Expert Members*

Total expert panellists (n=17)	
Placement Coordinators (n=6)	
Level of experience in coordination role	
- Less than 2 years	2 (33.3%)
- More than 2 years	4 (66.6%)
Geographical location/s placements have been coordinated in	
- Rural	4 (66.6%)
- Regional	5 (83.3%)
- Metropolitan	6 (100%)
Types of clinic placement coordinated	
- Student-led	3 (50%)
- Role emerging	3 (50%)
- Traditional	5 (83.3%)
- Inter-disciplinary	3 (50%)
Allied health professions represented	
- Audiology	1 (16.6%)
- Social Work	1 (16.6%)
- Occupational Therapy	1 (16.6%)
- Exercise Physiology	1 (16.6%)
- Physiotherapy	1 (16.6%)
- Speech Pathology	1 (16.6%)
Placement Supervisors (n=6)	
Areas of Practice with experience in	
- 1 areas of practice	2 (33.3%)
- 2 areas of practice	1 (16.6%)
- 3 or more areas of practice	3 (50%)
Geographical location/s worked in	
- Rural	1 (16.6%)
- Regional	4 (66.6%)
- Metropolitan	1 (16.6%)
Type of clinical placement supervised	
- Student-led	4 (66.6%)
- Traditional	5 (83.3%)
Allied health professions represented	
- Occupational Therapy	2 (33.3%)
- Speech pathology	1 (16.6%)
- Physiotherapy	1 (16.6%)
- Exercise Physiology	1 (16.6%)
- Psychology	1 (16.6%)
Recent Graduates (n=5)	
Geographical location/s placement took place in	
- Rural	4 (80%)
- Regional	5 (100%)
- Metropolitan	5 (100%)
Areas of Practice exposed to	
- 2-3	2 (40%)
- 4-5	3 (60%)
- 6+	1 (20%)
Type of clinical placement experienced	
- Student-led	4 (80%)
- Role emerging	1 (20%)
- Traditional	5 (100%)
Allied health professions represented	
- Occupational Therapy	1 (20%)
- Physiotherapy	3 (60%)
- Exercise Physiology	1 (20%)

Measuring Performance in Student-led Healthcare Services

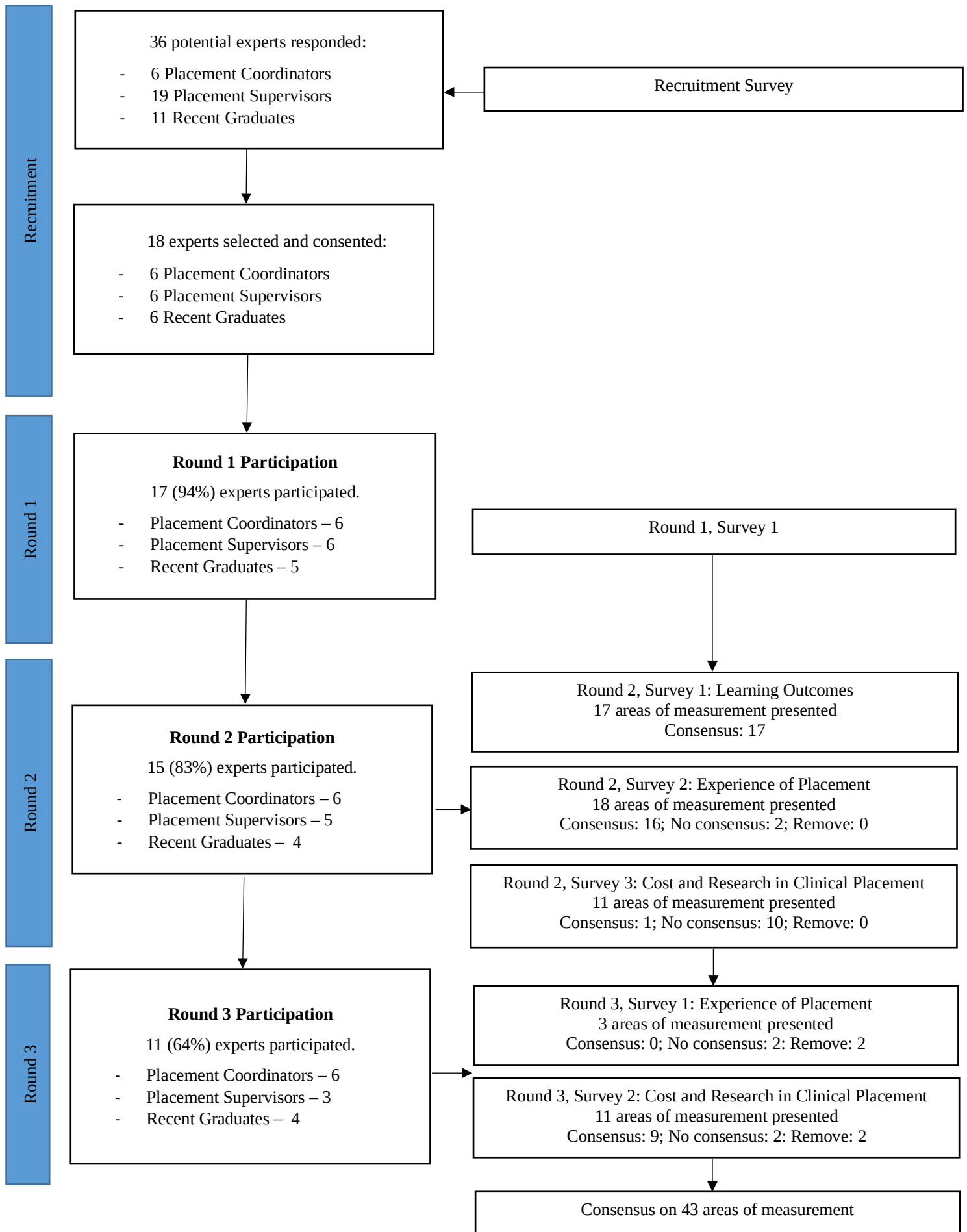


Figure 2. Flow of Participants and Surveys Through the Study

4.4.2 Round 1

The three predetermined themes of Learning Outcomes, Experience of Placement, and Cost of Placement were supported, with the majority of participant responses coded under these three overarching themes. An additional fourth theme was identified as 'Research in Clinical Placement'. Table 2 outlines the specific areas of measurement and the number of responses received from experts.

Table 2. *Frequency of Areas of Measurement Referenced in Expert's Responses*

Theme 1: Learning Outcomes		Theme 2: Experience of Placement		Theme 3: Cost of Placement		Theme 4: Research in Clinical Placement	
Area of Measurement	(n)	Area of Measurement	(n)	Area of Measurement	(n)	Area of Measurement	(n)
Clinical Reasoning	6	Exposure to quality practice	2	Transport and accommodation costs	4	Research Opportunities	1
Clinical Competency	9	Exposure to diverse practice	5	Loss to income	3		
Client Outcomes	1	Inclusiveness of placement site	4	Pre-placement costs	2		
Scope of Practice	1	Supportiveness of learning environment	4	Supervisor time	2		
Continuity of Care	1	Orientation to placement	5	Resourcing for student	2		
Interprofessional Practice	1	Supervision model	1	Risk to reputation	1		
Gathering Evidence and Information	4	Consistency of practice	1	Impact on services	4		
Knowledge of Practice	5	Supervisor skills	4	Paid placements	2		
Work preparedness	2	Constructive feedback	6	Operating university run sites	2		
Self-efficacy	1	Supervisor availability	9	Placement coordinator time	4		
Workplace Resilience	2	Goal Attainment	1	Insurance	1		
Reflective practice	4	Trust and autonomy	2				
Workload management	2	Coping with Placement	2				
Administration Skills	2	University support of the student	2				
Professional Behaviour	8	Preparedness for placement	2				
Communication and Rapport Building	7	Supervisor satisfaction	1				
Documentation and report writing skills	3	University support of the supervisor	1				
		Expectations of placement	2				

Measuring Performance in Student-led Healthcare Services

Areas of measurement were then categorised under sub themes, which were classified into the overarching themes. The sunburst diagram (Figure 3) represents the overarching themes (inner ring), the sub themes (middle ring/s) and the specific areas of measurement that were identified in Round 1 (outer ring). The size of each section is related to the frequency of the area of measurement mentioned in Round 1.



Figure 3. Sub Themes and Areas of Measurement Identified in Round 1

4.4.3 Round 2

Fifteen experts completed Survey 1, 14 completed Survey 2, and 13 experts completed Survey 3. In Survey 1, all areas of measurement relating to 'Learning Outcomes' achieved higher than 90% agreement on their importance, with eight areas achieving 100% agreement (Table 3). As the required level of consensus was achieved, all areas of measurement were included, and no items needed further consideration in subsequent rounds. Figure 4A provides an overview of the decision-making process undertaken to support the inclusion or exclusion of the identified areas of measurement. No new areas of measurement within free text responses were identified.

In Survey 2, areas of measurement relating to 'Experience of Placement' achieved consensus for 16 of the 18 areas and were not included in the subsequent round. Consensus was not reached (<75% agreement) for 'Quality of Supervision' and the 'Consistency of Practice' (Table 3) and were presented for further consideration in Round 3 (Figure 4B). In Survey 3, areas of measurement relating to 'Cost of Placement' achieved consensus in one area only – 'Insurance costs' (Table 3). All remaining areas of measurement were presented for further consideration in Round 3 (Figure 4C). Areas of measurement relating to 'Research in Clinical Placement' did not reach consensus and was presented for further consideration in Round 3 (Figure 3C).

New areas of measurement were identified within free text responses related to 'Cost of Placement' and 'Research in Clinical Placement'. These statements reflected the experts' justifications around why specific areas of measurement were ranked as either important or not important, which were then presented to all experts in Round 3 for further consideration. Figure 5 details each of these statements devised from expert responses.

Table 3. *Round Two Level of Agreement on Importance*

Area of Measurement	Level of Consensus (%)	Mean	Std. Deviation
Learning Outcomes - Clinical Service Delivery			
Scope of practice	80.0	3.20	0.75
Continuity of care	93.3	3.40	0.61
Interprofessional practice	100	3.33	0.47
Gathering evidence and information	100	3.73	0.44
Knowledge of practice	86.6	0.96	0.92
Clinical reasoning	100	4.00	0.00
Clinical competency	93.3	3.60	0.61
Client Outcomes	93.3	3.67	0.60
Learning Outcomes - Managing in the Workplace			
Work preparedness	86.6	3.33	0.70
Workplace resilience	93.3	3.40	0.61
Workload management	100	3.47	0.50
Reflective practice	100	3.80	0.40
Self-efficacy	86.6	3.40	0.71
Learning Outcomes - Professional Practice			
Administration skills	80.0	3.00	0.73
Professional behaviour	100	4.00	0.00
Communication and rapport building	100	4.00	0.00
Documentation and report writing skills	100	3.40	0.49
Experience of Placement - The Student Experience: Quality of Placement Opportunities			
Exposure to quality practice	100	3.36	0.48
Exposure to diverse practice	100	3.29	0.59
Inclusiveness of placement site	92.8	3.36	0.61
Supportiveness of learning environment	92.8	3.57	0.62
Orientation to placement	92.8	3.29	0.59
Experience of Placement - The Student Experience: Quality of Supervision			

Measuring Performance in Student-led Healthcare Services

Supervision model	71.4	2.79	0.77
Consistency of practice	71.4	2.93	0.70
Supervisor skills	92.8	3.21	0.56
Constructive feedback	92.8	3.43	0.62
Supervisor availability	85.7	3.07	0.80
Experience of Placement - The Student Experience: Student Satisfaction			
Goal attainment	85.7	3.21	0.67
Trust and autonomy	92.8	3.14	0.52
Coping with placement	92.8	3.29	0.59
University support of the student	92.8	3.21	0.56
Preparedness for placement	92.8	3.43	0.62
Experience of Placement - The Supervisor Experience			
Supervisor satisfaction	100	3.21	0.41
University support of the supervisor	100	3.43	0.49
Expectations of placement	92.8	3.29	0.59
Cost of Placement – Cost to the Student			
Transport and accommodation costs	69.2	2.69	0.91
Loss to income	53.8	2.62	1.00
Pre-placement costs	46.1	2.38	1.00
Cost of Placement – Cost to the Placement Site			
Supervisor time	69.2	2.77	0.80
Resourcing for student	46.1	2.69	0.72
Risk to reputation	46.1	2.54	0.84
Impact on services	61.5	2.54	0.63
Cost of Placement – Cost to the University			
Paid placements	46.1	2.38	0.84
Operating university run sites	53.8	2.54	0.93
Placement coordinator time	69.2	2.77	0.97
Insurance	76.9	2.85	0.95
Research in Clinical Placement			
Research Opportunities	61.5	2.62	0.74

Measuring Performance in Student-led Healthcare Services

Round 1 (n=17)		Round 2 (n=15)		Round 3	
1. Learning Outcomes					
Theme 1.1: Clinical Service Delivery					
Areas of Measurement	Client Outcomes	→	Consensus >75% = Include	✓	
	Clinical Competency	→	Consensus >75% = Include	✓	
	Clinical Reasoning	→	Consensus >75% = Include	✓	
	Continuity of Care	→	Consensus >75% = Include	✓	
	Gathering Evidence and Information	→	Consensus >75% = Include	✓	
	Interprofessional Practice	→	Consensus >75% = Include	✓	
	Knowledge of Practice	→	Consensus >75% = Include	✓	
	Scope of Practice	→	Consensus >75% = Include	✓	
Theme 1.2: Managing in the Workplace					
Areas of Measurement	Reflective Practice	→	Consensus >75% = Include	✓	
	Self-efficacy	→	Consensus >75% = Include	✓	
	Work Preparedness	→	Consensus >75% = Include	✓	
	Workload Management	→	Consensus >75% = Include	✓	
	Workplace Resilience	→	Consensus >75% = Include	✓	
Theme 1.3: Professional Practice					
Areas of Measurement	Administration Skills	→	Consensus >75% = Include	✓	
	Communication and Rapport Building	→	Consensus >75% = Include	✓	
	Documentation and Report writing	→	Consensus >75% = Include	✓	
	Professional Behaviour	→	Consensus >75% = Include	✓	

Figure 4A. Decision Making Process Supporting Inclusion/Exclusion of Areas of Measurement: Learning Outcomes

Measuring Performance in Student-led Healthcare Services

Round 1 (n=17)		Round 3 (n=15)		Round 3 (n=13)	
2. Experience of Placement					
Theme 2.1: The Student Experience					
2.1.1 Quality of Placement Opportunities					
Areas of Measurement	Exposure to Diverse Practice	→	Consensus >75% = Include	✓	
	Exposure to Quality Practice	→	Consensus >75% = Include	✓	
	Inclusiveness of Placement Site	→	Consensus >75% = Include	✓	
	Orientation of Placement	→	Consensus >75% = Include	✓	
	Supportive of Learning Environment	→	Consensus >75% = Include	✓	
2.1.2 Quality of Supervision					
Areas of Measurement	Consistency of Practice	→	Consensus <75% = Go to Round 3		→ Consensus <75%= Exclude
	Constructive Feedback	→	Consensus >75% = Include	✓	
	Supervision Model	→	Consensus <75% = Go to Round 3		→ Consensus <75%= Exclude
	Supervisor Availability	→	Consensus >75% = Include	✓	
	Supervisor Skills	→	Consensus >75% = Include	✓	
2.1.3 Student Satisfaction					
Areas of Measurement	Coping with Placement	→	Consensus >75% = Include	✓	
	Goal Attainment	→	Consensus >75% = Include	✓	
	Preparedness for Placement	→	Consensus >75% = Include	✓	
	Trust and Autonomy	→	Consensus >75% = Include	✓	
	University Support of Student	→	Consensus >75% = Include	✓	
Theme 2.2: The Supervisor Experience					
Areas of Measurement	Expectations of Placement	→	Consensus >75% = Include	✓	
	University Support of Supervisor	→	Consensus >75% = Include	✓	
	Supervisor Satisfaction	→	Consensus >75% = Include	✓	

Figure 4B. Decision Making Process Supporting Inclusion/Exclusion of Areas of Measurement: Experience of Placement

Measuring Performance in Student-led Healthcare Services

Round 1 (n=17)		Round 2 (n=15)	Round 3 (n=11)
3. Cost of Placement			
Theme 3.1: Cost to the Student			
Areas of Measurement	Loss of Income	→ Consensus <75% = Go to Round 3	→ Consensus >75% = Include ✓
	Pre-placement Costs	→ Consensus <75% = Go to Round 3	→ Consensus >75% = Include ✓
	Transport and Accommodation Costs	→ Consensus <75% = Go to Round 3	→ Consensus >75% = Include ✓
Theme 3.2: Cost to the Placement Site			
Areas of Measurement	Impact on Services	→ Consensus <75% = Go to Round 3	→ Consensus >75% = Include ✓
	Resourcing for Student	→ Consensus <75% = Go to Round 3	→ Consensus >75% = Include ✓
	Risk to Reputation	→ Consensus <75% = Go to Round 3	→ Consensus <75% = Exclude ✗
	Supervisor Time	→ Consensus <75% = Go to Round 3	→ Consensus >75% = Include ✓
Theme 3.3: Cost to the University			
Areas of Measurement	Insurance Costs	→ Consensus >75% = Include ✓	
	Operation of University-run Sites	→ Consensus <75% = Go to Round 3	→ Consensus <75% = Exclude ✗
	Paid Placements	→ Consensus <75% = Go to Round 3	→ Consensus >75% = Include ✓
	Placement Coordinator Time	→ Consensus <75% = Go to Round 3	→ Consensus >75% = Include ✓
4. Research in Clinical Placement			
Areas of Measurement	Research Opportunities	→ Consensus <75% = Go to Round 3	→ Consensus >75% = Include ✓

Figure 4C. Decision Making Process Supporting Inclusion/Exclusion of Areas of Measurement: Cost of Placement and Research in Clinical Placement

Measuring Performance in Student-led Healthcare Services

Cost of Placement		
Cost to the Student Loss of Income <i>Important to Measure:</i> <u>Statement 1</u> - To quantify costs associated with each placement and allow for more informed placement decisions. <u>Statement 2</u> - To ensure placement expectations and that any additional placement commitments don't cause undue financial burden on students. Pre-placement Costs <i>Important to Measure:</i> <u>Statement 1</u> - To accurately assess the financial impact on students and how this influences their placement experience. <u>Statement 2</u> - To accurately communicate the expected financial commitment of clinical placement and support student preparedness for placement. Transport and Accommodation Costs <i>Important to Measure:</i> <u>Statement 1</u> - To accurately assess the financial impact on students and how this influences their placement experience. <u>Statement 2</u> - To quantify costs associated with each placement and allow for more informed placement decisions.	Cost to the Placement Site Supervisor's Time <i>Important to Measure:</i> <u>Statement 1</u> - To understand the opportunity cost or potential lost revenue of providing supervision. Resourcing Costs for the Student <i>Important to Measure:</i> <u>Statement 1</u> - To understand the cost of supporting students while at the placement site. Risk to Reputation <i>Important to Measure:</i> <u>Statement 1</u> - To determine whether student placements lead to increased risk, which may influence future offers of placement. Impact on Services <i>Important to Measure:</i> <u>Statement 1</u> - To determine appropriate fee structures for student-led healthcare services. <u>Statement 2</u> - To understand what impact on services actually occurs (i.e decrease or increase in service capacity) while supervising students. <i>Not Important to Measure:</i> <u>Statement 1</u> - It may result in loss of placement sites or the placement site may request financial remuneration.	Cost to the University Paid Placements <i>Important to Measure:</i> <u>Statement 1</u> - To determine if the benefits outweigh the cost. <u>Statement 2</u> - To allow for sufficient resourcing of clinical placements. <i>Not Important to Measure:</i> <u>Statement 1</u> - It may encourage placement sites to offer placements for monetary gain or other ulterior motives. Operating University Run Placement Sites <i>Important to Measure:</i> <u>Statement 1</u> - It enables resourcing for high quality and evidenced-based placement sites. Placement Coordinator's Time <i>Important to Measure:</i> <u>Statement 1</u> - To address current barriers to career progression. <u>Statement 2</u> - To capture the large scope of the role and support workload allocation. <u>Statement 3</u> - To identify time spent/needed to effectively support supervisors and students. <u>Statement 4</u> - To identify time spent or needed to effectively support 'at risk students'. <i>Not Important to Measure:</i> <u>Statement 1</u> - It may lead to cost cutting.
Research in Clinical Placement		
Research Opportunities	<i>Important to Measure:</i> <u>Statement 1</u> - More translation research is needed. <u>Statement 2</u> - Research can lead to beneficial partnerships between the university, placement site and student. <u>Statement 3</u> - To gain information about wider scopes of practice, as well as identifying new placement opportunities. <u>Statement 4</u> - To support new and innovative placement and assessment, as well as to determine support requirements.	<i>Not Important to Measure:</i> <u>Statement 1</u> - Research is not a top priority in clinical placement. <u>Statement 2</u> - It may place additional pressure on placement coordinators to undertake research. <u>Statement 3</u> - Research does not play a direct role in the student's experience of placement.

Figure 5. Statements Collated from Expert Opinion Supporting Importance (Cost and Research in Clinical Placement)

4.4.4 Round 3

In Round 3, 11 experts completed Survey 1, and nine experts completed Survey 2. Consensus data including mean and standard deviation are presented in Table 4.

In Survey 1, the two remaining areas of measurement related to ‘Experience of Placement’ did not achieve consensus (Figure 4B) and were removed. In Survey 2, all but two of the remaining areas of measurement associated with ‘Cost of Placement’ achieved consensus. ‘Cost of university run placement sites’ and ‘Risk to Reputation’ did not achieve consensus and were removed (Figure 4C). All statements of importance relating to ‘Research in Clinical Placement’ achieved consensus (Table 4).

Table 4. Round Three Level of Agreement on Importance

Area of Measurement		Level of Consensus (%)	Mean	Std. Deviation
Experience of Placement - The Student Experience: Quality of Supervision				
Supervision model		63.4	1.64	0.48
Consistency of practice		63.4	1.64	0.48
Cost of Placement – Cost to the Student				
Transport and accommodation costs	Important to Measure Statement 1	88.8	1.11	0.31
	Important to Measure Statement 2	100	1.00	0.00
Loss to income	Important to Measure Statement 1	88.8	1.11	0.31
	Important to Measure Statement 2	77.7	1.22	0.42
Pre-placement costs	Important to Measure Statement 1	77.7	1.22	0.42
	Important to Measure Statement 2	88.8	1.11	0.31
Cost of Placement – Cost to the Placement Site				
Supervisor time	Important to Measure Statement 1	88.8	1.11	0.31
Resourcing for student	Important to Measure Statement 1	88.8	1.11	0.31
Risk to reputation	Important to Measure Statement 1	55.5	1.44	0.50
Impact on services	Important to Measure Statement 1	66.6	1.33	0.47
	Important to Measure Statement 2	77.7	1.22	0.42

Measuring Performance in Student-led Healthcare Services

	Not Important to Measure Statement 1	33.3	1.67	0.47
Cost of Placement – Cost to the University				
Paid placements	Important to Measure Statement 1	88.8	1.11	0.31
	Important to Measure Statement 2	88.8	1.11	0.31
	Not Important to Measure Statement 1	22.2	1.78	0.42
Operating university run sites	Important to Measure Statement 1	66.6	1.33	0.47
Placement coordinator time	Important to Measure Statement 1	66.6	1.33	0.47
	Important to Measure Statement 2	77.7	1.22	0.42
	Important to Measure Statement 3	77.7	1.22	0.42
	Important to Measure Statement 4	77.7	1.22	0.42
	Not Important to Measure Statement 1	33.3	1.67	0.47
Research in Clinical Placement				
Research Opportunities	Important to Measure Statement 1	88.8	1.11	0.31
	Important to Measure Statement 2	100	1.00	0.00
	Important to Measure Statement 3	100	1.00	0.00
	Important to Measure Statement 4	100	1.00	0.00
	Not Important to Measure Statement 1	44.4	1.56	0.50
	Not Important to Measure Statement 2	33.3	1.67	0.47
	Not Important to Measure Statement 3	33.3	1.67	0.47

4.4.5 Areas of Measurement not Achieving Consensus

Several areas of measurement within the theme of ‘Experience of Placement’ did not achieve consensus with variation in opinion between experts. For example, the importance of placement experience measures such as ‘supervision model’ and ‘consistency of practice’ received 100% and 75% agreement, respectively, from placement supervisors and recent graduates. However, among placement coordinators, only 50% agreed on the importance of the ‘supervision model’, and 15% agreed on ‘consistency of practice’. The notion that variations in supervisory models and differences in health professional practices may pose challenges for students during their learning journey can also be seen as a valuable educational opportunity, as highlighted by one expert’s response:

“... one of the biggest learning experiences students gain from going on multiple placements in different sites and different supervisors is the exposure to a range of different ways, practices, skills, approaches ... I think we would do our profession a disservice by becoming a standardised workforce that all has the same, consistent approach ("cookie cutter" approach) to areas of practice. I think it is valuable for students to see varying levels of good practice vs. not-so-good practice, provided they have the opportunity to debrief this in a safe space, to be able to identify and understanding the 'not-so-good' practice in context.”

Placement Coordinator 4

Similarly, measuring the cost associated with ‘operating university run placement sites’ also did not achieve consensus. Reviewing free text responses from experts in Rounds 2 and 3 suggested that there is support for university operated clinical placement sites from all stakeholder groups. However, there was disagreement about the cost of such endeavours being a specific performance measure of clinical placement. The following expert responses support this premise:

“Cost of operating university run placement sites should not purely be measured according to income and expenses. There are lots of benefits which become immeasurable such as service to the university sector, student educative experience, positive marketing/exposure for the university.”

Placement Supervisor 9

“I don't think the cost of uni run placements should factor in (sic) into measuring clinical placements as they aren't a money making entity for most universities.”

Recent Graduate 3

‘Risk to reputation’ also failed to reach consensus as an important area of measurement. Expert commentary revealed concerns about the subjective and contextual nature of reputational risk. Several respondents argued that reputational concerns should be mitigated through transparent communication and appropriate supervision, rather than treated as a core outcome measure. As one participant noted:

“I believe if you have elected to be a placement supervisor you inherently accept that your current caseload will be exposed to students. This should be a risk assessed by the supervisor

and the workplace prior to agreeing to provide placements.”

Recent Graduate 10

4.4.6 Finalised Areas of Measurement

Following the three Delphi rounds, consensus was achieved on 43 important areas of measurement. The finalised areas of measurement are presented in Figure 6.

Measuring Performance in Student-led Healthcare Services

Student Learning Outcomes		Experience of Placement		Cost of Placement		Research in Clinical Placement	
Clinical Service Delivery	• Client outcomes • Clinical competency • Clinical reasoning • Continuity of care • Gathering evidence and information • Interprofessional practice • Knowledge of practice • Scope of practice	The Student Experience	Student Satisfaction	• Coping with Placement • Goal Attainment • Preparedness for Placement • Trust and Autonomy • University Support of Student	To the Student	• Loss of Income • Pre-placement Costs • Transport and Accommodation Costs	Research Opportunities
Professional Practice	• Administration skills • Communication and Rapport Building • Documentation and Report Writing • Professional Behaviour		Quality of Supervision	• Constructive Feedback • Supervisor Availability • Supervisor Skills	To the Placement Site	• Impact on Services • Resourcing for Student • Supervisor Time	
Managing in the Workplace	• Reflective Practice • Self-efficacy • Work Preparedness • Workload Management • Workplace Resilience	The Supervisor Experience	• Supervisor Satisfaction • University Support of Supervisor • Expectations of Placement		To the University	• Insurance Costs • Paid Placements • Placement Coordinator Time	

Figure 6. Finalised Areas of Measurement Related to the Themes of ‘Learning Outcomes’, ‘Experience of Placement’, ‘Cost of Placement’ and ‘Research in Clinical Placement’

4.5 Discussion

The aim of this study was to gain consensus on the important areas of measurement that need to be considered in the evaluation of clinical placement performance. Through consensus building within a modified Delphi approach, 43 areas of measurement were identified and supported as important to measure when evaluating clinical placement. This study is novel in its scope and design, addressing limitations of existing approaches by encompassing a wider range of measurement areas, including cost considerations, and by ensuring applicability across diverse clinical placement models and health disciplines. Unlike other models for evaluation, this framework integrates stakeholder perspectives across educational, experiential, and financial dimensions. Its unique contribution lies in offering a holistic evaluation model that aligns with contemporary clinical education needs and that it is adaptable to various models of clinical placement, including within SLHS.

Existing frameworks for clinical placement have been designed to work as universal guides to supporting quality in clinical placement, predominately focusing on areas of measurement associated with the experience of placement or are intended to be implemented at the organisational level to support positive learning environments (McAllister et al., 2018; Siggins Miller Consultants, 2012). This study's contribution lies in its comprehensive identification of key areas for measuring clinical placement performance. Unlike frameworks such as the BPCLE, this study integrates diverse stakeholder perspectives to include critical dimensions such as financial parameters, research opportunities, and supervision quality. These additions enhance the applicability of our findings across various clinical placement models and allied health disciplines, offering a more comprehensive basis for evaluation.

While the findings of this study are similar to the BPCLE in emphasising the importance of a supportive learning environment, this study extends its scope by addressing specific areas within the overarching themes of Learning Outcomes, Experience of Placement and Cost of Placement, the latter being notably absent in the BPCLE. As a result, the findings of this study will guide improvements in placement performance by ensuring intended learning outcomes, maintaining strong stakeholder relationships, and addressing cost concerns. Fundamentally, these areas of measurement address the needs and expectations of

the frontline stakeholders involved in the clinical placement partnership and acknowledges the increasing concerns about the costs involved in sourcing, participating in, and facilitating placement (Copeland, 2020; Forbes, 2022; Patrick et al., 2008; Wray & McCall, 2007).

However, recent studies suggest that these concerns may be shifting. Evidence indicates that students can make a tangible contribution to service delivery and, in some cases, are perceived as an asset rather than a burden (Bourne et al., 2018; Bourne et al., 2019). This reflects evolving workforce sustainability pressures and a growing recognition of the value students bring to addressing service gaps. In this way, student placements may simultaneously present supervision challenges while also enhancing service delivery, a duality that strengthens the case for innovative placement models such as SLHS.

Evaluating the educational outcomes, placement experiences, and costs within SLHS has, until recently, been a relatively unexplored area. However, current literature on the effectiveness of SLHS as clinical placement providers has begun to identify various outcomes achieved within these models of clinical placement (Beckman et al., 2022; Heales et al., 2021; Nyoni et al., 2021). Contemporary research has highlighted the importance of clinical educators in fostering supportive learning environments, providing constructive feedback, offering developmental opportunities, and ensuring adequate resources for high-quality placements (Heales et al., 2021). Additionally, SLHS are recognised as environments that facilitate clinical skill development, cultivate empathy and leadership, and enhance interprofessional practice skills (Wilson et al., 2023).

This modified Delphi study identified clinical placement outcomes of importance that align closely with the contemporary literature focusing on educational outcomes attained within SLHS (Beckman et al., 2022; Heales et al., 2021; Nyoni et al., 2021). The diverse expertise of the expert panel, covering various clinical placement models and contexts, is a notable strength of this study (Jünger et al., 2017). The identified areas of measurement are relevant to a range of contexts due to the diverse experiences of the experts involved and aids in ensuring that the consensus reached is not limited to a single model or setting but rather, reflects a broad spectrum of clinical placement scenarios (Peisah et al., 2023). This approach offers comparability across various models, locations, and health disciplines (Bernhardt et al., 2017), providing key stakeholders with a set of clinical placement measures that can be used

to evaluate the performance of SLHS and compare them to more traditional clinical placement models to determine their effectiveness.

Financial considerations are critical for both universities and placement providers, influencing the sustainability and quality of placements (Bowles et al., 2014). The University Accord, which seeks to reform and enhance higher education in Australia, places a significant emphasis on the financial sustainability of educational programs, including clinical placements (Australian Department of Education, 2023). Identifying the costs associated with clinical placements, such as transport and accommodation, loss of income, pre-placement expenses, supervisor time, and student resourcing, is essential for optimising resources and improving student placement experiences. By incorporating these cost measurements into the evaluation of clinical placement performance, universities and placement providers can better understand the financial burden on both students and institutions, leading to more informed decisions about resource allocation, funding, and support. This alignment with the University Accord's focus on financial sustainability ensures that clinical placements remain viable and beneficial for all parties involved, while also achieving financial accountability.

The results of this study need to be considered in light of its limitations. Although in line with recommendations to effectively recruit a heterogeneous expert panel (Hsu & Sandford, 2007), the broad spectrum of opinions and priorities this approach produced can affect the level of consensus established. We recruited equal representation from key stakeholder groups to strike a good balance of perspectives (Keeney et al., 2001). However, as the study progressed, representation changed due to attrition, with fewer placement supervisors and recent graduates participating in later rounds, shifting the balance of opinion in favour of placement coordinators. This shift likely influenced the areas of measurement that did not achieve consensus, as placement coordinator perspectives became more prominent in later rounds.

To enhance the reliability of the areas of measurement identified in this study, a 75% consensus threshold was applied. This threshold is consistent with best practices for achieving rigor in Delphi studies (Hsu & Sandford, 2007; Maguire & Delahunt, 2017) and ensures that only areas with broad and robust agreement across the panel were included. Nonetheless,

areas that failed to achieve consensus (i.e. “supervision model,” “consistency of practice,” “risk to reputation” and the “cost of operating university-run placement sites”) may have achieved consensus if greater representation from other stakeholder groups had been maintained. Therefore, we acknowledge that the attrition experienced in this study may have influenced the findings and recommend further research to validate and extend on our results. Applying a mixed-methods approach to evaluating the more nuanced aspects of these areas of measurement would provide a deeper understanding and elicit rich, multifaceted insights that might otherwise be overlooked in a predominantly quantitative approach (Creswell & Clark, 2017), such as the one employed in this modified Delphi study.

Given the diversity of the expert panel, the findings of this study are broadly applicable across different clinical placement models, geographical locations and allied health professions (Hsu & Sandford, 2007; Jünger et al., 2017). Furthermore, a key contribution of this study lies in its ability to integrate educational, experiential, and financial dimensions into a cohesive evaluation framework, bridging gaps identified in prior research. However, further research is needed to determine whether the identified areas of measurement and their priorities for measurement align consistently across diverse clinical placement contexts. Future studies could investigate how contextual factors such as resource availability, cultural differences, and specific disciplinary requirements shape the prioritisation and implementation of these measurement areas. Understanding these influences would provide valuable insights into the adaptability and effectiveness of the framework across diverse clinical placement settings (Beckman et al., 2022; Heales et al., 2021).

Additionally, a cost-benefit analysis derived from the cost measurements in this study could provide valuable insights into financial sustainability of clinical placement and offer critical information about the educational value of SLHS (Mazander et al., 2024). Investigating the application of this study’s findings in these specific contexts will also help to identify necessary refinements and enhance its translational potential (Beckman et al., 2022; Wilson et al., 2023), ultimately paving the way for comparative analyses of different clinical placement models in different clinical contexts. Such comparative analyses can help stakeholders identify best practices, assess the relative strengths and weaknesses of different models, and understand how specific contexts influence outcomes (Nyoni et al., 2021).

4.6 Conclusion

By synthesising the diverse experiences of key stakeholders, this study provides a comprehensive list of important areas of measurement applicable across various clinical placement models, locations, and health disciplines. While recognising that expert opinions may vary, the diverse expertise of the panel strengthens the reliability and relevance of the results, offering key stakeholders a comprehensive perspective on measuring clinical placement performance. These findings provide a solid foundation for evaluating clinical placements across various models and offer valuable insights to guide future research into evaluating clinical placements.

Chapter 5: Consensus Challenges in Clinical Placement Evaluation: Insights from a Modified Delphi Study

While Chapter 4 identified important areas of measurement for evaluating clinical placement performance, further exploration was needed to understand what tools are perceived as effective, as well as the underlying reasoning and contextual factors that shape these priorities. Chapter 5 addresses this need by presenting and analysing consensus data on proposed tools of measurement, as well as qualitative insights gathered during the modified Delphi study. These insights reveal the complexities, tensions, and expectations that influence how placement quality is understood and measured. By interpreting these perspectives in relation to the broader literature on clinical education and health service delivery, Chapter 5 lays the necessary conceptual groundwork for the development of a comprehensive and contextually relevant evaluation framework. As with Chapters 3 and 4, this component of the research contributes to Research Question 2, and its place within the broader thesis structure is illustrated in Figure 1.

Chapter 5 is based on the following publication:

Simmons, L., Barker, R., Barnett, F., & McGuckin, T. (2025). Consensus challenges in clinical placement evaluation: Insights from a modified Delphi study. Abstract presented at the 16th National Allied Health Conference, 11–13 August, Adelaide, SA, Australia. Available at <https://nahc.com.au/consensus-challenges-in-clinical-placement-evaluation-insights-from-a-modified-delphi-study/> (see 10.6: Appendix 5 for publication).

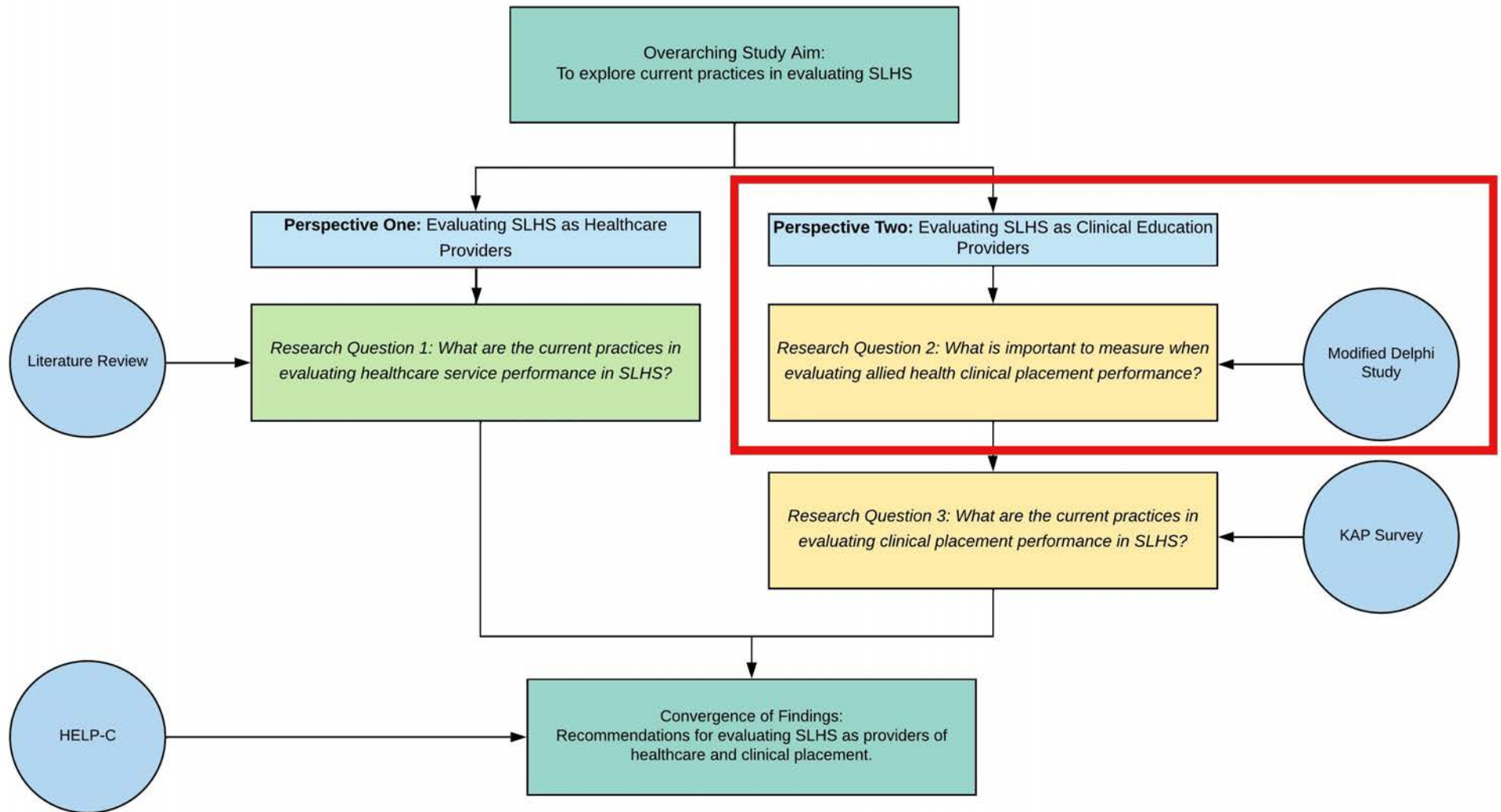


Figure 1. Thesis Structure Highlighting the Focus of Chapter 5 and Research Question 2

5.1 Abstract

Introduction: Evaluating clinical placement performance is crucial for ensuring high-quality learning experiences in health professional education. This study used a Modified Delphi approach to examine expert consensus on key measurement areas and the effectiveness of tools used to assess placement performance.

Method: In Rounds 2 and 3 of the Modified Delphi study, experts identified and ranked tools used to evaluate clinical placements. Open-ended responses were analysed deductively to determine commonly used approaches. Experts then rated each tool's effectiveness using a Likert scale, with consensus set at $\geq 75\%$ agreement.

Findings: While consensus was achieved for key measurement areas, significant variability existed in preferred assessment tools, reflecting differences in institutional practices, disciplinary expectations, and stakeholder perspectives. Consensus was stronger for tools measuring student learning outcomes compared to those assessing placement experiences, suggesting that educational outcomes are more systematically understood. Key challenges included limited empirical validation of tools, reliance on subjective assessments, and difficulties in measuring competencies such as workplace resilience and coping mechanisms.

Conclusion: Experts emphasised the need for a multi-method evaluation approach, integrating competency-based assessments, observational methods, and structured feedback mechanisms. However, the Delphi method proved less effective for tool selection, demonstrating the importance of an alternative research approach to consensus-building. Future research should focus on real-world application in specific clinical placement settings, ensuring that placement evaluation tools are both applicable and relevant. A flexible framework for tool selection is recommended to address standardisation challenges while maintaining disciplinary relevance.

5.2 Introduction

Clinical placements are a fundamental component of health professional education, providing students with real-world experience, skill development, and exposure to professional

practice. The effectiveness of these placements relies on robust evaluation methods that assess the quality of placement experiences across multiple dimensions, such as supervision, communication, and learning environment (McAllister et al., 2018).

Effective evaluation of clinical placements not only supports student competency development but also informs improvements in clinical education frameworks, ensuring that placements align with educational and workforce expectations (Nyoni et al., 2021). While various tools and frameworks exist, measuring clinical placement performance presents challenges, particularly in identifying reliable, valid, and context-appropriate evaluation tools that can be applied across diverse clinical settings (Baghdadi et al., 2023; Mansutti et al., 2017).

Numerous assessment tools have been developed to evaluate different aspects of clinical placements, including student competency assessments, supervisor evaluations, and patient feedback mechanisms (Burgess & Mellis, 2015). Competency-based assessment tools, such as the Assessment of Physiotherapy Practice (APP) for Physiotherapy (Dalton et al., 2011) and COMPASS® for Speech Pathology (McAllister et al., 2006), are widely used within their respective disciplines to evaluate clinical performance against national entry-level competency standards. However, these tools are not easily adaptable for use across multiple allied health professions. Supervisor observations and rating systems also play a significant role in student evaluations, particularly when measuring professionalism, communication, and workload management (Burgess & Mellis, 2015). However, these assessments can be highly subjective, leading to assessor bias and variability in assessment criteria (Hodwitz et al., 2019).

Beyond competency assessments, self-assessment and reflective practice methods such as reflective journals and structured feedback sessions are frequently used to encourage student-led learning and self-awareness (Tsingos et al., 2015). While these methods can enhance student engagement in their learning, they are often perceived as inconsistent and unreliable (Atrash et al., 2023). Some clinical education programs incorporate patient-reported experiences to assess students' communication and patient-centred care skills (Björklund et al., 2021), yet challenges in obtaining meaningful patient feedback have limited their widespread implementation (Wong et al., 2020). Additionally, placement site evaluation tools, such as the Placement Evaluation Tool (PET), assess the quality of the learning environment, including supervisor support and available

resources (Cooper et al., 2020). However, due to contextual differences between placement settings, universal application of such tools remains difficult.

Despite the availability of these evaluation tools, several critical gaps exist in assessing clinical placement performance. A significant challenge is the lack of standardisation across disciplines. Most existing tools are discipline-specific, making it difficult to develop a cross-professional framework for evaluating placements (Mansutti et al., 2017). As a result, measurement strategies vary significantly across health professions, leading to inconsistent assessment criteria and difficulties in comparing placement outcomes (Nyoni et al., 2021). While student learning outcomes are commonly measured, broader aspects of the placement experience, such as supervision quality, institutional support, and the overall learning environment, have been historically difficult to evaluate due to a lack of validated tools (McAllister et al., 2018).

Another key limitation in clinical placement evaluation is the lack of empirical validation of existing tools (Alkhelaiwi et al., 2024). Many commonly used assessment instruments have not undergone rigorous testing to determine their reliability and validity across different settings (Baghdadi et al., 2023; Courtney-Pratt et al., 2014). This raises concerns about whether these tools accurately reflect student performance and placement quality. Furthermore, subjective assessments remain a major challenge, as both supervisor observations and student self-assessments introduce bias and inconsistency in evaluation (Judd et al., 2023).

Given these challenges, this chapter expands on the findings of the modified Delphi study, focusing on the perceived effectiveness of tools used to evaluate key areas of clinical placement performance. It examines which assessment methods gained expert consensus and where significant gaps remain, highlighting the complexities involved in selecting appropriate evaluation tools. This chapter explores the practical challenges associated with interpreting and applying study results, particularly in the context of variability in clinical education environments, differences in stakeholder perspectives, and the limitations of expert-driven consensus approaches.

5.3 Methods

In Rounds 2 and 3 of the modified Delphi study, experts were asked to identify and rank tools used to measure clinical placement performance. For a detailed overview of the primary objectives and methodology of the modified Delphi study, refer to Chapters 3 and 4.

In Round 2 open ended questions, experts were asked to identify commonly used tools and approaches to evaluating important areas of measurement. These responses were then analysed deductively (Braun & Clarke, 2012), structured around the predefined areas of measurement identified in the modified Delphi. Identified tools were then presented to experts in Round 3, to rank each tool or approach based on perceived effectiveness using a 5-point Likert scale (i.e. 0 being least effective and 5 being most effective). Data were analysed using mean, standard deviation and percentage of agreement to confirm whether consensus had been achieved. The level for consensus was set in a manner similar to McIntyre et al. (2010), whereby consensus was determined when $\geq 75\%$ of experts rated the method of measurement as 4 or above.

Measurement tools and approaches for evaluating placement costs and research opportunities could not be explored in this study. Unlike other areas, consensus was not reached on the specific aspects that should be measured within these themes until Round 3. As a result, participants were unable to identify or rate potential tools for these domains during the study timeframe. While a fourth round would typically be used to identify tools and seek consensus, it was not pursued due to concerns about participant attrition and the limited likelihood of generating new insights (Beiderbeck et al., 2021; Knight et al., 2019).

5.4 Results

The findings highlight key areas where measurement tools were identified, and consensus was reached on their perceived effectiveness, particularly for student learning outcomes and the experience of placement. Consensus was reached for 13 of the 17 areas related to student

learning outcomes, which tended to have more clearly defined measurement strategies, compared to just 7 of the 16 areas related to placement experience.

5.4.1 Measuring Learning Outcomes in Clinical Placement

While not all proposed tools of measurement reached expert consensus, expert commentary identified common approaches that offer valuable perspectives to evaluating clinical placement performance. Table 1 summarises the consensus outcomes on the perceived effectiveness of various measurement tools for evaluating learning outcomes in clinical placements.

Measuring Performance in Student-led Healthcare Services

Table 1. *Consensus Outcomes on Tool Effectiveness for Measuring Student Learning Outcomes*

Identified Tool	Level of consensus (%)	Mean	Std Deviation
Administrations skills			
Discipline specific placement assessment tools	23.0	3.77	0.89
Checklists	46.2	3.46	0.75
Speed of completing administrative tasks	61.2	3.00	0.78
Professional behaviour			
Discipline specific placement assessment tools	76.9	4.15	0.77
Staff and client feedback surveys	84.6	4.00	0.96
Observation by supervisor	92.3	4.15	0.77
Communication and rapport building			
Discipline specific placement assessment tools	76.9	3.92	0.62
Placement site specific policies, procedures and standards	69.2	3.77	0.80
Staff and client feedback surveys	76.9	4.08	0.73
Observation by supervisor	84.6	4.31	0.72
Documentation and report writing			
Discipline specific placement assessment tools	76.9	4.00	0.68
Placement site specific policies, procedures and standards	75.4	3.77	0.89
Marking rubrics detailing each stage of competency	86.2	4.31	0.61
Increasing/decreasing level of support/supervision required	83.0	4.15	0.95
Work preparedness			
Placement site specific policies, procedures and standards	69.2	3.92	0.73
Observation by supervisor	84.6	4.15	0.86
Workplace resilience			

Measuring Performance in Student-led Healthcare Services

Observation by supervisor	61.5	3.85	0.95
Workload management			
Discipline specific placement assessment tools	69.2	3.92	0.92
Speed of completing administrative tasks	61.5	3.46	1.15
Observation by supervisor	76.9	4.08	0.73
Measuring reflective practice			
Discipline specific placement assessment tools	61.5	1.08	3.54
Reflective tasks	84.6	0.86	4.15
Theoretical models of reflective practice	46.2	0.89	3.77
Learning plans	61.5	1.00	3.62
Measuring self-efficacy			
Discipline specific placement assessment tools	46.2	3.31	0.99
Validated outcome-based tools specific to the measurement of self-efficacy	76.9	3.92	1.07
Observation by supervisor	61.5	3.85	0.95
Learning plans	61.5	3.38	1.15
Scope of practice			
Discipline specific placement assessment tools	84.6	4.15	0.66
Continuity of care			
Discipline specific placement assessment tools	84.6	4.15	0.66
Interprofessional practice			
Discipline specific placement assessment tools	61.5	3.85	0.77
Validated outcome-based tools specific to the measurement of interprofessional practice	84.6	4.08	0.83
Gathering evidence and information			
Increasing/decreasing level of support/supervision required	92.3	4.38	0.62
Observation by supervisor	76.9	4.15	0.77
Knowledge of practice			
Discipline specific placement assessment tools	84.6	4.23	0.70

Clinical reasoning			
Discipline specific placement assessment tools	76.9	4.00	0.68
Written tasks, case studies and problem-based learning	84.6	4.38	0.74
Impromptu questioning and probing of practice	92.3	4.54	0.84

Measuring Administrations Skills

Experts identified discipline-specific placement assessment tools, checklists, and the speed of task completion as tools used to assess administrative skills. However, none of these tools were considered effective enough to reach consensus. Experts noted that speed alone does not reflect the accuracy or quality of the administrative tasks performed. As one expert explained,

“I agree that completing these tasks in a timely manner is a useful measurement criteria. However, speed alone is not an indication of competency as it does not take into account accuracy of completing the tasks or having completed the tasks expected 100%.”

Placement Supervisor 6

Experts suggested that more nuanced assessment methods are needed. These included performance-based criteria and descriptive rubrics that outline varying levels of autonomy and supervision required. One expert elaborated that,

“Performance based criteria that gives narrative of what is indicative of appropriate/effective administration skills, in the context of the specific practice. This is more descriptive about what the performance of the skill looks like (in terms of autonomy & level of supervision/feedback required, consistency of the skill, integration or transferability across areas etc) rather than numerical competency score like a Likert scale.”

Placement Coordinator 4

Measuring Professional Behaviour

Tools considered to be effective by experts for assessing professional behaviour included discipline-specific placement assessment tools, staff and client feedback surveys, and supervisor observation. These tools were commonly used and considered useful, but it was the combination of multiple strategies that was most strongly endorsed.

Experts' additional suggestions included pass/fail criteria and dynamic, practice-based questioning. Furthermore, one expert highlighted the role of reflective practice in assessing behaviour, stating,

"...weekly written reflective activities using a reflection template (for communication), feedback and comments on the reflection, video observations, and reflection using video-obs (sic) reflection template."

Placement Supervisor 6

Measuring Communication and Rapport Building

Discipline-specific placement assessment tools, staff and client feedback surveys, and supervisor observation were considered by experts to be effective for evaluating students' communication skills and ability to build rapport. These tools were commonly used and supported by experts, although consensus on any single tool was not reached. Experts did not support the use of site-specific policies, procedures, or standards as a reliable indicator of student performance in this area. Instead, suggestions focused on the use of descriptive, performance-based criteria to capture how communication behaviours are enacted in context. One expert explained that,

"Performance based criteria that describes/gives narrative of appropriate/professional behaviours. This is more descriptive about what the performance of the skill looks like in a practitioner/scenario (in terms of autonomy & level of supervision/feedback required, consistency of the behaviour, integration or transferability across areas etc.) rather than numerical competency score like a Likert scale."

Placement Coordinator 4

Measuring Performance in Student-led Healthcare Services

These findings highlight the value of moving beyond checklist-style evaluations towards tools that reflect the nuance and relational dynamics of communication in clinical settings.

Measuring Documentation and Report Writing

Several variations of competency-based assessment criteria were perceived as effective, including the use of discipline-specific placement assessment tools and marking rubrics that provide detailed descriptions of each competency level. Additionally, tracking changes in the level of support and supervision required by the student was seen to be an effective measure. In contrast, relying on site-specific policies, procedures, and standards to determine whether a student has achieved this learning outcome was not supported as an effective strategy.

Measuring Work Preparedness

Supervisor observation was considered by experts to be an effective method for assessing work preparedness. This approach allows supervisors to evaluate students' readiness and engagement in real time. Experts strongly advised against using site-specific policies or general workplace procedures as proxies for preparedness. As one expert noted,

"Work preparedness can be measured via probing questions regarding whether or not students have used allocated time to read client notes or goal-setting tools prior to intervention sessions. Can be measured via observations of students being aware of sessions and being ready (packed and prepped) to go."

Placement Coordinator 2

Additional suggestions included the use of discipline-specific assessment tools and reflective practice to support the measurement of preparedness. These combined strategies suggest that preparedness is best evaluated through a blend of direct observation, reflective analysis, and structured assessment tools.

Measuring Workplace Resilience

Experts agreed that workplace resilience is an important learning outcome, but consensus was not achieved on effective tools to measure it. Additional suggestions included staff and client feedback surveys, as well as fostering environments that provide students with clear expectations

Measuring Performance in Student-led Healthcare Services

and safe debriefing opportunities. While no single tool was considered effective, the feedback highlights the need for a more structured approach to evaluating students' capacity to adapt and persist in challenging environments. These strategies support the idea that resilience should be assessed within the broader context of workplace dynamics and reflective support.

Measuring Workload Management

Supervisor observation was considered to be an effective strategy for assessing students' ability to manage their workload. In contrast, relying solely on speed of task completion or discipline-specific placement assessment tools was not considered sufficient. Additional suggestions emphasised the use of pass/fail criteria, checklists, and structured feedback mechanisms. Experts also identified observational indicators, such as delays in task submission or emotional distress, as potential markers of difficulty. One expert noted,

"Workload management can be measured via review of student work itself, their timely submission of work, their start time and end time for work day (late or early). Difficulty can also be observed if student affect appears distressed."

Recent Graduate 5

Another expert reinforced the importance of reflection, explaining,

"Students are required to meet time management requirements for their caseloads while on placement, and the need for reflective practice is considered in a number of sections of the SPEF-R assessment tools. Students are required to show improvements in their practice based upon reflection and feedback received."

Placement Supervisor 18

Together, these findings suggest that workload management is best assessed through a combination of observation, structured review, and reflective practice.

Measuring Reflective Practice

Frequent reflective tasks completed throughout placement were considered by experts to be an effective strategy for assessing reflective practice. This approach was supported by one expert who shared,

“Reflective practice is KEY. All my students email me written reflections every week after clinic.”

Placement Supervisor 6

In contrast, tools such as learning plans, discipline-specific assessment tools, and theoretical models of reflection were not considered effective on their own. One expert explained that learning plans are often neglected, stating,

“In my experience, the learning plan has never been referred to unless I remember to bring it up. Often it has been completed and submitted prior to me seeing it and being able to help guide likely and achievable goals.”

Recent Graduate 5

Measuring Self-Efficacy

Experts identified specific self-efficacy questionnaires as appropriate tools to assess this construct, while discipline-specific assessment tools, learning plans, and supervisor observation alone were not considered effective. Additional suggestions included promoting frequent opportunities for self-reflection and the use of probing questions during supervision to assess students' confidence and independence. One expert described,

“Self-efficacy – (sic) can be measured or observed via the student's use of language when discussing/planning/debriefing on/or running client sessions. E.g., if the student is constantly asking for answers without explaining own thoughts or ideas first, or if student requires constant prompting, they would still need to develop their skills in this area.”

Recent Graduate 5

These findings suggest that self-efficacy should be evaluated using dedicated tools and supported by supervisory strategies that encourage autonomy and critical thinking.

Measuring scope of practice

Discipline-specific placement assessment tools were considered to be effective for assessing students' understanding of scope of practice. Additional strategies were suggested, including reflective tasks and direct supervisor questioning to encourage articulation of professional boundaries. As one expert explained,

Measuring Performance in Student-led Healthcare Services

“Pre and post session verbal reflection is [a] good opportunity to practice discussing and fleshing out what scope of practice is and how to best identify same for client outcomes.”

Recent Graduate 5

These findings suggest that scope of practice is best measured through structured assessment combined with reflective and verbal demonstration.

Measuring Continuity of Care

Discipline-specific assessment tools were considered to be suitable for evaluating students' ability to support continuity of care. However, the practical implementation of these measurement tools proved challenging in some settings. One expert noted,

“Continuity of care is difficult to achieve in physiotherapy placements as the students are only completing 5 weeks of placement in a clinical area”.

Recent Graduate 3

This comment highlights the limitations imposed by short placement durations, which may restrict opportunities for students to follow clients over and suggest that while continuity of care is important, its measurement may need to be adapted to fit the realities of short-term clinical placements.

Measuring interprofessional practice

Validated outcome-based tools were considered by experts to be effective for measuring interprofessional practice, while discipline-specific placement assessment tools, though commonly used, were not viewed as sufficient. Experts suggested integrating feedback from other professionals and incorporating reflective tasks to assess how students collaborate and communicate within interdisciplinary teams. These strategies highlight the importance of engaging multiple perspectives and using context-specific feedback to evaluate interprofessional behaviours more authentically.

Measuring Performance in Student-led Healthcare Services

Measuring Gathering Evidence and Information

Effective strategies for evaluating a student's ability to gather evidence and clinical information included observing the level of support required and direct supervisor observation. These approaches were deemed effective because they allowed for real-time assessment of a student's initiative and clinical reasoning. Additional strategies suggested included setting structured learning activities, such as in-services or case conferences. One expert explained,

“Setting the students a task on the placement (in-service, resource development, case conference participation, case study presentation) are all practices that can capture application of EBP [evidence-based practice] to the clinical setting.”

Placement Coordinator 4

This reinforces the value of engaging students in authentic tasks that require them to seek and apply evidence to practice.

Measuring Knowledge of Practice

Discipline-specific placement assessment tools were considered to be effective in evaluating students' knowledge of practice. These tools were valued for their ability to link theoretical understanding with clinical performance. Experts made the additional suggestion to use specific outcome-based tools and knowledge questionnaires to provide more targeted assessments. Additionally, strategies to support student development in this area included establishing clear expectations and regular opportunities for reflection. As one expert explained,

“Clear expectations provided at [the] beginning of placement and reflection against[the] same [expectations] regularly throughout placement.”

Recent Graduate 5

Measuring Clinical Reasoning

Clinical reasoning was most often assessed through discipline-specific assessment tools, structured written tasks such as case studies, and impromptu supervisor questioning. These strategies were considered to be effective and received strong support across rounds. One expert detailed an integrated model that includes both assessment and learning components, explaining,

“...the APP assessment tool has extensive key performance indicators for each of these elements... Students are required to complete clinical reasoning sheets for each new assessment for their first three weeks of placement which steps them through and develops their clinical reasoning. Twice weekly tutorials are conducted throughout placement to build, refine and improve competency in all clinical skills.”

Placement Supervisor 9

Measuring Client Outcomes

No specific tools were initially identified to measure client outcomes. When this was further explored, experts noted that realistic and relevant goals developed in collaboration with the client and supervisor were important indicators of success. As one expert explained,

“...student competency can include a student having interpreted all information well enough and collaborated with supervisor and client to make realistic and relevant plans to support the client.”

Recent Graduate 5

Goal setting and achievement tracking were the most cited formal strategies. One expert noted,

“The students also receive feedback from clients and outcomes are measured using goal setting and the achievement of stated goals for clients.”

Placement Supervisor 1

These findings suggest that while measurement tools remain limited, incorporating goal-oriented approaches and client feedback offers a practical way forward.

Measuring Clinical Competency

No tools or practices were initially identified by experts to measure clinical competency in clinical placements. When given a second opportunity to contribute suggestions, common forms of measurement identified were discipline specific placement assessment tools and direct observation for the placement supervisor, along with patient and consumer feedback.

Interestingly, the view was that clinical competency needs to be considered as the summation of all other areas of measurement, hence measurement of all other areas need to be achieved:

“Clinical competency is the summation of all the areas detailed above. To be considered clinically competent, the student must be able to gather information, display clinical reasoning, show resilience and be reflective etc etc. (sic) Therefore the tool for measuring clinical competence is the summation of all of the above.”

Placement Supervisor 6

Summary of Results: Student Learning Outcomes

No single tool was considered effective for assessing all areas within student learning outcomes in clinical placements. A multi-method approach, combining structured assessment tools, supervisor observation, reflective activities, and feedback mechanisms, was consistently supported. Discipline-specific tools were favoured for evaluating core domains such as professional behaviour, communication, documentation, scope of practice, continuity of care, knowledge, and clinical reasoning. Experts recommended shifting from numerical scores to descriptive, performance-based criteria to better capture student development. Supervisor observation was valued for its real-time, contextual insights, particularly in assessing professionalism, communication, workload management, and preparedness.

External feedback from staff and clients was seen as useful for evaluating professional behaviour and communication, while marking rubrics were preferred for documentation and report writing. Validated tools were recommended for interprofessional practice and self-efficacy, and reflective tasks were strongly endorsed for fostering critical thinking and self-assessment. Clinical reasoning was best assessed through applied methods such as written tasks, case studies,

and supervisor questioning. Figure 2 demonstrates the relationship between commonly used tools and the areas of measurement they have been supported to be effective in measuring.

Some domains, like workplace resilience, lacked consensus on tools; however, combined approaches using observation, feedback, and debriefing were suggested. Overall, the findings emphasise the need for an integrated, multi-method framework to ensure fair, accurate, and meaningful assessment of student learning in clinical placements.

Measuring Performance in Student-led Healthcare Services

Discipline Specific Placement Assessment Tools	✗	✗	✓	✓	✓	✓	✗	✗	✗	✗	✓	✓	✓
Staff and Client Feedback Surveys	✗	✗	✓	✗	✗	✗	✗	✗	✗	✗	✓	✗	✗
Supervisor Observation	✗	✗	✓	✗	✗	✗	✓	✓	✓	✗	✓	✗	✗
Marking Rubrics	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✗	✗
Increasing/Decreasing Level of Support Required	✗	✗	✗	✗	✓	✗	✗	✗	✓	✗	✗	✗	✗
Validated Outcome-Based Tools	✓	✗	✗	✗	✗	✗	✗	✗	✗	✓	✗	✗	✗
Reflective Tasks	✗	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
Written Tasks, Case Studies and Problem-Based Learning	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗
Impromptu Questioning and Probing of Practice	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗
	Self-Efficacy	Reflective Practice	Communication and Rapport Building	Clinical Reasoning	Documentation and Report Writing	Knowledge of Practice	Work Preparedness	Workload Management	Gathering Evidence and Information	Interprofessional Practice	Professional Behaviour	Continuity of Care	Scope of Practice

Figure 2. Tools Achieving Consensus Aligned with Student Learning Outcomes

5.4.2 *Measuring Experience of Placement*

While certain tools used to measure the experience of placement in clinical education achieved consensus, most areas lacked agreement, demonstrating the complexity of assessing placement experiences through standardised methods. Experts suggested commonly used approaches that may help address these gaps, highlighting the need for both structured evaluation tools and informal assessment methods. Table 2 summarises the consensus outcomes on the effectiveness of various measurement tools for evaluating placement experiences.

Table 2. *Consensus Outcomes on Tool Effectiveness for Measuring Placement Experience*

Identified Tool	Level of consensus (%)	Mean	Std Deviation
Goal Attainment			
Clinical Contracts	54.5	3.36	1.23
SMART goal setting	72.7	3.91	1.08
Discipline specific placement assessment tools	63.6	3.73	1.29
Reflective tasks	54.5	3.91	1.08
Trust and autonomy			
Student feedback surveys	45.5	3.64	0.98
Incidental conversations between student/supervisor/university	63.6	3.82	0.94
Reflective tasks	63.6	3.55	1.08
Observation by supervisor	72.7	3.82	1.11
Coping with Placement			
Incidental conversations between student/supervisor/university	63.6	3.91	1.16
Student feedback surveys	18.2	2.82	0.83
Theoretical models of skill mastery e.g. Zones of Proximal Development	45.5	3.18	0.94
University support of student			
Incidental conversations between student/supervisor/university	81.8	4.00	1.04
Student feedback surveys	54.5	3.64	0.88
Preparedness for placement			
Student feedback surveys	54.5	3.73	0.75
Incidental conversations between student/supervisor/university	63.6	3.64	0.98
Discipline specific placement assessment tools	63.6	3.91	0.79
Reflective tasks	45.5	3.27	0.75
Supervisor skills			
Student feedback surveys	54.5	3.55	0.99
Evidence of attendance at supervision related professional development opportunities	45.4	3.45	0.78

Measuring Performance in Student-led Healthcare Services

Constructive feedback			
Discipline specific placement assessment tools e.g. Likert based scales	63.6	3.91	0.79
Student feedback surveys	63.6	3.64	0.77
Reflective tasks	72.7	3.27	0.86
Theoretical models of reflective practice e.g. Gibbs Model of Reflective Practice or a model of Appreciative Inquiry	72.7	3.91	0.67
Measuring supervisor availability			
Hours of accessibility	63.6	3.73	1.21
Exposure to quality practice			
Incidental conversations between student/supervisor/university	72.7	3.73	0.96
Exposure to diverse practice			
Total number of hours obtained.	36.4	2.73	1.21
Incidental conversations between student/supervisor/university	72.7	3.82	1.03
Total number and type of placement exposed to	81.9	4.18	0.94
Total number and type of clients and/or condition groups exposed to.	81.8	4.36	0.77
Student feedback surveys	54.5	3.73	0.75
Inclusive placement site			
Incidental conversations between student/supervisor/university	72.7	3.73	0.96
Student feedback surveys	54.5	3.73	0.75
Subjective observation by supervisor	36.4	3.18	0.94
Reflective tasks	36.4	3.18	0.72
Orientation of placement			
Checklists	72.7	4.18	0.83
Supportive learning environment			
Incidental conversations between student/supervisor/university	72.7	4.00	4.00
Student feedback surveys	81.8	4.00	4.00
Reflective tasks	36.4	3.09	3.09
Supervisor satisfaction			

Measuring Performance in Student-led Healthcare Services

Incidental conversations between student/supervisor/university	72.7	3.91	0.90
Loss of future placement opportunities	36.4	3.45	0.89
Supervisor feedback surveys	100	4.36	0.48
University support of supervisor			
Incidental conversations between student/supervisor/university	81.8	4.00	1.04
Loss of future placement opportunities	36.4	3.45	1.16
Supervisor feedback surveys	90.9	4.36	0.64
Supervisor expectations			
Benchmarking of expectations against multiple universities	54.5	3.64	0.88
Incidental conversations between student/supervisor/university	63.6	3.73	1.05
Loss of future placement opportunities	30.0	3.10	0.83
Supervisor feedback surveys	90.0	4.20	0.60

Measuring Goal Attainment

Tools identified to measure goal attainment included clinical contracts, SMARTER goal-setting frameworks, discipline-specific placement assessment tools, and reflective tasks. However, no single tool achieved consensus. Experts emphasised the value of using a combination of these tools to more effectively capture goal-related outcomes. One expert suggested that,

“... a combination of either learning contract OR SMARTER goal setting WITH reflective practice captures this area well.”

Placement Coordinator 4

Another expert added that reflective tasks need not be limited to written formats, stating,

“I feel a reflective tool is best but this can be oral discussion with (sic) supervisor not just a written task.”

Placement Supervisor 9

Measuring Performance in Student-led Healthcare Services

These insights suggest that flexibility and integration across tools, particularly combining goal-setting with reflective dialogue, may enhance the effectiveness of measuring student goal attainment.

Measuring Trust and Autonomy

Student feedback surveys, reflective tasks, incidental conversations, and supervisor observation were among the tools identified to assess trust and autonomy. However, none of these tools reached consensus, reflecting the challenge of objectively measuring these constructs. In response, experts recommended evaluating the level of supervision required by students through a mix of reflective writing and direct observation. This multi-method approach was considered better suited to capturing gradual shifts in trust and autonomy over time. The findings point to the need for tools that can balance subjective experience with observed behavioural indicators, acknowledging that trust and autonomy are relational and context dependent.

Measuring Coping with Placement

A variety of tools were suggested to measure students' ability to cope with placement, including feedback surveys, incidental conversations, and theoretical frameworks such as skill mastery models. However, no tool reached consensus on effectiveness. Experts agreed that timing is crucial in assessing coping, with a strong preference for real-time data collection. One expert noted,

“Feedback surveys that occur DURING a placement (i.e. end week 1, week 3, week 5) could provide some effective capture and capacity to address issues. But the standard student feedback approach after a placement doesn't give a lot to address this area well, or in a time that has impact for that student.”

Placement Coordinator 4

This suggests that capturing how students are coping requires ongoing check-ins, rather than retrospective evaluation at the end of placement.

Measuring University Support of Student

Incidental conversations between the student, supervisor, and university were considered

by experts to be an effective way to assess the support provided by the university. In contrast, student feedback surveys were not considered reliable for capturing this type of support. Experts highlighted the complexity and contextual nature of university support, noting that formal measurement tools often fall short in capturing its full scope. One expert reflected,

“As the level of support a student needs is so individual, and so contextual across their personal and professional/university life, being able to measure this in any accurate way requires something that allows for the nuances of what 'support' involves....What captures the seriousness, the time involved, the processes involved, the variety of platforms engaged for support, whether the support needed is learning and development focused, pastoral care, support in transitioning/adjusting to a new/sensitive environment, support around a particular incident/experience on placement (that may/may not have directly involved the student). I actually have no ideas for how to measure that well.”

Placement Coordinator 4

These insights reinforce that university support is multifaceted and highly individualised, requiring flexible, real-time conversations rather than standardised survey tools to effectively assess and respond to student needs.

Measuring Preparedness for Placement

Student feedback surveys, incidental conversations, and discipline-specific assessment tools were identified by experts as methods used to assess preparedness for placement. However, none of these tools reached consensus on effectiveness. Experts emphasised that preparedness is a multifaceted concept requiring input from both students and supervisors and may vary by discipline and placement context. While some suggested reflective tasks could offer insights into student readiness, others felt more structured tools were needed to guide expectations. These findings suggest that measuring preparedness may be strengthened by combining pre-placement reflection with supervisor input and assessment frameworks that target readiness indicators.

Measuring Supervisor Skills

Supervisor skills were assessed using student feedback surveys and evidence of supervisor participation in professional development. However, neither tool achieved consensus.

Measuring Performance in Student-led Healthcare Services

Experts expressed concerns about the subjectivity of student feedback and the absence of clear benchmarks for evaluating supervisor performance. While supervisor development activities were viewed as potentially indicative of skill levels, they were not consistently tracked or evaluated. These findings indicate a need for clearer criteria and more consistent processes for assessing supervisor capability within clinical placements.

Measuring Constructive Feedback

Experts considered discipline-specific placement assessment tools and student feedback surveys to be useful for evaluating the provision of constructive feedback. Experts emphasised the value of structured frameworks in supporting student reflection and feedback integration, noting that formal models can prompt deeper learning when used intentionally. However, consensus on a single approach was not achieved, highlighting ongoing variability in practice. These results suggest that assessing the quality of feedback goes beyond basic satisfaction measures, incorporating models that encourage reflection and iterative improvement.

Measuring Supervisor Availability

Supervisor availability was most often assessed through the number of hours supervisors were accessible to students. However, this method did not achieve consensus among experts, who questioned the validity of time-based metrics alone. Instead, the concept of accessibility was highlighted as a more meaningful indicator. As one expert explained,

“Accessibility needs to relate to the intended ‘presence’ of the supervisor, as well as the supervisor being positive and available when required.”

Placement Coordinator 6

This finding reinforces that availability must be measured in terms of quality and responsiveness, not just quantity, suggesting that future tools should account for both physical presence and relational engagement.

Measuring Exposure to Quality Practice

Incidental conversations were the most commonly used tool to assess exposure to quality clinical practice, but consensus was not achieved on their effectiveness. Experts acknowledged

the importance of this domain, but the lack of structured tools made accurate measurement difficult. One expert reflected on this challenge, stating,

“Supervisors often have the best insights into what students are exposed to, but without a structured measure, it is difficult to track.”

Recent Graduate 10

These results suggest that informal methods remain the primary approach in this area, but highlight the need for more formal, systematic tools to assess whether students are encountering best-practice care environments during their placements.

Measuring Exposure to Diverse Practice

Experts identified the total number and type of clients or conditions encountered, as well as the number and type of placements undertaken, as the most useful tools to measure exposure to diverse practice. These approaches were considered to be effective and achieved strong consensus. In contrast, total placement hours and incidental conversations were not considered reliable indicators. Experts recommended shifting from informal assessments to structured case logs or competency tracking systems. As one expert explained,

“Simply counting placement hours does not equate to diverse learning experiences. We need more nuanced tracking of the types of cases students are exposed to.”

Placement Coordinator 4

These findings suggest that accurate assessment of exposure to diverse clinical practice requires detailed and structured documentation of client types and placement settings, rather than reliance on time-based metrics or informal conversation.

Measuring Inclusiveness of Placement Site

Student feedback surveys, incidental conversations, supervisor observation, and reflective tasks were identified as tools used to assess inclusiveness of the placement environment. However, no tool achieved consensus, reflecting the complexity and context-specific nature of inclusivity. Experts noted that inclusiveness is difficult to standardise due to variations in placement site culture and student experiences. One expert explained,

Measuring Performance in Student-led Healthcare Services

“Inclusiveness is difficult to quantify and varies depending on the placement site’s policies and culture.”

Placement Coordinator 1

Another expert highlighted the limitations of student feedback, stating,

“Student feedback is valuable, but it depends on their comfort in reporting inclusivity issues.”

Placement Coordinator 6

These insights suggest that while student perspectives provide important data, additional structured approaches may be needed to reliably assess inclusivity across different placement settings.

Measuring Orientation of Placement

Checklists were the only tool identified for assessing student orientation to placement, but this approach did not achieve consensus. While checklists were considered helpful for ensuring consistency, experts emphasised the need for additional student-centred feedback to fully evaluate orientation quality. As two experts suggested,

“Checklists provide consistency, but they need to be tailored to each placement site.”

Placement Supervisor 15

“Orientation effectiveness should be assessed through student feedback, not just a checklist of completed tasks.”

Placement Coordinator 1

These findings indicate that while checklists are a useful foundation, they should be supplemented with tools that capture student perceptions and experiences of their orientation.

Measuring Supportive Learning Environment

Student feedback surveys were considered to be effective for assessing the supportiveness of the learning environment and were the only tool to achieve consensus in this domain. Other strategies suggested, included reflective tasks and incidental conversations, were frequently used

but did not reach consensus. Experts acknowledged the subjective nature of this measure and recommended triangulating student feedback with supervisor perceptions. One expert explained,

“Student feedback is crucial, but informal conversations allow us to identify concerns in real-time.”

Placement Coordinator 6

These findings reinforce the value of student surveys but also highlight the importance of incorporating real-time feedback mechanisms and supervisor insights to achieve a more comprehensive view of placement support.

Measuring Supervisor Satisfaction

Supervisor feedback surveys, incidental conversations with key stakeholders, and monitoring the loss of future placement opportunities were identified as tools for assessing supervisor satisfaction. Among these, only supervisor feedback surveys were considered to be effective and reached consensus. Experts highlighted that supervision is a demanding role, and capturing supervisors’ experiences is essential to support retention and ensure high-quality placements. One expert emphasised,

“Supervision can be very difficult & challenging. It is important that there is a link to receive feedback and support from the uni as needed.”

Placement Supervisor 18

However, some also noted the potential bias introduced by student performance, with one expert commenting,

“I don’t know if there are standardised tools for these types of measurement?? I think measuring supervisor satisfaction is challenging if a student hasn’t done well in the clinic, then they will blame their CE [Clinical Educator].”

Placement Supervisor 6

These insights reinforce that supervisor satisfaction is complex and context-sensitive, and that feedback tools should be designed to capture experiences beyond student outcomes alone.

Measuring the Support Provided to the Supervisor by the University

Supervisor feedback surveys and incidental conversations were the tools most commonly used to assess university support for supervisors, with both considered to be effective. Loss of future placement opportunities was also mentioned but viewed more as an outcome of dissatisfaction rather than a measurement tool. Experts stressed the importance of capturing supervisor experiences to ensure long-term sustainability of placement partnerships. As one expert noted,

“It is important to get feedback from supervisors about their experience (particularly to build a sustainable clinical education model with experienced supervisors). Some universities measure via a survey, as well as incidental conversation.”

Placement Coordinator 3

These findings suggest a need for more formalised processes to routinely assess and respond to supervisor support needs.

Measuring Supervisor Expectations

Tools identified to measure supervisor expectations included benchmarking exercises, incidental conversations, and supervisor feedback surveys. Of these, only supervisor feedback surveys were considered effective and achieved consensus. Experts noted that supervisor expectations are often shaped by student performance, institutional culture, and previous placement experiences. One expert explained,

“We ask supervisors to complete a (sic) Evaluation at the end of the year. Some relevant examples include: Did the students’ knowledge meet your expectations?”

Placement Coordinator 4

These perspectives demonstrate the need for standardised tools that separate student performance from supervisor satisfaction and allow for more accurate evaluation of supervisor expectations.

Summary of Results: Experience of Placement

These findings show that assessing placement experience requires multiple tools, with no single method achieving consensus across all areas. Structured tools, such as feedback surveys, were considered effective in certain domains, while informal approaches, particularly incidental conversations and supervisor observations, were valued for capturing contextual and qualitative insights.

Supervisor feedback surveys received strong support for evaluating both supervisor satisfaction and the level of support provided by the university. In contrast, student feedback surveys were the only tool to achieve consensus for assessing the supportiveness of the placement environment. For exposure to diverse practice, structured logbooks tracking client and placement types were preferred over total placement hours. Figure 3 outlines how commonly used tools aligned with specific areas of measurement deemed effective by experts.

In contrast, several areas, including trust, autonomy, coping, and preparedness, lacked consensus on effective tools. Experts emphasised the need for frequent, real-time feedback mechanisms in these domains, rather than relying solely on end-of-placement reflections. Similarly, tools for assessing supervisor skills and feedback quality varied widely, reflecting ongoing challenges in these areas. Overall, the findings reinforce the need for multi-method evaluation frameworks that combine structured tools, direct observation, and timely feedback. This integrated approach is essential to meaningfully capture the depth and complexity of student experiences in clinical placement.

Measuring Performance in Student-led Healthcare Services

Supervisor Feedback Surveys	✓	✓	✗	✗	✗	✓
Incidental Conversations	✗	✗	✗	✓	✓	✗
Student Feedback Surveys	✗	✗	✗	✓	✗	✗
Supervisor Observation	✗	✗	✗	✗	✗	✗
Total Number and Type of Clients/Conditions	✗	✗	✓	✗	✗	✗
Total Number and Type of Placement	✗	✗	✓	✗	✗	✗
	Supervisor Satisfaction	University Support for Supervisor	Exposure to Diverse Practice	Supportiveness of Placement	University Support for Student	Supervisor Expectations

Figure 3. Tools Achieving Consensus Aligned with Experience of Placement.

5.5 Discussion

Several challenges, limitations, and implications have emerged regarding the evaluation of clinical placement performance, based on the findings of the Modified Delphi study. A key challenge identified was the difficulty in achieving consensus on effective measurement tools for various aspects of clinical placement performance. While experts largely agreed on *what* should be measured, there was considerable variation in views on *how* to measure it. Consensus was stronger for tools assessing student learning outcomes than for those evaluating placement experience. This reflects a more established tradition of educational assessment in clinical education, whereas tools to evaluate broader placement dynamics, such as supervision, institutional culture, and support, are still emerging (Birks et al., 2017; Cooper et al., 2020; McAllister et al., 2018). Variability in institutional practices, disciplinary expectations, and stakeholder perspectives contributed to differences in preferred evaluation methods, making it difficult to establish universally accepted tools. This aligns with the existing literature, which highlights inconsistencies in the psychometric properties of clinical learning environment evaluation tools and reinforces the ongoing need for validated, standardised measures (Mansutti et al., 2017).

Despite these challenges, some common approaches were identified. The use of competency-based assessment tools, checklists, and reflective tasks was widely recognised across multiple fields as an effective strategy for evaluating clinical placement performance. However, experts frequently emphasised that relying on a single assessment tool was inadequate and that a combination of methods was necessary to achieve a comprehensive evaluation. Furthermore, assessment approaches should be tailored to specific educational and clinical settings, ensuring that evaluations are both reliable and contextually appropriate (Barquero-Ruiz et al., 2019; Chimea et al., 2020).

Supervisor observation emerged as a frequently used method, especially for assessing communication and professional behaviour. While direct observation is a widely used assessment method, its subjectivity and variability were noted as limitations. Individual assessor expectations and discipline-specific norms introduce potential bias, complicating efforts to establish consistent and equitable evaluations across settings (Burgess & Mellis, 2015; Judd et al., 2023; Kogan et al., 2017; Valentine et al., 2023). Additionally, several critical placement competencies, such as workplace resilience, trust, autonomy, and coping, remain difficult to assess due to a lack of validated tools (Aryuwat et al., 2023). Effective

supervision plays a crucial role in supporting student adaptation in clinical placements, but standardised criteria and valid tools for evaluating supervision quality and placement support are limited and inconsistent (Jafarian-Amiri et al., 2020; McAllister et al., 2018). This gap in assessment emphasises the need for more comprehensive frameworks that capture the complexities of student experiences over time and provide a structured approach to measuring workplace resilience.

The Delphi method identified key measurement areas in clinical placement evaluation but encountered challenges in achieving consensus on specific evaluation tools. While expert input and consensus-building helped define important domains, the limitations of this approach became apparent in its reduced effectiveness for selecting standardised assessment tools (Oyebode et al., 2016). Although an additional Delphi round could have further refined tool selection, it was not pursued due to concerns about participant attrition and diminishing returns, as further rounds were unlikely to yield meaningful new insights (Robertson et al., 2015). Additionally, the reliance on expert opinion created a gap in empirical validation, as expert insights alone do not substitute for real-world data on the effectiveness of these tools in actual clinical placement settings (Maqbool & Herold, 2024; McAllister et al., 2018). This lack of empirical validation further reinforces the need for evidence-based research to ensure that proposed measurement tools are not only theoretically sound but also practically effective (Courtney-Pratt et al., 2014).

The composition of the expert panel, including placement coordinators, clinical supervisors, and recent graduates, provided rich, practice-informed perspectives. However, the absence of patient and client voices represents a limitation. As key stakeholders in clinical placement settings, their exclusion may have affected the completeness of the consensus (Boulkedid et al., 2011; Nasa et al., 2021). Experts also tended to favour assessment tools developed within their own disciplines and placement environments, with limited adoption of universal, validated tools. This discipline-specific approach presents a challenge to standardising evaluation practices across different allied health professions (Courtney-Pratt et al., 2014). Currently, no single tool is adaptable across all clinical placement settings that adequately captures all key areas of measurement in placement evaluation (Cooper et al., 2020). Consequently, any tool or framework developed for evaluating clinical placement performance must be flexible and adaptable to meet the unique requirements of different health professions and placement contexts.

The qualitative analysis also reflects an uneven distribution of participant contributions across stakeholder groups. Supervisors and coordinators contributed the majority of illustrative quotes, while recent graduates were less represented. This imbalance partly reflects differences in the depth of responses, as supervisors and coordinators tended to provide more detailed reflections based on their direct involvement in placement supervision and evaluation. However, it also reflects the attrition that occurred across Delphi rounds, which disproportionately affected the recent graduate group. Attrition is a recognised limitation of Delphi studies, with reduced participation from specific stakeholder groups potentially shifting the balance of perspectives captured (Hsu & Sandford, 2007; Keeney et al., 2001). As a result, recent graduate perspectives were less prominent in later rounds and within the qualitative dataset. While quotes from recent graduates were included wherever possible, particularly where they aligned with or contrasted the views of other participants, their under-representation should be acknowledged as a limitation of this study (Maguire & Delahunt, 2017).

Given these challenges, there is a clear need for alternative research approaches to consensus-building that incorporate empirical testing of tools in real-world settings. Rather than pursuing a universal solution, a flexible, context-sensitive framework may better support standardisation while accommodating disciplinary and setting-specific differences (Moullin et al., 2020). Understanding how these tools are perceived, applied, and adapted in practice will also provide critical insights into barriers to standardisation, the feasibility of multi-method evaluation strategies, and the contextual factors influencing tool selection (Øvrebø et al., 2022). By assessing stakeholder knowledge and attitudes towards clinical placement evaluation, recommendations can be developed to improve placement assessment frameworks, ensuring that they are both rigorous and adaptable to the specific contexts in which they are implemented.

5.6 Conclusion

The Modified Delphi study highlighted the challenges of measuring clinical placement performance, particularly the difficulty in achieving consensus on assessment tools considered to be effective. While expert input identified key measurement areas, significant

variability in preferred evaluation methods highlighted the complexity of standardising placement assessments.

These findings confirm that no single tool is sufficient for comprehensively measuring student learning outcomes or placement experiences. The subjectivity of supervisor assessments, lack of standardised criteria, and uncertainty around measuring workplace resilience indicate that existing tools require further investigation. Future research should shift from expert consensus to real-world application, exploring stakeholder perceptions, barriers, and practices when evaluating clinical placement performance. A flexible framework for tool selection would better address disciplinary differences while maintaining assessment reliability, specifically when applied in unique clinical placement settings.

Chapter 6: Measuring Clinical Placement Performance: Knowledge, Attitudes and Practices in Student-led Healthcare Services

While Chapters 4 and 5 established consensus on important areas of measurement for evaluating clinical placement performance and explored their contextual meaning, it was also important to examine how these priorities are understood and enacted in practice. Chapter 6 addresses this by presenting findings from a Knowledge, Attitudes and Practices (KAP) survey of Student-led Healthcare Service (SLHS) clinical placement coordinators and supervisors. It explores the relevance and feasibility of the Delphi-derived important areas of measurement in real-world settings and identifies practical challenges and enablers to their implementation. In doing so, this chapter provides critical validation and refinement of the priorities, ensuring they are grounded in current practice and capable of guiding future SLHS evaluation. This stage of the research addresses Research Question 3, and its place in the thesis structure is shown in Figure 1.

Chapter 6 is based on a research manuscript currently under review with BMC Medical Education:

Simmons, L., McGuckin, T., Barnett, F., & others. (2025, May 30). *Evaluating clinical placement performance in student-led healthcare services: A knowledge, attitudes, and practices survey* (Version 1) [Preprint]. Research Square. <https://doi.org/10.21203/rs.3.rs-6499409/v1> (under review).

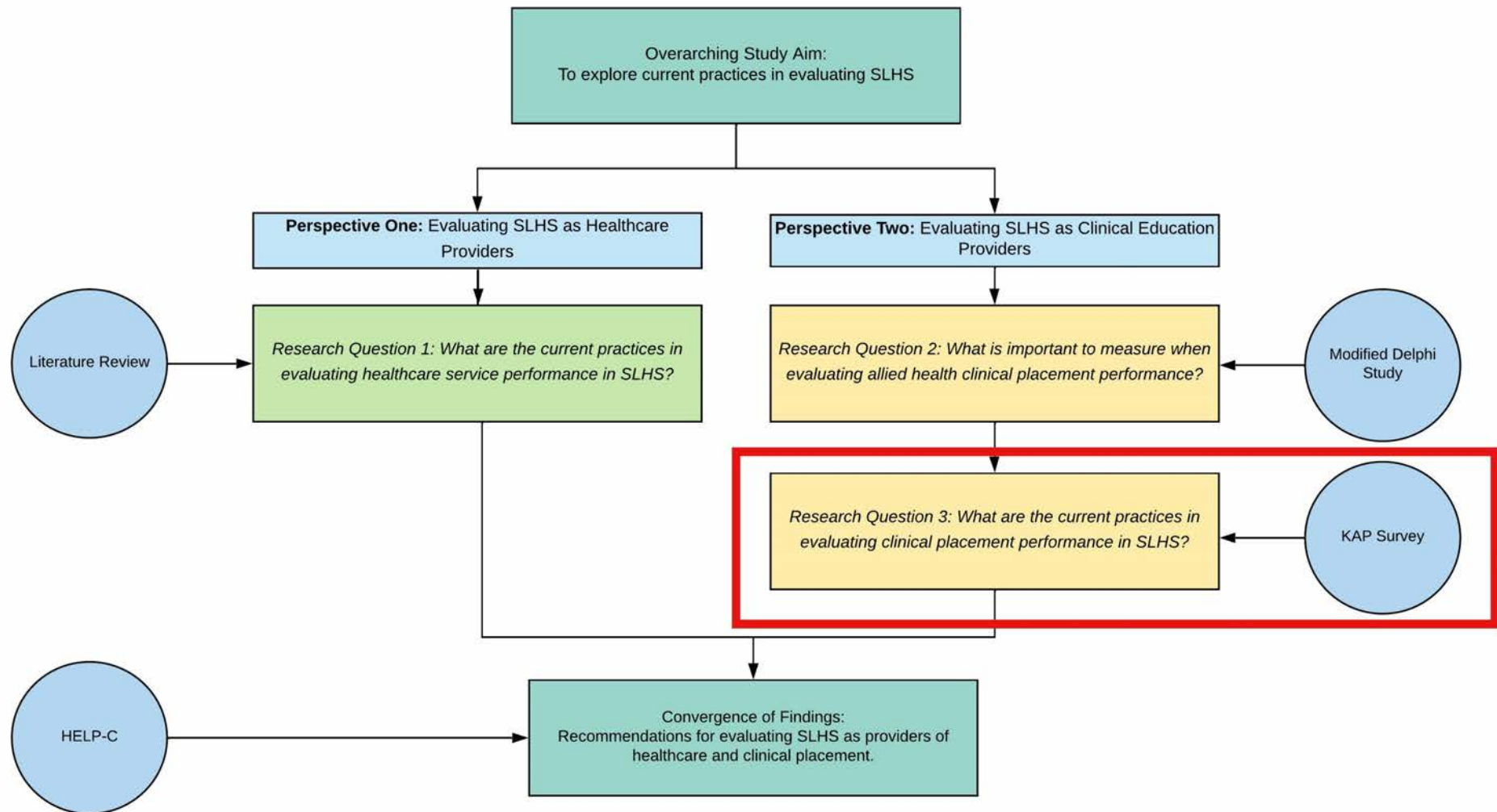


Figure 1. Thesis Structure Highlighting the Focus of Chapter 6 and Research Question 3

6.1 Abstract

Introduction: Student-led Healthcare Services (SLHS) expand clinical placement capacity while providing healthcare services, yet their evaluation remains inconsistent, limiting their effectiveness, institutional support, and integration into best practices in clinical training.

Objectives: This study examines stakeholder perspectives on SLHS evaluation, assessing knowledge, attitudes, and practices (KAP) to determine their alignment with current evidence and to identify key challenges to consistent evaluation.

Methods: A Knowledge, Attitudes and Practices (KAP) survey was distributed to placement supervisors and coordinators from a range of health disciplines and geographic locations involved in SLHS. The survey captured both quantitative and qualitative data on stakeholder familiarity with evaluation frameworks, attitudes toward systematic evaluation, current practices, and perceived barriers.

Results: Findings reveal a heavy reliance on informal evaluation methods, with limited awareness and use of standardised frameworks. Key areas such as supervisor experience, student financial burden, and placement site costs remain under-assessed. Additionally, cost measurement within SLHS is inconsistent, raising concerns about placement accessibility and the long-term viability of SLHS.

Conclusion: A structured evaluation framework is essential to enhance credibility, sustainability, and educational impact in SLHS placements. Future research should explore the impacts of SLHS and compare them with other placement models to ensure evaluation consistency and evidence-based decision-making in clinical education.

6.2 Introduction

Student-led Healthcare Services (SLHS) are increasingly recognised for their dual role in expanding access to healthcare and addressing the shortage of clinical placement opportunities in allied health education (Robertson et al., 2024). These services enhance student learning through hands-on experience, while supporting the development of

professional skills such as leadership and early clinical reasoning (Wilson et al., 2023; Wynne & Cooper, 2021). Student-led Healthcare Services have also been shown to ease pressure on traditional placement systems by offering flexible and scalable training models (Moran et al., 2020), particularly in rural areas where placement options and healthcare access are often limited (Thackrah & Thompson, 2019).

To ensure quality in clinical education, robust evaluation frameworks are needed to assess student learning, supervision, and the broader impact of placements on healthcare delivery (Simmons et al., 2025). While traditional placements often have established evaluation metrics, SLHS placements lack standardised measures, making it difficult to compare outcomes or advocate for continued integration into health professional education (Moran et al., 2020; Simmons et al., 2023). Like traditional models, evaluating SLHS placements is multifaceted, requiring assessment of student performance, supervision quality, financial considerations, and the overall learning environment. Student outcomes cannot be evaluated in isolation, as factors such as organisational culture, resource availability, and placement structure influence students' ability to apply theoretical knowledge in practice (Hashemiparast et al., 2019; Lane et al., 2020; McTier et al., 2023).

Supervision is consistently cited as one of the most important features of quality clinical placements (McAllister et al., 2018). Effective supervision fosters a supportive learning environment and ensures that students receive constructive feedback on their performance, which is essential for their progression. High-quality feedback helps students recognise their strengths, address areas for improvement, and refine their clinical skills (Keshavarzi et al., 2022). Without proper evaluation of supervisory effectiveness, students may miss out on valuable learning opportunities critical for their professional development (Vaughan, 2020). Inadequate supervision not only compromises the student learning experience (McAllister et al., 2018), but can also place additional strain on clinical educators, reducing the overall effectiveness of the placement environment (Rothwell et al., 2021).

Beyond the pedagogical considerations of supervision and learning environments, financial factors also play a key role in the success and sustainability of placements. Clinical placements are essential for training healthcare professionals but have significant financial considerations for educational institutions, healthcare providers, and students (Walker & Forbes, 2022). For placement providers, hosting students requires staff time for supervision, which can reduce the clinical workforce available for patient care and impact the quality of

education (Skaalvik et al., 2011). Educational institutions must also navigate financial challenges in securing quality placements, often making decisions based on cost-effectiveness, curriculum design, and partnerships with health facilities (Kirby et al., 2018). Additionally, students frequently experience financial hardship due to placement-related costs such as travel, accommodation, and lost income from reduced employment opportunities during placement periods, with longer placements exacerbating these financial pressures (Hughes & Desbrow, 2010).

Given the complexities surrounding supervision, learning environments, and financial constraints, a comprehensive understanding of the key measurement areas related to clinical placement performance is essential. This understanding enables stakeholders to assess these services effectively, promoting standardisation and comparability across different SLHS. This approach aligns with the work of Cooper et al. (2020), who developed the Placement Evaluation Tool (PET), which encompasses various domains including participant reactions, self-reported learning outcomes, and behavioural changes. Tools like PET support more structured evaluations of SLHS, helping to enhance their credibility and integration into health professional education (Cooper et al., 2020). Similarly, McAllister et al. (2018), building on earlier recommendations by Cusick (2014), adapted the Best Practice Clinical Learning Environment (BPCLE) framework (Darcy Associates, 2013a) by incorporating effective supervision as an additional core element, thereby enhancing its applicability to allied health education. This adapted framework reinforces the importance of learning culture, clinical governance, and student engagement in fostering high-quality clinical placement environments (McAllister, 2018). The Clinical Placement Quality Survey (CPQS) also contributes to evaluating placement quality by capturing student perceptions of supervision, support, and learning opportunities (Jones et al., 2022). While these tools provide valuable insights into the placement experience, their application within SLHS remains limited, revealing a gap in how these innovative models are evaluated.

Expanding on these approaches to clinical placement evaluation, 43 important areas of measurement for evaluating clinical placement performance have been identified (Simmons et al 2025). These areas extend beyond individual learning outcomes to include the broader experience and the overall cost of placement. Among the identified areas, student learning outcomes were a key focus, ensuring that placements effectively prepared students for professional practice. However, the importance of supervisory quality and student support

structures was also identified, recognising that the overall learning experience is shaped by more than just individual academic or clinical skill attainment. Additionally, the financial implications of placements were identified, including costs borne by students, healthcare institutions, and universities, reinforcing the need for viable placement models that balance quality education with financial feasibility (Simmons et al., 2025).

By integrating these important areas of measurement into comprehensive evaluation, SLHS can focus on maintaining high standards while fostering continuous improvement in clinical education and patient care. Given the potential benefits and impact of SLHS within the community, it is essential to examine current evaluation practices to identify gaps, challenges, strengths, and opportunities for improvement. This chapter explores the knowledge, attitudes, and practices of clinical placement coordinators and supervisors to determine how clinical placement performance is evaluated in SLHS. Specifically, it addresses two research questions:

1. To what extent do stakeholders' knowledge, attitudes, and practices support a comprehensive evaluation of clinical placement performance within SLHS?
2. What challenges and areas for improvement do stakeholders identify when evaluating clinical placement performance within SLHS?

6.3 Method

This study employed an observational design using a Knowledge, Attitudes, and Practices (KAP) survey distributed to key stakeholders involved in SLHS, including clinical placement coordinators and supervisors. Ethical approval was obtained from the James Cook University Human Research Ethics Committee (HREC Approval Number: H9592).

6.3.1 *The Knowledge, Attitudes, and Practices survey method*

The KAP survey is a widely recognised and validated approach for assessing stakeholder perspectives in health professional education, offering a structured approach to understanding how clinical placement evaluation in SLHS is perceived and implemented (Andrade et al., 2020; Sridhar et al., 2016). By capturing what stakeholders know, believe, and do, KAP surveys help identify discrepancies and barriers that may hinder practical

evaluation, particularly among those responsible for supervising and coordinating placements (Launiala, 2009). This approach identifies gaps in knowledge, inconsistencies in attitudes, and limitations in current practices, offering targeted insights for improvement (Zarei et al., 2024). When combined with quantitative and qualitative analysis, KAP surveys provide a comprehensive tool for evaluating professional competencies and system-level practices (Coppola et al., 2021).

Recent developments like the ChecKAP checklist have enhanced methodological transparency and reliability by standardising survey design, data collection, and reporting practices (Zarei et al., 2024). Careful attention to survey design, such as defining purpose, targeting the appropriate population, and crafting effective response options, ensures that KAP studies yield actionable, contextually grounded recommendations to strengthen clinical placement evaluation in SLHS (Andrade et al., 2020).

The KAP survey was selected for this study for its ability to capture breadth across diverse professional groups and geographic contexts. This was advantageous for identifying systematic gaps in evaluation knowledge, attitudes, and practices across SLHS. However, while KAP surveys provide breadth, they do not capture the same depth of insight as qualitative interviews or focus groups, and responses to open-ended items are often shorter (Launiala, 2009; Sridhar et al., 2016). This limitation is a recognised drawback of KAP methodology, which has been critiqued for generating relatively superficial data and for needing to be complemented with richer qualitative approaches to capture deeper insights (Launiala, 2009; Andrade et al., 2020). In this study, the limitation was offset by combining structured quantitative items with open-ended qualitative questions, using thematic analysis to identify patterns and meaning (Braun & Clarke, 2012, 2021).

6.3.2 Survey Development

The online survey instrument for this current study was developed through an iterative process, undergoing face and content validation through piloting and expert review to refine items, enhance question clarity and ensure the survey is reliable and effective in gathering the intended data (Antoniou et al., 2016; Nilvér et al., 2017). Furthermore, the survey design was aligned with contemporary evidence, supporting comprehensive clinical placement evaluation and important areas of measurement related to clinical placement performance (Simmons et al. 2025). Questions were formulated to align with the ChecKAP checklist and

practical guidelines proposed by Andrade et al. (2020), ensuring clarity, relevance, and methodological rigor (Zarei et al., 2024). The survey included closed and open-ended questions about demographic data, knowledge of evaluation frameworks, attitudes toward systematic evaluation, and current evaluation practices. Using the KAP structure, the following areas were explored:

Knowledge: Assessing familiarity with clinical placement evaluation frameworks, including knowledge-based items exploring awareness of standardised evaluation tools, methods used to assess clinical placement performance, and key measures within the domains of learning outcomes, experience of placement, and cost of placement.

Attitudes: Investigating perceptions of systematic evaluation's importance, feasibility, and challenges. These include beliefs about the effectiveness of evaluation frameworks, perceptions of institutional and logistical barriers, and willingness to engage in structured assessment practices.

Practices: Examining current methods used to measure clinical placement outcomes, while identifying challenges in implementation. This section investigates the extent to which established evaluation frameworks are applied in practice, how stakeholders conduct assessments, and barriers such as a lack of standardised tools, variability in placement settings, and time constraints faced by clinical educators. Additionally, the survey explores existing research capacity within SLHS, including access to research resources, institutional support for evaluation, and the integration of research into placement activities.

To ensure interpretability and reliability, response options varied across the survey sections (Barnum, 2011). Rather than presenting knowledge items with correct or incorrect response options, questions were designed to assess respondents' familiarity with clinical placement evaluation frameworks and tools. This approach allowed for an evaluation of baseline knowledge and awareness of standardised evaluation tools within the specific context of clinical placement. The attitudes section consisted of multiple-choice questions and ranking-based items, where respondents were asked to identify key areas of importance and perceived challenges related to clinical placement evaluation. These questions provided predefined categorical responses (i.e. 'important', 'not important') that allowed participants to express their views on systematic evaluation. The practices section combined different response formats, including frequency-based questions (i.e. 'Never,' 'Rarely,' 'Sometimes,'

'Often,' 'Always') to gauge how regularly participants engaged in clinical placement evaluations.

Additionally, open-ended questions allowed respondents to elaborate on their approaches, challenges, and strategies in evaluating placement in SLHS. Questions related to challenges and research capacity in SLHS used multiple-choice and open-ended response options to capture barriers to conducting evaluations and potential strategies for improving research integration. Pilot testing identified areas requiring refinement, including rewording ambiguous questions, adjusting response categories for consistency, and improving layout for better participant navigation.

6.3.3 Survey Recruitment

Participants were recruited between October 2024 and March 2025 using purposive and snowball sampling methods, specifically targeting clinical placement coordinators and supervisors involved in SLHS. Recruitment emails were disseminated through institutional networks and professional associations to ensure broad participation.

An estimated sample size of 30–40 participants was targeted, reflecting participant numbers used in previous research on similar topics with comparable populations (Forbes, 2022; Snowdon et al., 2019). This sample size was informed by precedence and practical considerations, ensuring it was sufficient to yield meaningful insights while remaining feasible within the study's scope and resources (Lwanga & Lemeshow, 1991).

A diversified recruitment approach was employed to mitigate potential selection, response, and representation biases (Newington & Metcalfe, 2014). This strategy aimed to enhance sample representativeness by reaching stakeholders across diverse geographical and institutional contexts. Recruitment targeted placement supervisors in SLHS programs, clinical sites supervising SLHS students, national clinical education networks (e.g., Allied Health Clinical Educators Network), and university placement coordinators affiliated with SLHS.

6.3.4 Data Collection

Participants were invited to participate in the online survey via a recruitment email, which included information about the study and an information sheet. Responses were

captured using the Qualtrics online survey platform (Qualtrics software, Version 2009. <https://www.qualtrics.com>). Informed consent was obtained online before participants responded to survey questions. Weekly reminders were sent to potential participants, and an opt-out option was provided to respect participant preferences. It was estimated that the survey would take under 20 minutes to complete, supporting survey completion rates (O'Reilly-Shah, 2017). All responses were anonymous.

6.3.5 Data Analysis

Surveys with a completion rate exceeding 60% were included in the analysis, as research indicates that responses above this threshold maintain data reliability and provide valuable insights into knowledge, attitudes, and practices (Islam et al., 2024; Willis et al., 2013). This inclusion criteria aligns with established survey research methodologies, where partial responses above 60% are sufficient for robust data analysis, minimising nonresponse bias while preserving meaningful trends (Volvovsky et al., 2014; Yale et al., 2018).

Quantitative data were analysed using descriptive statistics, focusing on proportions to summarise response patterns and identify trends across key variables. Sample representation was also assessed by mapping respondents' identified postcodes against the postcodes of SLHS advertised by Australian universities.

Qualitative data from open-ended survey responses were analysed using a categorisation approach informed by Braun and Clarke's (2012, 2021) principles of thematic analysis. Because many responses were brief, it was not feasible to apply all six phases of thematic analysis in full. Instead, responses were reviewed for commonalities, grouped into categories, and their frequency noted. Where responses contained nuance or elaboration, interpretive analysis was applied to capture meaning beyond simple counts. These categories were then integrated into the results to illustrate stakeholder perspectives. This approach balanced descriptive rigour with interpretive depth, remaining appropriate to the nature of the dataset and scope of the study (Andrade et al., 2020; Launiala, 2009). To ensure reliability and rigor, all authors reviewed and cross-checked quantitative and qualitative results, each an experienced academic or researcher in health professional education.

6.4 Results

6.4.1 Survey Response

Initial recruitment efforts (October to December 2025) targeted 210 potential respondents via email invitations, resulting in 43 survey initiations and 28 participants completing more than 60% of survey questions. Preliminary data analysis revealed an overrepresentation of respondents from eastern Australian states and metropolitan areas, prompting an additional recruitment effort (January to March 2025) to enhance geographic diversity. An additional 53 potential respondents affiliated with SLHS programs in rural regions of South Australia, Western Australia, and the Northern Territory were targeted. This second recruitment phase resulted in 10 additional survey initiations, with three respondents completing at least 60% of the survey. Figure 2 provides an overview of the survey structure, detailing the key sections and corresponding respondent participation.

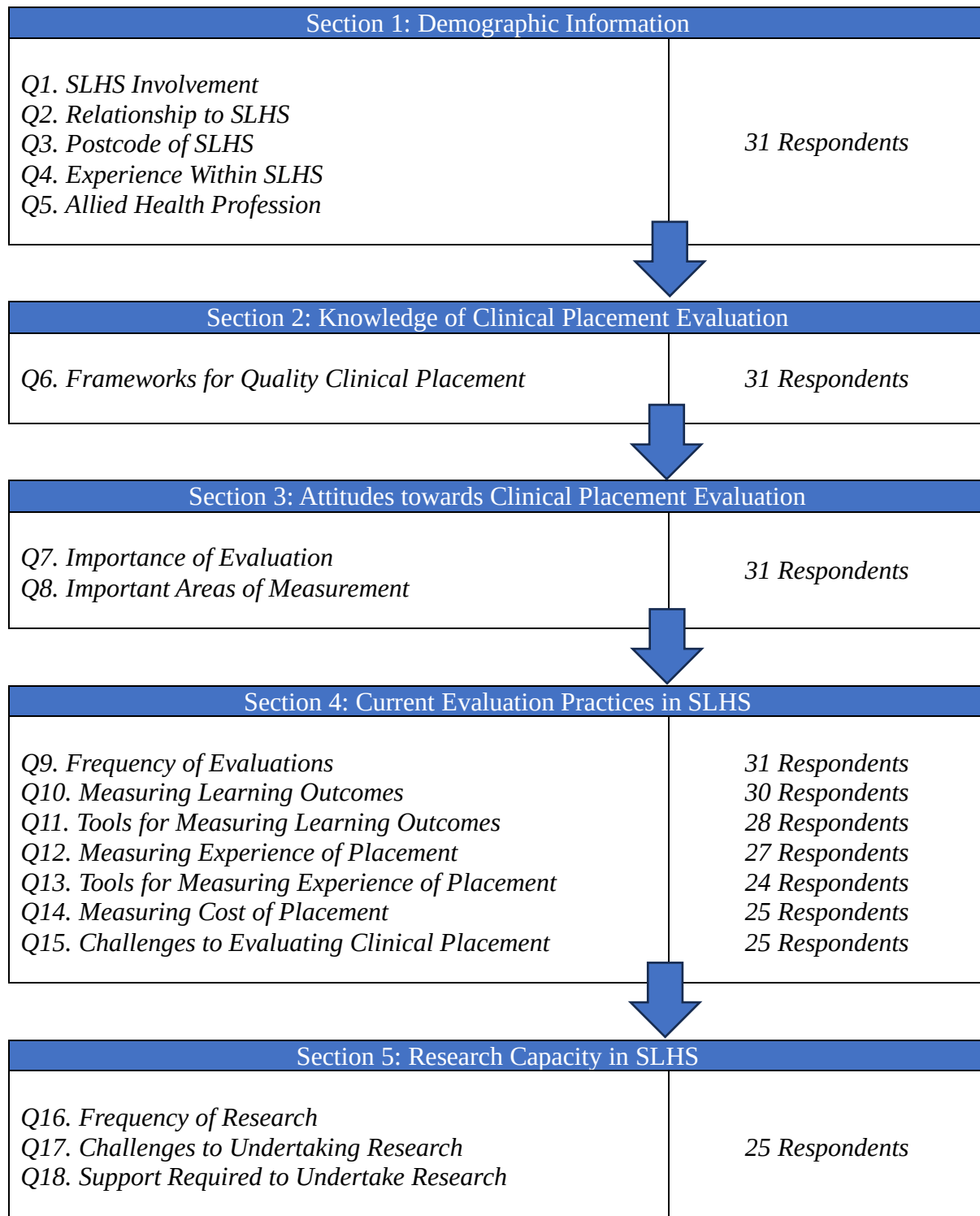


Figure 2. Survey Questions and Respondent Participation

6.4.2 Demographic Representation

Survey respondents were distributed across all Australian Statistical Geography Standard – Remoteness Areas (ASGS-RA) classifications (Australian Bureau of Statistics [ABS], 2016), with the largest group located in major cities (45.7%), followed by outer regional (31.4%), inner regional (14.3%), very remote (5.7%), and remote areas (2.9%). Most participants were from Queensland (60%), New South Wales (17.1%), and Western Australia (14.3%), with smaller numbers from the ACT (5.7%) and Victoria (2.9%). No respondents were from South Australia, the Northern Territory, or Tasmania. This reflects the geographic distribution of Australian universities, particularly the higher concentration of SLHS-affiliated institutions in New South Wales and Queensland.

Participants represented a range of health professions, most commonly Clinical Exercise Physiology (25.8%), Speech Pathology (22.6%), and Physiotherapy (19.5%). Fewer responses came from Occupational Therapy (9.7%), Audiology, Social Work, Psychology, Optometry, Dietetics, Nursing, and General Practice (each 3.2%). Most respondents identified as placement supervisors (74.4%), with 12.8% as placement coordinators and 12.8% holding both roles. Experience levels varied, with 22.5% reporting over 10 years of experience, indicating strong input from seasoned educators.

6.4.3 Knowledge of Quality Clinical Placement Frameworks or Guidelines

The most recognised framework was *The Superguide: A Handbook for Supervising Allied Health Professionals* (Health Education and Training Institute [HETI], 2019) recognised by 29% of respondents. This was followed by the *National Clinical Supervision Support Framework* (Health Workforce Australia, 2011) and the *Improving Quality in Practice Placements – Allied Health* (iQIPP-AH) (University of Queensland, 2012), each recognised by 26% of respondents. Other frameworks, such as the *Best Practice Clinical Learning Environment* (BPCLE) Framework (Darcy Associates, 2013a), the *Allied Health Clinical Supervision Framework* (Department of Health, 2022), and the *National Clinical Supervision Competency Resource* (Health Workforce Australia, 2013), were less widely recognised (13%, 10%, and 3%, respectively).

Standardised approaches to clinical placement evaluation were lacking, with 26% of respondents reporting using no framework and 7% indicating that none of the provided

frameworks were used in their practice. This suggests that many clinical educators and supervisors operate without structured frameworks or guidelines for quality clinical placement practice.

6.4.4 Attitudes Towards the Evaluation of Student-led Healthcare Services

There was strong consensus that systematic evaluation of SLHS placements is essential. Respondents unanimously supported measuring clinical service delivery, professional practice, and student experience. Furthermore, despite receiving more mixed responses, the cost to the placement site, the cost to the university, and the cost to the student were ranked as important by most respondents. Table 1 presents survey respondents' perspectives on the importance of areas of measurement for clinical placement performance evaluation.

Table 1. *Survey Respondents' Understanding of Clinical Placement Performance Evaluation*

Area of Measurement	Important	Not Important
Clinical Service Delivery	100%	0%
Professional Practice	100%	0%
Managing in the Workplace	80.7%	19.3%
The Student Experience of Placement	100%	0%
The Supervisor Experience of Placement	96.8%	3.2%
Cost to the Placement Site	71%	29%
Cost to the University	68%	32%
Cost to the Student	83.9%	16.1%

6.4.5 Current Evaluation Practices in SLHS

Most respondents (64.5%) reported conducting evaluations after each clinical placement. Smaller proportions indicated biannual (3.2%) or annual (16.1%) reviews, while only 3% used ongoing, continuous evaluation processes. In contrast, 6.5% of respondents were uncertain about how often evaluations occur and 3% did not conduct evaluations directly.

Measuring Learning Outcomes

Current practices in evaluating student learning outcomes in SLHS demonstrate a strong emphasis on clinical competency and professional practice, with some areas, such as interprofessional collaboration and workplace resilience, receiving less consistent evaluation. Table 2 presents an overview of how student learning outcomes are currently being measured in SLHS.

Measuring Performance in Student-led Healthcare Services

Table 2. *Evaluation of Student Learning Outcomes in SLHS*

Theme	Area of Measurement	Always measure	Sometimes measure	Never measure
Clinical Service Delivery	Clinical Competency	86.7%	13.3%	0%
	Clinical Reasoning	90%	10%	0%
	Knowledge of Practice	86.7%	10%	3.3%
	Gathering Evidence and Information	76.7%	20%	3.3%
	Interprofessional Practice	56.7%	43.3%	0%
	Client Outcomes	56.7%	43.3%	0%
	Continuity of Care	36.7%	53.3%	10%
	Scope of Practice	50%	36.7%	13.3%
Professional Practice	Administration Skills	40%	36.7%	23.3%
	Communication and Rapport Building	96.7%	0%	3.3%
	Documentation and Report Writing	86.7%	13.3%	0%
	Professional Behaviour	96.7%	3.3%	0%
Managing in the Workplace	Reflective Practice	93.4%	3.3%	3.3%
	Self-efficacy	63.4%	23.3%	13.3%
	Work Preparedness	63.3%	30%	6.7%
	Workload Management	50%	46.7%	3.3%
	Workplace Resilience	40%	40%	20%

Measuring Performance in Student-led Healthcare Services

Many respondents reported that clinical competency, clinical reasoning, and knowledge of practice are continuously measured. Communication, rapport building, and professional behaviour were among the most consistently measured areas, while interprofessional practice and client outcomes were measured less consistently.

Regarding measuring elements related to managing in the workplace, the respondents indicated a mixed approach to evaluation. Reflective practice was a well-established evaluation component; however, work preparedness, self-efficacy and workplace resilience were less frequently measured.

Respondents reported using a range of tools, feedback strategies, and reflective exercises to evaluate student learning outcomes. Evaluation practices varied across SLHS, incorporating a mix of standardised competency-based instruments, structured feedback processes, and reflective assessments. Half of the respondents relied on discipline-specific placement assessment tools, highlighting a strong preference for structured, skills-based evaluation approaches.

Measuring Experience of Placement

Supervisor satisfaction and university support of supervisors were not consistently measured. In contrast, student experience was more consistently evaluated, particularly regarding the quality of placement and supervision. Commonly measured aspects included the learning environment, student orientation, and exposure to diverse settings. However, the inclusiveness of the placement site, as well as measures like trust, autonomy, and goal attainment, were assessed less frequently. University support for students was particularly under-measured, with only 37% of respondents 'always' evaluating it, while 22.2% never do. Table 3 presents an overview of how placement experience is currently being measured in SLHS.

Table 3. *Evaluation of Experience of Placement in SLHS*

Theme		Area of Measurement	Always measure	Sometimes measure	Never measure
The Supervisor Experience		Supervisor Expectations of Placement	48.2%	25.9%	25.9%
		University Support of Supervisor	22.2%	44.5%	33.3%
		Supervisor Satisfaction	44.5%	37%	18.5%
The Student Experience	Quality of Placement	Supportive Learning Environment	70.4%	25.9%	3.7%
		Orientation of Student to Placement	70.4%	18.5%	11.1%
		Inclusiveness of Placement Site for Student	44.5%	44.4%	11.1%
		Student Exposure to Quality Practice	55.6%	29.6%	14.8%
		Student Exposure to Diverse Practice	63%	25.9%	11.1%
	Quality of Supervision	Supervisor Skills	55.6%	11%	3.7%
		Supervisor Availability	59.3%	37%	3.7%
		Constructiveness of Feedback	77.8%	14.8%	7.4%
	Student Satisfaction	University Support of Student	37.%	40.8%	22.2%
		Trust in, and Autonomy of the Student	51.9%	22.2%	25.9%
		Student Preparedness for Placement	48.2%	29.6%	22.2%
		Student Goal Attainment	63%	18.5%	18.5%
		Student Coping with Placement	63%	25.9%	11.1%

When asked about the specific tools used to evaluate placement experiences, respondents overwhelmingly indicated a reliance on informal, self-developed, or institution-specific methods, with little use of standardised evaluation tools. Only a small proportion of respondents reported using validated survey instruments. For example, 4.2% used the *Student Evaluation of Clinical Education Environment (SECEE) Survey* (Sand-Jecklin et al., 2023), and 8.3% used the *Clinical Placement Quality Survey (CPQS-S)* (Jones et al., 2022). Tools such as the *Clinical Learning Environment, Supervision and Nurse Teacher (CLES+T)* (Saarikoski et al., 2008), *Supervision Evaluation and Supervisory Competence (SE-SC) Scale* (Gonsalvez et al., 2021), *Dundee Ready Education Environment Measure (DREEM)* (Roff et al., 1997), *Maastricht Clinical Teaching Questionnaire* (Stalmeijer et al., 2010), and *BPCLEtool* (Darcy Associates, 2013b) were not used at all. Almost 80% of respondents reported using “other” methods, including placement site-specific or self-developed surveys, informal student interviews and discussions, discipline-specific placement assessment tools, post-placement student debrief sessions, and workload reviews combined with subjective feedback discussions.

Measuring Cost of Placement

The evaluation of cost in clinical placements remains inconsistent across institutions and SLHS. Many respondents reported that financial considerations are rarely or inconsistently measured, demonstrating a significant gap in how placements are evaluated regarding financial viability and accessibility for students. Table 4 presents an overview of how placement cost is currently being measured in SLHS.

Table 4. *Evaluation of Cost of Placement in SLHS*

Theme	Area of Measurement	Always measure	Sometimes measure	Never measure
Cost to the Student	Student Loss of Income	12%	20%	68%
	Pre-Placement Costs of Student	16%	20%	64%
	Transport and Accommodation Costs	24%	16%	60%
Cost to the Placement Site	Impact on Services	20%	40%	40%
	Resourcing for Student	24%	28%	48%
	Placement Supervisor Time	40%	28%	32%
Cost to the University	Insurance Costs	20%	16%	64%
	Paid Placements	12%	16%	72%
	Placement Coordinator Time	20%	36%	44%

Most respondents reported that student loss of income and pre-placement costs were not commonly assessed. Although transport and accommodation costs were slightly more likely to be considered, they were still frequently overlooked in evaluation practices. Financial impacts on placement providers were also reported as inconsistently assessed. Many respondents indicated that the effect of student placements on service delivery was either rarely or never evaluated. Among the few cost areas that were regularly assessed, supervisor time emerged as the most considered. In contrast, the costs associated with student resourcing were often overlooked. Costs incurred by universities were the least evaluated overall. Paid placements were seldom considered in assessments, and insurance costs, despite their importance for student safety and institutional liability, were largely ignored. Additionally, the time commitment required from placement coordinators was frequently not evaluated, suggesting a lack of recognition for the administrative demands of managing placements.

Challenges in SLHS Evaluation

A range of challenges to effectively evaluating clinical placements in SLHS were identified. The primary challenges identified include time constraints (60%), limited knowledge of evaluation frameworks (60%) and lack of structured assessment tools (52%).

Additionally, respondents highlighted other contributing factors, such as lack of continuity in student placements, limited supervisor-specific evaluation tools, and staffing shortages.

Research Capacity in SLHS

Despite the potential for evidence-based practice and scholarly inquiry, research remains a low priority within many student-led clinical settings. Research engagement within clinical placements is infrequent, with 40% of respondents indicating that research is rarely conducted (once per year) and 32% reporting that they never engage in research activities within SLHS.

Several significant challenges to conducting research in SLHS were identified, including limited time within the placement schedule (29.4%), lack of funding and resources (21.6%), insufficient support (21.6%), and institutional or organisational barriers (19.6%). Additionally, some respondents noted challenges such as difficulty engaging students in research and staffing constraints.

Subsequently, the most frequently identified requirement to improve research capacity was allocating dedicated time for research activities (38.9%), suggesting that placement coordinators and supervisors experience challenges with balancing research with their clinical and academic workload. Other essential forms of support identified included access to research training workshops (14.8%), mentorship from experienced researchers (16.6%), and access to research resources such as databases and software (14.8%).

6.5 Discussion

This study explored stakeholders' knowledge, attitudes, and practices regarding evaluating clinical placement performance within SLHS. Specifically, it sought to understand the extent to which current evaluation approaches reflect comprehensive, consistent, and evidence-informed practices across SLHS settings. The findings reveal significant gaps, notably in financial tracking, research integration, and the use of standardised evaluation tools. While stakeholders recognised the value of systematic evaluation, many relied on informal or locally developed methods. Key areas such as supervision quality, student financial burden, and placement site costs were often under-evaluated, raising concerns about

the long-term viability of SLHS. These challenges reflect broader issues in clinical education and emphasise the need for structured, evidence-based approaches to placement evaluation (Cooper et al., 2020; McAllister et al., 2018).

A strong response from regional and remote practitioners reinforces the importance of SLHS in expanding placement opportunities outside metropolitan centres, where traditional placements may be limited (Campbell et al., 2020; Wynne & Cooper, 2021). National workforce reports have repeatedly emphasised the need for regional and rural placements to address workforce shortages (Universities Australia, 2022), reinforcing the significance of SLHS placement models in ensuring equitable healthcare training distribution and service provision in underserved areas (Stuhlmiller & Tolchard, 2018). However, the concentration of SLHS in urban areas suggests their primary role in these settings is educational, rather than addressing service gaps. These findings are consistent with literature indicating that clinical placements in metropolitan areas often focus on student competency rather than directly improving healthcare accessibility (Carpenter et al., 2017; Oliveira et al., 2021; Perkins & Daly, 2013; Welsh & Swain, 2020).

The larger representation of health disciplines such as Clinical Exercise Physiology and Speech Pathology in SLHS placements may reflect these disciplines' challenges in securing traditional placements. Allied health professions with lower workforce representation have been shown to experience challenges with placement availability, leading to increased reliance on alternative models such as SLHS (Australian Council of Deans of Health Sciences [ACDHS], 2023; McBride et al., 2020;). Additionally, Clinical Exercise Physiology placements may be further constrained by the profession's strong focus on community-based and private practice settings, which traditionally offer fewer structured student placement opportunities (Sealey et al., 2015). In contrast, Physiotherapy's strong representation by respondents, despite having a more extensive workforce representation, suggests that financial constraints and high competition for clinical placements in traditional settings also play a role in the development of SLHS (Beks et al., 2024; O'Connor et al., 2019).

The findings also reveal limited knowledge and use of formal evaluation frameworks to assess clinical placement performance, which is consistent with previous research indicating that clinical educators often rely on informal, experience-based assessment methods rather than standardised tools (Burgess & Mellis, 2015; Nicola-Richmond et al.,

2025; Shrivastava & Shrivastava, 2022; Zhang et al., 2020). The reliance on informal methods may stem from a lack of accessible training on existing frameworks, the perceived complexity of standardised evaluation tools, or limited institutional emphasis on their use (Nicola-Richmond et al., 2025). Without structured frameworks, placement evaluations may lack consistency, reducing the ability to benchmark performance across institutions and ensuring comparability of student outcomes (Pearce et al., 2015). Structured evaluation models can improve placement outcomes by providing clear expectations, reducing variability in assessment, and enhancing feedback mechanisms (Gonsalvez, 2021; Ti-enkawol Nachinab & Armstrong, 2024).

Financial barriers to clinical placement participation are well-documented, yet findings from this study reveal that placement cost evaluation is under-utilised within SLHS. Financial hardship significantly impacts student engagement in placements, particularly for those from lower socioeconomic backgrounds (Devlin & McKay, 2017; Moran et al., 2024). Issues such as needing to work during full-time placements, increased burnout, and reduced learning opportunities are common (Johnstone et al., 2016). The concept of "placement poverty" reflects the financial strain of unpaid placements, transportation, accommodation, and professional registration costs (Moran et al., 2024). These challenges are especially pronounced in rural and remote placements, where students often face greater costs, limited local employment, and social isolation, all of which can hinder academic success and career development (Devlin & McKay, 2017; Smith et al., 2023).

Interestingly, responses from survey respondents affiliated with SLHS in rural and remote areas indicated lower rates of cost measurement practices, compared to those in regional and metropolitan settings. This lack of financial tracking presents a significant challenge, particularly in long-term workforce strategies to retain healthcare professionals in rural areas after their placements. Research suggests that exposure to rural clinical placements increases the likelihood of graduates returning to work in rural healthcare settings post-qualification (McGrail et al., 2024; Playford & Puddey, 2017). However, when financial burdens associated with these placements are not adequately measured or addressed, students from lower socioeconomic backgrounds may struggle to complete rural placements, reducing their willingness or ability to return to rural practice (Devlin & McKay, 2017; Moran et al., 2024).

The absence of financial assessment at the placement site also reveals a critical gap in understanding the economic impact of SLHS on healthcare organisations. Student placements can impose substantial costs on providers, including supervision time, resource use, and disruptions to service delivery (Bowles et al., 2014). Supervisors often face increased workloads without additional compensation, which may deter healthcare providers from participating in SLHS placements (Sealey et al., 2015). Additionally, resource constraints within placement sites, such as limited physical space, staff availability, and funding to support supervision, can impact the sustainability of SLHS models (McBride et al., 2020). A lack of financial transparency can financially strain universities and healthcare organisations, potentially reducing their willingness to operate SLHS or engage with them in long-term partnerships. Addressing these gaps through standardised financial tracking and institutional support is crucial for sustaining SLHS while ensuring they remain financially viable for healthcare providers (Mitchell et al., 2025).

However, research has also highlighted that student placements are not only viewed as a cost, but under certain conditions can make positive contributions to service productivity. Bourne and colleagues (2018, 2019) demonstrated that student placements can increase clinical outputs, particularly when supervision models are well designed and students become progressively more independent. Similar findings in SLHS contexts show that these models enhance service provision and patient access while simultaneously supporting student learning (Heales et al., 2021; Wilson et al., 2023). These findings suggest that the financial and workforce impact of placements should not be considered solely as a burden; instead, placements may simultaneously impose supervisory demands while enhancing service delivery. Incorporating these insights into SLHS evaluation is essential to developing a balanced understanding of placement costs and benefits.

Despite the recognised importance of research in clinical education, the survey results confirm that research engagement in SLHS remains low. This finding aligns with broader concerns about the lack of structured research opportunities in clinical training, where service delivery priorities often take precedence over scholarly inquiry (Smith et al., 2024). Clinical placement research often relies on faculty supervisors, clinical educators, and healthcare professionals to facilitate and oversee the research. However, without dedicated time or institutional support to incentivise research, research opportunities may be limited or inconsistently integrated into SLHS practices (Finch et al., 2013). This lack of research

opportunities has resulted in inconsistent or ineffective evaluation of clinical placement performance and under-reporting of data that could otherwise support the development of future SLHS evaluation practices.

Inconsistent or ineffective evaluation practices in SLHS placements limits their credibility, hinders policy advocacy, and reduces opportunities for scholarly contribution and best-practice dissemination (Finch et al., 2013; Frakes et al., 2011; Mitchell et al., 2025; Pearce et al., 2015). Without reliable evaluation data, it is difficult to justify continued investment or integration into mainstream clinical education and healthcare. The absence of standardised evaluation also contributes to variability in student learning experiences, potentially affecting clinical exposure, supervision, and professional preparedness (Channa et al., 2024; Negm et al., 2024). Strengthening SLHS evaluation is essential for ensuring program viability, improving educational outcomes, and gaining institutional and policy support (Wilson et al., 2023). Future research should compare SLHS with other placement models to identify best practices, assess supervision and learning outcomes, and explore financial and structural factors that impact stakeholder experiences (Mitchell et al., 2025).

6.6 Limitations

A key limitation of this study is its reliance on self-reported survey data, which introduces potential response bias and affects the generalisability of findings. Participants may overestimate or underestimate their familiarity with evaluation frameworks, engagement in assessment practices, or the challenges they encounter in SLHS placements. This discrepancy between perceived and actual practices is a common issue in survey-based research, where responses may not always align with institutional records (Podsakoff et al., 2012). Furthermore, even though responses were collected from a range of metropolitan, regional, and remote areas, the overrepresentation of Queensland-based SLHS limits the generalisability of findings. This geographic disparity may mean the results do not fully reflect the challenges of under-resourced or isolated SLHS programs, or practices in states not captured by survey respondents (Kukull & Ganguli, 2012).

While the KAP survey was effective for capturing broad stakeholder perspectives, it was limited in the depth of qualitative responses, as has been noted in prior critiques of KAP

methodology (Andrade et al., 2020; Launiala, 2009). To address this limitation, open-ended items were included to provide richer insights, although these could not substitute for the depth achievable through interviews or focus groups. Future research could therefore complement survey-based breadth with qualitative methods to enhance understanding of stakeholder perspectives in SLHS evaluation.

6.7 Conclusion

This study provides critical insights into evaluating SLHS placements, revealing significant gaps in measurement practices, financial tracking, and research integration. Despite stakeholder recognition of the importance of systematic evaluation, findings indicate inconsistent application of standardised frameworks, with many SLHS relying on institution-specific or informal assessment tools. Furthermore, improving the evaluation of financial considerations and integrating research into SLHS will ensure equitable access to placements and secure institutional and policy support. Future research should examine the impacts of SLHS placements, comparing them with other placement models to establish best practices in clinical training. By strengthening evaluation practices and addressing identified challenges, SLHS can enhance their role in health professional education, ensuring high-quality learning experiences while contributing to the broader healthcare system.

Chapter 7: Toward a Comprehensive Evaluation Strategy for Student-led Healthcare Services: The HELP-C Guiding Framework

Drawing together insights from the literature review, modified Delphi study, and Knowledge, Attitudes and Practices (KAP) survey, Chapter 7 introduces the HELP-C Guiding Framework. This framework provides a structured, multidimensional approach to evaluating the performance of Student-led Healthcare Services (SLHS) across both healthcare delivery and clinical education domains. As outlined in Figure 1, the HELP-C Guiding Framework represents the convergence of findings across the literature review, Delphi study, and KAP survey. It addresses the overarching study aim by integrating what should be measured in SLHS performance and how this can be meaningfully operationalised across both healthcare and clinical education domains.

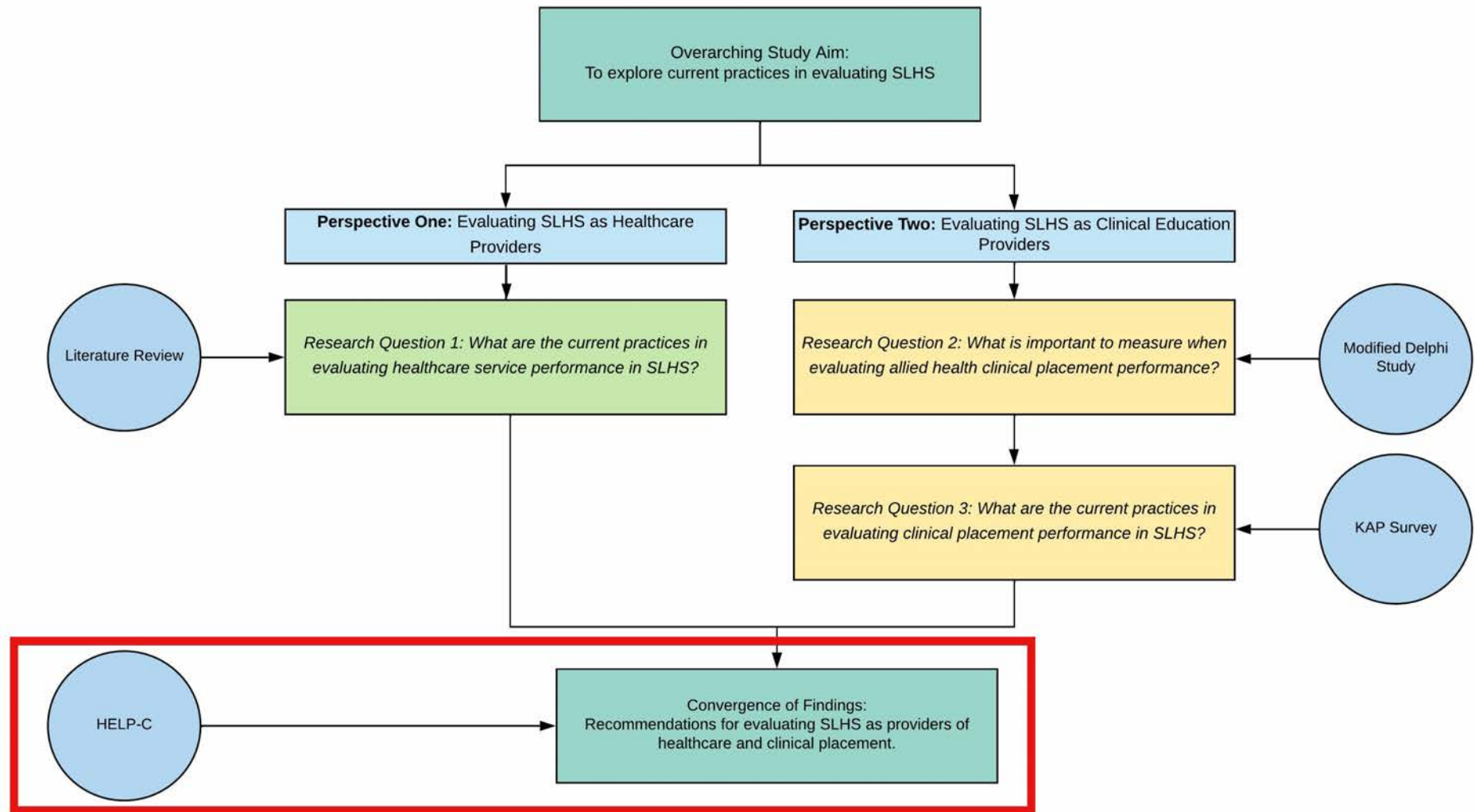


Figure 1. Convergence of Study Findings and Development of the HELP-C Guiding Framework

7.1 Defining the Need for SLHS Evaluation

Student-led Healthcare Services (SLHS) are uniquely positioned at the intersection of education and healthcare. They are designed to address dual priorities, delivering responsive, community-based healthcare while providing high-quality clinical placements for students (Beckman et al., 2022; Kent et al., 2014). This dual responsibility requires an evaluation approach that captures service delivery impact and educational effectiveness while accounting for the operational and pedagogical complexities inherent in SLHS (Simmons et al., 2022).

Despite the growing recognition of SLHS, evaluation practices remain inconsistent across sites (Channa et al., 2024; Simmons et al., 2022). This variability stems from differences in governance structures, funding arrangements, and service delivery models (Broman et al., 2023). Many SLHS rely on subjective evaluation tools, such as student satisfaction surveys or supervisor reflections, which are not always validated or comparable across settings (McAllister et al., 2018; Simmons et al., 2022). As a result, it is difficult to benchmark performance, assess impact, or drive quality improvement.

These limitations highlight the need for a tailored, multidimensional framework that reflects the integrated structure and purpose of SLHS. The HELP-C Guiding Framework was developed to respond to this need. It provides a structured yet flexible guide for evaluating SLHS across five core domains: Health Outcomes, Experience of Care, Learning Outcomes, Placement Experience and Cost. In doing so, it aims to support consistent evaluation practices while recognising the diversity and evolving nature of SLHS (Broman et al., 2022).

7.1.1 *The Purpose of the HELP-C Guiding Framework*

The purpose of the HELP-C Guiding Framework is to assist in evaluating SLHS as healthcare *and* clinical placement providers and does not override local arrangements, guidelines, or models that may apply to specific settings, sites, or professions. However, it supports existing arrangements and enables practical and comprehensive evaluation of SLHS performance.

The HELP-C Guiding Framework is intended to be used by the following key stakeholders:

Measuring Performance in Student-led Healthcare Services

- Clinical placement supervisors: to evaluate the services offered to the community and the support they provide to students on clinical placement within SLHS.
- Manager and team leaders of SLHS: to gather data about the quality, effectiveness and sustainability of clinical healthcare services and clinical placements within SLHS.
- Universities and educators: to review and develop curricula and to evaluate clinical placement outcomes.
- Health workforce planners: to guide decisions about investment in SLHS models.

The HELP-C Guiding Framework provides a comprehensive approach to evaluating SLHS performance by assessing key dimensions essential to both healthcare delivery and clinical education. Figure 2 illustrates the framework, highlighting the interconnected nature of its five core components:

- Patient **H**Health Outcomes
- **E**xperience of Healthcare
- Student **L**earning Outcomes
- **P**lacement Experience
- **C**ost of SLHS

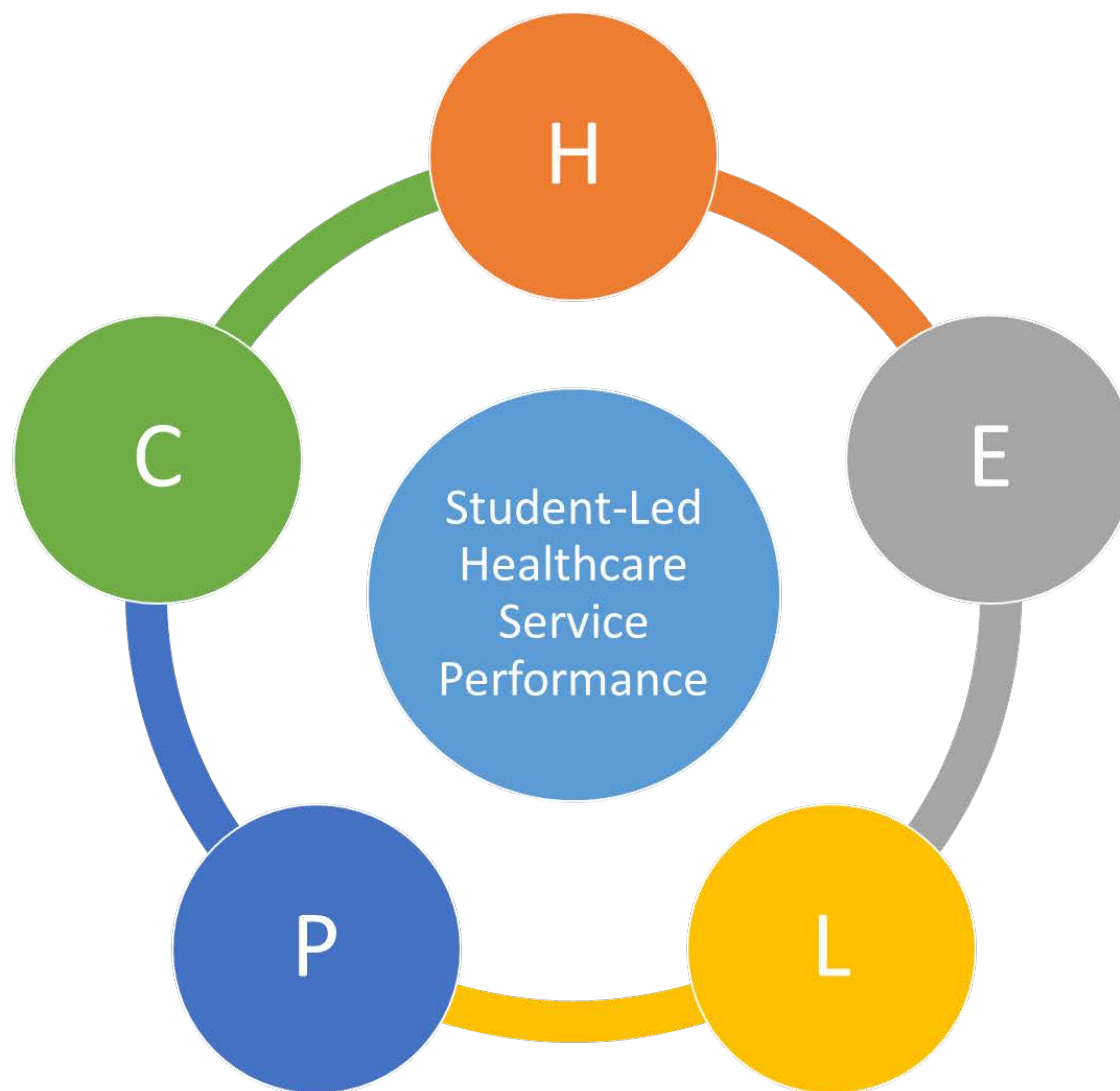


Figure 2. The HELP-C Guiding Framework for Evaluating SLHS Performance

7.2 The Evolution of the HELP-C Guiding Framework

The HELP-C Guiding Framework was developed to support an integrated approach to evaluating SLHS performance. It draws on the principles of the Institute of Healthcare Improvement's (IHI) Triple Aim, which emphasises improving the experience of care, advancing population health, and reducing per capita cost (Stiefel & Nolan, 2012). As discussed in Chapter 2, these three pillars align closely with the core service goals of SLHS and inform the healthcare service domains of the HELP-C Guiding Framework, specifically, Health Outcomes, Experience of Care, and Cost. However, the Triple Aim alone is insufficient to capture the full scope of SLHS, which also function as structured clinical education settings. This dual role requires an evaluation framework that considers both service delivery and educational outcomes (Simmons et al., 2022).

To bridge this gap, the HELP-C Guiding Framework was further shaped by the findings of the modified Delphi study presented in Chapters 4 and 5. This study served as a key turning point, identifying what matters most to stakeholders when evaluating clinical placement. Through a consensus-driven process, stakeholders prioritised three key domains: Learning Outcomes, Placement Experience, and Cost of Placement. Additionally, Research in Clinical Placement emerged as a novel domain, reflecting strong agreement on the importance of research engagement, capability building, and evidence-informed practice within SLHS models.

These findings extend existing models such as the Best Practice Clinical Learning Environment (BPCLE) framework (Darcy Associates, 2013a) by incorporating structured consideration of the financial impacts of clinical placements, capturing the economic burden on students, placement sites, and universities. The findings also emphasise the importance of research engagement, student autonomy, goal alignment, and contextual adaptability as key indicators of placement quality, particularly within emerging models such as SLHS (Simmons et al., 2025). While the BPCLE provides a valuable foundation, the Delphi results offer a more comprehensive and context-sensitive evidence base for defining what matters in evaluating placement performance, which is integrated within the HELP-C Guiding Framework's clinical placement focused components.

The Knowledge, Attitudes, and Practices (KAP) survey, detailed in Chapter 6, confirmed the relevance and feasibility of the 43 indicators identified in the Delphi study,

reinforcing their applicability across various professional, geographic, and organisational contexts. Importantly, the KAP survey also offered insight into how these indicators are currently perceived and applied in practice. By capturing real-world attitudes and experiences, the KAP findings help ensure that the HELP-C Guiding Framework is not only theoretically sound but also practically grounded. They contribute to shaping a framework that is both usable and meaningful in everyday SLHS operations, while also guiding the development of tools and processes needed to operationalise HELP-C effectively.

By drawing on the Triple Aim and incorporating stakeholder-driven insights from the Delphi and KAP studies, the HELP-C Guiding Framework offers a balanced, multidimensional structure for evaluating SLHS. It recognises the interdependence of healthcare service and clinical education and provides a shared language for understanding SLHS performance across different stakeholder perspectives. This structure also highlights the importance of embedding research capacity within SLHS, positioning research not as a separate endeavour but as a foundational component of high-quality evaluation.

To translate this conceptual framework into meaningful practice, it is essential to operationalise the identified domains and indicators through structured, context-sensitive approaches. This ensures that the HELP-C Guiding Framework can be applied consistently while remaining adaptable to the unique characteristics of each SLHS setting. The remainder of this chapter outlines how each domain of the HELP-C Guiding Framework can be measured in practice, guided by current evidence and stakeholder input. In doing so, it also identifies opportunities to strengthen research and evaluation capacity across SLHS models, an essential step toward continuous improvement and long-term sustainability.

7.3 Measuring SLHS Performance Across Key Domains

The following subsections outline how each component can be meaningfully measured in practice based on evidence from the literature, consensus and qualitative insights from the Delphi study, and stakeholder validation through the KAP survey. Emphasis is placed on selecting context-sensitive tools that balance rigour with flexibility, supporting consistent evaluation while accommodating local service delivery and clinical education models. Appendix 7 (see 10.7) provides an in-depth overview of the specific domains, measures, and recommendations that underpin the HELP-C Guiding Framework.

7.3.1 *Measuring Patient Health Outcomes* (H)

Student-led Healthcare Services commonly track the physiological and behavioural outcomes of patients due to their accessibility in routine care (Broman et al., 2022; Jiang et al., 2024; Simon et al., 2022). While useful, these are considered intermediate indicators that reflect short-term physiological or behavioural changes, rather than capturing healthcare interventions' broader, long-term impact on patient well-being, functional status, or overall quality of life (Evans & Stoddart, 1990; Stiefel & Nolan, 2012). A more comprehensive assessment should incorporate downstream outcomes, such as functional health, quality of life (QoL), and utility-based health metrics (Evans & Stoddart, 1990; Stiefel & Nolan, 2012).

Patient-reported outcome measures (PROMs) are gaining traction, particularly in rehabilitative and mental health SLHS (Bonsel et al., 2024; Curran et al., 2023; Miller et al., 2024, Powell et al., 2021). Unlike intermediate indicators, PROMs capture patients' perceptions of their own health status, functional ability, and quality of life, offering valuable insight into the effectiveness and person-centredness of care. Their use enables SLHS to measure the impact of services from the patient's perspective, an essential component of outcome-focused healthcare (Bonsel et al., 2024; Frendl & Ware, 2014). While standardisation across settings remains a challenge, adopting validated PROMs can improve the quality and comparability of evaluation across diverse SLHS models (Chen et al., 2005; Frendl & Ware, 2014).

7.3.2 *Measuring Experience of Healthcare* (E)

Student-led Healthcare Services often use tailored satisfaction surveys to measure the patient's experience of their care (Beard et al., 2020). Measuring the patient's experience is critical for assessing the quality of care and ensuring that services remain person-centred, respectful, and responsive to individual needs. Elements such as communication quality, attentiveness, involvement in decision-making, and continuity of care are particularly relevant in SLHS, where students are still developing clinical and interpersonal skills (Frakes et al., 2014; Kent et al., 2016). Patient-reported experience measures (PREMs), when adapted to the unique context of SLHS, can offer structured insight into how care is perceived and whether key expectations of safety, empathy, and respect are being met (Bliss et al., 2022; De Rosis et al., 2022; Engle et al., 2021; March et al., 2023). Embedding such measures within

routine evaluation processes strengthens accountability and ensures that SLHS deliver meaningful and acceptable care from the patient's point of view.

Provider experiences are often overlooked in evaluations of SLHS, yet they are essential for understanding the feasibility, sustainability, and quality of clinical education delivery (Stiefel & Nolan, 2012). The Institute of Medicine (IOM), now the National Academy of Medicine (NAM), outlines six core aims for high-quality healthcare: that care should be safe, effective, patient-centred, timely, efficient, and equitable (IOM, 2001). These aims provide a practical and widely recognised framework for assessing the quality of care from the provider's perspective (Hannawa et al., 2022).

Despite their relevance, SLHS evaluations seldom apply these dimensions through systematic or validated tools. Consequently, critical elements, such as clinical safety, service efficiency, and the service's capacity to deliver timely and equitable care, are often under-explored (Abdelwahab et al., 2023; Lee, et al., 2023; Simmons et al., 2022). Addressing this gap is vital not only for ensuring that SLHS are educationally robust, but also for demonstrating that they operate in accordance with established healthcare quality standards.

7.3.3 *Measuring Learning Outcomes* (L)

Evaluating student learning outcomes in SLHS requires attention to a broad range of capabilities. These include clinical reasoning, interprofessional collaboration, patient-centred communication, workplace readiness, and professional behaviours, each of which contributes to preparing students for safe, effective, and context-responsive practice (Prestes Vargas et al., 2024; Simmons et al., 2025; Wilson et al., 2023). In the complex and often resource-constrained environments of SLHS, these skills are critical for delivering care and fostering adaptability, confidence, and long-term employability (Artino, 2012; Chye et al., 2024).

Learning outcomes have been grouped into the three overarching themes of Clinical Service Delivery, Professional Practice and Managing in the Workplace, each capturing different but interrelated dimensions of student development during placement:

Clinical Service Delivery

Clinical Service Delivery encompasses clinical reasoning, evidence-informed decision-making, and discipline-specific knowledge application, all of which contribute directly to client outcomes (Chien et al., 2022; Salbach & Jaglal, 2011; Thampy et al., 2019).

In SLHS contexts, these competencies are commonly assessed through structured supervisor observation during clinical encounters, using validated discipline-specific placement assessment tools such as the Assessment of Physiotherapy Practice (APP) (Dalton et al., 2011) or COMPASS® for Speech Pathology (McAllister et al., 2006). Incorporating structured formative feedback aligned with outcome-based frameworks can further enhance the quality and consistency of these assessments (Rodger et al., 2014).

Professional Practice

Professional Practice includes behaviours such as communication, ethical conduct, and teamwork, which are essential for fostering professionalism and delivering high-quality, patient-centred care (Billett, 2001; Cruess et al., 2019). These behaviours can be effectively assessed using multi-source feedback (MSF) tools, also known as 360-degree feedback, which gather input from clients, peers, supervisors, and interprofessional team members (Burgess & Mellis, 2015). When integrated with educator assessment and guided reflection, MSF promotes professional self-awareness and supports the development of reflective practitioners (Nilsson et al., 2025).

Managing in the Workplace

Managing in the Workplace refers to competencies that support the transition from student to independent practitioner, including self-efficacy, resilience, reflective capacity, and time management (Nguyen et al., 2014; Rees et al., 2015). These outcomes are best assessed using longitudinal reflective tasks, structured clinical debriefs, and tools that measure readiness for practice, such as the Preparedness for Hospital Practice Questionnaire (PHPQ) (Yu et al., 2021; Phillips et al., 2024). Together, these approaches provide insight into students' ability to navigate real-world challenges and adapt to the demands of contemporary healthcare settings.

These three domains of learning outcomes offer a more holistic and realistic assessment of student development than technical skills alone. A programmatic assessment approach, combining multiple tools, perspectives, and time points, ensures that SLHS evaluation captures both the complexity of student growth and the variability of service contexts (Eva et al., 2016). Using validated tools that can be flexibly adapted to local service models promotes educational accountability and alignment with best practice healthcare standards.

7.3.4 Measuring Placement Experience (P)

Evaluating placement experience in SLHS is essential for understanding how learning environments shape student engagement, development, and long-term success. While learning outcomes focus on what students achieve, placement experience reflects the conditions under which learning occurs, including supervision quality, psychological safety, feedback culture, and the relational dynamics between students, supervisors, and institutions (McAllister et al., 2018; Zhang et al., 2022).

Placement experience can be examined through two interrelated lenses: the student experience and the supervisor experience. Each provides distinct yet complementary insights into the clinical learning environment's overall quality, inclusivity, and sustainability.

The Student Experience

A high-quality student experience fosters confidence, resilience, and professional identity development. It encompasses support, autonomy, and inclusion within the learning environment (Simmons et al., 2025).

Student Satisfaction reflects how students perceive trust, autonomy, and preparedness throughout their placement. These perceptions can be measured using brief post-placement surveys or confidence scales that assess emotional safety, goal attainment, and coping (Johansen, 2023; Bell et al., 2025). Reflective writing, SMARTE/R (Specific, Measurable, Achievable, Relevant, Time-bound, Evaluated/Reviewed) goal attainment logs, and self-evaluation tools, such as the Connor-Davidson Resilience Scale (CD-RISC), can further reveal how students navigate placement demands (Gonsalvez et al., 2017; Lavoie-Tremblay et al., 2022).

Quality of Supervision centres on supervisor availability, feedback quality, and communication effectiveness. This can be assessed through student evaluations using structured tools like the Feedback Quality Instrument (FQI) or MSF formats (Hattie & Timperley, 2007; Tai et al., 2018). Supervisor effectiveness can be reviewed using validated tools such as the Supervision Evaluation and Supervisory Competence (SE-SC) scale (Gonsalvez et al., 2017), and supervision-focused domains in broader clinical learning environment instruments (Irby et al., 2021).

Placement quality encompasses the placement setting's inclusiveness, structure, and educational value, including orientation, diverse client exposure, and a supportive learning environment. Tools like the Clinical Learning Environment, Supervision and Nurse Teacher (CLES+T) Scale (Saarikoski et al., 2008; Warne et al., 2010) and the Best Practice Clinical Learning Environment (BPCLE) Framework (Darcy Associates, 2013a) assess psychological safety, teamwork, and cultural inclusivity. Reflective prompts (e.g., “I felt safe to ask questions” or “I was treated as a valued team member”) can reveal perceived environmental quality (Saarikoski et al., 2008), while client encounter logs and diversity tracking tools assess exposure to varied clinical conditions, supporting readiness for diverse practice (Chooniedass et al., 2025; Lyng et al., 2021).

The Supervisor Experience

Supervisor experiences offer critical insights into placement sustainability and quality improvement. These experiences are shaped by institutional support, clarity of expectations, and the overall supervisory burden.

Supervisor satisfaction can be evaluated through post-placement feedback surveys that assess perceptions of role clarity, workload, and professional fulfilment. Validated tools such as the Questionnaire of Satisfaction with Clinical Practice – Mentors (QSCP-M) (Čukljek et al., 2024) or simple Likert-scale prompts (e.g., “How satisfied were you with your supervision experience?”) have been shown to be effective in capturing supervisor experience and satisfaction (Skjevik et al., 2024).

University Support for supervisors, including communication, responsiveness, and access to supervisor training, can be assessed using structured educator feedback forms. Items might include: “Were university staff available when needed?” or “Did you feel adequately prepared to supervise this student?” (Donough & Van der Heever, 2018; Gholizadeh et al., 2022).

Expectations of Placement should be clearly established and revisited through learning contracts, supervisor–student discussions, and mid-placement reviews. Using structured templates that include self-assessment and mutual goal-setting can ensure clarity and alignment (Milgate et al., 2024; Smith & Curtis, 2020).

7.3.5 *Measuring the Cost of SLHS* (C)

Evaluating the cost of clinical placements is essential to understanding the sustainability, equity, and scalability of SLHS. In SLHS, cost must be conceptualised beyond direct financial outlay to include indirect, hidden, and opportunity costs borne by students, placement providers, and universities (Mitchell et al., 2025; Simmons et al., 2025). These costs can significantly influence placement accessibility and service viability. Students from rural or financially disadvantaged backgrounds often face disproportionate burdens, which may impact retention and equity in the health workforce (Beks et al., 2024; Wray & McCall, 2007). Despite this, cost remains one of the least consistently measured aspects of SLHS.

To address this gap, cost can be examined through three interrelated domains that reflect the Triple Aim's supply, demand, and intermediary lenses: cost to the student, the placement site, and the university. These lenses promote a system-aware view of resource use and inform more strategic, equitable investment in clinical education.

Cost to the Student

Student-incurred costs often include travel, accommodation, uniforms, vaccinations, and income loss from time away from paid work. These expenses are especially pronounced in rural or extended placements and represent key barriers to participation (Grant-Smith & de Zwaan, 2019).

To measure these burdens, institutions can incorporate anonymous post-placement surveys tracking accommodation and transport costs by location (Russell et al., 2021), as well as pre-placement checklists and self-report logs of upfront expenses (Harvey et al., 2016). Tools such as the Connor-Davidson Resilience Scale (CD-RISC), may also help explore how financial strain impacts student well-being during placement (Usher et al., 2022). To capture loss of income, students can be invited to report estimated missed earnings during final placement anonymously debriefs. This data can support more targeted hardship support and provide evidence for policy reform (Beks et al., 2024).

Cost to the Placement Site

Placement sites often absorb indirect costs, including staff time for supervision, use of resources such as Information Technology, Personal Protective Equipment, clinical space, and

potential impacts on service delivery. These costs remain largely invisible in current evaluation models but directly influence site willingness to host students (Bowles et al., 2014; Mitchell et al., 2025; Patrick et al., 2008). However, research also demonstrates that under certain conditions, student placements may make positive contributions to service productivity. Bourne and colleagues (2018, 2019) showed that allied health student placements, particularly when supported by well-structured supervision models, can increase clinical outputs and enhance service efficiency. Similar findings in SLHS contexts indicate that placements may simultaneously impose supervisory demands while improving service access and supporting student learning (Heales et al., 2021; Wilson et al., 2023). Including such perspectives highlights the need for cost evaluation frameworks that capture both burdens and benefits to placement sites, rather than focusing solely on resource loss.

Site-level costs can be assessed using collaborative cost estimation tools that account for consumables, infrastructure usage, and indirect support needs (van Diggele, Burgess, et al., 2020). To measure the impact on services, brief post-placement provider surveys can be used to capture throughput changes and perceived burden and/or benefit (Gray et al., 2022). Time-use diaries or supervisor time-tracking tools can provide data on supervision hours, helping inform resourcing decisions and supervision ratios (Sealey et al., 2015; Zhang et al., 2022). Additionally, supervisor feedback forms can incorporate questions about challenges with student readiness, while maintaining confidential channels for concerns that may influence future participation (Forbes, 2022; García-Gómez et al., 2020).

Cost to the University

Universities play an intermediary role in SLHS and incur substantial costs related to coordination, insurance, compliance, academic oversight, and financial support. Despite the scale of this investment, few programs conduct formal audits or embed these costs into placement planning (Leong & Kavanagh, 2010).

To address this, internal auditing systems can be enhanced through finance-linked workload tracking logs, which document staff time spent coordinating placements and handling administrative tasks. Additionally, when paid placements are implemented or SLHS are funded, universities should undertake cost-effectiveness evaluations, including comparative data on student outcomes, satisfaction, and uptake, using methods such as incremental cost-effectiveness ratios (ICERs) (Smith et al., 2015; Usher et al., 2022).

Together, these cost domains provide a holistic understanding of the economic pressures facing SLHS stakeholders. Measuring cost from the perspectives of students (demand), placement sites (supply), and universities (intermediary) supports more equitable, sustainable, and scalable education-service partnerships. Structured evaluation of cost enables more effective resource allocation, supports student equity, and strengthens the case for ongoing investment in SLHS models (Berwick et al., 2008; Mitchell et al., 2025; Simmons et al., 2022).

7.4 Improving Research Opportunities and Capacity in SLHS

As SLHS continue to grow as models for clinical education and healthcare delivery, there is an urgent need to broaden and strengthen how they are evaluated. While studies frequently emphasise SLHS benefits such as increased placement capacity and student readiness, most focus narrowly on learner satisfaction and competency (Frakes et al., 2014; Kent et al., 2016; Mitchell et al., 2025; Rowland & Trueman, 2024; Sheepway et al., 2013). Broader dimensions, such as patient outcomes, financial viability, and health system contributions, remain underexplored (Simmons et al., 2022).

A more comprehensive approach requires recognising the interrelated nature of SLHS performance domains (Robertson et al., 2024; Simmons et al., 2025; Stuhlmiller & Tolchard, 2015). Figure 3 illustrates this integrated model, showing SLHS performance at the centre and each surrounding domain as both a contributor to performance and a distinct opportunity for research. However, building this evidence base depends on enhancing research capacity across SLHS. Improving research capacity involves embedding inquiry into everyday practice, fostering a culture of evaluation, and investing in the infrastructure and leadership needed to support scholarship (Boulton et al., 2018; Cooke, 2005; Ross-Hellauer et al., 2020).



Figure 3. Key Performance Domains and Research Opportunities in Student-led Healthcare Services (SLHS)

Research in SLHS should be embedded into practice, supporting evaluation and inquiry as core alongside placement planning, service delivery, and curriculum design (Edwards et al., 2016; Robertson et al., 2024). To build a more robust and sustainable research culture within SLHS, there is a need to implement systemic strategies that address both the known research gaps and the structural barriers limiting research engagement. The following recommendations outline practical strategies to support this goal.

7.4.1 Build Placement Supervisor and Placement Coordinator Capacity

Research engagement within SLHS is often affected by a lack of time, training, and access to resources. Providing protected time, training in research methods, and access to data or library services are essential enablers (Finch et al., 2013; Smith et al., 2024). Embedding these supports within professional development programs, recognising research in workload models, and offering mentorship or writing groups can normalise research engagement and foster sustainable inquiry (Robinson et al., 2020).

7.4.2 Establish Research-Practice Partnerships

Developing collaborative partnerships between universities, health services, and SLHS teams fosters research engagement and ensures that evaluation remains practice-informed and contextually relevant (Nott et al., 2024). Research–practice partnerships enable shared agenda setting, joint access to clinical and educational data, and co-supervision of research students, which can strengthen the translation of findings into improved service and teaching practices (Alonzo et al., 2022). These collaborations also provide a platform for cross-disciplinary inquiry, including health services research, implementation science, and clinical education scholarship (Pérez Jolles et al., 2022).

7.4.3 Develop Dedicated Research and Academic Leadership Roles

SLHS often relies on ad hoc research efforts by educators in a limited time. Establishing dedicated research roles, such as research fellows or academic leads, can provide the sustained leadership needed to coordinate evaluation activities, guide tool development, and advocate for institutional support (Barwick & Horstmanshof, 2025; Ruban et al., 2025). Research leaders can also advocate for funding and resource allocation, bridging institutional priorities with service-based needs (Robinson et al., 2020).

7.4.4 *Integrate Research Training into Student Placements*

Engaging students in meaningful research activities during their placements builds individual research capability and contributes valuable data for program evaluation and quality improvement (Menzies et al., 2021; Smith et al., 2024). Applied student projects, such as service evaluations, patient satisfaction audits, or reflective analyses, align closely with SLHS objectives and promote a culture of inquiry (Whitworth et al., 2012). Embedding research within placements supports the dual mission of SLHS by fostering critical thinking and practice-based learning while enhancing the evidence base around SLHS impact and performance (Dairo et al., 2024).

7.5 Summary, Significance and Future Development Needs

The HELP-C Guiding Framework offers a comprehensive, evidence-informed strategy for evaluating SLHS across five key domains: Health Outcomes, Experience of Care, Student Learning Outcomes, Placement Experience, and Cost. Developed in response to persistent gaps in SLHS evaluation practices, the framework synthesises insights from the literature review (Chapter 2), expert consensus (Chapters 4 and 5), and stakeholder feedback (Chapter 6). It recognises the dual function of SLHS as both healthcare providers and clinical placement settings, presenting a structured and adaptable approach to evaluation. This guiding framework aims to strengthen research capacity by embedding evaluation and reflective inquiry into everyday practice.

At present, the HELP-C Guiding Framework serves as a conceptual guide, offering a structured lens through which SLHS performance can be assessed. Its application in real-world settings has not yet been tested, and its components will require further validation and refinement to accommodate the varied structures, resources, and disciplinary contexts of SLHS across professions and regions. Real-world piloting will be essential to evaluate the feasibility, acceptability, and effectiveness of the framework in guiding meaningful performance evaluation.

Chapter 8: Reflections and Future Directions for Evaluating Student-led Healthcare Service Performance

This thesis set out to critically examine how Student-led Healthcare Services (SLHS) are evaluated as providers of healthcare and clinical placement. The work responds to a growing recognition that SLHS hold considerable promise in addressing health workforce shortages, providing care in underserved regions, and expanding placement capacity, yet their performance remains under-evaluated. Chapter 8 reflects on the trajectory of the thesis, the progression across chapters, the methodological contributions, the limitations of each study and the thesis as a whole. It concludes with future research directions that build upon this foundational work.

8.1 Reflections on the Research Journey

Chapter 1 established the rationale for this thesis by identifying SLHS as a promising but under-researched model for delivering healthcare and clinical education. It highlighted the challenges faced by health professional programs in securing quality placements, particularly in rural and resource-constrained settings. While SLHS offer clear benefits to both students and communities, a critical gap remains in how their dual contributions are evaluated.

To address this, the thesis aimed to explore current practices in evaluating SLHS and to develop a guiding framework for performance measurement across both healthcare and education domains. This aim was guided by three research questions:

1. What are the current practices in evaluating healthcare service performance in SLHS?
2. What is important to measure when evaluating clinical placement performance?
3. What are the current practices in evaluating clinical placement performance in SLHS?

These questions shaped the overall design of the thesis to capture both healthcare and education perspectives. This dual perspective ensured that the resulting guiding framework reflected the integrated nature of SLHS.

Beginning with the healthcare provider perspective, Chapter 2 applied the Triple Aim framework to a systematic review of SLHS studies, focusing on how healthcare performance is currently evaluated. The review revealed that while many studies addressed at least one domain of the Triple Aim, few considered all three simultaneously, and even fewer employed validated or comparative evaluation methods. These findings highlighted a significant gap in comprehensive, theory-informed approaches to SLHS evaluation and demonstrated the need for a more multidimensional framework. This helped shape the overall thesis aim and directly addressed Research Question 1.

The strength of this chapter lay in its structured, evidence-informed critique, which provided a strong conceptual foundation for the studies that followed. However, limitations included the relatively small number of eligible studies, limited representation from Australian settings, and the absence of quality appraisal of the grey literature.

Moving to the placement provider perspective, Chapters 3, 4, and 5 reported on a modified Delphi study designed to establish expert consensus on the most important areas to evaluate in clinical placement. The study engaged a diverse panel of allied health professionals, including placement supervisors, coordinators, and recent graduates, capturing experiences from a wide range of clinical placement models, disciplines, and geographic contexts across Australia. Through this process, 43 important areas of measurement were identified and grouped into four domains: Learning Outcomes, Placement Experience, Cost of Placement, and Research in Clinical Placement.

This study addressed Research Question 2 by identifying what should be measured when evaluating placement performance. The findings broaden the literature focus from 'placement quality' to a more comprehensive understanding of 'placement performance'. The strength of this research lies in its structured consensus-building process, multidisciplinary stakeholder engagement, and alignment with real-world placement considerations. These findings directly informed the development of the HELP-C Guiding Framework presented in Chapter 7.

Chapter 6 examined the real-world application of the Delphi findings through a Knowledge, Attitudes and Practices (KAP) survey, expanding on the placement provider perspective. Addressing Research Question 3, the study explored how clinical placement performance is currently evaluated within SLHS. Findings showed strong support for more structured evaluation, but most SLHS still rely on informal, ad hoc methods. Cost remains under-evaluated, and key barriers to systematic evaluation include limited time, resources, and the lack of standardised tools. Although the study had broad geographic reach, higher participation from Queensland may limit generalisability across all Australian states.

Chapter 7 synthesised the findings from the literature review, modified Delphi study, and KAP survey to propose the HELP-C Guiding Framework, a practical and flexible approach to evaluating SLHS performance. The framework offers a comprehensive strategy aligned with stakeholder priorities and system-level goals, integrating healthcare and educational evaluation into a unified structure. The HELP-C Guiding Framework represents both a theoretical and applied contribution to the field. However, it remains conceptual and its application in real-world settings has yet to be tested. Further validation and adaptation will be needed to ensure its relevance across the diverse contexts and professions encompassed by SLHS models.

8.2 Thesis Contribution to Knowledge

Collectively, this thesis provides a comprehensive investigation into evaluating SLHS performance. It contributes:

8.2.1 *A Conceptual Reframing of SLHS as Requiring Dual-Domain Performance Evaluation Across both Educational and Healthcare Dimensions.*

Traditional approaches to clinical placement evaluation have focused predominantly on student learning outcomes or isolated aspects of placement experience. This thesis reframes SLHS not merely as placement sites, but as a complex hybrid between healthcare and education. It argues that meaningful evaluation must account for students' educational outcomes and the quality, accessibility, and sustainability of the healthcare services provided. This dual perspective offers a more authentic representation of SLHS and is crucial for their integration into mainstream education and healthcare systems.

8.2.2 *An Empirical Basis for What Should be Measured in Clinical Placements Through Stakeholder Consensus on 43 Areas of Measurement.*

Through a modified Delphi study, this research achieved cross-disciplinary stakeholder consensus on 43 areas of measurement for evaluating clinical placement performance. These areas of measurement provide an extensive, empirically grounded list of evaluation priorities specific to clinical placement performance. It responds to long-standing calls in the literature for greater clarity and consistency in placement evaluation and enables institutions to move beyond ad hoc or discipline-specific evaluation approaches.

8.2.3 *A Diagnostic Insight into Current SLHS Evaluation Practices Through a National KAP Survey.*

The KAP survey uncovered critical barriers to SLHS evaluation, including over-reliance on informal feedback mechanisms, limited awareness or use of standardised tools, and variability in who takes responsibility for evaluation activities. It also highlighted a misalignment between stakeholder support for robust evaluation and their capacity to implement it, due to time, resource, and systemic constraints. This diagnostic contribution adds practical relevance and contextual depth to the consensus findings and informs strategies for bridging the gap between ideal and actual practice.

8.2.4 *A Novel, Conceptual Evaluation Framework that is Stakeholder-Informed, Evidence-Based, and Adaptable Across Healthcare and Education Systems.*

The HELP-C Framework provides a multidimensional model for SLHS performance evaluation that aligns with educational goals and health system imperatives. Its strength lies not just in its comprehensiveness but also in its adaptability. It offers a structure that can be used across different professions, service models, and institutional settings.

These contributions move the field beyond fragmented and discipline-specific approaches toward a shared language and structure for SLHS evaluation. They offer actionable insights and tools for educators to improve placement quality, health service providers to measure performance and justify investment, and policy-makers to support evidence-based planning and funding decisions. This thesis lays the groundwork for more rigorous, transparent, and viable SLHS models by integrating education, service, and system-level perspectives.

8.3 Limitations

Like any research, this thesis has several limitations that should be acknowledged. While it aimed to incorporate diverse stakeholder perspectives across a range of health professions and geographical locations, there were notable gaps in both disciplinary and geographic representation. These limitations may affect the broader applicability and generalisability of the findings.

Limited participation from nursing and medical professionals restricts the relevance of findings to those disciplines, especially given the distinct supervisory models, clinical responsibilities, and educational structures involved. While perspectives were captured from both metropolitan and regional settings, not all Australian states and territories were represented, which narrows the contextual breadth of the research. As such, the findings may not fully reflect the diversity of SLHS models that operate under varying policy settings, funding structures, and workforce challenges across Australia or internationally. Furthermore, while the study intentionally sought to capture perspectives across a broad range of allied health professions, the relatively small proportion of participants from each profession means that discipline-specific nuances may not have been fully represented.

In addition to these scope limitations, my dual role as both an academic and practitioner within SLHS provided valuable contextual insight but also introduced a potential source of interpretive bias. To mitigate this, I embedded multiple safeguards throughout the research process. These included consultation with supervisors at key stages of analysis, triangulation across multiple data sources, and grounding interpretations in participant responses. I further employed systematic coding matrices and NVivo software to organise and track data patterns. To enhance rigour, an independent researcher with no affiliation to SLHS or the supervisory team reviewed my initial thematic coding. Their independent analysis was compared with mine, and discrepancies were discussed, leading to refinement of several themes. In addition, one supervisor contributed to reviewing and refining coding decisions, ensuring that interpretations were critically examined from multiple perspectives. Together, these strategies enhanced the transparency and trustworthiness of the research, ensuring that findings were both credible and robust.

Finally, this research captures a snapshot in time, reflecting stakeholder views and SLHS practices during a specific phase of development. Given the rapid evolution of SLHS models, changes in health service delivery, education policy, or clinical training approaches may influence the relevance of these findings over time. Future research will be necessary to reassess priorities and practices as SLHS models continue to expand and adapt to emerging needs.

8.4 Directions for Future Research

This thesis represents a significant step toward a more structured, evidence-informed approach to evaluating SLHS performance. However, it also highlights several areas for future research to ensure ongoing relevance, adaptability, and utility across diverse healthcare and educational settings. The following recommendations aim to guide future inquiry and practical refinement of the evaluation of SLHS performance to strengthen their impact and responsiveness in real-world contexts:

8.4.1 *Refining and Prioritising Areas of Measurement*

While the modified Delphi process achieved expert consensus on 43 areas of clinical placement performance, further research is needed to validate and prioritise these important

areas to measure across diverse settings, disciplines, and health service models. Contextual differences, such as workforce needs, funding arrangements, and cultural factors, will shape what is most important to measure in each specific SLHS context. Future studies should explore how these priorities shift across different geographical and professional landscapes, supporting the development of adaptable yet consistent core indicators of clinical placement performance.

8.4.2 *Identifying and Validating Preferred Tools*

Although key domains for SLHS performance evaluation have been identified, there is limited agreement on the *most* effective tools for measuring them. Many current practices rely on informal, discipline-specific, or unvalidated tools that may not adequately reflect SLHS's unique features. Future research should test the reliability, validity, feasibility, and acceptability of existing and novel tools, particularly those that align with multi-domain evaluation strategies. Mixed-methods approaches will be especially valuable for capturing the complexity of placement experiences and outcomes across SLHS contexts.

8.4.3 *Advancing Economic Evaluation*

Economic evaluation remains underdeveloped in SLHS research, despite its critical role in demonstrating value, efficiency, and sustainability. Future work should focus on identifying direct and indirect costs and linking these to meaningful service and education outcomes. Comparative cost-effectiveness studies between SLHS and traditional placement models are particularly needed, as are tools that reflect the full spectrum of shared investment and distributed benefits across stakeholders. Building research capacity in health and education economics will be essential to embedding robust financial analysis into SLHS development and decision-making.

8.4.4 *Comparative Studies with Other Placement Models*

Future research should examine how SLHS compares to other clinical placement models in terms of learning outcomes, graduate readiness, health service contribution, and long-term workforce outcomes. While Randomised Control Trials may be limited in feasibility, matched cohort and longitudinal designs can offer practical and ethical alternatives. Embedding structured evaluation frameworks within these comparative designs will enhance the findings' quality, comparability, and policy relevance. Such evidence is

critical to positioning SLHS as a credible alternative within mainstream clinical education models.

These opportunities for future research will advance the evidence base for SLHS, enabling more rigorous, equitable, and sustainable evaluation and helping to inform funding, curriculum, and policy decisions in health professional education and healthcare service delivery.

8.5 Conclusion: Strengthening Evaluation in SLHS

Student-led Healthcare Services offer a promising model for meeting the dual needs of clinical education and healthcare delivery. This thesis set out to address a critical gap in how these services are evaluated, recognising that their long-term viability and impact have been hindered by fragmented, discipline-specific, and inconsistently applied evaluation practices.

In response, this thesis presents the HELP-C Guiding Framework as the culmination of findings from the literature review, modified Delphi study, and KAP survey. This cohesive, stakeholder-informed strategy advances a multidimensional view of SLHS, acknowledging their complexity and dual purpose, and provides a foundation for consistent, meaningful performance measurement across settings, health professions, and policy contexts.

The findings of this research also identify critical directions for future inquiry. As SLHS continue to evolve, there is a clear need to validate and operationalise the identified areas of measurement, assess cost-effectiveness compared to traditional placement models, and explore long-term outcomes for students, services, and communities. Advancing this agenda will require the development of context-specific tools, testing across professions and regions, and strengthening interdisciplinary collaborations between education, health services, and health economics.

Ultimately, this thesis makes a compelling case for rethinking how we evaluate SLHS, not as isolated educational environments, but as complex, system-responsive models of healthcare and learning. It calls for a shift toward more transparent, evidence-informed, and outcomes-based evaluation practices that can support quality improvement, viable investment, and policy advancement. In doing so, this work positions SLHS as an essential component of the

Measuring Performance in Student-led Healthcare Services

future clinical education landscape, deserving of greater visibility, rigour, and strategic support in years to come.

9.0 References

- Abuosi, A., Poku, C., Attafuah, P., Anaba, E., Abor, P., Setordji, A., & Nketiah-Amponsah, E. (2022). Safety culture and adverse event reporting in Ghanaian healthcare facilities: Implications for patient safety. *PLoS ONE*, 17(10), e0275606. <https://doi.org/10.1371/journal.pone.0275606>
- Abdelwahab, R., Abdelwahab, S., Hallman, M., Kruse, G., Chu, J. T., & Cohen, M. J. (2023). Student faculty collaborative clinics influence on emergency department use. *Journal of Community Health*, 48(1), 18–23. <https://doi.org/10.1007/s10900-022-01138-9>
- Abdelwahab, R., Abdelwahab, S., Kaltchenko, M., Hallman, M., Kruse, G., Chu, J. T., & Cohen, M. J. (2022). The impact of student-faculty collaborative clinics on patients' health-seeking behaviors in underserved communities. *Journal of Community Health*, 47(2), 378–386. <https://doi.org/10.1007/s10900-021-01060-6>
- Adams, R. P., Barton, G., Bhattacharya, D., Grassby, P. F., Holland, R., Howe, A., Norris, N., Shopstone, L., & Wright, D. J. (2015). Supervised pharmacy student-led medication review in primary care for patients with type 2 diabetes: A randomised controlled pilot study. *BMJ Open*, 5(11), e009246. <https://doi.org/10.1136/bmjopen-2015-009246>
- Al-Abri, R., & Al-Balushi, A. (2014). Patient satisfaction survey as a tool towards quality improvement. *Oman Medical Journal*, 29(1), 3–7. <https://doi.org/10.5001/omj.2014.02>
- Alkhelaiwi, W. A., Traynor, M., Rogers, K., & Wilson, I. (2024). Assessing the competence of nursing students in clinical practice: The clinical preceptors' perspective. *Healthcare (Basel, Switzerland)*, 12(10), 1031. <https://doi.org/10.3390/healthcare12101031>
- Alonzo, C. N., Komesidou, R., Wolter, J. A., Curran, M., Ricketts, J., & Hogan, T. P. (2022). Building sustainable models of research-practice partnerships within educational systems. *American Journal of Speech-Language Pathology*, 31(3), 1–13. https://doi.org/10.1044/2021_ajslp-21-00181
- Andrade, C., Menon, V., Ameen, S., & Kumar Praharaj, S. (2020). Designing and conducting knowledge, attitude, and practice surveys in psychiatry: Practical guidance. *Indian*

Journal of Psychological Medicine, 42(5), 478–481.

<https://doi.org/10.1177/0253717620946111>

Antoniou, P., Myburgh-Louw, J., & Gronn, P. (2016). School self-evaluation for school improvement: Examining the measuring properties of the LEAD surveys. *Australian Journal of Education*, 60(3), 191–210. <https://doi.org/10.1177/0004944116667310>

Artino, A. R., Jr. (2012). Academic self-efficacy: from educational theory to instructional practice. *Perspectives Medical Education*, 1(2), 76-85. <https://doi.org/10.1007/s40037-012-0012-5>

Aryuwat, P., Asp, M., Lövenmark, A., Radabutr, M., & Holmgren, J. (2023). An integrative review of resilience among nursing students in the context of nursing education. *Nursing Open*, 10(5), 2793-2818. <https://doi.org/10.1002/nop2.1559>

Atakro, C., Armah, E., Menlah, A., Garti, I., Addo, S., Adatara, P., & Boni, G. (2019). Clinical placement experiences by undergraduate nursing students in selected teaching hospitals in Ghana. *BMC Nursing*, 18(1), 1. <https://doi.org/10.1186/s12912-018-0325-8>

Atrash, H., Katz-Leurer, M., & Shahar, G. (2023). The effect of self-assessment on student competence in physiotherapy clinical training: A randomized controlled trial. *BMC Medical Education*, 23(1), 780. <https://doi.org/10.1186/s12909-023-04737-9>

Austin, S. R., Wong, Y.-N., Uzzo, R. G., Beck, J. R., & Egleston, B. L. (2015). Why summary comorbidity measures such as the Charlson Comorbidity Index and Elixhauser score work. *Medical Care*, 53(9), e65–e72. <https://doi.org/10.1097/MLR.0b013e318297429c>

Australian Bureau of Statistics. (2016). Australian Statistical Geography Standard (ASGS): Volume 5 – Remoteness structure, July 2016 (cat. no. 1270.0.55.005). <https://www.abs.gov.au/statistics/standards/australian-statistical-geography-standard-asgs/volume-5-remoteness-structure-2016>

Australian Council of Deans of Health Sciences. (2023). *Submission to the Australian Universities Accord Interim Report*. <https://acdhs.edu.au/wp-content/uploads/2023/09/Universities-ACCORD-Interim-Report-ACDHS.pdf>

- Australian Department of Education. (2023). *Australian Universities Accord – Final report*. Australian Government. <https://www.education.gov.au/australian-universities-accord/resources/final-report>
- Australian Institute of Health and Welfare. (2020). *Australia's health 2020: Data insights*. <https://www.aihw.gov.au/reports/australias-health/australias-health-2020-data-insights/data>
- Baghdadi, N. A., Alotaibi, T., & Abdelaliem, S. M. F. (2023). Assessing the quality of nursing clinical placement: A quantitative cross-sectional study. *Nursing Open*, 10(9), 6143-6149. <https://doi.org/10.1002/nop2.1836>
- Barker, R. N., Sealey, C. J., Polley, M. L., Mervin, M. C., & Comans, T. (2017). Impact of a person-centred community rehabilitation service on outcomes for individuals with a neurological condition. *Disability and rehabilitation*, 39(11), 1136–1142. <https://doi.org/10.1080/09638288.2016.1185803>
- Barnum, C. M. (2011). Reporting the findings. In C. M. Barnum (Ed.), *Usability testing essentials* (pp. 277–317). Morgan Kaufmann. <https://doi.org/10.1016/B978-0-12-375092-1.00009-X>
- Barquero-Ruiz, C., Estero, J. L. A., & Kirk, D. (2019). Assessment for tactical learning in games: A systematic review. *European Physical Education Review*, 26(4), 827–847. <https://doi.org/10.1177/1356336x19889649>
- Barrett, D., & Heale, R. (2020). What are Delphi studies? *Evidence Based Nursing*, 23(3), 68-69. <https://doi.org/10.1136/ebnurs-2020-103303>
- Barry, T. (2017). Health care merged with senior housing: Description and evaluation of a successful program. *Gerontology and Geriatric Medicine*, 3. <https://doi.org/10.1177/2333721417713096>
- Barwick, A., & Horstmanshof, L. (2025). Building and examining research capability in Australian health students: A mixed methods study. *Assessment & Evaluation in Higher Education*, 50(1), 98–110. <https://doi.org/10.1080/02602938.2024.2353251>

- Bawazeer, G., Sales, I., Alsunaidi, A., Aljahili, S., Aljawadi, M. H., Almalag, H. M., Alkofide, H., Adam Mahmoud, M., Alayoubi, F., & Aljohani, M. (2021). Student-led discharge counseling program for high-risk medications in a teaching hospital in Saudi Arabia: A pilot study. *Saudi Pharmaceutical Journal*, 29(10), 1129–1136. <https://doi.org/10.1016/j.jsps.2021.08.004>
- Beard, A. S., Candy, A. E., Anderson, T. J., Derrico, N. P., Ishani, K. A., Gravely, A. A., Englander, R., & Ercan-Fang, N. G. (2020). Patient satisfaction with medical student participation in a longitudinal integrated clerkship: A controlled trial. *Academic Medicine*, 95(3), 417–424. <https://doi.org/10.1097/acm.0000000000003021>
- Beckman, E., Mandrusiak, A., Forbes, R., Mitchell, L., Tower, M., Cunningham, B., & Lewis, P. (2022). A student-led, interprofessional care, community-based healthcare service: Student, clinical educator and client perceptions of interprofessional care and education. *Focus on Health Professional Education: A Multi-Professional Journal*, 23(1), 90–108. <https://doi.org/10.11157/fohpe.v23i1.476>
- Beiderbeck, D., Frevel, N., von der Gracht, H. A., Schmidt, S. L., & Schweitzer, V. M. (2021). Preparing, conducting, and analyzing Delphi surveys: Cross-disciplinary practices, new directions, and advancements. *MethodsX*, 8, 101401. <https://doi.org/10.1016/j.mex.2021.101401>
- Beks, H., Walsh, S., Clayden, S., Watson, L., Zwar, J., & Alston, L. (2024). Financial implications of unpaid clinical placements for allied health, dentistry, medical, and nursing students in Australia: A scoping review with recommendations for policy, research, and practice. *BMC Health Services Research*, 24(1), 1407. <https://doi.org/10.1186/s12913-024-11888-y>
- Bell, A., Amabile, B. D., Christiane, K., Gillian, N., Merrolee, P., Daniel, S., & Monrouxe, L. (2025). Improving the quality of allied health placements: Student, educator and organisational preparedness. *Studies in Continuing Education*, 47(1), 337–359. <https://doi.org/10.1080/0158037X.2024.2360495>
- Bennington, L. (2010). Review of the corporate and healthcare governance literature. *Journal of Management & Organization*, 16(2), 314–333. <https://doi.org/10.5172/jmo.16.2.314>

- Berezowski, J., Czapla, M., Manulik, S., & Ross, C. (2023). Rationing in healthcare—a scoping review. *Frontiers in Public Health*, 11. <https://doi.org/10.3389/fpubh.2023.1160691>
- Bernhardt, J., Borschmann, K., Boyd, L., Carmichael, S. T., Corbett, D., Cramer, S. C., Hoffman, T., Kwakkel, G., Savitz, S. I., Saposnik, G., Walker, M., & Ward, N. (2017). Moving rehabilitation research forward: Developing consensus statements for rehabilitation and recovery research. *Neurorehabilitation and Neural Repair*, 31(8), 694–698. <https://doi.org/10.1177/1545968317724290>
- Berwick, D., Nolan, T., & Whittington, J. (2008). The triple aim: Care, health, and cost. *Health Affairs (Millwood)*, 27(3), 759–769. <https://doi.org/10.1377/hlthaff.27.3.759>
- Biesta, G. (2010). Pragmatism and the philosophical foundations of mixed methods research. In A. Tashakkori & C. Teddlie (Eds.), *SAGE handbook of mixed methods in social & behavioral research* (2nd ed., pp. 95–118). SAGE.
- Billett, S. (2001). Learning through work: Workplace affordances and individual engagement. *Journal of Workplace Learning*, 13, 209–214. <https://doi.org/10.1108/EUM0000000005548>
- Billett, S., Sweet, L., & Glover, P. (2013). The curriculum and pedagogic properties of practice-based experiences: The case of midwifery students. *Vocations and Learning*, 6(2), 237–257. <https://doi.org/10.1007/s12186-012-9094-9>
- Bilheimer, L. T. (2010). Evaluating metrics to improve population health. *Preventing Chronic Disease*, 7(4), A69. https://www.cdc.gov/pcd/issues/2010/jul/10_0016.htm
- Bird, K., Stothers, K., Armstrong, E., Marika, E., Yunupingu, M., Brown, L., Barker, R. (2022). Marŋgithirri guŋga'yunarawu ga guŋga'yunyarawu marŋgithinyarawu: Learning to connect and connecting to learn. *Australian Journal of Rural Health*, 30(1), 75–86. <https://doi.org/10.1111/ajr.12813>
- Birks, M., Bagley, T., Park, T., Burkot, C., & Mills, J. (2017). The impact of clinical placement model on learning in nursing: A descriptive exploratory study. (2017). *Australian Journal of Advanced Nursing*, 34(3). <https://doi.org/10.37464/2017.343.1521>

- Björklund, K., Stenfors, T., Nilsson, G. H., Alinaghizadeh, H., & Leanderson, C. (2021). Let's ask the patient: Composition and validation of a questionnaire for patients' feedback to medical students. *BMC Medical Education*, 21, 269. <https://doi.org/10.1186/s12909-021-02683-y>
- Bliss, J. W., Yau, A., Beideck, E., Novak, J. S. S., d'Andrea, F. B., Blobel, N. J., Batavia, A. S., & Charney, P. (2022). A medical student-run telehealth primary care clinic during the COVID-19 pandemic: Maintaining care for the underserved. *Journal of Primary Care & Community Health*, 13. <https://doi.org/10.1177/21501319221114831>
- Bodenheimer, T., & Sinsky, C. (2014). From triple to quadruple aim: Care of the patient requires care of the provider. *Annals of Family Medicine*, 12(6), 573–576. <https://doi.org/10.1370/afm.1713>
- Bonsel, J. M., Itiola, A. J., Huberts, A. S., Bonsel, G. J., & Penton, H. (2024). The use of patient-reported outcome measures to improve patient-related outcomes – a systematic review. *Health and Quality of Life Outcomes*, 22(1), 101. <https://doi.org/10.1186/s12955-024-02312-4>
- Borralló-Riego, Á., Magni, E., Jiménez-Álvarez, J., Fernández-Rodríguez, V., & Guerra-Martín, M. (2021). Health sciences students' perceptions of the role of the supervisor in clinical placements. *International Journal of Environmental Research and Public Health*, 18(9). <https://doi.org/10.3390/ijerph18094427>
- Boulkedid, R., Abdoul, H., Loustau, M., Sibony, O., & Alberty, C. (2011). Using and reporting the Delphi method for selecting healthcare quality indicators: A systematic review. *PLoS ONE*, 6(6), e20476. <https://doi.org/10.1371/journal.pone.0020476>
- Boulton, M. G., & Beer, S. (2018). Factors affecting recruitment and retention of nurses who deliver clinical research: A qualitative study. *Nursing Open*, 5(4), 555–566. <https://doi.org/10.1002/nop2.167>
- Bourne, E., McAllister, L., Nagarajan, S., & Short, K. (2018). The effect of speech-language pathology students on clinician time use and activity. *International Journal of Speech-Language Pathology*, 21(2), 163–174. <https://doi.org/10.1080/17549507.2017.1416175>

- Bourne, E., Short, K., McAllister, L., & Nagarajan, S. (2019). The quantitative impact of placements on allied health time use and productivity in healthcare facilities: A systematic review with meta-analysis. *Focus on Health Professional Education: A Multi-Professional Journal*, 20(2), 8–40. <https://doi.org/10.11157/fohpe.v20i2.315>
- Bowles, K., Haines, T., Molloy, E., Maloney, S., Kent, F., Sevenhuysen, S., & Tai, J. (2014). *The costs and benefits of providing undergraduate student clinical placements for a health service organisation: An Evidence Check rapid review*. Sax Institute. <https://www.saxinstitute.org.au/wp-content/uploads/Costs-and-benefits-of-clinical-placements.pdf>
- Boxall, A. (2011). *What are we doing to ensure the sustainability of the health system?* Parliament of Australia. https://www.aph.gov.au/About_Parliament/Parliamentary_Departments/Parliamentary_Library/pubs/rp/rp1112/12rp04
- Braithwaite, J., Ludlow, K., Testa, L., Herkes, J., Augustsson, H., Lamprell, G., & Zurynski, Y. (2020). Built to last? The sustainability of healthcare system improvements, programmes, and interventions: A systematic integrative review. *BMJ Open*, 10(6), e036453. <https://doi.org/10.1136/bmjopen-2019-036453>
- Braun, V., & Clarke, V. (2012). Thematic analysis. In H. Cooper, P. M. Camic, D. L. Long, A. T. Panter, D. Rindskopf, & K. J. Sher (Eds.), *APA handbook of research methods in psychology: Vol. 2. Research designs: Quantitative, qualitative, neuropsychological, and biological* (pp. 57–71). American Psychological Association. <https://doi.org/10.1037/13620-004>
- Braun, V., & Clarke, V. (2021). One size fits all? What counts as quality practice in (reflexive) thematic analysis? *Qualitative Research in Psychology*, 18(3), 328–352. <https://doi.org/10.1080/14780887.2020.1769238>
- Braveman, P., & Gottlieb, L. (2014). The social determinants of health: It's time to consider the causes of the causes. *Public Health Reports*, 129(1), 19–31. <https://doi.org/10.1177/00333549141291S206>

- Broman, P., Brownie, S., & Fourie, L. (2023). Student-led health services in Australia and New Zealand: Comparing the costs. *Journal of Global Business and Technology*, 19(2), 31–47.
- Broman, P., Tokolahi, E., Wilson, O. W. A., Haggie, M., Andersen, P., & Brownie, S. (2022). Patient outcomes from student-run health services: An integrative review. *Journal of Multidisciplinary Healthcare*, 15, 641–665. <https://doi.org/10.2147/JMDH.S348411>
- Burgess, A., & Mellis, C. (2015). Feedback and assessment for clinical placements: Achieving the right balance. *Advances in Medical Education and Practice*, 6, 373–381. <https://doi.org/10.2147/AMEP.S77890>
- Butala, N. M., Chang, H., Horwitz, L. I., Bartlett, M., & Ellis, P. (2013). Improving quality of preventive care at a student-run free clinic. *PLOS ONE*, 8(11), Article e81441. <https://doi.org/10.1371/journal.pone.0081441>
- Campbell, N., Stothers, K., Swain, L., Cairns, A., Dunsford, E., & Barker, R. (2020). Allied health service-learning student placements in remote northern Australia during COVID-19. *The Australian Journal of Rural Health*, 28(5), 514–520. <https://doi.org/10.1111/ajr.12661>
- Carpenter, D. M., Estrada, R. D., Roberts, C. A., Elio, A., Prendergast, M., Durbin, K., Jones, G. C., & North, S. (2017). Urban-rural differences in school nurses' asthma training needs and access to asthma resources. *Journal of Pediatric Nursing*, 36, 157–162. <https://doi.org/10.1016/j.pedn.2017.06.013>
- Carter, N., Bryant-Lukosius, D., DiCenso, A., Blythe, J., & Neville, A. J. (2014). The use of triangulation in qualitative research. *Oncology Nursing Forum*, 41(5), 545–547. <https://doi.org/10.1188/14.Onf.545-547>
- Channa, S., Topping, A., Willis, C., Melody, T., & Pearce, R. (2024). Clinical learning experiences of healthcare professional students in a student-led clinical learning environment (SLCLE) - A mixed methods evaluation. *Nurse Education in Practice*, 79, 104035. <https://doi.org/10.1016/j.nepr.2024.104035>

- Che Daud, A. Z., Yau, M. K., & Barnett, F. (2015). A consensus definition of occupation-based intervention from a Malaysian perspective: A Delphi study. *British Journal of Occupational Therapy*, 78(11), 697-705. <https://doi.org/10.1177/0308022615569510>
- Chen, T. H., Li, L., & Kochen, M. M. (2005). A systematic review: how to choose appropriate health-related quality of life (HRQOL) measures in routine general practice?. *Journal of Zhejiang University. Science. B*, 6(9), 936–940. <https://doi.org/10.1631/jzus.2005.B0936>
- Chicca, J., & Shellenbarger, T. (2020). Fostering inclusive clinical learning environments using a psychological safety lens. *Teaching and Learning in Nursing*, 15(3), 174–178. <https://doi.org/10.1016/j.teln.2020.03.002>
- Chimea, T., Kanji, Z., & Schmitz, S. (2020). Assessment of clinical competence in competency-based education. *Canadian Journal of Dental Hygiene*, 54(2), 83–91. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7668267/>
- Chien, L. J., Slade, D., Dahm, M. R., Brady, B., Roberts, E., Goncharov, L., Taylor, J., Eggins, S., & Thornton, A. (2022). Improving patient-centred care through a tailored intervention addressing nursing clinical handover communication in its organizational and cultural context. *Journal of Advanced Nursing*, 78(5), 1413–1430. <https://doi.org/10.1111/jan.15110>
- Chin, S., Richardson, C. L., Gardner, A., & Nazar, H. (2024). The impact and user experience of a student-led clinic providing preventative services. *International Journal of Pharmacy Practice*, 32(3), 237–243. <https://doi.org/10.1093/ijpp/riae016>
- Chooniedass, R., Reekie, M., Denison, J., Mercuri, A., Nawara, R., Purcell, N., Oelke, M., & Janke, R. (2025). Embedding cultural safety in nursing education: A scoping review of strategies and approaches. *Journal of Professional Nursing*, 56, 113–129. <https://doi.org/10.1016/j.profnurs.2024.11.005>
- Chye, S. M., Kok, Y. Y., Chen, Y. S., & Er, H. M. (2024). Building resilience among undergraduate health professions students: Identifying influencing factors. *BMC Medical Education*, 24(1), 1168. <https://doi.org/10.1186/s12909-024-06127-1>

- Clark, J. S., Bollaert, A., Sills, S. O., Clark, J. H., & Norris, D. (2014). Patient perception of care received by students at the Jackson Free Clinic. *Journal of the Mississippi State Medical Association*, 55(4), 113–118.
- Cohen, C., & Shang, J. (2015). Evaluation of conceptual frameworks applicable to the study of isolation precautions effectiveness. *Journal of Advanced Nursing*, 71(10), 2279–2292. <https://doi.org/10.1111/jan.12718>
- Institute of Medicine (US) Committee on Quality of Health Care in America. (2001). *Crossing the quality chasm: A new health system for the 21st century*. National Academies Press. <https://doi.org/10.17226/10027>
- Cooke, J. (2005). A framework to evaluate research capacity building in health care. *BMC Family Practice*, 6, 44. <https://doi.org/10.1186/1471-2296-6-44>
- Cooper, L., Orrell, J., & Bowden, M. (2010). *Work integrated learning: A guide to effective practice* (1st ed.). Routledge. <https://doi.org/10.4324/9780203853505>
- Cooper, S., Cant, R., Waters, D., Luders, E., Henderson, A., Willetts, G., Tower, M., Reid-Searl, K., Ryan, C., & Hood, K. (2020). Measuring the quality of nursing clinical placements and the development of the Placement Evaluation Tool (PET) in a mixed methods co-design project. *BMC Nursing*, 19(1), 101. <https://doi.org/10.1186/s12912-020-00491-1>
- Copeland, D. (2020). Paying for nursing student clinical placements: Ethical considerations. *Journal of Professional Nursing*, 36(5), 330–333. <https://doi.org/10.1016/j.profnurs.2020.01.008>
- Coppola, N., Mignogna, M. D., Riviuccio, I., Blasi, A., Bizzoca, M. E., Sorrentino, R., Lo Muzio, L., Spagnuolo, G., & Leuci, S. (2021). Current knowledge, attitudes, and practice among health care providers in OSCC awareness: Systematic review and meta-analysis. *International Journal of Environmental Research and Public Health*, 18(9), 4506. <https://doi.org/10.3390/ijerph18094506>
- Courtney-Pratt, H., Fitzgerald, M., Ford, K., Johnson, C., & Wills, K. (2014). Development and reliability testing of the quality clinical placement evaluation tool. *Journal of Clinical Nursing*, 23(3–4), 504–514. <https://doi.org/10.1111/jocn.12158>

- Cowing, M., Davino-Ramaya, C. M., Ramaya, K., & Szmerekovsky, J. (2009). Health care delivery performance: Service, outcomes, and resource stewardship. *The Permanente Journal*, 13(4), 72–78. <https://doi.org/10.7812/TPP/08-100>
- Creswell, J. W., & Clark, V. L. P. (2017). *Designing and conducting mixed methods research* (3rd ed.). SAGE Publications.
- Critcher, C., & Gladstone, B. (1998). Utilizing the Delphi technique in policy discussion: A case study of a privatized utility in Britain. *Public Administration*, 76(3), 431–449. <https://doi.org/10.1111/1467-9299.00110>
- Cruess, S. R., Cruess, R. L., & Steinert, Y. (2019). Supporting the development of a professional identity: General principles. *Medical Teacher*, 41(6), 641-649. <https://doi.org/10.1080/0142159x.2018.1536260>
- Čukljek, S., Županić, M., & Takšić, I. (2024). Development and validation of satisfaction with clinical practice questionnaire for mentors and students. *International Journal of Nursing Education Scholarship*, 21(1). <https://doi.org/10.1515/ijnes-2022-0124>
- Curran, C., Baker, J. G., Smitley, M., & Baker, R. T. (2023). A descriptive analysis of patient outcomes and experiences at a student-run athletic training clinic. *Journal of Athletic Training*, 58(2), 163–176. <https://doi.org/10.4085/1062-6050-0051.22>
- Currie, C. (2016). Approaches to the assessment of healthcare needs, utilization, and outcomes, and the evaluation of health and healthcare (Revised). In *The Public Health Textbook*. <https://www.healthknowledge.org.uk/public-health-textbook>
- Cusick, A., Heydon, M., Caldwell, K., & Cohen, L. (2014). Finding measures of clinical placements quality for pre-service health services training: Challenges of definition and search strategy construction [Poster presentation]. *BMC Health Services Research*, 14(Suppl 2), Article P24. <https://doi.org/10.1186/1472-6963-14-S2-P24>
- Dairo, Y. M., Hunter, K., & Ishaku, T. (2024). The impact of simulation-based learning on the knowledge, attitude and performance of physiotherapy students on practice placement. *BMC Medical Education*, 24(1), 786. <https://doi.org/10.1186/s12909-024-05718-2>

- Dalton, M., Davidson, M., & Keating, J. (2011). The assessment of physiotherapy practice (APP) is a valid measure of professional competence of physiotherapy students: A cross-sectional study with Rasch analysis. *Journal of Physiotherapy*, 57(4), 239–246. [https://doi.org/10.1016/s1836-9553\(11\)70054-6](https://doi.org/10.1016/s1836-9553(11)70054-6)
- Darcy Associates. (2013a). *Best Practice Clinical Learning Environment (BPCLE) framework: Quality clinical education in Victoria*. Victorian Department of Health. <https://www.health.vic.gov.au/education-and-training/best-practice-clinical-learning-environment-bpcle-framework>
- Darcy Associates. (2013b). *Development of implementation tools for the BPCLE Framework: Final report*. Victorian Department of Health. https://www.bpcletool.net.au/resources/BPCLEtool-Final-Project-Report_web.pdf
- De Rosis, S., Ferrè, F., & Pennucci, F. (2022). Including patient-reported measures in performance evaluation systems: Patient contribution in assessing and improving the healthcare systems. *International Journal of Health Planning and Management*, 37(Suppl 1), 144-165. <https://doi.org/10.1002/hpm.3596>
- de Villiers, M. R., de Villiers, P. J. T., & Kent, A. P. (2005). The Delphi technique in health sciences education research. *Medical Teacher*, 27(7), 639-643. <https://doi.org/10.1080/13611260500069947>
- Dekker, R. S., Schutte, T., Tichelaar, J., Thijs, A., van Agtmael, M. A., de Vries, T. P., & Richir, M. C. (2015). A novel approach to teaching pharmacotherapeutics-feasibility of the learner-centered student-run clinic. *European Journal of Clinical Pharmacology*, 71(11), 1381–1387. <https://doi.org/10.1007/s00228-015-1916-x>
- Devlin, M., & McKay, J. (2016). Teaching students using technology: Facilitating success for students from low socioeconomic status backgrounds in Australian universities. *Australasian Journal of Educational Technology*, 32(1). <https://doi.org/10.14742/ajet.2053>
- Deyo, R. A., Cherkin, D. C., & Ciol, M. A. (1992). Adapting a clinical comorbidity index for use with ICD-9-CM administrative databases. *Journal of Clinical Epidemiology*, 45(6), 613–619. [https://doi.org/10.1016/0895-4356\(92\)90133-8](https://doi.org/10.1016/0895-4356(92)90133-8)

- Dixit, S., & Sambasivan, M. (2018). A review of the Australian healthcare system: A policy perspective. *SAGE Open Medicine*, 6. <https://doi.org/10.1177/2050312118769211>
- Donabedian, A. (1988). The quality of care. How can it be assessed? *JAMA*, 260(12), 1743–1748. <https://doi.org/10.1001/jama.260.12.1743>
- Donough, G., & Van der Heever, M. (2018). Undergraduate nursing students' experience of clinical supervision. *Curationis*, 41(1), e1-e8. <https://doi.org/10.4102/curationis.v41i1.1833>
- Ecken, P., Gnatzy, T., & von der Gracht, H. A. (2011). Desirability bias in foresight: Consequences for decision quality based on Delphi results. *Technological Forecasting and Social Change*, 78(9), 1654–1670. <https://doi.org/10.1016/j.techfore.2011.05.006>
- Edwards, B., Stickney, B., Milat, A., Campbell, D., & Thackway, S. (2016). Building research and evaluation capacity in population health: the NSW Health approach. *Health Promotion Journal of Australia*, 27(3), 264-267. <https://doi.org/https://doi.org/10.1071/HE16045>
- Efstathiou, N., Ameen, J., & Coll, A. M. (2008). A Delphi study to identify healthcare users' priorities for cancer care in Greece. *European Journal of Oncology Nursing*, 12(4), 362-371. <https://doi.org/10.1016/j.ejon.2008.04.010>
- Engle, R. L., Mohr, D. C., Holmes, S. K., Seibert, M. N., Afable, M., Leyson, J., & Meterko, M. (2021). Evidence-based practice and patient-centered care: Doing both well. *Health Care Management Review*, 46(3), 174-184. <https://doi.org/10.1097/hmr.0000000000000254>
- Eva, K. W., Bordage, G., Campbell, C., Galbraith, R., Ginsburg, S., Holmboe, E., & Regehr, G. (2016). Towards a program of assessment for health professionals: from training into practice. *Advances in Health Sciences Education*, 21(4), 897-913. <https://doi.org/10.1007/s10459-015-9653-6>
- Evans, D. (2003). Hierarchy of evidence: a framework for ranking evidence evaluating healthcare interventions. *Journal of Clinical Nursing*, 12(1), 77-84. <https://doi.org/10.1046/j.1365-2702.2003.00662.x>

- Evans, R. G., & Stoddart, G. L. (1990). Producing health, consuming health care. *Social Science & Medicine*, 31(12), 1347–1363. [https://doi.org/10.1016/0277-9536\(90\)90074-3](https://doi.org/10.1016/0277-9536(90)90074-3)
- Fagan, J., Eddens, K. S., Dolly, J., Vanderford, N. L., Weiss, H., & Levens, J. S. (2018). Assessing research collaboration through co-authorship network analysis. *Journal of Research Administration*, 49(1), 76–99. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6703830/>
- Farnan, J., Petty, L., Georgitis, E., Martin, S., Chiu, E., Prochaska, M., & Arora, V. (2012). A systematic review: The effect of clinical supervision on patient and residency education outcomes. *Academic Medicine*, 87(4), 428–442. <https://doi.org/10.1097/ACM.0b013e31824822cc>
- Finch, E., Cornwell, P., Ward, E. C., & McPhail, S. M. (2013). Factors influencing research engagement: research interest, confidence and experience in an Australian speech-language pathology workforce. *BMC Health Services Research*, 13, 144. <https://doi.org/10.1186/1472-6963-13-144>
- Flott, E., & Linden, L. (2016). The clinical learning environment in nursing education: A concept analysis. *Journal of Advanced Nursing*, 72(3), 501–513. <https://doi.org/10.1111/jan.12861>
- Forbes, R., Dinsdale, A., Copley, J., Booth, J., Cain, D., Crabb, M., Dunwoodie, R., Hunter, L., Sher, A., & Hill, A. (2022). The benefits and barriers of hosting students within allied health private practice settings: The perspective of private practice and clinical education coordinators. *Australian Journal of Clinical Education*, 11(1), 69–89. <https://doi.org/10.53300/001c.34708>
- Frakes, K., Brownie, S., Davies, L., Thomas, J., Miller, M., & Tyack, Z. (2014). Capricornia allied health partnership (CAHP): A case study of an innovative model of care addressing chronic disease through a regional student-assisted clinic. *Australian Health Review*, 38(5), 483–486. <https://doi.org/10.1071/AH13177>
- Frakes, K., Tyack, Z., Miller, M., Davies, L., Swanston, A., & Brownie, S. (2011). *The Capricornia project: Developing and implementing an interprofessional student-assisted allied health clinic*. Brisbane, Australia.

- Freundl, D. M., & Ware, J. E., Jr. (2014). Patient-reported functional health and well-being outcomes with drug therapy: A systematic review of randomized trials using the SF-36 health survey. *Medical Care*, 52(5), 439–445. <https://doi.org/10.1097/MLR.00000000000010311>
- Fröberg, M., Leanderson, C., Flackman, B., Hedman-Lagerlof, E., Bjorklund, K., Nilsson, G. H., & Stenfors, T. (2018). Experiences of a student-run clinic in primary care: A mixed-method study with students, patients and supervisors. *Scandinavian Journal of Primary Health Care*, 36(1), 36–46. <https://doi.org/10.1080/02813432.2018.1426143>
- Galletta, M., Portoghese, I., Aviles Gonzales, C., Melis, P., Marcias, G., Campagna, M., ... Sardu, C. (2017). Lack of respect, role uncertainty, and satisfaction with clinical practice among nursing students: The moderating role of supportive staff. *Acta Biomed*, 88(3s), 43–50. <https://doi.org/10.23750/abm.v88i3-S.6613>
- García-Gámez, M., Morales-Asencio, J. M., García-Mayor, S., Kaknani-Uttumchandani, S., Martí-García, C., Lopez-Leiva, I., León-Campos, Á., Fernandez-Ordoñez, E., García-Guerrero, A., & Iglesias-Parra, R. (2020). Adverse events encountered during clinical placements by undergraduate nursing students in Spain. *Nurse Education Today*, 91, 104480. <https://doi.org/10.1016/j.nedt.2020.104480>
- Gholizadeh, L., Shahbazi, S., Valizadeh, S., Mohammadzad, M., Ghahramanian, A., & Shohani, M. (2022). Nurse preceptors' perceptions of benefits, rewards, support, and commitment to the preceptor role in a new preceptorship program. *BMC Medical Education*, 22(1), 472. <https://doi.org/10.1186/s12909-022-03534-0>
- Gizaw, Z., Astale, T., & Kassie, G. (2022). What improves access to primary healthcare services in rural communities? A systematic review. *BMC Primary Care*, 23(1), 313. <https://doi.org/10.1186/s12875-022-01919-0>
- Gonsalvez, C. J. (2021). A short scale to evaluate supervision and supervisor competence—the SE-SC8. *Clinical Psychology & Psychotherapy*, 28(2), 452–461. <https://doi.org/10.1002/cpp.2510>
- Gonsalvez, C. J., Talia, W., & Deane, F. P. (2017). Goal-setting, feedback, and assessment practices reported by Australian clinical supervisors. *Australian Psychologist*, 52(1), 21–30. <https://doi.org/10.1111/ap.12175>

- Gorrindo, P., Peltz, A., Ladner, T., Reddy, I., Miller, B., Miller, R., & Fowler, M. (2014). Medical students as health educators at a student-run free clinic: Improving the clinical outcomes of diabetic patients. *Academic Medicine*, 89(4), 625–631. <https://doi.org/10.1097/ACM.0000000000000164>
- Grant-Smith, D., & de Zwaan, L. (2019). Don't spend, eat less, save more: Responses to the financial stress experienced by nursing students during unpaid clinical placements. *Nurse Education in Practice*, 35, 1–6. <https://doi.org/10.1016/j.nepr.2018.12.005>
- Green, E., Quilliam, C., Sheepway, L., Hays, C. A., Moore, L., Rasiah, R., ... Collett, M. (2022). Identifying features of quality in rural placements for health students: Scoping review. *BMJ Open*, 12(4), e057074. <https://doi.org/10.1136/bmjopen-2021-057074>
- Hall, A., Shoesmith, A., Doherty, E., McEvoy, B., Mettert, K., Lewis, C., ... Nathan, N. (2022). Evaluation of measures of sustainability and sustainability determinants for use in community, public health, and clinical settings: A systematic review. *Implementation Science*, 17(1), 81. <https://doi.org/10.1186/s13012-022-01252-1>
- Hall, R. E., Porter, J., Quan, H., & Reeves, M. J. (2019). Developing an adapted Charlson comorbidity index for ischemic stroke outcome studies. *BMC Health Services Research*, 19(1), 930. <https://doi.org/10.1186/s12913-019-4720-y>
- Hall, Y., Xu, P., Chertow, G., & Himmelfarb, J. (2013). Characteristics and performance of minority-serving dialysis facilities. *Health Services Research*, 49(3), 971–991. <https://doi.org/10.1111/1475-6773.12144>
- Hannawa, A. F., Wu, A. W., Kolyada, A., Potemkina, A., & Donaldson, L. J. (2022). The aspects of healthcare quality that are important to health professionals and patients: A qualitative study. *Patient Education and Counseling*, 105(6), 1561–1570. <https://doi.org/10.1016/j.pec.2021.10.016>
- Harrison, H., Birks, M., Franklin, R., & Mills, J. (2020). Fostering graduate nurse practice readiness in context. *Collegian*, 27(1), 115–124. <https://doi.org/10.1016/j.colegn.2019.07.006>
- Harvey, A., Burnheim, C., & Brett, M. (2016). *Student equity in Australian higher education: twenty-five years of 'A fair chance for all'*. Singapore: Springer.

- Hashemiparast, M., Negarandeh, R., & Theofanidis, D. (2019). Exploring the barriers of utilizing theoretical knowledge in clinical settings: A qualitative study. *International Journal of Nursing Sciences*, 6(4), 399–405.
<https://doi.org/10.1016/j.ijnss.2019.09.008>
- Hattie, J., & Timperley, H. (2007). The power of feedback. *Review of Educational Research*, 77(1), 81–112. <https://doi.org/10.3102/003465430298487>
- Havers, S. M., Martin, E., Wilson, A., & Hall, L. (2019). Implementation of government-directed policy in the hospital setting: a modified Delphi study. *Health Research Policy and Systems*, 17(1), 91. <https://doi.org/10.1186/s12961-019-0500-8>
- Heale, R., & Forbes, D. (2013). Understanding triangulation in research. *Evidence-Based Nursing*, 16(4), 98. <https://doi.org/10.1136/eb-2013-101494>
- Heales, L., Bonato, K., Randall, S., Hinz, C., Job, S., Bochkezanian, V., ... Obst, S. (2021). Factors associated with student satisfaction within a regional student-led physiotherapy clinic: A retrospective qualitative study. *Australian Journal of Clinical Education*, 10(1). <https://doi.org/10.53300/001c.21424>
- Health Education and Training Institute. (2019). The Superguide: A handbook for supervising allied health professionals.
https://www.heti.nsw.gov.au/_data/assets/pdf_file/0005/424859/HETI_Superguide_Txt_WARAHETI_OCT_19.pdf
- Health Workforce Australia. (2011). *National clinical supervision support framework*. Health Workforce Australia.
<https://www.nurse.org.nz/user/file/1607/HWA%20Supervision%20Support%20Framework.pdf>.
- Health Workforce Australia. (2013). *National clinical supervision competency resource: Validation edition*.
https://www.clinedaus.org.au/files/resources/hwa_national_clinical_supervision_competency_resource_ve_201305_2.pdf
- Hodwitz, K., Kuper, A., & Brydges, R. (2019). Realizing one's own subjectivity: Assessors' perceptions of the influence of training on their conduct of workplace-based

assessments. *Academic Medicine*, 94, 1.

<https://doi.org/10.1097/ACM.0000000000002943>

Hsu, C.-C., & Sandford, B. (2007). The Delphi technique: Making sense of consensus.

Practical Assessment, Research and Evaluation, 12(1), 10.

<https://doi.org/10.7275/pdz9-th90>

Hughes, R., & Desbrow, B. (2010). An evaluation of clinical dietetic student placement case-

mix exposure, service delivery, and supervisory burden. *Nutrition & Dietetics*, 67(4),

287–293. <https://doi.org/10.1111/j.1747-0080.2010.01478.x>

Hulme, A., Sangelaji, B., Walker, C., Fallon, T., Denham, J., Martin, P., ... Argus, G. (2024).

Efficacy of a student-led interprofessional health clinic in regional Australia for preventing and managing chronic disease. *Journal of Interprofessional Care*, 38(5),

893–906. <https://doi.org/10.1080/13561820.2024.2380436>

Institute for Healthcare Improvement. (2017). IHI Triple Aim prototyping partners.

<https://www.ihl.org/Engage/Initiatives/TripleAim/Pages/Participants.aspx>

Irby, D. M., O'Brien, B. C., Stenfors, T., & Palmgren, P. J. (2021). Selecting instruments for

measuring the clinical learning environment of medical education: A 4-domain framework. *Academic Medicine*, 96(2), 218–225.

<https://doi.org/10.1097/acm.0000000000003551>

Islam, M. S., Mondal, A. K., Auwul, M. R., Islam, T., Islam, O., Yasmin, A., Mahmud, M. A.,

Haque, A. K. M. Z., Begum, M., Tipu, J. H., Mojumder, Y., Roy, M., & Islam, M. A.

(2024). Assessment of knowledge, attitudes, and practices on vaccine usage among small ruminant farmers in the northern region of Bangladesh. *Veterinary World*, 17(7),

1435–1448. <https://doi.org/10.14202/vetworld.2024.1435-1448>

Jafarian-Amiri, S. R., Zabihi, A., & Qalehsari, M. Q. (2020). The challenges of supporting

nursing students in clinical education. *Journal of Education and Health Promotion*, 9, 216. https://doi.org/10.4103/jehp.jehp_13_20

Jiang, J., Link, K., Mellgard, G., Silvestri, F., Qian, D., Chennareddy, S., ... Meah, Y. (2024).

Evaluation of patient health outcomes of a student-run free clinic in East Harlem.

BMC Medical Education, 24(1), 323. <https://doi.org/10.1186/s12909-024-05070-5>

- Johansen, M. O. (2023). *Effects of autonomy and control on student motivation and functioning in higher education* (Doctoral thesis). University of Bergen. <https://doi.org/10.13140/RG.2.2.16069.46563>
- Johnstone, E., Brough, M., Crane, P., Marston, G., & Correa-Velez, I. (2016). Field placement and the impact of financial stress on social work and human service students. *Australian Social Work*, 69, 1–14. <https://doi.org/10.1080/0312407X.2016.1181769>
- Jones, T., Kirwan, G., Howells, S., & Hams, A. (2022). Clinical placement quality survey-student (CPQS-S): A tool to evaluate allied health placement quality. *International Journal of Work-Integrated Learning*, 23, 579-593. <http://hdl.handle.net/10072/419466>
- Jones, D., McAllister, L., & Lyle, D. (2015). Stepping out of the shadows: Allied health student and academic perceptions of the impact of a service-learning experience on student's work-readiness and employability. *Journal of Teaching and Learning for Graduate Employability*, 6(1), 66-87. <https://doi.org/10.21153/jtlge2015vol6no1art574>
- Judd, B., Brentnall, J., Scanlan, J. N., Thomson, K., Blackstock, F., Mandrusiak, A., Chipchase, L., Phillips, A., & McAllister, S. (2023). Evaluating allied health students' readiness for placement learning. *BMC Medical Education*, 23(1), 70. <https://doi.org/10.1186/s12909-023-04005-w>
- Jünger, S., Payne, S., Brine, J., Radbruch, L., & Brearley, S. (2017). Guidance on conducting and reporting Delphi studies (CREDES) in palliative care: Recommendations based on a methodological systematic review. *Palliative Medicine*, 31(8), 684–706. <https://doi.org/10.1177/0269216317690685>
- Keeney, S., Hasson, F., & McKenna, H. P. (2001). A critical review of the Delphi technique as a research methodology for nursing. *International Journal of Nursing Studies*, 38(2), 195–200. [https://doi.org/10.1016/S0020-7489\(00\)00044-4](https://doi.org/10.1016/S0020-7489(00)00044-4)
- Keeney, S., Hasson, F., & McKenna, H. (2011). *The Delphi technique in nursing and health research*. Wiley. <https://doi.org/10.1002/9781444392029.fmatter>

- Kenny, A., Hyett, N., Sawtell, J., Dickson-Swift, V., Farmer, J., & O'Meara, P. (2013). Community participation in rural health: A scoping review. *BMC Health Services Research*, 13(1), 64. <https://doi.org/10.1186/1472-6963-13-64>
- Kent, F., Drysdale, P., Martin, N., & Keating, J. (2014). The mixed-discipline aged-care student clinic: An authentic interprofessional learning initiative. *Journal of Allied Health*, 43(1), 51–56.
- Kent, F., Lai, F., Beovich, B., & Dodic, M. (2016). Interprofessional student teams augmenting service provision in residential aged care. *Australasian Journal on Ageing*, 35(3), 204–209. <https://doi.org/10.1111/ajag.12288>
- Keshavarzi, M. H., Azandehi, S. K., Koohestani, H. R., Baradaran, H. R., Hayat, A. A., & Ghorbani, A. A. (2022). Exploration of the role of a clinical supervisor to improve the professional skills of medical students: A content analysis study. *BMC Medical Education*, 22(1), 399. <https://doi.org/10.1186/s12909-022-03473-w>
- Kirby, S., Lyle, D., Jones, D., Brunero, C., Purcell, A., & Dettwiller, P. (2018). Design and delivery of an innovative speech pathology service-learning program for primary school children in far west NSW, Australia. *Public Health Research & Practice*, 28(3). <https://doi.org/10.17061/phrp28231806>
- Knight, S. R., Pathak, S., Christie, A., Jones, L., Rees, J., Davies, H., Wilson, M., Vaughan-Shaw, P. G., Roberts, K., Toogood, G. J., Harrison, E. M., & Taylor, M. (2019). Use of a modified Delphi approach to develop research priorities in HPB surgery across the United Kingdom. *HPB*, 21(11), 1446-1452. <https://doi.org/10.1016/j.hpb.2019.03.352>
- Koedyk, C., Satur, J., & Vaughan, B. (2021). What do dental students value about their rural placements—Is clinical experience enough? *Australian Journal of Rural Health*, 29(5), 670–677. <https://doi.org/10.1111/ajr.12780>
- Kogan, J. R., Hatala, R., Hauer, K. E., & Holmboe, E. (2017). Guidelines: The do's, don'ts and don't knows of direct observation of clinical skills in medical education. *Perspectives on Medical Education*, 6(5), 286-305. <https://doi.org/10.1007/s40037-017-0376-7>

- Kokko, P. (2022). Improving the value of healthcare systems using the Triple Aim framework: A systematic literature review. *Health Policy*, 126(4), 302–309. <https://doi.org/10.1016/j.healthpol.2022.02.005>
- Kukull, W. A., & Ganguli, M. (2012). Generalizability: the trees, the forest, and the low-hanging fruit. *Neurology*, 78(23), 1886-1891. <https://doi.org/10.1212/WNL.0b013e318258f812>
- Lane, A., Woolley, T., Gupta, T. S., Stewart, R., Hollins, A., & Harte, J. (2020). Factors impacting the solo remote placement experiences of undergraduate James Cook University medical students: A mixed-methods pilot study. *Australian Journal of Rural Health*, 28(6), 555-567. <https://doi.org/10.1111/ajr.12684>
- Larkins, L., Panzera, A., Beaton, N., Murray, R., Mills, J., Coulter, K., ... Baird, D. (2014). *Regional health workforce planning in north Queensland: Starting with the end in mind*. [Conference presentation]. Adelaide.
- Lawrence, D., Bryant, T. K., Nobel, T. B., Dolansky, M. A., & Singh, M. K. (2015). A comparative evaluation of patient satisfaction outcomes in an interprofessional student-run free clinic. *Journal of Interprofessional Care*, 29(5), 445–450. <https://doi.org/10.3109/13561820.2015.1010718>
- Lavoie-Tremblay, M., Sanzone, L., Aubé, T., & Paquet, M. (2022). Sources of stress and coping strategies among undergraduate nursing students across all years. *Canadian Journal of Nursing Research*, 54(3), 261-271. <https://doi.org/10.1177/08445621211028076>
- Lee, J. S., Combs, K., & Pasarica, M. (2017). Improving efficiency while improving patient care in a student-run free clinic. *Journal of the American Board of Family Medicine*, 30(4), 513–519. <https://doi.org/10.3122/jabfm.2017.04.170044>
- Lee, J. J., Sack, D. E., Kam, S., Reed, S. C., Carew, B., Lloyd, C., Weaver, E. O., & Miller, R. F. (2023). Results of leveraging pharmaceutical patient assistance programs to expand access to high cost medications in a student-run free clinic. *Journal of Community Health*, 48(6), 919-925. <https://doi.org/10.1007/s10900-023-01240-6>

- Leong, R., & Kavanagh, M. (2010). A literature review of work integrated learning (WIL) in accounting: Developments in the last decade and future directions. In ACEN 2010: *Work Integrated Learning (WIL): Responding to Challenges*, Perth, Australia. <https://research.usq.edu.au/item/q0197/a-literature-review-of-work-integrated-learning-wil-in-accounting-developments-in-the-last-decade-and-future-directions>
- Levesque, J. F., Harris, M. F., & Russell, G. (2013). Patient-centred access to health care: Conceptualising access at the interface of health systems and populations. *International Journal for Equity in Health*, 12(1), 18. <https://doi.org/10.1186/1475-9276-12-18>
- Lennox, L., Maher, L., & Reed, J. (2018). Navigating the sustainability landscape: A systematic review of sustainability approaches in healthcare. *Implementation Science*, 13(1). <https://doi.org/10.1186/s13012-017-0707-4>
- Liberman, K. M., Meah, Y. S., Chow, A., Tornheim, J., Rolon, O., & Thomas, D. C. (2011). Quality of mental health care at a student-run clinic: Care for the uninsured exceeds that of publicly and privately insured populations. *Journal of Community Health*, 36(5), 733–740. <https://doi.org/10.1007/s10900-011-9367-5>
- Liu, J. (2007). Health professional shortage and health status and healthcare access. *Journal of Health Care for the Poor and Underserved*, 18(3), 590–598. <https://search.proquest.com/docview/220585961?accountid=16285>
- Lovaglio, P. (2012). Benchmarking strategies for measuring the quality of healthcare: Problems and prospects. *The Scientific World Journal*, 2012, 1–13. <https://doi.org/10.1100/2012/606154>
- Lwanga, S. K., & Lemeshow, S. (1991). *Sample size determination in health studies: A practical manual*. World Health Organization. <https://iris.who.int/handle/10665/40062>
- Lyng, H. B., Macrae, C., Guise, V., Haraldseid-Driftland, C., Fagerdal, B., Schibevaag, L., Alsvik, J. G., & Wiig, S. (2021). Balancing adaptation and innovation for resilience in healthcare - a metasynthesis of narratives. *BMC Health Services Research*, 21(1), 759. <https://doi.org/10.1186/s12913-021-06592-0>

- Maguire, M., & Delahunt, B. (2017). Doing a thematic analysis: A practical, step-by-step guide for learning and teaching scholars. *All Ireland Journal of Teaching and Learning in Higher Education*, 9(3), 3351. <http://ojs.aishe.org/index.php/aishe-j/article/view/3354>
- Mann, C. L., Rifkin, R. A., Nabel, E. M., Thomas, D. C., Meah, Y. S., & Katz, C. L. (2019). Exploring antidepressant adherence at a student-run free mental health clinic. *Community Mental Health Journal*, 55(1), 57–62. <https://doi.org/10.1007/s10597-018-0301-5>
- Mannix, J., Wilkes, L., & Luck, L. (2009). Key stakeholders in clinical learning and teaching in Bachelor of Nursing programs: A discussion paper. *Contemporary Nurse*, 32, 59-68. <https://doi.org/10.5172/conu.32.1-2.59>
- Manoochehri, H., Imani, E., Atashzadeh-Shoorideh, F., & Alavi-Majd, A. (2015). Competence of novice nurses: Role of clinical work during studying. *Journal of Medicine and Life*, 8(Special Issue 4), 32–38. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5319286/>
- Mansutti, I., Saiani, L., Grassetti, L., & Palese, A. (2017). Instruments evaluating the quality of the clinical learning environment in nursing education: A systematic review of psychometric properties. *International Journal of Nursing Studies*, 68, 60-72. <https://doi.org/10.1016/j.ijnurstu.2017.01.001>
- Maqbool, B., & Herold, S. (2024). Potential effectiveness and efficiency issues in usability evaluation within digital health: A systematic literature review. *Journal of Systems and Software*, 208, 111881. <https://doi.org/10.1016/j.jss.2023.111881>
- March, S., Mangoyana, C., Oakley, P., Lalloo, R., & Walsh, L. J. (2023). Positive impacts of oral health services provision by a student-led primary care clinic to an Australian rural indigenous community. *Australian Dental Journal*, 68(3), 151-159. <https://doi.org/10.1111/adj.12960>
- Marsh, W., Colbourne, D. M., Way, S., & Hundley, V. A. (2015). Would a student midwife run postnatal clinic make a valuable addition to midwifery education in the UK?--a

systematic review. *Nurse Education Today*, 35(3), 480-486.

<https://doi.org/10.1016/j.nedt.2014.11.015>

Martin, P., Lizarondo, L., Argus, G., Kumar, S., & Kondalsamy-Chennakesavan, S. (2022).

Impact of the COVID-19 pandemic on clinical supervision of healthcare students in rural settings: A qualitative study. *International Journal of Environmental Research and Public Health*, 19(9), 5555. <https://www.mdpi.com/1660-4601/19/9/5555>

Martin, L., Nelson, E., Rakover, J., & Chase, A. (2016). *Whole system measures 2.0: A compass for health system leaders*. Institute for Healthcare Improvement.

<https://www.ihl.org/resources/Pages/IHIWhitePapers/WholeSystemMeasures20.aspx>

Martin, S., Williams, E., Huerth, B., & Robinson, J. (2015). A pharmacy student-facilitated

interprofessional diabetes clinic with the Penobscot Nation. *Preventing Chronic Disease*, 12, Article 150295. <https://doi.org/10.5888/pcd12.150295>

Mazander, M., Rumenapp, J., Lee, D., Ong, C., Floramo, E., Benjamins, M., & Chen, M.

(2024). Quantifying the educational value of a student-run free clinic. *Family Medicine*, 56(3), 176–179. <https://doi.org/10.22454/FamMed.2024.568265>

McAllister, S., Lincoln, M., Ferguson, A., & McAllister, L. (2006). *COMPASS: Competency assessment in speech pathology*. Speech Pathology Association of Australia.

McAllister, S., Lincoln, M., Ferguson, A., & McAllister, L. (2013). Validating workplace

performance assessments in health sciences students: A case study from speech pathology. *Journal of Applied Measurement*, 14(4), 356–374. Retrieved from <https://europepmc.org/article/MED/24064577>

McAllister, L., Nagarajan, S., Scott, L., Smith, L., & Thomson, K. (2018). Developing measures of placement quality in allied health, dentistry, medicine, and pharmacy.

International Journal of Practice-Based Learning in Health and Social Care, 6(2), 31–47. <https://doi.org/10.18552/ijpblhsc.v6i2.493>

McBride, L. J., Fitzgerald, C., Costello, C., & Perkins, K. (2020). Allied health pre-entry student clinical placement capacity: Can it be sustained? *Australian Health Review*,

44(1), 39. <https://doi.org/10.1071/AH18088>

- McCloughen, A., Levy, D., Johnson, A., Nguyen, H., & McKenzie, H. (2020). Nursing students' socialisation to emotion management during early clinical placement experiences: A qualitative study. *Journal of Clinical Nursing*, 29(13–14), 2508–2520. <https://doi.org/10.1111/jocn.15270>
- McGrail, M. R., Fox, J., & Martin, P. (2024). Evaluating the importance of rural internships to subsequent medical workforce distribution outcomes: an Australian cohort study. *BMJ Open*, 14(10), e084784. <https://doi.org/10.1136/bmjopen-2024-084784>
- McIntyre, S., Novak, I., & Cusick, A. (2010). Consensus research priorities for cerebral palsy: a Delphi survey of consumers, researchers, and clinicians. *Developmental Medicine & Child Neurology*, 52(3), 270–275. <https://doi.org/10.1111/j.1469-8749.2009.03358.x>
- McTier, L., Phillips, N. M., & Duke, M. (2023). Factors influencing nursing student learning during clinical placements: A modified Delphi study. *Journal of Nursing Education*, 62(6), 333–341. <https://doi.org/10.3928/01484834-20230404-01>
- Meek, R., Morphet, J., Hood, K., Leech, M., & Sandry, K. (2013). Effect of interprofessional student-led beds on emergency department performance indicators. *Emergency Medicine Australasia*, 25(5), 427–434. <https://doi.org/10.1111/1742-6723.12118>
- Menzies, J. C., Emms, K., & Valler, T. (2021). Developing research knowledge and capability in undergraduate nurses: evaluation of targeted placements. *Journal of Research in Nursing*, 26(5), 408–424. <https://doi.org/10.1177/17449871211003112>
- Milgate, W., Copley, J., & Hill, J. (2024). Failing professional practice placements in allied health: What do we understand about the student experience? A scoping review. *Advances in Health Sciences Education*, 29(1), 301–327. <https://doi.org/10.1007/s10459-023-10243-w>
- Miller, D., Mugridge, S., Elder, M., Holt, M., & Liu, K. P. Y. (2024). Student-led activities of daily living group program in a hospital inpatient rehabilitation setting. *Australian Occupational Therapy Journal*, 71(4), 486–498. <https://doi.org/10.1111/1440-1630.12937>

- Min, E., Ekeocha, C., Howarth, M., Keller, T., Shah, Z., Shah, S., & Cooper, R. (2023). The costs of operating a student-run free clinic. *Journal of Community Health*, 48(6), 926–931. <https://doi.org/10.1007/s10900-023-01252-2>
- Mitchell, D., Maloney, S., Robinson, L., Haines, T., & Foo, J. (2025). Costs and economic impact of student-led clinics-A systematic review. *Medical Education*, 59(4), 368–381. <https://doi.org/10.1111/medu.15550>
- Mohan, D. A., & Kumar, K. (2011). A study on the satisfaction of patients with reference to hospital services. *International Journal of Business Economics & Management Research*, 1(3), 15–25. http://www.zenithresearch.org.in/images/stories/pdf/2011/Dec/ZIBEMR/2_ZIBEMR_VOL1_ISSUE3.pdf
- Moran, A., Nancarrow, S., Cosgrave, C., Griffith, A., & Memery, R. (2020). What works, why and how? A scoping review and logic model of rural clinical placements for allied health students. *BMC Health Services Research*, 20, 104. <https://doi.org/10.1186/s12913-020-05669-6>
- Moran, L., Capper, T., Gupta, M., Meedya, S., & Mendez, S. (2024). Financial hardship and Australian midwifery students: A scoping review and thematic analysis. *Women and Birth*, 37(5), 101640. <https://doi.org/10.1016/j.wombi.2024.101640>
- Morgan, D. (2007). Paradigms lost and pragmatism regained: Methodological implications of combining qualitative and quantitative methods. *Journal of Mixed Methods Research*, 1(1), 48–76. <https://doi.org/10.1177/2345678906292462>
- Mori, B., Quesnel, M., & Wojkowski, S. (2019). Students' perspectives on their experience in clinical placements: Using a modified Delphi methodology to engage physiotherapy stakeholders in revising the national form. *Physiotherapy Canada*, 71(4), 368–381. <https://doi.org/10.3138/ptc-2018-43.e>
- Moullin, J. C., Dickson, K. S., Stadnick, N. A., Albers, B., Nilsen, P., Broder-Fingert, S., Mukasa, B., & Aarons, G. A. (2020). Ten recommendations for using implementation frameworks in research and practice. *Implementation Science Communications*, 1(1), 42. <https://doi.org/10.1186/s43058-020-00023-7>

- Stalmeijer, R. E., Dolmans, D. H., Wolfhagen, I. H., Muijtens, A. M., & Scherpbier, A. J. (2010). The Maastricht Clinical Teaching Questionnaire (MCTQ) as a valid and reliable instrument for the evaluation of clinical teachers. *Academic medicine : journal of the Association of American Medical Colleges*, 85(11), 1732–1738. <https://doi.org/10.1097/ACM.0b013e3181f554d6>
- Müllersdorf, M., & Ivarsson, A. B. (2011). Occupation as described by academically skilled occupational therapists in Sweden: a Delphi study. *Scandinavian Journal of Occupational Therapy*, 18(2), 85-92. <https://doi.org/10.3109/11038128.2010.483689>
- Murry, J. W., & Hammons, J. O. (1995). Delphi: A versatile methodology for conducting qualitative research. *The Review of Higher Education*, 18(4), 423–436. <https://www.proquest.com/docview/1308044902>
- Naeem, M., Ozuem, W., Howell, K., & Ranfagni, S. (2023). A Step-by-Step Process of Thematic Analysis to Develop a Conceptual Model in Qualitative Research. *International Journal of Qualitative Methods*, 22. <https://doi.org/10.1177/16094069231205789>
- Nasa, P., Jain, R., & Juneja, D. (2021). Delphi methodology in healthcare research: How to decide its appropriateness. *World Journal of Methodology*, 11(4), 116-129. <https://doi.org/10.5662/wjm.v11.i4.116>
- National Health Information and Performance Principal Committee (NHIPPC). (2017). *The Australian health performance framework*. https://www.coaghealthcouncil.gov.au/Portals/0/OOS318_Attachment%201.pdf
- National Quality Forum. (2016). *Measure evaluation criteria and guidance for evaluating measures for endorsement*. https://www.qualityforum.org/Measuring_Performance/Submitting_Standards/2016_Measure_Evaluation_Criteria.aspx
- Nayak, B. K. (2010). Understanding the relevance of sample size calculation. *Indian Journal of Ophthalmology*, 58(6), 469–470. <https://doi.org/10.4103/0301-4738.71673>

- Negm, L., Mersal, F. A., Fawzy, M. S., Rajennal, A. T., Alanazi, R. S., & Alanazi, L. O. (2024). Challenges of nursing students during clinical training: A nursing perspective. *AIMS Public Health*, 11(2), 379-398. <https://doi.org/10.3934/publichealth.2024019>
- Newington, L., & Metcalfe, A. (2014). Factors influencing recruitment to research: qualitative study of the experiences and perceptions of research teams. *BMC Medical Research Methodology*, 14(10). <https://doi.org/10.1186/1471-2288-14-10>
- Nguyen, Q. D., Fernandez, N., Karsenti, T., & Charlin, B. (2014). What is reflection? A conceptual analysis of major definitions and a proposal of a five-component model. *Medical Education*, 48(12), 1176-1189. <https://doi.org/10.1111/medu.12583>
- Nicola-Richmond, K., Long, N., White, N., Lawson, S., & Ajjawi, R. (2025). Feedback practices in clinical placement: How students come to understand how they are progressing. *Assessment & Evaluation in Higher Education*, 50(2), 323–335. <https://doi.org/10.1080/02602938.2024.2400349>
- Nicole, M., Raymond, J., Penman, M., & McAllister, L. (2016). 12 Tips for establishing a hospital-based student-led service [version 1]. *MedEdPublish*, 5(113). <https://doi.org/10.15694/mep.2016.000113>
- Niederberger, M., & Spranger, J. (2020). Delphi technique in health sciences: A map. *Frontiers in Public Health*, 8, 457. <https://doi.org/10.3389/fpubh.2020.00457>
- Nilsson, T., Masiello, I., Broberger, E., & Wihlborg, J. (2025). Clinical education: Nursing students' experiences with multisource feedback using a digital assessment instrument in the emergency medical service – A qualitative study. *BMC Medical Education*, 25, Article 391. <https://doi.org/10.1186/s12909-025-06950-0>
- Nilvér, H., Begley, C., & Berg, M. (2017). Measuring women's childbirth experiences: A systematic review for identification and analysis of validated instruments. *BMC Pregnancy and Childbirth*, 17(1). <https://doi.org/10.1186/s12884-017-1356-y>
- Nott, M., Schmidt, D., Thomas, M., Reilly, K., Saksena, T., Kennedy, J., Hawke, C., & Christian, B. (2024). Collaborations between health services and educational institutions to develop research capacity in health services and health service staff: a

- systematic scoping review. *BMC Health Services Research*, 24(1), 1363.
<https://doi.org/10.1186/s12913-024-11836-w>
- Nuffer, W., McCollum, M., Ellis, S., & Turner, C. (2012). Further development of pharmacy student-facilitated diabetes management clinics. *American Journal of Pharmaceutical Education*, 76(3), 50. <https://doi.org/10.5688/ajpe76350>
- Nyoni, C. N., Van Dyk, L. H., & Botma, Y. (2021). Clinical placement models for undergraduate health professions students: A scoping review. *BMC Medical Education*, 21(1), 598. <https://doi.org/10.1186/s12909-021-03023-w>
- Obucina, M., Harris, N., Fitzgerald, J. A., Chaia, A., Radford, K., Rossc, A., Carr, L., & Vecchio, N. (2018). 2018–04: *The triple aim framework in the context of primary healthcare: A systematic literature review* (Working paper). Griffith University.
<https://research-repository.griffith.edu.au/items/f60c31d0-bab1-4fec-8013-543a319847e0/full>
- O'Connor, A., Liston, E., & O'Donnell, M. (2019). Student-led community placement in physiotherapy. *The Clinical Teacher*, 16(6), 593-597.
<https://doi.org/10.1111/tct.12988>
- Ojeda, V., Eppstein, A., Lozada, R., Vargas-Ojeda, A., Strathdee, S., Goodman, D., & Burgos, J. (2014). Establishing a binational student-run free-clinic in Tijuana, Mexico: A model for US-Mexico border states. *Journal of Immigrant & Minority Health*, 16(3), 546–548.
<http://ovidsp.ovid.com/ovidweb.cgi?T=JS&CSC=Y&NEWS=N&PAGE=fulltext&D=medl&AN=23371839>
- Oliveira, L. F. d., Lima, I. L. B., Trigueiro, J. v. S., Lucena, B. T. L. d., Silva, E. B. d., Nóbrega, A. d. Q. C., & Bortolozzi, K. B. (2021). The speech-language-hearing pathologist's training to work in education: What speech-language-hearing undergraduate students have to say. *Revista Cefac*, 23(1).
<https://doi.org/10.1590/1982-0216/20212318720>

- O'Reilly-Shah, V. N. (2017). Factors influencing healthcare provider respondent fatigue answering a globally administered in-app survey. *Peerj*, 5, e3785.
<https://doi.org/10.7717/peerj.3785>
- O'Sullivan, B., Hickson, H., Kippen, R., Cohen, D., Cohen, P., & Wallace, G. (2021). A framework to guide the implementation of best practice clinical learning environments in community general practice: Australia. *International Journal of Environmental Research and Public Health*, 18(4).
<https://doi.org/10.3390/ijerph18041482>
- Ouyang, D., Yuan, N., Sheu, L., Lau, G., Chen, C., & Lai, C. (2013). Community health education at student-run clinics leads to sustained improvement in patients' hepatitis B knowledge. *Journal of Community Health*, 38(3), 471–479.
<https://doi.org/10.1007/s10900-012-9631-3>
- Øvrebø, L. J., Dyrstad, D. N., & Hansen, B. S. (2022). Assessment methods and tools to evaluate postgraduate critical care nursing students' competence in clinical placement. An integrative review. *Nurse Education in Practice*, 58, 103258.
<https://doi.org/10.1016/j.nepr.2021.103258>
- Oyebode, O., Patrick, H., Walker, A., Campbell, B., & Powell, J. (2016). The ghost in the machine? The value of expert advice in the production of evidence-based guidance: A mixed methods study of the NICE interventional procedures programme. *International Journal of Technology Assessment in Health Care*, 32(1–2), 61–68.
<https://doi.org/10.1017/S0266462315000690>
- Panzer, A., Murray, R., Stewart, R., Mills, J., Beaton, N., & Larkins, S. (2016). Regional health workforce planning through action research: Lessons for commissioning health services from a case study in Far North Queensland. *Australian Journal of Primary Health*, 22(1), 63–68. <https://doi.org/10.1071/PY15149>
- Park, N., Gundlach, C., Judge, T., Batavia, A. S., & Charney, P. (2023). Expanding access to psychiatric care through universal depression screening: Lessons from an urban student-run free clinic. *Journal of Community Health*, 48(6), 932–936.
<https://doi.org/10.1007/s10900-023-01250-4>

- Patrick, C., Peach, D., Pocknee, C., Webb, F., Fletcher, M., & Pretto, G. (2008). *The WIL [Work Integrated Learning] report: A national scoping study* (Final report). Australian Learning and Teaching Council. Queensland University of Technology. <http://www.altc.edu.au> or <http://www.acen.edu.au>
- Patton, M. Q. (2015). *Qualitative research & evaluation methods: Integrating theory and practice* (4th ed.). SAGE Publications. <https://us.sagepub.com/en-us/nam/qualitative-research-evaluation-methods/book232962>
- Pearce, J., Edwards, D., Fraillon, J., Coates, H., Canny, B., & Wilkinson, D. (2015). The rationale for and use of assessment frameworks: Improving assessment and reporting quality in medical education. *Perspectives on Medical Education*, 4(3), 110–118. <https://doi.org/10.1007/s40037-015-0172-5>
- Peisah, C., Sheppard, A. J., Benbow, S. M., Loughran-Fowlds, A., Grayson, S., Gunton, J. E., Kataria, A., Lai, R., Lele, K., Quadrio, C., Wright, D. J., & McLean, L. (2023). Operationalising the family-friendly medical workplace and the development of FAM-MED, a family-friendly self-audit tool for medical systems: A Delphi consensus. *Healthcare*, 11(12), 1679. <https://doi.org/10.3390/healthcare11121679>
- Peoples, N., Gebert, J., & Clark, D. (2024). Turning good intentions into good outcomes: Ethical dilemmas at a student-run clinic and a rubric for reflective action. *Medical Humanities*, 50(1), 179–184. <https://doi.org/10.1136/medhum-2023-012695>
- Peoples, N., & Ubel, P. (2024). Are students ready to run student-run clinics? *JAMA Internal Medicine*, 185(1), 14-15. <https://doi.org/10.1001/jamainternmed.2024.4884>
- Pérez Jolles, M., Willging, C. E., Stadnick, N. A., Crable, E. L., Lengnick-Hall, R., Hawkins, J., & Aarons, G. A. (2022). Understanding implementation research collaborations from a co-creation lens: Recommendations for a path forward. *Frontiers in Health Services*, 2. <https://doi.org/10.3389/frhs.2022.942658>
- Perkins, D., & Daly, M. (2013). What is the evidence for clinical placements in underserved areas? *Medical Education*, 47(10), 958-960. <https://doi.org/10.1111/medu.12271>

- Phillips, E. C., Smith, S. E., Tallentire, V., & Blair, S. (2024). Systematic review of clinical debriefing tools: attributes and evidence for use. *BMJ Quality & Safety*, 33(3), 187–198. <https://doi.org/10.1136/bmjqs-2022-015464>
- Playford, D., & Puddey, I. B. (2017). Interest in rural clinical school is not enough: Participation is necessary to predict an ultimate rural practice location. *Australian Journal of Rural Health*, 25(4), 210-218. <https://doi.org/10.1111/ajr.12324>
- Podsakoff, P. M., MacKenzie, S. B., & Podsakoff, N. P. (2012). Sources of method bias in social science research and recommendations on how to control it. *Annual Review of Psychology*, 63, 539–569. <https://doi.org/10.1146/annurev-psych-120710-100452>
- Portela, M., Pronovost, P., Woodcock, T., Carter, P., & Dixon-Woods, M. (2015). How to study improvement interventions: A brief overview of possible study types. *BMJ Quality & Safety*, 24(5), 325–336. <https://doi.org/10.1136/bmjqs-2014-003620>
- Powell, S. K., Gibson, C. L., Okoroafor, I., Hernandez-Antonio, J., Nabel, E. M., Meah, Y. S., & Katz, C. L. (2021). On-site prescription dispensing improves antidepressant adherence among uninsured depressed patients. *Psychiatric Quarterly*, 92(3), 1093-1107. <https://doi.org/10.1007/s11126-021-09885-z>
- Powell, S. K., Saali, A., Frere, J., Magill, E., Krystal, H., Serafini, R. A., Sultana, S., Dale, B., Ali, M., Kumar, V., Datta, D., Hernandez-Antonio, J., Aronson, A., Meah, Y. S., Gluhoski, V., & Katz, C. L. (2022). Design of and outcomes in a student-run free mental health clinic serving the uninsured in East Harlem. *BMC Psychiatry*, 22(1), 501. <https://doi.org/10.1186/s12888-022-04112-w>
- Prestes Vargas, J., Smith, M., Chipchase, L., & Morris, M. E. (2025). Impact of interprofessional student led health clinics for patients, students and educators: A scoping review. *Advances in Health Sciences Education*, 30(2), 321–345. <https://doi.org/10.1007/s10459-024-10342-2>
- Prikshat, V., Kumar, S., & Nankervis, A. (2019). Work-readiness integrated competence model. *Education + Training*, 61(5), 568–589. <https://doi.org/10.1108/ET-05-2018-0114>

- Prior, M., McManus, M., White, P., & Davidson, L. (2014). Measuring the “triple aim” in transition care: A systematic review. *Pediatrics*, 134(6), e1648–e1661. <https://doi.org/10.1542/peds.2014-1704>
- Ragsdale, J., Berry, A., Gibson, J., Herber-Valdez, C., Germain, L., & Engle, D. (2020). Evaluating the effectiveness of undergraduate clinical education programs. *Medical Education Online*, 25(1), 1757883. <https://doi.org/10.1080/10872981.2020.1757883>
- Rasmussen, S., Sperling, P., Poulsen, M. S., Emmersen, J., & Andersen, S. (2020). Medical students for health-care staff shortages during the COVID-19 pandemic. *The Lancet*, 395(10234), e79–e80. [https://doi.org/10.1016/S0140-6736\(20\)30923-5](https://doi.org/10.1016/S0140-6736(20)30923-5)
- Rees, C. S., Breen, L. J., Cusack, L., & Hegney, D. (2015). Understanding individual resilience in the workplace: the international collaboration of workforce resilience model. *Frontiers in Psychology*, 6, 73. <https://doi.org/10.3389/fpsyg.2015.00073>
- Reeve, C., Humphreys, J., & Wakerman, J. (2015). A comprehensive health service evaluation and monitoring framework. *Evaluation and Program Planning*, 53, 91–98. <https://doi.org/10.1016/j.evalprogplan.2015.08.006>
- Reid, M. J., Kramer, E., Iakovidis, A., Harris, J. B., Kronlage, R. M., Stanley, A., & Holland, C. (2024). Decreasing patient visit length at a student-run free clinic via a continuous quality improvement project. *Cureus*, 16(8), e66511. <https://doi.org/10.7759/cureus.66511>
- Robinson, T., Bailey, C., Morris, H., Burns, P., Melder, A., Croft, C., Spyridonidis, D., Bismantara, H., Skouteris, H., & Teede, H. (2020). Bridging the research–practice gap in healthcare: a rapid review of research translation centres in England and Australia. *Health Research Policy and Systems*, 18(1), 117. <https://doi.org/10.1186/s12961-020-00621-w>
- Robertson, I. T., Cooper, C. L., Sarkar, M., & Curran, T. (2015). Resilience training in the workplace from 2003 to 2014: A systematic review. *Journal of Occupational and Organizational Psychology*, 88(3), 533–562. <https://doi.org/10.1111/joop.12120>

- Robertson, S., Thomson, K., & Bannigan, K. (2024). Characteristics of student-led clinics in the allied health professions: Protocol for a scoping review. *JMIR Research Protocols*, 13, e58084. <https://doi.org/10.2196/58084>
- Rockey, N. G., Weiskittel, T. M., Linder, K. E., Ridgeway, J. L., & Wieland, M. L. (2021). A mixed methods study to evaluate the impact of a student-run clinic on undergraduate medical education. *BMC Medical Education*, 21(1), 182. <https://doi.org/10.1186/s12909-021-02621-y>
- Rodger, S., Turpin, M., Copley, J., Coleman, A., Chien, C.-R., Caine, A.-M., & Brown, T. (2014). Student practice evaluation form-revised edition online comment bank: development and reliability analysis. *Australian Occupational Therapy Journal*, 61(4), 241-248. <https://doi.org/10.1111/1440-1630.12115>
- Rodger, S., Webb, G., Devitt, L., Gilbert, J., Wrightson, P., & McMeeken, J. (2008). Clinical education and practice placements in the allied health professions: An international perspective. *Journal of Allied Health*, 37(1), 53–62. <https://www.jstor.org/stable/48721557>
- Roff, S., McAleer, S., Harden, R. M., Al-Qahtani, M., Ahmed, A. U., Deza, H., ... Primparyon, P. (1997). Development and validation of the Dundee Ready Education Environment Measure (DREEM). *Medical Teacher*, 19(4), 295–299. <https://doi.org/10.3109/01421599709034208>
- Ross, S., Hauer, K., & van Melle, E. (2018). Outcomes are what matter: Competency-based medical education gets us to our goal. *MedEdPublish*, 7, 85. <https://doi.org/10.15694/mep.2018.0000085.1>
- Ross, P. T., & Bibler Zaidi, N. L. (2019). Limited by our limitations. *Perspectives on Medical Education*, 8(4), 261-264. <https://doi.org/10.1007/s40037-019-00530-x>
- Ross-Hellauer, T., Tennant, J. P., Banelytė, V., Gorogh, E., Luzi, D., Kraker, P., Pisacane, L., Ruggieri, R., Sifacaki, E., & Vignoli, M. (2020). Ten simple rules for innovative dissemination of research. *PLoS Computational Biology*, 16(4), e1007704. <https://doi.org/10.1371/journal.pcbi.1007704>

- Rothwell, C., Kehoe, A., Farook, S. F., & Illing, J. (2021). Enablers and barriers to effective clinical supervision in the workplace: a rapid evidence review. *BMJ open*, 11(9), e052929. <https://doi.org/10.1136/bmjopen-2021-052929>
- Rowe, G., & Wright, G. (2001). Expert opinions in forecasting: The role of the Delphi technique. In J. S. Armstrong (Ed.), *Principles of forecasting: A handbook for researchers and practitioners* (pp. 125–144). Springer. https://doi.org/10.1007/978-0-306-47630-3_7
- Rowland, E., & Trueman, H. (2024). Improving healthcare student experience of clinical placements. *BMJ Open Quality*, 13(1). <https://doi.org/10.1136/bmjopen-2023-002504>
- Russell, D., Mathew, S., Fitts, M., Liddle, Z., Murakami-Gold, L., Campbell, N., Ramjan, M., Zhao, Y., Hines, S., Humphreys, J. S., & Wakerman, J. (2021). Interventions for health workforce retention in rural and remote areas: A systematic review. *Human Resources for Health*, 19(1), 103. <https://doi.org/10.1186/s12960-021-00643-7>
- Saarikoski, M., Isoaho, H., Warne, T., & Leino-Kilpi, H. (2008). The nurse teacher in clinical practice: Developing the new sub-dimension to the clinical learning environment and supervision (CLES) scale. *International Journal of Nursing Studies*, 45(8), 1233–1237. <https://doi.org/10.1016/j.ijnurstu.2007.07.009>
- Salbach, N., & Jaglal, S. (2011). Creation and validation of the evidence-based practice confidence (EPIC) scale for health care professionals. *Journal of Evaluation in Clinical Practice*, 17(4), 794–800. <https://doi.org/10.1111/j.1365-2753.2010.01478.x>
- Sand-Jecklin, K., Rogers, T., & Wang, K. (2023). Student evaluation of the clinical education environment: Development and testing of the SECEE version 4. *Journal of Nursing Measurement*, 31(1), 37–54. <https://doi.org/10.1891/JNM-2021-0026>
- Schoenfelder, T., Klewer, J., & Kugler, J. (2011). Determinants of patient satisfaction: A study among 39 hospitals in an in-patient setting in Germany. *International Journal for Quality in Health Care*, 23(5), 503–509. <https://doi.org/10.1093/intqhc/mzr038>
- Schutte, T., Tichelaar, J., Dekker, R. S., van Agtmael, M. A., de Vries, T. P., & Richir, M. C. (2015). Learning in student-run clinics: A systematic review. *Medical Education*, 49(3), 249–263. <https://doi.org/10.1111/medu.12625>

- Schutte, T., Tichelaar, J., Donker, E., Richir, M. C., Westerman, M., & van Agtmael, M. A. (2018). Clarifying learning experiences in student-run clinics: A qualitative study. *BMC Medical Education*, 18(1), 244. <https://doi.org/10.1186/s12909-018-1352-6>
- Sealey, R., Raymond, J., Groeller, H., Rooney, K., Crabb, M., & Watt, K. (2015). Supporting placement supervision in clinical exercise physiology. *Asia-Pacific Journal of Cooperative Education*, 16(1), 53–69. <https://hdl.handle.net/10779/uow.27705783.v1>
- Seif, G., Coker-Bolt, P., Kraft, S., Gonsalves, W., Simpson, K., & Johnson, E. (2014). The development of clinical reasoning and interprofessional behaviors: Service-learning at a student-run free clinic. *Journal of Interprofessional Care*, 28(6), 559–564. <https://doi.org/10.3109/13561820.2014.921899>
- Shannon-Baker, P. (2023). Philosophical underpinnings of mixed methods research in education. In R. J. Tierney, F. Rizvi, & K. Ercikan (Eds.), *International Encyclopedia of Education (Fourth Edition)* (pp. 380–389). Elsevier. <https://doi.org/https://doi.org/10.1016/B978-0-12-818630-5.11037-1>
- Shea, C., Turner, K., Albritton, J., & Reiter, K. (2018). Contextual factors that influence quality improvement implementation in primary care: The role of organizations, teams, and individuals. *Health Care Management Review*, 43(3), 261–269. <https://doi.org/10.1097/hmr.000000000000194>
- Sheepway, L., Lincoln, M., & McAllister, S. (2013). Impact of placement type on the development of clinical competency in speech-language pathology students. *International Journal of Language & Communication Disorders*, 49(2), 189–203. <https://doi.org/10.1111/1460-6984.12059>
- Shrivastava, S., & Shrivastava, P. (2022). The necessity, barriers and strategies to overcome the barriers in evaluation in medical education. *Journal of Dr. NTR University of Health Sciences*, 11, 161–165. https://doi.org/10.4103/jdrntruhs.jdrntruhs_112_21
- Siggins Miller Consultants. (2012). *Promoting quality in clinical placements: Literature review and national stakeholder consultation*. Health Workforce Australia. <https://www.adea.com.au/wp-content/uploads/2013/08/Promoting-quality-in-clinical-placements-report-20130408.pdf>

- Sikka, R., Morath, J., & Leape, L. (2015). The quadruple aim: Care, health, cost, and meaning in work. *BMJ Quality & Safety*, 24(10), 608–610. <https://doi.org/10.1136/bmjqs-2015-004160>
- Simon, M. E., Reuter, Z. C., Fabricius, M. M., Hitchcock, N. M., & Pierce, R. P. (2022). Diabetes control in a student-run free clinic during the COVID-19 pandemic. *Journal of Community Health*, 47(5), 835-840. <https://doi.org/10.1007/s10900-022-01117-0>
- Simmons, B., DeJoseph, D., Diamond, J., & Weinstein, L. (2009). Students who participate in a student-run free health clinic need education about access to care issues. *Journal of Health Care for the Poor & Underserved*, 20(4), 964–968. <https://doi.org/10.1353/hpu.0.0225>
- Simmons, L., Barker, R., & Barnett, F. (2023). Evaluating allied health clinical placement performance: Protocol for a modified Delphi study. *JMIR Research Protocols*, 12, e44020. <https://doi.org/10.2196/44020>
- Simmons, L., Barker, R., Barnett, F., & McGuckin, T. (2024). Evaluating clinical placement performance: What is important to measure? In *ANZAHPE 2024: Cultivating Innovation Abstract Book* (p. 183). ANZAHPE. Abstract presented at the ANZAHPE 2024 Festival, 1–4 July, Adelaide, SA, Australia.
- Simmons, L., Barker, R., Barnett, F., & McGuckin, T. (2025). Evaluating clinical placement performance in allied health student-led healthcare services: *Australian Journal of Clinical Education*, 14(1), 19–45. <https://doi.org/10.53300/001c.136339>
- Simmons, L., Callander, E., Barker, R., & Barnett, F. (2022). Measuring health outcomes, experience of care and cost of healthcare in student-led healthcare services: A literature review. *Focus on Health Professional Education a Multi-Professional Journal*, 23(1), 37-64. <https://doi.org/10.11157/fohpe.v23i1.389>
- Simpson, S., & Long, J. (2007). Medical student-run health clinics: Important contributors to patient care and medical education. *Journal of General Internal Medicine*, 22(3), 352–356. <https://doi.org/10.1007/s11606-006-0073-4>
- Skaalvik, M. W., Normann, H. K., & Henriksen, N. (2011). Clinical learning environment and supervision: Experiences of Norwegian nursing students – a questionnaire survey.

Journal of Clinical Nursing, 20(15-16), 2294-2304. <https://doi.org/10.1111/j.1365-2702.2011.03727.x>

- Skjevik, E. P., Schei, E., Boudreau, J. D., Tjølsen, A., Ringberg, U., Fuks, A., Kvernenes, M., & Ofstad, E. H. (2024). What makes mentors thrive? An exploratory study of their satisfaction in undergraduate medical education. *BMC Medical Education*, 24(1), 372. <https://doi.org/10.1186/s12909-024-05344-y>
- Smith, C., & Curtis, L. J. (2020). Scaffolding learners' self-regulation in workplace learning: design of a pedagogical pattern for placements. *Journal of Vocational Education & Training*, 72(3), 396-414. <https://doi.org/10.1080/13636820.2019.1612936>
- Smith, E. J., Morrell-Scott, N., Roberts, D., & Jones, I. (2024). Research in action-developing and evaluating a student research placement experience. *Nurse Education Today*, 133, 106049. <https://doi.org/10.1016/j.nedt.2023.106049>
- Smith, B., Robson, K., Robinson, C., & Patton, N. (2023). Factors influencing provision of clinical placements for health students: A scoping review. *Focus on Health Professional Education: A Multi-Professional Journal*, 24(2), 63–103. <https://doi.org/10.11157/fohpe.v24i2.562>
- Smith, S., Smith, C., & Caddell, M. (2015). Can pay, should pay? Exploring employer and student perceptions of paid and unpaid placements. *Active Learning in Higher Education*, 16(2), 149-164. <https://doi.org/10.1177/1469787415574049>
- Smith, S., Thomas, R., Cruz, M., Griggs, R., Moscato, B., & Ferrara, A. (2014). Presence and characteristics of student-run free clinics in medical schools. *JAMA*, 312(22), 2407–2410. <https://doi.org/10.1001/jama.2014.16066>
- Snowdon, D., Leggat, S., & Taylor, N. (2017). Does clinical supervision of healthcare professionals improve effectiveness of care and patient experience? A systematic review. *BMC Health Services Research*, 17(1), 786. <https://doi.org/10.1186/s12913-017-2739-5>
- Sridhar, S., Régner, I., Brouqui, P., & Gautret, P. (2016). Methodologies for measuring travelers' risk perception of infectious diseases: A systematic review. *Travel Medicine and Infectious Disease*, 14(4), 360-372. <https://doi.org/10.1016/j.tmaid.2016.05.012>

- Stiefel, M., & Nolan, K. (2012). *A guide to measuring the Triple Aim: Population health, experience of care, and per capita cost*. Institute for Healthcare Improvement. Retrieved from <https://www.ihl.org/resources/Pages/IHIWhitePapers/AGuidetoMeasuringTripleAim.aspx>
- Stuhlmiller, C., & Tolchard, B. (2015). Developing a student-led health and wellbeing clinic in an underserved community: Collaborative learning, health outcomes and cost savings. *BMC Nursing*, 14(1), 1–8. <https://doi.org/10.1186/s12912-015-0083-9>
- Stuhlmiller, C., & Tolchard, B. (2018). Population health outcomes of a student-led free health clinic for an underserved population: A naturalistic study. *Journal of Community Health*, 43(1), 193–200. <https://doi.org/10.1007/s10900-017-0402-z>
- Suen, J., Attrill, S., Thomas, J., Smale, M., Delaney, C., & Miller, M. (2020). Effect of student-led health interventions on patient outcomes for those with cardiovascular disease or cardiovascular disease risk factors: A systematic review. *BMC Cardiovascular Disorders*, 20(1), 332. <https://doi.org/10.1186/s12872-020-01602-1>
- Sultan, R., van den Beukel, T. O., Reumerman, M. O., Daelmans, H. E. M., Springer, H., Grijmans, E., Muller, M., Richir, M. C., van Agtmael, M. A., & Tichelaar, J. (2022). An interprofessional student-run medication review program: The clinical STOPP/START-based outcomes of a controlled clinical trial in a geriatric outpatient clinic. *Clinical Pharmacology & Therapeutics*, 111(4), 931–938. <https://doi.org/10.1002/cpt.2475>
- Swartz, M. K. (2012). The contributions of student-run free clinics. *Journal of Pediatric Health Care*, 26(6), 397. <https://doi.org/10.1016/j.pedhc.2012.07.015>
- Tai, J., Ajjawi, R., Boud, D., Dawson, P., & Panadero, E. (2018). Developing evaluative judgement: enabling students to make decisions about the quality of work. *Higher Education*, 6, 467–481. <https://doi.org/10.1007/s10734-017-0220-3>
- Teddlie, C., & Tashakkori, A. (2009). *Foundations of mixed methods research: Integrating quantitative and qualitative approaches in the social and behavioral sciences*. SAGE Publications.

- Thackrah, R. D., & Thompson, S. (2019). Learning from follow-up of student placements in a remote community: A small qualitative study highlights personal and workforce benefits and opportunities. *BMC Medical Education*, 19(1), 331. <https://doi.org/10.1186/s12909-019-1751-3>
- Thakkar, A. B., Chandrashekar, P., Wang, W., & Blanchfield, B. B. (2019). Impact of a student-run clinic on emergency department utilization. *Family Medicine*, 51(5), 420–423. <https://doi.org/10.22454/FamMed.2019.477798>
- Thampy, H., Willert, E., & Ramani, S. (2019). Assessing clinical reasoning: Targeting the higher levels of the pyramid. *Journal of General Internal Medicine*, 34(8), 1631–1636. <https://doi.org/10.1007/s11606-019-04953-4>
- Ti-enkawol Nachinab, G., & Armstrong, S. J. (2024). The development of a framework for clinical education programme of undergraduate nursing students in Ghana. *BMC Nursing*, 23(1), 263. <https://doi.org/10.1186/s12912-024-01915-y>
- Tokolahi, E., Broman, P., Longhurst, G., Pearce, A., Cook, C., Andersen, P., & Brownie, S. (2021). Student-led clinics in Aotearoa New Zealand: A scoping review with stakeholder consultation. *Journal of Multidisciplinary Healthcare*, 14, 2053–2066. <https://doi.org/10.2147/jmdh.S308032>
- Tsingos, C., Bosnic-Anticevich, S., Lonie, J. M., & Smith, L. (2015). A model for assessing reflective practices in pharmacy education. *American Journal of Pharmaceutical Education*, 79(8), 124. <https://doi.org/10.5688/ajpe798124>
- Universities Australia. (2022). *More clinical placements needed to meet health workforce demands*. Universities Australia. <https://universitiesaustralia.edu.au/media-item/more-clinical-placements-needed-to-meet-health-workforce-demands/>
- University of Queensland, School of Health and Rehabilitation Sciences. (2012). *Improving quality in practice placements – Allied health (iQIPP-AH) guides*. University of Queensland.
- Usher, K., Fagan, A., Brown, J. A., Mather, C., Marlow, A., Power, T., van de Mortel, T., West, C., Hutchinson, M., Zhao, L., Terry, V., Woods, C., & Lea, J. (2022). The financial challenges for Australian nursing students attending placement-based work-

integrated learning. *Collegian*, 29(2), 154-160.

<https://doi.org/10.1016/j.colegn.2021.07.005>

Vahidi, M., Jalilian Khav, L., Sanadgol, G., Shirini, D., & Karamouzian, M. (2020). Student-led initiatives' potential in the COVID-19 response in Iran. *International Journal of Health Policy and Management*, 9(10), 464–465.
<https://doi.org/10.34172/ijhpm.2020.82>

Valaitis, R. K., Wong, S. T., MacDonald, M., Martin-Misener, R., O'Mara, L., Meagher-Stewart, D., Isaacs, S., Murray, N., Baumann, A., Burge, F., Green, M., Kaczorowski, J., & Savage, R. (2020). Addressing quadruple aims through primary care and public health collaboration: Ten Canadian case studies. *BMC Public Health*, 20(1), Article 507. <https://doi.org/10.1186/s12889-020-08610-y>

Valentine, N., Durning, S. J., Shanahan, E. M., & Schuwirth, L. (2023). Fairness in assessment: Identifying a complex adaptive system. *Perspectives on Medical Education*, 12(1), 315–326. <https://doi.org/10.5334/pme.993>

Veugelers, R., Gaakeer, M. I., Patka, P., & Huijsman, R. (2020). Improving design choices in Delphi studies in medicine: the case of an exemplary physician multi-round panel study with 100% response. *BMC Medical Research Methodology*, 20(1), 156.
<https://doi.org/10.1186/s12874-020-01029-4>

Volvovsky, M., Vodopyanov, D., & Inglehart, M. R. (2014). Dental students and faculty members' attitudes towards care for underserved patients and community service: Do community-based dental education and voluntary service-learning matter? *Journal of Dental Education*, 78(8), 1127-1138. <https://doi.org/10.1002/j.0022-0337.2014.78.8.tb05783.x>

von der Gracht, H. A. (2012). Consensus measurement in Delphi studies: Review and implications for future quality assurance. *Technological Forecasting and Social Change*, 79(8), 1525–1536. <https://doi.org/10.1016/j.techfore.2012.04.013>

Wahle, B., Meyer, K., Faller, M., Kochhar, K., & Sevilla, J. (2017). Assessment of hypertension management and outcomes at an Indianapolis student-run free clinic.

Journal of Health Care for the Poor and Underserved, 28(2), 694–706.

<https://doi.org/10.1353/hpu.2017.0068>

- Walker, C., & Forbes, R. (2022). The impact of rural nursing and midwifery clinical placements from the perspective of health service staff. *Australian Journal of Rural Health*, 31(2), 256-265. <https://doi.org/10.1111/ajr.12943>
- Walugembe, D., Sibbald, S., Le Ber, M., & Kothari, A. (2019). Sustainability of public health interventions: Where are the gaps? *Health Research Policy and Systems*, 17(1), 8. <https://doi.org/10.1186/s12961-018-0405-y>
- Warne, T., Johansson, U.-B., Papastavrou, E., Tichelaar, E., Tomietto, M., Bossche, K., Vizcaya-Moreno, M. F., & Saarikoski, M. (2010). An exploration of the clinical learning experience of student nurses in nine European countries. *Nurse Education Today*, 30, 809-815. <https://doi.org/10.1016/j.nedt.2010.03.003>
- Webster, S., Lopez, V., Allnut, J., Clague, L., Jones, D., & Bennett, P. (2010). Undergraduate nursing students' experiences in a rural clinical placement. *Australian Journal of Rural Health*, 18(5), 194–198. <https://doi.org/10.1111/j.1440-1584.2010.01153.x>
- Welsh, R. O., & Swain, W. A. (2020). (Re)Defining urban education: A conceptual review and empirical exploration of the definition of urban education. *Educational Researcher*, 49(2), 90-100. <https://doi.org/10.3102/0013189X20902822>
- West, C. (2015). Physician well-being: Expanding the Triple Aim. *Journal of General Internal Medicine*, 31(5), 458–459. <https://doi.org/10.1007/s11606-016-3641-2>
- Whitworth, A., Haining, S., & Stringer, H. (2012). Enhancing research capacity across healthcare and higher education sectors: development and evaluation of an integrated model. *BMC Health Services Research*, 12(1), 287. <https://doi.org/10.1186/1472-6963-12-287>
- Williams, J., Walker, R., & Egede, L. (2016). Achieving equity in an evolving healthcare system: Opportunities and challenges. *American Journal of the Medical Sciences*, 351(1), 33–43. <https://doi.org/10.1016/j.amjms.2015.10.012>

- Willis, G., Smith, T., & Lee, H. J. (2013). Do additional recontacts to increase response rate improve physician survey data quality? *Medical Care*, 51(10), 945-948. <https://doi.org/10.1097/MLR.0b013e3182a5023d>
- Wilson, O. W. A., Broman, P., Tokolahi, E., Andersen, P., & Brownie, S. (2023). Learning outcomes from participation in student-run health clinics: A systematic review. *Journal of Multidisciplinary Healthcare*, 16, 143–157. <https://doi.org/10.2147/JMDH.S385709>
- Wolfgang, R., Wakely, L., Smith, T., Burrows, J., Little, A., & Brown, L. (2019). Immersive placement experiences promote rural intent in allied health students of urban and rural origin. *Journal of Multidisciplinary Healthcare*, 12, 699–710. <https://doi.org/10.2147/jmdh.S214120>
- Wong, E., Mavondo, F., & Fisher, J. (2020). Patient feedback to improve quality of patient-centred care in public hospitals: A systematic review of the evidence. *BMC Health Services Research*, 20(1), 530. <https://doi.org/10.1186/s12913-020-05383-3>
- World Health Organization. (2007). *Everybody's business: Strengthening health systems to improve health outcomes—WHO's framework for action*. <https://www.who.int/publications/i/item/everybody-s-business----strengthening-health-systems-to-improve-health-outcomes>
- Wray, N., & McCall, L. (2007). Money matters: Students' perceptions of the costs associated with placements. *Medical Education*, 41(10), 975–981. <https://doi.org/10.1111/j.1365-2923.2007.02840.x>
- Wright, A., Moss, P., Dennis, D. M., Harrold, M., Levy, S., Furness, A. L., & Reubenson, A. (2018). The influence of a full-time, immersive simulation-based clinical placement on physiotherapy student confidence during the transition to clinical practice. *Advances in Simulation*, 3, 3. <https://doi.org/10.1186/s41077-018-0062-9>
- Wynne, D., & Cooper, K. (2023). Students' perceptions of a UK physiotherapy student-led clinic. *The Clinical Teacher*, 20(6). <https://doi.org/10.1111/tct.13603>
- Yale, S. H., Liang, H., Schmelzer, J. R., Poplau, S., Bell, L., Toklu, H. Z., Brown, R., Williams, E. S., & Linzer, M. (2018). Factors associated with participation and

completion of a survey-based study. *International Journal of Health Care Quality Assurance*, 31(8), 888-895. <https://doi.org/10.1108/IJHCQA-02-2017-0029>

Yu, S.-R., Cheng, Y.-C., Tseng, H.-M., Chang, Y.-C., Ma, S.-D., Huang, C.-D., Hsieh, M.-J., Fang, J.-T., & Chaou, C.-H. (2021). Undergraduates' preparedness for practice is associated with professional identity and perception of educational environment: A validation study. *Biomedical Journal*, 44(4), 495–503. <https://doi.org/10.1016/j.bj.2020.04.009>

Zarei, F., Dehghani, A., Ratansiri, A., Ghaffari, M., Raina, S. K., Halimi, A., Rakhshanderou, S., Isamel, S. A., Amiri, P., Aminafshar, A., & Mosavi Jarrahi, A. (2024). ChecKAP: A checklist for reporting a knowledge, attitude, and practice (KAP) study. *Asian Pacific Journal of Cancer Prevention*, 25(7), 2573–2577. <https://doi.org/10.31557/APJCP.2024.25.7.2573>

Zhang, J., Shields, L., Ma, B., Yin, Y., Wang, J., Zhang, R., & Hui, X. (2022). The clinical learning environment, supervision, and future intention to work as a nurse in nursing students: A cross-sectional and descriptive study. *BMC Medical Education*, 22(1), 548. <https://doi.org/10.1186/s12909-022-03609-y>

Zhou, C., Fruitman, K., Szwed, S., Wickersham, M., Spellun, J., & Zonana, J. (2022). Weill Cornell medicine wellness qlinic: Adapting the student-run clinic model to expand mental health services and medical education. *Community Mental Health Journal*, 58(7), 1244-1251. <https://doi.org/10.1007/s10597-022-00943-9>

10.0 Appendices

10.1 Appendix 1:

Simmons, L. M., Callander, E., Barker, R., & Barnett, F. (2022). Measuring health outcomes, experience of care and cost of healthcare in student-led healthcare services: A literature review. *Focus on Health Professional Education*, 23(1), 37–64.
<https://doi.org/10.11157/fohpe.v23i1.389>

Measuring health outcomes, experience of care and cost of healthcare in student-led healthcare services: A literature review

L. Simmons¹, E. Callander², R. Barker³ & F. Barnett¹

Abstract

Introduction: In student-led healthcare services, health students take responsibility for the management and delivery of health services as part of clinical training. Like all healthcare services, student-led healthcare services need to be evaluated to ensure they provide high quality, safe and cost-effective services. The aim of this literature review was to understand how student-led healthcare services have been evaluated to date and to assess alignment of previous evaluations with the Triple Aim framework. The Triple Aim is a conceptual framework offering a systematic approach to evaluating healthcare services that may be appropriate for evaluation of student-led services.

Methods: Electronic databases were searched for articles describing a student-led healthcare service and were screened for studies that evaluated the impact of a student-led healthcare service on patient outcomes. Critical appraisal was informed by Stiefel and Nolan's (2012) IHI white paper *A Guide to Measuring the "Triple Aim"*, and each article was appraised against the Triple Aim measurement principles and dimensions of care.

Results: Fourteen of 211 identified articles met the inclusion criteria. All 14 studies met the Triple Aim measurement principles of "a defined population", "gather data over time" and "distinguish between measures", while only eight of the 14 studies achieved "comparison data". All 14 studies measured at least one or more of the Triple Aim dimensions.

Conclusions: There was little consistency across the evaluations of student-led healthcare services, limiting the extent to which the benefits of student-led healthcare services can be shown to be a valuable resource to the healthcare system. Further investigation is required to determine a suitable evaluation framework for student-led healthcare services.

Keywords: student-led healthcare service; Triple Aim; population health; patient experience; cost of care; evaluation; quality improvement

¹ College of Healthcare Sciences, James Cook University, Townsville, Australia

² School of Public Health and Preventive Medicine, Monash University, Melbourne, Australia

³ College of Healthcare Sciences, James Cook University, Cairns, Australia

Correspondence

Lisa Simmons

Email: lisa.simmons2@jcu.edu.au

Introduction

In Australia, there are hard to reach and underserved communities who experience inadequate access to healthcare (Stuhlmiller & Tolchard, 2018). People living in rural and remote areas of Australia generally experience lower life expectancy, higher rates of disease and injury and poorer access to healthcare services than people living in metropolitan areas of Australia (AIHW, 2020). There are growing concerns over differences in health outcomes for these communities, and there is a need to identify unique models of healthcare delivery that will address health disparities (Kenny et al., 2013). Student-led healthcare services are one possible solution to an “increasingly fractured health system, rising costs, huge needs of underserved populations, and limited access to care” (Stuhlmiller & Tolchard, 2018, p. 193).

In student-led healthcare services, health students take responsibility for the management and delivery of health services as part of their clinical training (Stuhlmiller & Tolchard, 2018; Suen et al., 2020). Student-led healthcare services vary from other forms of service-based learning in that they are purposely designed to provide continuous healthcare services to the community. Exposure to real-life clinical environments through clinical placement is integral to preparing healthcare students for practice (Atakro et al., 2019). Authentic environments such as those provided within student-led healthcare services allow students to improve their understanding of the social determinants of health and other barriers to healthcare access (Rockey et al., 2021), while contributing to the development of competency within the healthcare systems they intend to practise in (Froberg et al., 2018). However, to substantiate student-led healthcare services as quality providers of clinical education and promote their use as clinical placements, student-led healthcare services must be first substantiated as quality providers of healthcare.

Another purpose of student-led healthcare services is to fill the gaps in healthcare service provision in areas where attracting healthcare professionals may be difficult (Stuhlmiller & Tolchard, 2015). This is crucial in regional, rural and remote areas, where retaining healthcare professionals with varying levels of expertise is difficult, supporting the need for healthcare systems to move away from traditional models of healthcare and adopt innovative systems of healthcare practice (Panzer et al., 2016). Despite the potential benefits that student-led healthcare services can provide to underserved communities, there are challenges in successfully establishing and operating these unique healthcare services. Primarily, students on placement within student-led healthcare services may not have the knowledge or experience necessary to care for patients effectively (Atakro et al., 2019; Simmons et al., 2009). However, when a student is provided with support and gradual exposure to the healthcare environment, competence can improve, influencing the overall quality of the services they provide (Manoochehri et al., 2015; Simmons et al., 2009).

To justify and validate student-led healthcare services as both providers of care and clinical education, evaluation of student-led healthcare services is growing. Initial studies have found that student-led healthcare services contribute to student learning and result in health improvements and patient satisfaction (Clark et al., 2014; Ouyang et al., 2012; Schutte et al., 2018). However, whether student-led healthcare services produce equivalent health outcomes when compared to their professional counterparts is still unknown, with many studies lacking the research design to answer this question (Clark et al., 2014).

Student-led healthcare services also face challenges of financial viability (Frakes, Brownie, et al., 2014; Kent, Drysdale, et al., 2014; Ojeda et al., 2014). A potential risk to the sustainability of student-led healthcare services is the ongoing need to demonstrate their feasibility to funders, with a successful bid being sensitive to stakeholders' powers and priorities (Frakes, Brownie, et al., 2014). Threats to service continuity are a concern for under-resourced regions relying on student-led healthcare services. Accordingly, consideration must be given to financial sustainability in the ongoing management of student-led healthcare services. Like all healthcare services, student-led healthcare services should also be subject to rigorous performance assessment through audit and evaluation processes to ensure services provided to the community are delivered at a professional standard. To ensure student-led healthcare services maintain high standards of care and operation, an evaluation framework used to ensure quality of mainstream healthcare services is also applicable to student-led healthcare services.

The Institute of Healthcare Improvement (IHI) adopted the "Triple Aim" as a performance framework to reinvigorate a focus on quality in healthcare (Stiefel & Nolan, 2012) and is an overarching framework that guides healthcare services on what is important to measure when evaluating healthcare. The Triple Aim includes three domains of measurement: population health, experience of care and per capita cost (Stiefel & Nolan, 2012). To measure population health, the Triple Aim stipulates factors influencing health as either upstream or downstream determinants—with individual factors such as behavioural and psychological factors describing upstream factors, disease burden and health and function demonstrating more intermediate outcomes and quality of life (QoL) and mortality demonstrating more downstream health outcomes (Evans & Stoddart, 1990). To measure experience of care, the Triple Aim promotes the patient as being best placed to assess their experience of care and recommends the use of patient satisfaction surveys looking at likelihood to recommend, quality and satisfaction of healthcare received (Stiefel & Nolan, 2012). To assess experience of care from a provider's perspective, the Triple Aim promotes using the Institute of Medicine's (IOM) (2001) six aims of improvement, focusing on safe, effective, patient-centred, equitable, timely and efficient healthcare. The Triple Aim considers three perspectives when measuring per capita cost: the supply lens (hospitals, community healthcare services, etc.), the demand lens (consumers and/or purchasers of

services) and the intermediary lens (health insurers). The summation of costs from all three lenses is the total cost of care (Stiefel & Nolan, 2012).

The Triple Aim framework allows different healthcare services to use different methods of evaluation to achieve the Triple Aim while providing consistent information about healthcare service performance. The benefit of using the Triple Aim framework in comparison to other approaches to healthcare service evaluation is that it can be applied across a healthcare system, providing opportunities for comparison regardless of service structure and therapeutic focus. Additionally, the Triple Aim has been operationalised within healthcare services across the United States of America, the United Kingdom, Canada, Germany, Spain, New Zealand and Australia (IHI, 2017; Obucina et al., 2018), supporting its international relevance and allowing comparison of healthcare services and systems across countries.

A common aim of student-led healthcare services is to support healthcare systems in meeting the needs of underserved populations (Stuhlmiller & Tolchard, 2018). To prove their legitimacy as authentic healthcare providers, student-led healthcare services need an appropriate evaluation framework, focusing on healthcare quality, patient experience and cost effectiveness (Clark et al., 2014; Frakes, Brownie, et al., 2014; Kent, Lai, et al., 2016; Simmons et al., 2009). The Triple Aim is a framework that is designed to address these identified needs of student-led healthcare services through its assessment of health outcomes, patient experience and cost of healthcare, enabling comparison between services and providing evidence of their true impact within the healthcare system.

This literature review aims to determine the extent to which the evaluation of student-led healthcare services currently aligns with the recommendations of the IHI Triple Aim of Healthcare Improvement.

Methods

Search strategy

Three databases were searched using Ovid Medline, Cumulative Index to Nursing and Allied Health Literature (CINAHL) and Scopus from inception to August 2021. The development of the search strategy was undertaken by one author (LS) with the guidance of an independent research librarian. A combination of subject headings (MESH terms) and keywords were used in each search. Search terms were divided into three groups: the type of healthcare service (e.g., student-led, student-assisted), study design (e.g., evaluation study) and study outcome measures (e.g., health outcomes, patient experience, cost of healthcare). The Boolean phrase “AND” was used between groups and the phrase “OR” was used within groups. Search results were collated and duplicates removed (see Appendix A: Literature search strategy (Medline)). Additional articles were identified through pearling, whereby citations and reference lists of included studies were scanned to identify studies for inclusion. One reviewer applied the search strategy and screened titles

(LS). Abstracts and full texts were reviewed by authors (LS, RB, EC) to identify studies for inclusion. An independent reviewer was also enlisted to ensure consensus against the eligibility criteria.

Study selection

Studies that met the inclusion criteria were limited to those describing established student-led healthcare services providing services to the community on an ongoing basis; articles applying measures that align with the Triple Aim domains (i.e., health outcomes, patient experience and cost effectiveness), even if the Triple Aim framework was not explicitly referred to; and those that used either a pre-post intervention design or a comparative analysis as their method to evaluating outcomes (see Appendix B: Student-led health service evaluations inclusion criteria).

Critical appraisal

The Triple Aim framework was chosen to guide the critical appraisal due to its alignment with the evaluation needs of student-led healthcare services. The methodology of each study was assessed using a critical appraisal tool (CAT) that was developed specifically for this review and based on Stiefel and Nolan's (2012) IHI White Paper: *A Guide to Measuring the "Triple Aim"* and uses a similar approach to critical appraisals conducted by Prior et al. (2014) and Obucina et al. (2018). The critical appraisal tool assessed each article based on its ability to achieve the Triple Aim measurement principles of "defining the population", "gathering data over time", "distinguishing between measures" and incorporating "comparison data", in addition to the Triple Aim dimensions of "population health", "experience of care" and "per capita cost". One reviewer (LS) completed the critical appraisal, with additional reviewers (RB, EC, FB) contributing to the overall analysis and conclusions of the appraisal.

Data extraction

Data extraction involved use of a review matrix where one reviewer (LS) extracted data from the included studies and additional reviewers (RB, EC, FB) confirmed the accuracy of the data. Reviewers deliberated regularly throughout the data extraction phase, re-evaluating and amending review matrices to ensure the accuracy of the data extracted. Data synthesis and critical appraisal also followed a process of continual review to ensure the resulting outcome and recommendations remained true to the overall aims of the literature review. Table 1 summarises characteristics of the included studies.

Table 1*Study Characteristics*

Author	Study Type	Student Profession/s	No. of Patients	Type of Service/Intervention
Adams et al. (2015)	Pre and post intervention measures; comparative analysis	Pharmacy	200	A student-led pharmacy intervention based inside a professionally led medical centre; students undertook medication reviews on patients diagnosed with type 2 diabetes mellitus.
Butala et al. (2013)	Comparative analysis	Pre-clinical health professions	469	HAVEN Free Clinic, a student-led, free clinic affiliated with local university & community health centre located in New Haven, Connecticut, USA; provides uninsured adults with primary care, wellness education and assistance in securing healthcare; implemented a student medical records specialist role to improve service's adherence to national preventative service guidelines.
Clark et al. (2014)	Comparative analysis	Medical	43	Jackson Free Clinic (JFC), a student-led, free clinic located in Jackson, Mississippi, USA; provides care to uninsured, unemployed and homeless patients; student services involve providing patient interviews and physical exams, deliberation at the team level and developing treatment plans.
Gorrindo et al. (2014)	Pre and post intervention measures	Medical	45	Shade Tree Clinic, a student-led, free clinic affiliated with Vanderbilt University School of Medicine, located in Nashville, Tennessee, USA; provides medications, laboratory services, immunisations, social services and disease management to uninsured and underserved patients.
Lawrence et al. (2015)	Comparative analysis	Nurse practitioner and medical	127	Case Western Reserve University (CWRU) student-led healthcare service; free clinic affiliated with CWRU School of Medicine, located in Cleveland, Ohio, USA; provides acute care services to the underserved populations.
Lee et al. (2017)	Pre and post intervention measures	Medical	Not reported	The Keeping Neighbors in Good Health Through Service (KNIGHTS) Clinic, a student-led, free clinic coordinated and staffed by medical students from the University of Central Florida, providing services to the underserved community of Orlando, Florida, USA.
Liberman et al. (2011)	Comparative analysis	Medical	49	The East Harlem Health Outreach Partnership (EHHOP) student-led, free clinic, affiliated with Mount Sinai School of Medicine, located in New York City, USA.

Author	Study Type	Student Profession/s	No. of Patients	Type of Service/Intervention
Mann et al. (2019)	Comparative analysis	Medical	79	Provides primary healthcare and mental healthcare for highly disadvantaged residents, predominantly indigent, immigrant, Hispanic and uninsured; offers both a primary care (PC) clinic and a mental health (MH) clinic.
Martin et al. (2015)	Pre and post intervention measures	Pharmacy	48	Penobscot Nation Health Centre, a student-led service within established centre, affiliated with Husson University School of Pharmacy, located in Bangor, Maine, USA; provides diabetes management services.
Meek et al. (2013)	Comparative analysis	Medical and nursing	734	Dandenong Hospital Emergency Department (ED), a student-led healthcare program affiliated with Monash University, located in Melbourne, Victoria, Australia; student teams manage four ED beds.
Nuffer et al. (2012)	Pre and post intervention measures	Pharmacy	417	Twelve student-led healthcare service sites affiliated with University of Colorado, located in rural Colorado, USA; provides self-care management education to patients with diabetes.
Stuhlmiller & Tolchard (2018)	Comparative analysis	Student professions not defined	2,086	A student-led healthcare service serving a population living in an underserved region located in West Tamworth, New South Wales Australia; provides primary health, social care, health education, harm minimisation and mental health services.
Thakkar et al. (2019)	Pre and post intervention measures	Medical	796	The Crimson Care Collaborative (CCC), a Harvard Medical School-affiliated network of seven student-led healthcare services providing after hours primary care to residents in Boston, Massachusetts, USA.
Wahle et al. (2017)	Pre and post intervention measures; comparative analysis	Medical	64	The Indiana University Student Outreach Clinic (IUSOC), a student-led free clinic providing services to Indianapolis, Indiana, USA; allows professional students training in pharmacy, law, dentistry, social work, physical therapy, occupational therapy, public health and nursing through contributions in patient care.

Results

The database and pearling search generated 211 articles, with 105 full texts reviewed (Figure 1). Fourteen articles met the inclusion criteria. Eleven studies were conducted in the United States (Butala et al., 2013; Clark et al., 2014; Gorrindo et al., 2014; Lawrence et al., 2015; Lee et al., 2017; Liberman et al., 2011; Mann et al., 2019; Martin et al., 2015; Nuffer et al., 2012; Thakkar et al., 2019; Wahle et al., 2017), two studies were conducted in Australia (Meek et al., 2013; Stuhlmiller & Tolchard, 2018) and one study was conducted in the United Kingdom (UK) (Adams et al., 2015). Study design and intervention characteristics are shown in Table 1.

Alignment with Triple Aim measurement principles

All 14 studies focused on evaluating outcomes of a sub-population, which was defined either as the local population in which the healthcare service was located or by a specific health condition/disease (Table 2). Sample sizes in the included studies were not calculated statistically to determine power. Instead, sample size was commonly determined as all patients receiving care from the healthcare service, whether that was calculated at a single time-point (e.g., all patients of the service up until a point in time) or over a specified period (e.g., all patients between 2009 and 2016) (Table 2). Mann et al. (2019) reported broadening their inclusion criteria to increase power however did not include a power calculation or a population size required to be met. Being a pilot study, Adams et al. (2015) did not undertake a power calculation however, instead, calculated sample size through estimating the effect of the intervention based on 95% CI and difference in means of the continuous variable (i.e., glycosylated hemoglobin A1c (HbA1c)) between intervention and control groups. Additionally, Lee et al. (2017) did not provide clear information about the number of patient encounters reviewed when analysing patient visit times in their study.

Data in included studies were gathered over different periods using different study methods (Table 2). Eight of the 14 studies gathered data by analysing patient records retrospectively (Butala et al., 2013; Gorrindo et al., 2014; Liberman et al., 2011; Mann et al., 2019; Meek et al., 2013; Stuhlmiller & Tolchard, 2018; Thakkar et al., 2019; Wahle et al., 2017). Three studies used a combination of retrospective and prospective techniques (Lee et al., 2017; Martin et al., 2015; Nuffer et al., 2012). The remaining three studies administered outcome measures and/or collected data prospectively (Adams et al., 2015; Clark et al., 2014; Lawrence et al., 2015). Timeframes for data collection varied amongst studies, with eight studies reviewing data from 12 months or more (Butala et al., 2013; Gorrindo et al., 2014; Lee et al., 2017; Liberman et al., 2011; Mann et al., 2019; Stuhlmiller & Tolchard, 2018; Thakkar et al., 2019; Wahle et al., 2017), five studies collecting data over approximately 6 to 10 months (Adams et al., 2015; Clark et al., 2014; Lawrence et al., 2015; Nuffer et al., 2012) and one study reviewing data over 6 weeks (Meek et al., 2013) (Table 2).

Figure 1
PRISMA Flow Diagram of Article Inclusion Process

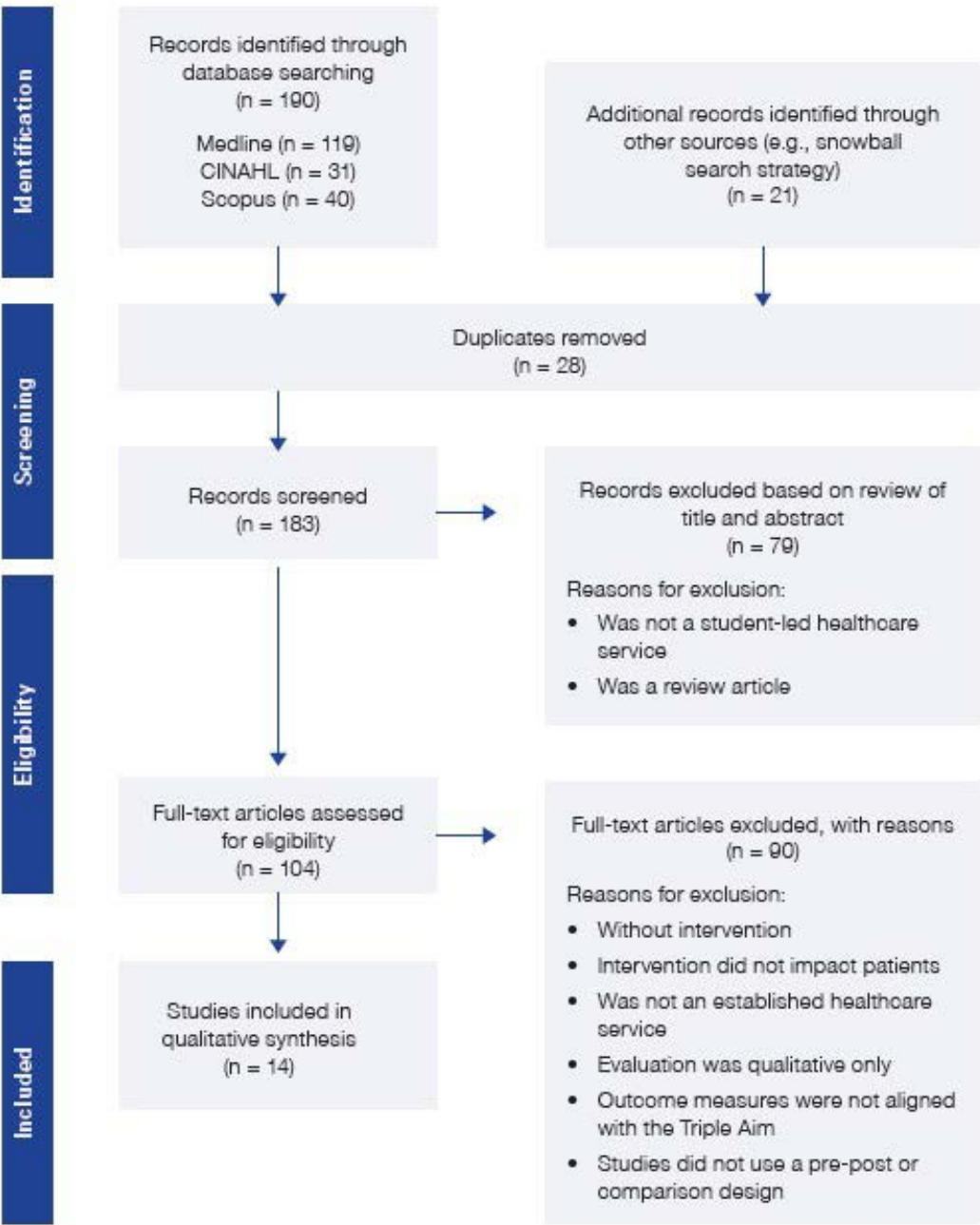


Table 2*Analysis of Articles Against the Triple Aim Measurement Principles*

Triple Aim Measurement Principles				
Authors	A defined population	Gather data over time	Distinguish between measures	Comparison data
Adams et al. (2015)	Patients (n = 200) with a diagnosis of type 2 diabetes attending one of five Norfolk medical practices	Measures were taken at baseline and at 6 months post intervention	Diabetes-related clinical data (glycosylated hemoglobin A1c (HbA1c), blood pressure and lipid profile), quality of life (EQ-5D), patient reported beliefs (The Beliefs and Medicines Questionnaire), adherence (MARS) and satisfaction with medicines (DTSQ) collected; patient behavioural characteristics recorded	Not included in study design
Butala et al. (2013)	Uninsured adults living in New Haven Connecticut in receipt of preventive healthcare services; demographic data collected for pre- and post-intervention analysis	Retrospective patient record reviews conducted pre intervention (2008–2009) and post intervention (2010–2011)	Number of screening/preventative tests and appropriateness of screening based on patient characteristics	Comparison data comprised of patients receiving services from HAVEN 12 months prior to the implementation of the intervention.
Clark et al. (2014)	Uninsured, unemployed and homeless population living in Jackson and receiving care from the JFC, with 16 examined by physicians and 27 examined by student groups	Weekly patient satisfaction surveys for 6 months; each patient completed only one questionnaire throughout the study period; surveys completed on site prior to consultation completion	PCAS aligned IOM formal definition of primary care	Patient experience of care with student group compared to care with a trained physician; PCAS were administered at the same time for physician consults
Gorrindo et al. (2014)	All patients with established care at Shade Tree Clinic after 2008 with a diabetes diagnosis	Retrospective patient record reviews of diabetic patients conducted 2008–2011	HbA1c collected at initial presentation and post (12 ± 3 months); presence/absence of required HbA1c measures within the 12-month measurement period; student–patient relationship examined by reviewing documented patient encounters	Not included in study design

Triple Aim Measurement Principles				
Authors	A defined population	Gather data over time	Distinguish between measures	Comparison data
Lawrence et al. (2015)	Patients receiving healthcare services at CWRU student-led healthcare service (n = 87) and a professionally led free medical service (n = 40)	Patient surveys facilitated over 10-month period; Different facilitation methods used between intervention and control	Two separate surveys developed based on Health Centre Patient Satisfaction Survey developed by the US Department of Health & Human Services: 28-item student-led survey; 21-question professionally led survey	A professionally led free medical service, dually located with the student-led healthcare service
Lee et al. (2017)	All patients receiving care from KNIGHTS Clinic in 2014/2015 following implementation of a quality improvement intervention; all patients receiving care in 2015/2016	Pre-intervention data collected retrospectively; post-intervention data collected prospectively	Process measures include availability and variety of services provided and patient wait and consultation times	Not included in study design
Liberman et al. (2011)	Disadvantaged adult patients living in East Harlem receiving healthcare services from EHHOP who have a diagnosis of depression	Conducted a point-in-time retrospective patient record review; all patient records reviewed to identify those who met inclusion criteria.	Data analysed based on HEDIS; parameters included demographics; diagnosis method; pharmacological treatment type; referral to specialty care; and patient adherence to follow-up care and pharmacologic treatment	Available HEDIS data on Medicaid and commercially insured populations in New York City and New York State (NYS) available from NYS Managed Care Plan Performance 2007 dataset
Mann et al. (2019)	Disadvantaged patients living in East Harlem with a diagnosis of major depression, adjustment disorder, dysthymia or depressive disorder not otherwise specified (NOS) receiving care from the MH Clinic within EHHOP	Conducted a point-in-time retrospective patient record review; all patient records were reviewed between 2009 and 2016 to identify those who met inclusion criteria	Data analysed based on HEDIS; adherence to antidepressant medication at 3 and 6 months was analysed against treatment response	Patients receiving care from the EHHOP PC Clinic, Liberman et al. (2011) data and available 2014 HEDIS data on Medicaid and commercially insured populations in NYS accessed from NYS Department of Health
Martin et al. (2015)	Penobscot Nation members with diabetes receiving healthcare services at Penobscot Nation Healthcare Centre; sample included patients with controlled diabetes (HbA1c < 7%; n = 30) and uncontrolled diabetes (HbA1c ≥ 7%; n = 18)	Retrospective patient record reviews to identify pre HbA1c values; patient experience surveys completed after each visit with healthcare provider	Pre-measures identified from previous HbA1c values and post HbA1c measures; patient satisfaction surveys completed	Not included in study design

Triple Aim Measurement Principles				
Authors	A defined population	Gather data over time	Distinguish between measures	Comparison data
Meek et al. (2013)	Patients presenting to Dandenong Hospital Emergency Department (ED) over a 10-week period in 2012; patients triaged based on presenting need, allocated to the next available bed: a student-led bed (n = 369) or standard care (n = 365)	Retrospective data accessed from patient records over five 2-week blocks May–September 2012; outcome measure data for all patients who had a length of stay (LOS) of at least 1 hour, assigned to either a student-led bed or standard care	ATS and Commonwealth Department of Health and Ageing ED access targets; ATS measures included time to nurse, time to doctor, time to inpatient referral and time to inpatient bed request	Four control beds matched for patient acuity and managed as per usual care (professionals)
Nuffer et al. (2012)	Adults with a diagnosis of diabetes receiving care at one of the 12 student-led clinics in rural Colorado	Retrospective patient record review over a 6-month period	HbA1c, BP, fasting total cholesterol (TC) and blood lipids; values obtained at visit 1 (pre measure) and 6 (post measure)	Not included in study design
Stuhlmiller & Tolchard (2018)	All patients receiving healthcare services from the Coledale student-led clinic	Data gathered through a point-in-time review of patient records	Behavioural factors such as smoking and drinking; physiological health outcome measures such as BMI, BP, body circumference, BGL and blood lipids	Two patient groups were compared: those receiving care for ≤ 12 months and those receiving care for > 12 months
Thakkar et al. (2019)	All adult patient receiving care from CCC	Retrospective patient record review over a 5-year period	ED utilisation rates obtained; socioeconomic status approximated and CCI used for health status	Not included in study design
Wahle et al. (2017)	Patients being treated for hypertension at IUSOC between January 2013 and March 2014 (n = 64) with > 3 visits at the clinic	Retrospective patient record review over 13-month period	Physiological health outcome measures such as BMI and BP; Data on behavioural factors, such as smoking and drinking, also collected	Hypertension control data collected from patients receiving care from the IUSOC Clinic and compared to available NHANES datasets

Table 3*Analysis of Articles Against the Dimensions of the Triple Aim*

Dimensions of the Triple Aim			
Authors	Population health	Experience of care	Cost of healthcare
Adams et al. (2015)	Upstream measures, including behavioural characteristics, i.e., exercise, diet and smoking status, and physiological measures i.e., HbA1c, blood pressure and lipid profile included; EQ-5D used to measure downstream measure of QoL	Global experience of care was assessed using the DTSQ, which also measures timeliness of services; treatment effectiveness was measured using MARS	Measures cost from a supply lens, calculating resource utilisation costs
Butala et al. (2013)	Not assessed	Service effectiveness assessed via adherence to National Preventive Service guidelines for HIV testing, fasting lipid panel, fasting blood glucose and Pap smear; every patient file assessed for indicators of specific preventative services (as per a defined criteria) and delivery of that service	Not assessed
Clark et al. (2014)	Upstream health outcomes assessed via patient demographic and socioeconomic data	Service effectiveness, timeliness, patient-centredness and affordability assessed via the PCAS	Not assessed
Gorrindo et al. (2014)	Physiological health outcomes assessed by HbA1c	Service effectiveness measured via the process measure of the presence/absence of required HbA1c measures; every patient file assessed for indicators of specific services (as per a defined criteria) and delivery of that service; patient-centredness assessed via review of patient interactions	Not assessed
Lawrence et al. (2015)	Not assessed	Service timeliness and global experience of care assessed via a modified version of the Centre Patient Satisfaction Survey	Not assessed
Lee et al. (2017)	Not assessed	Service efficiency/timeliness assessed through increased consultation availability and variety, as well as change in patient wait times/total visit duration	Not assessed

Dimensions of the Triple Aim			
Authors	Population health	Experience of care	Cost of healthcare
Liberman et al. (2011)	Not assessed	Service effectiveness assessed via HEDIS measures	Not assessed
Mann et al. (2019)	Not assessed	Service effectiveness assessed via HEDIS measures	Not assessed
Martin et al. (2015)	Physiological health outcomes assessed by HbA1c	Global experience of care assessed using a patient experience survey	Not assessed
Meek et al. (2013)	Not assessed	Service efficiency and timeliness assessed via measures aligned with the ATS and Commonwealth Department of Health and Ageing ED access targets	Not assessed
Nuffer et al. (2012)	Physiological health outcomes measures of HbA1c, BP and blood lipids	Not assessed	Not assessed
Stuhlmiller & Tolchard (2018)	Physiological health outcomes assessed by BMI, BP, body circumference, BGL and blood lipids; behavioural characteristics assessed via smoking and drinking	Equity assessed by stratifying all measures into identified subpopulations differentiated by gender, age and racial groupings	Not assessed
Thakkar et al. (2019)	Upstream health outcomes assessed via patient demographic data and estimated socioeconomic status; downstream health outcomes estimated using Deyo et al. (1992) adaptation of the CCI	Effectiveness of service measured through change in ED utilisation rates; equity assessed by stratifying all measures into identified subpopulations differentiated by gender, age and racial groupings	Estimation of cost savings through the median cost per ED visit for each visit avoided (accounting for inflation)
Wahle et al. (2017)	Upstream health outcomes assessed through patient demographic data and insurance status; physiological health outcomes assessed by BMI and BP; behavioural characteristics assessed via smoking and drinking behaviours	Not assessed	Not assessed

Nine of the included studies used outcomes measures either through patient experience surveys (Clark et al., 2014; Meek et al., 2013) or by measuring physiological parameters, behavioural characteristics or health and functional status (Adams et al., 2015; Gorrindo et al., 2014; Martin et al., 2015; Nuffer et al., 2012; Stuhlmiller & Tolchard, 2018; Thakkar et al., 2019; Wahle et al., 2017). Interestingly, Adams et al. (2015) reported changing the version of the QoL tool used to assess health and functional status from the five-level adaptation (i.e., EQ-5D) at baseline to the three-level adaptation (i.e., EQ-3D) at 6 months post-intervention follow up. Consequently, the authors acknowledged that any change in QoL cannot be attributed to the intervention. Six studies used process measures such as the Healthcare Effectiveness Data and Information Set (HEDIS), emergency department (ED) utilisation rates, the Australian Triage Scale (ATS) guidelines and visit duration (Butala et al., 2013; Clark et al., 2014; Gorrindo et al., 2014; Lee et al., 2017; Liberman et al., 2011; Mann et al., 2019) (Table 2).

Eight studies incorporated a comparison into their research design, such as a control group, standard care or available population health datasets (Table 2). Two studies had a sample size in the intervention group that was approximately double that within the control/standard care group (Clark et al., 2014; Lawrence et al., 2015). One of these studies (Lawrence et al., 2015) also used different adaptations of their patient satisfaction survey between comparison groups, wording questions differently between surveys as well as omitting some questions altogether. Two studies (Liberman et al., 2011; Mann et al., 2019) compared their intervention data to that of the Healthcare Effectiveness Data and Information Set (HEDIS), however the comparison data was not appropriate as population characteristics such as age, race, gender and diagnosis were not matched. One study (Wahle et al., 2017) compared hypertension control data to the National Center for Health Statistics, National Health and Nutrition Examination Survey (NHANES) datasets.

Dimensions of the Triple Aim

Eight studies measured the Triple Aim dimension of population health, predominantly using measures focused on evaluating upstream health outcomes (Table 3). Evans and Stoddart's (1990) "Model of Population Health Components and Relationships" distinguishes between health determinants and health outcomes. Health determinants include both upstream factors (socioeconomic factors and physical environment) and individual factors (genetic endowment, behavioural and psychological factors), while health outcomes include intermediate health outcomes (disease burden and injury) and downstream health outcomes (QoL and mortality) (Evans & Stoddart, 1990). In this review, one study (Clark et al., 2014) relied on demographic and socioeconomic data as their sole measure of population health. Four studies (Adams et al., 2015; Gorrindo et al., 2014; Martin et al., 2015; Nuffer et al., 2012) measured physiological factors, including HbA1c, blood pressure (BP), body mass index (BMI) and blood lipids. Two studies (Stuhlmiller & Tolchard, 2018; Wahle et al., 2017) gathered data on patient

demographic information, behavioural traits such as smoking and drinking and physiological measures such as BMI and BP, with Stuhlmiller & Tolchard (2018) also measuring body circumference, blood glucose levels (BGL) and blood lipids. Two studies (Adams et al., 2015; Thakker et al., 2019) measured downstream factors influencing health either via a QoL tool or by estimating mortality through a comorbidity index. The remaining six studies did not measure population health (Table 3). The combined results of the studies that measured health outcomes show improvements in health outcomes through physiological measures such as blood glucose, blood pressure, waist circumference and lipid values (Adams et al., 2015; Butala et al., 2013; Gorrindo et al., 2014; Martin et al., 2015; Nuffer et al., 2012; Stuhlmiller & Tolchard, 2015), as well as behavioural characteristics such as smoking and drinking (Adams et al., 2015; Stuhlmiller & Tolchard, 2018).

Three studies (Adams et al., 2015; Lawrence et al., 2015; Martin et al., 2015) evaluated the experience of care from the perspective of the patient. In one study (Lawrence et al., 2015), the Health Centre Patient Satisfaction Survey was used to measure patient experience. These domains were grouped into three themes: accessibility, licensed provider and facility quality. The patient satisfaction survey used by Martin et al. (2015) was poorly defined, with patients being provided with the opportunity to rate their healthcare providers as being helpful, respectful or knowledgeable, in addition to providing an overall rating of satisfaction of the healthcare service. The remaining study (Adams et al., 2015) used the Diabetes Treatment Satisfaction Questionnaire (DTSQ) to measure patient experience and asked global patient satisfaction questions related to willingness to refer and continue accessing services.

Nine of the included studies measured the experience of care through the perspective of the provider (Table 3), four of which (Butala et al., 2013; Gorrindo et al., 2014; Liberman et al., 2011; Thakker et al., 2019) measured service effectiveness. Furthermore, one study (Adams et al., 2015) measured timeliness and effectiveness, and one study (Clark et al., 2014) measured effectiveness, timeliness, affordability and patient-centredness. Additionally, two studies (Lee et al., 2017; Meek et al., 2013) measured efficiency and timeliness, and two studies (Stuhlmiller & Tolchard, 2018; Thakker et al., 2019) measured equity.

Many of the student-led healthcare services described in the current literature review provided healthcare services free of charge to the patient and were funded by either government or an affiliated university and, in some cases, were funded by both. Interestingly, 12 out of the 14 studies did not incorporate any type of economic evaluation into their measures. Adams et al. (2015) and Thakkar et al. (2019) were the only studies that incorporated a cost analysis into their research design, focusing on measuring cost of healthcare from a supply lens. By measuring resource utilisation costs, Adams et al. (2015) were able to determine the cost of a student-led service per patient, taking into account costs such as student training requirements and preceptor time to oversee service

provision. However, Adams et al. (2015) did not undertake a similar analysis of cost for a professional service or a standard care option, and therefore, cost effectiveness was not determined. Similarly, Thakker et al. (2019) calculated costs saved due to ED visits voided as a result of attending the student-led healthcare service. However, without calculating the costs associated with resourcing the student-led healthcare service, cost effectiveness of such services cannot be determined.

Discussion

The findings of this review indicate that, currently, the evaluations of student-led healthcare services do not consistently align with the recommendations of the IHI Triple Aim of Healthcare Improvement. Out of the 14 studies appraised, only two studies (Adams et al., 2015; Thakker et al., 2019) successfully achieved all three domains of the Triple Aim. It is promising, however, that a total of 12 studies included in this review applied a focus on experience of care, either by measuring experience of care from the perspective of the patient or from the perspective of the provider. In contrast, cost of healthcare was the least measured domain. Furthermore, this literature review has demonstrated that there is a lack of consistency in the measures used to evaluate student-led healthcare services and in the quality of research design. This suggests that any findings demonstrating that student-led healthcare services lead to an improvement in health outcomes or experience of care are preliminary, and further investigation of student-led healthcare services is required.

With respect to calculating the sample sizes, the included studies did not undertake a statistical calculation determining power, suggesting inadequately powered samples (Nayak, 2010). Even in pilot designs, sample size justification supporting the reasons for choosing a particular size is required (Whitehead et al., 2016). The timeframes of measurement also varied between studies. It is recommended to collect data at multiple points to gain insight into the relationship between interventions and effects and to better understand time lags between cause and effect (Stiefel & Nolan, 2012). Limiting points of measurement before and after the intervention weakens a study's ability to assign causality (Portela et al., 2015). Comparing outcome data to other healthcare services or using available benchmark data is advocated for within the Triple Aim framework (Stiefel & Nolan, 2012). Due to identified limitations in study design across many of the studies in this review, overall validity of their data is compromised, influencing the comparability of their findings across groups (Portela et al., 2015).

Concerning the measurement of population health outcomes, priority was given to measuring socioeconomic factors, behavioural traits and physiological outcomes. Such factors are considered upstream factors influencing population health (Braveman & Gottlieb, 2014), whereas measuring more downstream factors, such as mortality, QoL, health and functional status and their combination (i.e., healthy life expectancy), allows for comparison of alternative practices, evaluation of disparities and guidance of resource

allocation (Stiefel et al., 2010). Adams et al. (2015) was one of two studies that measured downstream factors through the use of a QoL tool. However, any observed changes in QoL could not be attributed to the intervention due to a change in the version of the tool from baseline to post intervention. Thakker et al. (2019) also measured downstream factors influencing health using an adaptation of the Charlson Comorbidity Index (CCI), a popular index used to assign mortality risk (Deyo et al., 1992; Hall et al., 2019). Being derived from administrative databases, the utility of a comorbidity score is dependent on the quality of information used (Hall et al., 2019), and some authors suggest that continuous measures of disease might outperform the CCI (Austin et al., 2015). There are challenges to implementing measures of downstream influences in healthcare service evaluations, as no one healthcare service is the same and, thus, tools of measurement may vary greatly between services. In contrast, using more universal functional health and QoL tools that can be applied across populations and disease groups does provide opportunity for comparability across services (Chen et al., 2005; Stiefel & Nolan, 2012; Frendl & Ware, 2014).

The experience of care is best measured using global questions in patient satisfaction surveys (Stiefel & Nolan, 2012). Incorporating the patient's perspective into quality improvement initiatives is critical in achieving patient-centred care (Al-Abri & Al-Balushi, 2014). Additionally, evidence supports a correlation between measuring patient satisfaction, continuity of care and improved health behaviour (Mohan & Kumar, 2011; Schoenfelder et al., 2011), as well as being a reflection of health practitioner communication (Schoenfelder et al., 2011). While most of the included studies in this review measured the experience of care, only three studies focused on evaluating the experience of care from the patient's perspective. The remaining 11 studies either solely examined experience of care from that of the healthcare provider's perspective or did not measure experience of care, demonstrating limited input from patients in the quality appraisal of student-led healthcare services. This also doesn't address potential safety concerns patients and professional providers of care may hold when a student independently coordinates and delivers care.

The concept of equity is in relation to access and use of services and is directly related to need of care (Levesque et al., 2013). Despite all reviewed studies describing student-led healthcare services providing healthcare to underserved or disadvantaged populations, Stuhlmiller and Tolchard (2018) and Thakkar et al. (2019) were the only studies that measured equity. Without specifically measuring equity, the impact of student-led healthcare services on the underserved and/or disadvantaged populations they intend to serve will not be able to be understood. Student-led models of healthcare have enormous potential to supplement the healthcare system in areas where healthcare professional retention is low and health services are sparse (Frakes, Tyack, et al., 2011). This is particularly important in a world responding to increased healthcare demand due to the COVID-19 pandemic, where now more than ever, healthcare services are experiencing

shortages in capacity to deliver care (Rasmussen et al., 2020). As healthcare services struggle to adapt to increases in demand, student-led services are appropriately placed to adequately address patient care requirements (Vahidi et al., 2020). However, without having a clear understanding of the true impact of student-led services and concerns being raised around potential safety risks in a COVID-19 world (Vahidi et al., 2020), there is still some work required to understand the value of student-led healthcare services. Additionally, there is little work around the cost or economic value involved in delivering services through student-led healthcare models. As many of the studies included in this literature review were funded either through government or an affiliated university, justification of cost efficiency or cost effectiveness is essential to securing ongoing funding and ensuring continued operation (Boxall, 2011; Cowing et al., 2009). As a result, student-led healthcare services will continue to face difficulties in demonstrating their contribution to the healthcare system from an economic perspective (Frakes, Brownie, et al., 2014; Kent, Drysdale, et al., 2014; Ojeda et al., 2014).

Since its proposal in 2008, the Triple Aim has sought to simultaneously improve population health, enhance experience of care and reduce the cost of healthcare (Whittington et al., 2015). Following on from this, the IHI has recruited over 140 organisations worldwide involving healthcare systems, hospitals, healthcare insurers and other organisations involved in providing healthcare in their quest to improve healthcare quality (Whittington et al., 2015). Nonetheless, the Triple Aim has received criticism for its inability to consider the provider and their experience and how these influence overall quality of care (Bodenheimer & Sinsky, 2014). As such, authors have suggested introducing a fourth aim, which acknowledges providers of care as the backbone of the healthcare system, to be included (Bodenheimer & Sinsky, 2014; Valaitis et al., 2020). When considering how student-led healthcare services are resourced, it is also important to consider the experience of the provider. Students are developing healthcare professionals, and their experiences have significant influence on their skills and future provision of care (Burgess & Mellis, 2015). The evidence supporting the use of student-led healthcare services as clinical placement providers is mixed, and although students value the exposure to authentic healthcare environments (Fröberg et al., 2018), the learning experience is highly dependent on the student's sense of responsibility to their patient and an effective collaboration between the student and the healthcare professional (Schutte et al., 2018). The Triple Aim is designed to specifically evaluate healthcare services as providers of care and doesn't consider that these healthcare services hold additional roles, such as providers of clinical placement. For this reason, the Triple Aim is not comprehensive in its current form to effectively evaluate student-led healthcare services. An evaluation framework that not only considers the impact on the community but also the experience and learning needs of the student is required to effectively evaluate student-led healthcare services and the benefits they provide.

In Australia, the Australian Health Performance Framework (AHPF) is designed to support system-wide reporting on population health and healthcare performance, the

assessment and evaluation of value and sustainability, as well as the identification of priorities for improvement and development (NHIPPC, 2017). The AHPF houses five domains, including the determinants of health, the health system, health status, the health system context and equity, most of which align to the Triple Aim domains of population health, experience of care and cost of healthcare. However, in contrast to the Triple Aim, the AHPF does place emphasis on the health system context in which workforce, infrastructure, governance, structure and the sustainability of the Australian health system are acknowledged as additional factors influencing population health outcomes (NHIPPC, 2017). Nevertheless, as student-led healthcare services are unique both in their model and workforce, further investigation is required to ensure all elements of student-led healthcare service performance and impact are considered, in addition to identifying appropriate measures for comprehensive evaluation.

In order to identify a comprehensive evaluation framework for evaluation of student-led healthcare services, consensus needs to be reached on how to evaluate student-led healthcare services, not just from the perspective of healthcare provision but also provision of clinical education. If researchers used a common set of measures and gathered data at agreed time-points, results could be compared across different types of services and placement types, pooling data for meta-analyses (Bernhardt et al., 2017). For student-led healthcare services to become authentic and credible models of care within the broader healthcare system, it is crucial to prescribe to a set of standards similar to that utilised in mainstream healthcare but specific enough to consider the needs of the students.

Limitations

The findings of this review must be considered in light of its limitations. In this review, medical and healthcare databases (i.e., Ovid Medline, CINAHL and Scopus) were searched. It is possible that additional articles may have been identified had an educational database been considered. However, pearling of included articles was conducted to minimise the likelihood of missing eligible articles.

Conclusion

Currently, evaluation of student-led healthcare services does not consistently align with the recommendations of the Triple Aim, and the current literature needs to be strengthened to support student-led healthcare services as a valuable resource to the healthcare system. Student-led healthcare services need to pursue a broader system of linked goals to ensure their accountability to the community they serve, as well as their comparability to the healthcare system they support. Clearly, when adopting the Triple Aim framework, there will be elements of student-led healthcare services that will go unmeasured. Therefore, consensus on what is an appropriate evaluation framework for student-led healthcare services needs to be achieved before their value within the healthcare system can be demonstrated.

Conflicts of interest and funding

The authors declare no conflicts of interest and acknowledge funding was received for this project through an Australian Government Research Training Program Scholarship.

References

- Atakro, C. A., Armah, E., Menlah, A., Garti, I., Addo, S. B., Adatar, P., & Boni, G. S. (2019). Clinical placement experiences by undergraduate nursing students in selected teaching hospitals in Ghana. *BMC Nursing*, 18(1), Article 1. <https://doi.org/10.1186/s12912-018-0325-8>
- Adams, R. P., Barton, G., Bhattacharya, D., Grassby, P. F., Holland, R., Howe, A., Norris, N., Shopstone, L., & Wright, D. J. (2015). Supervised pharmacy student-led medication review in primary care for patients with type 2 diabetes: A randomised controlled pilot study. *BMJ Open*, 5(11), Article e009246. <https://doi.org/10.1136/bmjopen-2015-009246>
- Austin, S. R., Wong, Y.-N., Uzzo, R. G., Beck, J. R., & Egleston, B. L. (2015). Why summary comorbidity measures such as the Charlson Comorbidity Index and Elixhauser score work. *Medical Care*, 53(9), e65–e72. <https://doi.org/10.1097/MLR.0b013e318297429c>
- Australian Institute of Health and Welfare (AIHW). (2020). *Australia's health 2020: Data insights*. <https://www.aihw.gov.au/reports/australias-health/australias-health-2020-data-insights/data>
- Al-Abri, R., & Al-Balushi, A. (2014). Patient satisfaction survey as a tool towards quality improvement. *Oman Medical Journal*, 29(1), 3–7. <https://doi.org/10.5001/omj.2014.02>
- Bernhardt, J., Borschmann, K., Boyd, L., Carmichael, S. T., Corbett, D., Cramer, S. C., Hoffman, T., Kwakkel, G., Savitz, S. I., Saposnik, G., Walker, M., & Ward, N. (2017). Moving rehabilitation research forward: Developing consensus statements for rehabilitation and recovery research. *Neurorehabilitation and Neural Repair*, 31(8), 694–698. <https://doi.org/10.1177/1545968317724290>
- Bodenheimer, T., & Sinsky, C. (2014). From triple to quadruple aim: Care of the patient requires care of the provider. *American Family Medicine*, 12(6), 573–576. <https://doi.org/10.1370/afm.1713>
- Boxall, A. (2011). *What are we doing to ensure the sustainability of the health system?* Parliament of Australia. https://www.aph.gov.au/About_Parliament/Parliamentary_Departments/Parliamentary_Library/pubs/rp/rp1112/12rp04
- Braveman, P., & Gottlieb, L. (2014). The social determinants of health: It's time to consider the causes of the causes. *Public Health Reports*, 129(1), 19–31. <https://doi.org/10.1177/003335491412915206>
- Burgess, A., & Mellis, C. (2015). Feedback and assessment for clinical placements: Achieving the right balance. *Advances in Medical Education and Practice*, 6, 373–381. <https://doi.org/10.2147/AMEP.S77890>

- Butala, N. M., Chang, H., Horwitz, L. I., Bartlett, M., & Ellis, P. (2013). Improving quality of preventive care at a student-run free clinic. *PLoS ONE*, 8(11), Article e81441. <https://doi.org/10.1371/journal.pone.0081441>
- Chen, T., Li, L., & Kochen, M. M. (2005). A systematic review: How to choose appropriate health-related quality of life (HRQOL) measures in routine general practice? *Journal of Zhejiang University Science B*, 6(9), 936–940.
- Clark, J. S., Bollaert, A., Sills, S. O., Clark, J. H., & Norris, D. (2014). Patient perception of care received by students at the Jackson Free Clinic. *Journal of the Mississippi State Medical Association*, 55(4), 113–118.
- Cowing, M., Davino-Ramaya, C. M., Ramaya, K., & Szmerekovsky, J. (2009). Health care delivery performance: Service, outcomes, and resource stewardship. *The Permanente Journal*, 13(4), 72–78. <https://doi.org/10.7812/TJPP/08-100>
- Deyo, R. A., Cherkin, D. C., & Ciol, M. A. (1992). Adapting a clinical comorbidity index for use with ICD-9-CM administrative databases. *Journal of Clinical Epidemiology*, 45(6), 613–619. [https://doi.org/10.1016/0895-4356\(92\)90133-8](https://doi.org/10.1016/0895-4356(92)90133-8)
- Evans, R. G., & Stoddart, G. L. (1990). Producing health, consuming health care. *Social Science & Medicine*, 31(12), 1347–1363. [https://doi.org/10.1016/0277-9536\(90\)90074-3](https://doi.org/10.1016/0277-9536(90)90074-3)
- Frakes, K., Brownie, S., Davies, L., Thomas, J., Miller, M., & Tyack, Z. (2014). Capricornia Allied Health Partnership (CAHP): A case study of an innovative model of care addressing chronic disease through a regional student-assisted clinic. *Australian Health Review*, 38(5), 483–486. <https://doi.org/10.1071/AH13177>
- Frakes, K., Tyack Z., Miller, M., Davies, L., Swanston, A., & Brownie, S. (2011). The Capricornia project: Developing and implementing an interprofessional student-assisted allied health clinic. *ClinEdQ*. <https://research-repository.griffith.edu.au/handle/10072/42605>
- Freundl, D. M., & Ware, J. E., Jr. (2014). Patient-reported functional health and well-being outcomes with drug therapy: A systematic review of randomized trials using the SF-36 Health Survey. *Medical Care*, 52(5), 439–445. <https://doi.org/10.1097/MLR.00000000000010311>
- Fröberg, M., Leanderson, C., Flackman, B., Hedman-Lagerlof, E., Bjorklund, K., Nilsson, G. H., & Stenfors, T. (2018). Experiences of a student clinic in primary care: A mixed-method study with students, patients and supervisors. *Scandinavian Journal of Primary Health Care*, 36(1), 36–46. <https://doi.org/10.1080/02813432.2018.1426143>
- Gorrindo, P., Peltz, A., Ladner, T. R., Reddy, I., Miller, B. M., Miller, R. F., & Fowler, M. J. (2014). Medical students as health educators at a student-run free clinic: Improving the clinical outcomes of diabetic patients. *Academic Medicine*, 89(4), 625–631. <https://doi.org/10.1097/ACM.000000000000164>
- Hall, R. E., Porter, J., Quan, H., & Reeves, M. J. (2019). Developing an adapted Charlson comorbidity index for ischemic stroke outcome studies. *BMC Health Services Research*, 19(1), 930. <https://doi.org/10.1186/s12913-019-4720-y>

- Institute of Healthcare Improvement (IHI). (2017). IHI Triple Aim prototyping partners. Retrieved May 24, 2017, from <http://www.ihl.org/Engage/Initiatives/TripleAim/Pages/Participants.aspx>
- Kenny, A., Hyett, N., Sawtell, J., Dickson-Swift, V., Farmer, J., & O'Meara, P. (2013). Community participation in rural health: A scoping review. *BMC Health Services Research*, 13(1), Article 64. <https://doi.org/10.1186/1472-6963-13-64>
- Kent, F., Drysdale, P., Martin, N., & Keating, J. (2014). The mixed-discipline aged-care student clinic: An authentic interprofessional learning initiative. *Journal of Allied Health*, 43(1), 51–56.
- Kent, F., Lai, F., Beovich, B., & Dodic, M. (2016). Interprofessional student teams augmenting service provision in residential aged care. *Australasian Journal on Ageing*, 35(3), 204–209. <https://doi.org/10.1111/ajag.12288>
- Lawrence, D., Bryant, T. K., Nobel, T. B., Dolansky, M. A., & Singh, M. K. (2015). A comparative evaluation of patient satisfaction outcomes in an interprofessional student-run free clinic. *Journal of Interprofessional Care*, 29(5), 445–450. <https://doi.org/10.3109/13561820.2015.1010718>
- Lee, J. S., Combs, K., & Pasarica, M. (2017). Improving efficiency while improving patient care in a student-run free clinic. *Journal of the American Board of Family Medicine*, 30(4), 513–519. <https://doi.org/10.3122/jabfm.2017.04.170044>
- Levesque, J. F., Harris, M. F., & Russell, G. (2013). Patient-centred access to health care: Conceptualising access at the interface of health systems and populations. *International Journal for Equity in Health*, 12(1), Article 18. <https://doi.org/10.1186/1475-9276-12-18>
- Lieberman, K. M., Meah, Y. S., Chow, A., Tornheim, J., Rolon, O., & Thomas, D. C. (2011). Quality of mental health care at a student-run clinic: Care for the uninsured exceeds that of publicly and privately insured populations. *Journal of Community Health*, 36(5), 733–740. <https://doi.org/10.1007/s10900-011-9367-5>
- Mann, C. L., Rifkin, R. A., Nabel, E. M., Thomas, D. C., Meah, Y. S., & Katz, C. L. (2019). Exploring antidepressant adherence at a student-run free mental health clinic. *Community Mental Health Journal*, 55(1), 57–62. <https://doi.org/10.1007/s10597-018-0301-5>
- Manoochchri, H., Imani, E., Atashzadeh-Shoorideh, F., & Alavi-Majd, A. (2015). Competence of novice nurses: Role of clinical work during studying [Special Issue 4]. *Journal of Medicine and Life*, 8, 32–38.
- Martin, S., Williams, E., Huerth, B., & Robinson, J. (2015). A pharmacy student-facilitated interprofessional diabetes clinic with the Penobscot Nation. *Preventing Chronic Disease*, 12, Article 150295. <https://doi.org/10.5888/pcd12.150295>
- Meek, R., Morphet, J., Hood, K., Leech, M., & Sandry, K. (2013). Effect of interprofessional student-led beds on emergency department performance indicators. *Emergency Medicine Australasia*, 25(5), 427–434. <https://doi.org/10.1111/1742-6723.12118>

- Mohan, D. A., & Kumar, K. (2011). A study on the satisfaction of patients with reference to hospital services. *International Journal of Business Economics & Management Research*, 1(3), 15–25. http://www.zenithresearch.org.in/images/stories/pdf/2011/Dec/ZIBEMR/2_ZIBEMR_VOLI_ISSUE3.pdf
- National Health Information and Performance Principal Committee (NHIPPC). (2017). *The Australian health performance framework*. <https://meteor.aihw.gov.au/content/index.phtml/itemId/721590>
- Nayak, B. K. (2010). Understanding the relevance of sample size calculation. *Indian Journal of Ophthalmology*, 58(6), 469–470. <https://doi.org/10.4103/0301-4738.71673>
- Nuffer, W., McCollum, M., Ellis, S. L., & Turner, C. J. (2012). Further development of pharmacy student-facilitated diabetes management clinics. *American Journal of Pharmaceutical Education*, 76(3), Article 50. <https://doi.org/10.5688/ajpe76350>
- Obucina, M., Harris, N., Fitzgerald, J. A., Chaia, A., Radford, K., Rossc, A., Carr, L., & Vecchio, N. (2018). 2018–04: *The triple aim framework in the context of primary healthcare: A systematic literature review (Working paper)*. Griffith University. <https://research-repository.griffith.edu.au/handle/10072/390503>
- Ojeda, V. D., Eppstein, A., Lozada, R., Vargas-Ojeda, A. C., Strathdee, S. A., Goodman, D., & Burgos, J. L. (2014). Establishing a binational student-run free-clinic in Tijuana, Mexico: A model for US–Mexico border states. *Journal of Immigrant & Minority Health*, 16(3), 546–548. <https://doi.org/10.1007/s10903-012-9769-1>
- Ouyang, D., Yuan, N., Sheu, L., Lau, G., Chen, C., & Lai, C. J. (2012). Community health education at student-run clinics leads to sustained improvement in patients' hepatitis B knowledge. *Journal of Community Health*, 38(3), 471–479. <https://doi.org/10.1007/s10900-012-9631-3>
- Panzer, A., Murray, R., Stewart, R., Mills, J., Beaton, N., & Larkins, S. (2016). Regional health workforce planning through action research: Lessons for commissioning health services from a case study in Far North Queensland. *Australian Journal of Primary Health*, 22(1), 63–68. <https://doi.org/10.1071/PY15149>
- Portela, M. C., Pronovost, P. J., Woodcock, T., Carter, P., & Dixon-Woods, M. (2015). How to study improvement interventions: A brief overview of possible study types. *BMJ Quality & Safety*, 24(5), 325–336. <https://doi.org/10.1136/bmjqs-2014-003620>
- Prior, M., McManus, M., White, P., & Davidson, L. (2014). Measuring the “triple aim” in transition care: A systematic review. *Pediatrics*, 134(6), e1648–e1661. <https://doi.org/10.1542/peds.2014-1704>
- Rasmussen, S., Sperling, P., Poulsen, M. S., Emmersen, J., & Andersen, S. (2020). Medical students for health-care staff shortages during the COVID-19 pandemic. *The Lancet*, 395(10234), e79–e80. [https://doi.org/10.1016/S0140-6736\(20\)30923-5](https://doi.org/10.1016/S0140-6736(20)30923-5)
- Rockey, N. G., Weiskittel, T. M., Linder, K. E., Ridgeway, J. L., & Wieland, M. L. (2021). A mixed methods study to evaluate the impact of a student-run clinic on undergraduate medical education. *BMC Medical Education*, 21(1), Article 182. <https://doi.org/10.1186/s12909-021-02621-y>

- Schoenfelder, T., Klewer, J., & Kugler, J. (2011). Determinants of patient satisfaction: A study among 39 hospitals in an in-patient setting in Germany. *International Journal for Quality in Health Care*, 23(5), 503–509. <https://doi.org/10.1093/intqhc/mzr038>
- Schutte, T., Tichelaar, J., Donker, E., Richir, M. C., Westerman, M., & van Agtmael, M. A. (2018). Clarifying learning experiences in student-run clinics: A qualitative study. *BMC Medical Education*, 18(1), Article 244. <https://doi.org/10.1186/s12909-018-1352-6>
- Simmons, B. B., DeJoseph, D., Diamond, J., & Weinstein, L. (2009). Students who participate in a student-run free health clinic need education about access to care issues. *Journal of Health Care for the Poor & Underserved*, 20(4), 964–968. <https://doi.org/10.1353/hpu.0.0225>
- Stiefel, M., & Nolan, K. (2012). *A guide to measuring the Triple Aim: Population health, experience of care, and per capita cost* [White paper]. Institute of Healthcare Improvement. <http://www.ihl.org/resources/Pages/IHIWhitePapers/AGuideToMeasuringTripleAim.aspx>
- Stiefel, M. C., Perla, R. J., & Zell, B. L. (2010). A healthy bottom line: Healthy life expectancy as an outcome measure for health improvement efforts. *The Milbank Quarterly*, 88(1), 30–53. <https://doi.org/10.1111/j.1468-0009.2010.00588.x>
- Stuhlmiller, C. M., & Tolchard, B. (2015). Developing a student-led health and wellbeing clinic in an underserved community: Collaborative learning, health outcomes and cost savings. *BMC Nursing*, 14, Article 32. <https://doi.org/10.1186/s12912-015-0083-9>
- Stuhlmiller, C. M., & Tolchard, B. (2018). Population health outcomes of a student-led free health clinic for an underserved population: A naturalistic study. *Journal of Community Health*, 43, 193–200. <https://doi.org/10.1007/s10900-017-0402-z>
- Suen, J., Attrill, S., Thomas, J. M., Smale, M., Delaney, C. L., & Miller, M. D. (2020). Effect of student-led health interventions on patient outcomes for those with cardiovascular disease or cardiovascular disease risk factors: A systematic review. *BMC Cardiovascular Disorders*, 20(1), Article 332. <https://doi.org/10.1186/s12872-020-01602-1>
- Thakkar, A. B., Chandrashekar, P., Wang, W., & Blanchfield, B. B. (2019). Impact of a student-run clinic on emergency department utilization. *Family Medicine*, 51(5), 420–423. <https://doi.org/10.22454/FamMed.2019.477798>
- Vahidi, M., Jalilian Khavari, L., Sanadgol, G., Shirini, D., & Karamouzian, M. (2020). Student-led initiatives' potential in the COVID-19 response in Iran. *International Journal of Health Policy and Management*, 9(10), 464–465. <https://doi.org/10.34172/ijhpm.2020.82>
- Valaitis, R. K., Wong, S. T., MacDonald, M., Martin-Misener, R., O'Mara, L., Meagher-Stewart, D., Isaacs, S., Murray, N., Baumann, A., Burge, F., Green, M., Kaczorowski, J., & Savage, R. (2020). Addressing quadruple aims through primary care and public health collaboration: Ten Canadian case studies. *BMC Public Health*, 20(1), Article 507. <https://doi.org/10.1186/s12889-020-08610-y>
- Wahle, B., Meyer, K., Faller, M., Kochhar, K., & Sevilla, J. (2017). Assessment of hypertension management and outcomes at an Indianapolis student-run free clinic. *Journal of Health Care for the Poor and Underserved*, 28(2), 694–706. <https://doi.org/10.1353/hpu.2017.0068>

- Whitehead, A. L., Julious, S. A., Cooper, C. L., & Campbell, M. J. (2016). Estimating the sample size for a pilot randomised trial to minimise the overall trial sample size for the external pilot and main trial for a continuous outcome variable. *Statistical Methods in Medical Research*, 25(3), 1057–1073. <https://doi.org/10.1177/0962280215588241>
- Whittington, J. W., Nolan, K., Lewis, N., & Torres, T. (2015). Pursuing the triple aim: The first 7 years. *The Milbank Quarterly*, 93(2), 263–300. <https://doi.org/10.1111/1468-0009.12122>

Appendix A

Literature Search Strategy (Medline)

#	Search Statement
1	("student-led" or "student led" or "student-assisted" or "student assisted" or "student run" or "student-run" or "student facilitated" or "student-facilitated").mp. (mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms)
2	exp Students/ or exp Students, Health Occupations/
3	exp "Delivery of Health Care"/ or exp Community Health Services/
4	1 AND 2
5	3 AND 4
6	exp Evaluation Studies/
7	exp Clinical Trial/
8	exp Cohort Studies/
9	exp Retrospective Studies/
10	exp Comparative Study/
11	exp Follow-Up Studies/
12	exp "Outcome Assessment (Health Care)"/ or exp "Outcome and Process Assessment (Health Care)"
13	exp Patient Satisfaction/
14	exp "Costs and Cost Analysis"/
15	exp "Quality of Health Care"/ or exp Health Status/ or exp "Quality of Life"/
16	6 OR 7 OR 8 OR 9 OR 10 OR 11 OR 12
17	13 OR 14 OR 15
18	16 OR 17
19	5 AND 18

Appendix B

Student-Led Health Service Evaluations Inclusion Criteria

- Is in a peer reviewed journal
 - Is not a review article
 - Describes a student-led health service and/or intervention
 - Intervention impacts:
 - Patients receiving student-led healthcare services as inpatients OR outpatients OR from community-based healthcare service
 - Are established healthcare services that provide ongoing services and include one or more of the following characteristics:
 - Provides continuity of care by providing ongoing healthcare services to the community
 - Exposes students to the operational environment of healthcare and/or clinical services
 - Primary outcome focuses on evaluating one or more of the following elements:
 - Patient health outcomes
 - Patient experience/satisfaction
 - Patient cost
 - Provider cost
 - Cost effectiveness
 - Evaluates the intervention (may be retrospective or prospective) by:
 - collecting pre-intervention and post-intervention dataOR
 - comparing the intervention to a control (e.g., other models of care and/or types of healthcare services).
-

10.2 Appendix 2: A Critical Appraisal Tool for assessing health service evaluations using the Triple Aim Framework

PART ONE – Principles of Measurement

Part one of this critical appraisal tool, will ask a set of questions to enable the user to critically assess the selected measures of a healthcare system/service evaluation using the standards and principles identified by the National Quality Form's criteria for the evaluation of quality measures, Bilheimer's (201) and Perstronsk's (2010) measurement principles for evaluating population health metrics and the Triple Aim measurement principles, proposed by Stiefel and Nolan (2012).

The need for a defined population

- Does the evaluation articulate the methods of measurement, including how the target population was determined? (Y/N)
- If the evaluation focuses on a sub population, how is the sample size calculated and is this large enough for generalisability? (Y/N, N/A)
- Does the evaluation identify more than one population? (Y/N)
- And if so, how does the evaluation apply measures to each of the identified populations? (discussion)
- Does the evaluation articulate population characteristics including socioeconomic factors such as wealth and income; education, employment and occupation, family and social support; as well as disease burden and reasons for accessing care? (Y/N, discussion)

The need to gather data over time

- Are the points of measurement appropriate and sensitive enough to allow the evaluation to draw conclusions between common cause and special cause variation and/or to gain insight into the relationship between interventions and effects, and to better understand time lags between cause and effect? (Y/N, discussion)

The need to distinguish between outcome measures and process measures and between population and project measures.

Measuring Performance in Student-led Healthcare Services

- Does the population health measure focus on an outcome (e.g., morbidity, mortality, function, health-related quality of life) that is relevant to, or associated with, a national health goal/priority, the condition, population, and/or care being addressed? (Y/N)
- If the chosen measure for population health is an intermediate outcome measure, is there evidence that supports that the chosen measure leads to improved health/avoidance of harm or cost/benefit? (Y/N, N/A)
- Does the chosen measure for patient experience have evidence that supports its use in the measurement of patient experience care for the specific population it applies it to? (Y/N)
- Is there evidence to support that selected outcome measures are reliable in that the measure results are repeatable, producing the same results a high proportion of the time when assessed in the same population in the same time period? (Y/N, discussion)
- Is there evidence to support that selected outcome measures are valid in that the measure reflects the quality of care provided, adequately distinguishing good and poor quality? (Y/N, discussion)

The value of Benchmark data

- The measure is well defined and precisely specified so it can be implemented consistently within and across organizations and allows for comparability? (Y/N)
- If multiple data sources/methods are allowed, there is demonstration they produce comparable results. (Y/N, N/A, discussion)
- Does the evaluation utilise a comparison site and or comparison data to effectively draw conclusions from their results? (Y/N, Discussion)

PART TWO – Measurement of the Triple Aim

Population Health Outcomes

This section of the critical appraisal tool will ask a set of questions to enable the analysis of measurement tools used to assess health outcomes, looking specifically at how this approach to health outcome measurement fits into Evan and Standard's (1990) Model of Population

Health and how well this approach reflects the overall intentions of the Triple Aim Framework.

- Does the evaluation attempt to measure upstream factors, including the measurement of socioeconomic factors and physical environment? (Y/N)

Note: Socioeconomic factors can include: wealth and income; education, employment and occupation, family and social support.

Factors within the Physical Environment can include: the build environment; the food environment, community safety and culture, the media/information environment and environment pollution.

- If Yes, discuss how this approach to measuring population health outcomes aligns with the overall aims of the Triple Aim framework and how this reflects the evaluation's ability to assess health system/service impact on population health outcomes. (Discussion)
- Does the evaluation attempt to measure individual factors, including the measurement of individual factors including behavioral factors and physiological factors? (Y/N)
Note: Other areas of measurement associated with individual factors include genetic endowment, spirituality and resilience.
- If Yes, discuss how this approach to measuring population health outcomes aligns with the overall aims of the Triple Aim framework and how this reflects the evaluation's ability to assess health system/service impact on population health outcomes. (Discussion)
- Does the evaluation attempt to measure intermediate health outcomes including disease burden? (Y/N)
- If Yes, discuss how this approach to measuring population health outcomes aligns with the overall aims of the Triple Aim framework and how this reflects the evaluation's ability to assess health system/service impact on population health outcomes. (Discussion)
- Does the evaluation attempt to measure Health Outcomes (Downstream Factors) including a focus on Health and Function and/or Mortality? (Y/N)
Note: Other downstream factors that may be included in this type of measure include Quality of Life and Wellbeing.
- If Yes, discuss how this approach to measuring population health outcomes aligns with the overall aims of the Triple Aim framework and how this reflects the

evaluation's ability to assess health system/service impact on population health outcomes. (Discussion)

Patient Experience of Care

This section of the critical appraisal tool will ask a set of questions to enable the analysis of the ability of a health service evaluation to assess the Triple Aim dimension of experience care. This tool will look specifically at how well this approach to measurement fits into the IHI recommendations for evaluating experience of care from a patient's perspective and the IOM's six drivers of excellent care.

Overall Experience of Care

- Is overall experience of care measured? (Y/N)
- Is the assessment of overall experience of care assessed by the person who receives the care? (Y/N, discussion)
- How is this assessed? E.g. global experience questions from the patient, a member or a population survey? (discussion)

IOM's Six Aims of Improvement

- Is the safety of services provided measured? (Y/N)
- How is safety of healthcare assessed? (discussion)
Note: Recommended Triple Aim measures for safety include:
 - Rate of Adverse Events
 - Incidence of Nonfatal Occupational Injuries and Illnesses
 - Serious Reportable Events including product/device events, patient protection events, care management events, environmental events and/or potential criminal events.
- Is healthcare service effectiveness measured? (Y/N)
- How is effectiveness measured? (discussion)
- Are the measures used to measure effectiveness reliable? (Y/N, discussion)
Note: Recommended Triple Aim measures for effectiveness include:
 - Standardised mortality ratio
 - Unadjusted Raw Mortality %
 - Functional Health Outcome Measures

Measuring Performance in Student-led Healthcare Services

- % of hospital readmission.
- Reliability of Core Measures
- Is timeliness to access healthcare services measured? (Y/N)
- How is timelessness of healthcare services measured? (discussion)
Note: Recommended Triple Aim measures for timeliness include:
 - Days to Third Next Available Appointment
- Is the degree to which patients are involved in the direction of their own care measured? (Y/N)
- How is patient-centeredness measured? (discussion)
Note: Recommended Triple Aim measures for patient-centeredness include:
 - Patient-clinician communication satisfaction
- Is efficiency of care measured? (Y/N)
- How is healthcare efficiency measured? (discussion)
Note: Recommended Triple Aim measures for effectiveness include:
 - Hospital Days per Decedent during the Last Six Months of Life
- Are disparities in the healthcare system/service measured? (Y/N)
- How is equity within the healthcare system/service measured? (discussion)
Note: Equity is measured by stratifying all measures, when possible, into subpopulations that differentiate by gender, age, income, or racial groupings, for example.

Cost of Healthcare

This section of the Critical Appraisal Tool will ask a set of questions in relation to how cost is measured, how effective the approach to measuring costs is in capturing total cost and how well this approach reflects the overall intentions of the Triple Aim Framework.

- Does the evaluation measure costs associated with providing or receiving healthcare services? (Y/N)
- If yes, from which lens does the evaluation use to guide the measuring of cost associated with healthcare:
 - From a demand lens?
 - From an intermediary lens?

Measuring Performance in Student-led Healthcare Services

- From a supply lens?
 - If the evaluation looks at costs from a ‘demand’ lens, what does it measure?

Note: Triple Aim recommendations for measuring cost from a supply lens include:

Healthcare provider costs such as:

- Inpatient services
 - Outpatient facilities
 - Emergency department
 - Specialty services
 - Primary Care
 - Pharmacy
 - Other care provided
 - Healthcare provider overhead/margin.
- If the evaluation looks at costs from an intermediary lens, what does it measure?

Note: Triple Aim recommendations for measuring cost from an intermediary lens include:

 - Health plan costs
 - Health plan overhead/margin

If the evaluation looks at costs from and demand lens, what does it measure?

Note: Triple Aim recommendations for measuring cost from a demand lens include:

- Public/private insurance premiums
- Consumer out of pocket
- Public health expenditures
- Indirect costs such as absenteeism, presenteeism)

References

- Bilheimer, L. T. (2010). Evaluating metrics to improve population health. *Preventing Chronic Disease*, 7(4), A69. http://www.cdc.gov/pcd/issues/2010/jul/10_0016.htm
- Committee on Quality of Health Care in America, Institute of Medicine. (2001). *Crossing the quality chasm: A new health system for the 21st century*. National Academies Press.

- Evans, R. G., & Stoddart, G. L. (1990). Producing health, consuming health care. *Social Science & Medicine*, 31(12), 1347–1363. [https://doi.org/10.1016/0277-9536\(90\)90074-3](https://doi.org/10.1016/0277-9536(90)90074-3)
- Jacobson, D. M., & Teutsch, S. (2012). An environmental scan of integrated approaches for defining and measuring total population health by the clinical care system, the government public health system, and stakeholder organizations. *National Quality Forum*.
- National Quality Forum. (2011). Guidance for measure testing and evaluating scientific acceptability of measure properties. http://www.qualityforum.org/Publications/2011/01/Measure_Testing_Task_Force.aspx
- Pestronk, R. M. (2010). Using metrics to improve population health. *Preventing Chronic Disease*, 7(4), A70. http://www.cdc.gov/pcd/issues/2010/jul/10_0018.htm
- Stiefel, M., & Nolan, K. (2012). A guide to measuring the Triple Aim: Population health, experience of care, and per capita cost (IHI Innovation Series white paper). Institute for Healthcare Improvement.

10.3 Appendix 3:

Simmons, L., Barker, R., & Barnett, F. (2023). Evaluating allied health clinical placement performance: Protocol for a modified Delphi study. *JMIR Research Protocols*, 12, e44020. <https://doi.org/10.2196/44020>.

Protocol

Evaluating Allied Health Clinical Placement Performance: Protocol for a Modified Delphi Study

Lisa Simmons, MPH; Ruth Barker, DPhil; Fiona Barnett, DPhil

James Cook University, Townsville, Queensland, Australia

Corresponding Author:

Lisa Simmons, MPH

James Cook University

Bldg 43, Rehabilitation and Exercise Sciences

1 James Cook Dr

Townsville, Queensland, 4811

Australia

Phone: 61 0747813200

Email: lisa.simmons2@jcu.edu.au

Abstract

Background: University-affiliated student-led health care services have emerged in response to the challenges faced by universities in securing quality clinical placements for health care students. Evidence of the health care benefits and challenges of student-led health care services is growing, while evidence of clinical placement performance remains variable and not generalizable. Though there have been previous attempts to develop a framework for evaluation of clinical placement performance, concerns have been raised about the applicability of these frameworks across the various placement settings. Additionally, the perspectives of all key stakeholders on the critical areas of clinical placement performance have yet to be considered.

Objective: This study's objective is to gather information on areas of measurement related to student learning outcomes, experience of placement, and costs of placement and then develop consensus on which of those areas need to be included in a framework for evaluation of clinical placement performance within the context of student-led health care services. The aim of this paper is to outline a protocol for a modified Delphi study designed to gain consensus on what is important to measure when evaluating an allied health clinical placement.

Methods: We will recruit up to 30 experts to a heterogeneous expert panel in a modified Delphi study. Experts will consist of those with firsthand experience either coordinating, supervising, or undertaking clinical placement. Purposive sampling will be used to ensure maximum variation in expert panel member characteristics. Experts' opinions will be sought on measuring student learning outcomes, student experience, and cost of clinical placement, and other areas of clinical placement performance that are considered important. Three rounds will be conducted to establish consensus on what is important to measure when evaluating clinical placement. Each round is anticipated to yield both quantitative data (eg, percentage of agreement) and qualitative data (eg, free-text responses). In each round, quantitative data will be analyzed descriptively and used to determine consensus, which will be defined as $\geq 70\%$ agreement. Qualitative responses will be analyzed thematically and used to inform the subsequent round. Findings of each round will be presented, both consensus data and qualitative responses in each subsequent round, to inform expert panel members and to elicit further rankings on areas of measurement yet to achieve consensus.

Results: Data analysis is currently underway, with a planned publication in 2024.

Conclusions: The modified Delphi approach, supported by existing research and its ability to gain consensus through multiround expert engagement, provides an appropriate methodology to inform the development of a framework for the evaluation of clinical placement performance in allied health service.

International Registered Report Identifier (IRRID): DERR1-10.2196/44020

(*JMIR Res Protoc* 2023;12:e44020) doi: [10.2196/44020](https://doi.org/10.2196/44020)

KEYWORDS

clinical placement; cost of placement; learning outcomes; student experience; student-led health care services

Introduction

Universities face many challenges in sourcing and securing clinical placements for health students [1]. For regional universities, there is the added pressure of limited health care services from which to secure sufficient clinical placements [2]. The cost associated with paid placements is also a major concern, as paid placements can potentially create issues around placement outcomes and add to the financial burden on universities [3,4]. For example, the question for universities securing paid placements is whether the student learning outcomes or the student experiences achieved in these placements are equivalent to the amount paid. Conversely, the question may be whether an equivalent or greater outcome could be achieved through an alternate clinical placement. Placement providers also report increased costs associated with supervising students on clinical placement, including loss of productivity when working with inexperienced students, increased recruitment requirements to manage the additional workload, supervision of students on top of clinical workloads, and procuring and maintaining state-of-the-art equipment for teaching [5]. Cost of clinical placement to the clinical placement provider has been estimated to be an average of Aus \$34,326 (US \$22,531.3) per year for 1 student [5], influencing a health care provider's ability to offer placements without compensation [4]. As a result, university-affiliated student-led health care services have emerged to address the many challenges faced by universities in securing quality clinical placements for health care students [6].

Student-led health care services are often seen as innovative health care models providing much-needed services to disadvantaged or underserved populations [7]. There is mounting evidence supporting the benefits of student-led health care services as both adequate providers of care and attractive educational opportunities [8]. In a recent study, allied health students co-designed and implemented a health service in a remote Aboriginal community in northern Australia, where students learned how to adapt their skills and approaches to the cultural needs of the Aboriginal community [9]. However recent reviews of the outcomes of student-led health care services more broadly, indicate the need for more rigorous reporting [10], with more specific attention to students' skill development, knowledge, and behavior required [11]. If students are not adequately prepared to operate in a fashion similar to that of qualified health care professionals, then it is possible that undertaking placement in a student-led health care service may be detrimental to their learning outcomes and overall experience of placement. Conversely, providing students with the ability to operate in authentic clinical environments where they can collaborate and regulate their own learning needs may improve overall student experience. Current findings from evaluations of student-led health care services as providers of clinical placement lack generalizability [11,12] and there is little consensus on the most critical educational outcomes that need to be measured when students are on placement within these settings [12]. Therefore, further research is needed to establish a consensus on how to evaluate student-led health care services as clinical placement providers.

Clinical placement evaluation has typically been specific to a single element of student experience, for example student confidence [13] or student satisfaction [14], or alternatively, a specific learning outcome related to a single health profession, such as clinical competency of physiotherapy students [15]. To effectively evaluate the performance of student-led health care services as providers of clinical placement, all elements of the experience that are deemed to be important must be considered together. Furthermore, an evaluation framework that can be applied to student-led health care services, which includes elements of placement performance specific to the needs and expectations of the student, the placement supervisor, the placement coordinator and to the profession is required.

Applying an evaluation framework across various health professions and health care services is not without its challenges. Previous national stakeholder consultation on use of a universal framework indicated that disciplinary and contextual differences in supervision would impact on the effectiveness of such a framework [16]. Therefore, any framework used to evaluate the quality of clinical placement needs to be consultative, collaborative, and comprehensive, so that it can accurately assess clinical placement performance across different health care settings. In addition, the framework needs to be all-encompassing and flexible so that it can be applied across different clinical placement models and different health professions [16]. A framework that can be used to effectively evaluate all clinical placement will offer the opportunity for standardization and comparability, but more importantly measure the quality of placement experience, enable quality improvement, and enhance educational opportunities [17,18].

Previous studies that have used a Delphi approach to evaluate clinical placement, or to identify factors influencing clinical placement quality, predominately exist within the medical, nursing, and allied health literature. For example, the Delphi approach has been used to engage clinical placement key stakeholders to revise clinical placement evaluation tools in physiotherapy [19], as well as to generate expert consensus between nurse clinical educators to identify important factors influencing student learning during clinical placement [20]. Additionally, a modified Delphi approach was adopted to identify key features within a quality measures framework to guide clinical placement in allied health, dentistry, medicine, and pharmacy [18]. These studies support previous notions that current tools and approaches to evaluating clinical placement quality and performance are limited in their generalizability and that key factors influencing quality in clinical placement need to be considered, that is, student learning outcomes, experience of placement, and cost of placement.

The aim of this paper, therefore, is to outline a protocol for a modified Delphi study designed to gain consensus on what is important to measure when evaluating an allied health clinical placement. This study's objective is to gather information on areas of measurement related to student learning outcomes, experience of placement and cost of placement and then reach consensus on which of those areas need to be included in a framework for evaluation of clinical placement performance within the context of student-led health care services.

Methods

The Delphi Approach

A 3-round modified Delphi study design will be conducted to establish consensus on what is important to measure when evaluating clinical placement, from the perspective of students, placement supervisors, and coordinators, as experts with firsthand experiences of clinical placement.

The Delphi is a mixed methods approach to systematically collect judgments and opinions on a topic, through sequential questionnaires to gain respondents feedback on responses from earlier rounds of questioning [21]. The primary aim of the Delphi technique is to obtain consensus among a selected panel of experts. The Delphi approach will allow for drilling down into common areas of clinical placement through multiple rounds of questioning, as well as analysis of conflicting and common viewpoints through statistical methods [22]. The Delphi technique has been used extensively in higher education, health, and social sciences to inform the development of criteria, forecasting, issue prioritization, policy formation, and framework development [23,24].

Approaches to using the Delphi technique have evolved over time, which has led to some criticism on the validity of this approach. At the heart of the Delphi technique is the ability to form consensus between experts within a particular field. However, there is currently no set level for consensus [24] with consensus previously set anywhere from 51% to 100% [25]. Additionally, previous studies indicate that panel size and the area of investigation influences consensus [26] and consideration needs to be given to achieving an expert panel of an appropriate size and make up [27].

Anonymity, iteration, controlled feedback, and statistical stability of consensus are essential components of the Delphi approach [28]. However, the time it takes to complete these types of studies is often underpredicted [24] and has been found to influence low response rates in later rounds [24,25,27]. The several adaptations of the Delphi technique have also received criticism, as many Delphi studies lack detailed methodologies, influencing their reproducibility [24,28]. Additionally, the relevance of using experts to inform research has been questioned [25-27], as expert opinion is considered inferior to more highly regarded evidence-based methods [28,29]. The term *expert* has also broadened over time and is now not only used to refer to an individual's scientific or professional expertise but can include patients or users of an intervention to create diversity within the expert panel [30]. It is not clear what the effects of a heterogeneous expert panel has on consensus building [30], however, this has become a defining feature within the Delphi technique [31].

Currently, no proven quality indicators for Delphi studies exist [30]. However, the Delphi technique does provide an opportunity to draw on the experiences and expertise of a range of key stakeholders with a diverse set of perspectives in an iterative process where complex ideas can be examined and built on to form consensus. Therefore, considering the limitations of this approach, it is crucial to plan and set standards

before commencing the process to improve the robustness of the Delphi technique [28].

Expert Panel Members

Overview

A minimum of 18 and maximum of 30 experts will be recruited to the expert panel, with a minimum of 6 members (hereafter referred to as *experts*) for each identified group (ie, recent allied health graduates, placement supervisors, and placement coordinators). This panel size is viewed as manageable, where available resources can be applied to vigorously promote high response rates within rounds [32]. To achieve heterogeneity within the panel, purposive sampling to ensure maximum variation in expert characteristics will be undertaken. Experts will consist of those with firsthand experience either coordinating placement, supervising placement, or undertaking clinical placement. All experts will be aged 18 years or older, be an Australian resident, and be English speaking. Additionally, clinical placement coordinators will be required to be employed in an Australian university allied health program, with involvement in coordinating or undertaking assessment of clinical placement within the past 2 years; clinical placement supervisors will be required to be located within Australia, and have had supervised allied health students from Australia-based universities within the past 2 years; and graduates will be required to have completed their allied health program within the past 12 months from an Australian university, successfully completing a clinical placement subject of an applied or immersive nature (eg, not solely an observational placement).

Consistent with the Delphi technique, the aforementioned approach to sampling will elicit expert opinion on the topic in question, and the disciplinary areas of expertise required [33]. Suitability of panel membership has been generally based on a background or experience concerning the target issue and an ability to contribute helpful inputs to the questions being asked [33]. The heterogeneity of the expert panel, as a critical feature within the Delphi technique [33], is required to maintain quality in research design and uncover the entire spectrum of opinion on the topic [27].

Expert Panel Member Recruitment

Potential experts will be identified, and if interested, will be invited to register through an electronic short survey sent through email. In the survey, they will be asked to confirm their interest in taking part in the study or to forward it to other potential experts meeting the target group criteria. The eligibility of potential experts who have registered will be assessed and if deemed to meet the target group criteria, will be invited to participate in the study.

Placement supervisors will be identified based on their previous or current involvement in hosting allied health students on clinical placement. Placement supervisor information from across Australia will be identified through the James Cook University placement software database (InPlace) and by snowball sampling. InPlace is a web-based software application developed by QuantumIT Pty Ltd to enable universities to identify supervisors for a given site, coordinate and manage

clinical placements, and store data on placement contact information.

Placement coordinators will be identified by their previous or current involvement in coordinating clinical placement within Australian universities. Placement coordinator information will be identified through academic role descriptions on Australian university websites and membership details within discipline specific clinical placement committees.

Recent graduates will be identified by their past enrollment in a placement subject within an Australian university allied health program. This information will be identified through James Cook University alumni networks and snowball sampling whereby contact will be made with key people within clinical placement partnerships and those who hold key positions within Australian universities to identify members of the target groups who meet the inclusion criteria. Key people within clinical

partnerships will include national clinical placement committed groups within professional registration bodies (eg, Exercise and Sport Science Australia, Australian Health Practitioner Regulation Agency, Occupational Therapy Australia, and Speech Pathology Australia) and existing placement arrangements with external clinical placement sites.

Panel Characteristics

Purposive sampling of experts to ensure equal representation across placement coordinators, placement supervisors, and recent graduates and to achieve maximum variation in expert characteristics, will be conducted using a matrix method to gain representation based on geographical location, experience, and exposure to clinical placement, as well as the allied health profession they represent. [Textbox 1](#) outlines the expert panel selection criteria and the specific factors of variation intended to be achieved through purposive sampling techniques.

Textbox 1. Selection criteria and considerations for variation in expert panel members.

Placement coordinators:

- Duration in the role of placement coordinator
- Geographical locations of placements coordinated, that is, rural or remote, regional, or metropolitan areas
- Types of clinical placement coordinated, for example, student-led, role-emerging, traditional, and interdisciplinary
- Allied health discipline for which they coordinate placement

Placement supervisors:

- Level of experience supervising students on clinical placement
- Geographical locations of previous and current employment, that is, rural or remote, regional, or metropolitan areas
- Types of clinical placement supervised, for example, student-led, role-emerging, traditional, and interdisciplinary
- Allied health discipline for which they currently supervise

Recent graduates:

- Level of exposure to areas of practice while on placement
- Geographical locations of placements completed, that is, rural or remote, regional, or metropolitan areas
- Types of clinical placement completed, for example, student-led, role-emerging, traditional, and interdisciplinary
- Allied health discipline from which they graduated

Survey Design and Facilitation Within Delphi Rounds

The Delphi technique uses several rounds, whereby a series of questionnaires are provided to experts until consensus is reached [27]. Following each round, a summary of results from the previous round is provided to the experts to either gain consensus or elicit further discussion [27]. In this study, 3 or more consensus rounds will be conducted with survey questionnaires sent to each expert electronically.

Like that of a classical Delphi, the survey design will use open-ended questions, aimed at facilitating idea generation and

eliciting opinion [27]. Three overarching themes, predetermined through a review of the literature, will be used to identify common areas of measurement when evaluating student-led health care services and clinical placement. These overarching themes include “learning outcomes,” “student experience,” and “cost of placement.”

A pilot questionnaire for round 1 will be tested with a small sample of people including 1 allied health placement supervisor, 1 recent graduate, and 1 allied health academic to ensure clarity of each question [34]. [Textbox 2](#) outlines open-ended questions 1 to 5 that will be included in the round 1 questionnaire.

Textbox 2. Proposed round 1 survey questions.

Question 1: Reflecting on previous experience, what is important to measure when evaluating clinical placement?

Question 2: When evaluating learning outcomes of clinical placement, please describe what variables to measure. (Provide an example where necessary)

Question 3: When evaluating student experiences of clinical placement, please describe what variables are essential to measure. (Provide an example where necessary)

Question 4: When evaluating costs associated with clinical placement, please describe what variables are essential to measure. (Provide an example where necessary)

Question 5: Is there any additional information that you would like to provide in relation to what is important to measure when evaluating clinical placement?

Question 1 is designed to set the scene and encourage the experts to respond to the question more broadly, without leading their responses. Questions 2–4 are designed to solicit information around specific areas of clinical placement related to the predetermined themes and to direct experts to consider what specific areas of clinical placement, that is, subthemes of measurement, exist when evaluating clinical placement. The final question in the survey will allow experts to discuss other areas of clinical placement evaluation, not yet covered.

Round 2 will include a structured questionnaire that will focus on areas of measurement identified in round 1 and relate to the overarching themes of learning outcomes, student experience, and cost of placement. Experts will rank the level of importance for each area of measurement using a 4-point Likert-type scale ranging from 1=not very important to 4=very important [34]. Experts will be given the opportunity to provide suggestions on any current methods of measurement for each of the proposed areas of measurement, which then will be analyzed and presented in subsequent rounds [35].

In round 3, a list of prioritized areas of measurement from the previous round will be presented. Experts will be asked to rank their level of agreement on the areas of measurement required, using 2 options: agree or disagree. Additionally, any specific methods of measurement identified in round 2 will be ranked using a 5-point Likert-type scale ranging from 1=least effective to 5=most effective [34]. Once again, experts will be invited to provide free-text comments to further explain their position.

Data Collection

All responses will be captured using the Qualtrics web-based survey platform (version 2009; Qualtrics). For each round, each expert will be sent a unique web link to access the surveys. Expert panel members will be provided with a minimum of 4 weeks to complete all surveys within each round, with only those who participated in previous rounds being invited to participate in subsequent rounds. Weekly reminder emails will be sent to each expert until each round is completed. Once the final deadline is reached, surveys will be closed to all experts and responses will be analyzed before commencing the next round. Each survey will take no more than 40 minutes to complete and all responses will be deidentified and coded to maintain anonymity between experts.

Data Analysis

Round 1 responses will be analyzed using thematic analysis to generate themes related to “learning outcomes,” “experience of placement,” and “cost of placement,” as well as any additional

themes identified through the process. The thematic analysis will follow Braun and Clark’s [36] 6-phase framework for analyzing qualitative data [36]. These steps include becoming familiar with the data, generating initial codes, searching for themes, reviewing, and defining themes, as well as the final write-up [37]. Qualitative data analysis software, NVivo (version 12; NVivo Inc), will be used to code and group data. Additionally, triangulation will occur between the main research team (LS, FB, and RB) and an independent researcher with experience in thematic analysis to ensure validity of our assumptions through the convergence of themes from different sources [38].

Round 2 and 3 quantitative data will be analyzed using percentage of agreement to confirm whether consensus had been achieved. As identified in other Delphi protocols within health and education fields, combined scores of importance and agreement must equal $\geq 75\%$ to achieve consensus [39]. In accordance with round 1, qualitative data from rounds 2 and 3 will be analyzed thematically, where common themes will be identified and presented as statements in subsequent rounds.

Ethical Considerations

Informed consent will be obtained before participating in the research project through a unique electronic link, which will form the first page of the questionnaire in round 1. Expert anonymity will be maintained through coding of participant responses and any identifying information will not be linked with any research materials or questionnaires developed through the modified Delphi process or in the outputs that result from this research. Additionally, no compensation will be offered to selected experts for their participation in this study.

Ethical approval has been obtained through the James Cook Human Research Ethics Committee (H7541).

Results

Data analysis is underway, with the results of the modified Delphi study expected to be submitted for publication in 2024.

Discussion

Overview

The aim of this modified Delphi study is to obtain consensus from a panel of experts on how to measure the salient areas of student learning outcomes, student experience, and cost of clinical placement, and to gain valuable insight into the important areas of clinical placement measurement. The

outcomes of this project are intended to inform the development of a framework for evaluation of clinical placement performance.

The strength of using a modified Delphi study design for this proposed study is that it will allow for multiple perspectives from the range of stakeholders whose experiences are influenced by clinical placement performance. As a result, experts will be drawn from a variety of backgrounds to produce heterogeneity and will ensure investigation of the full scope of opinions associated with the topic [27]. The Delphi principle of anonymity also provides strength to this study's design, as it offers an equal chance for each expert to respond in a fashion that is unbiased by the identities of the other panel members [40]. By maintaining communication through electronic means and providing deidentified results in each subsequent round, this study will ensure each expert has the opportunity to react independently, eliminating subject bias and avoiding the potential of power influenced dynamics between experts [41].

Within the Delphi approach, the notion exists that members of the panel are experts in the area of interest, where the term *expert* has been defined as "an informed individual," a specialist in their field, or someone who is knowledgeable in a specific subject [27]. Within this study, the definition of *expert* is based on key stakeholders of clinical placement, which is commonly identified as students, universities, placement supervisors, and the organizations in which placement takes place [4,42], all of which, significantly influence clinical placement quality and performance. Incorporating the knowledge, views, and experiences of key stakeholders is critical to determining a best practice approach to the evaluation of clinical placement performance. Criticism of the expert opinion sought within the Delphi approach applies to the terminology used, determining who is an expert and what degree of expertise is required to offer opinion [27]. Expert opinion has also been criticized as a poor basis for making judgments on a topic and that researchers should consider whether the research question could be better

answered through a systematic review [31,43]. However, current systematic reviews on clinical placement performance in student-led health care services identified limitations in the overall quality and generalizability of the research [10-12]. Therefore, this study will inform the critical appraisal of studies that intend to evaluate student-led health care services as providers of clinical placement and whether this is aligned to key stakeholder perspectives.

Consensus will be determined in this study using percentage of agreement, where scores of importance, effectiveness, and agreement must equal $\geq 75\%$ to be deemed consensus. As seen in similarly designed studies [32,39], this approach favors the majority, but also allows for the anticipated variability in opinion from a heterogeneous expert panel. As a group of experts are unlikely to demonstrate 100% agreement, consensus forming is the essence of the Delphi technique, wherein an appropriate level of consensus needs to be determined to avoid bias [31,43]. Determining consensus remains a contentious issue with critics of the Delphi approach [27,32], however most Delphi researchers agree that the approach needs to be determined in advance and that resistance to consensus needs to be considered carefully, as this will yield new perspectives on the topic in question and will require further investigation [32,44].

Conclusion

This protocol paper describes a modified Delphi study design, to explore key stakeholder perspectives on important areas of clinical placement performance measurement, related to learning outcomes, student experience, and cost of placement. Despite the limitations of the Delphi approach, existing research, and its ability to gain consensus through multiround expert engagement supports this methodology as appropriate to inform the development of a framework for the evaluation of clinical placement performance. As such, the outcomes of this study are intended to form part of a framework for the evaluation of allied health student-led health care services.

Data Availability

The data sets generated and analyzed during this study are available from the corresponding author on reasonable request.

Authors' Contributions

All authors contributed to the design of the research, selection of expert panel members, and writing of the manuscript.

Conflicts of Interest

None declared.

References

1. Frakes KA, Tyzack Z, Miller M, Davies L, Swanston A, Brownie S. The capricornia project: developing and implementing an interprofessional student-assisted allied health clinic. Queensland Government. 2011. URL: https://www.health.qld.gov.au/data/assets/pdf_file/0026/147581/cabpipefull1.pdf [accessed 2023-08-05]
2. Barker RN, Sealey CJ, Polley ML, Mervin MC, Comans T. Impact of a person-centred community rehabilitation service on outcomes for individuals with a neurological condition. *Disabil Rehabil* 2017;39(11):1136-1142 [doi: [10.1080/09638288.2016.1185803](https://doi.org/10.1080/09638288.2016.1185803)] [Medline: [27281692](https://pubmed.ncbi.nlm.nih.gov/27281692/)]
3. Copeland D. Paying for nursing student clinical placements, ethical considerations. *J Prof Nurs* 2020;36(5):330-333 [doi: [10.1016/j.profnurs.2020.01.008](https://doi.org/10.1016/j.profnurs.2020.01.008)] [Medline: [33039066](https://pubmed.ncbi.nlm.nih.gov/33039066/)]

4. Patrick CJ, Peach D, Pocknee C, Webb F, Fletcher M, Pretto G. The WIL (Work Integrated Learning) report: a national scoping study [Australian Learning and Teaching Council (ALTC) final report]. Queensland University of Technology. 2008. URL: <https://eprints.qut.edu.au/216185/> [accessed 2021-11-11]
5. Bowles K, Haines T, Molloy E, Maloney S, Kent F, Sevenhuysen S, et al. The costs and benefits of providing undergraduate student clinical placements for a health service organisation: an evidence check rapid review brokered by the Sax Institute for the Hunter and Coast Interdisciplinary Training Network through the Health Education Training Institute (HETI). Sax Institute. 2014. URL: <https://www.saxinstitute.org.au/publications/evidence-check-library/the-costs-and-benefits-of-providing-undergraduate-student-clinical-placements/> [accessed 2021-09-24]
6. Stuhlmiller CM, Tolchard B. Developing a student-led health and wellbeing clinic in an underserved community: collaborative learning, health outcomes and cost savings. *BMC Nurs* 2015;14(1):32 [FREE Full text] [doi: [10.1186/s12912-015-0083-9](https://doi.org/10.1186/s12912-015-0083-9)] [Medline: [26085815](https://pubmed.ncbi.nlm.nih.gov/26085815/)]
7. Stuhlmiller CM, Tolchard B. Population health outcomes of a student-led free health clinic for an underserved population: a naturalistic study. *J Community Health* 2018;43(1):193-200 [FREE Full text] [doi: [10.1007/s10900-017-0402-z](https://doi.org/10.1007/s10900-017-0402-z)] [Medline: [28681281](https://pubmed.ncbi.nlm.nih.gov/28681281/)]
8. Beckman EM, Mandrusiak A, Forbes R, Mitchell L, Tower M, Cunningham B, et al. A student-led, interprofessional care, community-based healthcare service: student, clinical educator and client perceptions of interprofessional care and education. *FoHPE* 2022;23(1):90-108 [FREE Full text] [doi: [10.1111/fohpe.v23i1.476](https://doi.org/10.1111/fohpe.v23i1.476)]
9. Bird K, Stothers K, Armstrong E, Marika ED, Yunupingu MD, Brown L, et al. Margithini gunga'yunawu ga gunga'yunawu margithinyarawu learning to connect and connecting to learn: preparing the rural and remote allied health workforce through a co-created student-implemented service in East Arnhem, Australia. *Aust J Rural Health* 2022;30(1):75-86 [FREE Full text] [doi: [10.1111/ajr.12813](https://doi.org/10.1111/ajr.12813)] [Medline: [34932243](https://pubmed.ncbi.nlm.nih.gov/34932243/)]
10. Suen J, Atrill S, Thomas JM, Smale M, Delaney CL, Miller MD. Effect of student-led health interventions on patient outcomes for those with cardiovascular disease or cardiovascular disease risk factors: a systematic review. *BMC Cardiovasc Disord* 2020;20(1):332 [FREE Full text] [doi: [10.1186/s12872-020-01602-1](https://doi.org/10.1186/s12872-020-01602-1)] [Medline: [32652933](https://pubmed.ncbi.nlm.nih.gov/32652933/)]
11. Schutte T, Tichelaar J, Dekker RS, van Agtmael MA, de Vries TGM, Richir MC. Learning in student-run clinics: a systematic review. *Med Educ* 2015;49(3):249-263 [doi: [10.1111/medu.12625](https://doi.org/10.1111/medu.12625)] [Medline: [25693985](https://pubmed.ncbi.nlm.nih.gov/25693985/)]
12. Marsh W, Colbourne DM, Way S, Hundley VA. Would a student midwife run postnatal clinic make a valuable addition to midwifery education in the UK?—A systematic review. *Nurse Educ Today* 2015;35(3):480-486 [doi: [10.1016/j.nedt.2014.11.015](https://doi.org/10.1016/j.nedt.2014.11.015)] [Medline: [25497039](https://pubmed.ncbi.nlm.nih.gov/25497039/)]
13. Wright A, Moss P, Dennis DM, Harrold M, Levy S, Furness AL, et al. The influence of a full-time, immersive simulation-based clinical placement on physiotherapy student confidence during the transition to clinical practice. *Adv Simul (Lond)* 2018;3:3 [FREE Full text] [doi: [10.1186/s41077-018-0062-9](https://doi.org/10.1186/s41077-018-0062-9)] [Medline: [29484204](https://pubmed.ncbi.nlm.nih.gov/29484204/)]
14. Fröberg M, Leanderson C, Fläckman B, Hedman-Lagerlöf E, Björklund K, Nilsson GH, et al. Experiences of a student-run clinic in primary care: a mixed-method study with students, patients and supervisors. *Scand J Prim Health Care* 2018;36(1):36-46 [FREE Full text] [doi: [10.1080/02813432.2018.1426143](https://doi.org/10.1080/02813432.2018.1426143)] [Medline: [29368978](https://pubmed.ncbi.nlm.nih.gov/29368978/)]
15. Muhamad Z, Ramli A, Amat S. Validity and reliability of the clinical competency evaluation instrument for use among physiotherapy students: pilot study. *Sultan Qaboos Univ Med J* 2015;15(2):e266-e274 [FREE Full text] [Medline: [26052461](https://pubmed.ncbi.nlm.nih.gov/26052461/)]
16. Promoting quality in clinical placements: literature review and national stakeholder consultation. Siggins Miller Consultants. Adelaide: Health Workforce Australia; 2012. URL: <https://www.adea.com.au/wp-content/uploads/2013/08/Promoting-quality-in-clinical-placements-report-20130408.pdf> [accessed 2022-09-24]
17. Cooper S, Cant R, Waters D, Luders E, Henderson A, Willets G, et al. Measuring the quality of nursing clinical placements and the development of the Placement Evaluation Tool (PET) in a mixed methods co-design project. *BMC Nurs* 2020;19:101 [FREE Full text] [doi: [10.1186/s12912-020-00491-1](https://doi.org/10.1186/s12912-020-00491-1)] [Medline: [33132757](https://pubmed.ncbi.nlm.nih.gov/33132757/)]
18. McAllister L, Nagarajan S, Scott L, Smith L, Thomson K. Developing measures of placement quality in allied health, dentistry, medicine, and pharmacy. *Int J Pract-Based Learn Health Soc Care* 2018;6(2):31-47 [FREE Full text] [doi: [10.18552/ijpbhlsc.v6i2.493](https://doi.org/10.18552/ijpbhlsc.v6i2.493)]
19. Mori B, Quesnel M, Wojkowski S. Students' perspectives on their experience in clinical placements: using a modified Delphi methodology to engage physiotherapy stakeholders in revising the national form. *Physiother Can* 2019;71(4):368-381 [FREE Full text] [doi: [10.3138/ptc-2018-43.e](https://doi.org/10.3138/ptc-2018-43.e)] [Medline: [31762547](https://pubmed.ncbi.nlm.nih.gov/31762547/)]
20. McTier L, Phillips NM, Duke M. Factors influencing nursing student learning during clinical placements: a modified Delphi study. *J Nurs Educ* 2023;62(6):333-341 [FREE Full text] [doi: [10.3928/01484834-20230404-01](https://doi.org/10.3928/01484834-20230404-01)] [Medline: [37279976](https://pubmed.ncbi.nlm.nih.gov/37279976/)]
21. Murry JW, Hammons JO. Delphi: a versatile methodology for conducting qualitative research. *Rev High Educ* 1995;18(4):423-436 [doi: [10.1353/rhe.1995.0008](https://doi.org/10.1353/rhe.1995.0008)]
22. Rowe G, Wright G. Expert opinions in forecasting: the role of the Delphi technique. In: Armstrong JS, editor. *Principles of Forecasting: A Handbook for Researchers and Practitioners*. International Series in Operations Research & Management Science, Vol 30. Boston, MA: Springer; 2001:125-144
23. Efstathiou N, Ameen J, Coll AM. A Delphi study to identify healthcare users' priorities for cancer care in Greece. *Eur J Oncol Nurs* 2008;12(4):362-371 [doi: [10.1016/j.ejon.2008.04.010](https://doi.org/10.1016/j.ejon.2008.04.010)] [Medline: [18547866](https://pubmed.ncbi.nlm.nih.gov/18547866/)]

24. Veugelaers R, Gaakeer MI, Patka P, Huijsman R. Improving design choices in Delphi studies in medicine: the case of an exemplary physician multi-round panel study with 100% response. *BMC Med Res Methodol* 2020;20(1):156 [FREE Full text] [doi: [10.1186/s12874-020-01029-4](https://doi.org/10.1186/s12874-020-01029-4)] [Medline: [32539717](#)]
25. Keeney S, Hasson F, McKenna H. Consulting the oracle: ten lessons from using the Delphi technique in nursing research. *J Adv Nurs* 2006;53(2):205-212 [doi: [10.1111/j.1365-2648.2006.03716.x](https://doi.org/10.1111/j.1365-2648.2006.03716.x)] [Medline: [16422719](#)]
26. von der Gracht HA. Consensus measurement in Delphi studies. *Technol Forecast Soc Change* 2012;79(8):1525-1536 [doi: [10.1016/j.techfore.2012.04.013](https://doi.org/10.1016/j.techfore.2012.04.013)]
27. Keeney S, Hasson F, McKenna HP. *The Delphi Technique in Nursing and Health Research*. Oxford, UK: Wiley Publishing; 2011.
28. Gallo A. The Delphi method: a structured approach to submit a quality editorial output on scholarly journals. *Medici Oggi*. 2022. URL: <https://medicioggi.it/metodologia-della-ricerca/the-delphi-method-a-structured-approach-to-submit-a-quality-editorial-output-on-scholarly-journals/> [accessed 2023-08-05]
29. Evans D. Hierarchy of evidence: a framework for ranking evidence evaluating healthcare interventions. *J Clin Nurs* 2003;12(1):77-84 [FREE Full text] [doi: [10.1046/j.1365-2702.2003.00662.x](https://doi.org/10.1046/j.1365-2702.2003.00662.x)] [Medline: [12519253](#)]
30. Niederberger M, Spranger J. Delphi technique in health sciences: a map. *Front Public Health* 2020;8:457 [FREE Full text] [doi: [10.3389/fpubh.2020.00457](https://doi.org/10.3389/fpubh.2020.00457)] [Medline: [33072683](#)]
31. Barrett D, Heale R. What are Delphi studies? *Evid Based Nurs* 2020;23(3):68-69 [FREE Full text] [doi: [10.1136/ebnurs-2020-103303](https://doi.org/10.1136/ebnurs-2020-103303)] [Medline: [32430290](#)]
32. de Villiers MR, de Villiers PJT, Kent AP. The Delphi technique in health sciences education research. *Med Teach* 2005;27(7):639-643 [doi: [10.1080/13611260500069947](https://doi.org/10.1080/13611260500069947)] [Medline: [16332558](#)]
33. Hsu C, Sandford B. The Delphi technique: making sense of consensus. *Pract Assess Res Eval* 2007;12:1-8 [FREE Full text] [doi: [10.7275/pd29-th90](https://doi.org/10.7275/pd29-th90)]
34. Müllersdorf M, Ivarsson AB. Occupation as described by academically skilled occupational therapists in Sweden: a Delphi study. *Scand J Occup Ther* 2011;18(2):85-92 [doi: [10.3109/11038128.2010.483689](https://doi.org/10.3109/11038128.2010.483689)] [Medline: [20553112](#)]
35. Daud AZC, Yau MK, Barnett F. A consensus definition of occupation-based intervention from a Malaysian perspective: a Delphi study. *Br J Occup Ther* 2015;78(11):697-705 [doi: [10.1177/0308022615569510](https://doi.org/10.1177/0308022615569510)]
36. Braun V, Clarke V. Using thematic analysis in psychology. *Qual Res Psychol* 2006;3(2):77-101 [FREE Full text] [doi: [10.1191/1478088706qp063oa](https://doi.org/10.1191/1478088706qp063oa)]
37. Maguire M, Delahunt B. Doing a thematic analysis: a practical, step-by-step guide for learning and teaching scholars. *AISHE-J* 2017;9(3):3351 [FREE Full text]
38. Carter N, Bryant-Lukosius D, DiCenso A, Blythe J, Neville AJ. The use of triangulation in qualitative research. *Oncol Nurs Forum* 2014;41(5):545-547 [doi: [10.1188/14.ONF.545-547](https://doi.org/10.1188/14.ONF.545-547)] [Medline: [25158659](#)]
39. Havers SM, Martin E, Wilson A, Hall L. Implementation of government-directed policy in the hospital setting: a modified Delphi study. *Health Res Policy Syst* 2019;17(1):91 [FREE Full text] [doi: [10.1186/s12961-019-0500-8](https://doi.org/10.1186/s12961-019-0500-8)] [Medline: [31775771](#)]
40. Winkler J, Moser R. Biases in future-oriented Delphi studies: a cognitive perspective. *Technol Forecast Soc Change* 2016;105:63-76 [doi: [10.1016/j.techfore.2016.01.021](https://doi.org/10.1016/j.techfore.2016.01.021)]
41. Pezaro S, Clyne W. Achieving consensus in the development of an online intervention designed to effectively support midwives in work-related psychological distress: protocol for a Delphi study. *JMIR Res Protoc* 2015;4(3):e107 [FREE Full text] [doi: [10.2196/resprot.4766](https://doi.org/10.2196/resprot.4766)] [Medline: [26341794](#)]
42. Mannix J, Wilkes L, Luck L. Key stakeholders in clinical learning and teaching in Bachelor of Nursing programs: a discussion paper. *Contemp Nurse* 2009;32(1-2):59-68 [doi: [10.5172/conu.32.1-2.59](https://doi.org/10.5172/conu.32.1-2.59)] [Medline: [19697978](#)]
43. Ecken P, Gnatzy T, von der Gracht HA. Desirability bias in foresight: consequences for decision quality based on Delphi results. *Technol Forecast Soc Change* 2011;78(9):1654-1670 [doi: [10.1016/j.techfore.2011.05.006](https://doi.org/10.1016/j.techfore.2011.05.006)]
44. Critcher C, Gladstone B. Utilizing the Delphi technique in policy discussion: a case study of a privatized utility in Britain. *Public Adm* 1998;76(3):431-449 [doi: [10.1111/1467-9299.00110](https://doi.org/10.1111/1467-9299.00110)]

Edited by A Mavragani; submitted 03.11.22; peer-reviewed by S Hertling, H Alsharraf, W Klement, N Sidhu; comments to author 04.05.23; revised version received 27.06.23; accepted 21.07.23; published 31.08.23

Please cite as:

Simmons L, Barker R, Barnett F
Evaluating Allied Health Clinical Placement Performance: Protocol for a Modified Delphi Study
JMIR Res Protoc 2023;12:e44020
URL: <https://www.researchprotocols.org/2023/1/e44020>
doi: [10.2196/44020](https://doi.org/10.2196/44020)
PMID: [37651163](https://pubmed.ncbi.nlm.nih.gov/37651163/)

©Lisa Simmons, Ruth Barker, Fiona Barnett. Originally published in JMIR Research Protocols (<https://www.researchprotocols.org>), 31.08.2023. This is an open-access article distributed under the terms of the Creative Commons Attribution License (<https://creativecommons.org/licenses/by/4.0/>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work, first published in JMIR Research Protocols, is properly cited. The complete bibliographic information, a link to the original publication on <https://www.researchprotocols.org>, as well as this copyright and license information must be included.

10.4 Appendix 4:

Simmons, L., Barker, R., Barnett, F., & McGuckin, T. (2024). Evaluating clinical placement performance: What is important to measure? *In ANZAHPE 2024: Cultivating Innovation Abstract Book* (p. 183). ANZAHPE. Abstract presented at the ANZAHPE 2024 Festival, 1–4 July, Adelaide, SA, Australia.

Evaluating clinical placement performance: What is important to measure?

Simmons L,¹ Ruth Barker¹, Fiona Barnett¹ & Teneale McGuckin¹

¹James Cook University

Introduction/Background

Evaluating clinical placement is generally specific to a single element of student experience or a specific learning outcome related to a single health profession. However, to effectively evaluate the performance of clinical placement, all elements of the experience that are deemed to be important must be considered together. Therefore, any evaluation of clinical placement needs to be consultative, collaborative and comprehensive, so that clinical placement performance can be accurately assessed across different healthcare settings. Understanding important areas of measurement will enable key stakeholders to effectively evaluate clinical placement and will offer the opportunity for standardisation and comparability, but more importantly, it will measure the quality of placement experience, enable quality improvement and enhance educational opportunities. The objective of this study was to develop consensus on important areas of measurement needing to be included in the evaluation of clinical placement performance.

Methods

Eighteen experts were recruited to a heterogeneous panel for a modified Delphi study. Three rounds of surveys were conducted to establish consensus on what is important to measure when evaluating clinical placement performance. Quantitative data were analysed to determine consensus with $\geq 70\%$ agreement, and qualitative responses were thematically analysed.

Results/Evaluation

Forty seven areas of measurement for the evaluation of clinical placement were identified with consensus achieved on 44 areas relating to four overarching themes: Learning Outcomes, Experience of Placement, Cost of Placement and Research in Clinical Placement.

Discussion

This study has established a comprehensive list of areas related to the measurement of clinical placement performance that can be used to guide clinical placement quality and sustainability through ensuring intended learning outcomes, maintaining stakeholder relationships, and addressing cost concerns.



Evaluating clinical placement performance: What is important to measure?

Lisa Simmons¹, Ruth Barker¹, Fiona Barnett¹ & Teneale McGuckin¹

¹James Cook University, Townsville, Australia

Introduction

To effectively evaluate the performance of clinical placement, all elements of clinical placement deemed important must be considered together. Understanding important areas of measurement across key areas of clinical placement will enable key stakeholders to effectively evaluate clinical placement; and will enable the measurement of educational attainment, placement experience, and cost, supporting quality improvement and enhancing educational opportunities. This study aims to develop consensus on important areas of measurement needing to be included in the evaluation of clinical placement performance.

Methods

Eighteen experts including placement coordinators, placement supervisors and recent graduates were recruited to a heterogeneous panel for a modified Delphi study. Three rounds of surveys were conducted to establish consensus on what is important to measure when evaluating clinical placement performance. Quantitative data were analysed to determine consensus with $\geq 70\%$ agreement, and qualitative responses were thematically analysed.

Results

Expert Recruitment

Experts represented allied health professions including Audiology, Social Work, Occupational Therapy, Exercise Physiology, Physiotherapy and Speech Pathology. Diversity in placement type, geographic location and area of practice was achieved.

Round One

Three predetermined themes of Learning Outcomes, Experience of Placement and Cost of Placement were supported with the majority of participant responses coded under these three overarching themes. An additional fourth theme was identified as 'Research in Clinical Placement'. Areas of measurement were categorised under sub themes, which were then classified into the overarching themes (Figure 1).

Round Two and Three

All areas of measurement relating to Learning Outcomes achieved consensus. Sixteen areas of measurement related to Experience of Placement achieved consensus. Nine areas of measurement associated with Cost of Placement achieved consensus. Research in Clinical Placement achieved consensus. Figure 2 shows the finalised areas of measurement related to Learning Outcomes, Experience of Placement, Cost of Placement and Research in Clinical Placement.

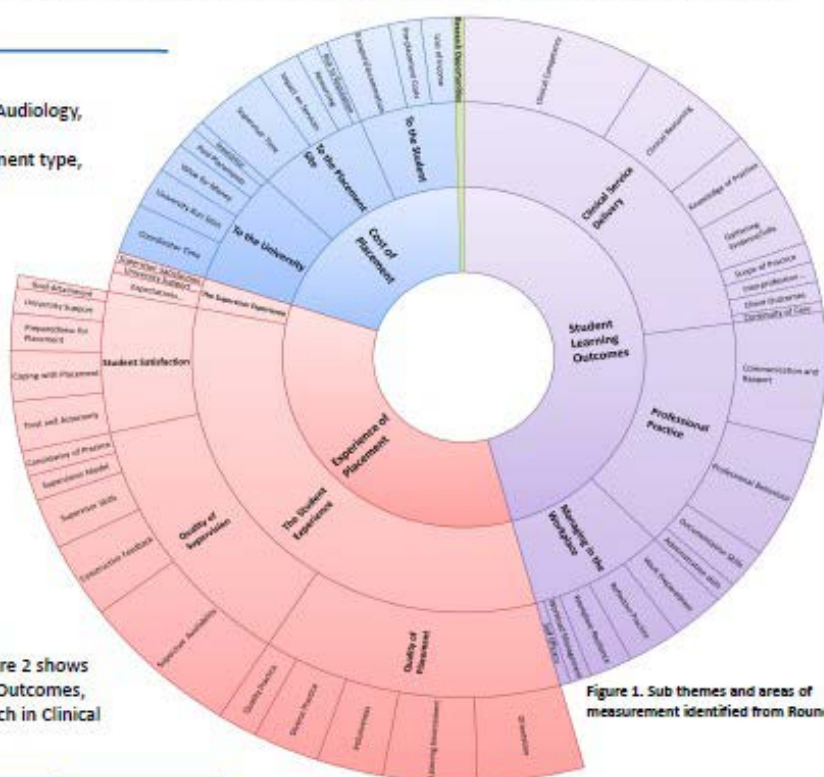


Figure 1. Sub themes and areas of measurement identified from Round 1

Student Learning Outcomes	Experience of Placement	Cost of Placement	Research in Clinical Placement
Clinical Service Delivery Client Outcomes Clinical Competency Clinical Reasoning Cardinality of Care Gathering Evidence and Information Interprofessional Practice Knowledge of Practice Scope of Practice	The Student Experience Student Satisfaction Coping with Placement Trust and Autonomy University Support of Student Constructive Feedback Supervisor Availability Supervisor Skills Exposure to Disease Practice Supervisor is Quality Practice Inclusive Placement Site Orientation of Placement Supportive Learning Environment	To the Student Low or Inconceivable Pre-placement Costs Transport and Accommodation Costs To the Placement Site Impact on Services Resourcing for Students Risk to Reputation Supervisor Time To the University Insurance Costs Paid Placements Placement Coordinator Time	Research Opportunities
Professional Practice Administrative Skills Communication and Report Writing Documentation and Report Writing Professional Behaviour			
Managing in the Workplace Reflective Practice Self-efficacy Work Preparedness Workload Management Workplace Resilience	The Supervisor Experience Supervisor Satisfaction University Support of Supervisor Expectations of Placement		

Figure 2. Finalised areas of measurement of clinical placement performance

Conclusions

The contribution this study makes is the comprehensive list of areas related to the measurement of clinical placement performance that can be used to guide clinical placement quality and sustainability through ensuring intended learning outcomes, maintaining stakeholder relationships, and addressing cost concerns. Fundamentally, these areas of measurement address the needs and expectations of the frontline stakeholders involved in the clinical placement partnership and acknowledges the increasing concerns of the costs involved in sourcing, participating in, and facilitating placement (Copeland, 2020; Patrick et al., 2008; Wray & McCall, 2007).

References

- Copeland, G. (2020). Paying for nursing student clinical placements, ethical considerations. *Journal of Professional Nursing*, 35(3), 330-338. doi:https://doi.org/10.1016/j.profnurs.2020.01.008
- Patrick, C., Peaty, D., Rockwell, C., Wells, R., Fletcher, M., & Piro, G. (2008). The WU (Work Integrated Learning) report: A national scoping study (Australian Learning and Teaching Council (ALTC) Final report). Retrieved from Brisbane: Queensland University of Technology. Available online at: www.alta.edu.au and www.alta.edu.au
- Wray, N., & McCall, L. (2007). Money matters: students' perceptions of the costs associated with placements. *Medical Education*, 41(10), 975-982. doi:https://doi.org/10.1111/j.1365-2929.2007.02883.x

10.5 Appendix 5:

Simmons, L., Barker, R., Barnett, F., & McGuckin, T. (2025). Evaluating clinical placement performance in allied health student-led healthcare services: A modified Delphi study. *Australian Journal of Clinical Education*, 14(1), 19–45.
<https://doi.org/10.53300/001c.136339>

Bond University



Volume 14 Issue 1

2025

Evaluating Clinical Placement Performance in Allied Health
Student-Led Healthcare Services: A Modified Delphi Study

Lisa Simmons
James Cook University

Ruth Barker
James Cook University

Fiona Barnett
James Cook University

Teneale McGuckin
James Cook University

Follow this and additional works at: <https://ajce.scholasticahq.com/>



© Copyright the authors.
This work is licensed under a [Creative Commons Attribution-NonCommercial-NoDerivative 4.0 International Licence](https://creativecommons.org/licenses/by-nc-nd/4.0/).

**Evaluating Clinical Placement Performance in Allied Health Student-Led Healthcare Services:
A Modified Delphi Study**

Lisa Simmons,* Ruth Barker,* Fiona Barnett* and Teneale McGuckin*

* College of Healthcare Sciences, James Cook University, Townsville, QLD, Australia

Abstract

University-affiliated student-led healthcare services have emerged to address challenges in securing quality clinical placements. As the benefits and challenges of student-led healthcare services emerge in recent literature, it is important to identify key measurement areas that will help stakeholders evaluate placements, allowing for standardisation, comparability, and quality improvement. This study aims to achieve consensus among key stakeholders on important areas of measurement for evaluating clinical placement performance in student-led healthcare services. A three-round modified Delphi study was conducted with 18 experts using purposive sampling to ensure diverse firsthand experience in clinical placements. Each round yielded quantitative (e.g. percentage of agreement) and qualitative (e.g. free text responses) data. Quantitative data were analysed to determine consensus with $\geq 70\%$ agreement, and qualitative responses thematically analysed. Round one identified 47 areas of measurement for evaluating clinical placement. In rounds two and three, consensus was established on 44 areas of measurement related to four overarching themes: Learning Outcomes, Experience of Placement, Cost of Placement, and Research in Clinical Placement. The findings provide a solid foundation for evaluating clinical placements across various models, including student-led healthcare services, and offer valuable insights to guide future research into evaluating clinical placements.

I INTRODUCTION

Securing high-quality clinical placements is a significant challenge for universities, particularly in areas with limited healthcare services (Barker et al., 2017; Frakes et al., 2011). Paid placements exacerbate this issue by imposing financial burdens on universities, and they often fail to deliver student outcomes that justify the costs, leading institutions to explore alternative models (Copeland, 2020; Patrick et al., 2008). Additionally, placement providers face increased costs due to reduced productivity, recruitment demands, and the need for additional supervision (Forbes, 2022). Compounding the problem, students face financial hardship from travel and limited income, negatively impacting their placement experience (Wray & McCall, 2007).

To address these challenges, university-affiliated student-led healthcare services have emerged, providing essential care in resource-poor regions and addressing professional retention issues (Larkins et al., 2014; Stuhlmiller & Tolchard, 2015). These services have been found to benefit both healthcare delivery and health professional education (Beckman et al., 2022; Bird et al., 2022). However, recent reviews highlight the need for a more rigorous evaluation of student skills and professional readiness (Schutte et al., 2015; Suen et al., 2020), as current assessments lack generalisability and consensus on key educational outcomes (Marsh et al., 2015; Schutte et al., 2015). To evaluate student-led healthcare services, a comprehensive strategy that considers the needs of students, supervisors, coordinators, and their professions is required.

Assessing clinical placement performance across diverse health professions and healthcare services presents significant challenges. Insights from national stakeholder consultations emphasise that differences in discipline-specific practices and contextual factors in supervision can influence the success of universal evaluation strategies (Siggins Miller Consultants, 2012). Consequently, evaluations need to adopt a consultative, collaborative, and comprehensive approach to accurately reflect the diverse nature of clinical placements across healthcare settings. Such frameworks must also be adaptable and inclusive to accommodate various placement models and professional disciplines (Siggins Miller Consultants, 2012). An effective evaluation model would not only enable standardisation and comparability but also focus on measuring the quality of placement experiences, driving continuous improvement, and enhancing educational outcomes (Cooper et al., 2020; Murry & Hammons, 1995).

Previous studies that have identified factors influencing quality of clinical placement predominately exist within the medical, nursing and allied health literature. For example, research has focused on engaging clinical placement key stakeholders to revise clinical placement evaluation tools in physiotherapy (Mori et al., 2019), as well as to generate expert consensus among nurse clinical educators to identify important factors influencing student learning during clinical placement (McTier et al., 2023). Key features within a quality measures framework have also been identified to guide clinical placement in allied health, dentistry, medicine and pharmacy (McAllister et al., 2018). However, these studies support previous notions that current tools and approaches to evaluating clinical placement quality and performance are limited in their generalisability and that critical factors influencing quality in clinical placement need to be considered, i.e. student learning outcomes, experience of placement and cost of placement.

While universal frameworks for clinical placement evaluation are available, they too often fall short in comprehensively assessing specific aspects of clinical placement performance. The Best Practice Clinical Learning Environment (BPCLE) framework is supported as providing structured guidance on effective learning within authentic clinical environments, but it inadequately addresses specific requirements for effective clinical supervision (Siggins Miller Consultants, 2012; McAllister et al., 2018), patient care outcomes or cost considerations critical for models like student-led healthcare services (Suen, 2020). Similarly, competency-based approaches emphasise skill acquisition but often overlook broader experiential factors such as learning environment diversity and equity in clinical placements (Ross et al., 2018; Zhang et al., 2022).

This study aims to achieve consensus among key stakeholders on the critical areas for measuring clinical placement performance. Specifically, it seeks to identify and prioritise the key areas of measurement that should be considered when evaluating clinical placements, including within the context of student-led healthcare services.

II METHODS

A three-round modified Delphi study was conducted to gather information and achieve consensus on the important factors to measure when evaluating clinical placements. The expert panel (hereafter referred to as 'experts') comprised of individuals with diverse expertise and perspectives (i.e. students, placement supervisors, and placement coordinators), which served as the primary source of insights and opinions in the study. Ensuring equal representation from each stakeholder group allowed for a comprehensive understanding of clinical placement performance, integrating the unique perspectives of those coordinating, supervising, and directly participating in clinical placements. Please refer to the published protocol for detailed information on expert recruitment and survey design for this study (Simmons et al., 2023).

A Modified Delphi Rounds

In Round 1 of this modified Delphi, the primary goal was to gather a broad range of ideas and perspectives from the expert panel regarding the overarching themes of learning outcomes, experience of placement, and cost of placement. One survey questionnaire was distributed to the panel, involving open-ended questions, to generate initial input on areas that should be considered when evaluating clinical placements. To ensure clarity of each question, a pilot questionnaire was tested with a small sample of people including one allied health placement supervisor, one recent graduate and one allied health academic to ensure clarity of each question (Müllersdorf & Ivarsson, 2011). Responses were analysed thematically and presented in Round 2 (Che Daud et al., 2015).

Round 2 involved three survey questionnaires, each pertaining to one or more overarching themes. Survey 1 focused on presenting themes and areas of measurement associated with learning outcomes, Survey 2 explored experience of placement, and Survey 3 focused on presenting areas of measurement associated with placement cost and research within clinical placement. Experts were asked to rank the level of importance for each area of measurement using a four-point Likert scale ranging from (1) not very important to (4) very important (Müllersdorf & Ivarsson, 2011). Experts were also given the opportunity to provide free text responses, which were analysed thematically and presented in subsequent rounds (Che Daud et al., 2015).

In Round 3, two survey questionnaires were sent to the experts. Survey 1 focused on presenting areas of measurement associated with experience of placement and Survey 2 focused on cost of placement and research within clinical placement. In Survey 1, consensus data for the two areas of measurement that did not reach consensus in Round 2 were presented. Experts were then asked to indicate whether they agreed or disagreed with the area of measurement as not being important to measure. Additionally, statements that were collated from Round 2 were presented. Experts were asked to rank their level of agreement for each statement presented, using either agree or disagree. Furthermore, experts were invited to provide free text comments to explain their position further.

B Data Collection

All responses were captured using the Qualtrics online survey platform (Qualtrics software, Version 2009, <https://www.qualtrics.com>). For each round, each expert was sent a unique web link to access the surveys questionnaires. Experts were provided at least four weeks to complete all surveys within each round, with only those who participated in prior rounds invited to participate in subsequent rounds. Weekly reminder emails were sent to each expert until the round was completed. Once the final deadline was reached, surveys were closed and responses were analysed before commencing the next round. Each survey was designed to take no more than 40 minutes to complete, and all responses were de-identified and coded to maintain anonymity between experts.

C Data Analysis

Round 1 responses were analysed using deductive thematic analysis to generate themes related to 'Learning Outcomes', 'Experience of Placement' and 'Cost of Placement', as well as inductively to identify any additional themes within the data. Thematic analysis followed Braun & Clarke's (2021) six-phase framework to qualitatively analysing data. The initial coding and theme generation was carried out by the first author, who systematically coded the data and identified preliminary themes. All authors collaboratively reviewed the coding and themes, working together to refine, define, and name each

theme as part of the collective analysis process. Themes were then finalised and presented to experts in subsequent rounds. Qualitative data analysis software, NVivo, was used to code and group data (Nvivo software, Version 12, <https://www.qsrinternational.com>). Additionally, triangulation occurred between the leading research team and an independent researcher with experience in thematic analysis to ensure the validity of our assumptions through the convergence of themes from different sources (Carter et al., 2014).

Round 2 and 3 quantitative data were analysed using percentages of agreement to confirm whether consensus had been achieved. The level for consensus was set in a manner similar to Maguire and Delahunt (2017), whereby combined scores of importance and agreement must equal $\geq 75\%$ to achieve consensus. In accordance with Round 1, qualitative data from Rounds 2 and 3 were analysed inductively, where common themes were identified and triangulated between three researchers and presented as statements in subsequent rounds.

To address attrition within the study, participation rates were tracked and characteristics of participants in each round were compared to identify any potential shifts in representation. Furthermore, the consensus threshold of 75% agreement was applied to ensure that only areas with broad support across the panel were included. This threshold aligns with recommendations for achieving rigor in Delphi studies (Hsu & Sandford, 2007; Maguire & Delahunt, 2017).

D Ethical Considerations

Informed consent was obtained from all experts before participating in the research project via a unique electronic link, which formed the first page of the questionnaire in round one. Expert anonymity was maintained by assigning unique identifiers to each expert. This identifier was used to track survey completion and summarise expert responses for subsequent rounds. Additionally, selected experts were not compensated for participating in this study. Ethical approval was obtained through the institutional Human Research Ethics Committee (approval number H7541).

III RESULTS

E Expert Characteristics

A total of 36 potential expert panelists responded to the recruitment survey; from which 18 experts were selected (i.e. six Placement Coordinators, six Placement Supervisors and six Recent Graduates). Characteristics of experts are outlined in Table 1. Participation by experts in Round 1 was 94% (17 experts), 83% in Round 2 (15 experts) and 64% in Round 3 (11 experts). Figure 1 provides an overview of recruitment, the participation of experts in each round, and the outcomes of consensus after each round.

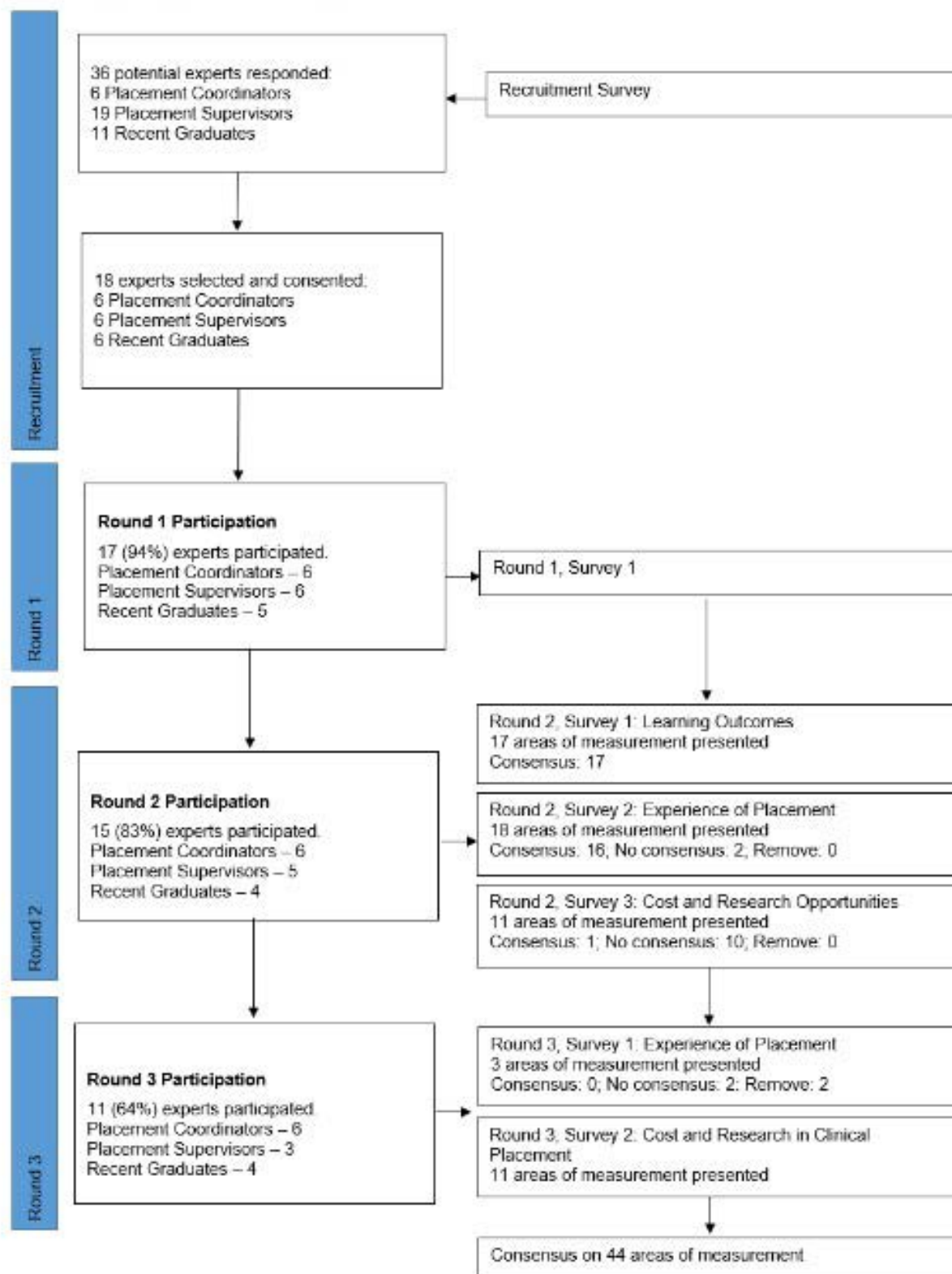
Table 1**Characteristics of expert members**

Total expert panellists (n=17)

Placement Coordinators (n=6)	
Level of experience in coordination role	
Less than 2 years	2 (33.3%)
More than 2 years	4 (66.6%)
Geographical location/s placements have been coordinated in	
Rural	4 (66.6%)
Regional	5 (83.3%)
Metropolitan	6 (100%)
Types of clinic placement coordinated	
Student-led	3 (50%)
Role emerging	3 (50%)
Traditional	5 (83.3%)
Inter-disciplinary	3 (50%)
Allied health professions represented	
Audiology	1 (16.6%)
Social Work	1 (16.6%)
Occupational Therapy	1 (16.6%)
Exercise Physiology	1 (16.6%)
Physiotherapy	1 (16.6%)
Speech Pathology	1 (16.6%)
Placement Supervisors (n=6)	
Areas of Practice with experience in	
1 areas of practice	2 (33.3%)
2 areas of practice	1 (16.6%)
3 or more areas of practice	3 (50%)
Geographical location/s worked in	
Rural	1 (16.6%)
Regional	4 (66.6%)
Metropolitan	1 (16.6%)
Type of clinical placement supervised	
Student-led	4 (66.6%)
Traditional	5 (83.3%)
Allied health professions represented	
Occupational Therapy	2 (33.3%)
Speech pathology	1 (16.6%)
Physiotherapy	1 (16.6%)
Exercise Physiology	1 (16.6%)
Psychology	1 (16.6%)
Recent Graduates (n=5)	
Geographical location/s placement took place in	
Rural	4 (80%)
Regional	5 (100%)
Metropolitan	5 (100%)
Areas of Practice exposed to	
2-3	2 (40%)
4-5	3 (60%)
6+	1 (20%)
Type of clinical placement experienced	
Student-led	4 (80%)
Role emerging	1 (20%)
Traditional	5 (100%)
Allied health professions represented	
Occupational Therapy	1 (20%)
Physiotherapy	3 (60%)
Exercise Physiology	1 (20%)

Figure 1

Flow of participants and surveys through the study



F Round 1

The three predetermined themes of Learning Outcomes, Experience of Placement, and Cost of Placement were supported, with the majority of participant responses coded under these three overarching themes. An additional fourth theme was identified as 'Research in Clinical Placement'. Table 2 outlines the specific areas of measurement and the number of responses received from experts.

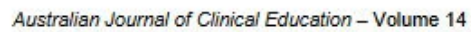
Table 2

Frequency of areas of measurement referenced in expert's responses

Theme 1: Learning Outcomes		Theme 2: Experience of Placement		Theme 3: Cost of Placement		Theme 4: Research in Clinical Placement	
Area of Measurement	(n)	Area of Measurement	(n)	Area of Measurement	(n)	Area of Measurement	(n)
Clinical Reasoning	6	Exposure to quality practice	2	Transport and accommodation costs	4	Research Opportunities	1
Clinical Competency	9	Exposure to diverse practice	5	Loss to income	3		
Client Outcomes	1	Inclusiveness of placement site	4	Pre-placement costs	2		
Scope of Practice	1	Supportiveness of learning environment	4	Supervisor time	2		
Continuity of Care	1	Orientation to placement	5	Resourcing for student	2		
Interprofessional Practice	1	Supervision model	1	Risk to reputation	1		
Gathering Evidence and Information	4	Consistency of practice	1	Impact on services	4		
Knowledge of Practice	5	Supervisor skills	4	Paid placements	2		
Work preparedness	2	Constructive feedback	6	Operating university run sites	2		
Self-efficacy	1	Supervisor availability	9	Placement coordinator time	4		
Workplace Resilience	2	Goal Attainment	1	Insurance	1		
Reflective practice	4	Trust and autonomy	2				
Workload management	2	Coping with Placement	2				
Administration Skills	2	University support of the student	2				
Professional Behaviour	8	Preparedness for placement	2				
Communication and Rapport Building	7	Supervisor satisfaction	1				
Documentation and report writing skills	3	University support of the supervisor	1				
		Expectations of placement	2				

Areas of measurement were then categorised under sub themes, which were classified into the overarching themes. The sunburst diagram (Figure 2) represents the overarching themes (inner ring), the sub themes (middle ring/s) and the specific areas of measurement that were identified in Round 1 (outer ring). The size of each section is related to the frequency of the area of measurement mentioned in Round 1.

Sub themes and areas of measurement identified in Round 1



G Round 2

Fifteen experts completed Survey 1, 14 completed Survey 2, and 13 experts completed Survey 3. In Survey 1, all areas of measurement relating to 'Learning Outcomes' achieved higher than 90% agreement on their importance, with eight areas (47.1%) achieving 100% agreement (Table 3). As the required level of consensus was achieved, all areas of measurement were included, and no items needed further consideration in subsequent rounds. Figure 3A provides an overview of the decision-making process undertaken to support the inclusion or exclusion of the identified areas of measurement. No new areas of measurement within free text responses were identified.

In Survey 2, areas of measurement relating to 'Experience of Placement' achieved consensus for 16 of the 18 areas and were not included in the subsequent round. Consensus was not reached (<75% agreement) for 'Quality of Supervision' and the 'Consistency of Practice' (Table 3) and were presented for further consideration in Round 3 (Figure 3B). In Survey 3, areas of measurement relating to 'Cost of Placement' achieved consensus in one area only – 'Insurance costs' (Table 3). All remaining areas of measurement were presented for further consideration in Round 3 (Figure 3C). Areas of measurement relating to 'Research in Clinical Placement' did not reach consensus and was presented for further consideration in Round 3 (Figure 3C).

New areas of measurement were identified within free text responses related to 'Cost of Placement' and 'Research in Clinical Placement'. These statements reflected the experts' justifications around why specific areas of measurement were ranked as either important or not important, which were then presented to all experts in Round 3 for further consideration. Textbox 1 details each of these statements devised from expert responses.

Table 3
Round two level of agreement on importance

Area of Measurement	Level of Consensus (%)	Mean	Std. Deviation
Learning Outcomes - Clinical Service Delivery			
Scope of practice	80.0	3.20	0.75
Continuity of care	93.3	3.40	0.61
Interprofessional practice	100	3.33	0.47
Gathering evidence and information	100	3.73	0.44
Knowledge of practice	86.6	0.96	0.92
Clinical reasoning	100	4.00	0.00
Clinical competency	93.3	3.60	0.61
Client Outcomes	93.3	3.67	0.60
Learning Outcomes - Managing in the Workplace			
Work preparedness	86.6	3.33	0.70
Workplace resilience	93.3	3.40	0.61
Workload management	100	3.47	0.50
Reflective practice	100	3.80	0.40
Self-efficacy	86.6	3.40	0.71
Learning Outcomes - Professional Practice			
Administration skills	80.0	3.00	0.73
Professional behaviour	100	4.00	0.00
Communication and rapport building	100	4.00	0.00
Documentation and report writing skills	100	3.40	0.49
Experience of Placement - The Student Experience: Quality of Placement Opportunities			
Exposure to quality practice	100	3.36	0.48
Exposure to diverse practice	100	3.29	0.59
Inclusiveness of placement site	92.8	3.36	0.61
Supportiveness of learning environment	92.8	3.57	0.62
Orientation to placement	92.8	3.29	0.59
Experience of Placement - The Student Experience: Quality of Supervision			
Supervision model	71.4	2.79	0.77
Consistency of practice	71.4	2.93	0.70
Supervisor skills	92.8	3.21	0.56
Constructive feedback	92.8	3.43	0.62
Supervisor availability	85.7	3.07	0.80
Experience of Placement - The Student Experience: Student Satisfaction			
Goal attainment	85.7	3.21	0.67
Trust and autonomy	92.8	3.14	0.52
Coping with placement	92.8	3.29	0.59
University support of the student	92.8	3.21	0.56
Preparedness for placement	92.8	3.43	0.62
Experience of Placement - The Supervisor Experience			
Supervisor satisfaction	100	3.21	0.41

University support of the supervisor	100	3.43	0.49
Expectations of placement	92.8	3.29	0.59
Cost of Placement – Cost to the Student			
Transport and accommodation costs	69.2	2.69	0.91
Loss to income	53.8	2.62	1.00
Pre-placement costs	46.1	2.38	1.00
Cost of Placement – Cost to the Placement Site			
Supervisor time	69.2	2.77	0.80
Resourcing for student	46.1	2.69	0.72
Risk to reputation	46.1	2.54	0.84
Impact on services	61.5	2.54	0.63
Cost of Placement – Cost to the University			
Paid placements	46.1	2.38	0.84
Operating university run sites	53.8	2.54	0.93
Placement coordinator time	69.2	2.77	0.97
Insurance	76.9	2.85	0.95
Research in Clinical Placement			
Research Opportunities	61.5	2.62	0.74

Figure 3A.

Decision making process supporting inclusion/exclusion of areas of measurement: Learning Outcomes.

Round 1 (n=17)		Round 2 (n=15)	Round 3
1. Learning Outcomes			
Theme 1.1: Clinical Service Delivery			
Areas of Measurement	Client Outcomes	➤ Consensus >75% = Include	✓
	Clinical Competency	➤ Consensus >75% = Include	✓
	Clinical Reasoning	➤ Consensus >75% = Include	✓
	Continuity of Care	➤ Consensus >75% = Include	✓
	Gathering Evidence and Information	➤ Consensus >75% = Include	✓
	Interprofessional Practice	➤ Consensus >75% = Include	✓
	Knowledge of Practice	➤ Consensus >75% = Include	✓
	Scope of Practice	➤ Consensus >75% = Include	✓
Theme 1.2: Managing in the Workplace			
Areas of Measurement	Reflective Practice	➤ Consensus >75% = Include	✓
	Self-efficacy	➤ Consensus >75% = Include	✓
	Work Preparedness	➤ Consensus >75% = Include	✓
	Workload Management	➤ Consensus >75% = Include	✓
	Workplace Resilience	➤ Consensus >75% = Include	✓
Theme 1.3: Professional Practice			
Areas of Measurement	Administration Skills	➤ Consensus >75% = Include	✓
	Communication and Rapport Building	➤ Consensus >75% = Include	✓
	Documentation and Report writing	➤ Consensus >75% = Include	✓
	Professional Behaviour	➤ Consensus >75% = Include	✓

Figure 3B

Decision making process supporting inclusion/exclusion of areas of measurement: Experience of Placement

Round 1 (n=17)		Round 3 (n=15)	Round 3 (n=13)
2. Experience of Placement			
Theme 2.1: The Student Experience			
2.1.1 Quality of Placement Opportunities			
Areas of Measurement	Exposure to Diverse Practice	Consensus >75% = Include	✓
	Exposure to Quality Practice	Consensus >75% = Include	✓
	Inclusiveness of Placement Site	Consensus >75% = Include	✓
	Orientation of Placement	Consensus >75% = Include	✓
	Supportive of Learning Environment	Consensus >75% = Include	✓
2.1.2 Quality of Supervision			
Areas of Measurement	Consistency of Practice	Consensus <75% = Go to Round 3	Consensus <75% = Exclude ✗
	Constructive Feedback	Consensus >75% = Include	✓
	Supervision Model	Consensus <75% = Go to Round 3	Consensus <75% = Exclude ✗
	Supervisor Availability	Consensus >75% = Include	✓
	Supervisor Skills	Consensus >75% = Include	✓
2.1.3 Student Satisfaction			
Areas of Measurement	Coping with Placement	Consensus >75% = Include	✓
	Goal Attainment	Consensus >75% = Include	✓
	Preparedness for Placement	Consensus >75% = Include	✓
	Trust and Autonomy	Consensus >75% = Include	✓
	University Support of Student	Consensus >75% = Include	✓
Theme 2.2: The Supervisor Experience			
Areas of Measurement	Expectations of Placement	Consensus >75% = Include	✓
	University Support of Supervisor	Consensus >75% = Include	✓
	Supervisor Satisfaction	Consensus >75% = Include	✓

Figure 3C

Decision making process supporting inclusion/exclusion of areas of measurement: Cost of Placement and Research in Clinical Placement

Round 1 (n=17)		Round 2 (n=15)	Round 3 (n=11)
3. Cost of Placement			
Theme 3.1: Cost to the Student			
Areas of Measurement	Loss of Income	→ Consensus <75% = Go to Round 3	→ Consensus >75% = Include ✓
	Pre-placement Costs	→ Consensus <75% = Go to Round 3	→ Consensus >75% = Include ✓
	Transport and Accommodation Costs	→ Consensus <75% = Go to Round 3	→ Consensus >75% = Include ✓
Theme 3.2: Cost to the Placement Site			
Areas of Measurement	Impact on Services	→ Consensus <75% = Go to Round 3	→ Consensus >75% = Include ✓
	Resourcing for Student	→ Consensus <75% = Go to Round 3	→ Consensus >75% = Include ✓
	Risk to Reputation	→ Consensus <75% = Go to Round 3	→ Consensus >75% = Include ✓
	Supervisor Time	→ Consensus <75% = Go to Round 3	→ Consensus >75% = Include ✓
Theme 3.3: Cost to the University			
Areas of Measurement	Insurance Costs	→ Consensus >75% = Include ✓	
	Operation of University-run Sites	→ Consensus <75% = Go to Round 3	→ Consensus <75% = Exclude ✗
	Paid Placements	→ Consensus <75% = Go to Round 3	→ Consensus >75% = Include ✓
	Placement Coordinator Time	→ Consensus <75% = Go to Round 3	→ Consensus >75% = Include ✓
4. Research in Clinical Placement			
Areas of Measurement	Research Opportunities	→ Consensus <75% = Go to Round 3	→ Consensus >75% = Include ✓

Textbox 1

Statements collated from expert opinion supporting importance (Cost and Research in Clinical Placement)

Cost of Placement		
Cost to the Student Loss of Income <i>Important to Measure:</i> <u>Statement 1</u> - To quantify costs associated with each placement and allow for more informed placement decisions. <u>Statement 2</u> - To ensure placement expectations and that any additional placement commitments don't cause undue financial burden on students. Pre-placement Costs <i>Important to Measure:</i> <u>Statement 1</u> - To accurately assess the financial impact on students and how this influences their placement experience. <u>Statement 2</u> - To accurately communicate the expected financial commitment of clinical placement and support student preparedness for placement. Transport and Accommodation Costs <i>Important to Measure:</i> <u>Statement 1</u> - To accurately assess the financial impact on students and how this influences their placement experience. <u>Statement 2</u> - To quantify costs associated with each placement and allow for more informed placement decisions.	Cost to the Placement Site Supervisor's Time <i>Important to Measure:</i> <u>Statement 1</u> - To understand the opportunity cost or potential lost revenue of providing supervision. Resourcing Costs for the Student <i>Important to Measure:</i> <u>Statement 1</u> - To understand the cost of supporting students while at the placement site. Risk to Reputation <i>Important to Measure:</i> <u>Statement 1</u> - To determine whether student placements lead to increased risk, which may influence future offers of placement. Impact on Services <i>Important to Measure:</i> <u>Statement 1</u> - To determine appropriate fee structures for student-led healthcare services. <u>Statement 2</u> - To understand what impact on services actually occurs (i.e decrease or increase in service capacity) while supervising students. <i>Not Important to Measure:</i> <u>Statement 1</u> - It may result in loss of placement sites or the placement site may request financial remuneration.	Cost to the University Paid Placements <i>Important to Measure:</i> <u>Statement 1</u> - To determine if the benefits outweigh the cost. <u>Statement 2</u> - To allow for sufficient resourcing of clinical placements. <i>Not Important to Measure:</i> <u>Statement 1</u> - It may encourage placement sites to offer placements for monetary gain or other ulterior motives. Operating University Run Placement Sites <i>Important to Measure:</i> <u>Statement 1</u> - It enables resourcing for high quality and evidenced-based placement sites. Placement Coordinator's Time <i>Important to Measure:</i> <u>Statement 1</u> - To address current barriers to career progression. <u>Statement 2</u> - To capture the large scope of the role and support workload allocation. <u>Statement 3</u> - To identify time spent/needed to effectively support supervisors and students. <u>Statement 4</u> - To identify time spent or needed to effectively support 'at risk students'. <i>Not Important to Measure:</i> <u>Statement 1</u> - It may lead to cost cutting.
Research in Clinical Placement		
Research Opportunities	<i>Important to Measure:</i> <u>Statement 1</u> - More translation research is needed. <u>Statement 2</u> - Research can lead to beneficial partnerships between the university, placement site and student. <u>Statement 3</u> - To gain information about wider scopes of practice, as well as identifying new placement opportunities. <u>Statement 4</u> - To support new and innovative placement and assessment, as well as to determine support requirements.	<i>Not Important to Measure:</i> <u>Statement 1</u> - Research is not a top priority in clinical placement. <u>Statement 2</u> - It may place additional pressure on placement coordinators to undertake research. <u>Statement 3</u> - Research does not play a direct role in the student's experience of placement.

H Round 3

In Round 3, 11 experts completed Survey 1, and nine experts completed Survey 2. Consensus data including mean and standard deviation are presented in Table 4.

In Survey 1, the two remaining areas of measurement related to 'Experience of Placement' did not achieve consensus (Figure 3B) and were removed. Two of the three remaining areas of measurement associated with 'Cost of Placement' achieved consensus. 'Cost of university run placement sites' did not achieve consensus and was removed (Figure 3C). Three of the four areas of measurement relating to 'Research in Clinical Placement' achieved consensus (Table 4).

Table 4**Round three level of agreement on importance**

Area of Measurement		Level of Consensus (%)	Mean	Std. Deviation
Experience of Placement - The Student Experience: Quality of Supervision				
Supervision model		63.4	1.64	0.48
Consistency of practice		63.4	1.64	0.48
Cost of Placement – Cost to the Student				
Transport and accommodation costs	Important to Measure Statement 1	88.8	1.11	0.31
	Important to Measure Statement 2	100	1.00	0.00
Loss to income	Important to Measure Statement 1	88.8	1.11	0.31
	Important to Measure Statement 2	77.7	1.22	0.42
Pre-placement costs	Important to Measure Statement 1	77.7	1.22	0.42
	Important to Measure Statement 2	88.8	1.11	0.31
Cost of Placement – Cost to the Placement Site				
Supervisor time	Important to Measure Statement 1	88.8	1.11	0.31
Resourcing for student	Important to Measure Statement 1	88.8	1.11	0.31
Risk to reputation	Important to Measure Statement 1	55.5	1.44	0.50
Impact on services	Important to Measure Statement 1	66.6	1.33	0.47
	Important to Measure Statement 2	77.7	1.22	0.42
	Not Important to Measure Statement 1	33.3	1.67	0.47
Cost of Placement – Cost to the University				
Paid placements	Important to Measure Statement 1	88.8	1.11	0.31
	Important to Measure Statement 2	88.8	1.11	0.31
	Not Important to Measure Statement 1	22.2	1.78	0.42
Operating university run sites	Important to Measure Statement 1	66.6	1.33	0.47
Placement coordinator time	Important to Measure Statement 1	66.6	1.33	0.47
	Important to Measure Statement 2	77.7	1.22	0.42
	Important to Measure Statement 3	77.7	1.22	0.42
	Important to Measure Statement 4	77.7	1.22	0.42
	Not Important to Measure Statement 1	33.3	1.67	0.47
Research in Clinical Placement				
Research Opportunities	Important to Measure Statement 1	88.8	1.11	0.31
	Important to Measure Statement 2	100	1.00	0.00
	Important to Measure Statement 3	100	1.00	0.00
	Important to Measure Statement 4	100	1.00	0.00
	Not Important to Measure Statement 1	44.4	1.56	0.50
	Not Important to Measure Statement 2	33.3	1.67	0.47
	Not Important to Measure Statement 3	33.3	1.67	0.47

I Areas of Measurement not Achieving Consensus

Several areas of measurement within the theme of 'Experience of Placement' did not achieve consensus with variation in opinion between experts. For example, the importance of placement experience measures such as 'supervision model' and 'consistency of practice' received 100% and 75% agreement, respectively, from placement supervisors and recent graduates. However, among placement coordinators, only 50% agreed on the importance of the 'supervision model', and 15% agreed on 'consistency of practice'. The notion that variations in supervisory models and differences in health professional practices may pose challenges for students during their learning journey can also be seen as a valuable educational opportunity, as highlighted by one expert's response:

... one of the biggest learning experiences students gain from going on multiple placements in different sites and different supervisors is the exposure to a range of different ways, practices, skills, approaches ... I think we would do our profession a disservice by becoming a standardised workforce that all has the same, consistent approach ("cookie cutter" approach) to areas of practice. I think it is valuable for students to see varying levels of good practice vs. not-so-good practice, provided they have the opportunity to debrief this in a safe space, to be able to identify and understanding the 'not-so-good' practice in context (Placement Coordinator #4).

Similarly, measuring the cost associated with 'operating university run placement sites' also did not achieve consensus. Reviewing free text responses from experts in Rounds 2 and 3 suggested that there is support for university operated clinical placement sites from all stakeholder groups. However, there was disagreement about the cost of such endeavours being a specific performance measure of clinical placement. The following expert responses support this premise:

Cost of operating university run placement sites should not purely be measured according to income and expenses. There are lots of benefits which become immeasurable such as service to the university sector, student educative experience, positive marketing/exposure for the university (Placement Supervisor #9).

I don't think the cost of uni run placements should factor in (sic) into measuring clinical placements as they aren't a money-making entity for most universities (Recent Graduate #3).

J Finalised Areas of Measurement

Following the three Delphi rounds, consensus was achieved on 44 important areas of measurement. The finalised areas of measurement are presented in Textbox 2.

Measuring Performance in Student-led Healthcare Services

Textbox 2.

Finalised areas of measurement related to the themes of 'Learning Outcomes', 'Experience of Placement', 'Cost of Placement' and 'Research in Clinical Placement'

Student Learning Outcomes		Experience of Placement			Cost of Placement		Research in Clinical Placement
Clinical Service Delivery	Client Outcomes Clinical Competency Clinical Reasoning Continuity of Care Gathering Evidence and Information Interprofessional Practice Knowledge of Practice Scope of Practice	The Student Experience	Student Satisfaction	Coping with Placement Goal Attainment Preparedness for Placement Trust and Autonomy University Support of Student	To the Student	Loss of Income Pre-placement Costs Transport and Accommodation Costs	Research Opportunities
	Quality of Supervision		Constructive Feedback Supervisor Availability Supervisor Skills				
Professional Practice	Administration Skills Communication and Rapport Building Documentation and Report Writing Professional Behaviour		Quality of Placement	Exposure to Diverse Practice Exposure to Quality Practice Inclusive Placement Site Orientation of Placement Supportive Learning Environment	To the Placement Site	Impact on Services Resourcing for Student Risk to Reputation Supervisor Time	
	Managing in the Workplace	Reflective Practice Self-efficacy Work Preparedness Workload Management Workplace Resilience	The Supervisor Experience	Supervisor Satisfaction University Support of Supervisor Expectations of Placement			

IV DISCUSSION

The aim of this study was to gain consensus on the important areas of measurement that need to be considered in the evaluation of clinical placement performance. Through consensus building within a modified Delphi approach, 44 areas of measurement were identified and supported as important to measure when evaluating clinical placement. This study is novel in its scope and design, addressing limitations of existing approaches by encompassing a wider range of measurement areas, including cost considerations, and by ensuring applicability across diverse clinical placement models and health disciplines. Unlike other models for evaluation, this framework integrates stakeholder perspectives across educational, experiential, and financial dimensions. Its unique contribution lies in offering a holistic evaluation model that aligns with contemporary clinical education needs and that it is adaptable to various models of clinical placement, including within student-led healthcare services.

Existing frameworks for clinical placement have been designed to work as universal guides to supporting quality in clinical placement, predominately focusing on areas of measurement associated with the experience of placement or are intended to be implemented at the organisational level to support positive learning environments (McAllister et al., 2018; Siggins Miller Consultants, 2012). This study's contribution lies in its comprehensive identification of key areas for measuring clinical placement performance. Unlike frameworks such as the BPCLE, this study integrates diverse stakeholder perspectives to include critical dimensions such as financial parameters, research opportunities, and supervision quality. These additions enhance the applicability of our findings across various clinical placement models and allied health disciplines, offering a more comprehensive basis for evaluation.

While the findings of this study are similar to the BPCLE in emphasising the importance of a supportive learning environment, this study extends its scope by addressing specific areas within the overarching themes of learning outcomes, placement experience and placement cost, the latter being notably absent in the BPCLE. As a result, the findings of this study will guide improvements in placement performance by ensuring intended learning outcomes, maintaining strong stakeholder relationships, and addressing cost concerns. Fundamentally, these areas of measurement address the needs and expectations of the frontline stakeholders involved in the clinical placement partnership and acknowledges the increasing concerns about the costs involved in sourcing, participating in, and facilitating placement (Copeland, 2020; Forbes, 2022; Patrick et al., 2008; Wray & McCall, 2007).

Evaluating the educational outcomes, placement experiences, and costs within student-led healthcare services has, until recently, been a relatively unexplored area. However, current literature on the effectiveness of student-led services as clinical placement providers has begun to identify various outcomes achieved within these models of clinical placement (Beckman et al., 2022; Heales et al., 2021; Nyoni et al., 2021). Contemporary research has highlighted the importance of clinical educators in fostering supportive learning environments, providing constructive feedback, offering developmental opportunities, and ensuring adequate resources for high-quality placements (Heales et al., 2021). Additionally, student-led healthcare services are recognised as environments that facilitate clinical skill development, cultivate empathy and leadership, and enhance interprofessional practice skills (Wilson et al., 2023).

Our modified Delphi study identified clinical placement outcomes of importance that align closely with the contemporary literature focusing on educational outcomes attained within student-led healthcare services (Beckman et al., 2022; Heales et al., 2021; Nyoni et al., 2021). The diverse expertise of the expert panel, covering various clinical placement models and contexts, is a notable strength of this study (Jünger et al., 2017). The identified areas of measurement are relevant to a range of contexts due to the diverse experiences of the experts involved and aids in ensuring that the consensus reached is not limited to a single model or setting but rather, reflects a broad spectrum of clinical placement scenarios (Peisah et al., 2023). This approach offers comparability across various models, locations, and health disciplines (Bernhardt

et al., 2017), providing key stakeholders with a set of clinical placement measures that can be used to evaluate the performance of student-led healthcare services and compare them to more traditional clinical placement models to determine their effectiveness.

Financial considerations are critical for both universities and placement providers, influencing the sustainability and quality of placements (Bowles et al., 2014). The University Accord, which seeks to reform and enhance higher education in Australia, places a significant emphasis on the financial sustainability of educational programs, including clinical placements (Australian Universities Accord Final Report, 2023). Identifying the costs associated with clinical placements, such as transport and accommodation, loss of income, pre-placement expenses, supervisor time, and student resourcing, is essential for optimising resources and improving student placement experiences. By incorporating these cost measurements into the evaluation of clinical placement performance, universities and placement providers can better understand the financial burden on both students and institutions, leading to more informed decisions about resource allocation, funding, and support. This alignment with the University Accord's focus on financial sustainability ensures that clinical placements remain viable and beneficial for all parties involved, while also achieving financial accountability.

The results of this study need to be considered in light of its limitations. Although in line with recommendations to effectively recruit a heterogeneous expert panel (Hsu & Sandford, 2007), the broad spectrum of opinions and priorities this approach produced can affect the level of consensus established. We recruited equal representation from key stakeholder groups to strike a good balance of perspectives (Keeney et al., 2001). However, as the study progressed, representation changed due to attrition, with fewer placement supervisors and recent graduates participating in later rounds, shifting the balance of opinion in favour of placement coordinators. This shift likely influenced the areas of measurement that did not achieve consensus, as placement coordinator perspectives became more prominent in later rounds.

To enhance the reliability of the areas of measurement identified in this study, a 75% consensus threshold was applied. This threshold is consistent with best practices for achieving rigor in Delphi studies (Hsu & Sandford, 2007; Maguire & Delahunt, 2017) and ensures that only areas with broad and robust agreement across the panel were included. Nonetheless, areas that failed to achieve consensus (i.e. "supervision model," "consistency of practice," and the "cost of operating university-run placement sites") may have achieved consensus if greater representation from other stakeholder groups had been maintained. Therefore, we acknowledge that the attrition experienced in this study may have influenced the findings and recommend further research to validate and extend on our results. Applying a mixed-methods approach to evaluating the more nuanced aspects of these areas of measurement would provide a deeper understanding and elicit rich, multifaceted insights that might otherwise be overlooked in a predominantly quantitative approach (Creswell & Clark, 2017), such as the one employed in this modified Delphi study.

Given the diversity of the expert panel, the findings of this study are broadly applicable across different clinical placement models, geographical locations and allied health professions (Hsu & Sandford, 2007; Jünger et al., 2017). Furthermore, a key contribution of this study lies in its ability to integrate educational, experiential, and financial dimensions into a cohesive evaluation framework, bridging gaps identified in prior research. However, further research is needed to determine whether the identified areas of measurement and their priorities for measurement align consistently across diverse clinical placement contexts. Future studies could investigate how contextual factors such as resource availability, cultural differences, and specific disciplinary requirements shape the prioritisation and implementation of these measurement areas. Understanding these influences would provide valuable insights into the adaptability and effectiveness of the framework across diverse clinical placement settings (Beckman et al., 2022; Heales et al., 2021).

Additionally, a cost-benefit analysis derived from the cost measurements in this study could provide valuable insights into financial sustainability of clinical placement and offer critical information about the educational value of student-led healthcare services (Mazander et al.,

2024). Investigating the application of this study's findings in these specific contexts will also help to identify necessary refinements and enhance its translational potential (Beckman et al., 2022; Wilson et al., 2023), ultimately paving the way for comparative analyses of different clinical placement models in different clinical contexts. Such comparative analyses can help stakeholders identify best practices, assess the relative strengths and weaknesses of different models, and understand how specific contexts influence outcomes (Nyoni et al., 2021).

V CONCLUSION

By synthesising the diverse experiences of key stakeholders, this study provides a comprehensive list of important areas of measurement applicable across various clinical placement models, locations, and health disciplines. While recognising that expert opinions may vary, the diverse expertise of the panel strengthens the reliability and relevance of the results, offering key stakeholders a comprehensive perspective on measuring clinical placement performance. These findings provide a solid foundation for evaluating clinical placements across various models and offer valuable insights to guide future research into evaluating clinical placements.

VI DECLARATION OF INTEREST STATEMENT

The authors report no conflict of interest. All authors contributed to the design of the research, the selection of expert panel members, and the writing of the manuscript.

References

- Barker, R., Sealey, C., Polley, M., Mervin, M., & Comans, T. (2017). Impact of a person-centred community rehabilitation service on outcomes for individuals with a neurological condition. *Disability and Rehabilitation*, 39(11), 1136–1142. <https://doi.org/10.1080/09638288.2016.1189604>
- Beckman, E. M., Mandrusiak, A., Forbes, R., Mitchell, L., Tower, M., Cunningham, B., & Lewis, P. (2022). A student-led, interprofessional care, community-based healthcare service: Student, clinical educator and client perceptions of interprofessional care and education. *Focus on Health Professional Education: A Multi-Professional Journal*, 23(1), 90–108. <https://doi.org/10.11157/fohpe.v23i1.476>
- Bernhardt, J., Borschmann, K., Boyd, L., Carmichael, S. T., Corbett, D., Cramer, S. C., Hoffmann, T., Kwakkel, G., Savitz, S., Saposnik, G., Walker, M., & Ward, N. (2017). Moving rehabilitation research forward: Developing consensus statements for rehabilitation and recovery research. *Neurorehabilitation and Neural Repair*, 31(8), 694–698. <https://doi.org/10.1177/1545968317724290>
- Bird, K., Stothers, K., Armstrong, E., Marika, E. D., Yunupingu, M. D., Brown, L., Witt, S., Campbell, N., & Barker, R. (2022). Marrgithiri gunga'yunarawu ga gunga'yunyarawu marrgithinyarawu: Learning to connect and connecting to learn: Preparing the rural and remote allied health workforce through a co-created student-implemented service in East Arnhem, Australia. *Australian Journal of Rural Health*, 30(1), 75–86. <https://doi.org/10.1111/ajr.12813>
- Braun, V., & Clarke, V. (2021). One size fits all? What counts as quality practice in (reflexive) thematic analysis? *Qualitative Research in Psychology*, 18(3), 328–352. <https://doi.org/10.1080/14780887.2020.1769238>
- Carter, N., Bryant-Lukosius, D., DiCenso, A., Blythe, J., & Neville, A. J. (2014). The use of triangulation in qualitative research. *Oncology Nursing Forum*, 41(5), 545–547. <https://doi.org/10.1188/14.ONF.545-547>
- Che Daud, A. Z., Yau, M. K., & Barnett, F. (2015). A consensus definition of occupation-based intervention from a Malaysian perspective: A Delphi study. *British Journal of Occupational Therapy*, 78(11), 697–705. <https://doi.org/10.1177/0308022615569510>
- Cooper, S., Cant, R., Waters, D., Luders, E., Henderson, A., Willetts, G., Tower, M., Reid-Searl, K., Ryan, C., & Hood, K. (2020). Measuring the quality of nursing clinical placements and the development of the Placement Evaluation Tool (PET) in a mixed methods co-design project. *BMC Nursing*, 19(1), 101. <https://doi.org/10.1186/s12912-020-00491-1>
- Copeland, D. (2020). Paying for nursing student clinical placements: Ethical considerations. *Journal of Professional Nursing*, 36(5), 330–333. <https://doi.org/10.1016/j.profnurs.2020.01.008>
- Creswell, J. W., & Clark, V. L. P. (2017). *Designing and Conducting Mixed Methods Research*. SAGE Publications. <https://books.google.com.au/books?id=eTwmDwAAQBAJ>
- Forbes, R., Dinsdale, A., Copley, J., Booth, J., Cain, D., Crabb, M., Dunwoodie, R., Hunter, L., Sher, A., & Hill, A. (2022). The benefits and barriers of hosting students within allied health private practice settings: The perspective of private practice and clinical education coordinators. *Australian Journal of Clinical Education*, 11(1), 69–89. <https://doi.org/10.53300/001c.34708>
- Frakes, K. A., Tyack, Z. F., Miller, M., Davies, L., Swanston, A., & Brownie, S. (2011). *The Capricornia Project: Developing and implementing an interprofessional student-assisted allied health clinic*. Clinical Education and Training in Queensland, Queensland Health. https://www.health.qld.gov.au/_data/assets/pdf_file/0026/147581/cahpipefull1.pdf

- Heales, L. J., Bonato, K., Randall, S., Hinz, C., Job, S., Bochekezanian, V., Palmer, T., & Obst, S. J. (2021). Factors associated with student satisfaction within a regional student-led physiotherapy clinic: A retrospective qualitative study. *Australian Journal of Clinical Education*, 10(1), 1–17.
- Hsu, C. C., & Sandford, B. A. (2007). The Delphi technique: Making sense of consensus. *Practical Assessment, Research & Evaluation*, 12(10). <https://doi.org/10.7275/pdz9-th90>
- Jünger, S., Payne, S., Brine, J., Radbruch, L., & Brearley, S. (2017). Guidance on conducting and reporting Delphi studies (CREDES) in palliative care: Recommendations based on a methodological systematic review. *Palliative Medicine*, 31(8), 684–706. <https://doi.org/10.1177/0269216317690685>
- Keeney, S., Hasson, F., & McKenna, H. P. (2001). A critical review of the Delphi technique as a research methodology for nursing. *International Journal of Nursing Studies*, 38(2), 195–200. [https://doi.org/10.1016/S0020-7489\(00\)00044-4](https://doi.org/10.1016/S0020-7489(00)00044-4)
- Larkins, S., Panzera, A., Beaton, N., Murray, R., Mills, J., Coulter, K., Stewart, R., Hollins, J., Matich, P., & Baird, D. (2014). *Regional health workforce planning in north Queensland: Starting with the end in mind*. Health Workforce Australia.
- Maguire, M., & Delahunt, B. (2017). Doing a thematic analysis: A practical, step-by-step guide for learning and teaching scholars. *All Ireland Journal of Teaching and Learning in Higher Education*, 9(3), 3351. <http://ojs.aishe.org/index.php/aishe-j/article/view/3354>
- Marsh, W., Colbourne, D. M., Way, S., & Hundley, V. A. (2015). Would a student midwife-run postnatal clinic make a valuable addition to midwifery education in the UK? A systematic review. *Nurse Education Today*, 35(3), 480–486. <https://doi.org/10.1016/j.nedt.2014.11.015>
- Mazander, M., Rumenapp, J., Lee, D., Ong, C., Floramo, E., Benjamins, M., & Chen, M. (2024, Mar). Quantifying the Educational Value of a Student-Run Free Clinic. *Family Medicine*, 56(3), 176–179. <https://doi.org/10.22454/FamMed.2024.568265>
- McAllister, L., Nagarajan, S., Scott, L., Smith, L., & Thomson, K. (2018). Developing measures of placement quality in allied health, dentistry, medicine, and pharmacy. *International Journal of Practice-based Learning in Health and Social Care*, 6(2), 31–47. <https://doi.org/10.18552/ijpbhlsc.v6i2.493>
- McTier, L., Phillips, N. M., & Duke, M. (2023). Factors influencing nursing student learning during clinical placements: A modified Delphi study. *Journal of Nursing Education*, 62(6), 333–341. <https://doi.org/10.3928/01484834-20230404-01>
- Mori, B., Quesnel, M., & Wojkowski, S. (2019). Students' perspectives on their experience in clinical placements: Using a modified Delphi methodology to engage physiotherapy stakeholders in revising the national form. *Physiotherapy Canada*, 71(4), 368–381. <https://doi.org/10.3138/ptc-2018-43.e>
- Müllersdorf, M., & Ivarsson, A. B. (2011). Occupation as described by academically skilled occupational therapists in Sweden: A Delphi study. *Scandinavian Journal of Occupational Therapy*, 18(2), 85–92. <https://doi.org/10.3109/11038128.2010.483689>
- Murry, J. W., Jr., & Hammons, J. O. (1995). Delphi: A versatile methodology for conducting qualitative research. *The Review of Higher Education*, 18(4), 423–436. <https://doi.org/10.1353/rhe.1995.0008>
- Nyoni, C. N., Van Dyk, L. H., & Botma, Y. (2021). Clinical placement models for undergraduate health professions students: A scoping review. *BMC Medical Education*, 21(1), 598. <https://doi.org/10.1186/s12909-021-03023-w>

- Patrick, C., Peach, D., Pocknee, C., Webb, F., Fletcher, M., & Pretto, G. (2008). *The WIL [Work Integrated Learning] report: A national scoping study* [Australian Learning and Teaching Council (ALTC) Final Report]. Queensland University of Technology.
- Peisah, C., Sheppard, A. J., Benbow, S. M., Loughran-Fowlds, A., Grayson, S., Gunton, J. E., Kataria, A., Lai, R., Lele, K., Quadrio, C., Wright, D. J., & McLean, L. (2023). Operationalising the Family-Friendly Medical Workplace and the Development of FAM-MED, a Family-Friendly Self-Audit Tool for Medical Systems: A Delphi Consensus. *Healthcare*, 11(12), 1679. <https://doi.org/10.3390/healthcare11121679>
- Ross, S., Hauer, K. E., & van Melle, E. (2018). Outcomes are what matter: Competency-based medical education gets us to our goal. *MedEdPublish*, 7, 85. <https://doi.org/10.15694/mep.2018.0000085.1>
- Schutte, T., Tichelaar, J., Dekker, R. S., van Agtmael, M. A., de Vries, T. P., & Richir, M. C. (2015). Learning in student-run clinics: A systematic review. *Medical Education*, 49(3), 249–263. <https://doi.org/10.1111/medu.12625>
- Siggins Miller Consultants. (2012). *Promoting Quality in Clinical Placements: Literature review and national stakeholder consultation*. Health Workforce Australia. <https://www.hwa.gov.au>
- Simmons, L., Barker, R., & Barnett, F. (2023). *Evaluating Allied Health Clinical Placement Performance: Protocol for a Modified Delphi Study*. *JMIR research protocols*, 12, e44020. <https://doi.org/10.2196/44020>
- Stuhlmiller, C. M., & Tolchard, B. (2015). Developing a student-led health and wellbeing clinic in an underserved community: Collaborative learning, health outcomes, and cost savings. *BMC Nursing*, 14(1), 1–8. <https://doi.org/10.1186/s12912-015-0083-9>
- Suen, J., Attrill, S., Thomas, J. M., Smale, M., Delaney, C. L., & Miller, M. D. (2020). Effect of student-led health interventions on patient outcomes for those with cardiovascular disease or cardiovascular disease risk factors: A systematic review. *BMC Cardiovascular Disorders*, 20(1), 332. <https://doi.org/10.1186/s12872-020-01602-1>
- Wray, N., & McCall, L. (2007). Money matters: Students' perceptions of the costs associated with placements. *Medical Education*, 41(10), 975–981. <https://doi.org/10.1111/j.1365-2923.2007.02840.x>
- Zhang, J., Shields, L., Ma, B., Yin, Y., Wang, J., Zhang, R., & Hui, X. (2022). The clinical learning environment, supervision and future intention to work as a nurse in nursing students: A cross-sectional and descriptive study. *BMC Medical Education*, 22(1), 548. <https://doi.org/10.1186/s12909-022-03609-y>

10.6 Appendix 6:

Simmons, L., Barker, R., Barnett, F., & McGuckin, T. (2025). Consensus challenges in clinical placement evaluation: Insights from a modified Delphi study. Abstract presented at the 16th National Allied Health Conference, 11–13 August, Adelaide, SA, Australia. Available at <https://nahc.com.au/consensus-challenges-in-clinical-placement-evaluation-insights-from-a-modified-delphi-study/>

Consensus Challenges in Clinical Placement Evaluation: Insights From a Modified Delphi Study

Ms Lisa Simmons¹, Prof Ruth Barker¹, A/Prof Fiona Barnett¹, Dr Teneale McGuckin¹

¹James Cook University, Townsville, Australia

Biography:

Lisa Simmons is a PhD candidate at James Cook University and a senior lecturer in Health Professional Education. Her research focuses on evaluating clinical placement models in Student-Led Healthcare Services (SLHS) to enhance learning outcomes and placement experience. With over 10 years of experience in SLHS development and management, Lisa has worked extensively on improving placement experiences for students and supervisors, particularly in rural and under-resourced regions. Her PhD research applies a multi-stakeholder approach to assess SLHS effectiveness, aiming to establish standardised evaluation frameworks that align with best practices in health professional education.

Abstract:

Background:

Evaluating clinical placement performance is crucial for ensuring high-quality learning experiences in health professional education. This study used a Modified Delphi approach to examine expert consensus on key measurement areas and the effectiveness of tools used to assess placement performance.

Method:

In Rounds 2 and 3 of a Modified Delphi study, experts identified and ranked tools used to evaluate clinical placements. Open-ended responses were analysed inductively to determine commonly used approaches. Experts then rated each tool's effectiveness using a Likert scale, with consensus set at $\geq 75\%$ agreement.

Findings:

While consensus was achieved for key measurement areas, significant variability existed in preferred assessment tools, reflecting differences in institutional practices, disciplinary expectations, and stakeholder perspectives. Consensus was stronger for tools measuring student learning outcomes compared to those assessing placement experiences, suggesting that educational outcomes are more systematically understood. Key challenges included limited empirical validation of tools, reliance on subjective assessments, and difficulties in measuring competencies such as workplace resilience and coping mechanisms.

Conclusion:

Experts emphasised the need for a multi-method evaluation approach, integrating competency-based assessments, observational methods, and structured feedback mechanisms. However, the Delphi method proved less effective for tool selection, demonstrating the importance of an alternative research approach to consensus-building. Future research should focus on real-world application in specific clinical placement settings, ensuring that placement evaluation tools are both applicable and relevant. A flexible framework for tool selection is recommended to address standardisation challenges while maintaining disciplinary relevance.

Consensus Challenges in Clinical Placement Evaluation: Insights from a Modified Delphi Study



Lisa Simmons¹, Ruth Barker¹, Fiona Barnett¹ & Teneale McGuckin¹
¹James Cook University, Townsville, Australia

Introduction

Clinical placements are essential to health professional education, yet evaluating their quality remains inconsistent. Although tools exist to assess student learning and placement environments, many are discipline-specific, lack validation, or fail to address broader aspects such as workplace resilience and supervision quality. Building on a previous modified Delphi study that identified key areas of measurement (Simmons et al., 2025), this study explored expert consensus on the tools used to evaluate clinical placement performance within allied health contexts.

Methods

A modified Delphi approach was used to explore expert opinion on the effectiveness of existing clinical placement evaluation tools. In Round 2, experts from diverse allied health disciplines identified commonly used tools for 33 areas of measurement. These included student learning outcomes (e.g., communication, reasoning) and placement experience (e.g., supervision, feedback, inclusivity). In Round 3, experts rated each tool's effectiveness using a 5-point Likert scale. Consensus was defined as ≥75% agreement with a rating of 4 or higher. Qualitative responses were analysed deductively, using predefined areas of measurement. This allowed insights and limitations to be explored in context with the tools identified for each domain.

Results

Experts achieved consensus on tools for 20 of 33 measurement areas. Tools for student learning outcomes reached higher consensus than those for placement experience. Supervisor observation, discipline-specific assessment tools (e.g., APP, COMPASS®), and reflective tasks were widely supported for evaluating communication, documentation, reasoning, and professionalism. Validated tools were preferred for self-efficacy and interprofessional practice (Figure 1).

In contrast, placement experience domains such as student trust, autonomy, coping, supervisor skills, and institutional support lacked clear consensus on measurement tools. While surveys and informal conversations were commonly used, experts questioned their reliability and emphasised the importance of real-time, contextual feedback. Areas such as supervisor satisfaction and university support of supervisors were best measured through structured feedback tools (Figure 2).

In qualitative responses, experts stressed that no single tool suffices and that blended, multi-method approaches were essential:

"Clinical competency is the summation of all the areas detailed above. To be considered clinically competent, the student must gather information, display clinical reasoning, show resilience and be reflective." - Placement Supervisor 6

Real-time feedback and context-specific assessment were seen as more effective than end-of-placement surveys:

"Feedback surveys that occur DURING a placement... provide effective capture and capacity to address issues. But the standard student feedback approach after a placement doesn't give a lot to address this area well." - Placement Coordinator 4

Experts were also highly aware of the limitations of student feedback:

"Student feedback surveys can be useful, but this is also loaded against the bias of the student's experience on the placement." - Placement Coordinator 4

Finally, one of the most powerful themes that emerged was the importance of context:

"Inclusiveness is difficult to quantify and varies depending on the placement site's policies and culture." - Placement Coordinator 1

References

Simmons, L., Barker, R., Barnett, F., & McGuckin, T. (2025). Evaluating clinical placement performance in allied health student-led healthcare services: A modified Delphi study. *Australian Journal of*

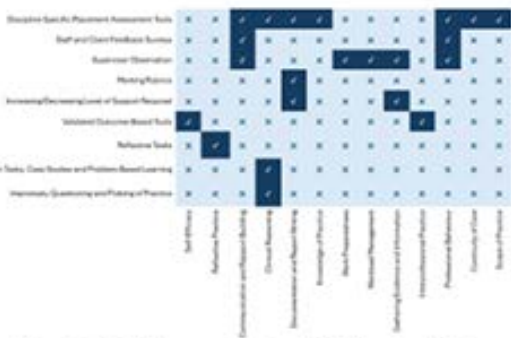


Figure 1. Tools achieving consensus aligned with Student Learning Outcomes

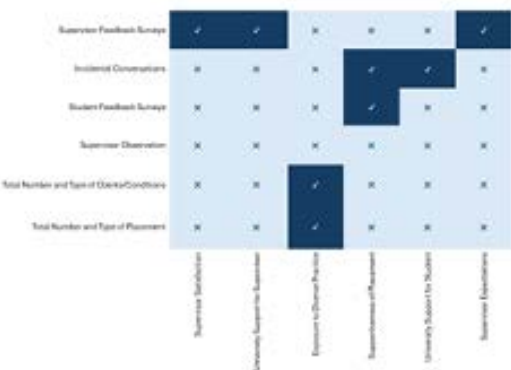


Figure 2. Tools achieving consensus aligned with Experience of Placement

Conclusions

The findings confirm that clinical placement evaluation requires a multi-method, context-sensitive approach. While student learning outcomes are relatively well-supported by existing tools, measuring placement experience, especially relational, emotional, and supervisory domains, remains inconsistent. These insights support the development of a flexible evaluation framework that balances standardisation with local adaptability and disciplinary relevance.

10.7 Appendix 7: HELP-C Guiding Framework: Domains, Measures, and Recommendations

Table 1. HELP-C Recommendations for Measuring Health Outcomes and Experience of Healthcare in SLHS

Outcome Area	Recommended Approach	Example Tools/Models
Patient Health Outcomes	Use a three-tiered measurement approach recommended by Evans & Stoddart (1990) and Stiefel and Nolan (2012). Align primary outcomes with service aims. Incorporate PROMs and QoL tools as measures to capture the downstream impact (Bonsel et al., 2024; Chen et al., 2005; Curran et al., 2023; Frendl & Ware, 2014).	Priority 1: Downstream Health Outcomes- QoL & Function (e.g., SF-36, EQ-5D, AQoL-8D) Utility-based health status (e.g., SF-6D) Priority 2: Intermediate Outcomes Disease burden (e.g., prevalence of chronic conditions) Priority 3: Individual Factors Behavioural: smoking, alcohol, activity, diet Physiological: BP, BMI, cholesterol, BGL Composite risk scores (e.g., HRA)
Experience of Care - patient	Use SLHS-adapted PREMs focused on patient-provider communication, attentiveness, and satisfaction. Tailor instruments to SLHS models to ensure contextual relevance and capture shared decision-making (Beard et al., 2020; De Rosis et al., 2022; Engle et al., 2021; Stiefel & Nolan, 2012).	Patient satisfaction surveys, PREMs, customised SLHS surveys, and shared decision-making questionnaires. Sample questions include: “Using any number from 0 to 10, how would you rate all your healthcare?”

Measuring Performance in Student-led Healthcare Services

		• “I receive exactly what I want and need exactly when and how I want and need it.”
Experience of Care - provider	Incorporate provider-focused assessments aligned with the IOM’s six quality aims (Hannawa et al., 2022; Stiefel & Nolan, 2012):	
1. Clinical Effectiveness	Monitor adherence to evidence-based guidelines through clinical audits and peer-reviewed documentation. Track patient outcomes using condition-specific tools and guideline checklists (Jiang et al., 2024; Wynne & Cooper, 2019).	Clinical audit templates, guideline adherence checklists, peer review forms, HEDIS metrics.
2. Timeliness and Access to Care	Track wait times, appointment availability, and service delays. Collect operational data and patient feedback to identify systemic barriers to timely access and care flow (Stiefel & Nolan, 2012).	Internal scheduling metrics, wait-time logs, appointment dashboards, and patient feedback forms. Sample questions include: • In the last six months, when you made an appointment with the healthcare provider/student, how often did you get to see them as soon as you needed to? • In the last six months, when you contacted the healthcare provider/student with a question about your health, how often did you get an answer to your question that same day?

Measuring Performance in Student-led Healthcare Services

3. Patient-Centredness	Assess respect for patient preferences, shared decision-making, cultural responsiveness, and communication quality. Use qualitative interviews and validated scales to explore relational care (Jiang et al., 2024; Stiefel & Nolan, 2012).	Patient narratives, cultural competence scales, Patient-Practitioner Orientation Scale (PPOS), experience interviews with questions. Sample questions include: • “How often did the healthcare provider/student show respect for what you had to say?” • “How often did they spend enough time with you?” • “How often did they explain things clearly?”
4. Equity in Care Delivery	Analyse demographics of service users and accessibility for marginalised population. Use outreach data and inclusion audits to evaluate reach and impact on healthcare equity (Beks et al., 2020; Braveman, 2014; March et al., 2023).	Demographic utilisation audits, equity dashboards, geographic access mapping, community engagement logs.
5. Patient Safety	Develop systems to report and review adverse events and near-misses. Implement incident logs, safety debriefs, and supervision protocols tailored to the SLHS environment (Gorrindo et al., 2014).	Incident Reporting Systems, patient safety dashboards, structured post-event debrief templates.
6. Efficiency of Care Delivery	Compare inputs (e.g., supervision time, consumables, student hours) with outputs (e.g., patients seen, outcomes achieved). Use efficiency ratios and cost	Resource use tracking tools, throughput-outcome ratios, cost-benefit, and workload modeling tools.

Measuring Performance in Student-led Healthcare Services

	modeling to assess value (Mitchell et al., 2025; Wynne & Cooper, 2019).	

Adapted from Stiefel and Nolan (2012)

Table 2. HELP-C Recommendations for Measuring Student Learning Outcomes in SLHS

Learning Outcome	HELP-C Recommendation	Example Tools
Client Outcomes	Assess student participation in collaborative goal-setting and tracking of client change using structured tools. Use PROMs, COPM, or GAS where feasible. Reflective tasks should include interpretation of client outcomes. Supervisor training in basic outcome measurement should be included.	Goal Attainment Scaling (GAS); Canadian Occupational Performance Measure (COPM); PROMs (e.g., EQ-5D, SF-12).
Clinical Reasoning	Use case-based discussions, think-aloud strategies, and structured rubrics to assess reasoning processes (Delany & Golding, 2014; Kojich et al., 2024; Thampy et al., 2019)	Script Concordance Test (SCT); Clinical Reasoning Assessment Rubric (CRAR); Mini-CEX.
Continuity of Care	Assess student contributions to handover and ongoing care documentation. Use audit tools and reflective tasks (Ljungholm et al., 2022; Malone et al., 2016; Peisah et al., 2023).	Handover Assessment Tools; Continuity of Care Logs.
Gathering Evidence	Assess through case presentations and appraisal of relevant literature integrated into clinical planning (Halm, 2023; Ilic et al., 2014; Salbach et al., 2013).	Evidence-Based Practice Confidence Scale (EPIC) Scale; Case-Based Discussion.

Measuring Performance in Student-led Healthcare Services

Interprofessional Practice	Assess teamwork, communication, and role clarity using validated IPL tools. Encourage joint case discussions. (Hopkins et al., 2022; Orchard et al., 2012; Prestes Vargas et al., 2024)	Interprofessional Collaborative Competencies Attainment Survey (ICCAS); Assessment of Interprofessional Team Collaboration Scale (AITCS).
Knowledge of Practice	Evaluate via supervisor questioning during debriefs and structured written assessments on discipline-specific knowledge (Imran et al., 2019; Makhene, 2022; van Diggele et al., 2020).	Oral Viva Exams; Written Case Reflections; scenario-based questions.
Scope of Practice	Use structured observation and reflective prompts. Assess student role articulation and ability to seek support appropriately (Chien et al., 2022; Deckers & van Zaalen, 2024).	Entrustable Professional Activities (EPAs).
Clinical Competency	Use programmatic assessment combining supervisor ratings, observation, and performance evidence across domains (McAllister et al., 2011; Ten Cate, 2013; Wilson et al., 2023).	COMPASS®; APP; EPAs; Clinical Performance Instrument (CPI).
Administration Skills	Track independence in admin tasks using checklists or rubrics. Provide feedback on accuracy and efficiency (McAllister et al., 2018; Sarkar et al., 2021).	Clinical Administration Task Checklists; Custom Placement Rubrics.

Measuring Performance in Student-led Healthcare Services

Communication & Rapport	Incorporate structured feedback from clients and use validated communication frameworks during observation. Supplement with simulation or scenario-based assessments (Burgess et al., 2020; Kurtz & Silverman, 1996).	Calgary-Cambridge Guide; Four Habits Model; ISBAR; Communication Assessment Tool (CAT).
Documentation	Use discipline-specific rubrics to assess clarity, accuracy, and integration of clinical reasoning in documentation. Review progress over time (Boase-Jelinek et al., 2013; Caine et al., 2021; McAllister et al., 2011).	Discipline Specific Placement Assessment tools such as COMPASS® (Speech Pathology); APP (Physiotherapy); Customised Clinical Documentation Rubrics.
Professional Behaviour	Use structured observation tools with behavioural anchors and triangulate with multi-source feedback. Reflective logs can supplement observations (Amin et al., 2024; Archer et al., 2010; Cruess et al., 2019).	Professionalism Mini-Evaluation Exercise (P-MEX); Clinical Evaluation Exercise (Mini-CEX); Multi-Source Feedback (MSF).
Reflective Practice	Use structured reflection templates alongside guided supervision discussion. Encourage depth through prompts and feedback (Boud & Walker, 1998; Nguyen et al., 2014; Wald et al., 2012).	Gibbs' Reflective Cycle; Borton's Model; REFLECT Tool.
Self-Efficacy	Use pre/post confidence scales and structured reflection.	General Self-Efficacy Scale; Self-Efficacy for Clinical Performance Tool.

Measuring Performance in Student-led Healthcare Services

	Support development through supervisor scaffolding (Abusubhiah et al, 2023; Artino, 2012).	
Work Preparedness	Use supervisor observation and student reflection. Evaluate punctuality, initiative, and ability to function independently (Aggarwal et al., 2023; Jackson et al., 2023).	Early Clinical Exposure (ECE) Tools; Professional Behaviour Rating Scales.
Workload Management	Assess through planning logs and supervision discussions on prioritisation. Use self-monitoring tools (Garcia et al., 2019; Sadeghi et al., 2024)s	Time Management Checklists; Self-Regulation Reflection Tools.
Workplace Resilience	Encourage reflective tasks focusing on recovery from challenges. Use structured supervision debriefing (Chye et al., 2024; Kunzler et al., 2020; Rees et al., 2015).	Connor-Davidson Resilience Scale (CD-RISC); Resilience Snapshot Tools.

Table 3. HELP-C Recommendations for Measuring Placement Experience in SLHS

Placement Experience	HELP-C Recommendation	Example Tools
The Student Experience		
Student Autonomy	Monitor supervision levels over time and evaluate readiness for independent tasks through supervision logs and EPA alignment (Ceelen et al., 2024; Encandela et al., 2023).	EPAs: Tracking level of supervision required.
Preparedness for Placement	Use student self-assessments and supervisor ratings during early placement to track preparedness (Judd et al., 2023; Marriott et al., 2024; Zhang et al., 2022).	Pre-Placement Confidence Surveys; Student Preparedness Checklist.
University Support (Student)	Evaluate through post-placement surveys, tracking accessibility, responsiveness, and student perceptions (Bell et al., 2025; Burgess & Mellis, 2015; Smith et al., 2023).	Placement Evaluation Tools; Custom Institutional Support Surveys.
Goal Attainment	Use SMART goal templates revisited mid- and end-placement, with reflective summaries on progress (Gonsalvez et al., 2017; Weallans et al., 2022).	Learning Contracts; Goal Attainment Logs; SMARTE/SMARTER framework; end of placement reflection.

Measuring Performance in Student-led Healthcare Services

Student Coping	Monitor using weekly wellbeing check-ins, reflective tasks, and structured supervision debriefs (Goodchild et al., 2023; Lavoie-Tremblay et al., 2022; Wu et al., 2021).	Brief Resilience Scale (BRS); Connor-Davidson Resilience Scale (CD-RISC); Model (REPM).
Supervisor Availability	Assess the quality and responsiveness of supervision using student surveys and qualitative feedback (Borralló-Riego et al., 2021; Saarikoski et al., 2008; Warne et al., 2010).	Placement Quality Survey; Clinical Learning Environment, Supervision and Nurse Teacher (CLES+T) scale or Development of the Clinical Placement Quality Survey – Educator (CPQS-E) Tool; Sample survey questions include: • “My supervisor was available when needed” • "My supervisor was approachable and supportive."
Constructiveness of Feedback	Use structured student surveys and reflective logs to assess the specificity and impact of feedback provided (Hattie & Timperley, 2007; Johnson et al., 2021; Weallans et al., 2022).	Feedback Quality Instrument (FQI); Feedback Engagement Tool (FET).
Supervisor Skills	Use student feedback, peer reviews, and professional development participation as indicators. Encourage reflective supervision logs (Gonsalvez et al., 2017; Irby et al., 2021; Ladyshevsky, 2010).	Clinical Educator Evaluation Form (CEEF); Supervision Evaluation and Supervisory Competence (SE-SC) Scale; Clinical Supervision Skills Review Tool (CSSRT).
Orientation to Placement	Use structured orientation checklists and student ratings of the quality and completeness of orientation (Bril et al., 2022; Hardie et al., 2022; McAllister et al., 2018).	Clinical Placement Orientation Checklist; Student Orientation Evaluation Tool.

Measuring Performance in Student-led Healthcare Services

Supportive Learning Environment	Assess psychological safety, feedback culture, and peer collaboration using validated surveys and supervisor input (Javornická et al., 2024; Saarikoski et al., 2008; Warne et al., 2010; Zhang et al., 2022).	Best Practice Clinical Learning Environment (BPCLE) Framework; Clinical Learning Environment and Supervision (CLES+T); Sample survey questions include: • “I felt safe to ask questions,” • “I was treated as a member of the team,” • “My supervisor encouraged open communication.”
Inclusiveness of Site	Evaluate student sense of belonging and cultural safety via surveys and qualitative reflection (Chicca & Shellenbarger, 2020; Dowling et al., 2021; Philion et al., 2021; Sand-Jecklin, 2009).	Inclusion Climate Scale; Student Inclusiveness Reflection Tool; Sample survey questions include: • “I felt respected and included in the team,” • "I felt safe to express my cultural identity."
Exposure to Quality Practice	Prompt student reflection and supervisor confirmation of exposure to safe, evidence-based care (Cruess et al., 2019; Dalton et al., 2011; Levett-Jones et al., 2010).	The Clinical Reasoning Cycle; Discipline Specific Placement Assessment Tools; Best Practice Clinical Learning Environment (BPCLE).
Exposure to Diversity	Use client encounter logs to track diversity in clinical conditions, populations, and settings (Chooniedass et al., 2025; Lyng et al., 2021).	Client Encounter Logs; Diversity Exposure Logs.
The Supervisor Experience		

Measuring Performance in Student-led Healthcare Services

Supervisor Satisfaction	Track supervisor willingness to supervise again and satisfaction with placement conditions and support through Supervisor Feedback Surveys (Čukljek et al., 2024; Gholizadeh et al., 2022; Skjevik et al., 2024)	Questionnaire of Satisfaction with Clinical Practice – Mentors (QSCP-M); Preceptor Satisfaction and Perception Surveys; Sample survey question includes: “Overall, how satisfied were you with this supervision experience?”
University Support (Supervisor)	Use post-placement supervisor surveys to evaluate responsiveness, clarity of documentation, and training access (Donough & Van der Heever, 2018; Gholizadeh et al., 2022; Hargreaves et al., 2024; Rodger et al., 2008).	Clinical Educator Evaluation Form (CEEF); Placement Communication Feedback Form; Sample survey questions include: “Were university staff available when needed?”, “Was the placement documentation clear and sufficient?”, “Did you feel adequately prepared to supervise this student?”
Expectations of Placement	Use learning agreements and periodic reviews to ensure clarity and alignment of expectations between student and supervisor (Bogo et al., 2002; Milgate et al., 2024; Smith & Curtis, 2020).	Feedback Surveys; Self-assessment and Reflection prompts.

Table 4. HELP-C Recommendations for Measuring Cost in SLHS

Cost of SLHS	HELP-C Recommendation	Example Tool / Approach
Cost to the Student		
Loss of Income	Include anonymous student self-report of income lost during placements in post-placement evaluations (Beks et al., 2024; Usher et al., 2022).	Voluntary income loss survey (e.g., anonymous form during final placement debrief).
Pre-placement Costs	Use standardised checklists and anonymous post-placement tools to track upfront placement expenses (Grant-Smith & de Zwaan, 2019; Mitchell et al., 2025).	Pre-placement cost checklist and anonymous expense log.
Transport & Accommodation	Include standardised questions on transport and accommodation costs in post-placement surveys, mapped by location (Moran et al., 2024; Russell et al., 2021).	Post-placement travel/accommodation cost survey with mapping by region.
Cost to the Placement Site		
Impact on Services	Survey placement providers on perceived service delivery impact, throughput changes, and	Post-placement provider impact survey or semi-structured debrief.

Measuring Performance in Student-led Healthcare Services

	supervision burden (Cooper et al., 2020; Gray et al., 2022; Mitchell et al., 2025).	
Resourcing for Students	Collaborate with site staff to estimate per-student indirect costs such as IT, room usage, and PPE (Mitchell et al., 2025; van Diggele, Burgess, et al., 2020) .	Site resource inventory template and collaborative cost estimation worksheet.
Supervisor Time	Use structured tracking tools (e.g., time-use diaries) for supervision time to inform ratios and compensation models (Sealey et al., 2015; Skaalvik et al., 2011; Zhang et al., 2022).	Supervisor logbook or app-based time-tracking tool.
Cost to University		
Cost to University: Insurance and Coordination	Conduct internal audits of coordination time, insurance coverage, and related expenses to inform planning (Leong & Kavanagh, 2010; Patrick et al., 2008).	Internal staff workload logs and finance system audit templates
Cost to University: Paid Placement Costs	Undertake cost-effectiveness evaluations when implementing paid placements, tracking costs and outcomes (Mitchell et al., 2025; Smith et al., 2015; Usher et al., 2022).	Cost-effectiveness analysis using ICERs; comparative pre/post student satisfaction and uptake data.

References:

- Abusubhiah, M., Walshe, N., Creedon, R., Noonan, B., & Hegarty, J. (2023). Self-efficacy in the context of nursing education and transition to practice as a registered practitioner: A systematic review. *Nursing Open*, 10(10), 6650–6667.
<https://doi.org/10.1002/nop2.1931>
- Aggarwal, M., Scott, G., Kokorelias, K. M., Kulasegaram, K., Katz, A., & Upshur, R. E. G. (2023). Defining the capabilities and competencies of high-performing family physicians: A mixed methods study. *BMJ Open*, 13(8), e072266.
<https://doi.org/10.1136/bmjopen-2023-072266>
- Amin, S., Ambreen, S., Ul-Ain, N., Murad, T., Sajwani, K., & Qaiser, A. (2024). Professionalism program evaluation and its impact on undergraduate medical students. *Cureus*, 16(1), e53051. <https://doi.org/10.7759/cureus.53051>
- Archer, J., McGraw, M., & Davies, H. (2010). Assuring validity of multisource feedback in a national programme. *Archives of Disease in Childhood*, 95(5), 330–335.
<https://doi.org/10.1136/adc.2008.146209>
- Artino, A. R., Jr. (2012). Academic self-efficacy: From educational theory to instructional practice. *Perspectives on Medical Education*, 1(2), 76–85.
<https://doi.org/10.1007/s40037-012-0012-5>
- Beard, A. S., Candy, A. E., Anderson, T. J., Derrico, N. P., Ishani, K. A., Gravely, A. A., Englander, R., & Ercan-Fang, N. G. (2020). Patient satisfaction with medical student participation in a longitudinal integrated clerkship: A controlled trial. *Academic Medicine*, 95(3), 417–424. <https://doi.org/10.1097/ACM.0000000000003021>
- Beks, H., Walsh, S., Clayden, S., Watson, L., Zwar, J., & Alston, L. (2024). Financial implications of unpaid clinical placements for allied health, dentistry, medical, and nursing students in Australia: A scoping review with recommendations for policy, research, and practice. *BMC Health Services Research*, 24(1), 1407.
<https://doi.org/10.1186/s12913-024-11888-y>

- Bell, A., Amabile, B. D., Christiane, K., Gillian, N., Merrolee, P., Daniel, S., & Monrouxe, L. (2025). Improving the quality of allied health placements: Student, educator and organisational preparedness. *Studies in Continuing Education*, 47(1), 337–359. <https://doi.org/10.1080/0158037X.2024.2360495>
- Boase-Jelinek, D., Parker, J., & Herrington, J. (2013). Student reflection and learning through peer reviews. *Issues in Educational Research*, 23(1), 119–131.
- Bonsel, J. M., Itiola, A. J., Huberts, A. S., Bonsel, G. J., & Penton, H. (2024). The use of patient-reported outcome measures to improve patient-related outcomes – A systematic review. *Health and Quality of Life Outcomes*, 22(1), 101. <https://doi.org/10.1186/s12955-024-02312-4>
- Boud, D., & Walker, D. (1998). Promoting reflection in professional courses: The challenge of context. *Studies in Higher Education*, 23(2), 191–206. <https://doi.org/10.1080/03075079812331380384>
- Braveman, P., & Gottlieb, L. (2014). The social determinants of health: It's time to consider the causes of the causes. *Public Health Reports*, 129(1), 19–31. <https://doi.org/10.1177/003335491412915206>
- Bril, I., Boer, H. J., Degens, N., & Fleer, J. (2022). Nursing students' experiences with clinical placement as a learning environment for assertiveness: A qualitative interview study. *Teaching and Learning in Nursing*, 17(4), 383–391. <https://doi.org/10.1016/j.teln.2022.04.006>
- Bogo, M., Cheryl, R., Judy, H., Roxanne, P., & Globberman, J. (2002). Evaluating a measure of student field performance in direct service. *Journal of Social Work Education*, 38(3), 385–401. <https://doi.org/10.1080/10437797.2002.10779106>
- Borralló-Riego, Á., Magni, E., Jiménez-Álvarez, J., Fernández-Rodríguez, V., & Guerra-Martín, M. (2021). Health sciences students' perceptions of the role of the supervisor in clinical placements. *International Journal of Environmental Research and Public Health*, 18(9), Article 4427. <https://doi.org/10.3390/ijerph18094427>

- Burgess, A., van Diggele, C., Roberts, C., & Mellis, C. (2020). Feedback in the clinical setting. *BMC Medical Education*, 20(2), 460. <https://doi.org/10.1186/s12909-020-02280-5>
- Caine, A. M., Copley, J., Turpin, M., Fleming, J., & Herd, C. (2021). Development of the Student Practice Evaluation Form-Revised (Second Edition) (SPEF-R2): The first action research cycle. *Australian Occupational Therapy Journal*, 68(1), 21–31. <https://doi.org/10.1111/1440-1630.12702>
- Ceelen, L., Anne, K., Loek, N., & de Bruijn, E. (2024). Pedagogic strategies of supervisors in healthcare placements. *Medical Teacher*, 46(3), 406–413. <https://doi.org/10.1080/0142159X.2023.2256960>
- Chen, T. H., Li, L., & Kochen, M. M. (2005). A systematic review: How to choose appropriate health-related quality of life (HRQOL) measures in routine general practice? *Journal of Zhejiang University Science B*, 6(9), 936–940. <https://doi.org/10.1631/jzus.2005.B0936>
- Chicca, J., & Shellenbarger, T. (2020). Fostering inclusive clinical learning environments using a psychological safety lens. *Teaching and Learning in Nursing*, 15(3), 174–178. <https://doi.org/10.1016/j.teln.2020.03.002>
- Chien, L. J., Slade, D., Dahm, M. R., Brady, B., Roberts, E., Goncharov, L., Taylor, J., Eggins, S., & Thornton, A. (2022). Improving patient-centred care through a tailored intervention addressing nursing clinical handover communication in its organizational and cultural context. *Journal of Advanced Nursing*, 78(5), 1413–1430. <https://doi.org/10.1111/jan.15110>
- Chooniedass, R., Reekie, M., Denison, J., Mercuri, A., Nawara, R., Purcell, N., Oelke, M., & Janke, R. (2025). Embedding cultural safety in nursing education: A scoping review of strategies and approaches. *Journal of Professional Nursing*, 56, 113–129. <https://doi.org/10.1016/j.profnurs.2024.11.005>
- Chye, S. M., Kok, Y. Y., Chen, Y. S., ... & others. (2024). Building resilience among undergraduate health professions students: Identifying influencing factors. *BMC Medical Education*, 24(1), 1168. <https://doi.org/10.1186/s12909-024-06127-1>

- Cruess, S. R., Cruess, R. L., & Steinert, Y. (2019). Supporting the development of a professional identity: General principles. *Medical Teacher*, 41(6), 641–649. <https://doi.org/10.1080/0142159X.2018.1536260>
- Čukljek, S., Županić, M., & Takšić, I. (2024). Development and validation of satisfaction with clinical practice questionnaire for mentors and students. *International Journal of Nursing Education Scholarship*, 21(1), Article 20220124. <https://doi.org/10.1515/ijnes-2022-0124>
- Curran, C., Baker, J. G., Smitley, M., & Baker, R. T. (2023). A descriptive analysis of patient outcomes and experiences at a student-run athletic training clinic. *Journal of Athletic Training*, 58(2), 163–176. <https://doi.org/10.4085/1062-6050-0051.22>
- Dalton, M., Davidson, M., & Keating, J. (2011). The Assessment of Physiotherapy Practice (APP) is a valid measure of professional competence of physiotherapy students: A cross-sectional study with Rasch analysis. *Journal of Physiotherapy*, 57(4), 239–246. [https://doi.org/10.1016/s1836-9553\(11\)70054-6](https://doi.org/10.1016/s1836-9553(11)70054-6)
- Delany, C., & Golding, C. (2014). Teaching clinical reasoning by making thinking visible: An action research project with allied health clinical educators. *BMC Medical Education*, 14, 20. <https://doi.org/10.1186/1472-6920-14-20>
- Deckers, S., & van Zaalen, Y. (2024). Insights into shared decision-making in interprofessional teams for a boy with Down syndrome with communication and language issues: Simulation-based training for medical and allied health students. *Healthcare*, 12(6), Article 681. <https://doi.org/10.3390/healthcare12060681>
- De Rosis, S., Ferrè, F., & Pennucci, F. (2022). Including patient-reported measures in performance evaluation systems: Patient contribution in assessing and improving the healthcare systems. *The International Journal of Health Planning and Management*, 37(Suppl 1), 144–165. <https://doi.org/10.1002/hpm.3596>
- Donough, G., & Van der Heever, M. (2018). Undergraduate nursing students' experience of clinical supervision. *Curationis*, 41(1), e1–e8. <https://doi.org/10.4102/curationis.v41i1.1833>

- Dowling, T., Metzger, M., & Kools, S. (2021). Cultivating inclusive learning environments that foster nursing education program resiliency during the COVID-19 pandemic. *Journal of Professional Nursing*, 37(5), 942–947.
<https://doi.org/10.1016/j.profnurs.2021.07.010>
- Encandela, J. A., Shaull, L., Jayas, A., Amiel, J. M., Brown, D. R., Obeso, V. T., Ryan, M. S., & Andriole, D. A. (2023). Entrustable professional activities as a training and assessment framework in undergraduate medical education: A case study of a multi-institutional pilot. *Medical Education Online*, 28(1), Article 2175405.
<https://doi.org/10.1080/10872981.2023.2175405>
- Engle, R. L., Mohr, D. C., Holmes, S. K., Seibert, M. N., Afable, M., Leyson, J., & Meterko, M. (2021). Evidence-based practice and patient-centered care: Doing both well. *Health Care Management Review*, 46(3), 174–184.
<https://doi.org/10.1097/HMR.0000000000000254>
- Frendl, D. M., & Ware, J. E., Jr. (2014). Patient-reported functional health and well-being outcomes with drug therapy: A systematic review of randomized trials using the SF-36 Health Survey. *Medical Care*, 52(5), 439–445.
<https://doi.org/10.1097/MLR.000000000000010311>
- Garcia, C. L., Abreu, L. C., Ramos, J. L. S., Castro, C. F. D., Smiderle, F. R. N., Santos, J. A. D., & Bezerra, I. M. P. (2019). Influence of burnout on patient safety: Systematic review and meta-analysis. *Medicina*, 55(9), Article 553.
<https://doi.org/10.3390/medicina55090553>
- Gholizadeh, L., Shahbazi, S., Valizadeh, S., Mohammadzad, M., Ghahramanian, A., & Shohani, M. (2022). Nurse preceptors' perceptions of benefits, rewards, support, and commitment to the preceptor role in a new preceptorship program. *BMC Medical Education*, 22(1), 472. <https://doi.org/10.1186/s12909-022-03534-0>
- Gonsalvez, C. J., Talia, W., & Deane, F. P. (2017). Goal-setting, feedback, and assessment practices reported by Australian clinical supervisors. *Australian Psychologist*, 52(1), 21–30. <https://doi.org/10.1111/ap.12175>

- Goodchild, T., Heath, G., & Richardson, A. (2023). Delivering resilience: Embedding a resilience building module into first-year curriculum. *Student Success*, 14(1), 30–40. <https://doi.org/10.5204/ssj.2883>
- Gorrindo, P., Peltz, A., Ladner, T., Reddy, I., Miller, B., Miller, R., & Fowler, M. (2014). Medical students as health educators at a student-run free clinic: Improving the clinical outcomes of diabetic patients. *Academic Medicine*, 89(4), 625–631. <https://doi.org/10.1097/ACM.0000000000000164>
- Grant-Smith, D., & de Zwaan, L. (2019). Don't spend, eat less, save more: Responses to the financial stress experienced by nursing students during unpaid clinical placements. *Nurse Education in Practice*, 35, 1-6. <https://doi.org/https://doi.org/10.1016/j.nepr.2018.12.005>
- Gray, G., Schalk, A. E., Cooke, G., Murnion, P., Rooney, P., & O'Rourke, K. C. (2022). Stakeholders' insights on learning analytics: Perspectives of students and staff. *Computers & Education*, 187, 104550. <https://doi.org/https://doi.org/10.1016/j.compedu.2022.104550>
- Halm, M. A. (2023). An objective test to measure evidence-based practice knowledge and skill competency of acute care nurses: A psychometric validation study. *Worldviews on Evidence-Based Nursing*, 20(3), 269–280. <https://doi.org/10.1111/wvn.12639>
- Hannawa, A. F., Wu, A. W., Kolyada, A., Potemkina, A., & Donaldson, L. J. (2022). The aspects of healthcare quality that are important to health professionals and patients: A qualitative study. *Patient Education and Counseling*, 105(6), 1561–1570. <https://doi.org/10.1016/j.pec.2021.10.016>
- Hardie, P., O'Donovan, R., Jarvis, S., & Redmond, C. (2022). Key tips to providing a psychologically safe learning environment in the clinical setting. *BMC Medical Education*, 22(1), 816. <https://doi.org/10.1186/s12909-022-03892-9>
- Hargreaves, J., Thomas, P., & Kirwan, G. (2024). Development of the Clinical Placement Quality Survey – Educator (CPQS-E) tool to evaluate the quality of physiotherapy clinical placements. *Australian Journal of Clinical Education*, 13, 27–44. <https://doi.org/10.53300/001c.94127>

- Hattie, J., & Timperley, H. (2007). The power of feedback. *Review of Educational Research*, 77(1), 81–112. <https://doi.org/10.3102/003465430298487>
- Hopkins, S., Bacon, R., & Flynn, A. (2022). Student outcomes for interprofessional education in student led clinics: A rapid review. *Journal of Interprofessional Care*, 36(2), 234–244. <https://doi.org/10.1080/13561820.2021.1931559>
- Ilic, D., Nordin, R. B., Glasziou, P., Tilson, J. K., & Villanueva, E. (2014). Development and validation of the ACE tool: Assessing medical trainees' competency in evidence based medicine. *BMC Medical Education*, 14, 114. <https://doi.org/10.1186/1472-6920-14-114>
- Imran, M., Doshi, C., & Kharadi, D. (2019). Structured and unstructured viva voce assessment: A double-blind, randomized, comparative evaluation of medical students. *International Journal of Health Sciences*, 13(2), 3–9.
- Irby, D. M., O'Brien, B. C., Stenfors, T., & Palmgren, P. J. (2021). Selecting instruments for measuring the clinical learning environment of medical education: A 4-domain framework. *Academic Medicine*, 96(2), 218–225. <https://doi.org/10.1097/ACM.0000000000003551>
- Jackson, D., Linda, R., Stephanie, M., Madeleine, O., Alf, K., Laurie, M., Nathalie, C., Karina, L., & Brock, M. (2023). Using an industry-aligned capabilities framework to effectively assess student performance in non-accredited work-integrated learning contexts. *Teaching in Higher Education*, 28(4), 802–821. <https://doi.org/10.1080/13562517.2020.1863348>
- Javornická, D., Kisvetrová, H., Prušová, E., Váverková, R., Greaves, P. J., & Steven, A. (2024). The influence of supervisory support on clinical learning as experienced by Czech nursing and health professional students in the context of patient safety events: A qualitative study. *Nurse Education in Practice*, 79, 104041. <https://doi.org/10.1016/j.nepr.2024.104041>
- Jiang, J. J., Link, K., Mellgard, G., Silvestri, F., Qian, D., Chennareddy, S., Tran, M., Goldstein, Y., Frid, G., Band, I., Saali, A., Thomas, D. C., Jasti, H., & Meah, Y. S. (2024). Evaluation of patient health outcomes of a student-run free clinic in East

Harlem. *BMC Medical Education*, 24(1), 323. <https://doi.org/10.1186/s12909-024-05070-5>

Johnson, C. E., Keating, J. L., Leech, M., Congdon, P., Kent, F., Farlie, M. K., & Molloy, E. K. (2021). Development of the Feedback Quality Instrument: A guide for health professional educators in fostering learner-centred discussions. *BMC Medical Education*, 21(1), 382. <https://doi.org/10.1186/s12909-021-02722-8>

Judd, B., Brentnall, J., Scanlan, J. N., Thomson, K., Blackstock, F., Mandrusiak, A., Chipchase, L., Phillips, A., & McAllister, S. (2023). Evaluating allied health students' readiness for placement learning. *BMC Medical Education*, 23(1), 70. <https://doi.org/10.1186/s12909-023-04005-w>

Kojich, L., Miller, S. A., Axman, K., Eacret, T., Koontz, J. A., & Smith, C. (2024). Evaluating clinical reasoning in first year DPT students using a script concordance test. *BMC Medical Education*, 24(1), 329. <https://doi.org/10.1186/s12909-024-05281-w>

Kunzler, A. M., Helmreich, I., König, J., Chmitorz, A., Wessa, M., Binder, H., & Lieb, K. (2020). Psychological interventions to foster resilience in healthcare students. *Cochrane Database of Systematic Reviews*, 2020(7), Article CD013684. <https://doi.org/10.1002/14651858.CD013684>

Kurtz, S. M., & Silverman, J. D. (1996). The Calgary-Cambridge referenced observation guides: An aid to defining the curriculum and organizing the teaching in communication training programmes. *Medical Education*, 30(2), 83–89. <https://doi.org/10.1111/j.1365-2923.1996.tb00724.x>

Ladyshevsky, R. K. (2010). Building competency in the novice allied health professional through peer coaching. *Journal of Allied Health*, 39(2), e77–e82.

Lavoie-Tremblay, M., Sanzone, L., Aubé, T., & Paquet, M. (2022). Sources of stress and coping strategies among undergraduate nursing students across all years. *Canadian Journal of Nursing Research*, 54(3), 261–271. <https://doi.org/10.1177/08445621211028076>

- Leong, R., & Kavanagh, M. (2010). A literature review of work integrated learning (WIL) in accounting: Developments in the last decade and future directions. In ACEN 2010: *Work Integrated Learning (WIL): Responding to Challenges*, Perth, Australia. <https://research.usq.edu.au/item/q0197/a-literature-review-of-work-integrated-learning-wil-in-accounting-developments-in-the-last-decade-and-future-directions>
- Levett-Jones, T., Hoffman, K., Dempsey, J., Jeong, S. Y., Noble, D., Norton, C. A., Roche, J., & Hickey, N. (2010). The 'five rights' of clinical reasoning: An educational model to enhance nursing students' ability to identify and manage clinically 'at risk' patients. *Nurse Education Today*, 30(6), 515–520. <https://doi.org/10.1016/j.nedt.2009.10.020>
- Ljungholm, L., Edin-Liljegren, A., Ekstedt, M., & Klinga, C. (2022). What is needed for continuity of care and how can we achieve it? Perceptions among multiprofessionals on the chronic care trajectory. *BMC Health Services Research*, 22(1), 686. <https://doi.org/10.1186/s12913-022-08023-0>
- Lyng, H. B., Macrae, C., Guise, V., Haraldseid-Driftland, C., Fagerdal, B., Schibevaag, L., Alsvik, J. G., & Wiig, S. (2021). Balancing adaptation and innovation for resilience in healthcare: A metasynthesis of narratives. *BMC Health Services Research*, 21(1), 759. <https://doi.org/10.1186/s12913-021-06592-0>
- March, S., Mangoyana, C., Oakley, P., Lalloo, R., & Walsh, L. J. (2023). Positive impacts of oral health services provision by a student-led primary care clinic to an Australian rural Indigenous community. *Australian Dental Journal*, 68(3), 151–159. <https://doi.org/10.1111/adj.12960>
- Makhene, A. (2022). Use of foundational knowledge as a basis to facilitate critical thinking: Nurse educators' perceptions. *Nursing Research and Practice*, 2022, Article 3736322. <https://doi.org/10.1155/2022/3736322>
- Malone, L., Anderson, J., & Manning, J. (2016). Student participation in clinical handover: An integrative review. *Journal of Clinical Nursing*, 25(5–6), 575–582. <https://doi.org/10.1111/jocn.13081>

- Marriott, P. H. M., Weller-Newton, J. M., & Reid, K. J. (2024). Preparedness for a first clinical placement in nursing: A descriptive qualitative study. *BMC Nursing*, 23(1), 345. <https://doi.org/10.1186/s12912-024-01916-x>
- McAllister, L., Nagarajan, S., Scott, L., Smith, L., & Thomson, K. (2018). Developing measures of placement quality in allied health, dentistry, medicine, and pharmacy. *International Journal of Practice-Based Learning in Health and Social Care*, 6(2), 31–47. <https://doi.org/10.18552/ijpblhsc.v6i2.493>
- Milgate, W., Copley, J., & Hill, J. (2024). Failing professional practice placements in allied health: What do we understand about the student experience? A scoping review. *Advances in Health Sciences Education*, 29(1), 301–327. <https://doi.org/10.1007/s10459-023-10243-w>
- Mitchell, D., Maloney, S., Robinson, L., Haines, T., & Foo, J. (2025). Costs and economic impact of student-led clinics: A systematic review. *Medical Education*, 59(4), 368–381. <https://doi.org/10.1111/medu.15550>
- Moran, L., Capper, T., Gupta, M., Meedya, S., & Mendez, S. (2024). Financial hardship and Australian midwifery students: A scoping review and thematic analysis. *Women and Birth*, 37(5), 101640. <https://doi.org/https://doi.org/10.1016/j.wombi.2024.101640>
- Nguyen, Q. D., Fernandez, N., Karsenti, T., & Charlin, B. (2014). What is reflection? A conceptual analysis of major definitions and a proposal of a five-component model. *Medical Education*, 48(12), 1176–1189. <https://doi.org/10.1111/medu.12583>
- Orchard, C. A., King, G. A., Khalili, H., & Bezzina, M. B. (2012). Assessment of Interprofessional Team Collaboration Scale (AITCS): Development and testing of the instrument. *Journal of Continuing Education in the Health Professions*, 32(1), 58–67. <https://doi.org/10.1002/chp.21123>
- Patrick, C., Peach, D., Pocknee, C., Webb, F., Fletcher, M., & Pretto, G. (2008). *The WIL [Work Integrated Learning] report: A national scoping study* (Final report). Australian Learning and Teaching Council. Queensland University of Technology. <http://www.altc.edu.au> or <http://www.acen.edu.au>

- Peisah, C., Sheppard, A. J., Benbow, S. M., Loughran-Fowlds, A., Grayson, S., Gunton, J. E., Kataria, A., Lai, R., Lele, K., Quadrio, C., Wright, D. J., & McLean, L. (2023). Operationalising the family-friendly medical workplace and the development of FAM-MED, a family-friendly self-audit tool for medical systems: A Delphi consensus. *Healthcare*, 11(12), 1679. <https://doi.org/10.3390/healthcare11121679>
- Philion, R., St-Pierre, I., & Bourassa, M. (2021). Accommodating and supporting students with disability in the context of nursing clinical placements: A collaborative action research. *Nurse Education in Practice*, 54, 103127. <https://doi.org/10.1016/j.nepr.2021.103127>
- Prestes Vargas, J., Smith, M., Chipchase, L., & Morris, M. E. (2024). Impact of interprofessional student led health clinics for patients, students and educators: A scoping review. *Advances in Health Sciences Education. Advance online publication*. <https://doi.org/10.1007/s10459-024-10342-2>
- Rees, C. S., Breen, L. J., Cusack, L., & Hegney, D. (2015). Understanding individual resilience in the workplace: The international collaboration of workforce resilience model. *Frontiers in Psychology*, 6, 73. <https://doi.org/10.3389/fpsyg.2015.00073>
- Rodger, S., Webb, G., Devitt, L., Gilbert, J., Wrightson, P., & McMeeken, J. (2008). Clinical education and practice placements in the allied health professions: An international perspective. *Journal of Allied Health*, 37(1), 53–62. <https://www.jstor.org/stable/48721557>
- Russell, D., Mathew, S., Fitts, M., Liddle, Z., Murakami-Gold, L., Campbell, N., Ramjan, M., Zhao, Y., Hines, S., Humphreys, J. S., & Wakerman, J. (2021). Interventions for health workforce retention in rural and remote areas: a systematic review. *Human Resources for Health*, 19(1), 103. <https://doi.org/10.1186/s12960-021-00643-7>
- Saarikoski, M., Isoaho, H., Warne, T., & Leino-Kilpi, H. (2008). The nurse teacher in clinical practice: Developing the new sub-dimension to the Clinical Learning Environment and Supervision (CLES) scale. *International Journal of Nursing Studies*, 45(8), 1233–1237. <https://doi.org/10.1016/j.ijnurstu.2007.07.009>

- Sadeghi, N., Janatolamagn, M., Rezaeian, S., Rashi, M., & Khatony, A. (2024). Exploring self-directed learning readiness and related factors: The role of time management skills in nursing students. *BMC Medical Education*, 24(1), 1088. <https://doi.org/10.1186/s12909-024-06083-w>
- Salbach, N. M., Jaglal, S. B., & Williams, J. I. (2013). Reliability and validity of the Evidence-Based Practice Confidence (EPIC) scale. *Journal of Continuing Education in the Health Professions*, 33(1), 33–40. <https://doi.org/10.1002/chp.21164>
- Sand-Jecklin, K., Rogers, T., & Wang, K. (2023). Student evaluation of the clinical education environment: Development and testing of the SECEE version 4. *Journal of Nursing Measurement*, 31(1), 37–54. <https://doi.org/10.1891/JNM-2021-0026>
- Sarkar, M., Gibson, S., Karim, N., Rhys-Jones, D., & Ilic, D. (2021). Exploring the use of self-assessment to facilitate health students' generic skills development. *Journal of Teaching and Learning for Graduate Employability*, 12(2), 65–81. <https://doi.org/10.21153/jtlge2021vol12no2art976>
- Sealey, R., Raymond, J., Groeller, H., Rooney, K., Crabb, M., & Watt, K. (2015). Supporting placement supervision in clinical exercise physiology. *Asia-Pacific Journal of Cooperative Education*, 16(1), 53–69. <https://hdl.handle.net/10779/uow.27705783.v1>
- Skjevik, E. P., Schei, E., Boudreau, J. D., Tjølsen, A., Ringberg, U., Fuks, A., Kvernenes, M., & Ofstad, E. H. (2024). What makes mentors thrive? An exploratory study of their satisfaction in undergraduate medical education. *BMC Medical Education*, 24(1), 372. <https://doi.org/10.1186/s12909-024-05344-y>
- Smith, C., & Curtis, L. J. (2019). Scaffolding learners' self-regulation in workplace learning: Design of a pedagogical pattern for placements. *Journal of Vocational Education & Training*, 72(3), 396–414. <https://doi.org/10.1080/13636820.2019.1612936>
- Smith, B., Robson, K., Robinson, C., & Patton, N. (2023). Factors influencing provision of clinical placements for health students: A scoping review. *Focus on Health Professional Education: A Multi-Professional Journal*, 24(2), 63–103. <https://doi.org/10.11157/fohpe.v24i2.562>

- Smith, S., Smith, C., & Caddell, M. (2015). Can pay, should pay? Exploring employer and student perceptions of paid and unpaid placements. *Active Learning in Higher Education*, 16. <https://doi.org/10.1177/1469787415574049>
- Stiefel, M. C., Perla, R. J., & Zell, B. L. (2010). A healthy bottom line: Healthy life expectancy as an outcome measure for health improvement efforts. *The Milbank Quarterly*, 88(1), 30–53. <https://doi.org/10.1111/j.1468-0009.2010.00588.x>
- Suen, J., Attrill, S., Thomas, J., Smale, M., Delaney, C., & Miller, M. (2020). Effect of student-led health interventions on patient outcomes for those with cardiovascular disease or cardiovascular disease risk factors: A systematic review. *BMC Cardiovascular Disorders*, 20(1), 332. <https://doi.org/10.1186/s12872-020-01602-1>
- Ten Cate, O. (2013). Competency-based education, entrustable professional activities, and the power of language. *Journal of Graduate Medical Education*, 5(1), 6–7. <https://doi.org/10.4300/jgme-d-12-00381.1>
- Thampy, H., Willert, E., & Ramani, S. (2019). Assessing clinical reasoning: Targeting the higher levels of the pyramid. *Journal of General Internal Medicine*, 34(8), 1631–1636. <https://doi.org/10.1007/s11606-019-04953-4>
- Usher, K., Fagan, A., Brown, J. A., Mather, C., Marlow, A., Power, T., van de Mortel, T., West, C., Hutchinson, M., Zhao, L., Terry, V., Woods, C., & Lea, J. (2022). The financial challenges for Australian nursing students attending placement-based work-integrated learning. *Collegian*, 29(2), 154-160. <https://doi.org/10.1016/j.colegn.2021.07.005>
- van Diggele, C., Roberts, C., Burgess, A., & Mellis, C. (2020). Interprofessional education: Tips for design and implementation. *BMC Medical Education*, 20(2), 455. <https://doi.org/10.1186/s12909-020-02286-z>
- Wald, H. S., Borkan, J. M., Taylor, J. S., Anthony, D., & Reis, S. P. (2012). Fostering and evaluating reflective capacity in medical education: Developing the REFLECT rubric for assessing reflective writing. *Academic Medicine*, 87(1), 41–50. <https://doi.org/10.1097/ACM.0b013e31823b55fa>

- Warne, T., Johansson, U.-B., Papastavrou, E., Tichelaar, E., Tomietto, M., Bossche, K., Vizcaya-Moreno, M. F., & Saarikoski, M. (2010). An exploration of the clinical learning experience of student nurses in nine European countries. *Nurse Education Today*, 30(8), 809–815. <https://doi.org/10.1016/j.nedt.2010.03.003>
- Weallans, J., Roberts, C., Hamilton, S., & Parker, S. (2022). Guidance for providing effective feedback in clinical supervision in postgraduate medical education: A systematic review. *Postgraduate Medical Journal*, 98(1156), 138–149. <https://doi.org/10.1136/postgradmedj-2020-139566>
- Wilson, O. W. A., Broman, P., Tokolahi, E., Andersen, P., & Brownie, S. (2023). Learning outcomes from participation in student-run health clinics: A systematic review. *Journal of Multidisciplinary Healthcare*, 16, 143–157. <https://doi.org/10.2147/JMDH.S385709>
- Wu, C. S., Rong, J. R., & Huang, M. Z. (2021). Factors associated with perceived stress of clinical practice among associate degree nursing students in Taiwan. *BMC Nursing*, 20(1), 89. <https://doi.org/10.1186/s12912-021-00602-6>
- Wynne, D., & Cooper, K. (2019). Student-led physical rehabilitation groups and clinics in entry level health education: A scoping review protocol. *JBIS Database of Systematic Reviews and Implementation Reports*, 17(6), 1092–1100. <https://doi.org/10.11124/JBISRIR-2017-003990>
- Zhang, J., Shields, L., Ma, B., Yin, Y., Wang, J., Zhang, R., & Hui, X. (2022). The clinical learning environment, supervision and future intention to work as a nurse in nursing students: A cross-sectional and descriptive study. *BMC Medical Education*, 22(1), 548. <https://doi.org/10.1186/s12909-022-03609-y>

