HEALTH SYSTEMS RESEARCH CAPACITY BUILDING IN SOLOMON ISLANDS: A MULTIPLE CASE STUDY APPROACH.

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Statement

I hereby declare that this submission is my own work. To the best of my knowledge and belief it contains no materials previously published or written by another person, no substantial portion of material which have been accepted for the award of my degree or diploma at Massey University or any other educational institution, except where due acknowledgement is made within the thesis. I also declare that the intellectual content of this thesis is the product of my own work, except to the extent that assistance from others in the projects design and conception or in style, presentation and linguistic expression is acknowledged.

Sign:

Date: 31/05/22

Abstract

Introduction

Historically health research projects in Lower and Middle Income Countries, including in many Pacific island countries and territories, have been planned and implemented by research leaders in, or from Higher Income Countries. This dynamic limits the development and building of research capacity by the local health system workers and managers who provide services for the population facing the health issue. Health improvements in Pacific island counties and territories depend on rigorous and locally relevant research evidence that can directly inform health system policy and practice. Many Pacific island countries and territories have limited capacity to conduct health research when compared to Higher Income Counties. Over the past two decades, however, there have been considerable efforts made to build, and strengthen health research capacity in many Pacific island countries and territories. Numerous different approaches and models have been used for this purpose. This thesis describes four models used in the process of Health Systems Research Capacity Building in the South Pacific Country of Solomon Islands over the period 2008-2018.

This PhD study asked the question:

How were the four models of health systems research capacity building planned and implemented between 2008 and 2018 and what was the impact on health research capacity in Solomon Islands?

The study aimed to explore the planning, implementation and the impact of the four models on health system research capacity in Solomon Islands and to specifically:

- Describe how the four health system research capacity building models were planned and implemented in Solomon Islands
- Identify and explore the impact of these models on individual, institutional and health system capacity
- Identify unique features, challenges and limitations of the four models
- Recommend strategies to inform and improve future planning and implementation of the four health system research capacity building models in Solomon Islands.

Methods:

The four health research system capacity building models operating in Solomon Islands between 2008 and 2018 described and analysed in this thesis are:

Model 1: Higher Degree by Research

Model 2: International Health Research Projects

Model 3: World Health Organisation Structured Operational Research and Training IniTiative

Model 4: Atoifi Health Research Group

This study employed a multiple case study design to investigate the four models. Each of the models was designated as a single 'case study' and then all four cases combined to enable a cross-case analysis of the findings. Purposive sampling and semi-structured interviews were employed to collect qualitative data from 55 health system and institutional leaders, government officials, local health workers and community leaders directly involved in at least one (with some involved in many) of the health capacity building models in Solomon Islands from 2008 until 2018. Interviews were recorded and audio files transcribed and analysed using social constructivist theory. All interviews were conducted in Solomon Islands Pijin, and initial and focused coding and categorisation leading to the development of seven thematic areas was also undertaken in Solomon Islands Pijin. Key quotes were then translated into English to be used in this thesis. The seven themes that emerged were:

1. participant experiences and perspectives of the model
2. training and teaching used in the model
3. finance to enable the model
4. communications within the model
5. leadership and management within the model
6. impact of the model
7. unique issues intrinsic to each model

Findings:

Case Study 1: Higher Degree by Research

The Higher Degree by Research model of research capacity building was designed to have Solomon Islanders undertake formal university research training by enrolling in Masters of Philosophy or Doctor of Philosophy degrees. There are no Master of Philosophy or Doctor of Philosophy degrees offered by universities in Solomon Islands. Solomon Islanders are therefore required to enrol at universities in foreign countries. Financial support in the form of student scholarships and international student fees is required to live and study abroad, often for many years. The complexity of engaging in multiple bureaucratic and administrative processes, living away from family and irregular and unpredictable payments of Solomon

Islands Government Scholarships to students overseas were highlighted by participants with experience of this model. In addition, some graduates do not return to Solomon Islands because of a lack of research systems, research infrastructure and research positions in the country.

Case Study 2: International Health Research Projects

The International Health Research Project model enables Solomon Islanders to build research capacity by being directly involved in an existing research project being undertaken in Solomon Islands. The unique structural issue that defines this model is that, by definition, the projects are large and internationally led. Projects are often designed overseas and implemented in Solomon Islands to an agenda largely determined outside Solomon Islands. Capacity building is not the primary objective of these large projects, but an additional, and welcome, by-product of employing Solomon Islanders as project workers and research assistants within the project. Training within this model is to build capacity to achieve specific project outcomes rather than research capacity building per se.

Case Study 3: World Health Organisation Structured Operational Research and Training IniTiative

The WHO Structured Operational Research and Training IniTiative (SORT-iT) model was designed to help Solomon Islanders build research capacity by formally enrolling in a series of structured workshops tailored to specific needs of local health services within Solomon Islands. Workshops were facilitated within health service institutions in both the national capital and provincial locations, and taught by both Solomon Islanders and international researchers. Each trainee chose a research topic within their specific health service and was allocated an international and in-country mentor. Cross-cultural and cross-disciplinary communication proved to be difficult and exacerbated by slow and expensive internet and lack of computers in some remote health service locations. In addition, because of the workplace-based structure, some participants struggled with completing research tasks in addition to existing workload.

Case Study 4: Atoifi Health Research Group

The Atoifi Health Research Group model was designed to have Solomon Islanders build research capacity through a bottom-up organic process based on principles of collaboration between local health service, community leaders, and national and international research partners. The model is based on working together to identify local issues, design projects, collect and analysis data and disseminate findings to directly inform health system policy and

practice. The model uses a learn-by-doing approach to research capacity building and was designed to include capacity building throughout every aspect of a mutually agreed research project and facilitate processes in a culturally appropriate way, based on a principle of inclusion where everybody is invited to be involved in research capacity building activities. The Atoifi Health Research Group model built considerable capacity at individual and institutional levels, but was also impacted by religious differences and the unwillingness of some Christian Health workers to work with non-Christian community groups. Some Christian health workers explicitly stated their first priority was to convert non-Christians to become Christians and that providing health services or engaging in health research was a secondary endeavour.

Each model shows potential and actual impact on health systems research capacity building. Participants across all four models emphasised that cooperative and collaborative understanding of context and mutual respect has a significant impact on implementing health systems research capacity building in Solomon Islands. However, results from the four case studies clearly demonstrate that cooperation and collaboration was implemented very differently across the four models.

There are also features shared by all models. Solomon Islands is largely donor-dependent and relies on external research funding. Participants in this study expressed how they now realise that local projects that include capacity building components, can be implemented in health care settings in remote or provincial locations with very limited external funds or resources. Facilitators and experienced research advice still largely come from overseas, but the last decade of research capacity building initiatives has built and strengthened internal research capacity within Solomon Islands that is now being utilised to extend and expand research capacity building for the next decade and beyond. For research capacity building to be successful in the future, cultural issues, religious beliefs and practice, interpersonal expectations of communication norms, communication infrastructure and finance systems all need to be carefully considered – on a case-by-case basis. This can provide rigorous and locally relevant research evidence to directly inform health system policy and practice. Almost everyone interviewed in this study wants to learn more and do more locally relevant research.

Discussion:

This is the first study to explore health systems research capacity building in Solomon Islands. This study is particularly unique, because I am a Solomon Islander undertaking this study in my own country. As a Solomon Islander, I am submitting this thesis at the completion of my

Doctor of Philosophy study at James Cook University in Australia, and as such I am directly engaged in the Higher Degree Model. I was a foundation member of the Atoifi Health Research Group, also taught sessions on locally appropriate research and was a mentor in the Structured Operational Research IniTiative workshops in Solomon Islands in 2018. I have also been periodically involved as an advisor and research worker within some large International Research Projects throughout my nursing career in Solomon Islands. I am therefore an insider on some levels and an outsider on other levels. I have specifically and deliberately engaged in this 'insider-outsider space' to undertake this study. I have endeavoured to bridge the knowledge gap between external observations and internal experience of health systems research capacity building by Solomon Islands participants with a view to identifying the individual, cultural and systemic factors that may facilitate or hinder effective capacity building in Solomon Islands. The findings from this study inform locally contextual recommendations for better planning and implementation of health research capacity building in Solomon Islands and in similar Pacific Island Country settings. Capacity that has been built through these four models is being utilised to improve health systems and is a solid foundation to continue into the future, cognizant of the myriad of complex social, cultural, historical, structural and ideological insights that are required to ensure the greatest impact for health systems and the populations they are there to serve.

To fully realise the research capacity that has been built over the past decade, the Solomon Islands health system, at national and provincial levels, needs to increase its ability to absorb and utilise the talented health professionals that now have research skills and experience. The health system also needs to increase its ability to utilise the locally produced research evidence, from these skilled Solomon Islander researchers, to directly inform health system decision making, and improve population health across the country.

Ultimately this study has demonstrated that it is possible for health system research capacity building endeavours to be successfully implemented and such models provide a foundation and mechanism for creating and incorporating local evidence and new knowledge into decision making and policy development to improve health outcomes for people of Solomon Islands and in similar settings.

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Acronyms and Abbreviations

AAH - Atoifi Adventist Hospital

ACON – Atoifi College of Nursing

AHRG - Atoifi Health Research Group

COHRED - Commission on Health Research for Development

DFAT – The Australian Government Department of Foreign Affairs and Trade

FBO - Faith-Based Organisation

GDP - Gross Domestic Product

GNI - Gross National Income

HDR - Higher Degree by Research

HICs - High Income Countries

HSRCB - Health Systems Research Capacity Building

IHRP - International Health Research Project

JCU - James Cook University

LMICs - Low and Middle Income Countries

MDPAC - Solomon Islands Ministry of Development, Planning and Aid Coordination

MEHRD – Solomon Islands Ministry of Education and Human Resource Development

MHMS – Solomon Islands Ministry of Health and Medical Services

MPhil – Masters of Philosophy

MPS – Solomon Islands Ministry of Public Service

NGO - Non-Government Organisation

NRH – Solomon Islands National Referral Hospital

NTU – Solomon Islands National Training Unit

PhD - Doctor of Philosophy

PICTs - Pacific island countries and territories

PIFCs - Pacific Island Forum Countries

PNG – Papua New Guinea

RAMSI - Regional Assistance Mission to Solomon Islands

SDA – Seventh-day Adventist

SDG - Sustainable Development Goals

SINU - Solomon Islands National University

SORT-iT - Structured Operational Research and Training IniTiative

STDP - Staff Training Development Plan

USP - University of the South Pacific

WHO - World Health Organisation

Prologue: The Journey of the Unexpected

I was born at Gizo Hospital in Western province, Solomon Islands in 1972. I am the eldest of five siblings and my parents were both from Marovo Lagoon, Western Province. My father attended Betikama secondary school and my mother went as far as Grade six at a village community primary school. I was the only one in the family that went through university training. Two of my siblings reached high school and two finished in Grade six.

Undertaking PhD studies was never part of my future plans and dreams. I remember that when I was doing my secondary education at Kukudu Adventist National Secondary School in Western Province, I wanted to be a pilot or a lawyer. As my school years progressed, I realised that my grades would not enable me to fulfil my dreams as I was struggling academically, I felt my mind was not open and ready. I simply could not understand what my teachers taught us in the classrooms. I read library books over and over again but could not understand what I was reading, I felt that my brain just couldn't really capture and utilise the information that came through my five senses at that time. This gave me the impression that I was not getting anywhere, as if my brain was asleep, I was not ready like the other classmates. Realising all these things I became unsettled, I began to miss classes, and I was punished by the school for breaking minor school rules.

When I was in Grade nine (14 years old) I had already given up and was just following the current of peer influence. I thought to myself: 'that's it, and I'm ready to go home.' Although I failed my Grade nine exams, the school let me continue, and when I was in Grade 11 I thought of just completing the year to look for jobs. In the 1980s and 1990s it was very easy to get jobs in the Solomon Islands particularly when you had completed Grade11. It didn't matter how good your results were. A lot of jobs were waiting at the government ministries, so I just couldn't wait to get a job and start to earn money.

I thought getting into the Atoifi School of Nursing (located on the grounds of Atoifi Adventist Hospital in Malaita Province) after completing Grade 11 was out of the question because of my academic grades. I thought at that time that my grades cannot get me any further, so when I was accepted to do nursing it was a real privilege, even though I was not particularly interested in nursing as a career at the time. During those days the nursing course was considered a 'women's thing' and not something men did routinely. This made me question the idea of doing nursing, but I started anyway.

Later on, during the course of study I found out that nursing was a very important profession. It gave me great opportunities to meet and help people that need help. I became hooked and couldn't let go. With my Christian background and strong Christian beliefs and values I also believed that nursing was where God wanted me to be. This made me finally accept the fact that I was going to be a nurse. I decided to work for the church (church run health services) all my life because I was convinced that I was called by God to do this work, to help care for other people.

I did not think I would be able to complete a Bachelor's degree let alone Masters and PhD. I was satisfied with the Certificate in General Nursing that I acquired from Atoifi School of Nursing in Malaita Province, which was where I met my future wife Relmah. My nursing qualification enabled me to be employed and earn a little bit of money to support myself and my own family. I was happy to work in any rural health clinic as a nurse.

My wife, Relmah Baritama Harrington has changed my life dramatically. Relmah was an intelligent young woman who completed Grade 12 at Betikama Adventist College in Honiara. She was accepted by Pacific Adventist University in Papua New Guinea to study a Bachelor's degree in secondary education. However, she decided to stay in Solomon Islands and study nursing at Atoifi School of Nursing instead. She was clever and was full of potential. As soon as she walked into my life that was the beginning of this journey of the unexpected.

In 1999 Relmah was awarded a New Zealand Aid scholarship to study a two year Bachelor degree in midwifery at Massey University in Wellington. I went to New Zealand with her and while there I was awarded an Aotearoa Scholarship to study a Bachelor degree in nursing for a year. I was then awarded a dependant scholarship (because I was in New Zealand with Relmah) to study a Postgraduate Diploma in Adult Education.

I clearly remember that these two courses were very difficult, I almost gave up. However, with all the support given by the University and family members I managed to successfully complete the two programmes. I was more than satisfied with my achievement. I think I was the happiest amongst those who graduated at that time.

Given my academic background and learning challenges, I don't have the words to express how much I appreciate the opportunity and the achievement I gained through the journey of completing my Bachelor degree and postgraduate courses. It was indeed a journey of the unexpected.

The achievement was so great, I didn't imagine I needed to go further than this level of learning. However, at the end of 2004 I was award a postgraduate scholarship from Massey University to complete my Masters Degree in Adult education. Thus, my journey of the unexpected continued to unveil and yet I still wasn't convinced that I could and would be able to undertake PhD study in the future. This is because I found it very difficult to complete the Masters programme. I had very little knowledge about research because my Masters was by coursework, and I struggled to understand even basic research concepts and principles.

At the same time as I was studying my Masters degree, David MacLaren (now Associate Professor) had just finished his Masters of Public Health and was beginning his PhD study. During his time at Atoifi we discussed many public health theories, concepts and principles. This started to open my mind and I began to understand these concepts and how they were applicable to us at Atoifi.

This was the time my mind opened and I was ready to get into the world of research. My ability to learn is different now compared to my School of Nursing days. The ideas, principles and concepts that I was reading about became clearer and I started to enjoy learning new things. I began to understand things. I wished I had this learning ability earlier in my high school days. This learning is so different from the rote learning of my earlier studies. Now I understand things as they come, and have become able to explain what I have learned to other people using my own words.

With this new learning experience, I began to see a vague light at the end of the tunnel. I began to think about research, I thought about what I should do to get into research. I began to get involved in working with David and partnering in some of his research work. In 2008 I became heavily involved in trying to make research training happen at Atoifi by attending meetings, negotiating and opening dialogue with David MacLaren and other James Cook University (JCU) public health researchers. In 2009 I was one of the first 102 participants who attended a week long research training workshop at Atoifi Adventist Hospital facilitated by JCU public health researchers. I then became one of the founders of Atoifi Health Research Group (AHRG). I also became involved in some of the international health research projects implemented in the communities around Atoifi Adventist Hospital (AAH). In 2016 I was asked by Professor Rick Speare if I was willing to be part of the research capacity building component of the JCU (Australian Department of Foreign Affairs and Trade funded) 'Tropical Partners' Project'. The Tropical Partners Project used a modified WHO Structured Operational Research

Training IniTiative (SORT-iT) model to strengthen research capacity in Solomon Islands and other countries across the Pacific. Without hesitation I joined and felt privileged to have been part of the health systems research capacity building team within the Tropical Partners Project. My involvement in the AHRG, participation in some large international research projects investigating yaws and scabies and contribution to SORT-iT training led me to a life path that I had not dreamt of, given my previous academic history.

In May 22, 2017 I arrived at JCU to commence my Higher Degree by Research, a Doctor of Philosophy in Health. It was indeed a very big academic jump for me. It was not easy but I'm thankful for my experiences from high school, Atoifi School of Nursing, working at AAH and the people who I encountered while on my life journey. They hugely contributed and assisted in making this journey of the unexpected become what it is today. As I complete my PhD study, it is still not an easy journey, but with the help of people around me I believe I will get to the end. The end is just in sight. So the path that I'm treading is indeed a journey of the unexpected, the journey that I was not planning, dreaming or intending to be, the journey that I did not believe was meant to be for me.

What led to my PhD thesis

I worked with David MacLaren, my primary supervisor for this thesis, when he did his Masters degree and PhD fieldwork at Atoifi and I became fascinated by the new ideas and concepts that came up in my discussions with him of his work and our work together. I then worked with the late Professor Rick Speare on health research projects and this opened my mind to how research can inform health and change for the better the way in which we might do things at Atoifi. As a teacher myself I wanted to know more about research and understand the importance of it so I could help other health workers to find evidence to support better health practices. This was especially significant to me because I was in a rural area where I could see the potential impact on the majority of people in Solomon Islands, and how they were less well served by health services than the people who lived in the capital, Honiara, which is where the majority of health services are provided. I was not confident that I had the capabilities to undertake a PhD, but Professor Speare was very supportive and encouraging, and his confidence in me was the deciding factor in me beginning my PhD journey.

Standpoint: Positioning myself within the study

The concept of 'standpoint' in research stems from the Marxist principle that power relationships between groups can be exploitative and can create conflicts (Cockburn, 2015). Standpoint is embedded in the idea that knowledge is shaped by the different ways individuals understand and engage with the world. Standpoint theory is concerned with explicitly describing this dynamic and is part of the 'theory of justice' which recognizes power issues within human society (Paradies, 2018).

The Western scientific tradition overwhelmingly prioritises objective thinking and follows particular methods of creating knowledge. This may not always reflect the understanding and experiences of Indigenous peoples like me. Indigenous researchers use the concept of standpoint as a tool to advocate that objectivity is not the only way of creating knowledge and there are many ways of knowing. To me standpoint generally refers to the impact of the individual's location and ability to know within the context where there as differences in gender, experience and ways of knowing (Datta, 2013; Paradies, 2018). The most important precepts of standpoint theory are that our perspective is shaped by our own social, political and spiritual experience and we use this to see, interpret and understand our world.

My social, political and spiritual experience, which shapes my perspective, is fairly typical of a Solomon Islander from a rural province. Both my parents were Christians of the Seventh-day Adventist (SDA) denomination and sent all five of their children to Christian schools. My parents were village dwellers and dependent on subsistence farming for food and income. They come from a village named Chea and Billy passage in Marovo Lagoon, Western Province. I am the only one in the family who has undertaken higher education, initially a nursing qualification undertaken at a SDA hospital, and then overseas education in New Zealand for my degree in nursing and later Masters Degree in Adult Education.

Training history

At the time I did my nursing training, research was not part of the syllabus. This is the case for most nursing graduates in the Solomon Islands. Nurses in the Solomon Islands generally understand 'research' to mean going to the library and reading books to gain more knowledge. Research was not understood by us in the way it might be understood by an external expert working in the Solomon Islands today. Academic health research was not carried out in rural locations like Atoifi Hospital in those days. Nurses simply tried their very best to provide

the best health care services based on experience under the direction of nurse leaders and clinicians.

The influence of the Seventh-day Adventist church

Christian nurses in Solomon Islands believe they are doing God's business when working in a church run hospital. This belief inspires nurses to strive to do their best for God and for the church. Some Nurses at Atoifi Adventist Hospital may attempt to convert their patients, from other Christian denominations or those who practice Kwaio Religion, to become Seventh-day Adventists and join the SDA church. The SDA church builds rural clinics and hospitals across Solomon Islands. At AAH, 'medical ministry is the right hand of the Gospel' (Ellen, n.d.; Harvestime Books, 2004) and although their primary role is health service delivery, health workers openly demonstrate their Christian faith to set an inspirational example to those who come to the hospital to seek diagnosis and treatment of their health condition. Some individuals from other faiths or traditions may feel uncomfortable with the overtly SDA focused mission of the AAH.

I firstly worked at AAH and later Atoifi School of Nursing (now Atoifi College of Nursing) as a facilitator. The Atoifi School of Nursing (ASON) offered a certificate of general nursing, and then a Diploma in Nursing after its upgrade to Atoifi College of Nursing (ACON) and now offers four years Bachelor degree programme, since the College's affiliation with Pacific Adventist University in Papua New Guinea.

As a registered nurse working at AAH, I experienced many challenges in providing holistic and culturally relevant health care. Health workers are expected to follow SDA church systems, beliefs, principles and protocols. The care provided at AAH prioritises Christian communities who have converted from traditional Kwaio Religion to Christianity and therefore share similar principles and values. My experience of working from within the SDA system at AAH, and my observations of the unequal treatment of Christian and non-Christian Solomon Islanders, who faced similar health concerns, led me to realise that the SDA approach did not best meet the needs of all. The SDA system did not provide equitable health services or equitable health care. In part, my motivation for undertaking my PhD research was to see if it was possible to find a way to reduce this inequality in future healthcare provision.

My experience at AAH over many years, meant that I saw frequent changes of leaders at Atoifi Hospital. There were no strategic plans at AAH to guide the running of the hospital. The whole operation, including hospital and community health activities seemed ad hoc,

disorganised and unable to be systematically measured. How the hospital was managed, and its general church focus gives rise to a 'labour oriented' rather than 'professional oriented' environment. By labour orientation, I mean nurses on the ground just do what their boss tells them to do. What their boss or supervisor tells them is final and nurses thought this was the right way of doing things. The mentality and behaviour of nurses was to aspire to one day become a boss and tell others what to do. Nurses did not see themselves as professional health care workers who could ask questions, suggest alternative ways of doing things based on their observations or experience or having the ability (nor institutional role) to create new knowledge to improve the hospital and/or patient outcomes through research. I felt that this approach did not respect the professional skills and experience of the workforce and missed many opportunities for improving health delivery by not being open to new ideas, innovation and evidence-based research inputs. This feeling also became a driver for me to undertake research into how change might be implemented.

Personal interests and focus

Over time, I have developed a significant interest in how to work together with village people to identify ways for health services and community leaders, to work together to improve people's lives. Most people living in my village depend on the forest, traditional bush gardens and the sea for their food. I was originally interested in agricultural activities and tried to find something that would enable me to settle back into my village lifestyle and also helped other village people in terms of skills in growing different vegetables and crops and how to cultivate them. People were interested in the things I had learned and how they could benefit from sharing this knowledge. I found satisfaction in doing things that really meet people's needs. This inspired me to continue to identify and seek ways to work together to improve what people appreciated and found important in their lives. This approach has translated very well from my agricultural work to my nursing career. These are activities that touch people's life in the Solomon Islands. So, my philosophy in life is rooted in the idea of what I can do to improve people's lives.

I also have taken great satisfaction from discovering that my nursing students understood and appreciated the subjects that I taught. I was very pleased when I observed that my students could see the importance of the fundamental principles that guide nursing practice and decision making, and were able to apply these principles in the real world.

Research background

I consider that to foster and enhance professionalism, and especially research within the professional healthcare sector in Solomon Islands, four important cognitive skills are crucial for nurses or health workers to have: critical thinking, reflexivity, innovation and creativity. My experience and observation have been that these skills were not demonstrated by the nurses who worked at AAH in the 1990s and even today are not entertained within the health institution or organisational system of AAH or ACON. I believe that part of the problem stems from the way nurses have been and continue to be trained at ACON. Due to a lack of planning, the College of Nursing does not order new books, or improve the internet and library system. This situation leads tutors providing all materials to students, and so the students do not look for their own information. The tutors are not facilitating self-directed study and research. Student nurses learn to depend on tutors/teachers for information and learning materials. Graduate students take this dependency behaviour with them to their work at the hospital. They depend on their boss or supervisor at the hospital or workplace for detailed direction. My understanding is that this drives a task-oriented and dependent approach to work on the part of nurses working across the entire Solomon Islands. ACON trains almost half of the nurses in the country, which perpetuates this approach and embeds it in nursing culture. I believe this is one of the factors that deprives Solomon Islands nurses of the four important cognitive skills they should be using in the workplace.

Traditional Systems of Leadership in the Solomon Islands

In many parts of Solomon Islands local governance is managed under the rule of village chiefs and elders. Village chiefs or elders are not exclusively male. In some islands within Solomon Islands there is a matriarchal society where women as superior to men. Men are expected to listen and follow what the women say. Solomon Islands government and Christian institutions generally reflect a patriarchal governance system however, and are dominated by males in positions of power and influence, so matriarchal society leadership is often diminished or ignored. My observation is that this traditionally autocratic system reinforces a task based and low initiative culture of nursing. The chief system in my village is not democratic. When our village chief or elders tell the community what to do everybody has to obey. If you disobey the command, your action will be met by very strong disapproval from the community at large, and particularly the chief. This system stifles constructive criticism. When someone tries to constructively question the chief's decision, he/she in many instances is seen by the chief or community as challenging or threatening legitimate authority.

I come from one of the Solomon Island communities that considers men to be superior to women, and which is managed by a patriarchal chief. Women are expected to listen and follow what men say. Most of the time women's ideas and viewpoints are suppressed. Women do the work, while men dictate the activities. At present my experience is that it is unusual to find a village chief who entertains creativity, innovation and allows community members to exercise freedom of speech, reflection and thought sharing, or one who is above using the position for personal gain.

Church influence

The way Church doctrine is interpreted is another factor that inhibits nurses in the Solomon Islands from demonstrating the four important cognitive skills mentioned above and engaging in research. Members of the SDA Church in my village are known for the obedience they show to the church leaders (pastors/teachers/elders). This makes them unwilling to openly challenge them. Our pastors, teachers and elders are seen as God's representatives, deserving of the utmost respect. If someone critically challenges them and their biblical representation, they are strongly condemned by the entire congregation and their characters are damaged. This parallels the chief system, in that respect for church leaders' opinions and pronouncements reduces the opportunities to express critical, reflective, innovative and creative thinking.

In SDA Church schools in the Solomon Islands teachers are seen by the students as knowing everything and are heroic. Students believe everything they say without reflection or question. Challenging a schoolteacher is considered to be disrespectful. It is my belief and experience that this is another feature of a system that suppresses critical, reflective, innovative and creative thinking in Melanesian communities.

Summary

This is my standpoint. It is my experience that Solomon Islands Christian and village leadership systems and approaches to education do not readily support health research activities which demand critical, reflective, innovative and creative thinking and behaviour to create new knowledge to improve health in rural and remote settings. This clearly influences my perspective on my studies and how I perceive the efforts made in the domain of health systems research capacity building in the Solomon Islands. As a researcher, I have evolved from this environment. This has shaped the values that underpin my reality and my assumptions about how and when to use critical, reflexive, innovative and creative thinking. My experiences in education overseas, in NZ and Australia, made a significant contribution to broadening my

understanding of the society where I grew up, and helped to develop my capacity for reflexivity, innovation, creativity and critical thinking. This has led me to where I am today. I see the importance of working collaboratively and in partnership with others, being willing to listen to others and being quite happy to be told what to do by others even though it's sometimes difficult. I do, however, perform well in an environment where I have someone to lead and tell me what to do and how to do things, and this no doubt relates back to my traditional upbringing. To me these cultural influences have a significant impact on facilitating change and are a big challenge to health research activities in the Solomon Islands.

As researchers we bring beliefs and assumptions with us into our research work. Our philosophical assumptions strongly influence and guide how we select the issues that we want to investigate, the research questions that we ask and how we go about gathering information to answer our questions. We develop and cultivate these philosophical assumptions through educational training that we have gone through, the books or articles that we read, the advice that was given to us by our supervisors as well as academic or scholarly communication in scholarly meeting and conferences.

The challenge we must face as researchers is to become aware of our philosophical assumptions and beliefs and how we consciously and actively incorporate them into our research. My assumptions and beliefs and how these inform the way that I see, understand and interpret the world are now explicit.

Insider – Outsider Research

This study evaluates four models of health systems research capacity building in Solomon Islands: (i) Higher Degree by Research; (ii) International Health Research Projects; (iii) WHO Structured Operational Research Training IniTiative; and, (iv) Atoifi Health Research Group. I was a founder member of the AHRG, taught modules and mentored trainees in the Structured Operational Research Training IniTiative, participated in the design and fieldwork of International Health Research Projects and am undertaking a Higher Degree by Research. This thesis is therefore written from the perspective of an insider, someone who is very familiar with the environment, projects and methods of capacity building within the specific programmes. However, I believe I am also able to represent outsider perspectives because of my formal systematic description and analysis of these models as a PhD scholar, alongside my experience of working overseas and working with people from other countries, both in Solomon Islands and overseas in New Zealand and Australia. This helps me to describe and transparently explain my personal and local insights at the same time as undertaking formal systematic analysis. Mindful of the insider-outsider positionality, and potential to misinterpret my sources, or to impose my own views upon theirs, I purposefully include interview data from a large and diverse group of interviewees across the four capacity building models. My insider status allowed me to take the research findings back to interviewees for them to endorse that my interpretation matched their lived reality, confirming the relevance of findings to decision makers in Solomon Islands. This thesis presents a broad and inclusive perspective, because I included health professionals, government officers, local community members and health service users.

Thesis structure

This thesis is comprised of nine chapters.

Introduction and background to the study

In Chapter 1, I describe the origin, rationale, aims and objectives of the study and introduce the concepts behind health systems research capacity building (HSRCB) in the region, and in the specific context of Solomon Islands health care and the structure of this thesis.

Study setting

In Chapter 2, I situate the study in Solomon Islands setting where different communities, health institutions and organisations play a vital role in the implementation of health system research capacity building activities.

Methodology and Methods

In Chapter 3, I outline the qualitative phenomenological approach taken to interviewing and analysing the responses of interviewees to questions relating to HSRCB in Solomon Islands and describe how interviews were planned and conducted with participants including member checking and analysis of the data.

Interviews & results

In Chapters 4 – 7, transcriptions of selected interviews demonstrate the findings from particular cross-case thematic elements identified in the methodological process for each of the case studies.

Cross-case analysis

In Chapter 8, I provide a comparison of the different approaches to HSRCB in Solomon Islands as a cross-case analysis. I evaluate how health systems capacity building in Solomon Islands can be understood and improved under the thematic elements across the cases and highlight the unique challenges and opportunities inherent to each model.

Discussion

In Chapter 9, I discuss what the results imply within the context of HSRCB and provide recommendations for ways to improve HSRCB in Solomon Islands, based on the analysis of the responses to the interview questions.

Thesis style

Respect for study participants underpins my decisions about the style in which to present their interview data. Each HSRCB approach is referred to as an approach, model and case study within the thesis depending on context. To maintain confidentiality, participants are given codes or in-text pseudonymous. The words spoken by participants are italicised. Findings are presented in both the original Solomon Islands Pijin and in English translation. Throughout my thesis, I refer to the people who I interviewed as interviewees and also as participants. This is because the interviewees both participated in this study and also were participants in the HSRCB models that I am investigating here.

English is the third or fourth language for most participants, and their verbatim responses often contained non-verbal exclamations and pauses. These are removed from the text for ease of reading when reporting the findings. However, as much as possible I have retained the style of individual speakers, which varied from very informal to very formal, to preserve the individual perspectives and some degree of the emotional attachment felt by individuals to their words. I seek the reader's patience when reading this thesis, because English is also my fourth language. This thesis is written in Australian / British English.

Chapter 1: A Review of the history and outcomes of health system research capacity building in low and middle-income countries

Chapter outline

In this chapter I examine the history of health system research capacity building (HSRCB) in low and middle-income countries (LMICs), and discuss the factors that are known to influence outcomes on individual and system capacity, as well as approaches to HSRCB. I will also reflect on the role of health research funding in HSRCB, how knowledge translation may occur as evidence-based policy making, and the potential outcomes and impacts arising. Finally, I will consider how HSRCB has been implemented in Pacific island countries and territories, and more specifically in Solomon Islands. This informs the research question systematically addressed in this PhD, which is presented at the end of the chapter.

Introduction

Strengthening health systems research capacity in LMICs is one of the most powerful means to advance and sustain health development (Lansang & Dennis, 2004; Minja et al., 2011; Nchinda, 2002; Sitthi-amorn, Somrongthong, Reeder, & Simon, 2000; Whitworth et al., 2008). Strong health systems research capacity is a critical component of effective efficient and acceptable health services delivery that can support the global agenda of universal health care. Policymakers and health care providers are guided by the outcomes of such health systems research to identify priority issues, develop and effectively implement research findings, monitor and evaluate existing services and systems, identify unreached populations, and locally contextualise global and national policy and guidance (Zachariah et al., 2012).

Research is the organised quest for new knowledge, and research capacity is the ability to effectively carry out reliable research with reproducible outcomes (Bates et al., 2011; Lansang & Dennis, 2004; Nchinda, 2002). Health policy and systems research has been defined as "an emerging field that seeks to understand and improve how societies organise themselves in achieving collective health goals, and how different actors interact in the policy and implementation processes to contribute to policy outcomes" (World Health Organization, 2017). This area of research seeks to understand how different actors interact to contribute to policy outcomes upstream of clinical and research services and undertakings. It describes how health systems respond and adapt to health policies and how health policies can shape and be shaped by the health system and broader determinants of health to collectively achieve their health goals. It seeks answers to a wide range of questions about finance, governance, and

issues surrounding the implementation of services and delivery of care in both the public and private sectors (World Health Organization, 2017).

Health systems research capacity building at a systemic level is assumed to have an impact on the efficiency of programmes and their effectiveness, making it an essential activity. The term "capacity building" has been criticised by many scholars because it denotes a lack of existing capacity (Vasquez, Hirsch, Giang, & Parker, 2013). The term "capacity building" is used here to identify any process that adds to existing capacity regardless of starting level (Vasquez et al., 2013). In this thesis, HSRCB is understood to be activities focused on the ability of individuals, institutions and systems to identify and prioritize health research problems, develop and implement appropriate research, and disseminate and apply the findings to provide solutions to relevant health problems (Gadsby, 2011; Minja et al., 2011). Programme capacity is the ability of a health system to deliver services in response to the health needs of a country or population (Gadsby, 2011).

The Commission on the Social Determinants of Health observes that health systems are "vital elements of the social fabric of every society. They are not only critical for the treatment and prevention of ill-health but are central strategies for addressing health inequity and wider social injustice" (Gilson, 2012, p. 13). High quality health care is such an important determining factor for a developed society that health system strengthening has been described as "essential" for achieving the Millennium Development Goals (Travis et al., 2004). Gilson states that: "Health systems… provide the platform from which to launch dedicated efforts to address major diseases and health conditions that burden low-income populations, such as HIV/AIDS, tuberculosis and malaria. Given these roles, the early 2000s saw a significant expansion of international and national interest in health systems as one component of sustainable development in LMICs." (Gilson, 2012, p. 13)

According to the Alliance for Health Policy & Systems Research, health system research capacity building "is a crucial policy analysis tool − of both policies and processes − including the role, interests and values of key actors at local, national and global levels" (World Health Organization, 2017). WHO has noted that the supporting research and information to guide strengthening health systems and health policies in LMICs lacks depth and rigor (World Health Organization, 2009), and has stated that there is a need "to make evidence-informed decisions for configuring health systems and making the right policy choices" (World Health Organization, 2012). Mills considers that because of the limitations in quality and scope of

HSRCB per se it is difficult to transfer findings between different countries (Mills, 2012). This makes it important to carry out original and empirical research in specific countries to capture local systemic drivers and limitations effectively and is a reason for focusing on the Solomon Islands in this thesis.

History of health research capacity building and health systems research capacity building

Developing HSRCB initiatives in LMICs can be traced to a 1963 United Nations conference when participants identified that the health status of LMICs had not necessarily improved despite notable investments committed to scientific and technological interventions (Pang et al., 2003; Rottingen et al., 2013). In 1970 Canada's International Development Research Centre (IDRC) was established to address this concern and led the way in building health research capacity in LMICs. IDRC research projects were both locally located and implemented by local researchers (Cole, Boyd, Aslanyan, & Bates, 2014; Savigny, Kasale, Mbuya, & Reid, 2004). In 1974 the UN Department for Research and Training, WHO and World Bank established two health systems research capacity building programmes that also aimed to address concerns raised in 1963. These are research and training in tropical disease for research and research training on human reproduction (Cole et al., 2014). These programmes focused on training individuals and building research capacity in disease endemic countries to identify and implement appropriate solutions to their health problems (Cole et al., 2014). In 1975, the Swedish International Development Corporation Agency was established and further supported health research development in LMICs (Cole et al., 2014). The Alma Ata Declaration in 1978 raised similar issues to the 1963 conference, specifically regarding the limited impact of health research initiatives and activities on people who live in LMICs (Cole et al., 2014).

The Commission for Health Research for Development was established in 1987 by a global consortium of public, private and NGO partners who aimed to assist HSRCB in LMICs through a worldwide health research system that organised and supported international and national early career researchers by providing a coordinating network to bring people together to address both national and international health problems (Cole et al., 2014). In 1993, Commission for Health Research for Development evolved into the Council for Health Research and Development, established with the goal that health systems research capacity building should be prioritised in all developing countries. Council for Health Research and

Development promoted Essential National Health Research as a strategy "to promote research on country-specific problems that could underpin national and community decisions on health policy and management" (Commission on Health Research for Development, n.d.). Essential National Health Research aims to promote country-specific research activities that can inform national and community decisions on health policy and management and assist researchers, decision-makers and community people to collectively work together to identify priority issues that need to be investigated. Findings can guide a country on how to use its resources wisely and improve its capacity to judge and seek appropriate measures to utilise external development assistance.

In 1990 Council for Health Research and Development reported that 85% of the world's population lived in LMICs where 90% of the global disease burden could be found, but only 10% of global research funds were spent on health research activities. This was referred to as the 10/90 gap by WHO, noting that US$ 70 billion was being spent worldwide on health research each year and only 10% of that was spent on 90% of the global disease burden. WHO then proposed a restructuring of global research funds (Atkins, Varshney, Meragia, Zwarenstein, & Diwan, 2016). These concerted efforts to solve health problems in LMICs implied a revolution in health research (Franzen, Chandler, & Lang, 2017). However, fifteen years later no significant improvements had been seen in the health status of populations within LMICs, despite all the health research initiatives and activities that had been implemented (Franzen et al., 2017). Disease prevalence in terms of communicable and non-communicable diseases was still significant (Petersen, 2009).

In 2001 the Commission on Macroeconomics and Health argued for larger investments in health research capacity strengthening, which they identified as the most powerful, cost-effective and sustainable means of advancing health and development (Cole et al., 2014). In 2004 a Ministerial summit on health research held in Mexico strongly supported the argument posited in 2001 of the importance of health research and in the run-up to the November 2008 Ministerial summit in Bamako donors were engaged in meetings and initiatives aimed at drawing up strategies to help strengthen health research capacity in LMICs (Cole et al., 2014; Sewankambo et al., 2015). The 2013 World Health Report demanded that "all nations should be producers of research as well as consumers" (Dye et al., 2013, p. 133). However, despite years of international collaborations, investments, and development work with LMICs, the capacity to address health problems remains limited (Petersen, 2009).

As noted in this brief historical review, HSRCB initiatives and activities have not led to significant gains in health delivery. In areas where there is progress in HSRCB, foreign support was required to achieve it (Franzen et al., 2017; Gadsby, 2011; Kagan et al., 2016). Bilateral restructuring of health research activities between HICs and LMICs has occurred but has not led to independently sustainable HSRCB activities. The historical evidence demonstrates that HICs are seriously concerned about and demonstrate a willingness to assist LMICs to ensure HSRCB is implemented, but their initiatives appear to be ineffective. This suggests that part of the problem may lie within the health systems of LMICs rather than HSRCB activities. There are several factors to consider when thinking about how issues may be arising at a systems level within LMICs. The appropriateness and suitability of HSRCB methods and the type, level and conditions of research funding may also be significant. (Franzen et al., 2017). Despite investments and progress in HSRCB initiatives further work is needed to develop sustainable health research systems in LMICs (Dodani & LaPorte, 2008). More context specific research that assists in addressing these questions is also needed to identify the most effective strategies to achieve long lasting and impactful solutions for HSRCB in LMICs.

Factors influencing the outcomes for individuals, institutions and systems of health systems research capacity building efforts

The next section of this chapter will review the factors that influence the success of HSRCB outcomes, and the sustainability of gains in capacity. These could be summarised in (figure 1.).

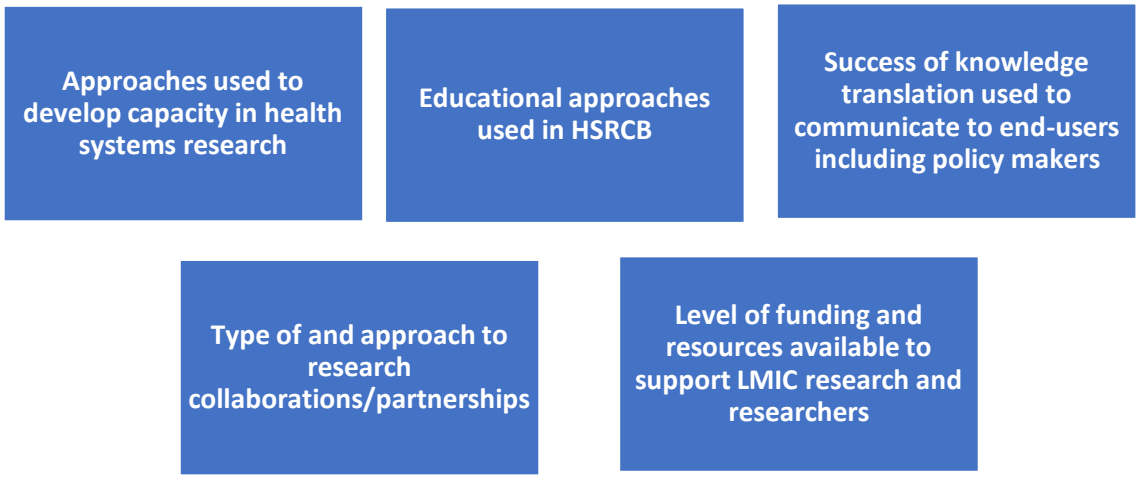

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Figure 1: Summary of factors influencing the outcomes of Health System Research Capacity Building efforts

Health systems research capacity building approaches

LMICs have been engaged in HSRCB from as early as the 1970s (Cole et al., 2014). The implementers of this research have genuinely committed their time, money and other resources including expertise to build and strengthen research capacity. However, there is also evidence that HSRCB activities have not been able to guarantee improvement of health outcomes in LMICs settings. Discussions in the literature seem to focus more on the process of developing research capacity than the general description of the development of health research or the capacity building aspect of HSRCB. These concepts have to go hand in hand. Each supports and enables the other to develop abilities which are captured under the general description of HSRCB in LMICs (Cole et al., 2014). Health research capacity building often refers to the process individuals, institutions and health systems employ to develop research abilities such as identifying health problems, setting objectives and priorities, developing protocols and disseminating knowledge gained from the study. These abilities are envisaged to enable individuals to independently perform simple health research that can inform local policies and practices in LMICs. The factors that affect this process are: research training approaches, collaborations, funding and knowledge translation. The training approach appears

to be the most important activity in the process of HSRCB. The three main approaches that emerged from the literature and are well described are Higher Degree by Research, short-term workshops and on-the-job project-based HSRCB. It is also important to note that how these approaches are designed and delivered might affect their impact on health improvements in LMICs.

Higher Degree by Research is a formal academically accredited training approach. It delivers a recognised academic qualification at the successful completion of the course. This programme is delivered by universities using different models including full-time on campus, part-time off-campus, conjoint programmes between academic institutions, online, or a sandwich model that includes online and face-to-face within a programme. (Nangami, Rugema, Tebeje, & Mukose, 2014). The main aim of this approach is to develop and strengthen an individual's research capacity to enable the candidate to independently conduct research and attain a formal research qualification. (Abawi et al., 2016; Bates et al., 2011; Clifford & Zaman, 2016; El Lawindi, Galal, & Khairy, 2015; Gotham et al., 2016; Goyet, Sauvegrain, Schantz, & Morin, 2018; Nangami et al., 2014; Pinto et al., 2014; Simba, Mukose, & Bazeyo, 2014).

The second approach is a well-structured short-term workshop that often issues a certificate of participation, completion or competency, at the successful conclusion of the training, and may be for individuals or groups of participants. An example of this approach is the SORT-iT model (Ramsay et al., 2014), which comprises a series of two to three week blocks delivered over 12 to 24 months. Other versions of this approach include post-doctoral fellowship programmes and conference group discussions. The general aim of this approach is to build and strengthen individual, institutional, and health system research capacity that enables individuals, institutions and systems to achieve institutional, national and regional health goals (Bates et al., 2007; Dodani & LaPorte, 2008; Ekeroma, Kenealy, Shulruf, McCowan, & Hill, 2014; Goel et al., 2018; Heimburger et al., 2013; MacDonald et al., 2014; Memiah et al., 2018).

The third approach is project-based, or 'on-the-job' research capacity building. This is usually delivered through research projects, collaborations, engagement of faculty, stakeholders and policymakers, and engagement with institutions and health systems. Health professionals learn research skills by being involved in the implementation of the project which is part of their day to day job. The formation of alumni groups, the establishment of research institutes and centres of excellence are also considered as project-based approaches. The

broader aim is to build and strengthen the health research capacity of individuals, institutions and health systems. This often leads to the development of regional and international collaborations to address national, regional and international priorities in health issues (Stenson, Kapungu, Geller, & Miller, 2010; Yazdizadeh et al., 2016).

Other approaches described in the literature, and sometimes included in the above-mentioned approaches as an element of that approach, include:

- Collaboration: This model involves the establishment of a research institute, centre of excellence, hub, and alumni to form networks and partnerships between LMICs and HICs to identify priority health problems, HSRCB needs and to propose strategies to address the problems and needs identified through collaborations (Ayah, Jessani, & Mafuta, 2014; Elmusharaf et al., 2016; Heller, Machingura, Musa, Sengupta, & Myles, 2015; Kohrt et al., 2014).
- Through engagement with policymakers: This model involves the engagement of faculty members, stakeholders, health systems and policy-makers to investigate, identify needs and challenges and the impact of research evidence on policy and practice in LMICs (Jessani, Kennedy, & Bennett, 2016; Jönsson, Tomson, Jönsson, Kounnavong, & Wahlström, 2007; Naidoo, Dimba, Yengopal, Folayan, & Akpata, 2015).
- Conference based models: In this model conferences are organised in a manner that small focus group discussions are formulated to share ideas, discuss and identify the positives and negatives of HSRCB activities and proposed strategies to address the identified HSRCB challenges (Adanu et al., 2015; Ezeanolue et al., 2018).
- Reporting or describing health research: This model uses reviewing published papers as a journal club to report and describe the positives, negatives and HSRCB needs in LMICs (Kirigia et al., 2016; Lawrence, Mitrou, & Zubrick, 2011; Petersen, 2009).
- Undertaking a literature review: This model involves reviewing peer-reviewed literature for evidence of the impact of HSRCB and knowledge translation strategies that can help transform health systems (Kanoute, Faye, & Bourgeois, 2012; Siron, Dagenais, & Ridde, 2015).

In addition to the approaches are the contexts in which the opportunity for some capacity building emerges such as:

- Engagement in health policy development: This model stresses the importance of conducting local epidemiological studies on mental health, and calls for changes in research funding priorities by public and private, national and international funding agencies to follow the WHO Mental Health Action Plan. The Ministry of Health in Costa Rica mental health policy for 2013 to 2020 was developed using this approach (Contreras, Raventos, Rodriguez, & Leandro, 2014; Lembani, Teddy, Molosiwa, & Hwabamungu, 2016).
- Being involved in evaluation: for example, an evaluation of school-based HIV prevention interventions done with South African adolescents - focusing on their fieldwork experiences (Casale, Flicker, & Nixon, 2011).
- Feedback from and engagement with ethics boards: This model identifies the main ethical issues in HSRCB and puts forth recommendations for ethically mindful short-term student research (Provenzano et al., 2010).
- Engagement with editors of peer-reviewed publications: This model investigates ways to make published articles accessible to poorly resourced countries (Rottingen et al., 2012).
- Working with ministry of health data/information systems: This model involves a comprehensive description of available data sources and proposes a set of indicators for monitoring the global landscape of health research and development (Rottingen et al., 2013).
- Being involved directly in health systems/service delivery reforms and transformations: This model proposes key system thinking tools and strategies that can be used to transform health systems (Swanson et al., 2012) and
- Developing research methods and theories that align with local cultural contexts: An example of this model discusses the integration of research approaches using Kaupapa Maori methodology in health research on the Maori population (Rolleston, Doughty, & Poppe, 2016)

These approaches are summarised in Figure 2, below.

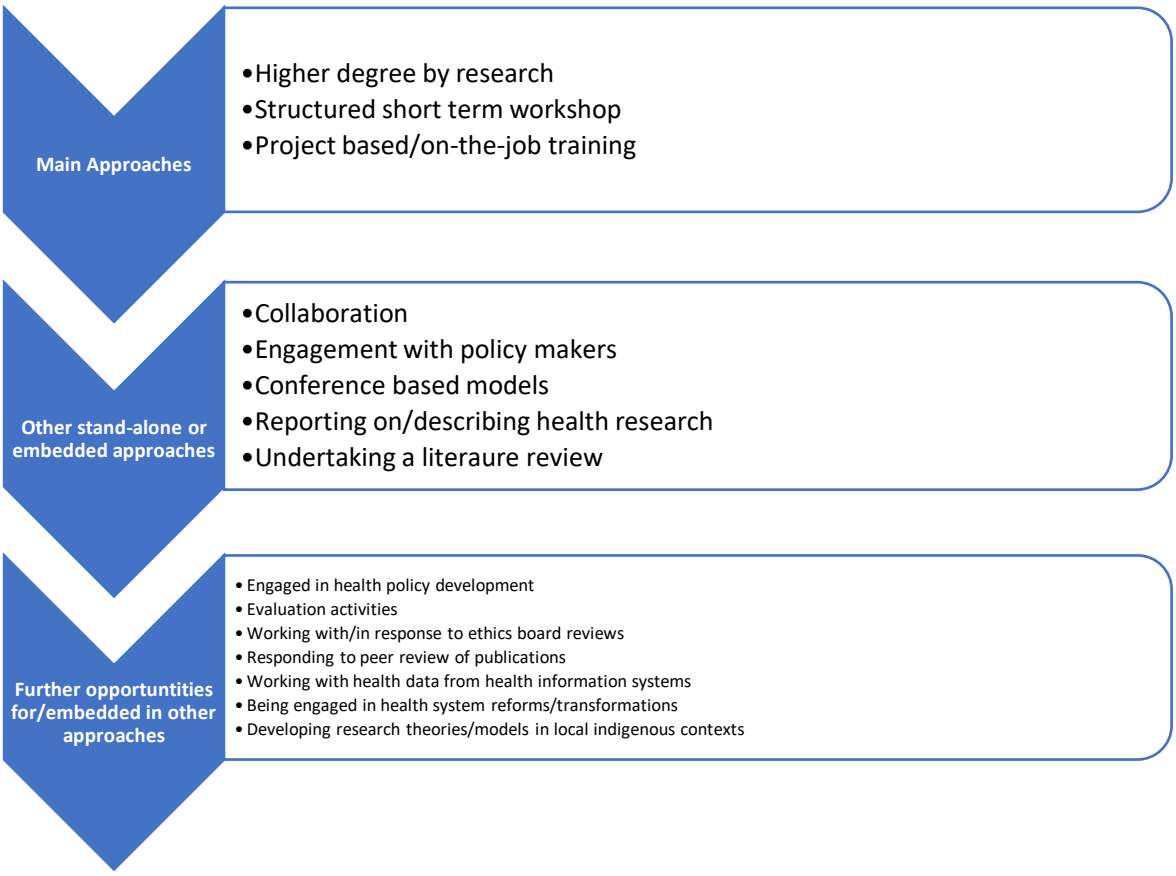

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Figure 2: Summary of approaches used for Health System Research Capacity Building, based on the literature

Education: pedagogical principles informing health systems research capacity building

As discussed earlier, a competent health workforce is critical to achieving sustainable development goals and universal health coverage in LMICs (Lansang & Dennis, 2004; Larkins et al., 2020; Nuyens, 2005) and central to the success in achieving health goals is HSRCB. HSRCB has now been recognised as core to effective and responsive health systems in LMICs (Nangami et al., 2014). However, there has been little assessment of the capacity and success of HSRCB in LMICs, and rare emphasis on this capacity as part of "health workforce capacity studies". However, it is important to have and produce competent research practitioners who are trained and should be able to conduct health systems research efficiently and effectively (Nangami et al., 2014).

Frenk et al., and Nangami et al., describe three general paradigm shifts in educational reform that took place in the wider health training arena within LMICs (Frenk et al., 2010; Nangami et al., 2014). At the beginning of the 20th century, the educational model to train health workers began with a "science-based" approach. This science-based curriculum was delivered in a traditional teaching mode of lectures and knowledge recall. In the mid-20th century, the approach shifted from a science-based to a "problem-based" approach. In the early 21st century the approach shifted from problem-based to "systems-based" promoting a competency-based curriculum delivered under the auspices of adult learning principles (Nangami et al., 2014).

The latter approach has captured the attention of health systems research training institutions worldwide because of its unique focus on designing and teaching a competency-based driven curriculum which eventually leads to transformative learning and institutional reforms, and promotes interdependency, collaboration and partnership in education (Nangami et al., 2014). The principles underpinning the delivery of competency-based education complement the health system principles, namely: a systems approach that is people-centred, performance-based, and promoting interdependence, integration, team approaches, innovation in training such as the use of technology, and adult learning approaches (Nangami et al., 2014). These principles might be expected to create a competent workforce in Solomon Islands as they would in any other country attempting to build health systems research capacity. However, in many LMICs (including Pacific island countries and territories) there has been little or slow effort to push for educational reforms resulting in very slow progress in shifting from a science-based to a systems-based educational approach. Training providers should regularly review their programmes and focus, and in those reviews could accommodate the training of trainers component of HSRCB. There is also a lack of clarity on the nature of training and competencies of professionals who are engaged in this systematic approach. Further the rationale behind professionals undertaking short term or HDR training to build capacity in these systems-based education approaches is not clear, leading to graduates who are ill-prepared to understand and address the dynamics of the health systems where they work (Nangami et al., 2014). Extending this training approach to health systems research training, it is very important that individuals undertaking the training, in whatever form, should demonstrate knowledge, skills and attitudes that enable them to effectively perform the required tasks as part of the programme.

In other LMICs, it is also evident that there was no clear understanding between governments and education providers on the framework that can strengthen their contribution

to health research training (Nangami et al., 2014). This results in a lack of clarity on how to build capacity for transformative training, resulting in training programmes being static, remaining in an either scientific or project-based training approach. As a result, people who "graduate" from these programmes, continue on to be "faculty members" working independently rather than working collaboratively to develop health systems research capacity building strategies. So although health research training reforms are progressing the focus in most programmes remains on training individuals to conduct research rather than teaching it (Dye, Reeder, & Terry, 2013).

To assess individuals, institutions and the health system's capacity to perform health research, it is important to know the expected ability each level will need to demonstrate (Ghaffar, IJsselmuidien, & Zicker, 2008). At an individual level, a person is required to demonstrate the ability to participate, conduct and communicate relevant research findings (Ghaffar et al., 2008). At an institutional level, the institution needs to demonstrate the ability to establish infrastructure that can enable the conduct and communication of relevant health research. At the health systems level, the system needs to demonstrate the ability to reflect and/or identify the need for sustainable health research systems that can support the continual quality improvement of the system to use evidence to influence policy and programmes, and to prioritise health research through investment, political will, appropriate legal framework and strong research leadership (ESSENCE on Health Research, 2011, 2014; Lansang & Dennis, 2004).

Common capacity building models have reflected engagement and capacity development at individual, institution and health system levels. However the outcomes across these three levels have not been clearly articulated within the literature. This suggests that local research on HSRCB approaches, their outcomes and impacts on individuals, institutions and health systems in terms of service delivery and improved health is needed in LMICs, particularly Pacific island countries and territories.

Health systems research collaboration as a capacity strengthening approach

Collaboration is one of the critical elements that contribute to HSRCB in LMICs. It can be described as a platform for linkages and the exchange of ideas for common goals. Collaboration has been used interchangeably with partnership, networking, consortium, alliance, and coalition (Elmusharaf et al., 2016). It aims to develop individual capacity, the process for discussion and create an impact from research evidence. Collaboration plays a

crucial role in HSRCB in LMICs. Some of the reasons why collaborations and partnerships between HICs & LMICs are so important include that they:

- have the potential to become powerful entities for lobbying regional development agencies and government agencies
- have greater power to influence local policy particularly if there is local ownership of the programme
- can create a central liaison point for donors, policy, decision-makers and other researchers
- provide the avenue to raise sensitive issues in a diplomatic manner
- can develop research capacity through training, mentoring or sharing skills while conducting research projects
- can situate local interventions as part of a larger intervention
- provide a pool of resources and skills, which can assist LMICs that experience difficulty in retention and other scarcity of skilled human resources
- share the expertise and experiences amongst LMICs and between HIC and LMICs
- can reduce the feeling of isolation through the matching of individual researchers with some institutional support
- can increase the influence on national and regional agendas because the research results come from a group of well-known researchers rather than from a single researcher or institution
- can provide financial, human resources and institutional capacity from other partners to assist resource-poor countries
- provide opportunities for researchers from resource-rich countries to develop understanding of, and opportunities to undertake research into, diseases or settings not otherwise available to them, (Carlisle & Cropper, 2009; Lokot & Wake, 2021).

Local and contextual factors influence the extent of the benefits and the sustainability of the collaboration. Therefore, context specific research is required in LMICs, including the Pacific island countries and territories, given the different cultures, settings and contexts (Elmusharaf et al., 2016).

The role of health research funding in building and sustaining health systems research capacity building

Research funding has been recognised to be a catalyst in implementing HSRCB in LMICs (Dodani & LaPorte, 2008). As previously noted, the Global Forum for Health Research Report noted that only 10% of funding for global health research has been allocated to health problems that affected 90% of the world's population (Greco, Lorgelly, & Yamabhai, 2016). In 2004 and 2009 total global investment in high-income countries for health research and development was US$240 billion, however only 1% was allocated to neglected diseases and disease burdens within LMICs. This report highlights the substantial gap that still exists within the global landscape of health research and development in LMICs (Greco et al., 2016). In LMICs very few governments are allocating adequate funds for conducting health research to address their health problems (Yazdizadeh et al., 2016) and it is often unpredictable. For instance, in Iran, the research budget had increased from 0.55% in 2001 to 0.87% in 2009 and although "planned" be raised to 2.5% in 2015, this did not eventuate (Yazdizadeh et al., 2016). So while there is progress in both the production and provision of funding to build the capacity to undertake health systems research in LMICs, this has been growing at a slow pace (Simba et al., 2014).

There is certainly a global need for health research that can generate evidence to inform policies, programme design, and interventions to improve the quality of life in a cost-effective way (Greco et al., 2016). However, Macdonald et al., argued that the research gap for LMICs remains a major problem because they only received 2% of the global research funding (MacDonald et al., 2014) and have been heavily dependent on donors to carry out health research (Greco et al., 2016). The cost of delivering HSRCB in LMICs needs to be carefully assessed in terms of its sustainability to support ongoing research capacity initiatives and activities.

In 2017 a short 5 1/2 day partly funded HSRCB project was implemented in India, enrolling 15 participants facilitated by 9 facilitators. This training aimed to explore cost-effective and less resource-intensive training approaches to build operational research capacity focusing on tobacco control programmes (Goel et al., 2018). The outcome of the programme suggests that such a low-cost and less time-intensive HSRCB approach can be applied to similar settings across a range of public health issues. This may be cost-effective in India but the cost implications of such training in the Pacific are uncertain. There is an assumption that

a similar HSRCB approach will be appropriate for other LMICs, however Bates *et al.* (2011) argued that such interventions cannot simply be transferred to other LMICs due to differences in settings, cultures and contexts (Bates et al., 2011a).

Knowledge translation into policy and practice

Knowledge translation has been identified in the literature as an important element of the HSCRB process. Communicating and disseminating health systems research information is a crucial undertaking and it should be strategically implemented for maximum benefit to LMICs. A step further than just dissemination, knowledge translation is defined by the Canadian Institute of Health Research as "a dynamic and interative process that includes the synthesis, dissemination, exchange and ethically sound application of knowledge to improve health, provide more effective health services and products, and strengthen the health care systems" (Ayah et al., 2014, p. 2). In discussing knowledge translation, two groups of people are usually described: research producers and research consumers. Research producers refer to those who produce evidence and research consumers are those who used the evidence produced (Bosch-Capblanch et al., 2012). Knowledge translation serves to bridge the gap between producers and users of research products.

As the field of health systems research is growing in LMICs, it is becoming important to ensure that research products are absorbed by the users to support the adoption of evidence-based policies and practice (Ayah et al., 2014). The utilisation of research evidence should be driven by the ability of research consumers to translate the evidence into policy, practice and decisions. One of the many challenges facing LMICs is when producers and users of evidence fail to understand the complexities of the context where knowledge translation occurs. To deal with this failure, researchers should prioritise the need for them to understand systems and entities that exist within the health sector; for example, the ministry of health, universities, and non-government organisations, and how they operate. The lack of a link between researchers and policymakers is another setback that needs to be addressed. Understanding the capacity gaps, challenges, and opportunities in enhancing KT is very important for LMICs including for the Pacific islands.

Outcomes and impacts of health systems research capacity building

Given the above description of investments in HSRCB and the different approaches used, what has been the outcome of these efforts?

I conducted a systematic literature review in 2018 to identify what had been learned from the many initiatives to build health system research capacity in LMICs (see Appendix 1 for details of the approach and the literature found). Thirty-four papers were found to meet the inclusion criteria that it:

- refers to health systems research capacity building and/or strengthening – planning and implementation
- refers to the outcome/impact of health systems research capacity building on individuals, institutions and health systems
- is peer-reviewed literature
- was published between 2007 and 2018
- was published in English
- focused on target populations or settings in LMICs

The most common approaches described in these papers were short term workshop (n= 6), collaboration (n= 6), engagement with policy makers (n= 6), HDR (n= 5), report and description of health research (n= 3), and the contexts described were project-based or on-the-job (n= 2), within conference (n=2) and others (n= 4).

The main criteria for assessing "outcomes" were quantitative indicators, specifically, papers published, and number of first and last authors and total authors from LMICs (Ekeroma, Kenealy, Shulruf, Nosa, & Hill, 2015). These appear to be the most common and accepted quantitative ways of measuring the success of HSRCB in LMICs. In addition, qualitative indicators such as knowledge gain, and positive changes in attitude towards, intention and motivation to perform research have been suggested but are generally not reported in the peer reviewed papers, and hence unable to be consistently used as performance measures.

All of the studies identified focussed upon LMIC contexts, most of the studies were undertaken in LMICs and a small number were carried out in conjunction with HICs. Within LMICs the majority of the studies were implemented in African countries and the rest in Pakistan, Pacific Islands, Iran, Egypt, Vietnam, Nepal and Haiti. The publications can be classified into two categories: original research categorised into descriptive, exploratory and evaluative studies (refer to Appendix 1); and commentaries. Most of the authors in the 34 publications are from institutions in LMICs. According to the address provided at the time of

publication, however, 18 of the first authors were based in HICs and 16 were from LMICs. Considering the leadership (first and last authors) role in authorship, 11 provided addresses based in HICs and 22 from LMICs. Using the same information, the majority of the first (n = 18) and last (n = 19) authors listed locations from HIC institutions although the majority of all of the authors listed a location in a LMIC (n = 22) compared to (n = 11) an HIC. The number of LMIC and HIC authors represented in these articles appear to be similar, however the overall picture of authorship does not seem to indicate leadership by LMIC participants, who are generally secondary authors. Because the analysis demonstrates all these papers about LMICs appear to be dominated by HIC authors there seems work to progress leadership by LMIC authors on LMIC research topics is still needed. This may reflect that HSRCB in LMICs remains a challenge and continues to lag behind HICs in terms of number, quality and impact of scholarly activities (Ezeanolue et al., 2018). However, some of the authors at the time of publication may be from, and may later return to LMICs, e.g. they were HDR students at the time of writing, so definitive statements cannot be made.

The health systems research capacity building case of Pacific island countries and territories, with particular focus on the Solomon Islands

There is a clear indication of a growing need for locally led research projects within Pacific island countries and territories. Local, context-specific health research is required to determine the effectiveness of HSRCB programmes (Cuboni, Finau, Wainiqolo, & Cuboni, 2004; Speare, Harrington, Canyon, & Massey, 2014)

> Pacific island countries and territories (PICTs) share many similarities with non-Pacific LMICs regarding health burdens, health equity and sustainability of health systems. They also face similar challenges in implementing HSRCB. Within PICTs there are sub regions of Micronesia in the North, Melanesia in the East and Polynesia in the Southwest. The total population residing within PICTs is 10 million and Papua New Guinea is the most populated with 6.6 million (Ekeroma et al., 2013). Melanesians have the highest disease burden followed by Micronesians and then Polynesians (Ekeroma et al., 2013). Papua New Guinea, Fiji and Samoa have their medical schools as well as national Universities and the Solomon Islands established its own national University in 2014 (Ekeroma et al., 2013).

In 2004 a paper was published by health researchers in Fiji entitled “Participation in health research by Fijians” (Cuboni et al., 2004). This bibliometric review revealed two

conclusions; firstly, expatriate dominance in health research in Fiji, and secondly, the uncertain and limited availability and accessibility of published papers to local readers as well as their limited relevance to Fijian health priorities. The evidence also emphasised the ongoing demand for the involvement of local health professionals in health systems research capacity building and as well as the need for participatory community based health research by Fijians (Cuboni et al., 2004). In 2007, a special discussion was organised by WHO and held in Fiji that focussed on results from the use of a mapping tool developed by COHRED investigating four key health research areas (governance; policies and priorities; communication and dissemination; and utilisation of routine health information systems) in the 15 PICTs (Cuboni et al., 2004). The analysis concluded that the health research system in PICTs is poorly resourced and structured, and the report recommended that national health budgets in PICTs annually allocate funding for health research and that it also be provided for in the development assistance budgets of the international partners (Cuboni et al., 2004).

Similar conclusions were identified in other papers in PICTs including one in 2010 by a group of health researchers in the Solomon Islands entitled, "We can move forward despite: Challenging historical inequity in public health research in Solomon Islands" (Redman-MacLaren et al., 2010). And in the same year a paper published in Samoa entitled, "Strengthening health research capacity from within Samoa" (Suaalii-Sauni et al., 2011). In 2012 a follow-up COHRED survey was done on six Pacific island countries (Fiji, Solomon Islands, Vanuatu, Samoa, Tonga and Cook Islands) to determine whether there had been any changes to the national health research system since the 2007 survey (Harrington et al., 2013). This study revealed that there were some improvements in the four key health research areas and affirmed that politics, human resources and infrastructure development affect the improvement of national health research systems in these countries (Ekeroma et al., 2015). A paper published in 2016 entitled, "Pacific Island's publication in reproductive health literature 2000- 2011 – A comparison with NZ" concluded that 57% of papers published were from Papua New Guinea, followed by Samoa and Vanuatu. Most of the studies were observational in which 34% of all authors were listed as from Australia and 25% from Papua New Guinea. Most of the publications by Pacific Island identified authors were in local journals, whereas non-Pacific Island authors published in global journals. The large number of published papers without Pacific Island authors led to a call to have non-PI researchers to enter into genuine research partnerships in order to build research capacity in the PICTs (Ekeroma et al., 2015).

There are a limited number of articles published that discuss HSRCB in PICTs, making it difficult to know what HSRCB initiatives and activities have occurred. From analysing the few articles that were retrieved, it is evident that historical capacity-building efforts in health research in PICTs have been pursued by international collaborators, bilateral collaborators and private organisations, however, there is a lack of local trained professionals and funds to sustain HSRCB without external support. Often, local scientists are sent to HICs for training and do not return to the country of origin (Amado et al., 2017; Petersen, 2009). This concurs with the finding that in most LMICs, only 10% of the scientists trained in HICs returned to their countries of origin and 90% remained in HICs after the training (Dodani & LaPorte, 2008; Franzen et al., 2017; Sharma & Sturges, 2007). When PICTs like Solomon Islands determine a need to establish high-quality research capacity, they need high quality trained professionals to undertake research and support others in the country. But the major challenge faced in HSRCB is the limited number and scope of HDR health research training programmes in PICTs alongside the need for locally contextualised evidence based solutions, especially to address local diseases burdens and health transitions. Building and/or strengthening health research is critical in PICTs as this can provide a platform for research activities to occur (Ayah et al., 2014; Bates et al., 2007). What is not well addressed in the literature is what sort of health research training approach will: i) fit Pacific island countries and territories' context, ii) be able to improve the health outcome of the population, iii) work better to retain trained scientists, iv) be affordable and cost-effective, and, v) be sustainable (Cuboni et al., 2004a; Dodani & LaPorte, 2008).

There has been no study done in the PICTs on the implementation and the impact of HSRCB on the individual, institution, or health system. A few studies have discussed the "impact" of HSRCB by the number of publications, conference presentations and first authorship of local researchers. Even though these output indicators might not be good measures of the impact of HSRCB activities they are the only data available. The limited number of studies on HSRCB in PICTs suggests that there is a need for further research.

Additionally, it is possible that effective HSRCB approaches implemented in other LMICs (Amado et al., 2017) may not be appropriate for Pacific island countries and territories. Each PICT has unique challenges and ways of living and knowing. Therefore context-specific research is required to design the best approach to HSRCB in PICTs.

For PICTs like the Solomon Islands, the knowledge transfer approach that occurred in Africa might not be applicable. Local research is needed to discover relevant knowledge translation methods and skills that will be appropriate for the local context. The question for the Pacific is what are the implications of existing health research training approaches, collaborations, funding and knowledge translation to Pacific island countries and territories? The answers have to be taken into consideration when discussing, planning and implementing HSRCB with its intended outcomes. The discussion should include analysis at the individual, institutional and health system levels to assist health leaders, professionals and early career health researchers to comprehend the broader picture of HSRCB approaches and their strengths and challenges.

The Pacific island countries and territories should approach HSRCB critically and holistically. This will greatly assist health professionals (researchers) to: i) see the big picture involving individuals, institutions and systems research capacity, ii) clearly articulate the outcomes of the HSRCB to individuals, institutions and the health systems, iii) link the capacity that needs to be developed in all three levels and how they can be translated into policies and then to practice, and, iv) be able to monitor and evaluate the various HSRCB models that could be used within their own setting or context.

Rationale, aims and objectives of this study

The importance of HSR and HSRCB to PICTs is clear, but currently does not appear to be achieving the desired outcomes. There are difficulties in assessing impacts and outcomes because the indicators are often merely quantitative and lack qualitative assessments of the local impacts of different HSRCB approaches. There is currently very limited research in this field that has been undertaken by PICT researchers, consequently there is a need for qualitative research to identify and assess how HSRCB approaches can lead to sustainable outcomes in context-specific PICTs. Based on these needs and gaps, the author initiated this study to explore, describe and document the delivery and impact of the four main health system research capacity building approaches that have been employed in the Solomon Islands between 2008 and 2018. These are: i) Higher degree by research (HDR), ii) International Health Research Projects (IHRP), iii) WHO Structured Operational Research and Training IniTiative (SORT-iT), and, iv) Atoifi Health Research Group (AHRG).

The **research question** for this study was:

How were the four models of health system research capacity building (HSRCB) planned and implemented between 2008 and 2018 and what was the impact on health research capacity in Solomon Islands?

The **aim** of this study was:

To explore planning, implementation and the impact of the four models on health system research capacity in Solomon Islands.

The **objectives** were to:

- Describe how the four health system research capacity building models were planned and implemented in Solomon Islands
- Identify and explore the impact of these models on individual, institutional and health system capacity
- Identify unique features, challenges and limitations of the four models
- Recommend strategies to inform and improve future planning and implementation of the four health system research capacity building models in Solomon Islands.

In the next chapter I will talk about the setting for the study in terms of geography, demographics and education, with additional attention to specific country characteristics that may influence the interpretation of results.

Chapter 2: Study Setting

Chapter outline

In this chapter I will describe the study setting. This includes Solomon Islands country profile, health care issues, language, education, religion, healthcare system, traditional belief systems and values and health research in Solomon Islands. All of these factors directly influence how health system research capacity building has been planned and implemented in Solomon Islands and are crucial to understand when interpreting results from this study.

Solomon Islands Country Profile

Geography

Solomon Islands is a Pacific country lying between the latitudes 6 degrees and 12 degrees south. It comprises 900 islands including mountainous and low lying coral atolls with a total land area of 28,370 km^2 (Hodge, Slatyer, & Skiller, 2015; Itogo et al., 2014; Solomon Islands Statistics office, 2020). The coral atolls are vulnerable to climate change impacts including rising tide and sea level (Hodge et al., 2015).

Population

The estimated population of Solomon Islands in 2019 was 721,455, an increase of 169,930 (30.8%) since the last census in 2009 (Solomon Islands Statistics office, 2020), and it is the second most populous of the Pacific island countries and territories. This increase represents an average annual growth rate of 2.7% for the period 2009 – 2019, in other words an increase of 17,000 people per year. The country's population has tripled in size since independence. The number of males and females are almost the same with male population 369, 352 (51.2%) and female 352, 204 (48.8%) (Solomon Islands Statistics office, 2020). The urban population comprised of 184,832 people (25.6%) and the larger rural population is 536, 623 (74.4%). In the nine provinces, population ranged from 4000 people in Rennel and Bellona to over 173,000 in Malaita. Ethnic composition was Melanesian 95%, Polynesian 3%, Micronesians 1% and the remaining 1% unspecified (Hodge et al., 2015; Solomon Islands Statistics office, 2020). The majority of the population depend on a village-based subsistence lifestyle and more than 70 different languages are spoken (Itogo et al., 2014; Redman-MacLaren et al., 2010; Solomon Islands Ministry of Health and Medical Services, 2017; Solomon Islands Statistics office, 2020)

History

First settlement may have occurred between 20,000 and 30,000 B.C. (Taika, 1989), and archaeological evidence demonstrates permanent settlement from 1000 B.C (Rukia, 1989). Early attempts at western colonisation occurred in 1568, when the Spanish explorer Mendana also gave the islands the names used today. In the eighteen century British, French, and Spanish explorers and then sandalwood traders arrived (Corris, 1973). In 1871 and 1904 European "blackbirders" abducted labourers to provide a workforce for colonial sugar plantations in Queensland (19,000 people) and Fiji (10,000) (Clive, 1985; David, 1993). In 1893 the eastern part of Solomon Islands was a British government protectorate and the west was under German control. In 1899 the British assumed overall control (Maike, 2010). Japanese troops invaded the Central and Western Solomon Islands in 1942, but were defeated by American forces in the same year (White, Gegeo, Akin & Watson, 1988). In 1976 the British government granted Solomon Islands self-determination, and independence followed in 1978 (Maike, 2010).

Politics

Since independence Solomon Islands has remained a member of the Commonwealth of Nations. Solomon Islands is a parliamentary democracy with 50 members representing geographical constituencies. Voting takes place on a four year cycle and usually along family or religious lines (Fraenkel, 2004; Moore, 2004). The Prime Minister is elected by the parliament. Each government ministry is headed by a cabinet minister, assisted by a non-elected Permanent Secretary. This system is a legacy of colonial government, founded on European structures that are not traditional to Solomon Islands culture, and it might be argued that current issues with governance may arise from the imposition of a non-traditional colonial system on a country that might be better managed in more traditional ways. Wainwright described Solomon Islands as having emerged from colonial rule with a legacy of poorly designed institutions of statehood. Political parties in Solomon Islands are fragmented, and the government relies on coalitions. Members may change allegiance and shift the composition of the cabinet and ministerial responsibilities at any time. The first government to survive the full four year term in office since independence was under Prime Minister Allan Kemakeza between 2002 and 2006 (Wainwright, 2003).

Civil unrest has been a frequent and significant problem in Solomon Islands. Between 1998 and 2003 indigenous inhabitants of Guadalcanal Island and settlers from nearby Malaita entered into armed conflict and law and order broke down (Dinnen, 2008; Redman-MacLaren

et al., 2009). The Guadalcanal people were unhappy about some Malaitans occupying land without respecting traditional cultural ownership and arrangements. Despite the establishment of a peace agreement brokered by the governments of Australia and New Zealand in October 2000, violence continued. In 2003, Prime Minister Allan Kemakeza instigated the Regional Assistance Mission to Solomon Islands to help restore peace and stability in response to the breakdown in government systems and structures that destabilised the foundations of Solomon Islands democracy (Redman-MacLaren et al., 2009). In 2006 the naming of Snyder Rini as prime minister after the national election sparked a riot which destroyed the Honiara China Town area, because local Solomon Islanders believed that Chinese residents were interfering in the election process. Chinese investment and influence in Solomon Islands had been growing for some time in competition with Taiwanese investment in the region. Between 2006 and 2017 Solomon Islands experienced a period of reduced conflict, and in June 2017 Regional Assistance Mission to Solomon Islands withdrew from Solomon Islands because a degree of stability had been restored. Ongoing political and ethnic tension, however, continued to have an impact on delivery and access to services including healthcare. In November 2021, a protest march organised by a Malaitan group triggered the burning of China Town and many industrial buildings in Eastern Honiara. The protest was driven by people's unhappiness with a government policy change from diplomatic ties with Taiwan to Mainland China by Prime Minister Mannasah Sogovare, which the Premier of Malaita province strongly opposed.

Provincial governance.

The ten provinces each have an elected provincial assembly with an executive council, provincial premier and provincial secretary. Assemblies pass local ordinances that do not conflict with national policy/legislation (Hodge et al., 2015; Itogo et al., 2014). Provincial ministers are appointed by the assembly and allocated portfolio responsibilities. The provincial government manages local municipal services including road maintenance, while national government is responsible for national state functions including policing, schools and health service delivery. The provincial governance system is also a legacy of the colonial system and does not reflect structures of traditional decision making, resource allocation or conflict resolution.

Economy

The Solomon Islands economy largely relies on subsistence agriculture of people living on customary land combined with cash cropping (cocoa and palm oil), fishing and (often

unsustainable) logging (Hodge et al., 2015, p.5). Most manufactured goods and fuels are imported. The 2009 population and housing census found 81,000 Solomon Islanders were in paid employment, 88,000 were classified as subsistence workers, 41,000 were classified as unpaid workers. Overall labour force participation rate was 63% and according to the Domestic Housing Survey 40% of women and 77% of men aged 15 – 49 were regularly employed within the previous 12 months. The largest source of employment in the country is the agricultural sector, providing 32% of the total employment for women and 40% for men (Hodge et al., 2015, p.2).

Total GDP was just under US$1.1billion in 2003, and in 2017 it increased to US$1.6 billion making Solomon Islands the poorest by GDP measures compared to its Pacific neighbouring countries Vanuatu (GDP US$2.8 billion) and Fiji (GDP US$4.6 billion) (indexmundi, 2010). Solomon Islands is one of the smallest economies in the world, classified under Low and Middle-Income, and highly aid dependent (Hodge et al., 2015). Gross national income per capita of US$560 in 2004 was down from US$750 in 1998, however by 2017 it had increased to US$ 2,253 (Hodge et al., 2015). Life expectancy is 61.9 years for males and 63.1 years for females (Hodge et al., 2015).

Health issues

On average one woman dies every 19 days in Solomon Islands, due to complications after childbirth, and 10% of births in Solomon Islands are not attended by skilled health workers. Six infants die every week and one child dies every day in Solomon Islands (Solomon Islands Ministry of Health and Medical Services, 2017).

According to the 2015 Demography and Health Survey, 82.5% of households had access to an improved drinking water supply. In urban households, safe drinking water is available to 94.6% of the population but in rural areas to only 80.1% (Solomon Islands Ministry of Health and Medical Services, 2017). Household access to basic sanitation facilities in 2015 was 67.8% in urban locations and 13.4% in rural locations. On average 179 children were treated in a health facility every day for Acute Respiratory Infection and 118 cases of Malaria were treated each day. An average of one person was diagnosed with TB every day in Solomon Islands (Solomon Islands Ministry of Health and Medical Services, 2017).

In terms of Non-communicable disease, one in three people seen at health facilities have hypertension and one in five people presenting themselves at the Non-communicable disease clinic are diabetic. In terms of people visiting health facilities, on average an individual

visits health facilities twice a year. On average 40% of health facilities do not have a functional toilet. In 2017 the availability of pharmaceutical supplies and medication within the country at the National Medical Store stood at 90% and was 72% at point of service (Solomon Islands Ministry of Health and Medical Services, 2017).

80% of all the medical doctors and 45% of nurses are based in Honiara, the capital of Solomon Islands, but nearly 75% of the population live outside of the capital, and this clearly indicates that service provision is skewed in favour of the urban centre (Solomon Islands Ministry of Health and Medical Services, 2017).

Language

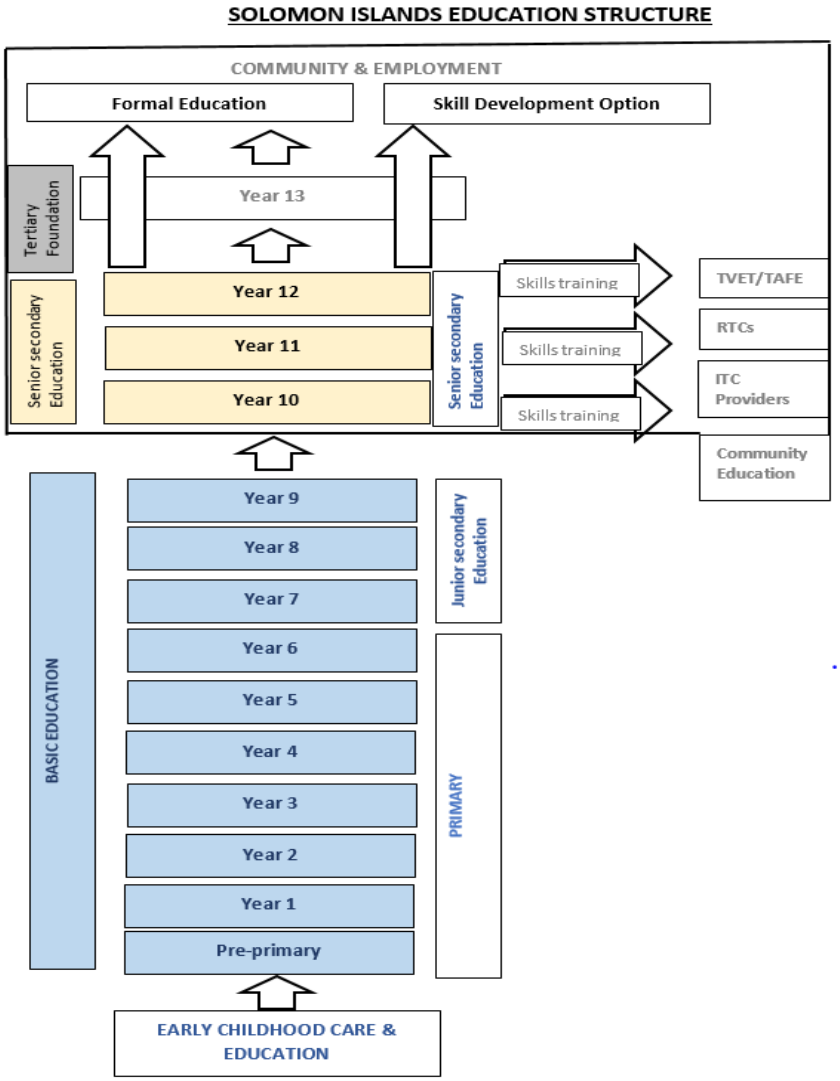
More than 70 different languages are spoken in Solomon Islands (Redman-Maclaren et al., 2010). English is the official national language of Solomon Islands, but Pijin, a language that derives from colonisation and trading, is the lingua franca used for general day to day communication. Complex and controversial ideas are often described in a convoluted or indirect way in Solomon Islands Pijin. This may be due to a desire to avoid conflict, in a historically conflict-ridden society, but also influenced by a strong oral society tradition that values discussion over rapid communication. The English literacy rate among the population age 15 years is 85% (Hodge et al., 2015), and the dominance of Pijin and local languages means that English is not commonly spoken with any fluency.

Education system

Solomon Islands education system follows a British model with primary schools, high schools, and tertiary level institutions administered and operated free of charge by government education authorities and at low cost by government subsidised non-government charitable organisations including church schools. There are also a very small number of private for-profit education institutions that are much more expensive. Children start school aged three to four years in their communities. Teaching and learning is focused mainly on play and value-based education, starting from age five. The Primary education syllabus covers ages 6 – 11 years, with year one starting at age six. Junior secondary comprises years seven – nine, and year nine is the final year for basic education. Solomon Islands Ministry of Education and Human Resource Development policy is to have all children complete 10 years (pre-primary and years one – nine). Senior secondary school comprises years 10 – 12 as post-basic education. National examinations are held at the end of years nine, 11 and 12. Students must pass before progressing to the next year. Year 13 is pre-tertiary, the foundation year for University education.

In March 2017, an act of parliament approved the formation of the Solomon Islands Tertiary Education and Skills Authority. This body manages policy direction, strategic planning, funding, labour market response and management of scholarship programmes in the Tertiary sector (Ministry of Education and Human Resource Development, 2018). Solomon Islands Tertiary Education and Skills Authority provides guidance to the Ministry of Education and Human Resource Development to deliver quality relevant technical and University education, developing sound partnerships with the private sector and other labour market stakeholders. The current system lacks the collaboration and integration of all the agencies involving in the tertiary skills development in the country. Under Solomon Islands Tertiary Education and Skills Authority the Solomon Islands National Qualification Framework was developed to provide quality training in the country. Solomon Islands National Qualification Framework provides pathways for students to acquire skills and qualifications at the training colleges and Universities and to move between them. The intention is to develop the national qualification framework based on regional and international best practice. In 2017 Solomon Islands National Qualification Framework approved 15 qualifications under six national skills packages. These national skills packages were validated by the Fiji Higher Education Commission between 2017 and 2018 to be recognised as foreign qualifications (Ministry of Education and Human Resource Development, 2018). Fiji is the closest geographic educational partner to Solomon Islands for the purposes of course quality auditing and is also a destination of choice for many Solomon Islanders seeking tertiary qualifications.

Current tertiary skills development does not sufficiently meet labour market demands and the need for more women in the workplace with these skills, and does not incorporate new technologies (Ministry of Education and Human Resource Development, 2018). The intention in developing new courses by the newly established Solomon Islands National University is to address these gaps. This includes creating pathways from Rural Training Centres to Solomon Islands National University for further qualification (Fig. 3). The Solomon Island National University (formerly Solomon Islands College of Higher Education) offers certificates, diplomas and some Bachelor degree courses, but no HDR programmes.



(Ministry of Education and Human Resource Development, 2018)

Figure 3: Solomon Islands Education Pathway

Solomon Islands currently does not have internal capacity to deliver postgraduate training. The Ministry of Education and Human Resource Development annually allocates scholarships for postgraduate studies. In 2017 Ministry of Education and Human Resource Development spent a large portion of its budget on tertiary scholarships for overseas education. The total amount spent on scholarships was $491,311,317SBD. This is 41% of the Ministry of Education and Human Resource Development recurrent budget (including payroll) of $1,198,288,453SBD (Ministry of Education and Human Resource Development, 2018) (Table 1).

Categories	**No. of scholarships**
Additional	304
Skill development	186
High achiever (pre-service)	99
Constituency	97
In-service	90
No category stated	66
Cost sharing	40
Postgraduate	9
Full funded	4
Reinstate	2
Blank detail	2
Award needed	1

(Ministry of Education and Human Resource Development, 2018)

Table 1: Scholarship allocations 2018

Records from the Ministry of Public Service show the number of health professionals who have been approved by Ministry of Public Service for scholarships to undertake HDR training from 2014 to 2019. A total of 17 health professionals were given scholarships by the Solomon Islands government over this period; 16 of them for Masters Degrees and one at PhD level. For those that did Masters Degrees the record did not specify whether these masters were completed through course work or by research.

The postgraduate educational system of Solomon Islands depends on overseas support to fund students. Annually the Australian government provides 40 scholarships and the New Zealand government provides 49 for Solomon Islanders to undertake tertiary studies (MEHRD, 2018). These scholarships are for study in Australia or New Zealand tertiary institutions, or regional development scholarships to study in any Pacific based institutions, or Australia and New Zealand based short term training awards. The exact number of scholarships for postgraduate training and Higher Degree by Research (HDR) in health-related programmes is unclear because this information is not publicly available.

The investment in HDR level training by foreign governments can be traced back to Chevening scholarships provided by the British Government in 1985. The record shows that none of those awarded Chevening scholarships for HDR level training did health related programmes. While the United State of America has also provided scholarships to Solomon Islands for HDR level training since 1993, none of the participants did health related projects.

The Japanese government provided 34 scholarships for HDR level training to Solomon Islanders between 1993 and 2016. Within this period 25 scholarships were for general research study programmes and one at PhD level. There was no detail available of specific areas of study for these scholarships.

The Taiwanese, New Zealand and Australian diplomatic offices would not provide details on the HDR scholarships they award because of privacy policies, but Ministry of Education and Human Resource Development includes the total numbers in their reporting, so this is available as indicated above. It is unclear from the report whether these scholarships are specifically for HDR training.

Religion

Christianity is the dominant religion in Solomon Islands and religious leaders are highly influential. A small proportion (7%) of Solomon Islanders are not Christian, maintaining pre-colonial ancestral religious practices (Hodge et al., 2015). The last 160 years of colonisation and Christianisation has fundamentally transformed religious practice from a multitude of local traditional ancestral belief systems, particular to specific cultural groups, to the contemporary situation where Christian churches dominate people's daily lives and influence business, education and political networks, with 93% of the national population identifying as Christians. The breakdown of Christians by Christian denomination is: Anglican 37%, South Sea Evangelical 21%, Roman Catholic 16%, Methodist (United Church) 10%, and Seventh-day Adventist 9% (Hodge et al., 2015).

Solomon Islands health care system

The Ministry of Health and Medical Services (MHMS) is responsible for, funds, regulates and manages the country's health system. Non-government organisations and faith-based organisations also provide health services. The majority of the population live in rural locations, but the majority of health care infrastructure, health services and health workforce are located in urban or peri-urban locations, leaving the more rural population less comprehensively served by the national health system than urban populations (Solomon Islands Statistics office, 2011, 2020).

Health care delivery is structured hierarchically from small rural nurse aid posts, rural clinics, area health centres and provincial hospitals to the National Referral Hospital. Provincial health offices manage rural health services and support the delivery of public health programmes and outreach tours. Solomon Islands receives overseas development assistance, where donor agencies provide financial and technical support (Hodge et al., 2015). Section 10 (2) of the government Health Services Act empowers MHMS, the peak body for the Solomon Islands healthcare system, to instruct provincial assemblies and the Honiara City Council to deliver public health services (Hodge et al., 2015; JTA International, 2014). Section 13 of the Act, allows MHMS to make arrangements with church or voluntary bodies to provide health services (Hodge et al., 2015; JTA International, 2014).

The MHMS has four divisions, each headed by an undersecretary (Hodge et al., 2015, p.16). The divisions are: i) health improvement, ii) health care, iii) health policy and planning, and, iv) administration and finance. The health improvement division manages national public

health programmes and works closely with provincial health services. The health care division manages all clinical health services and professional registrations, including pharmaceutical and diagnostic services, the functions of the National referral hospital, Provincial Health Offices and the National Medical Store. The health policy and planning division manages national and provincial health planning, monitoring and evaluation, the Health Information System, development or redevelopment of infrastructure, and procurements. The administration and finance division manages human resource management, planning and development, and is accountable for financial management and auditing.

The MHMS has recently re-designed the types of services available and defined these at six operational levels. The six different levels of care provided are (Ministry of Health and Medical Services, 2020):

Level 1: Community Centre (previously called Nurse Aide posts)

Level 2: Rural health clinic (RHC)

Level 3: Area health centre (AHC)

Level 4: Urban health centre

Level 5: General hospital

Level 6: National Referral Hospital (NRH)

The recently launched Role Delineation Policy (Ministry of Health and Medical Services, 2020. p.10) describes the role of these various levels as follows:

Community centres are not staffed on a full-time basis but provide health services (family planning, community case management of childhood illness and communicable diseases, self-care and healthy lifestyle counselling for non-communicable diseases, health promotion, education and prevention activities, and participation in community monitoring for Healthy Islands initiatives and outbreaks or emerging diseases), on an outreach basis from Area Health Centres and Rural Health Centres.

Rural health clinics provide services to multiple community centres within a catchment area. Rural health clinics are usually staffed by two registered nurses and/or nurse aides and provide quality basic clinical services to the surrounding communities through a mix of facility based services and outreach. Multiple rural health centres feed into area health centres.

Area health centres in addition to providing all of the services that are provided at rural health centres, area health centres are the facilities where first-level referrals are sent. Area Health Centres have both a supervision and coordination role for RHCs within the health Zone area. Both inpatient and outpatient care is offered, as well as birthing facilities, administration services and staff housing. There are at least three Registered Nurses or Nurse Aides, these are Area health centre-1 and Area health centre- 2, with Area health centre providing a greater level of care, having a full time medical officer, and usually servicing a larger population.

Urban Health Centres provide health services in the urban areas of Honiara primarily, and in provincial capitals as required. They provide community/population based interventions, but do not have any supervision role for other facilities. Urban Health Centre -1 are also responsible for the provision of ambulatory and outpatient care for patients discharged from the General Hospital or National Referral Hospital. Urban Health Center -2 provide normal delivery services and short-term inpatient services.

General Hospitals provide general, acute, curative, and chronic care, inpatient and outpatient services to the population of a province where there is a population greater than 20,000 or the facility is the only general hospital facility for a Province. Their role is to provide all types of medical services and larger general hospitals also provide general surgical and operating theatre services as well as some specialist surgery, along with both regional and general anaesthetic services. They also provide additional accident and emergency services including post-operative rehabilitation for trauma related injuries; more advanced diagnostic imaging such as x-ray and ultrasound. Additional allied health services are also provided, including clinical outreach services.

The National Referral Hospital (NRH) provides tertiary and general hospital services to the population of Honiara and to patients referred from the General Hospitals and other health facilities. Specialist services are also provided on an outreach basis to provincial general hospitals or to larger Area Health Centres. The NRH is also responsible for the coordination and management of overseas medical transfers/referrals and visiting overseas specialist services

Non-governmental providers

In rural locations, faith-based and private services follow the same hierarchy. In Honiara, there are some specialised primary care services, including family planning and disability services that do not fit this model. All services are expected to follow MHMS

standards (e.g. the Essential Medicines List), and report to the Health Information System, even though in practice not all do this.

Several Christian denominations provide health care in Solomon Islands. Seventh-day Adventist (SDA) operated Atoifi Adventist Hospital (AAH) in Malaita, a Roman Catholic Good Samaritan Hospital in Guadalcanal, and United Church Hospitals in the Western and Choiseul Province. In addition, the SDA runs a College of Nursing based at Atoifi Adventist Hospital and operates 18 rural health clinics across the country.

Atoifi Adventist Hospital was established in the East Kwaio coastal region in the late 1960s. In 2018 there were 43 (24 male, 19 female) health professionals working at AAH. There are 35 registered nurses, with one registered nurse aide who works as a primary health care nurse and hospital data registry officer. In terms of qualifications, three health professionals who work at the hospital have certificates, 27 with Diploma, 11 with Bachelor degrees and two with postgraduate qualifications. There were no changes to the qualification distribution within the hospital between 2008 and 2018.

Most coastal villagers in the region are Christians. People living in the mountains, by contrast, remain loyal to their cultural traditions and maintain ancestral worship. There is an ongoing sociocultural tension between practitioners of Christian and traditional beliefs. This requires people who convert to Christianity to leave their traditional land and move to coastal Christian villages. This process maintains a distinction between coastal and mountain people and has caused social and cultural tensions for more than a century. This tension is inherent in the access to health services to the two groups. The mountain group cannot readily access health services provided by the SDA staff at AAH without significant social and cultural offense. The layout of the AAH buildings were designed by European Christian missionaries and breaches fundamental Kwaio traditional beliefs about respect for women and that men cannot be in a building where women give birth. The historical and contemporary AAH leadership are not motivated to make changes to accommodate local belief systems that they believe to be contrary to the rules established by the SDA Christian mission. This makes it socially, spiritually and culturally unsafe for mountain people to be admitted to the hospital or enter hospital buildings. If people from traditional backgrounds enter the hospital building to access basic health care provision, they need to make costly sacrifices to ancestral spirits before they can be accepted back into their villages. The process to return to a village after accessing basic health care at the hospital can be very lengthy and if unsuccessful, can lead to exclusion from

a traditional village with the possible outcome that the individual may feel compelled to convert to Christianity, move to a Christian village and live as a Christian for the rest of their lives.

The Good Samaritan Hospital is a 30-bed hospital, situated on the Eastern side of Guadalcanal province. This facility is staffed by 12 registered nurses. No doctor is resident onsite and it relies on visiting overseas doctors. Helena Goldie Hospital was established in 1903 by the Methodist missionaries and is situated in the western province. This facility is staffed by one medical doctor and 60 staff including midwives, nurses, nurse aids, paramedics, and supporting staff. These facilities are both classified as Area Health Centres 2 according to Solomon Islands Ministry of Health role delineation policy.

Workforce qualifications have been collated for health professionals who work at Atoifi Adventist Hospital, Buala provincial hospital (Isabel Province), Kilu'ufi hospital (Malaita Province), Rennel and Bellona hospital (Renbel province) and Honiara City Council (which is classified as a Solomon Islands province). Table 2 provides a general picture of research capacity of the selected provincial health workers in terms of qualification. The table reveals that most hospital staff have Diplomas or Bachelors degrees, a very small number have Masters Degrees (no detail if by coursework or research) and no one at the provincial level has a PhD qualification. This indicates the pre-existing capacity of the health workforce to conduct health research and use research evidence to inform decision making at the provincial level. Formal approval for access was granted by the Ministry of Health and Medical Services (MHMS) to other provincial hospital data and workforce qualification records held by the MHMS and National Referral Hospital (NRH) but there was no response to requests for specific information. Access was provided to the Honiara City Council (HCC) data which provides some information on health services in urban centres, consequently it is not possible to assess if the workforce qualification profile of HCC is comparable to that of the NRH and MHMS.

Provinces	Certificate	Diploma	Bachelor degree	Postgrad Cert/Dip	Masters	PhD
Atoifi Hospital	3	27	9	1	1	0
Buala Hospital	21	40	6	2	0	0
Honiara City Council	5	21	39	0	1	0
Kilu'ufi Hospital	14	95	37	1	3	0
Rennel Bellona Hospital	3	14	5	0	1	0
Totals	46	197	96	4	6	0

(Developed by author)

Table 2: Health worker's qualifications at selected provincial hospitals in 2018

Nursing training schools in Solomon Islands

There are two nursing schools in Solomon Islands. The Solomon Islands College of Higher Education, now Solomon Islands National University and Atoifi College of Nursing. Sixteen health professionals (M8, F8) work at the government school of nursing based at Solomon Islands National University. Twelve of these held Masters' degrees and four held Bachelor degrees in 2018. The yearly nursing student intake at Solomon Islands National University is approximately 200.

Atoifi College of Nursing is operated by the SDA Church on the grounds of AAH in East Kwaio, Malaita province. In 2018, eight health professionals (M4, F4), four holding Masters' degrees, two with postgraduate certificates, two with Bachelor degrees, worked at Atoifi College of Nursing with a yearly intake of 40 students. There were no changes to the staff qualifications between 2008 and 2018. Table 3 shows the breakdown of staff qualifications for both institutions.

School of Nursing	Certificate	Diploma	Bachelor degree	Postgrad Cert/Dip	Masters	PhD
Solomon Islands National University School of Health Sciences	0	0	4	0	12	0
Atoifi College of Nursing	0	1	3	2	4	0
Totals		1	7	2	16	

(Developed by author)

Table 3: School and College of Nursing staff qualifications 2018

The workforce qualification records for these two schools of nursing indicate most of the staff have Bachelor and Masters Degrees. There was no clarification whether the Masters degree is by course work or research, which makes it harder to estimate the capacity to conduct research or use research evidence effectively.

Health research in Solomon Islands

Nationally organised health research in Solomon Islands started within Solomon Islands Malaria Training and Research Institute in 1988. Solomon Islands Malaria Training and Research Institute was funded and built on land owned by Solomon Islands College of Higher Education by the Japanese government, coordinated by local researcher Dr Nathan Kere primarily to conduct malaria research (Bobogare, 6th Sept 2021 - personal conversation). In the early 1990s, Solomon Islands Malaria Training and Research Institute was retitled as the Solomon Islands Medical Research Centre, to act as the central research body managed by MHMS, to reflect an increasing interest in non-malarial research alongside the original research aims of the organisation. In 2010 Solomon Islands Medical Research Centre changed to being called the National Health Training and Research Division to reflect the training component of the Division, and the MHMS established an ethics committee to protect the safety and interests of Solomon Islanders participating in health research. In 2014 the land assets of Solomon Islands Medical Research Centre were incorporated into the newly formed Solomon Island National University, which replaced Solomon Islands College of Higher Education. SINU wished to use the land to expand their university precinct. The government was no longer able to use the land and consequently National Health Training and Research Division does not

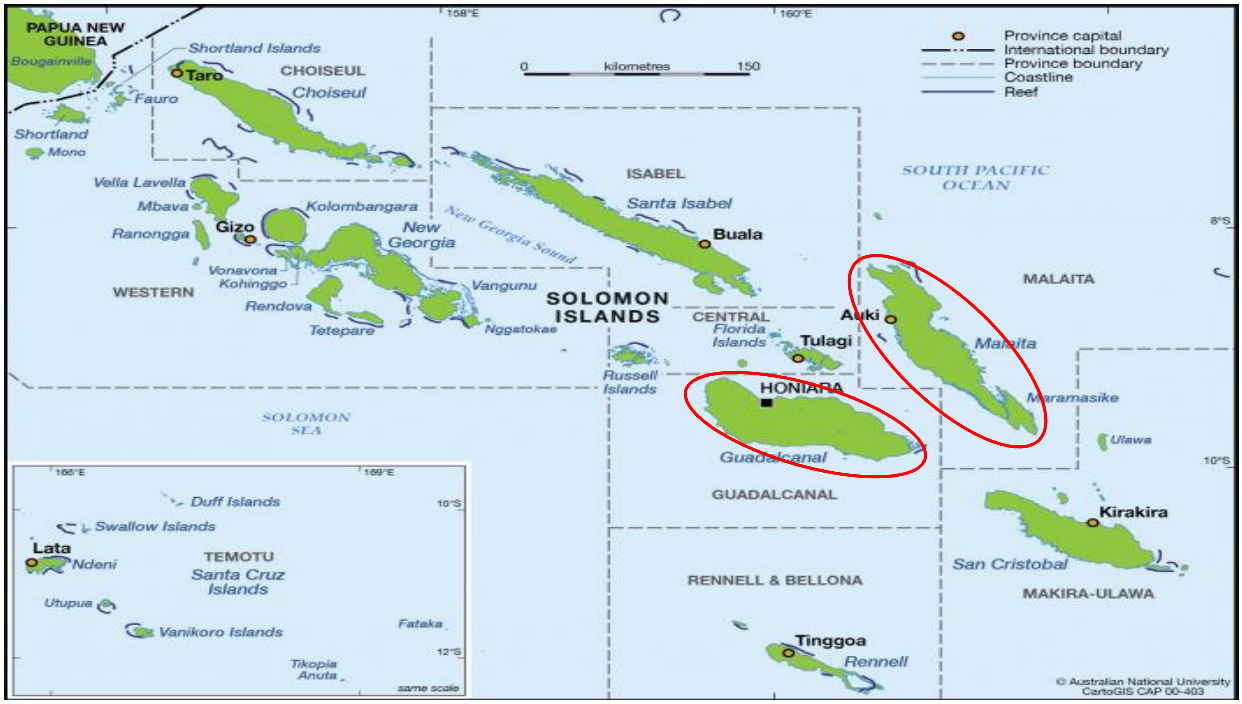
currently have a research facility. In 2016 MHMS established a dedicated research department enabling a greater degree of local oversight over health research, and the research officer for this department is also the secretary of Solomon Islands Human Ethics Review Board. Prior to this, health research programmes that came to the country were organised from overseas, with limited governmental engagement in ethical and health priority aspects of the studies.

Health research under local leadership, including capacity building, in the Pacific Islands is now emerging as an important contributor to health outcomes for the nation, and is starting to shape the health research agenda. This has not always been the case. A review of health literature conducted in 2009 showed that between 1999 and 2009 only 23% (16/70) of health research written about Solomon Islands was led by a researcher from Solomon Islands (Redman-MacLaren et al., 2010). The majority of historic health research focused on Solomon Islands has been conducted without the people of Solomon Islands being actively involved in the scoping, design or execution of these studies (Redman-MacLaren et al., 2010).

Maps are included in this chapter to show Solomon Islands in relation to Australia and the study sites (Figure 4 & 5.).

(https://www.google.com/search?q=maps+solomon+islands&rlz=1C1GCEA_enAU996AU996&source=lnms&tbm=isch&sa=X&ved=2ahUKEwitzK3mibT5AhW34TgGHXXnBWMQ_AUoA3oECAEQBQ&biw=1920&bih=947&dpr=1#imgrc=6S7Ind-EF6ronM)

Figure 4: Map showing Solomon Islands in relation to Australia



(https://www.google.com/search?client=firefox-b-e&q=solomon+islands+map+provinces#imgrc=U2BqFKditXUqYM)

Figure 5: Map showing study sites

Summary of this chapter

In this chapter I have provided background information on Solomon Islands economics, politics, governance, medical and healthcare systems, education, population, language and culture including religious factors. I have noted some specific areas where unique or special characteristics have an impact on health research.

In the following chapter I will describe the background and rationale for the methodology employed, outline the basis for the triangulation document review, and provide an overview of the case study approach.

Chapter 3: Methodology and Methods

Chapter outline

A description of the process of how formative decisions are made throughout the research design and implementation is missing from many research studies. Morse introduced the concept of "armchair walk through" by a researcher being critically aware or conscious of each step of their research project (Morse, 1999, p. 435). Following this approach, I provide a reflective narrative on my decision-making process as an emerging researcher. In this chapter I describe and discuss:

- The nature of knowledge, how this is relevant to a methodological approach to healthcare capacity building in Solomon Islands and how this has influenced my decision-making process for developing the methodology
- The methodology used for this study is multiple-case design
- The methods used are interviewing and document reviewing
- How the project was established and cases were selected, and how I engaged with the institutions' leaders and participants including ethical behaviour
- The process of participant recruitment, data collection and analysis during the project including reflections on use of language and cultural factors.
- A review of the available documents for triangulation of results.
- Within case and cross-case analytical approaches

Knowledge, evidence, research, and decision making in the context of Solomon Islands health systems research capacity building

The concept of knowledge has evolved over time, once believed to be discovered through divine revelation from God, sometimes as traditions maintained by the assumed authority of elders within society and more recently through research methods. Although the foundations of modern science are arguably in the rational thought and logic of pre-classical societies and their philosophers, the modern concept of gaining knowledge through evidence based research was introduced in the early seventeenth century (Grinnell, Unrau, & Williams, 2014). 'Knowledge' has been defined as an accepted body of facts or ideas that is acquired through the use of the senses or reason or through research methods (Grinnell et al., 2014).

Knowledge requires evidence to demonstrate validity. Evidence in the healthcare context has been described as information used to support and guide practices, programmes

and policies in health and social care in order to enhance the health and wellbeing of individuals, families and communities (Grinnell et al., 2014). Scientific knowledge cannot be demonstrated without evidence. When we use evidence to guide or support our practice as health professionals, the practice is called 'evidence-based practice,' described as the process that includes finding valid and relevant empirical information that can be used to evaluate the effectiveness and efficacy of various treatment options and then determine the most relevant option for clients or situations (Grinnell et al., 2014). In order for individuals to understand and effectively use evidence-based practice they must have basic knowledge of research methodology (Grinnell & Unrau, 2008).

According to Grinnell et al., research as a means of generating new knowledge comprises two complementary approaches, qualitative and quantitative (Grinnell et al., 2014). Qualitative research relies on phenomenological and descriptive data. Qualitative data is presented in the form of words, diagrams or drawings, multimedia and emotional responses, for example, but is not readily quantified (Patton, 2016). The quantitative approach on the other hand, relies on collecting and analysing numerical data, and generally employs statistical analysis (Patton, 2016). Research has the function of finding evidence that can be used to create new knowledge.

Reflections – a Solomon Islands perspective

From my personal perspective, my PhD has functioned as an apprenticeship where an individual learns the art of research. Previously I thought a PhD provided a similar learning experience to my undergraduate training, but the more complex requirements to consider additional levels of understanding have been a positive challenge. Research provides mechanisms that help an individual to discover the answer to their questions and add to their knowledge. This is how research is connected to philosophy (Birks, 2014). Philosophy is a world view that is a direct result of an individual's attempt to arrive at real knowledge (Birks, 2014; Cater, 2007). Individuals come to research with their existing world view, which forms their assumptions and beliefs about the nature of reality. This informs who they are, what they know and their relationship with the world around them. This forms an integral part of the research paradigm, which acts as a compass to guide and inform the design and conduct of research projects (Creswell, 2014). In Solomon Islands, this 'knowledge compass' includes both elements of western scientific research paradigms and traditional knowledge that is more closely aligned with the authority of elders and religious practices and beliefs. We also have

the complex overlap of contemporary western Christian beliefs with the scientific paradigm. This makes HSRCB in the context of Solomon Islands particularly complex, because stakeholders and participants do not always share the same world view or classification of knowledge systems.

The differing world views found among Solomon Islanders have an impact on how individuals engage with and interpret the four important concepts that Creswell attaches to research paradigms: axiology, ontology, epistemology, and methodology (Creswell, 2013). Axiology because it deals with the nature of ethics - individual values that guide individuals in attempting to understand and find answers to their questions (Creswell, 2013). Ontology because it concerns how a researcher perceives reality and the nature of human engagement in the world around them (Crotty, 1998; Scotland, 2012). Epistemology because it explores how knowledge of reality is created, understood and utilised (Wahyuni, 2012). Different research paradigms hold various ontological and epistemological views with varying assumptions of reality and knowledge that informs specific research approaches as reflected in their methodology and methods (Scotland, 2012). Any methodology is subject to how these paradigms are constructed, as it is the mechanics of the process by which we collect and analyse information that can help individuals arrive at the answers to their question(s) (Crotty, 1998; Wahyuni, 2012). In the Solomon Islands context, cultural and traditional knowledge and behaviours are often valued more than scientific investigations for creating a functional and holistic national world view. Introduced Christian beliefs and traditions also influence people's world views, making things even more complex. This makes it especially important that a researcher clearly understands that different individuals have their own philosophical positions that can offer differing views and approaches to the same phenomenon (Grix, 2010).

As a researcher, I need to identify my personal philosophical tradition and be able to perceive the tradition adopted by others to be able to assess and interpret the human centred phenomena of participant interpretations of health research and capacity building activities. This led me to consider that two research paradigms are particularly relevant to my study: critical theory, because it argues reality is shaped by relationships of power that are socially and historically situated; and constructivism, which argues multiple realties exist, and are constructed through lived experience and social interaction (Birks, 2014; Kincheloe, McLaren, & Steinberg, 2011; Lincoln, Lynham, & Guba, 2011). In the multi-cultural, tradition-rich, economically and socially diverse environment of a relatively small, but widely distributed, post-colonial country

with a history of Christian missionary influence like Solomon Islands, these paradigms are self-evident in day-to-day activities and behaviours.

Theoretical basis and methodology for this study

As a study of people's lived experiences of HSRCB in Solomon Islands, this research is fundamentally qualitative, focused on the 'what,' 'why,' and 'how' of human behaviour, thought and meaning making (Ambert, Adler, Adler, & Detzner, 1995; Kuper, Reeves, & Levinson, 2008). The strength of qualitative research is its focus on understanding the process that leads to outcomes rather than just the outcomes alone (Maxwell, 2013). It enables researchers to obtain rich descriptions of phenomena from the perspective of the people who experienced them (Mills & Birks, 2014). Qualitative research provides opportunities for researchers to gain insights into the contextual and structural element of participants' lives through the thoughts, feelings, intentions and actions that comprise their reality (Charmaz, 2014; Holliday, 2016). In the complex cultural environment of Solomon Islands, it is often difficult to disentangle traditional and modern cultural influences, beliefs and forms of knowledge without employing the depth of investigation and analysis that qualitative approaches allow. The qualitative approach is especially appropriate for obtaining knowledge about new or unfamiliar issues because it facilitates free exploration of areas where there is little existing knowledge (Creswell, 2014). Qualitative research also has a flexibility that allows researchers to modify design and respond to events as they occur in the research setting (Maxwell, 2013; Ritchie & Lewis, 2003). This flexibility is important to me especially when exploring sensitive issues in a healthcare context (Liamputtong, 2013; Ritchie & Lewis, 2003). Qualitative research has many possible reporting formats, as these represent the voices of participants, based on experience, we discover a complex description and interpretation of a problem or study that adds to the literature, and may provide a call for action (Creswell, 2013).

Different approaches to qualitative inquiry

Creswell (2013) lists five approaches to qualitative inquiry, which may be more or less appropriate for any specific study.

- Narrative research
- Case-study research
- Ethnography research
- Phenomenology
- Grounded theory

Different qualitative inquiries share many general processes of data gathering, analysis, and reporting. There are also common features in terms of utilisation of data collection methods such as observation, interviewing, text and audio visual and images (Creswell, 2013). The differences are in the contrasting characteristics each approach offers to address the focus of the research study. The difference can also be found in the ways of thinking about the data and the manipulation of methods to achieve the research goals (Creswell, 2013; Richards & Morse, 2013).

Why I chose a multiple-case study methodology

For the purpose of this study, I sought to collect personal observations and insights into HSRCB in Solomon Islands from stakeholders who had participated in HSRCB activities, a case study approach utilising interview data appeared to be the most appropriate, with the use of document and literature reviews for supporting evidence and information. Deciding to use a case study approach was strongly influenced by my personal experience across the different HSRCB models that I have been involved in, and my strong network of trusted connections, which made it relatively straightforward for me to recruit interview participants in sufficient numbers to enable an in-depth case study analysis and also enable me to purposely select cases for inclusion in the qualitative study.

Creswell describes multiple-case study as a method that explores real-life, multiple bounded systems (cases) and uses detailed in-depth data collection from multiple sources of information. This enables researchers to broadly explore and address the study aim and question (Creswell, 1998). Multiple-case study research also enables the researcher to investigate differences and similarities between and across cases (Eisenhardt & Graebner, 2007). It is used to describe the complex issues arising in different systems and contexts based on the differing perspective of study participants. It facilitates holistic and in-depth explanation across multiple case, and allows me as a researcher to go beyond quantitative statistical results. The multiple-case study approach seemed most appropriate for understanding the four models of HSRCB from the perspective of the study participants who were involved and participated in them.

Case-study offers a narrative methodology for qualitative research, but focuses on shared issues and not individuals in the method of analysis (Creswell, Hanson, Plano Clark, & Morales, 2007). Yin (2014) describes case study as an investigation of a contemporary phenomenon within its real world context, especially when the boundaries between

phenomenon and context are not clearly evident, and finds it suitable for answering questions of how and why contemporary phenomena occur (Yin, 2014). Case-study provides in-depth perspective of the phenomenon from the perspective of the participants (Harrison, Birks, Franklin, & Mills, 2017; Hentz, 2016) and researchers using case-studies situate each case or multiple cases within specific boundaries, such as conditions of time and place, activity, definition and context to define the scope of the research (Baxter & Jack, 2008; Creswell, 2013). Cases to be analysed can range from individual, to organisation, simple to complex process, interventions, programmes or relationship, enabling researchers to construct and then reconstruct the phenomenon explored (Baxter & Jack, 2008). Unlike other methodologies, case study research does not align to a particular philosophical position, providing researchers the flexibility to customise the research design to meet specific research requirements (Casey, 2010). Case-studies may be explanatory, exploratory and descriptive, with the final interpretation often including the researcher and the case (Creswell, 2013; Yin, 2014).

I chose the case-study approach to address the aims of my study, which investigates and explores the different HSRCB models and their impact on individuals, institutions and the health system from the perspectives of the study participants. This approach enables me to: i) understand the story, ii) keep close link to the naturalistic events, iii) explore new ideas and iv) discover new ways to understand future undertakings (Robert, 2006; Yin, 2008).

This project was designed to guide me as a researcher to make appropriate decisions when implementing this study in exploring HSRCB activities in Solomon Islands. The result of this study is envisaged to help the researcher and people who will read this thesis to understand the process and the impact of HSRCB and activities in Solomon Islands between 2008 and 2018.

Reflecting on social constructivism

Social constructionist assumptions and pragmatism helps inform and anchor my research project in Solomon Islands (Aveling, 2013; Liamputtong, 2013). Constructivism is a research paradigm that recognises that reality is constructed by those who experience it - and research in this case is a process of reconstructing the reality (Birks, 2014). Constructivism often combines with interpretivism and it is an approach that is commonly used in qualitative research. Constructivism is an idea that comes from the work of Lincoln and Guba's (1985) Naturalistic inquiry and more recent work by Crotty, Mertens, Lincoln and others (Crotty, 1998; Lincoln et al., 2011; Lincoln & Guba, 1985; Mertens, 2010). In my endeavour in using

qualitative multiple-case study design I understand that individuals including researchers like myself seek to understand the world that we live and work in. This means that individuals build subjective meanings of their experiences and these meanings are multiple, leading the researcher to look for complexity of views rather than narrowing meanings into fewer categories or ideas. The questions I asked were general enough for participants to describe how they construct the meaning of the situation or phenomena, because the more open ended the questions within a semi-structured interview the more options the interviewee has to express their subjective view in the way in which it has meaning for them. These subjective meanings are negotiable socially and culturally, the meanings are formed through interaction with others and through historical and cultural norms, which is why this approach is called social constructivism. Social constructivist researchers also focus on the specific context in which people live and work in order to understand the historical and cultural settings of the participants. Social constructivist researchers recognise that their own backgrounds shape their interpretation and they have to clarify their position within the research to acknowledge this. Interpretation of the qualitative data flows from the researcher's personal cultural and historical experience. Researchers applying this approach inductively generate or develop theories or patterns of meaning from the data. I began my analysis inductively by reading through the interview transcriptions to allow the data to speak to me through the voices of the interviewees. The seven thematic categories emerged naturally and readily during the coding process that followed. I then applied deductive reasoning by analysing the transcriptions to make a more detailed assessment of what the participants say about the individual themes both within and across the case studies assisted by my insider-outsider awareness of context.

Theory of change

Developing a theory statement is one of the key characteristics of case study design (Yin, 2008). "Theory of Change" is used to identify the results of interventions arising from research capacity building activities (Knowlton & Phillips, 2013). The theory of change assumption of this study is that change from a weak to a strong research culture can occur through health systems research capacity building, and the best way to identify strengths, weaknesses, opportunities and threats is by interviewing expert participants in past programmes. These interviews are analysed to determine possible actions that could improve the effectiveness of local HSRCB. The discussion of the interview results is used to identify theoretical and practical changes that might be beneficial to future HSRCB programmes.

This study is comprised of four case-studies, which are the four main models or approaches to HSRCB experienced in Solomon Islands. The experience of past participants in HSRCB in Solomon Islands provides insights from a first-person perspective into what worked, and what did not work. This study assumes that the outcome of the four HSRCB models in Solomon Islands from 2008 to 2018 has been a strengthening of research culture and environment in Solomon Islands, resulting in improved and stronger research ability and capacity at the individual, institutional and health system levels (Knowlton & Phillips, 2013).

A theory of change for HSRCB arises by identifying the capacity that has been built within each model over the 2008-2018 time period and how this capacity, in combination, can be utilised to create a stronger research culture in Solomon Islands. The diagram below illustrates how theory of change is incorporated into the conceptual framework of this study (Fig 6.).

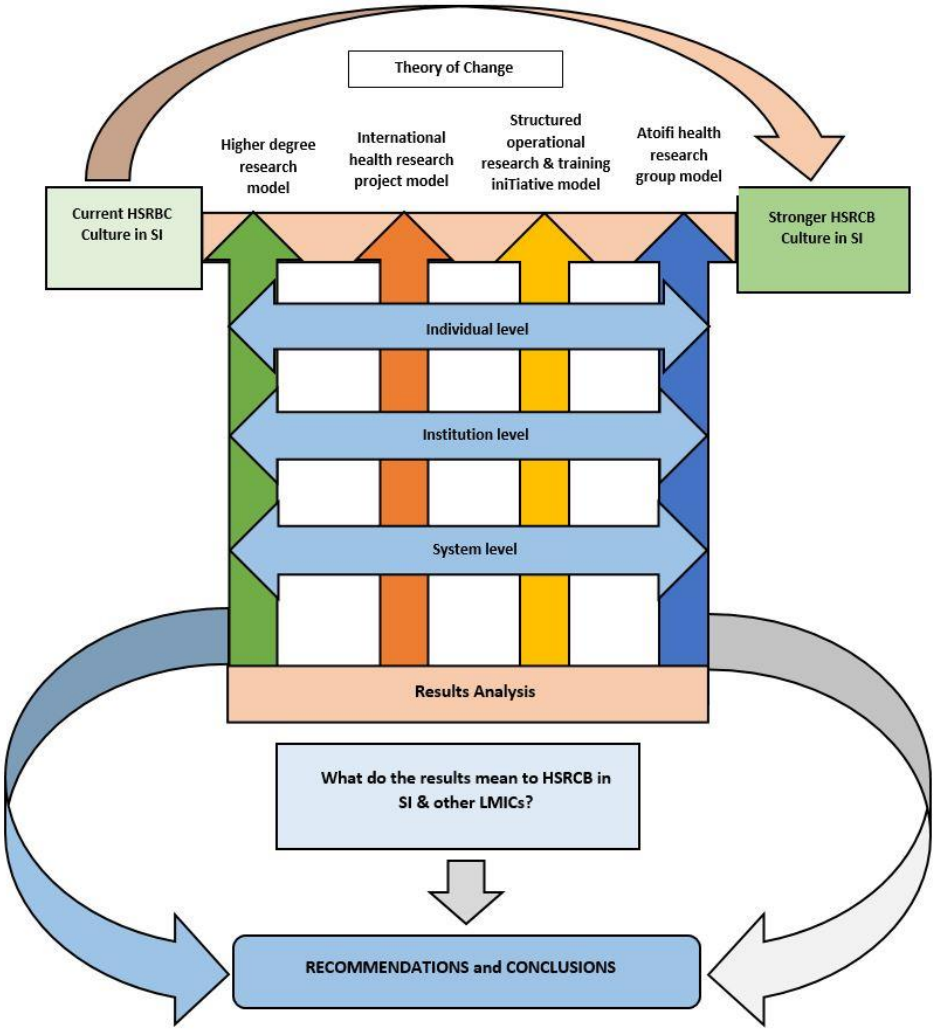


Figure 6: Health systems research capacity building framework for this study (Developed by author)

To enable the transition from the current state of HSRCB in Solomon Islands to a stronger HSRCB culture, this framework (Fig.6) indicates how it is not only individual capacity that needs to be increased, but health systems and institutions need to provide a supportive and enabling environment. At an individual level health workers need to understand health research and possess the skills to carry out quality research at the work place. For this to be effective they need to be supported by institutional and systemic structures and processes. To carry out quality research at the work place, individual capacity needs to include skills to interpret health data and the results of research, and to be able to communicate this evidence. For health research to be strong and successful in Solomon Islands, health insitutions and systems need to be prepared to apply this evidence appropriately to make decisions that improve health outcomes.

Establishing the project from an insider perspective

The Atoifi College of Nursing has approximately 70 students and 10 staff, and is located in rural East Kwaio in Malaita province. I was appointed head of the college in 2006 and became a member of several local and international SDA management boards. These are the Atoifi Hospital Administrative Committee, Atoifi Hospital Board, and the South Pacific Division Education Board of the SDA. I am a member of Solomon Islands Nursing Council Board and a national Nurse Leaders' Forum at the Ministry of Health and Medical Services. My pre-existing participation in this wide network, which connects church and ministry of health leaders helped me to earn the respect of and develop relationships with health leaders and fora to discuss my research projects with health institution leaders and staff, and has been invaluable in enabling me to undertake this study.

In December 2017, I conducted a series of meetings with my extended network of Solomon Islands health stakeholders, to examine and recommend improvements to HSRCB in the country. This included Atoifi Adventist Hospital and community leaders in East Kwaio, leaders at the Ministry of Health and Medical Services, Ministry of Education and Human Resource Development, Ministry of Public Service, Ministry of Finance, parliament members, Diplomatic office scholarship leaders and administrators, and the country High Commission offices for Australia, New Zealand, Britain, Japan and Taiwan. I introduced my project and the requirements to access and collect the information needed for this study. In June 2018, I revisited the stakeholders individually in a follow-up to confirm and finalise the timing and

methodology for data collection from the institutions. This visit also provided an opportunity to offer to clarify issues that they might have regarding my study, with no issues raised by the stakeholders at this time. Of the High Commissions/Embassies approached, only one was willing to participate in interviews, or provide access to relevant documents that I requested. I also approached the National Referral Hospital, provincial hospitals, and the SDA administrative headquarters in Honiara but none of these institutions responded to my requests for interviews or documents.

Many people wanted to participate, and recruitment was not difficult. It was necessary to control numbers and ensure I interviewed individuals that I expected to be able to provide qualitative data relevant to my research question. Some participants were experienced in more than one HSRCB model.

I have personal experience in HSRCB work across all the models used in Solomon Islands, culminating in my current HDR project. I was conscious of the words of Aveling who noted "if we are not familiar with the cultural protocols or ignore them we fall straight back into the intellectual arrogant trap of thinking that we know what we are doing" (Aveling, 2013, p.206). As a Solomon Islander who knows the context and the people, working with participants had fewer barriers than might be present for a non-Solomon Islander carrying out this type of research. I safeguarded cultural respect through engaging a young community leader in East Kwaio to negotiate and discuss the study with potential community participants. I contacted institutional leaders out of respect for traditional Solomon Islands notions of hierarchy and politeness to notify my intention to ask staff to participate and then contacted participants to organise where, how and when to conduct interviews. Leaders were also contacted at this stage to request documents needed for this study.

As someone who works at Atoifi College of Nursing in East Kwaio, I am an insider and as such familiar in how to conduct myself in a safe and respectful manner with Solomon Islanders from different cultural and religious backgrounds. Because, as an insider, I know the context well, and I aim to conduct field studies in a culturally safe and respectful manner. As an insider, I am well known and have a strong working relationship with many institutional leaders. I ensure humility, respect and the desire for positive relationships guides my action and the way I conduct myself throughout my field work. Cultural sensitivity is embedded in my field work and I used the following cultural protocols to enable the success of the project: respecting the hierarchy of organisational and community structures by asking permission from

leaders and chiefs to interview people who they consider to be under their authority. Carrying out interviews in places people feel culturally safe, including for example, not closing the interview room door when interviewing female participants, engaging with traditional leaders in buildings and places that did not culturally insult them, and being very flexible in timing and waiting for people to be ready for interviews.

Experience in the IHRP, SORT-iT and AHRG models of HSRCB enabled me to relate to participants who have also experienced these models. I taught workshop sessions and was a mentor to assist SORT-iT participants to design, analyse, report findings, and writing their policy briefs, I provided advice to international health research projects and helped establish the Atoifi Health Research Group, so was an insider across all of these models. My historical involvement in HSRCB activities helped me gain people's trust and respect and build strong collaborative and cooperative relationships, a principle and protocol that guides my study.

Case selection and definition

Discussions with health professionals and health leaders in Solomon Islands identified the four main models of HSRCB employed in Solomon Islands between 2008 and 2018 chosen for this study. These are Higher Degree by Research, International Health Research Projects, World Health Organization Structured Operational Research and Training IniTiative and Atoifi Health Research Group.

The Higher Degree by Research (HDR) model requires Solomon Islanders to enrol at a university outside Solomon Islands to undertake a formal research degree, either the Masters of Philosophy (MPhil) or Doctor of Philosophy (PhD). Both MPhil and PhD candidates are taught to design and implement a research project that demonstrates an ability to understand and use research skills to create new knowledge. They are also required to undertake a supervised piece of original research. The Solomon Islands Ministry of Education facilitates scholarships to Solomon Islands students for overseas postgraduate studies (Masters by Coursework and HDR). Scholarships are also available from international organisations such as the Australian Department for Foreign Affairs & Trade and the World Health Organisation.

International Health Research Projects are planned and implemented in partnership between Ministry of Health and Medical Services and international research groups/organisations. International researchers and local health leaders identify research areas considered important for the health of Solomon Islanders and/or the region. Individuals are recruited into specific roles within these projects and often build/strengthen research capacity

opportunistically while employed in that role. Research projects are almost always funded by international organisations, with project leaders and chief/primary investigator roles typically performed by international researchers. At the time of writing, the Solomon Islands health system depends on international research funding and technical expertise for support, management and implementation of IHRPs.

The Structured Operational Research and Training IniTiative is a training programme designed by WHO to train health workers in operational research to inform local policy and practice (Ramsay et al., 2014). In Solomon Islands, the SORT-iT programme was modified to train health workers to analyse existing quantitative data and collect new quantitative or qualitative data from their workplace on topics relevant to the local health research setting. SORT-iT consists of three teaching blocks and a small, individual workplace-based research project designed and implemented by the health worker. Each health worker is allocated international and in-country mentors to assist them in completing their project. Health workers are encouraged to publish the findings of their research project (Tripathy et al., 2018).

Atoifi Health Research group is a health systems research capacity building model employed in a rural context in Malaita Province. The AHRG model is an organic, self-governing, collaborative endeavour to build research capacity in the local health service, local communities and national/international partners within the group. Local community leaders, health service providers and national/international researchers' work together to identify research areas considered important for the local community and local health service provider. The group is based at the local Seventh-day Adventist church hospital, Atoifi Adventist Hospital and adjacent Atoifi College of Nursing and involves numerous community groups, health services and international research institutions. AHRG deliberately develops practical research skills through a 'learn by doing' approach that purposefully brings experienced international and local researchers together from the very beginning to identify priority areas, develop research questions, and design and implement group research projects.

This PhD study asked the question:

How were the four models of health system research capacity building planned and implemented between 2008 and 2018, and what was their impact on research capacity in Solomon Islands. The aim is to explore the planning, implementation and the impact of the four models on research capacity in Solomon Islands and to superficially:

- Describe how the four models were planned and implemented

- Identify and explore the impact these models on individual, institution and health systems
- Identify unique features, challenges and limitations of the four models
- Recommend strategies to inform and improve future planning and implementation of the four models in Solomon Islands

This research question and aims guided the selection of the cases that needed to be investigated. This also influenced the selection of data sources and evidence required.

This study employed document review and individual interview methods to collect data. Document reviews are common methods used by health researchers to gather data and fitted well with the research question and methodological approach. Personal interviews and discussion are highly compatible with Solomon Islands cultural values and ideas about sharing information.

The attempt was made to collect and review documents related to how the four models were planned and implemented, and to assess their impact on research capacity. The document review included a literature search to explore the academic output of the models. It was not possible to obtain official documentation apart from the numbers of scholarships awarded to Solomon islanders by the Solomon Islands government and some diplomatic offices.

Ethics approval and implementation

Prior to commencement, ethics approval was given by Solomon Islands Health Research and Ethics Review Board and James Cook University Human Research Ethics Committee (Appendix 2). At each stage, study participants were given an information sheet to read and keep. Ethical requirements regarding the purpose of the study and expected use of participant contributions were explained. The voluntary nature of participation and confidentiality of reporting were also explained. Pseudonyms and participant codes are used throughout when reporting the results, and other details such as very specialised occupational positions are generalised or removed when this might make an interviewee readily identifiable. Interviews were audio recorded with participant consent. Consent forms were used to confirm that participants understood their rights and agreed to participate. University, principal investigator, ethics committee and supervisor contact addresses, emails and telephone numbers were provided to enable participants to discuss any issues arising. Participants were informed that if they experienced any discomfort during the interview continuing an interview was entirely voluntary and they could stop it at any time. Original hard copies of signed consent

forms from the individual interviews are kept securely at JCU. There was no financial payment for participation. In accordance with Melanesian traditional culture, participants were thanked by sharing of food. Tokens of appreciation were also given that included USB drives, pocket notebooks, pens and JCU shirts and lanyards. No participants contacted me, my supervisor, Solomon Islands or James Cook University ethics committees with queries following participation.

An insider / outsider perspective on data collection, management and analysis

In this study, I used interviews to gather primary data, as well as seeking both primary and secondary data from documentation and literature. Applying a social constructivist approach to individual and cross-case analysis with the added layer of the necessity to translate both language and cultural concepts from Solomon Islands Pijin into English is complex. For this reason, I feel it is necessary to explain the interviewing process and associated factors in some depth for reasons of clarity, and also because documentary evidence proved to be difficult to access, as I will also explain below.

Participant recruitment and interviewing

Purposive sampling was used to select study participants with experience in HSRCB activities for interview. All interview participants were known to me from prior work with the four models and community engagement. I approached individuals who I knew could provide different perspectives on the planning, implementation and impact of the HSRCB models that would enable me to answer my research aim and question (Creswell, 2013). Sixty individuals agreed to be interviewed. Of these, fifty-five participants were interviewed and five were not available at the time of interview. Interview duration was between 50 and 110 minutes. As a local 'insider' researcher, colleague and community member, the trust and respect that I have built with participants over the years may have helped them to share their stories with me. It seems from the frankness of some responses regarding often sensitive cultural, financial and political matters that this was the case. I also answered questions and shared details of my experience in HSRCB work to minimise the hierarchical structure of interaction between me as a researcher and participants (Birks & Mills, 2015).

An interview is a deliberate semi-structured conversation between a researcher and a study participant, which results in knowledge construction (Brinkmann & Kvale, 2015). Individual interviews are the most popular data collection method in qualitative research (Charmaz, 2014; Mills & Birks, 2014). Marvasti suggests the aim of the interview is to explore the insider

perspective to capture the participants' feelings and experiences in a partnership with the participants (Marvasti, 2004,).

There are three types of interviews that depend on directed dialogue between the researcher and interviewee:

- Unstructured interviews that begin with open-ended questions
- Semi-structured interviews where the researcher follows a guide to prompt questioning
- Structured interviews where the researcher asks each participant a set of identical questions (Charmaz, 2014; Mills & Birks, 2014).

Semi-structured interviews were used in this study because this is the most appropriate method to ensure the wide range of possible subjects could be included across all case studies while keeping interviews within the scope of the study. Initial questions were intended to put interviewees at ease and to build trust and confidence in the anonymity and non-critical nature of the study and interpretation of their responses (Hiller & Deluzio, 2004). This helped to develop a rapport between the interviewer and interviewees, which often led to in-depth, open and frank discussions of significant topics. In semi-stuctured interviews participants may elaborate on their responses to initial prompts. The interviewer steers the interview but allows for some spontaneity (Yin, 2014). Closing questions are an opportunity to ask for additional comments, to answer participant questions and to thank interviewees for participating (Creswell & Poth, 2018).

My insider / outsider perspective was especially valuable in the semi-structured interview format. Individual interviewing for data collection in Solomon Islands by a local researcher who has an awareness of social constructivist concepts adds valuable dimensions to the integrity of this study, because I was able to readily identify gaps, omissions, possible misdirections or avoidance of sensitive subjects, or areas that might be relevant but had not been mentioned by the interviewee, and to probe for further information. These interviews were my primary source of data, and shared understandings and cultural knowledge assist in the validation of experience (Charmaz, 2014).

Interviews allow participants to discuss complex experiences with the researcher to develop nuanced insights into interviewee's actions and behaviour (Hiller & Diluzio, 2004). Interviews are utilised as a data collection method in qualitative approach because they allow for such open-ended, comprehensive explorations of a participants substantial experience in a given situation (Charmaz, 2014). As an insider / outsider researcher I was able to frame my

questioning in a personally and culturally appropriate manner that did not make it seem strange to the participants that I was asking about things they would expect me to know already. This was achieved by focusing on their experiences and views as insiders themselves in the particular cases being discussed.

Language

Interview participants use language to present an image of self and to describe and explain matters related to their cultures, gender and other elements of identity (Squires, 2008). One decision I had to make was whether to conduct interviews in English or Solomon Islands Pijin. English is the official language of Solomon Islands, and is used for government documentation, official business and formal matters. Most Solomon Islanders do not speak English in social conversations and day to day interactions. Among their immediate family and cultural group, people usually speak their own local languages and dialects, which vary in different regions. Solomon Islands Pijin is the language that Solomon Islanders use to communicate across the multiple cultural and linguistically distinct ethnicities that comprise the population (Shelley, 2013). Very little English is spoken by people living in rural and remote areas, and as this study was carried out at local health institutions where Solomon Islands Pijin is commonly used, I decided to interview participants in Pijin. This potentially avoided having to translate multiple regional languages as well as ensuring participants were speaking a language in which they were fluent, which could not be guaranteed if interviews were conducted in English.

Monitoring linguist choices

Liamputtong highlighted that interviewers should adapt their own vocabulary to meet the needs of the interviewees (Liamputtong, 2013). To accommodate the diverse socio-cultural and linguistic needs of individual participants Liamputtong recommends avoiding the use of fixed wording format (Liamputtong, 2013). I phrased my research questions in a way that did not imply I knew the answers to the questions or that the participant had the answer, but which respected their experience and made it clear that their experiences were the valuable information I sought for my data collection. I found this very effective as it created an environment for participants to talk freely.

Actively listening

To me listening is a very important skill because I did not only listen to what was said by the participants but I also paid attention to what was not said. Non-verbal features such as

hesitation, pauses and volume changes provided signals for me to actively engage with the participants. As an insider / outsider researcher, I could readily identify suitable follow up prompts to clarify points raised (or ignored) by participants, which could be of value to the study (Yin, 2014).

Attention to silence

Times when the participant does not speak are also significant when conducting interviews. I needed to be aware of the ramification of silence, as Charmaz (2002) highlighted that "not all experiences are stories, nor are all experiences stored for ready recall. Silence have meaning too. Silences signify an absence-of words and/or perceivable emotions…[and] may… reflect active signals-of meaning, boundaries, and rules" (Charmaz, 2002, p. 303).

Understanding the context

As discussed earlier, I engaged a respected young East Kwaio community leader, colleague and researcher to safeguard culturally appropriate communication and procedural arrangements for interviews with East Kwaio community stakeholders. This individual helped with arrangements for interviews conducted at the hospital in Atoifi. Participants from other regions decided the day, time and venue for interviews themselves.

In this study the aim is to explore how the models were planned and implemented, and what the impact has been on research capacity in Solomon Islands. As an exploratory approach, it seemed prudent not to anticipate any particular focus when gathering participants experience and perspectives of the features, approaches, management, appropriateness and outcomes of four models of HSRCB. By employing open questions within the semi-structured interviews the participants had freedom to discuss any aspect of the HSRCB programmes, with the interview questions being largely employed to keep the interview within the scope of the study. The more general a question was, the more likely it was that I would receive a wide range of responses. This was considered to be a good way to capture a genuine range of serious concerns and interests expressed by participants without constraining the possible diversity that might arise. It turned out that participants tended to be interested in very similar aspects of the programmes, and the implications of this proved to be very valuable in the cross-case analysis for separating specific and unique model features and issues from more general systemic factors.

I was fortunate to have a supervisory team with extensive experience in qualitative research interviewing in the Pacific region to review my approach and assist me in the design of my twelve open-ended questions used semi-structured interview. My own personal experiences and review of HSRCB literature also helped inform the writing process.

The outline of my interview questions covered six principal areas:

- Participants' understanding of HSRCB
- The explanation of the process or steps in implementing HSRCB in the organisation or institution
- System used for Solomon Islanders to undertake the four models of HSRCB
- General impact and/or outcome of the four models of HSRCB to individual, institution and health system
- What could be done differently or better next time
- Any general comments, advice or recommendations

(Refer to Appendix: 3 for detailed interview format and questions)

I conducted interviews in Solomon Islands between December 2018 and January 2019. Timing was scheduled for the holiday period as this was when people were most available. A cultural factor that is relevant to organising research in Solomon Islands and other Pacific island countries and territories is that notions of time, the need to be punctual and even turn up at all are more vague than in many other countries. I had to be patient, flexible to flow with last-minute changes to interview time, venues and encountering locked buildings, participants running late or cancelling without notice. As a Solomon Islander 'insider,' I was not surprised by these things, and it was possible for me to work around these inconveniences without becoming unnecessarily stressed by them.

Straight after each individual interview I looked for a quiet place to document what was occurring in and around the interview venue. This included participant reaction and movements before, during and immediately after the interview. This was to safeguard against possible culturally or personally sensitive events or encounters that might have influenced the interviewee's responses as well as to capture any other local information that might be relevant.

I reserved at least one day between interviews to revise and reflect on the interview process and to account for unforeseen circumstances that interrupted the interview schedule.

The diagram below illustrates how the interview data collection process was organised and executed (Figure 7.).

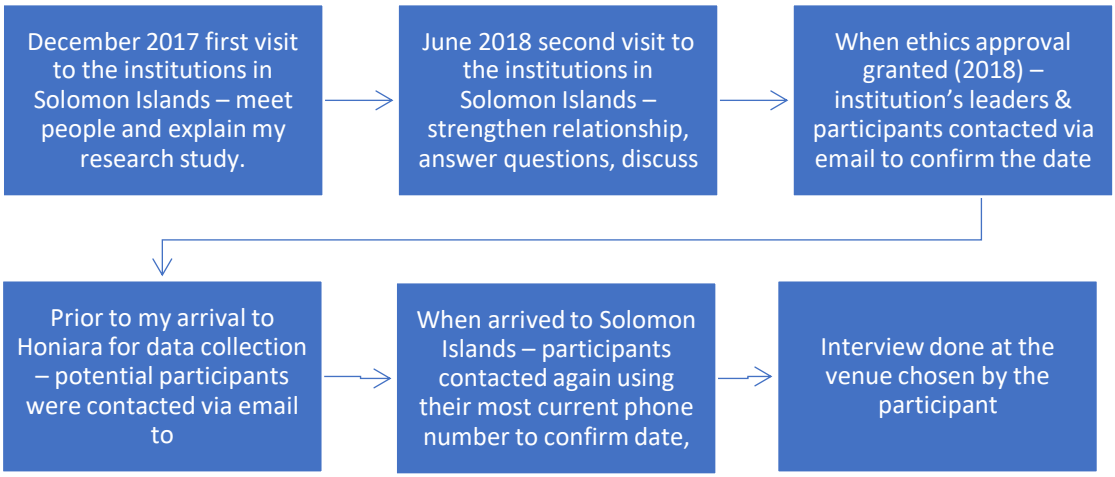


Figure 7: Timeline of interview process (Developed by author)

Participants for this study consisted of 33 males and 22 females, of ages ranging from 25 – 60 years. The time elapsed since they had attained their current qualifications was two years or more (Table 3.).

Qualifications of the participants	**Number of Participants**
PhD	3
Master's degree	15
Bachelor Degree	21
Diploma	8
Certificate	5
Grade 6	2
Grade 2	1
Total	55

(Ministry of Education and Human Resource Development, 2018)

Table 3: Qualifications of interview participants

I interviewed participants who were well informed about the four case studies or models of HSRCB. For the HDR case study, interviewees included current HDR candidates, and many people now in leadership roles including leaders in health professions. SORT-iT interviewees included health institution leaders, health workers, community and political leaders. AHRG interviewees comprised health institution leaders, health workers, coastal Christians, mountain traditionalists, religious leaders and a hospital administrator. There was a range of experience with the AHRG model, some people newly arrived at the area, some engaged since inception of the model, and some with quite limited experience. This range was useful because due to the inclusive community aims of the AHRG approach it might be significant to discover peoples' views on why they were not significantly involved in this model, and to provide potentially different perspectives on the AHRG model from people at the core and on the periphery, which would aid in identifying the perceived effectiveness of AHRG collaboration by those who were not early adopters of the approach in comparison to those who were involved from the outset of this novel programme. Some of the participants were interviewed on more than one case study or research capacity building model, because they had been involved in more than one model or case study and were included in each of the models of which they had experience.

Document review

I requested documents from stakeholders as well as published materials to ascertain scholarship numbers. Documents relating to scholarship numbers were provided by the Japanese, British and US diplomatic offices. AHRG, SORT-iT, and the Ministry of Education provided official reports on implementation, management and outcomes. I also carried out a literature search for published articles directly resulting from HSRCB activity in the four case study programmes from 2008 – 2018. Despite a signed letter from the Director of Policy and Planning within the Ministry of Health and Medical Service, allowing me to have access to these documents, no documents were provided by any Solomon Islands Government Ministry. The document review used in this study therefore relates only to publicly available documents and International Health Research Project reports for the period 2008 to 2018.

In order to document academic output by people who had been engaged in any one of the four HSRCB case studies, a literature search on Medline PubMed database was undertaken for the period 2008 – 2018 using the search term "Solomon Islands". The search resulted in a list of 424 articles. Inclusion criteria to identify academic publications created from the four

research capacity building approaches were (i) studies were undertaken within Solomon Islands (ii) publications resulted from one of the four HSRCB Models and (iii) publications had at least one Solomon Islands author. Exclusion criteria were (i) studies not undertaken in Solomon Islands (ii) publication resulted from study outside the four research capacity building models (iii) no Solomon Islands author. Applying these inclusion and exclusion criteria resulted in a list of 127 articles across all four health systems research capacity building models investigated in this study (See Appendix:4: Literature search results for all four models, for detailed findings). Inclusion criteria for individual case studies (publication resulting from specific HSRCB models) were then applied to the 127 articles. The table below summarises the results of that search (Table 4.). A hand search looking specifically for an article I was already aware of identified one further publication by a HDR candidate that was not identified in the Medline search because it was published in the predatory journal ISSN Public Health (Lui, Sarangapany, Begley, Coote, & Kishore, 2014). The academic output for the recent 2017/18 SORT-iT training conducted in Solomon Islands is not included in this sample.

HSRCB Model	Number of publications 2008-2018 (Medline)	Number of publications with a Solomon Islanders as first author
HDR	9	9
IHRP	97	2
SORT-iT	1	1
AHRG	20	5

(Developed by author)

Table 4: Academic output of the four models

Data Management

McLellan, MacQueen and Neidig suggest there are seven steps to take when managing qualitative databases:

1. Keeping copies of important information. A data management system should also be backed up and backups updated as data preparation and analysis proceeds.
2. Arranging field notes or researcher commentary in a chronological, genre, cast-of-characters, event or activity, topical or quantitative data file schema.
3. Creating a system for labelling and storing interviews. This includes a unique name or case identifier for each file that communicates crucial information about the file to researchers.
4. Cataloguing all documents and artefacts.
5. Providing for the safe storage of all materials.
6. Checking for missing data.
7. Developing a process for reading and reviewing text. (Mclellan, MacQueen, & Neidig, 2008, p.65)

After interviewing, I organised my audio recordings by date, time, location, participant and HSRCB model and stored them securely in a digital format before starting the transcription process. These audio-files were securely stored on a password–protected laptop. At JCU, the transcribed audio files and documents were stored on a password protected computer and secure servers. Audio and transcript files are uniquely identified with a code for each interviewee to enable cross-referencing with the excerpts used in this thesis.

Ethics approval requirements included daily download of audio files from a voice recorder used in the field and interview audio files are catalogued and stored securely in the James Cook University data hub (https://research.jcu.edu.au/data/default/rdmp/home), curated by JCU staff.

Data processing and analysis

There are five basic requirements for qualitative data analysis using coding, according to McLellan, MacQueen and Neidig:

1. Prepare and organise your data (Print out your transcripts, gather your notes, documents, or other materials)

2. Review and explore the data
3. Create initial codes
4. Review those codes and revise or combine into themes
5. Present themes in a cohesive manner (Mclellan et al., 2008, p.69)

Transcriptions were analysed in Solomon Island Pijin to avoid loss of meaning through translation. Quotes used in the results section were translated as a final step in the process to allow the voice of participants to be better understood by readers who are not fluent in Solomon Islands Pijin. Two of my advisors are fluent in Solomon Islands Pijin, and have been working on projects in Solomon Islands for many years. They were able to question and critically critique groupings, coding and themes generated from the data to cross check and make sure the ideas arise naturally from the Pijin original, and verify the systematic rigor of the analysis.

The strength of qualitative data analysis is built on the richness, thoroughness, balance and nuance of detail that allows the researcher to prepare a report that is convincing and based on participant's voice and experience. For qualitative data analysis to be rich, the researcher must integrate a creative, critical and reflective thinking cycle with systematic and rigorous empirical enquiries. It must be data-based and highly data-driven. Analytical approaches used by qualitative researchers can help turn the voluminous data into clear, understandable, insightful, trustworthy and even original analysis (Liamputtong, 2017).

Within case analysis

I applied the basic principles of the Colaizzi seven step framework (Colaizzi, 1978) to structure my data analysis of the interviews as it is commonly used by health service researchers because it offers a rigorous analytical process that allows a concise but inclusive description of the phenomenon under study. I integrated elements of the thematic analysis approaches of Braun and Clarke, McLellan, Saldana and Liamputtong (Braun & Clarke, 2006; Liamputtong, 2017; Mclellan et al., 2008; Saldana, 2013) where I felt these added depth or functionality to the process. The steps I followed were:

Step 1: Acquiring a sense of each transcript

In this stage I prepared and organised my data by printing out my transcriptions and gathering my documents and began to review and explore my data by reading through the transcriptions multiple times. This enabled me to get a sense of the whole data. Mclellan called this preparing and organising of documents, Liamputtong defined this stage as

opening/descriptive coding, and Braun and Clarke called this familiarising with the data, both terms meaning to sort the data in preparation for further analysis (Braun & Clarke, 2006; Liamputtong, 2017; Mclellan et al., 2008). My analytic instincts stepped in during transcription. I started to hear the voices that emerged from the text and to think about them in thematic groupings.

Step 2: Extracting significant statements

The second step of analysing the transcriptions involved highlighting and writing comments on important phrases or statements that related to HSRCB activities in general. I tabulated this information with suitable headings and subheadings to make a preliminary classification. The main ideas were summarised in bullet points within the table forming my initial codes. Extracts were highlighted in the transcript that illustrated the understanding of each of the participant's experiences of HSRCB. I labelled each statement with the participant's pseudonym, page and line number, then copied them from the transcript, and assigned them initially under tentative themes within the table template. According to Saldana this is the 'coding' stage - meaning assigning of labels to data and Braun and Clarke called this 'generating codes' that label and group interesting data. Mclellan et al. refer to this as creating initial codes (Braun & Clarke, 2006; Mclellan et al., 2008; Saldana, 2013).

Step 3: Formulating of meanings

In the third step I began to note passages that related to the codes identified within the table. Summarising the main ideas from the table template led me to draw lines, pictures, and diagrams (mind maps) to link the key ideas that emerged from the analysis and grouped them under the major codes and categories. I found it essential at this stage to reflect on my own assumptions, my reaction to the participant's narratives, and the connection I made with the related literature. Liamputtong (2017) called this 'focused coding' meaning working with the codes to make sense of the data (Liamputtong, 2017).

Step 4: Organising formulated meanings into clusters of themes

In the fourth step the significant thematic categories began to emerge after a long period of re-reading the transcriptions. Statements and associated formulated meanings that clearly represented a common focus were grouped together as a theme cluster (which I called a 'category'). This stage of analysis resulted in many theme clusters. For peer review, I presented the analysis to colleagues at the university, and my primary supervisor, who were

knowledgeable in both qualitative research and HSRCB work, to examine the emerging relationships between the categories to ensure that the interpretative process was clear and accurately described. The many theme clusters were distilled into seven main thematic categories at this stage. Liamputtong called this 'Axial/interpretive coding' meaning re-assembling and re-organising of codes for greater abstraction and Saldana called this 'Sorting', where the codes are grouped into categories (Liamputtong, 2017; Saldana, 2013).

Step 5: Exhaustively describing the investigated phenomenon

The fifth step of the analysis was to identify the key experiences described by the participants that illustrated these seven thematic categories and describe these key ideas in short analytical paragraphs. The seven main themes were described in detail with evidence from participant's quotes. This initial account was again discussed with my experienced colleagues and supervisor. Differences in interpretive decisions occurred, and these caused me to reflect on and re-examine my analytic process. This was an iterative cycle as I went back and forth between the steps to make sense and try to understand the depth of content and generate codes, categories and themes. During this process I was unsure if I would ever reach an end, as there was so much data to consider. However, results had to be finalised and so I began the process of writing up a logical narrative once I had a significant number of illustrative examples and felt I had thoroughly coded the main issues. This stage of critically thinking through the main ideas or codes is what Mclellan (2008) called reviewing the codes to revise or combine into themes (Mclellan et al., 2008), Braun and Clarke refer to this as 'Generating of the initial codes (Braun & Clarke, 2006). Laimputtong called this 'Selective coding' meaning identification of central core themes or concepts based on previous analysis (Liamputtong, 2017) and Saldana called this 'synthesizing,' where the researcher generates themes from the categories (Saldana, 2013). Braun and Clarke (2006) use three inter-related processes for this stage: 'generating the initial code,' 'reviewing initial themes,' and 'defining and renaming of themes.' This involves organising codes into potential themes, sorting and identifying the nature or characteristics of the potential themes and defining or describing these themes (Braun & Clarke, 2006). During the process of coding the interview transcripts in this step the seven thematic categories were strengthened as I coded and grouped the data that I used to collate, analyse and understand participants experience and insights into the model.

I have used these seven thematic categories across all four models – and so they will appear as headings across all of the four results chapters of this thesis, they are:

1. Participant's experiences and perspective on the model
2. Training and teaching approach in the model
3. Finance in the model
4. Communication within the model
5. Leadership and management in the model
6. Impact of the model
7. Unique issues of the model

Step 6: Describing the fundamental structure of the phenomenon

Colaizzi (1978) argued that the theme descriptions should be further reduced to a statement of their fundamental or essential structure. It had become apparent how the seven themes were informed by theoretical principles in adult education, and I developed an overall explanation of the themes framed by this theory. Braun and Clarke (2006) called this 'the production of reports', meaning analysis that consists of analytical comments, data extraction and interpretation of themes. Mclellan (2008) called this presenting themes in a cohesive manner (Mclellan et al., 2008), Saldana (2013) called this step 'Theorizing', where the researcher develops an explanation that best suits or represents the themes (Saldana, 2013).

Step 7: Returning to the participants

Colaizzi (1978) suggests that final validation of data analysis should involve the researcher returning to the participants to present how they have organised their words, and to verify that they can recognise their own experience in the themes. This forms a final statement (a process called member checking) (Collaizzi, 1978).

Due to the COVID-19 pandemic, Australia and Solomon Islands closed their borders, travel was restricted and I could not travel to Solomon Islands to make a face to face presentation of the preliminary results to the study participants and leaders. I contacted my research colleagues and the same Kwaio community leader who had assisted with interviewing. They were able to organise a venue and get the study participants and institution leaders at the MHMS and AAH together for zoom feedback sessions. At AAH, where the AHRG model of research capacity building was implemented, there were three groups of study participants: the coastal Christian community group, the health workers, and the mountain traditional group.

My cultural facilitator chose a venue that was culturally safe for the mountain group because we could take them upstairs, avoiding possible issues with being underneath other people, and which was not connected to the main AAH buildings, which could have been seen as a source of cultural influence. This enabled the groups to openly share their thoughts and ideas in response to my presentation of preliminary results arising from analysis of AHRG case study data. At the beginning of the presentation I personally thanked and welcomed the group. I briefly explained the scope of the presentation and why the presentation was important to my study. I then asked for recording consent and unanimous verbal consent was given by the group. Three separate presentations were delivered via zoom for the three groups. The presentations were delivered on 29/12/20, 30/12/20 and 31/12/20. After the 15 minute presentation, a question was asked to guide a 20 minute discussion. The question was: 'What is the most important thing for you in the presentation?'

For the Ministry of Health and Honiara based study participants, a MHMS research department leader was contacted to organise the venue and bring study participants and leaders together for the preliminary result feedback sessions. In Honiara two separate presentations were delivered via zoom for the two groups and the venue was the WHO meeting room at the MHMS compound. The results for the HDR, IHRP and SORT-iT models were presented. Two separate presentations were done because it was difficult to get everybody together at one time. As a researcher I had to be flexible and gave an identical presentation twice to the two groups. These presentations followed the same format as the AHRG presentations, and were delivered on 23/02/21 and 25/02/21. The presentation time was 30 minutes followed by 20 minutes discussion arising from the same question.

Cross-case analysis

After doing within case analysis of the individual models as case studies, I did a cross-case synthesis by asking myself how the findings from the four models demonstrated the building of research capacity in Solomon Islands, and the extent to which the models were similar or different from each other, how they exhibited any unique characteristics, what challenges they created, what their strengths and limitations were, and if similarities between participant experiences of different models were indicative of broader systemic or cultural issues that affected the implementation of all the models in common (Creswell, 2013).

Methodologies using multiple sources of data allow for each source to contribute in its own unique way to understanding the topic studied (Morgan, 1997). Additional data collection

methods may help substantiate the findings and provide a fuller picture of the phenomena (Cheer, MacLaren, & Tsey, 2016). Qualitative research approaches often allow data collection to be flexible in timing and process. Researchers may also modify their analytical approach to data collection as ideas emerge (Charmaz, 2014). I documented how participants described health system research capacity building, how the models (case-studies) were planned, implemented and their impact and individual experiences of the four HSRCB models in Solomon Islands from 2008 to 2018. Coming from Melanesian society and a 'learn by doing' culture, I started my analysis with what people said about HSRCB models and moved on to discuss the content of documentation, and finally explored how literature from LMICs describes the models.

Summary of this chapter

In this chapter I have described how the project was designed, and how I collected data through semi-structured interviews and document reviews. I have explored and confirmed adherence to ethical considerations and respect for cultural differences, and explained how preliminary feedback and confirmation of accurate representations was obtained from participants after the interview stage, and initial coding was completed.

In the following case study results chapters, I will describe the thematic data arising from coding by providing interview quotations in the original Pijin and dual language English translations. These illustrate specific thematic concepts that emerged as particularly relevant to participants' experience of HSRCB in Solomon Islands.

Chapter 4: Case study 1 - Higher Degree by Research model

Chapter outline

In this chapter I describe the development and structure of the Higher Degree by Research model and use interview data to describe key factors that influence the successes and challenges of building research capacity using this model in Solomon Islands. I list the academic outputs from Solomon Islanders involved in Higher Degree by Research between 2008 and 2018. Qualitative data from participant interviews is then grouped under seven thematic categories. At the end of this chapter I briefly summarise the implications of the results for building health research capacity in Solomon Islands.

Description

Higher Degree by Research (HDR) is a research capacity building model employed in Solomon Islands. The HDR model requires Solomon Islanders to enrol at a university outside Solomon Islands to undertake a formal research degree, either the Masters of Philosophy (MPhil) or Doctor of Philosophy (PhD). The PhD is the highest examined level of research degree. Both MPhil and PhD candidates are taught to design and implement a research project that demonstrates an ability to understand and use research skills to create new knowledge. The HDR model intends to build the research capacity of individuals as research leaders with high levels of philosophical, theoretical and methodological knowledge as a foundation for building health system research capacity in Solomon Islands.

Higher Degree by Research requires the candidate to undertake a supervised piece of original research. This process builds skills to create a research question, design a research study, choose appropriate methods, collect and interpret data, analyse the data, and make recommendations based on the findings. HDR candidates develop independent research skills while making an original contribution to a specific area. Candidates work closely with experienced advisors to identify a research question, design and implement their specific research project and ultimately write a thesis. Projects need to be managed with clear expectations about milestones. Professional development of research-related skills is generally part of university HDR programmes. HDR candidates can be expected to participate in national or international conferences and publish their research work.

History

At the time of writing, the Solomon Islands tertiary education system does not offer HDR training within the country (Ministry of Education and Human Resource Development, 2018). The Solomon Islands National University offers only certificate, diploma and Bachelor degrees. Solomon Islanders therefore spend two to four years overseas for their HDR candidature. Most depend on funding to support their HDR study because travelling, living expenses and fees for overseas education are very expensive by local standards. The Solomon Islands Ministry of Education facilitates scholarships to Solomon Islands students for overseas postgraduate studies (Masters by Coursework, Masters by Research and PhD). Scholarships are also available from international organisations such as the Australian Department for Foreign Affairs & Trade, World Health Organization, and the United Nations Education, Science & Cultural Organisation.

Selection processes

The system for individuals to undertake health related HDR training overseas begins with the development of a Staff Training Development Plan by each of the four divisions in the Ministry of Health and Medical Services. Candidates identified in the plans who are approved by the National Training Committee of the Ministry of Health and Medical Services may apply for Solomon Island government or foreign diplomat office scholarships to enable their studies. Government HDR scholarships in Solomon Islands are managed by a training committee within each government ministry, who screen and select HDR candidates based on Staff Training Development Plans and priority areas. The names of candidates selected by divisional training committees are then sent to the Ministry of Public Service to be screened and checked for eligibility to study abroad. The names of endorsed candidates are then processed through the National Training Unit, a department within the Ministry of Education and Human Resource Development (Ministry of Education and Human Resource Development, 2018). For applicants in health-related fields who receive scholarships, the Ministry of Health and Medical Services release the candidates from their substantive position to undertake HDR study overseas.

For Solomon Islanders to receive a scholarship they must first be accepted into a HDR programme at an international university. This often requires several months of engagement with the university to find a suitable academic advisor and develop a research topic.

For health professionals working for private non-government organisations and faith-based organisations, their institution's training committee endorses submissions for a government scholarship application through the Ministry of Commerce, Industry, Labour and Immigration. The Ministry of Labour training committee screens and selects applications and recommends a list of applicants to the National Training Unit within the Ministry of Education and Human Resources Development.

International governments also offer scholarships for Solomon Islanders to undertake HDR studies abroad (Ministry of Education and Human Resource Development, 2018). These scholarships, known as 'open category,' are made available through the diplomatic offices of various countries in Honiara. Solomon Islanders apply directly to the diplomatic offices for these scholarships (Ministry of Education and Human Resource Development, 2018). When awarded a scholarship through the open category, the candidate is released on study leave by their employing institution or required to resign if formal release is not granted.

Measuring the impact of HDR projects

As HDR candidates are expected to produce original research outputs, and commonly this entails publishing their thesis as well as contributing to academic research articles, a way of measuring the impact of the HDR model is to identify the relevant publication outputs by Solomon Islands HDR graduates. However, publications alone do not give a complete picture of the experience of HDR trained individuals in building capacity in health research. Their individual experiences of attempting to apply their new knowledge to HSRCB is directly relevant in measuring the effectiveness of HDR training in this context. I decided to interview HDR candidates and graduates who had participated in HSRCB projects in Solomon Islands to capture the full range of their experience and their ideas about how effective HDR training had been for them in improving their capacity and effectiveness in delivering health related research.

Introduction of the results

In this section I list the academic publication outputs from Solomon Islanders undertaking HDR training between 2008 and 2018. Seventeen participants (4F, 13M) who were well informed about the HDR model were interviewed for the HDR case study, some still current HDR candidates, and many now in leadership roles including in health. Interviews are tagged with anonymous codes comprising three or four alphanumeric characters to conceal the

identity of the interviewees. Qualitative data from study participant interviews is grouped under the seven thematic categories.

Findings

Academic publication outputs

Using a Medline search, nine publications were identified as originating from the HDR model between 2008 and 2018. All nine of these articles had a Solomon Islander as first author. In addition, a hand search (looking specifically for an article I was already aware of) identified one further publication. The publication was not identified in the initial search because it was published in a predatory journal (Lui et al., 2014). Publication details of all 10 papers are provided in Appendix 4. The publications identified are concentrated on the work of a small number of HDR graduates, with two primary authors responsible for seven of the ten publications. These publications focus on malaria research (four publications) and social and psychological aspects of public health (three publications). This finding suggests that only limited information on the impact of HDR training in Solomon Islands can be discovered through publication history, and suggests that a full picture of how Solomon Islands HSRCB is supported by the HDR training model requires more in-depth information. This is gained here through interviews with HDR candidates and graduates.

Interview results

1. Participants' experience and perspectives on the Higher Degree by Research model

A female health professional participant spoke of how the staff training development plan (STDP) guides each division within the Ministry in their capacity development programme, commenting:

> *When it comes to HDR level training and the selection of officers in each division, oketa garem STDP ia, oketa followim na disfala STDP ia. There are others wea oketa no come under STDP, but takem/awarded with Australian or New Zealand "Open category"scholarship. Time oketa takem open category scholarship finis before oketa come back lo system and ask to be release for go further study (**1B5**).* (When it comes to HDR level training and the selection of officers in each division, they have a STDP [staff training development plan], they follow this STDP. There are others who don't come under the STDP, but are awarded with Australian or New Zealand "open category" scholarships. After they have been awarded with an open category scholarship, they come back to the system and ask to be released to go for further education).

The process of form filling and seeking approvals across multiple organisational units is highly bureaucratic. The National Training Unit facilitates this process. Speaking about applications and paperwork, a senior leader and former training officer within the Ministry of Health and Medical Services stated:

> *Individual health workers seleva bae must find admission lo University and then oketa bae go takem form from NTU and fillim it up. But first of all oketa must be approved officers for further study from Ministry of Health and Medical Services training committee and public service training board (**1A11**).* (Individual health workers have to apply themselves for admission to a University and then they will go and get a form from NTU and fill it out. But first of all they must be approved as officers for further study by the Ministry of Health and Medical Services training committee and the public service training board).

A nurse currently undertaking HDR studies described her experience of the lengthy and convoluted application process:

> *Me inside lo STDP… blo Ministry of Health and Medical Services for go doim postgraduate study overseas lo 2018. Division blo me putim/submitim name blo mifala go lo national training unit blo Ministry of Health and Medical Services... Me meetim na opportunity list and priority areas blo ministry. So oketa human resource department informim mifala that name blo mifala inside for go training oversea next year so mifala apply for scholarship. Human resource department givim come forms and askim mifala for go takem other scholarship forms lo diplomat office. So mi go takem form… fillim up na open category one. Public category hem same one too ia but hem mostly for oketa undergrad students, open category ia na for in-service save apply lo hem (**1B6**).* (I was in the STDP of the Ministry of Health and Medical Services… to go and do postgraduate study overseas in 2018. My Division submitted our names to the national training unit of the Ministry of Health and Medical Services…. I met the criteria for the opportunity list and priority areas of the ministry. The Human Resource Department told us that our names are on the list to go overseas for training next year so we applied for scholarships. The Human Resources Department gave us the forms and also asked us to go and collect other scholarship forms from the diplomatic office. So I got the forms… and filled out the "open category" one. The "public category" is much the same but mostly for undergraduate students, "open category" enables in-service officers to apply to it).

Participants reported that the number of Solomon Islands government scholarships each year is determined by the Ministry of Development, Planning and Aid Coordination and the Ministry of Education and Human Resource Development. For government health workers, the Ministry of Public Service training board decide based on the number of scholarships

determined by Ministry of Development, Planning and Aid Coordination, and the Ministry of Education and Human Resource Development. A senior leader at the Ministry of Public Service explained:

> *Number of spaces available hem no save staka ia. Staka man save like go training but hem save no staka, and the spaces hem specific lo areas na, may be health hem garem only certain allocations, oketa other different field of studies hem garem own allocations blo oketa and at what levels, postgraduate or undergraduate ia. Hem pre-determined by Ministry of Development, Planning and Aid Coordination and Ministry of Education. Oketa na predetermine come spaces or allocations ia. So the Ministry of Public Service training board lo here makem allocation followim oketa spaces ia nomoa and then it goes back to ministry of education den oketa na processim scholarship after the decisions are made lo here. **(1A10)**.* (There are not usually a lot of spaces available. Many people would like to get training but there aren't many that can, and the spaces are specific to disciplines, maybe health only has certain allocations, those other fields of studies have their own allocations that belong to them, and at specific levels – postgraduate or undergraduate. This is predetermined by the Ministry of Development, Planning and Aid Coordination and Ministry of Education and Human Resource Development. They predetermine the spaces or allocations. So the Ministry of Public Service training board here make allocations according to the spaces available and then it goes back to the Ministry of Education [MEHRD], then they process the scholarship after the decisions are made here).

When the Ministry of Public Service approves work release for government employed health workers they can then start overseas study programmes. A senior leader at the Ministry of Public Service commented:

> *From understanding blo me lo process, any one where interested lo within the Ministry of Health and Medical Services they have to apply to their ministerial training committee. However before list of names from various ministries including Ministry of Health and MPS it has to be vetted and endorsed by their own training committee. There is a MPS application form for in-service health workers for fillim in and there is a part of form wea garem place for ministrial training committee for sign of lo hem before hem comes MPS. There is what we called a Public Service Training Board - members consist of Permanent Secretary blo oketa government ministries mainly oketa lo education. They go through and screened every applications. **(1A10)**.* (From my understanding of this process, anybody within the Ministry of Health and Medical Services who is interested has to apply to their ministerial training committee. However before the list of names from various ministries, including the Ministry of Health [and Medical Services] and MPS [Ministry of Public Service], is sent to the MPS

[Ministry of Public Service], it has to be vetted and endorsed by their own training committees. There is an MPS application form for in-service health workers to fill in and there is a part of the form which has a place for the ministerial training committee to sign off on it before it goes to the MPS. There is what is called Public Service [MPS] Training Board – members consist of Permanent Secretaries of the government ministries mainly those in education. They go through and screen every application).

Because scholarships and enrolment into international university MPhil or PhD programmes are limited, some people articulated that the HDR model should be thought of as only one part of overall research capacity building, and not a standalone solution for HSRCB. A senior leader at the Ministry of Health and Medical Services, stated:

Well I think there has to be a combination of the research capacity building models - on the point that we know from HDR we have limited number of people that can go out ia. This already limits our option as being the right way for health research capacity building ia - small number nomoa save go ***(1A14)****.* (Well I think there has to be a combination of research capacity building models – the point is that we know with HDR we have a limited number of people that can go overseas. This fact limits this choice as being the right way for health research capacity building – only a small number can go).

Participants described how building research capacity using the HDR model helped candidates gain research knowledge and conduct research on issues of national importance. Participants noted that results from studies undertaken through the HDR model had the potential to provide evidence for decision making in Solomon Islands. A senior researcher within the Ministry of Health and Medical Services, said:

Capacity building in HDR level –hemi meanim equipim iumi moa or advancim na level of research knowledge and skills iumi already garem. Add on more, upgrade for garem skill blo research for save findim out what na happen and addressim good. So time iumi say health research capacity building, hem particularly focus on the health perspective of it nomoa ia and datwan me lookim hem important tumas, because in every organisation we need evidence-based decision making ***(1A1)****.* (Capacity building at HDR level – it means to better equip us or advance our existing level of research knowledge and skills. Adding to and upgrading the research skills we have so we can find out what's happening and address it properly. So when we say health research capacity building, it is really particularly focused on the health perspective, and that seems very important to me, because in every organisation we need evidence-based decision making).

Participants believed the HDR model benefitted individuals by learning problem solving skills to overcome challenges that previously seemed insurmountable. A recent PhD graduate commented:

> *You have the opportunity to get real thinking ia, being critical and think deep about things. This enable individual to face whatever challenges or problems, use research concept and principles to survive, because hemi givim you survival skills too ia. It gives you problem solving skills. Like sometimes you wawaka lo samting go, go you hitim wanfala challenge nomoa you stop lo dea na. Whereas if you garem some of these tools ia, bae iumi save climbim mountain or bae iumi drill through lo mountain or whatever to survive - kind osem **(2A3)**.* (You have the opportunity to really make you think, being critical and thinking deeply about things. This enables individuals to face whatever challenges or problems, use research concepts and principles to survive, because it gives you survival skills too. It gives you problem solving skills. Like sometimes you are working hard on something, and you just hit an obstacle and stop right there. Whereas if you have some of these tools, you will be able to climb the mountain or you will drill through the mountain or whatever to survive – that kind of approach).

The HDR model provided candidates with the opportunity to undertake their own research project, gaining research experience. A senior researcher within the Ministry of Health and Medical Services who has completed HDR training said:

> *I think wan of the positive things about HDR na is that you doim own research project blo you ia - like if you doim intervention research hem actually givim you more power to learn and observe and experience what na research hem really like lo field and result blo hem bae hem garem impact lo workplace and country blo iumi **(1A2)**.* (I think one positive thing about HDR is that you do your own research project – for example if you do intervention research, it actually gives you more power to learn and observe and experience what research is really like in the field and its result will have an impact on our workplace and our country).

Participants recognised the HDR model of research capacity building is used for different purposes at different levels of the health system. A senior leader at the Ministry of Health and Medical Services highlighted:

> *We have to see things in a big picture situation when we plan to use HDR model in building research capacity of the health workers. Let say those that we send for HDR should be the strategists and the planners of the Ministry of Health and Medical Services **(1A14)**.* (We have to look at the big picture when we plan to use the HDR model in building the research capacity of health workers. The strategists and planners of the Ministry of Health and Medical Services should be the people we send for HDR training).

A recent PhD graduate spoke about HSRCB models and local leadership, noting:

> *I think all methods or model of HRCB ia are good. Oketa useful ia but I think, key thing nomoa is that HRCB must be led by people on the ground who are on the frontline of health. They are the ones that need capacity building and oketa too should be the ones where leadim or directim capacity building so oketa nao bae se mifala like improve long area osem, and then outside partners come and say okay what kind samting bae iumi save doim osem. But I think, it should not totally be done by local seleva but I think it should be local led, lo four fala research capacity building approach everyone (**2A3**).* (I think all methods or models of health research capacity building are good. They are useful but I think the key thing is that health research capacity building must be led by people on the ground who are on the frontlines of health. They are the ones that need capacity building and they too should be the ones who lead or direct capacity building. So they should say "we want to improve this area" and then outside partners come and say "okay what sort of things should we do?" But I think, it should not be entirely done by the locals themselves, but I think it should be locally led in all four research capacity building approaches).

2. Training and teaching in the Higher Degree by Research model

Teaching and training used in the HDR model was expressed as essentially teaching the candidate to have a set of tools to use as an independent researcher. This participant said:

> *How me lookim capacity building in HDR model is like you are giving, for example a carpenter more tools den you buildim capacity blo hem nao ia. Instead of content knowledge, maybe hemi start for garem hammer nomoa, saw, level ia and you keep givim hem more tools you increasim capacity blo hem na ia - hemi still a carpenter but with the tools bae hemi able for doim more and more, bae hemi save work faster, more effectively and efficiently inside lo context blo hem. So I think in capacity building, the 'what' or the 'knowledge' hemi important but hemi more about the ability and the process (**2A3**).* **(**How I see capacity building in the HDR model is like you are giving, for example, a carpenter more tools, then you build his capacity. Instead of content knowledge, maybe he begins by having just a hammer, a saw, a level and you keep giving him more tools, you increase his capacity – he is still a carpenter but with the tools he will be able to do more and more, he will be able to work faster, more effectively and efficiently in his context. So I think in capacity building, the "what" or the "knowledge" is important but it is more about the ability and the process).

These research tools can then be used to build the research capacity of the country. From the perspective of a senior researcher within the Ministry of Health and Medical Services who has also completed HDR training:

*Research capacity building hem for buildim capacity blo iumi as a country ia - for buildim iumi oketa locals lo country blo iumi to be more capable of doing research. So we need to build more researchers lo Solomon Islands. I think what iumi duim, so many times, iumi rely lo international partners for kam duim research. Oketa identifiem research areas from outside than oketa tekem kam in na proposal ia. If iumi garem oketa own researchers blo iumi to reach that level iumi duim own research because main ting ting blo me na osem - how na bae iumi improvom iumi fo doim na research, base lo needs blo country (**1A2**).* (Research capacity building is about building our capacity as a country – for us to build up our native people in our country to be more capable of doing research. So we need to build more researchers in the Solomon Islands. I think what we did, so many times, we relied on international partners to come and do the research. They identify research areas from outside then they come in with the proposal. If we get our own researchers to reach that level, we'll do our own research because the main thought that I have is this – how shall we improve how we do our research based on the needs of the country?).

These research tools can then be used to teach others within Solomon Islands. A nurse who is currently undertaking HDR training also commented:

*I think the HDR one wea you go train and you come back, den you seleva conductim research ia. If you, one local qualified researcher bae you save trainim more locals for ota too save how for doim research. The more you trainim locals how for doim research the more you bae garem more new knowledge for umi closim now gap lo country blo iumi ia. Nurse or health workers wea save lo research lelebet come trainim more people. You wea quailiified finis come and teach other health workers osem (**1B6**).* (I think HDR, it's the one where you go to train and you come back, then conduct research yourself. If you are one local qualified researcher, you will be able to train more locals so that they will also know how to do research. The more you train locals how to do research the more you will gain the knowledge for us to close the current gap in our country. Nurses or health workers that know a bit about research come and train more people. Those of you who have been qualified come and teach other health workers).

However, some participants expressed that not all HDR teaching and training was uniform across all international universities:

*Lo time me go doim HDR training blo me lo [A Pacific University] me facim challenge lo side lo resources, hem no mas good, not enough compared to institution lo Australia ia - hem na lelebet struggle blo me (**1A1**).* (When I went to do my HDR training at [A Pacific University], I faced challenges in terms of resources, it was not really good, not enough compared to institutions in Australia – That was a little bit difficult for me).

3. Finance in the Higher Degree by Research model

HDR level training is an expensive undertaking so individual health workers and their institutions look to government and external funding to support them financially. One of the faith-based health institution leader and administrator stated:

> *Iumi have to look somewhere else or outside for funding to support health workers do their HDR level training overseas. So hem na me say HDR hem wanfala model where hem no really work good yet lo capacity building health personnel blo iumi (**2A9**).* (We have to look somewhere else or outside for funding to support the health workers to do their HDR level training overseas. That is why I say the HDR model is one model that doesn't really work well yet for the capacity building of our health personnel).

However, the financial support is subject to scholarship availability. A senior leader with training experience said:

> *Lo this department me just work lo list of whoever hem like for go for further studies overseas, just submit the list ia lo Division's training committee and mifala prioritizim oketa... From dea ministry's training committee approve the names base on how many scholarship for the year. (**1A11**).* (In this department, I just work on the list of whoever wants to go for further studies overseas, we just submit the list to the Division's training committee and prioritise them... From there the Ministry's training committee approve the names based on the number of annual scholarships).

Within the HDR model, finance also needs to be considered for the scope of the research project, and the length of time covered by the scholarship in which to complete the degree. A senior researcher within the Ministry Health and Medical Services said:

> *If you mekem go lelebet big go moa project blo you - you might ran into some kind of shortage moa ia, so sometimes you no completim project ia and I think that's what happen to [ministry of health officer] ba. Hem struggle, I think hem no garem enough data. Hemi needim moa time moa ia – go, go but scholarship hemi come to an end na. I mean [ministry of health officer] supervisor na osem hem kaen dedelay hem for write too ia (**1A2**).* (If you make your project a little bit too big – you might run into difficulties, so sometimes you don't complete your project, and I think that is what happened to [Ministry of Health officer]. He struggled, I think he did not have enough data. He needed a lot more time – to keep on going, but the scholarship came to an end. I mean, it's like [Ministry of Health officer] supervisor also delayed him in his writing up).

The HDR model presented financial barriers for faith-based health service providers in Solomon Islands with limited funding available to support staff who wished to undertake HDR studies abroad. A faith-based health institution leader and administrator highlighted:

> *For man go for doim PhD is an impossibility because research funding for fundim PhD hem very little. In fact lo church institution hem non-exist, so hem impossible to go and do PhD overseas. Chance to go for HDR level training is very slim because of funding. Hem even non-existent - by that I mean every yearly budget no any budget for training oketa staff overseas so iumi have to look somewhere else, look outside for this (**2A9**).* (It's impossible for anyone to go and do a PhD because there's very little funding for PhD research. In fact in church institutions it is non-existent, so it's impossible to go and do a PhD overseas. There's a very slim chance to go for HDR level training because of funding. It is even non-existent – by that I mean in every year's budget, there's no budget for overseas staff training, so we have to look somewhere else, look outside for this).

Solomon Islanders undertaking HDR training overseas often experienced late or irregular payment of their Solomon Islands Government scholarship. Students receiving scholarships from the Australia or New Zealand governments did not face this challenge. A researcher within the Ministry of Health and Medical Services, who had completed HDR training in one of the Pacific universities said:

> *Lo time me go doim HDR training blo me lo [University] challenge lo side lo resources hem no mas good compared to institution that you come from lo Australia and New Zealand ia Allowance blo government no mas flow good osem NZAID and AusAID lo time blo mifala - challenge lo side lo irregularity blo student allowance (**1A1**).* (When I went and did my HDR training at [University]… I faced challenges in terms of resources, it was not really good compared to institutions that you come from in Australia and New Zealand.-The government allowance did not flow [regular payments] like AusAID and NZAID in our day – the challenge lay on the side of irregularity of student allowances).

4. Communication in the HDR model

Communication systems are structured and hierarchical within government ministries. Departmental training officers meet and consult with employees about their areas of interest and motivation for HDR training. A senior researcher within the Ministry of Health and Medical Services said:

> *Training officer come around and say you willing for go for further study too? Me say ia man me like go school too ia. me like advancim na education blo me ia (**1A1**).* **(**The training officer

came around and said, are you willing to go for further study too? I said yes, I want to go for further study. I want to advance my education).

A leader at the Ministry of Health and Medical Services stated that there are health workers who are not in the Ministry's staff development plan for training who received "open category scholarships" that does not address national priorities. As one senior leader within the Ministry of Health and Medical Services said:

> *The issue we have had for a number of years since me come lo dis level. I can see there is disjointed coordination between the funders of scholarship and what the ministry requires or need. Discussion between Ministry of Health and scholarship provider especially the diplomat office was not done so scholarship that come under open category that was provided did not actually meet the training need of the Ministry of Health and Medical Services as per the training plan (**1A14**).* (The issue we have had for a number of years since I took up this position. I can see there is disjointed coordination between the funders of scholarships and what the Ministry requires or needs. Discussion between the Ministry of Health and scholarship providers, especially the diplomatic office doesn't occur, so scholarships that come under the "open category" were awarded that did not actually meet the training needs of the Ministry of Health and Medical Services as per the training plan.)

The inability to communicate clearly while undertaking HDR studies overseas was a challenge for HDR students. Some participants stated that they had difficulties communicating with their supervisors in languages other than Solomon Pijin and had to learn to work in an unfamiliar educational system. A scholarship officer in a diplomat office highlighted:

> *Challenges lo sendem people for studim research oversea for the first time especially when studying in Japan is language barriers and cultural barrier there. Diswan hem wanfala challenge for oketa post grade students' blo iumi. Japan is very different from iumi – lo side lo language and even education system blo oketa hem quite different from iumi. But main challenge ia na language otherwise everything ia hem orate nomoa ia (**2A6**)* (The challenges in sending people to study research overseas for the first time, especially when studying in Japan is language barriers and the cultural barrier there. This is one challenge for our postgraduate students. Japan is very different from us in terms of language and even their education system is quite different from ours. But the main challenge is the language).

A recent Masters Degree graduate who now works at the Solomon Islands National University also highlighted:

*May be the challenge is, me say osem, language, communication na wanfala. Because time study in different place like [Country], when communicating may be misunderstanding happen first time causim communication barrier. But maybe as time goes on when you sit down with you supervisor going through your work, may be bae hem become clear and you start for meanim na conversation or communication ia. (**1B7**).* (Maybe the challenge, I would say, is language - communication is one. Because when you study in a different place, like [Country], misunderstanding may happen when communicating for the first time – causing a communication barrier. But maybe as time goes on when you sit down with your supervisor going through your work, maybe it will become clear and you begin to understand the conversation or communication).

5. Leadership and Management in Higher Degree by Research model

Participants interviewed did not directly comment on leadership and management in the HDR model as a specific mechanism to build research capacity building in Solomon Islands other than the bureaucratic administrative processes outlined for scholarships and international university enrolment outlined above.

6. Impact of the Higher Degree by Research model

Study participants highlighted numerous impacts of the HDR model. Having a pool of HDR trained health workers made it easier for the Ministry of Health and Medical Services to negotiate with sources of bilateral and multilateral aid to sustain research work in the Solomon Islands. One of the senior leaders within the Ministry of Health and Medical Services, highlighted:

*Doing HDR training or having PhD bae placem individual lo nara level, not only expose blo ministry but blo individual ia too ia. Bae individual placem country lo nara level. So oketa researchers, even oketa research fundings bae flow na ia. Research funders bae say ohh country ia garem light na ia - problem ia true nao oketa seleva findim answer/solution lo hem - oketa no collaborate wetem iumi but oketa seleva findim so iumi givim seleni lo oketa na osem. So time osem mifala lo ministry level yet – putim lo bilateral level, multilateral lo aid ia man. Time osem oketa sit down wetem DFAT the largest contributor lo country blo iumi na ia - time iufala flagim ohh research ma mifala lookim nao, something osem. The higher you go the more expose you are, everybody will know, not so much you the person ia, but what you doim everyone bae interest lo hem, so bae pull ia, bae iumi pullem funding osem (**1A6**).* (Doing HDR training or having a PhD will raise an individual to another level, not only for the reputation of the ministry but also that of the individual. Individuals can raise the country to another level. So these researchers… even research funding will flow. Research funders will

say “ohh this country has talent – they actually found the answer/solution to the problem for themselves – they didn’t collaborate with us but they discovered it on their own so we’ll give them funding for this sort of thing.” When this happens, those of us at the ministerial level will apply for aid on a bilateral or multilateral basis. At this time they [the researchers] will liaise with DFAT, the largest contributor to our country – when they [the researchers] signpost it as research, we all recognise it as something of that type. The higher you go your reputation increases, everybody will know, not so much you the person, but everybody will be interested in what you do, so it will pull, we will pull in funding).

For the new knowledge gained from HDR research to have any impact, it is necessary for HDR candidates and graduates to learn how to embed and apply this knowledge into real-world practice in Solomon Islands. This skill is essential for individuals to drive changes identified through evidence-based research that need to happen at individual, institutional and systemic levels. A recent PhD graduate, said:

Another skill is what oketa callem knowledge translation ia - bae, bae iumi think aboutim how na this knowledge hemi bae go lo oketa people wea needim, so that change hemi save happen. This is a skill on its own. Ino wea iumi duim thesis finis nomoa den finis ia - hemi no complete yet, lo me if iumi findim or creatim knowledge ia nomoa. How nao bae iumi disseminatim or talem people for convincim oketa so that change happen is another thing. But I think in HDR process oketa no look lo datwan ia man. Oketa stop lo knowledge creation and lo paper ia nomoa den finis. I think that is only half of the equation for iumi creatim change or influencem insitution – think think base lo experience blo me nomoa ***(2A3)***. (Another skill is what they called knowledge translation – we will think about how this knowledge will reach people that needs it, so that change can happen. This is a skill on its own. It’s not like we did the thesis and then stopped there – to me it isn’t complete yet, if we only find or create knowledge. How we can disseminate it or tell people to convince them so that change happens is another thing. But I think in the HDR process we don’t go there. People stop at knowledge creation and just finish the thesis. I think that is only half of the equation for us to cause changes or influence institutions – just some thoughts based on my experience).

HDR training has a positive impact when it builds practical skills that can be applied successfully in the local context. One of the senior researchers within the Ministry of Health and Medical Services, stated:

Last time point of entry lo community for takem data na wanfala challenge blo me. But now, time me come back from HDR training me barava save na. Before you go into the community you need for save nao what na structure blo community, who na chief inside? And time you go

lo community what na you should doim lo cultural setting blo oketa and what na you should doim as a researcher like for example if you go den man lo village die bae you continue for study or nomoa? Hem kind osem so you needim someone for leadim you go. Time osem lo here, oketa aggressive man nao lo dea ia you must careful hem kind osem. Need someone for advisem you, where na particular river lo here, where na source of water lo here, where na clinic lo village kind osem. We need someone to guide us ***(1A1)***. (Last time, one of my challenges was the point of entry to the community for data collection. But now I'm back from HDR training I know exactly what to do. Before you go into community, you need to know the structure of the community, who is the chief? And when you go to the community what should you do in their cultural setting? And what should you do as a researcher, like for example – if you go then someone in the village dies will you continue to do your research or not? It's like this, so you need someone to guide your way. Right now an aggressive person is around, you must be careful... You need someone to advise and show you where a particular river runs, a source of water, the location of the clinic in the village, that sort of thing. We need someone to guide us).

The impact of HDR training to Solomon Islands is not always seen as positive. One participant noted that some HDR graduates do not have useful research skills. This participant questioned the need for people to have PhD qualifications in Solomon Islands at all. One of the senior leaders at the National Referral Hospital, commented:

Me think PhD training ia hemi specific lo each areas ia, asta why some PhD holder no save nomoa how for doim research and even how for writem health report. Oketa completem PhD as an academic requirement nomoa but no garem skills for conduct research nomoa ia. Another question me garem na is, do we really need PhD level people lo country blo iumi? ***(1A9)***. (I think PhD training is specific to each area that is why some PhD holders just don't know how to do research and even how to write health reports. They just completed a PhD as an academic requirement but just don't have the skills to conduct research. Another question I have is, do we really need PhD level people in our country?)

However, this sentiment was not uniform with HDR graduates expressing the impact their HDR training had in returning to Solomon Islands with more choice of opportunities for employment. A recent PhD graduate, stated:

I think me probably might just go back lo academic institution, some opportunity for work lo ministry lo dea but probably go back nomoa lo academic. Stay lo house and doim consultation waka bae hem might help nomoa too ia ***(2A13)***. (I think I probably might go back to an academic institution, there are some opportunities to work at the ministry, but probably just go back to academia. Staying home and just doing consultancy work might help too).

Students from the Solomon Islands undertaking HDR in other countries seem to benefit in several ways from being exposed to different cultures. A scholarship officer in a diplomat office, said:

> *Oketa developim capacity blo oketa solomon Island post grade students or researchers ia. Osem lo mi seleva Japan hem different from studying in Australia, New Zealand, Fiji or any other Pacific island countries and territories. Oketa place ia hem different lelebet in terms of culture and hao oketa duim things osem. So here student hemi exposed lo new something. Oketa bae learnim other things apart from their study program. They will learn some other things that they might not be able to if oketa go nomoa lo Fiji or PNG or any Melanisan countries wea iumi familar wetem (**2A6**).* (Solomon Islands postgraduate students or researchers develop capacity. For me, Japan is different from studying in Australia, New Zealand, Fiji or any other Pacific island countries and territories. These places are a bit different in terms of culture and how they do things. Here students are exposed to new things. They will learn other things apart from their study programme. They will learn some other things that they might not be able to if they went to Fiji or PNG or any Melanesian countries that we are familiar with).

A scholarship officer observed that Solomon Islands students in Japan have learned how to appreciate time as an important commodity, to use it wisely and be as productive as possible. Students accustomed to this culture may be frustrated when they return to the Solomon Islands, especially by the difference in work ethics between the two countries. He also commented by saying:

> *Lo me hem wan good thing aboutim going to Japan hem openem mind blo you - for example lo Japan if oketa se time, ma time na ia. I think there's a lot of frustration for oketa student when come back to the country and lookim Solo time ia. If oketa se something hem available, ma hem available na, if oketa se hem public information ma no eni wan bae hidim moa ia hem mas public na ia. So time oketa come back an waka lo Solo hem frustratim oketa lelebet after oketa get used to such routine. Work ethics blo oketa lo Japan hem barava go over high na, thats why oketa develope for good - work ethics blo iumi hem barava lo down lo dea na – hem no really good ia. (**2A6**).* (To me one good thing about going to Japan, it opens you mind - for example, in Japan if they say a time, they mean it. I think students get very frustrated when they come back to the country and realise its Solomon Islands time… If they said something is available, it is available, if they said its public information, nobody will be hiding it – it must be public. When they return and work in Solo [Solomon Islands], it's a bit frustrating for them because they got used to such a routine. The Japanese have a very high standard of work ethics that is why they are so successful – our work ethics are really rock bottom, this is really no good).

HDR candidates and graduates shared experiences of being mentored by supervisors but often feeling isolated and lonely. Undertaking HDR training often results in stress, frustration and can lead to depression. A recent PhD graduate, stated:

> *Becos hem academic samting na you duim. Time you doim HDR training ia you bae lelebet stressful too ia. Detwan hem barava big, time you doim thesis blo you, no any wan moa bae hem helpem you, only you seleva nomoa bae doim work most of the time. Thats how oketa trainim you lo HDR level ia. Sometimes you feel you waka in isolation although iu garem wanfala suppervisor blo you lo dea. Most of the time bae you think, think seleva den you go sharem wetem oketa supervisor blo you osem. So hem very stressful, stress na barava wanfala big samting. Sometimes you get depressed too ia. But I think stress ia hem lo level wea iumi save stay lo hem, ino kaen wea go go you end up admit lo hospital. I think hem nomoa samfala challnege mi save tingim distaem* ***(2A13)***. (Because you're doing an academic endeavour, when you do HDR training you will also be a bit stressed. It's a really big deal when you do your thesis, there is nobody else to help you, it's just you yourself who will be doing the work most of the time. That is how they train you at HDR level. Sometimes you feel you work in isolation although you have your supervisor there. Most of the time you will do the thinking yourself and then you will share it with your supervisor. So it is very stressful, stress is really big part of it. Sometimes you get depressed too. But I think the stress is at a level that we can manage, not the kind where you end up admitted to hospital. I think this is just one challenge that I can think of right now).

7. Unique issues of the Higher Degree by Research model

Within the HDR model, participants expressed issues that reflect challenges created by the Solomon Islands Health system as well as personal challenges arising from undertaking HDR training. Participants talked about the stress of family separation, financial difficulties and lack of positions for HDR graduates when returning to Solomon Islands. A senior researcher within the Ministry of Health and Medical Services, highlighted:

> *Challenge lo side lo family, if oketa family lo here and you lo dea, family separation, pikinini lo here osem so oketa daddy no save concerntrate guti lo study ia, thinkim oketa family wea stay lo home country, kind osem* ***(1A1)***. (A challenge in terms of family is family separation, if your family are here and you are over there, the children are here as well so their father isn't able to concentrate hard on his studies, he's thinking about the family who remain in the home country, and things like that).

A senior leader at the Ministry of Public Service indicated that some HDR graduates do not return to Solomon Islands:

*Government spendem big seleni tumas lo human resources ia – time go doim HDR level training finis and no come back, government barava lusi big stret na man. So hem na sampala negative something about HDR model ia – of course when you have PhD qualification other countries would want you, other organizations bae needim you, even though that particular person hem signim bond wetem government. Bond agreement hem se ia, if you go study for three years at least you come back for servim government for three years, that's the bond if you work lo government (**1A10**).* (The Government spends a huge amount of money on human resources – when people complete HDR level training and don't come back, it is a very big loss to the government. These are some negative things about the HDR model – of course when you have a PhD qualification other countries would want you, other organisations will need you, even though that particular person has signed a bond with the government. The Bond agreement says, if you go study for three years you should come back to serve the government for at least three years, that's the bond for government workers).

The same senior leader at the Ministry of Public Service talked about how this happens:

*One particular HDR trained individual plead, hem se please iufala wavim nomoa requirement blo bond ia, so that USP save employim me. USP like holem hem for hem lecturer back lo USP. So ia in this case government lusi na - because hem fully funded by SIG, on full salary during three years study ia. You lookim barava double loss blo government na ia. Anyway that's the negative and it's just the way it is na ia, unless individuals really committed, even though seleni small but iumi helpem government ia. The idea of help ia na hem must come first lo mind blo iumi (**1A10**).* (One particular Higher Degree by Research trained individual pleaded, saying please can you just waive the requirement so that USP [University of the South Pacific] can employ me. USP wanted to get hold of him to become a lecturer back at USP. So in this case government lost because he was fully funded by Solomon Islands Government, on full salary during his three years of studies. You see this really doubles the loss to the government. Anyway that's the negative and it's just the way it is, unless individuals are really committed, even though the salary is small, we help the government. The idea of help, that's what should come first in our minds).

The lived reality of one HDR graduate shines light on the challenges of returning to Solomon Islands to discover that the system that supported their training is unable to provide appropriate work for them to do when they return:

*HR woman blo mifala Ministry of Health and Medical Services last time hem say, you go findim any work somewhere else, government no garem anything for iufala - government no garem place for oketa PhDs bae oketa pushim olobaout na paper blo you ia (**1A5**).* (Our human resource lady at the Ministry of Health and Medical Services once said, you go and find any

work somewhere else, the government hasn't got anything for you people – the government does not have a place for PhDs, they will take that piece of paper you've got and just keep passing it around).

A faith-based health institution leader and administrator expressed that this was also an issue for non-government services:

> *Time ol HDR or PhD student completem study blo oketa oversea, mind or think, think blo oketa save change. Oketa start for find place wea garem selen - greener place. They thought I'm a now a PhD and I will serve in a country that has more money for pay me. So just a why plade lo HDR graduates time complete ol no save come back lo country. So these are the real issues at the moment ia (**2A9**).* (When HDR or PhD students complete their study overseas, their mindset and thinking can change. They discover places that have money – greener pastures. They think 'I now have a PhD and I will work in a country that has more money to pay me.' This is why many HDR graduates do not usually return back to the country after completion. So these are the real issues at the moment).

Summary of Higher Degree by Research results

In this chapter I have described the complex issues that occur with the HDR model for building health systems research capacity building in Solomon Islands. Several key issues were identified from the data. The HDR model involved a highly bureaucratic process of potential HDR candidates working with multiple government committees, departments and Ministries to apply for scholarships and to gain entry into international university HDR programmes.

Training and teaching for HDR candidates comprised a set of research tools at international universities that were valuable foundation skills for independent research after graduation. Some HDR graduates had opportunities to teach others after they returned to Solomon Islands. HDR candidates relied on financial scholarships to attend HDR programmes at international universities. There were no HDR scholarships awarded by faith-based organisations for HDR study. HDR candidates often experienced financial hardship caused by delays in the release of funds.

There was a lack of coordinated communication and management systems connecting the Solomon Islands government scholarship system with foreign government scholarship systems. Language and cultural differences were often challenging for HDR candidates studying in both English and non-English speaking countries. Overall, international study was

found to be beneficial as it opened up personal perspectives, including the experience of living and working to different cultural standards, and being in a novel cultural environment.

There was no specific identifying feature of the leadership and management of the HDR model to build health research system capacity in Solomon Islands, beyond recognition of the internal bureaucratic processes for specific tasks. The impact of HDR training was limited by the failure to deploy postgraduates who returned to Solomon Islands in positions that made use of their new research capabilities. There was an expectation that the Ministry of Health and Medical Services should be able to access increased international aid if HDR candidates returned to Solomon Islands after training and developing skills to conduct locally appropriate research projects, but this pathway had not been developed.

There were unique issues in the HDR model. HDR candidates experienced personal stress due to separation from family. Some HDR graduates did not return to Solomon Islands after completing their studies as there were no specific positions available for HDR graduates in the Ministry of Health and Medical Services, or because they found more lucrative postgraduate positions overseas.

In the following chapter I will describe the development and structure of the International Health Research Project Model in Solomon Islands. This includes the key factors that influence the successes and challenges of the International Health Research Project model in building health research capacity in the country identified from the data.

Chapter 5: Case study 2 – International Health Research Project model

Chapter outline

In this chapter I describe the development and structure of the International Health Research Project (IHRP) model and use interview data that describe key factors that influence successes and challenges of building research capacity in Solomon Islands using this model. I list the academic outputs from Solomon Islanders involved in IHRPs between 2008 and 2018. Qualitative data from participant interviews is then grouped under seven thematic categories. At the end of this chapter I briefly summarise the implication of the results for building health research capacity in Solomon Islands.

Description

The IHRP model builds research capacity through recruitment and training of Solomon Islanders to work with international research experts for project implementation within Solomon Islands, with the assumption that this process will thereby increase knowledge and ability to lead, manage and do research. The IHRP also has the potential to build capacity in international researchers in conducting research in the local Solomon Islands context including skills in cross-cultural research collaboration.

International researchers and local health leaders identify research areas considered important for the health of Solomon Islanders and/or the region. Research projects are almost always funded by international organisations, with project leaders and chief/primary investigator roles typically performed by international researchers. Solomon Islanders may be listed as a co-chief investigator, primary investigator or associate investigator, while others may be employed as project workers or research assistants.

History

At the time of writing, the Solomon Islands health system depends on international research funding and technical expertise for support, management and implementation of IHRPs. IHRPs are planned and implemented in partnership between Ministry of Health and Medical Services and international research groups/organisations. There is no formal health systems research capacity building structure or mechanism required to be embedded within IHRPs. Research capacity building is therefore an assumed feature of being employed within a specific role and an outcome of receiving training for that role. Individuals are recruited into specific roles within these projects and often build/strengthen research capacity

opportunistically while employed in that role. While the structure of the IHRP model provides a pathway for implementing large scale research projects, research capacity building for Solomon Islanders is not always articulated within the overall aims and objectives of these large projects.

Measuring the impact of International Health Research Projects

A formal academic measure of the impact of IHRP is to identify publication outputs by Solomon Islands participants. As with the HDR model, publications alone do not give a complete picture of the experience of HSRCB. I interviewed people who had participated in IHRP projects to capture their experience of how effective the training had been in improving their capacity and effectiveness in delivering health related research.

Introduction of the results

In this section I list the academic publication outputs from Solomon Islanders undertaking IHRPs between 2008 and 2018. Twenty-two participants (19M, 3F) who were well informed about the IHRP model were interviewed, this included community leaders, health professionals and leaders, government officers and administrators. Qualitative data from study participant interviews is grouped by the seven thematic categories.

Findings

Academic publication outputs

Using a Medline search, 97 publications were identified as having originated from the IHRP model between 2008 and 2018. Two of the publications listed had a Solomon Islander as the first author. Publication details of the 97 papers are shown in Appendix 4.

Interview results

1. Participant's experience and perspective on International Health Research Project model

Participants reported the Ministry of Health uses research evidence from IHRPs to inform and guide the health system and programmes implemented and managed by the Ministry. A senior leader within the Ministry of Health and Medical Services provided the opinion:

> *IHRP where come in ia, bae oketa save guidim Ministry ia – time you like for doim research, oketa can guide you international health research ia hem come for supportim na system and*

*programs lo Ministry of Health (**1A14**).* (IHRPs [International Health Research Projects] that come here offer guidance to the Ministry [of Health and Medical Services]. When you want to do research, they can guide you. IHRP comes to support the system and programmes of the Ministry of Health [and Medical Services]).

Some leaders highlighted that IHRP provides an opportunity for Solomon Islanders to learn how to do research by working with qualified and experienced international researchers. Providing more detail, a faith-based health institution leader and administrator commented:

*IHRP ia hem gat oketa higly qualified researchers, where time ol come and iumi work wetem oketa – along with the projects where oketa international come for leadim – ol gat too training workshop where oketa local researchers blo iumi (ol staff) oli can learn about research lo different phases of the projects ia. Lo different phases or stages of the project, workshops are conducted. oketa people where oketa specialist in research ol na conductim training so it's good (**2A9**).* (IHRP [International Health Research Projects] have highly qualified researchers. When they come and we work alongside them in the projects that they come to lead - they also provide training workshops where our local researchers (staff) can learn about research in the different phases of the projects. In different phases or stages of the project, workshops are conducted. People that are research specialists conducted the training so it is good).

However, this positive approach to IHRP was not common. Most participants expressed concerns about IHRPs and described very limited capacity building opportunities for Solomon Islanders working on IHRPs. Many participants reported that most of the IHRPs carried out in Solomon Islands were initially planned and designed by international institutions. Solomon Islands was used as a hub to implement these projects with no real emphasis on local research capacity building. A research leader within the Ministry of Health and Medical Services noted:

*Bae me say most of the collaborative research projects ia, outside institution na planned or initiate before come to the Ministry of Health, iumi nao bae waka wetem oketa for implementetim. What me findim lo oketa collaborative research projects done by international institutions or led by international institutions is, only few nomoa bae willing for buildim research capacity blo locals (**1B5**).* (I will say, most of the collaborative research projects, were planned and initiated by outside institutions before coming to the Ministry of Health [and Medical Services], we then work with them on implementation. What I found in the collaborative research projects done by international institutions or led by international institutions is, really only a few are willing to build research capacity of locals).

International health research projects operated at a scale and level of complexity that creates barriers for local research collaboration. The Ministry of Health and Medical Services

often do not have the expertise and the resources to carry out big research projects within the country and they need outside researchers to help them with this level of research. A senior leader within the Ministry of Health and Medical Services, stated:

English (interview conducted in English)

The level of research will depend on the technical capacity of local researchers whom we have on the ground. The level of expertise to guide, so that particular research meets the scientific rigours and requirement and also the equipment to actually go into ground breaking or innovative research, I mean there are some level of commodities, equipments that we actually need and sometimes we do not have the capacity but some colleagues or some outside institutions or partners can actually support us with this level of expertise or equipment or funding ***(1A14)****.*

Participants commented that when implementing large scale international health research projects in Solomon Islands, it is important for international researchers to listen to the locals' advice on how to do research at the community level. Understanding and respecting local culture was highlighted as essential, given a good relationship with the community is necessary for successful community-based research projects and future research. A senior researcher within the Ministry of Health and Medical Services said:

For iumi Solomon capacity building or strengthening ia na wanpala part where international researchers must always consider when working with local staff and the communities. Oketa must understandim local custom blo iumi. Respectim oketa cultures blo iumi and understandim context blo iumi ia - diswan hem important. Oketa no can followim na what oketa thinkim time work wetem iumi, so that next time iumi go lo oketa places ia, people oketa happy wetem iumi ***(1A3)****.* (For us in Solomon Islands capacity building or strengthening is one part that international researchers must always consider when working with local staff and communities. They must understand our local customs. Respect our cultures and understand our context. This is important. They cannot go just by what they think when they work with us, next time we go to those places, people need to be happy with us).

Many local workers were recruited on casual employment contracts and trained by IHRPs to help research leaders with basic tasks. Recruitment into subsequent IHRPs depended on how well they performed in the first project, according to the standards of the IHRP managers. From the same senior researcher within the Ministry of Health and Medical Services, we heard:

*Staka where oketa assist me ia osem oketa casual nomoa ia. How oketa come work for mipala, mifala save recruitim oketa inside lo program. Sampala oketa wea recruited and involve ia, oketa promote too ia. So sampla research skills and knowledge oketa takem from oketa trainings ia barava helpim oketa lo promotion and recruitment blo oketa next time. Mifala takem oketa wea displayim na oketa good skills, oketa promote in that way, because oketa no permanent worker, oketa casual nomoa – because oketa garem interest ia – oketa dedicated lo work ia so osem promote lo datwan – next project bae mipala eyem man ia na ia because hemi work good osem (**1A3**).* (Many that have assisted me they are just casual. How they came and work for us, we usually recruit them inside the program. Some of them were recruited, got involved, were promoted too. Some of the research skills and knowledge they gained from the trainings really helped them in their promotion and recruitment next time around. We only recruit those that demonstrate good skills, they are promoted in that way, because they are not permanent workers, they are just causal - some are promoted because they have an interest, they are dedicated to the work. In the next project we will look for that person because he works really well).

2. Training and teaching approach in the International Health Research Project model

Participants expressed the importance of training of local people who were recruited into an IHRP so that they understand what they do in the IHRP, and why. A senior researcher within Solomon Islands National University, highlighted:

*Suppose no any training osem and you involve lo IHRP may be bae you learnim nomoa wanfala small part blo research ia, sometimes man oketa involve ia no meanim too ia (**1A5**).* (If there is no training and you get involved in an IHRP, maybe you will learn just a small piece of research, sometimes the person who is involved doesn't understand the purpose either).

A faith-based health institution leader and administrator commented on the opportunity of research training conducted by qualified and experienced international researchers:

*Oketa people where oketa specialist in research ol na conductim training lo IHRP so hemi good. Because again, research oketa international people na oketa save dodoim olove where me save…Time ol come and iumi work wetem oketa – along with the projects where oketa international come for leadim. Oketa ia, oketa people where oketa specialist in research ia (**2A9**).* (People that are specialised in research conduct the training in IHRPs so it is good. Because again research is usually or always done by international people, as far as I know… When they come and we work with them - along with the projects that internationals come to lead. Those people there, they are specialists in research).

Participants expressed that training provided within IHRPs is different from the general research training provided through other research models used in Solomon Islands because it is specific to the particular aims and objectives of the project. A senior researcher within Solomon Islands National University said:

> *Capacity building was made in such way that bae project hem successful. So training here hemi osem specific for that project. Diswan ino capacity building where hem general osem iufala doim lo SORT-iT or HDR ia, hemi work bae you doim for completim guti disfala project ia **(1A5)**.* (Capacity building was done in a way that would make the project successful. So training here is specific to the project. This is not general capacity building like you do with SORT-iT or HDR, the work we do goes towards having a good outcome at the end of that particular project).

Participants described how local people recruited into IHRPs are given training specific to their role in the project. This not only helped to achieve project outcomes but also improved future employment opportunities. One senior researcher within the Ministry of Health and Medical Services, said:

> *Research skills and knowledge oketa takem from oketa trainings ia barava helpim oketa for doim work blo oketa inside lo projects. So mifala save recruitim back oketa wea displayim good skills lo first project -kind osem. Samfala mifala takem oketa back for work lo project because oketa garem interest and barava dedicated lo work wea oketa doim – oketa barava work good tumas **(1A3)**.* (Research skills and knowledge that they gained from the training really helped them to do their work well within the projects. So we used to recruit again those who displayed good skills in the first project – something like that. Some of them were recruited again to work in the next project because they are interested and dedicated in doing the work – they are really good workers).

However, in some IHRPs there was no training provided for local participants, who just felt they were doing the project like any other job. A senior researcher within the Ministry of Health and Medical Services, commented:

> *What me lookim lo oketa operational research type ia people just come pikim oketa man ia nomoa mi no sure if oketa duim oketa training before oketa go out ia. Becos if you tekem come international researchers, bae you trainim oketa ia two weeks or one month kaen osem, but samfala ia come nomoa, pick nomoa den go na or sometimes team ia arrive na oketa blo mifala se you go lo hospital lo dea **(1A2)*** (What I saw in this type of operational research, people just come and select a few people, that's it. I'm not sure if they do any training before they go out. Because if you take on international researchers, you expect to get two weeks or a month of

training from them or something like that, but some people just come to recruit and then leave or sometimes a team arrives and our guys say 'you go to that hospital over there).

3. Finance in the International Health Research Project model

Because of limited resources and expertise to conduct research projects in Solomon Islands, participants highlighted the need to collaborate with the international researchers who have the capacity to provide expertise, equipment and funding support. The level of support provided can lead Solomon Islanders to agree to research projects even if they are not in priority areas. This demonstrates the influence that funding agencies can have in directing research carried out in Solomon Islands purely because they have resources that are not available locally. A senior leader within the Ministry of Health and Medical Services said:

English (interview conducted in English)

We do not have the capacity to undertake IHRP ourselves - but some of our colleagues or outside institutions or partners can actually support us with this level of expertise or commodities or equipment or funding to undertake international level health research projects. ***(1A14)***

Another senior leader at the Ministry of Health and Medical Services added:

Time oketa international researchers come wetem research proposal and funding - sometimes hemi no fitim iumi tumas but iumi no garem selen so iumi se yes nomoa lo oketa. This is how funding hem save garem power lo side lo research. Top dowm approach and datwan hem hard for iumi denym na kind funding ia. Hem na writim policy brief ia iumi dodoim ia hem very important for good ia, makem oketa international researchers and even government understandim na struggle blo iumi ***(1A5)*** (When the international researchers come with their research proposal and funding - sometimes the research topic is not within our priority area but because we do not have much funding we say yes to them anyway. This is how research that has money/funding becomes influential. It's a top down approach and we cannot deny this kind of funding exists. That is why writing the policy briefs that we do is really very important, it makes the international researchers and even our government understand our difficulties).

Participants reported IHRPs provided short-term employment for junior or unemployed health workers. A research leader within the Ministry of Health and Medical Services, said:

IHRP hemi providim some sort of employment and keepim the momentum blo oketa wea straight from school come out and also learn how for doim research ia, so that is wanfala something me lookim ***(1B5)****.* (IHRP provides some sort of employment and keep the momentum

going for people who are straight out of college, and also learn how to do research, so that is something I see).

Participants also noted differences in pay levels and extra allowances for people working in IHRPs. Another senior researcher within the Ministry of Health and Medical Services commented:

> *I think… allowance in IHR… unfair. Oketa se followim nomoa government standard … But mi tingim… there's a lot of money alocated for those things ia - me save which is very unfair ia. I think hem followim GO blo government nomoa ia....Touring and payment for one day including hard touring also hem $100SBD nomoa ia… oketa should followim na what na oketa putim lo research proposal blo oketa for paym oketa ia. Because proposal wea mifala save givim WHO or TDR mifala putim accurate amount for personal osem - maybe $6,000 US dollar....Time you givim go rate blo you bae oketa international researchers ia bae talk wetem oketa human resouce man blo iumi lo head quarter moa - so time you askem - oketa bae se oh according to General Order blo goveernment - oketa treatim you osem touring nomoa to me hem very unfair na ia **(1A2)**.* (I think… allowances in IHRPs [are] unfair. They say they just follow the government standard... But I'm thinking… there's a lot of money allocated for those things - I believe this is very unfair. I think it follows the GO [General Order] of the government to the letter. Travel and extra payment for a day including remote travel is also just $100SBD... They should follow what they put in the research proposal when they pay us, because in the proposals that we used to give to WHO or TDR [the Special Programme for Research and Training in Tropical Diseases] we accurately stated the amount for personal expenses – maybe $6000 US… When you've given your rate to the international researchers they go and talk about it with our human resource personnel at headquarters – so when you ask them – they will say 'oh according to the General Order of the government' - they treat you just like it's a travel allowance, to me it is very unfair).

4. Communications in the International Health Research Project model

Participants highlighted that IHRPs were initiated and designed from outside, then discussed with the Ministry of Health and Medical Services leaders. One senior health researcher within Solomon Islands National University said:

> *I think way forward for Solomon Islands na is iumi initiatim or controlim research agenda rather than people from outside come wetem proposal blo oketa and se, how bae fit you na diswan? **(1A5)*** (I think a way forward for Solomon Islands is we initiate or control the research agenda rather than people from outside coming with their proposals and saying, how will this suit you?)

Participants stated communication should occur between international researchers and the programme leaders within the Ministry of Health and Medical Services before project implementation, to consider the needs of research partners and the national health programme. A senior leader within the Ministry of Health and Medical Services, highlighted:

> *In terms of research coming from outside, at one stage the planning process, me believe that there has been some level of communication, consultations to actually meet the needs of the team coming from outside and also the Ministry of Health and Medical Services and its program. I think this is a very important point (**1A14**).* (In terms of research coming from outside, at one stage of the planning process, I believe there has been some level of communication and consultation to actually meet the needs of the team coming from outside and also the Ministry of Health and Medical Services and its programme. I think this is a very important point).

However, this does not always occur. One participant explained that proposals are sent for approval without communication between international and local partners. From one of the senior researchers within the Ministry of Health and Medical Services:

> *I think what international researchers do, oketa writim up proposal den oketa sendem come lo mifala. Mifala bae lookim fastaem. Any one like doim research lo any program blo mifala lo here ia oketa have to sendem come proposal den mifala look through fastaem for advice, what na hem stay, what na hem possible for doim kind osem ia - editim. What na goal blo project ia and what nao outcome blo hem, what na bae hem helpem program ia lo hem if hemi look good what na oketa like doim before mifala and oketa sendem go stret lo ethics commitee lo ministry for approval before implementation of the project happen (**1A2**)* (I think what international researchers do, they write up a proposal and then send it to us. We look at it first. Anyone who wants to do research in any of our programmes here, have to send us the proposal and we look through it first to provide advice, what is available, what sort of thing like it is possible – we edit it. What is the goal of the project, what is the outcome of the project, in what way will it help the programme? If what they want to do looks good then we all send the proposal to the ethics committee of the ministry for approval before implementing the project).

Participants also highlighted that communication occurs between local researchers and local workers between projects. People who have been trained in previous projects are contacted and asked if they are available for short term employment in the next IHRP. A senior researcher within the Ministry of Health and Medical Services noted:

> *Mifala save contactim oketa wea mifala trainim last time and displayim good skill for come in more lo next project - oketa promote na ia - oketa no permanent worker, oketa osem casual –*

*but oketa garem interest – oketa dedicated lo work, oketa work hard osem – so lo next project mipala look lo oketa (**1A3**).* (We contact those who were previously trained and displayed good skills to come into the next project - they are promoted – they are not permanent workers, they are just casual - but they're interested – they're dedicated to the work, they also work hard - so in the next project we look to them).

Many aspects of communication between the leaders of international research projects and local community/village people before commencement of fieldwork were highlighted as issues. Participants reported local people were often unhappy with the way they had been treated by IHRP researchers in the past. The same senior researcher at the Ministry of Health and Medical Services reflected:

*Sampala cases me experiencim, time me go lo Gela, sampala locals lo dea oketa no happy wetem how oketa people approachim and treatim oketa, especially overseas stakeholders/researchers blo iumi. Oketa still no happy yet distaem ia. So time me go ia me have to explainim that work me come lo hem ia hem different from work last time, kind osem ia. How oketa international researchers ia treatim oketa people blo iumi na must lelebeti think aboutim ia. Oketa must storim lo oketa people clearly aboutim project - whether project ia finis nao or go heti yet, because oketa lo community look forward project complete house oketa buildim lo village ia. Come out clear wetem ia – place blo oketa ia and hem wanfala good study site ia (**1A3**).* (Some cases I experienced, when I went to [name], some of the locals there were not happy with how those people approached and treated them, especially our overseas stakeholders/researchers. They are still unhappy. So when I go there I have to explain to them that the new work is different from last time, that sort of thing. International researchers need to think a bit about how they treat those people. They must talk clearly to the people there about the project - whether the project has completed or not yet, because the community look forward to the project completing the house they are building at the village. Be straight with them – it is their place and a very good study site).

A senior researcher within Solomon Islands National University, went on to explain:

*Suppose IHRP bae go lo community, I think before iumi go lo community or village, iumi must makem awareness first time lo oketa community before implement research project den bae hem make sense lo me ia. But suppose no any awareness and training of the people that bae involve osem before you involve may be bae you learnim nomoa wanfala small part of it or sometimes man oketa involve ia no meanim too ia (**1A5**)* (If an IHRP is going to the community, I think, before we go to the community we must firstly make the community aware before implementing the research project – then that will make sense to me. But if there is no

awareness and training of the people that will be involved before you get involved, maybe you will only learn a small part of it or sometimes people that are involved don't get the meaning of it).

Participants reported that communication within the IHRP model is a top-down approach, without much discussion between international researchers and local health leaders about the topic. Participants expressed the importance for both groups to communicate clearly in the development of the project. In this way locals can learn about research and international researchers can improve their understanding of local issues and context. One senior researcher within the Ministry of Health and Medical Services proposed:

> *Lo side lo international health research ia lo country blo iumi I think becos last taem ba iumi save recruitim oketa, learn lo small area lo research but full process blo research ia oketa missim nomoa ia so hao na bae oketa learnim guti research lo this model? I think there should be some communication happen prior to implementing IHRP lo country. You sendem come topic blo you mi try lukim fastaem rather den givim mi a full proposal wea you workem finish den you askem me just look through nomoa. Sendem come topic first makem mi save whether hem important or hemi no important lo mifala ia becos for iumi save too how for iumi putim together disfala project ia o iumi sitdown and iumi discussim fastaem – diswan bae helpim international researchers for lukim guti situation blo iumi and decide what na methodology wea hem applicable - kaen osem (**1A2**).* (In international health research in our country, I think because in the past we used to recruit people, they learned about a small research topic - but they missed out on the full process of research, so how can they learn good research through this model? I think there should be some communication that happens first before implementing IHRP in country. First you should send us your topic to look at rather than giving me a fully developed proposal that you just want me to look over. Send us the topic first so that I can understand whether it is important or not to us. Because we also want to know how to put the project together – we sit-down and discuss it first – this will help international researchers understand our situation and decide what sort of methodology is applicable – something like that).

5. Leadership and Management in the IHRP model

Participants expressed the opinion that managing IHRP agreements requires balancing the benefit of research to Solomon Islands with contribution costs of research projects. From the perspective of a senior leader at the Ministry of Health and Medical Services:

> *It's a very fine line lelebeti too ia, because I think for some, like for me personally, me like makem arrangement for iumi greatly benefit lo IHRP that hem happen lo country, but the issue*

*na is - how do we give enough to get as much as well **(1A14)**.* (It is a bit of a very fine line because I think for some, like for me personally, I want to make arrangements so that we greatly benefit from the IHRPs that happen in the country, but the issue is - how do we contribute enough to justify what we get back.)

Although some people had positive experiences, others did not. Many participants said that Solomon Islanders are recruited into IHRPs as workers, and do not have leadership roles. As a senior researcher within the Ministry of Health and Medical Services said:

*Okay lo IHRP ia hemi – iumi locals ia iumi involve go lo big health project ia nomoa ia **(1A1)*** (Okay in IHRPs us locals, we're just workers in the big health projects).

6. Impact of the International Health Research Project model

Some participants said that what they have learned from their IHRP experience helps motivate them to continue to learn and do more research. A faith-based health institution leader and administrator, said:

*Locals involved in IHRP in my view hemi osem second best health systems research capacity building approach na ia, because time you involve you learn and time you learn you want to do more research **(2A9)**.* (Local involvement in IHRP in my view is the second best health systems research capacity building approach because when you get involved, you learn and when you learn you want to do more research.)

Doing research with other people in IHRPs helped some individuals to understand and internalise research concepts. The same faith-based leader and administrator continued:

*Sometimes oketa terminology lo research ia bae you no understandim nomoa ia but time you actually go and involve lo hem bae you say "eiiii ma something me learnim ia na me doim ia". So time you learn that way, bae hem stap lo mind blo you, bae you no save forget **(2A9)**.* (Sometimes you will just not understand research terminologies, but when you actually get involved in it, you will say "hang on, I'm actually doing something that I have learned about". So when you learn that way, it will stay in your mind and you will not be able to forget).

Participants also said that learning experienced through the IHRP model not only increases their theoretical knowledge and skills but also makes them think deeply and critically about their professional day-to-day work. One nurse educator within the faith-based health institution stated:

Time IHRP model increasim na knowledge blo me lo research hemi osem help me for broadenim up think think blo me lo area me work lo hem too ia man - always makem me for

*applym na datpala knowledge or skill ia for findim answer lo oketa so many questions, problems and needs inside lo area where me work lo hem – address issues and needs ia. So hem helpim me a lot for improvim na area me work lo hem (**2A2**).* (Time on the IHRP model increases my research knowledge and skills, it also helps me broaden my thinking about my area of work – always makes me apply that knowledge or skill to find the answer to so many questions, problems and needs in my work area - address issues and needs. So this helps me a lot to improve my work practice).

Participants reported IHRPs make them more receptive to new information and discoveries, expanding their thinking beyond local issues. Participants were often surprised to discover new and different ways of thinking and new forms of knowledge and were exposed to ways of working they had not considered previously. A head of a department within the faith-based health institution who was also involved in IHRPs said:

*IHRP produce report that individual save readim. These reports hem help you for findim out sampala something that you never thinkim or save lo hem before. Something that you never think that hem happen or exist, but time you readim international research report na you just dicscoverim - lo me dispala discovery hem important tumas ia. Me, time me doim research blo me, me only doim research lo local area blo me nomoa - identifym local research needs or issues lo small area blo me nomoa. But IHRP ia hem barava makem mind blo me for think broader and wider (**2B3**).* (IHRPs produce reports that individuals can read, these reports help you to discover things that you never thought or knew about before. Something that you never thought happened or existed, but you just discover this when you read international research reports – to me this discovery is so important. For me, when I did my research, I only did research on my local area – just identifying local research needs or issues in my small area. But IHRP really makes my mind think broader and wider).

Some participants highlighted that research networks and collaboration developed between individuals involved in IHRPs. A senior health researcher at Solomon Islands National University involved in an IHRP commented:

*IHRP hem makem you for garem oketa networks too ia, both nationally and international - hem wanpala outcome na ia (**1A5**).* (IHRPs also make you build these networks, both nationally and internationally – this is one outcome).

Some participants found that research collaboration between local and international institutions provided opportunities for local researchers to co-author and publish research

findings. A senior researcher within Solomon Islands National University, who is also involved in IHRP, said:

> *Since me come lo here few years ago, mifala publishim four papers finis ia. Wanfala wetem group blo JCU nomoa - group blo [name]. Three hemi project blo School of Nursing, mifala finis analysim so this year bae try for work for publishim (**1A5**).* (Since I came here a few years ago, we've finalised four papers for publication. One just with the JCU group – [name]'s group. Three from the [Solomon Islands National University] School of Nursing project that we have completed analysing – so this year [we] will try to work on publishing them).

Participants highlighted that IHRPs enable the individual to use research evidence to change people's health attitudes and behaviours. A faith-based health institution leader and administrator, also said:

> *Lo think, think blo me IHRP hem makem iumi for doim research and then look lo situation and work out how na bae iumi change lo diswan, how na bae iumi talk save lo people for oketa changim attitude or behaviour (**2A9**).* (In my thinking, IHRPs make us do research and then look at a situation and work out how we can change it, how we can educate people to change their attitude and behaviour).

Some participants said there had been only limited research capacity built through the IHRPs for local researchers and for ongoing research benefit to Solomon Islands. From the perspective of a senior health and research leader within the faith-based health institution:

> *Lo side lo skill for collectim data IHRP hem barava good ia. Whoever involve lo IHRP developim sampala research skills. But when researcher come for collectem data nomoa den go away hem osem bae no garem any benefit lo side lo health outcome blo iumi. Nationally IHRP yes hem good but if you come and collect data den go away osem mosquito or helicopter approach - datwan hem something for iumi look, look lo hem (**2B10**).* (In terms of data collection skills IHRP is really good. Whoever is involved in IHRP develops some research skills. But when researchers just come to collect data and go again, this does not have any benefit in terms of our health outcomes. Nationally IHRP, yes it is good, but if you come and collect data and then go again like a mosquito or helicopter approach that is something for us to take a good look at).

7. Unique issues of the International Health Research Project model

Participants expressed many characteristics that are unique to the IHRP model. The main issues participants raised were that most IHRPs are initiated and planned by international researchers. In many IHRPs, Solomon Islanders were employed in casual data collection roles

and thus local research capacity building occurred in only discrete stages of the research. A senior researcher within the Ministry of Health and Medical Services, highlighted:

> *Whole lot blo proposal ia oketa international researchers na doim come finish from outside… ia certain part lo proposal ia nomoa hem change lo here by the leaders but the whole proposal ia oketa wakem come finish lo dea na (**1A2**).* (The entire proposal is completed by the international researchers externally… only certain parts of the proposal were changed by the leaders here, but for the whole proposal they already did the work externally).

This issue was further elaborated by a research leader within the Ministry of Health and Medical Services,

> *If you also look lo oketa projects wea oketa international nao plannim and leadim - locals osem data collectors nomoa. Oketa no come buildim any research capacity too - they just come in collect data and go away (**1B5**).* (If you also look at the projects that are internationally planned and led – locals are just data collectors. They did not come to also build any research capacity. They just come in, collect data, and go away).

However, some participants saw the opportunity to utilise IHRPs to explain how research can improve things in Solomon Islands. A senior researcher at Solomon Islands National University, who is also involved in an IHRP, said:

> *Research hem wanfala word wea people frightim too ia, but hem not that difficult ia. Research hem meanim osem, iumi try for findim out what na wrong lo datwan and try for improvim - kaen osem (**1A5**). (*Research is a word that frightens people too, but it is not that difficult. Research simply means, we try to find out what is wrong with a thing and try to improve it, just like that*).*

Summary of International Health Research Project results

In this chapter I have described the complex issues that are fundamental to the IHRP model for building health systems research capacity building in Solomon Islands. Several key issues were identified from the data. In the IHRP model, some projects provided research data that directly supported the priority activities of the Ministry of Health and Medical Services, and provided training workshops throughout the project. However, not all IHRPs had a scope that included building the research capacity of local participants as an aim or priority. In the IHRP model, local people were typically employed as casual research assistants for specific components of a project, with no long-term prospects or development of transferable skills.

Training and teaching delivered by IHRPs was specific to the aims of a specific project, and not always useful in adding generic research skills or building research capacity.

Some IHRPs supported the Ministry of Health and Medical Services financially to implement locally identified projects. Other IHRPs had a large budget for topics that were not defined as priority issues by the local authorities, but approved simply because they were fully funded. Some people were uneasy with (real or perceived) large salary disparities within and across the projects. Proposals were often designed and written outside Solomon Islands and arrived as fully planned projects for endorsement by Solomon Islands authorities, without significant collaborative engagement or communication. Misunderstandings and miscommunication were a common experience for members of local communities when international projects are conducted in rural/remote villages. Many Solomon Islanders involved in IHRPs perceived themselves as being workers on projects that offered limited leadership or management roles, and limited or no research capacity building support.

The positive impacts of the IHRP model were in growing national and international networks, building critical thinking processes and offering valuable exposure to international issues. IHRPs are perceived negatively due to limited research capacity building systems and the fact that some Solomon Islanders were used as data collectors by international researchers to achieve project aims, without higher level engagement or training. Uniquely among the four RCB models, the IHRP model involved large external projects that offered limited research capacity building for Solomon Islanders.

In the following chapter I will describe the development and structure of the SORT-IT (Structured Operational Research Training IniTiative) model in Solomon Islands. This includes the key factors that influence the successes and challenges of the SORT-iT model in building health research capacity in the country identified from the data.

Chapter 6: Case Study 3 - Structured Operational Research and Training IniTiative model.

Chapter outline

In this chapter I describe the development and structure of the Structured Operational Research and Training IniTiative (SORT-iT) model and use interview transcriptions that describe key factors that influence the success and challenges of building research capacity in Solomon Islands using this model. I list the academic outputs from Solomon Islanders involved in SORT-iT between 2008 and 2018. Qualitative data from participant interviews is then grouped under the seven thematic categories. At the end of this chapter I briefly summarise the implication of the results for building health research capacity in Solomon Islands.

Description

Structured Operational Research and Training iniTiative (SORT-iT) is a research capacity model designed by WHO to train health workers in operational research to inform local policy and practice (Ramsay et al., 2014). In Solomon Islands, the SORT-iT programme was modified to be context relevant to the local health research setting, and entry level qualification guidance was relaxed to enable more people to participate.

> *This meant changing the original pre-requisite of Masters level qualifications, to no expectation of previous research experience or educational qualification. This opened eligibility to many frontline rural/provincial health workers who would otherwise be systematically excluded from such programs.* (Larkins et. al,. 2020)

SORT-iT consists of three teaching blocks and a small, individual workplace-based research project designed and implemented by the health worker. Project results are directly disseminated to stakeholders as part of the training. Each health worker is allocated international and in-country mentors to assist them in completing their project. Health workers are encouraged to publish the findings of their research project (Tripathy et al., 2018). At the time of writing, Solomon Islands Ministry of Health and Medical Services did not have the capacity or expertise to implement SORT-iT alone. However, they had the skills to work with external partners to plan and support SORT-iT activities as a model of research capacity building in Solomon Islands. SORT-iT therefore has a two-fold potential to build research capacity of Solomon Islander and international researchers while partnering to facilitate SORT-iT training and mentoring in Solomon Islands.

History

The standard SORT-iT model has been used to build health system research capacity in countries across the Pacific, and provided an opportunity for health workers (including from Solomon Islands) to learn and conduct research using existing quantitative data (Itogo et al., 2014). In 2018, James Cook University implemented a modified SORT-iT in partnership with Solomon Islands Ministry of Health and Medical Services to strengthen research capacity to respond to infectious diseases emergencies (Larkins et al., 2020). Appendix 5 contains a table of changes made to the original SORT-IT programme content. Funded by the Australian Government Department of Foreign Affairs and Trade, JCU researchers delivered the modified SORT-IT program with and for local health workers and leaders to help identify and prioritise local health issues and then to develop and implement individual research projects over 12 months. This flexible "learn by doing" training model derived content from the generic WHO SORT-iT curriculum, but was specifically modified to include qualitative research methods to suit the local Solomon Islands context (Larkins et al., 2020). In the final stage of training, participants wrote policy briefs to inform local, provincial and national health managers, policy makers and development partners of project results and make recommendations for improved practice and training. The information in the policy briefs was intended to be used to assist and strengthen health work force capacity in rural/provincial areas. Solomon Islands Ministry of Health and Medical Services provided catering for one workshop and paid travel allowances to government employed health workers who attended training blocks. All health workers in the Solomon Islands Health Service (both government and non-government service providers) were eligible and invited to apply regardless of prior qualifications. Applications were screened by Ministry of Health and Medical Services and JCU SORT-iT team leaders for suitability and research capacity building potential. The structure of the SORT-iT model specifically provides a pathway implementing small scale research projects while building research capacity for Solomon Islander health workers.

Measuring the impact of Structured Operational Research and Training IniTiative projects

A formal academic measure of the impact of SORT-iT is to identify publication outputs by Solomon Islands participants. As with the HDR and IHRP models, publications alone do not give a complete picture of the experience of HSRCB. I interviewed people who had participated in SORT-iT to capture their experience of how effective the training had been in improving their capacity and effectiveness in delivering health related research. Additionally,

there were no publications from the 2018 initiated SORT-iT as it was not completed to that stage in the 2008-2018 review period.

Introduction of the results

In this section I list the academic publication outputs from Solomon Islanders participating in SORT-iT between 2008 and 2018. Eighteen participants (8M, 10F) who were well informed about SORT-iT were interviewed and included health institution leaders, health workers, community and political leaders. Qualitative data from study participant interviews is then grouped under the seven thematic categories.

Findings

Academic publication outputs

Using a Medline search, only one publication was identified arising from the SORT-iT model between 2008 and 2018. This resulted from SORT-iT training implemented in Fiji in 2011. A Solomon Islander was the first author on this paper. Because a modified SORT-iT training was implemented in Solomon Islands in 2018, there were no publications in the 2008 -2018 timeframe. However, there have been three publication outputs following the 2018 SORT-iT training, which are out of scope for this study. A Solomon Islander was first author on two of these. Publication details are shown in Appendix 4.

Individual interviews

1. Participant's experience and perspective of the Structured Operational Research and Training IniTiative model

The SORT-iT model of research capacity building was described by participants as international research training in partnership with Solomon Islands Ministry of Health and Medical Services priority needs. A medical doctor and executive recently appointed within a faith-based health institution said:

> *Over the years before come, top down approach na happen. Iumi need for shiftim model ia na, collaboration nomoa – iufala on top come down and oketa lo bottom come up and meet somewhere lo middle. Oketa kind approach osem ia bae iumi look lo hem now. So hem na big impact blo SORT-iT lo here ia. ...they have to really depend on each other ia* ***(1A7)****.* (In past years what happened was a top down approach. We need to shift the model into collaboration. You people from the top come down and those from the bottom come up and meet somewhere

in the middle. This kind of approach is the one we want to follow…this is the big impact of SORT-iT here…they have to really depend on each other).

Researchers from James Cook University and the Ministry of Health and Medical Services research department collaborated to scope and implement the modified SORT-iT training in Solomon Islands in 2017 and 2018. The local leaders agreed to be partners in delivering this training to health workers. A senior nurse working at the National Referral Hospital highlighted that the:

> *Process or steps before SORT-iT research training happen. Osem ota training institution ia with the Ministry of Health wetem donor partners oketa save osem waka together for help for osem mekem up training for health workers ia like all this partners ia mas agree on or like oketa meet and talk about ota things bae take place before osem umi actually doim training. **(1B2)**.* (Process or steps were taken before the SORT-iT research training happened. The training institution works together with the Ministry of Health [and Medical Services] and donor partners to make the training happen for the health workers. All these partners must discuss and agree on the training before we do the training).

Participants stated the SORT-iT model was appropriate to the Solomon Island context because it provides research knowledge and skills for local participants to independently conduct research. A research leader within the Ministry of Health and Medical Services commented:

> *Bae hemi addressim shortage lo research activities lo country. Now ia osem iumi no garem a lot of people doing research ia and with the growing population, growing demand hem come. Issues blo health are also changing. So having this research capacity building initiative bae hemi helpem iumi for train all these people so that they can be able to do their own research ia and then not asking people from outside for come and do the research for us. We know well our context, we don't need people outside to come and do it for us ia **(1B5)**.* (It will address the shortage of research activities in the country. Currently we do not have many people doing research and with the growing population, growing demand comes. Health issues are also changing. So having this research capacity building initiative will help us train all these people to be able to do their own research and then not asking people from outside to come and do the research for us. We know our context well, we don't need outsiders to come and do it for us).

The SORT-iT model was seen to provide an opportunity for a large group of health workers to participate in training that they might not be able to receive elsewhere. An additional positive aspect was that the SORT-iT implementation in Solomon Islands was modified to

include qualitative research and entry requirements were made as minimal as possible to open training to participants holding Diplomas or Undergraduate Degrees. The standard SORT-iT entry criteria require a Masters qualification, but this was considered too limiting for Solomon Islands participation. The same research leader within the Ministry of Health and Medical Services continued:

> *SORT-iT hemi save trainim staka at one time and hemi good too because majority of the health workers that bae joinim training oketa bae no garem degree nomoa ia. Many lo oketa fellows ia sit lo undergrad nomoa ia, even diploma level nomoa osem. So disfala SORTiT hemi recognizim these people for come in and duim training ia. Hemi good for those ones where cannot go oversea for research training because do not meet the entry criteria or requirement for HDR level training (**1B5**).* (SORT-iT can train many at one time and it is good too because most of the health workers who will join the training do not have a degree. Many of the fellows [SORT-iT participants] have undergraduate or even just Diploma level. This SORT-iT programme recognises and accepts these people to come in and do the training. It's good for those that cannot go overseas for research training because they do not meet the entry criteria or requirement for HDR level training).

The SORT-iT model fosters the mentality of identifying problems, collecting information, doing analysis and coming up with recommendations in the minds of the health workers and leaders. A senior leader within the Ministry of Health and Medical Services stated:

> *Having that structure of thinking and how to see problems and how to analysis it and how to solve it, I think it's the mentality that we need to have and that's probably what SORT-iT help providim lo oketa ia. So osem identify problem/issue, what na bae iumi should doim, what na oketa factors contribute lo hem den findim out what na solution and then iumi come up wetem recommendation (**1A14**).* (Having that structure of thinking, of seeing the problem, how to analyse it and how to solve it – I think it's the mentality that we need to have and that is probably what SORT-iT helps to provide them with. So it's like identify problem/issue, what should we do, what are the factors that contribute to it, then find out the solution and then we come up with a recommendation).

2. Training and teaching approach in the Structured Operational Research and Training IniTiative model

A senior leader within a faith-based health institution described the SORT-iT approach as one where capacity was built through the sharing of research knowledge and experience:

*Think, think blo lo health research capacity building through SORT-iT, hem osem wanfala training or programme where trainim oketa people for understandim na research and also how for doim research. Through lo experience blo oketa other people where sharim wetem mifala. **(A28)**.* (My understanding of health research capacity building through SORT-iT, it was like a training or a programme that trained people to understand research and also how to conduct research. Through experiences of other people that share their experience with us).

Each SORT-iT participant was given a USB with all teaching and learning material in the first teaching block. The participants referred to these materials to assist their learning during the three blocks. A senior nurse working within the Ministry of Health and Medical Services said:

*Oketa providim oketa resources too ia. Oketa informations ia stap finish lo oketa memory sticks or flash drive ia. So hemi stap, stap go you save able for read back moa, you like write up you look back moa hao na for statim detfala sentence ia osem. **(1B11)**.* (They provide resources too, the information is already on the memory sticks or flash drive. So it's there, you can read it again, you want to write something up you can look back again, for example, on how to start a sentence).

Nurses new to research found the SORT-iT model 'learn by doing' method made understanding research concepts much easier. A senior nurse working at the National Referral Hospital shared her experience:

*Mifala no garem good knowledge lo research nomoa ia. Diswan wea iumi duim ia "learn by doing" hem no really inside lo curriculum blo nursing school ia. So time detfala programme ia hem come inside, hem mekem hem look easy lo me. SORT-iT training brekem down research simple, nice and easy stret **(1B10)**.* (We do not have good knowledge about research. This thing where we did "learn by doing" was not really in the nursing school curriculum. So when that programme came it makes it easier for me. SORT-iT training breaks research down, nice and simple, and really easy).

Nurses working in the hospital wards preferred the SORT-it model for learning research because training was delivered at the workplace and research projects were manageable in size. Nurses believed these features of the model facilitated learning and understanding of research over time. A senior nurse working at the National Referral Hospital who is a participant of SORT-iT said:

For me seleva bae me go na for SORT-iT na ia, becos SORT-iT hem come down lo level blo iumi. Hem come lo iumi and ino iumi na go schoolim lo dea. Oketa na come teachim iumi lo

*work ples blo iumi and doim in a way wea "small is beautiful". SORT-iT bae you lanem good health research lo hem and maybe if you duim one or two, three time osem den iu garem good knowledge before you save go further. (**1B10**). (*For myself I will go for SORT-iT because SORT-iT comes down to our level. It comes to us and we don't go and learn it there. They come and teach us in our work place and do it in a way where "small is beautiful." You learn health research really well through SORT-iT and maybe if you do it one, two, or three times you will develop a good understanding before you go further).

The 'learn by doing' approach used within SORT-IT was described by local practitioners as relevant because it mirrors the traditional approach in their home villages when elders teach them traditional skills. A senior leader within the Ministry of Health and Medical Services who is also a participant in SORT-iT commented:

*Mi save always think of capacity building like this - before lo custom blo iumi… mummy actually showm iumi how for mekem or lightim fire ia. So that time hem no stap me save how for mekem/lightim fire seleva na. Maybe hem showm me for the first time and den time hem lo dea yet me trym go and den taem iumi save how for duim den iu mekem seleva na. Sometimes bae hem na talem you what for duim go moa. kaen simple illustration osem. (**1B1**).* (I always think of capacity building like this – in the past in our culture…mothers actually showed us how to make or light a fire. When she is not around I know how to light a fire myself. Maybe she showed it to me at first and while she is still around I tried it and then we know how to do it, and we can make it ourselves. Sometimes she will tell you what else to do. This is a simple sort of illustration).

However, some participants reported they could not keep up with the pace of what was presented to them during the training sessions. A senior nurse working at the National Referral Hospital who also a participant in SORT-iT training said:

*Sometimes nomoa maybe teaching ia hem fast tumas. Programme ia hem look osem hem intensive wan lelebet ia. So you just have to keep up nomoa sometimes and work extra seleva lo own time blo you kaen osem. (**1B10**). (*Sometimes maybe teaching is a little too fast. The programme appears to be a little bit intensive. So you just have to keep up sometimes and work extra in your own time, and make do).

Participants, particularly those new to research, were challenged by the need to complete and submit concurrent tasks on time. SORT-iT trainers provided flexibility to accommodate individual needs. A nurse educator working at the provincial hospital, who was a participant in SORT-iT training, highlighted that:

*Time nomoa hem short for doim oketa work, activities or assignment iumi se nomoa. But ota facilitators save extendim due date so hem lelebet guti, I mean oketa osem no strict, ota flexible nomoa too. I mean what me se na is, during the training sessions ia na time barava short tumas lo me – same time me takem note then bae preparim PowerPoint to be presented at the end of the session too so osem me kick round lelebet too ia. Osem everything hem squeeze come one time nomoa man and then next thing makem presentation na (**1B2**).* (The time to do the activities, assignments and our work is short. But the facilitators used to extend the due date so it was not so bad. I mean they were not strict, they were flexible too. What I mean to say is, my time was really short during the training sessions. At the same time I took notes I was preparing a PowerPoint to be presented at the end of the session too, so I was feeling my way a little too. It was like everything was squeezed together at the same time and then the next thing is to make the presentation!)

Some participants were not as challenged by research theory and set tasks. A senior nurse working at the National Referral Hospital who is also a participant in SORT-iT training noted:

*For me seleva writing, hem okay, samfala na me no save, may be easy or hard… Iumi everiwan lo different level so maybe samfala find writing difficult. For understandim oketa research concept ia lo me hem okay, how iufala presentim hem okay (**1B10**).* (To me writing is okay, others I do not know, may be easy or hard... We are all at a different level so maybe some found writing difficult. To me understanding the research concepts is okay, how you present them is okay).

Participants expressed that SORT-iT facilitators and mentors worked alongside them when implementing or conducting their research projects. The support they received from the facilitators and mentors was highly appreciated. A senior nurse working at the National Referral Hospital and a SORT-iT participant said:

*SORT-iT nao osem me think hem best research training approach ia…. Oketa research experts work alongside wetem mifala and mifala save askem oketa question wea osem mifala no sure good (**1B2**).* (I think SORT-iT is the best research training approach… Research experts work alongside us and we can ask questions that we are not sure about).

3. Finance in the Structured Operational Research and Training IniTiative model

Small research projects conducted through SORT-iT training are supported by the model at no financial cost to the participants. A senior nurse working at the National Referral Hospital and participant in SORT-iT training said:

*Nurses lo Solomon na doim ota simple research with in their work, wea zero-dollar hem involve lo hem. No needim seleni, mifala barava experiencim seleva that one na. (**1B9**).* (Nurses in Solomon Islands are doing simple research at their workplace that does not cost them a dollar. You don't need money, we really experienced that for ourselves).

In Solomon Islands, government-employed health workers typically receive additional salary to attend workshops organised by the Ministry of Health and Medical Services. Yet participants were unsure about this process, as expressed by a senior nurse working at the National Referral Hospital who was also a participant in SORT-iT training:

*Is there supposed to be any allowance wea oketa supposed for givim mifala for two weeks out lo work place, kaen osem? Wanfala question wea staka lo mifala everiwan garem…hem should come under lo research blo Ministry of Health (**1B10**).* (Are we supposed to be given an extra payment on top of our salary for the two weeks out of our workplace, or something similar? It's a question that many of us have… this should come under Ministry of Health [and Medical Services] research).

Participants stated the benefit they received in terms of research knowledge and skills gained from the training far outweighed the lack of a training allowance. Yet people were conscious of not receiving payment to attend. A senior nurse working at the National Referral Hospital who was also a participant in SORT-iT training commented:

*No warrim tumas, big samting na iumi tekem out na ia so iumi ovam part ia but maybe for next time. For group blo mefala ia hem ova na and wat iumi tekem out of this finis na most important. (**1B10**).* (Don't worry too much about it, we get a lot out of this, we've done it now, but maybe for next time. For our group it's finished now, and what we already got from this is the most important thing).

4. Communication in the Structured Operational Research and Training IniTiative model

Leaders at the Ministry of Health and Medical Services used the Ministry's email system SIGNet to communicate with health workers throughout the country about the SORT-iT programme. This means that in rural areas people are unlikely to receive notification unless a senior officer tells them about it. A nurse educator working at a provincial hospital and a participant in SORT-iT training applied this way:

*Me lookim information about SORT-iT lo outlook email blo me. Oketa head office lo ministry putim na lo SIGNet ia… so lo there now me lookim information and me apply (**1B3**).* (I saw

information about SORT-iT in my outlook email. Those at the head office of the Ministry of Health [and Medical Services] put it on the SIGNet… that is where I saw the information and I applied).

As did a senior nurse working within the Ministry of Health and Medical Services:

*In 2017 hemi garem wanfala circular oketa putim lo email blo mifala regardim SORT-iT research training program. Oketa like for anyone waka long ministry for apply lo hem ia. Everyone lo Ministry blo Health garem fair chance for apply because everyone lookim lo email. Me lookim too lo email with all the information lo there finis nao for you followm nao (**1A15**).* (In 2017 we had a circular emailed to us regarding the SORT-iT research training programme. They want anybody who works at the Ministry to apply to this. Everybody at the Ministry of Health [and Medical Services] had a fair chance to apply because everyone sees this in their emails. I saw this too in my email with all the information there for you to follow).

Participants commented that sessions delivered in Solomon Pijin assisted learning outcomes. A senior nurse working at the National Referral Hospital recounted:

*Lo side lo Pijin hem good too, out of all facilitators ia [name] hem barava good ia, [name] hem explain come hem barava lo level blo iumi stret na ia. Oketa nara fren blo iumi na becos oketa no barava Pijin osem [name] so sometimes mifala no save good tumas lo English so sometimes osem hem lo nara level for mifala na (**1B10**). (*In terms of Pijin it was also good, out of all the facilitators, [name] was really good, [name] explanations were really at our level. Those other friend of ours, because they did not speak Pijin really well like [name], so sometimes we did not really understand English, so for us sometimes it seemed on another level).

5. Leadership and management in the Structured Operational Research and Training IniTiative model

SORT-iT was celebrated by leaders within the Ministry of Health and Medical Services because the model promotes respectful collaboration with international partners on research of importance to Solomon Islands. A research leader within the Ministry of Health and Medical Services, expressed this by saying:

Side lo SORT-IT, it's really good, it's an approach where even the Ministry, executive oketa likem because they have seen that research capacity was built. And also they like the partnership, it's not them coming and telling us what to do, it's us and iumi everyone work together ia for identify priority issues, designim projects and helped the fellows to really do the research themselves. Identifym priority area first time blo Ministry then fellows choosim topic

*where hemi come under lo priority areas (**1B5**)*. (The SORT-iT side of things was really good, an approach that even the Ministry [of Health and Medical Services] executives want because they have seen that research capacity was built. And also they like the partnership, it was not them coming and telling us what to do, it's all of us working together to identify priority issues, design projects and help the fellows [SORT-iT participants] to really do the research themselves. Firstly identifying the priority areas of the Ministry then fellows choose the topics within the priority areas).

Health research leaders identified the importance of attending SORT-iT training alongside frontline health workers to increase their own skillsets and create a better culture of research in the workplace. A senior leader at the Ministry of Health and Medical Services highlighted that:

*Managers and directors iumi also need to go through SORT-iT training ia - to refresh ourselves. This training ia bae equipim iumi good lo role blo iumi ia. We are leaders and so we need to go through SORT-iT training. In that way both frontline and leaders, everybody bae garem research minded set ia - becos lo look look blo me currently we are not. (**1B1**).* (We managers and directors also need to go through SORT-iT training to refresh ourselves. This training will better equip us in our roles. We are leaders and so we need to go through SORT-iT training. In that way both frontline and leaders, everybody will have the research mindset – because currently the way I see things we don't).

Participants also highlighted the importance for health leaders to better understand research to help them guide and provide appropriate support to frontline health workers undertaking research activities. The same senior leader at the Ministry of Health and Medical Services said:

*As leaders iumi need for understandim research so that when health workers under our leadership talk about research you should be in a position for supportim research work ia na, lookim na importance blo research, should garem research development thinking and openem eye lelebet and see things through lo research lense osem. Kind leader ia hem also guidim iumi good ia (**1B1**).* (As leaders we need to understand research so that when health workers under our leadership talk about research, you should be in a position to support their research work, see the importance of research, should have the research development thinking and open their eyes a bit to see things through the research lens. This type of leader can guide us well).

The management of transport, accommodation and food for participants during SORT-iT training in the provinces was appreciated. A senior nurse working at the National Referral Hospital who also participated in SORT-iT training noted:

*Transport bara nice, good experience for mifala somefala for go through lo Auki before Atoifi. First time blo me for travel and kasem Atori lo truck. Transport is okay because bara luxury transport na lo plane ia. Accommodation very nice, excellent, everything excellent nomoa na ba. Food, ma umi gain weight after training time come back home. (**1B9**)*. (Transport was really good, it was a good experience for some of us to go through Auki before getting to Atoifi. It was my first time to travel and get to Atori by truck. Transport was okay because travel by plane is a real luxury. Accommodation was very nice, excellent, everything was really excellent. Food, we actually gained weight by the time we got back home after the training).

Participants advised SORT-iT should be managed to enable other interested health workers to attend future training. A nurse educator at a faith-based health institution stated:

*Advise blo me if iumi doim SORT-iT next time - iumi increasim number of participants me no save, but hem depend lo oketa facilitator nomoa ia. Continuity and sustainability of SORT-iT must happen, because I think sampala province iumi no go, go lo hem nomoa ia, sampala miss out yet ia - so may be iumi involvim other province where miss out ia. (2**A2**)*. (My advice is if we continue with SORT-iT, we increase the number of participants, I don't know, but it depends on facilitators. The continuity and sustainability of SORT-iT must be maintained because I think we simply haven't reached some provinces yet, some still miss out – so maybe we involve other provinces that missed out).

Participants commented they are more productive when others take the lead to identify research priorities for them. Some existing leadership and management structures in Solomon Islands are very hierarchical and people are comfortable being directed by senior or more culturally influential person. A head of department at a faith-based health institution highlighted:

*Nara thing too is oketa areas where mifala pick up or doim na study lo hem… oketa should pickim oketa areas where oketa na identify and givim lo mifala so that time me doim go, me come nomoa me reportim na findings blo problem ia osem. Oketa man trainers pick up what health issues and givim lo mifala. So that you putim come nomoa or give come issue where really common lo here and mifala doim research lo hem. (**2B3**)*. (Another thing is those areas we pick up or do our projects on… they should pick the areas which they identify and give them to us so that when we get on with it, I just come to report the findings about that problem. The trainers identify the health issues and give them to us. So that you just come, set out and give us issues that are really common here, and we do research on it).

6. Impact of the Structured Operational Research and Training IniTiative model

Participants noted an important impact of the SORT-iT model was that workplace-based training ensured continuation of service delivery. One of the training officers within the Ministry of Health and Medical Services highlighted:

> *SORT-iT me lookim hem wanfala best approach to research capacity building becos, iumi retainim officer. Officer still continue providim service while hem duim research wea bae supportim operational waka blo hem which is hem barava good… and then hem learnim research same time. Lelebet time noma hem go from waka but full time hem lo work place blo hem nomoa. (**1B8**).* (To me, SORT-iT seems like one of the best approaches to research capacity building because we retain the officers. Officers still continue to provide services while doing research, which will support their operational work, which is really good…and then they learn about research at the same time. They take short breaks from work but they are still at the workplace full time).

Workplace-based training connected to workplace health issues was also an important feature of the SORT-iT model. Supporting this approach, a senior nurse working at the Ministry of Health and Medical Services said:

> *Good thing about SORT-iT training na… you doim research while you lo place of work. Nara good samting abautim too hem operational, research wea you findim out samting lo place wea you waka lo hem you deal with problem related lo waka blo you hem help for improvim area of work blo you. (**1B11**).* (A good thing about SORT-iT training is… you do your research while you're in your workplace. Another good thing about it too is, it is operational research, where you find out about something in your work place, you deal with problems related to your work, it helps to improve your area of work).

Participants expressed how happy they were about having been able to participate in SORT-iT because it inspired individuals to make low-cost service improvements with the help of advocates for change. A senior nurse working at the National Referral Hospital who participated in SORT-iT training said:

> *I think generally me bara hapi tumas for joinim this SORT-iT program. Hem bara osem openem mind blo me. Staka small samting iumi save improvim and hem no needim seleni nomoa ia, you seleva nomoa save doim. Make sure nomoa ota right people save for you actionim. you save creative lo own workplace blo you for improvim service osem, I think hem na me lukim becos of the training ia. (**1B2**).* (I think generally I'm really very happy to join this SORT-iT programme, it really opened my mind. There are many small things we can improve that don't

need money, you yourself can do it. Just make sure you know the right people carry it out. You can be creative in your own workplace to improve service. I think I see this now because of the training).

Participants gained new knowledge from their involvement in SORT-iT, leading to new perspectives about the connection between research and health service provision. A senior nurse working at the National Referral Hospital reflected:

> *Staka issues wea time you no save good aboutim research, bae you no garem eye for lookim ia, not until you go inside lo hem and you garem lelebet knowledge lo hem, you go further moa lo hem. Kaen osem nao bae you save lookim things from different perspectives. Bae you save lookim issues, come up inside lo work place and then you pickim na. Bae you also lookim "oh kaen osem no need for you researchim nomoa" ia. Whereas before you no look from that perspective ia. You look at things just like hem part lo routine waka nomoa but distaem you look lo different view moa lo things lo work place blo you (**1B10**).* (There are many issues when you don't know much about research, you will not have the eyes to see, not until you get into it, and you have a little bit of knowledge about it, you go further in it, in that way you will be able to see things from different perspectives. You will also be able to recognise and pick up on issues that arise in your work place. You will also be able to tell "oh this is the kind of issue that doesn't need to be researched." Whereas before, you did not see things from that perspective. You saw things just as part of the routine work, but now you take more of a different view on the things you see in your work place).

Participants recognised the importance of conducting participatory research to find ways to address specific health issues in their communities. A senior nurse working at the National Referral Hospital who is a participant in SORT-iT training noted that:

> *SORT-iT hem also broadenim thinking blo me. Time me come back lo here hem barava openem eye blo me for lukim ota issues wea "eiii me need evidence on this one ia, why hem ia happen lo hia? Why is this issues hem osem?" Me try for questionim why people keep coming back with non-compliance. We have to find bottom why they not comply to treatment - I mean example na me givim ia – rather than iumi wait nomoa and keep on going and keep asking the same question and we never do something to address the issue. When we ask people, bae umi find out why na osem ia. So maybe askim oketa, what na happen? What should we do to rectify problem? Oketa ba givim come reason or answer ia - actually me askim few people already ia and ota givim come reasons finish ia – but I mean, I need to properly planim and designim na research study for takem evidence (**1B9**).* (SORT-iT also broadened my thinking. When I returned back here, it really opened my eyes to issues like: "Eiii I need evidence on this, why

does this happen here? Why is this issue like this?" I tried to question why people keep coming back with non-compliance. We have to find the root cause of why they are not complying with treatment – I mean just to give you an example – rather than we just wait and keep going and keep asking the same questions and never do something to address the issue. When we ask people, we will find out why things are like this... So maybe ask them, what happened? What should we do to rectify the problem? They will give us the reason or answers – actually I asked a few people already and they gave me the reasons – but I mean, I need to properly plan and design a research study to find evidence).

SORT-IT participants gained confidence in conducting operational research and their ability to continue to learn and do research, and work with colleagues to use research evidence to address specific health concerns. A senior nurse working at the Ministry of Health and Medical Services stated:

> *First of all disfala research programme ia hemi buildim na confidence and self-esteem blo me lo side lo doim research and hem motivatim me for learnim moa research ia. SORT-iT hem barava best approach or method where iumi save helpem others lo hem too ia" because oketa skills ia hemi givim me samfala new ideas or new ways of thinking ia. Iumitufala hard for lookim problem den se "ohh problem lo here bae iumitufala se, iumitufala have to do research lo hem nao ia - research na bae hemi talem iumitufala that "ohh yes something lo here." Hemi must evidence-based ia (**1A15**). (*First of all, this research programme builds my confidence and self-esteem on how to do research and motivates me to learn more about research. SORT-iT is really the best approach or method that we can help others with too, because the skills gave me some new ideas or new ways of thinking. The two of us cannot tell if there is a problem by just looking at it and then say "Ohh the two of us will say there's a problem here, we have to investigate it – research will show us that "ohh yes something is here." It has to be evidence-based).

Participants reported research knowledge gained from SORT-iT helped them to understand the routine health data they recorded. Participants also highlighted they could also now identify correlations between the behaviour of villagers and their health outcomes in the data record. A head of department at a faith-based health institution highlighted:

> *Every day me save interim data lo record blo me but until time me garem knowledge lo research me just lookim "eiiiii problem osem too ia man, oketa something lo here." So me start for think about na oketa data ia. Example - how na every boy nomoa garem staka Malaria lo village? Okay suppose you analysim guti that question – because malaria lo pregnant mother and below 5 years hemi 60%, 70%, or 80% ia hem boy ia. So me try for think and questionim what na*

*happen ia? Now suppose you go lo village wanfala area me lookim, time watchim oketa boys ia, oketa naked ia, you meanim you go Na'au and Loama bae you lookim oketa boys lo dat age group ia na naked. Then me also noticim that oketa boys ia mummy and daddy givim freedom lo oketa tumasi ia while oketa girls nomoa ia. Time oketa girls go for play, play mummy blo oketa bae say hay you come keepim small sister blo you lo here, you come back. You see culture lo here girls ino for play, play ia. So me say oh datwan ia might garem impact lo high Malaria lo male under 5 years ia man something osem. (**2B3**).* (Every day I used to enter data into my records, but until I have the research knowledge, I just saw "eiii there's some sort of problem, something's going on here." So I began to think about the data. For example – why is it just boys that have a high number of malaria cases in the village? Okay, suppose you analyse that question better – because malaria in pregnant women and below 5 years was 60%, 70% or 80% were boys. So I tried to think and question what is happening. Now if you go to the village, one thing I noticed when I watch the boys, they are naked, you know [name of a village] and [name of a village] - you will see boys in this age group are naked. Then I also noticed that these boys were given more freedom by Mum and Dad, while girls are not. When girls go out to play their mum will say hey you come and stay with your little sister here, you come back. You see in this culture girls don't get to play a lot. So I said - oh that might have an impact on the high malaria cases in males under 5 years – yes something like this).

The SORT-iT model helps the participants to have a deeper understanding of how to use qualitative research methods to provide rich data as evidence. A senior nurse working at the Ministry of Health and Medical Services commented:

*Hemi evidence-based nao ia, hemi no samting where osem you talem nomoa or you herem nomoa and you lookim nomoa then you se "oh hem nao problem" nomoa ia. Hemi samting where you work lo hem, systematically collectim data, doim interview, story wetem people, askem why na hem osem? How na hemi come about? ia, what nao think think blo oketa aboutim issue osem? So you collectim data ia, before you can really come up wetem information or important evidence (**1A15**).* (It's evidence-based, it is not something that's just talked about, or heard about, or you just see it and say "oh this is a problem" no. It is something that you work on, systematically collect data, do interviews, talk with people and ask them why is it like that? How did it came about? What are people thinking now about the issue itself? So you collect data before you can really come up with information or important evidence).

SORT-iT helps participants develop critical thinking skills that enable them to see the big picture and put together or link the ideas within the big picture. Participants also realised the importance of questioning their own personal and workplace practices. A research leader at the Ministry of Health and Medical Services said:

*Attending SORT-iT programme is a good thing. Me lookim that all the fellows they come to realise the broader picture of their work, oketa save linkim na start from SDGs goal go kasem nao oketa each individual AOP's ia. Because from there na they pick up or identify the issues ia. Some of them come through a lot of challenges but they don't see them as issues because hemi go, go hemi osem wanfala normal something lo oketa nao. (**1B5**).* (Attending the SORT-iT programme is a good thing. I noticed that all the fellows came to realise the broader picture of their work, they can make links that start from SDGs goal and connect to each of the individual AOPs [annual operational plans]. Because from there they pick up or identify the issues. Some of them came through a lot of challenges but they did not see them as issues because it had become normalised).

Participants said SORT-iT helped them identify and improve the weaker areas of their practice. A senior nurse working at the Ministry of Health and Medical Services who is also a participant in SORT-iT training shared his experience:

*Lo me, SORT-iT hemi really helpem me for lookim strength blo me too ia and where nao me weak lo hem lo workplace blo me. "Oh programme ia weakness blo hem long here, strength blo hem lo here"osem ia. Lo dea na bae iumi save look save where nao area where iumi save addressim, iumi save improvim lo workplace (**1A15**).* (To me SORT-iT really helped me to see my strengths and weaknesses in my workplace. "Oh this programme is weak in this area, it's strong here." In that way we will be able to see areas that we can address, we can make improvements at work).

However, participation in SORT-iT did not impact workplace promotion. A nurse educator at a faith-based health institution expressed her concern:

*No any promotion that hem base on the training ia. Promotion lo work place hemi base on the position available I think. Lo think, think blo me skills na bae helpim you for doim work ia, bae helpim you for you really perform well lo work blo you ia, so I think may be promotion lo skills hem better then position. (2**A2**).* (There wasn't any promotion based on the training. I think promotion in the workplace was based on available positions. In my thinking it is skills that will help you do the work, will help you to really perform well in your work, so I think maybe skills-based promotion is better than position related).

One important outcome of the SORT-iT training was being able to present the research findings at the health conference. The SORT-iT programme expects fellows to present at the end of each block what they had completed and what they are working towards. This gave a lot of practice and confidence for individuals to be able to present their research work at the health conference. In addition to being able to present the findings at the health conference

both nationally and internationally, individuals also gained research knowledge and skills. Gaining research knowledge and skills was considered to be one of the biggest achievements or benefits achieved by individuals through the SORT-iT program. This was highlighted by a nurse educator at the faith-base health institution, who was also a participant in SORT-IT training:

> *Wanfala important output or outcome especially lo SORT-iT is me present lo health conference. Actually doim conference presentation lo here lo Atoifi and lo Honiara. Osem lalane one nomoa ia in both local and national symposium ia. Second na acquiring of research knowledge and skills ia, ieee barava big outcome tumas na ia. Writim of policy brief and now me accepted to do my bridging programmeand bachelor degree lo SINU. Research training hemi inside lo CV blo me. (2**A2**).* (One important output or outcome especially of SORT-iT is I presented at the health conference. Actually, I did a conference presentation here at Atoifi and also at Honiara. I practiced at both the local and national symposiums. Second, acquiring research knowledge and skills, this was really a very big outcome. I write a policy brief and now I'm accepted to do my bridging programme and bachelor degree at SINU [Solomon Islands National University]. Research training was on my CV [curriculum vitae].

A senior nurse working at the National Referral Hospital also shared her experience in presenting her project at the international conference:

> *Me doim presentation but no lo research osem kaen presentation lo health topics just general wan osem ia but for presentim research nomoa. I think first taem me presentim research was at the nursing forum or nursing conference ia lo Cook Island (**1B10**).* (I have done a presentation but not on research like this, it was a presentation on general health topics, but not presenting research. I think the first time I presented research was at the nursing forum or nursing conference in the Cook Islands).

Finally, participants also reported that SORT-iT increased their networking opportunities. As one said:

> *Wanfala big something wea me gainim out too from disfala programmetime me go inside, is that networking. You save lo oketa researchers. Oketa people wea me no save and me no liase wetem oketa before ia, distaem me save good and mifala really discussim things lo level wea hem openem up mind blo me na man. [name] and most of all [name], oketa man, me no save talk wetem oketa before ia. Through lo disfala programmeia na, hem na how me have to go approachim oketa lo office and distaem oketa barava close and good fren stret na (**1B10**).* (One big thing that I gained out of this programme is networking. You know the researchers. Those people that I did not know and I did not liase with before, now I really come to know them and

we really discuss things at a level that opened my mind. [name] and most of all [name] are people that I did not usually talk to before. Because of this programme I had to approach them in their office and now they have become my very close and good friends).

7. Unique Issues in the Structured Operational Research and Training IniTiative model

The SORT-iT model provides a good grounding in health research concepts for nurses who worked in the hospital wards. Nurses voiced concerns about maintaining connections with the SORT-iT facilitators and international mentors for assistance in doing future "small is beautiful" workplace based research. A senior nurse working at the National Referral Hospital asked:

> *If me like makem wanfala small research moa "small is beautiful" inside lo work place bae iufala willing for save support come yet if mifala sendem come any email for askem come any advice osem? Hao hem oraet noma? **(1B10)**.* (If I want to do some more research next time "small is beautiful" in my workplace, will you be willing and able to come with further support, if we send emails asking questions and advice like that will you get you back to us? Will that be okay?).

One of the unique challenges of SORT-iT workplace-based training is the continuous disturbance by work colleagues going to the training venue to ask questions of participants even when in the training blocks. A senior faith-based health institution leader said:

> *Time findim interest lo disfala programmeia den you involve too lo other work moa lo hospital sometimes hem disturbim tumas na. Osem time you like work nao wetem work blo you but you busy more lo sampala different programme moa. Osem delayim tumas na work. Osem time me interest lo SORT-iT, me like full time but where sampala work lo hospital hem come moa, disturbim me go, go sampala mifala last minute nomoa lo research project for completem. **(2A8)**.* (When you find yourself interested in this programme and then you are also involved in other additional work at the hospital, sometimes this disturbed me a lot. Like when you want to work on your own work, but you are more busy with additional different programmes. This really delays your work. When I'm involved in SORT-iT, I want to do it full time but then some other hospital work comes along, really disturbs me, some of us end up completing our research projects at the last minute).

Other participants talked about logistical challenges. A nurse educator working at the provincial hospital, a participant in SORT-iT training, stated:

*Transport nomoa hem challenge lelebet like iumi change route, lo last training because of rain and so plane cannot go straight to Atoifi so we have to go through Auki, board the truck and then boat before arrived to Atoifi. (**1B3**).* (Only the transport is a little bit challenging, like when we changed route in our last training because of the rain and the plane couldn't go direct to Atoifi so we had to go through Auki, board the truck and then a boat before we arrived to Atoifi).

Not all SORT-iT participants had access to computers, making materials provided on a USB difficult to retrieve. A senior nurse working at the National Referral Hospital said that:

*Iufala should providim ota hard copies of the materials bae hem good ia because some of us do not access to computer. (**1B9**).* (You should provide hard copies of the materials, it would be a good thing because some of us do not have access to a computer).

The mentoring system did not work well for some SORT-iT participants during the training. Some participants reported that in-country mentors assigned to the programme were not helpful in directing and coaching them. This led to SORT-iT participants looking for people at the Ministry of Health and Medical Services who could offer guidance for their projects. Participants reported that international mentors were very busy and not able to reply to participant's emails quickly. Others said that they received auto-replies to their emails sent to the international mentors. A senior nurse working at the National Referral Hospital, a participant in SORT-iT training said:

*My international mentor – ating because hem professor ia man, so osem hem very busy, a lot of my emails machine reply them go go me move lo [SORT-iT facilitators] na. Me send go lo [facilitators] - once me send they reply – they even do some critics and analysis on my write ups and ota send back, go go me end up lo tufala. Local in-country mentor me go go lo [name] few times. Man ia, who ia that guy from TB, [name]. Mindset blo hem bara different too, time me go go lo hem, hem even like divertim topic blo me na man Time me go lo hem, bae hem se, me kolsaf go na ia osem. So mi say message hem clear lo here I just need to find somebody else (**1B9**).* (My international mentor - I think because they are a professor they are very busy, also a lot of my emails received auto-replies to them, so I moved to [SORT-iT facilitators]. I messaged [SORT-iT facilitators] – as soon as I send it to them they reply – they even did some critique and analysis of my write ups and sent it back – so I ended up with them. I went to [name], the local in-country mentor, a few times. That person… who is it, that guy from TB, [name]. His mindset is very different, when I went to see him, he even wanted to change my topic. When I went to see him, he said, 'I'm retiring soon.' So I could tell that his message is clear here, I just need to find somebody else).

A senior nurse working at the National Referral Hospital, a participant in SORT-iT training, suggested:

> *Samfala challenge lo hem, side lo mentors, I think hem good for next time iumi selectim mentor carefully. Samfala mentor wea iufala givim come first time lo mifala osem hem no work out good tumas. For me seleva me fifindim way blo me around lelebet ia. Me go first time lo oketa samfala lo here lo Ministry but go go me feelim that hem no bara really hitim the nail on the head yet until me findim wanfala. So must carefully choosim able mentor - someone wea hem duim oketa research finis and with experience osem. Not only look lo qualification, someone with experience na bae hem save critiqim you ia. Someone wea hem publishim paper finis kaen osem. (**1B10**).* (Part of the challenge is on the mentoring side, I think it would be good if we selected the mentors carefully next time. Some mentors that you gave us first time round did not work out very well. For myself I had to look around for a bit. Firstly, I went to some people here at the Ministry [of Health and Medical Services] but I ended up feeling that no one was really suitable, until I eventually found one. So we must carefully choose able mentors – someone that has completed some research and has experience of it. Not only looking for qualifications. Someone who has the experience can critique you. Someone who has published a paper already, that sort).

Participants reported emailing their work to mentors and not receiving replies. There was an expectation of getting follow up email from mentors, but this tended not to happen. A senior nurse working at the National Referral Hospital said:

> *I think lo meeting in the last training ia, osem this part of communication wetem ota mentors ia hem no happen good ia. Wan fala area like me too me fail lo hem. Oketa no_save emailim me asking me hao nao iu distaim? kaen osem. For osem follow up lo me, project blo me ia, me sendem for oketa look through lo hem but nating sedem kam baik lo me nomoa ia, so there na osem me but loose too. Me say lo mi seleva, eiiii bae diswan me save or getem knowledge lo hem too or nomoa beacuse practical part ia, hem no stret lo me yet yia man kind osem (**1B2**).* (I think in the meeting in the last training, this part of communicating with mentors was not really happening. Something that I also failed at. They did not usually email asking "how are you now?" or anything like that. To follow up on me, my project, I sent it to them to look through but they never sent anything back to me – so there I was a bit lost too. I said to myself, eiii will I gain any knowledge on this or not because for me the practical side of it was not really there yet).

Poor internet connection was identified as causing some health workers not to submit their SORT-iT application. A senior nurse working within the Ministry of Health and Medical Services said:

> *Those of us where mifala stap lo Ministry where internet hemi good, mifala barava set nao, mifala lookim. But I think lo some stories me herem nomoa that samfala people no lookim because of poor internet connection so oketa no access or oketa herem late. oketa no nap able for joinim (**1A15**).* (Those of us at the Ministry [of Health and Medical Services] where internet access is good, we were really set, we could see it. But I think from what I heard from others some other people did not see it because of poor internet connection so they did not access it or they heard about it late. They were not able to join in).

Finally, the sustainability of the SORT-iT model was identified as an issue, with concerns regarding the type of organisation best able to deliver training, accreditation for the educational programme, and recognition of qualification for participants. A senior leader within the Ministry of Health and Medical Services said:

> *I think the biggest challenge with SORT-iT training in Solomon Islands is the sustainability of the program. This is something that the Ministry of Health would have to undertake, would have to invest in so that it can actually provide the outcome that hem likem. The issue here really is institutionalizing such trainings, whether oketa come through government or private sector investment. Private here refers to SINU. Government tertiary institution investment arrangement is something where mifala lo ministry no actually look lo hem yet ia in terms of research. Are we maximizing our potential of what SINU can provide for the ministry? Institutionalizing certain trainings is important because of the issue of validation and credibility of the qualifications issued to people - you know accreditation, credibility ia (**1A14**).* (I think the biggest challenge with SORT-iT training in Solomon Islands is the sustainability of the programme. This is something that the Ministry of Health [and Medical Services] would have to undertake, would have to invest in so that it can actually provide the outcome that they want. The issue here really is institutionalising such trainings, whether they come through the government or private sector investment. Private here refers to SINU [Solomon Islands National University]. The government tertiary institution investment arrangement is something that we at the ministry have not actually looked at yet – in terms of research. Are we maximizing our potential of what SINU can provide for the ministry? Institutionalising certain training is important because of the issue of validation and credibility of the qualifications issued to people – you know accreditation and credibility).

Summary of Strcutured Operational Research and Training IniTiative Results

I have described in this chapter the complex issues that are fundamental to the SORT-iT model for building health research capacity in Solomon Islands. Several key issues were identified from the data. The SORT-iT model used in Solomon Islands was based upon a WHO programme modified for local context, run in collaboration between Solomon Islands MHMS and international partners. Research training and teaching was delivered at the workplace using an accessible 'learn by doing' approach. SORT-iT training was open to all health workers in Solomon Islands, with participants provided Solomon Islands and international mentors for each project.

Workplace projects could be achieved with very little or no financial support, which was considered a benefit of the SORT-iT model. There was a disparity between health workers who expected extra payments for attending training, and those who found the research knowledge and skills obtained from attending SORT-iT outweighed financial gain. SORT-iT participants found the cost of internet access for email communication with facilitators and mentors was often prohibitive.

Communication about applying for the SORT-iT programme was sent to health workers through the government email system, thus excluding non-government health workers. Although SORT-iT participants found it helpful that some international researchers teaching SORT-iT could speak Solomon Islands Pijin, email communication between mentors and health workers was not always effective. Active leadership from within MHMS was required to support the partnership model of leadership and management between MHMS and international universities, and to sustain ongoing SORT-iT activities in Solomon Islands.

There were positive impacts of the SORT-iT model. The programme inspired individuals to use local evidence for low-cost improvements, and new knowledge to connect health research with health provision. The programme opened peoples' minds to identify research questions and approaches, and helped increase their awareness of strengths and weaknesses in their workplace. SORT-iT enabled participants to question things, develop critical thinking skills and conduct relevant and achievable research while recognising the bigger picture. The SORT-iT programme built participant confidence in how to use research evidence, connect with international researchers, and professional development in presenting research findings at national and international conferences.

There were unique issues in the SORT-iT model. The training programme could be disrupted by workplace responsibilities. The lack of computers in some locations limited participant access to materials and communications. In-country mentors were sometimes not as helpful as participants hoped or expected, and participants did not always provide feedback on their queries from international mentors.

In the next chapter I will describe the development and structure of the Atoifi Health Research Group Model in Solomon Islands. I will explore the key factors that influence the successes and challenges of the Atoifi Health Research Group model in building health research capacity in the country identified from the data.

Chapter 7: Case study 4 - Atoifi Health Research Group model

Chapter outline

In this chapter I describe the developmental history, structure and partnerships of the Atoifi Health Research Group (AHRG) model and provide illustrations from interview transcriptions that describe the significant features and factors that influence its success. I list the academic publication outputs from Solomon Islanders involved in the AHRG model between 2008 and 2018. Qualitative data from study participant interviews is then grouped under the seven thematic categories. At the end of this chapter I summarise what the results mean for building health research capacity in Solomon Islands.

Description

Atoifi Health Research Group (AHRG) is a health systems research capacity building model employed in a rural context in Malaita Province, Solomon Islands. The AHRG model is an organic, self-governing, collaborative endeavour to build research capacity in the local health service, local communities and with national/international partners within the group. Local community leaders, health service providers and national/international researcher work together to identify research areas considered important for the local community and local health service provider. A specific project team is then assembled to work together on the research project, comprising of locally and internationally appropriate people with the skills and experience to conduct the project. Funding for the specific research project is then discussed and appropriate applications made to specific organisations to support the project. Some projects do not need funding and can be conducted within existing health service or national/international partner budgets. Research capacity is built for all involved in each project through a 'learn by doing' approach. Specific training needs are discussed at the beginning of each project and capacity building workshops then designed to suit the specific project. This may range from research methodology through to financial and resource management. The group is based at the local Seventh-day Adventist church hospital, Atoifi Adventist Hospital and adjacent Atoifi College of Nursing and involves numerous community groups, health services and three international research institutions.

The AHRG model of research capacity building aims to build research capacity through the active partnership working together to identify local issues, design projects, collect and analyse data and disseminate findings. This model generates new knowledge and evidence that is specifically tailored to inform local policies and practices in East Malaita. The AHRG model

deliberately develops practical research skills through a 'learn by doing' approach that purposefully brings experienced international and local researchers together from the very beginning to identify priority areas, develop research questions, and design and implement group research projects. AHRG research projects are purposefully intended to address historical power imbalances between community people and local health workers in East Malaita.

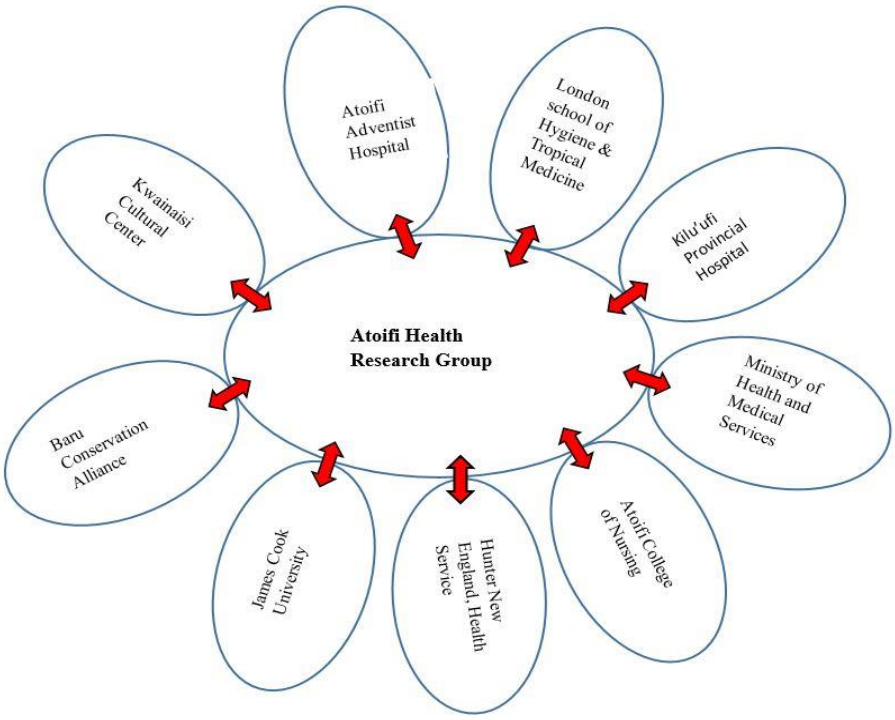
The AHRG model seeks to fill the gap that many rural health centres in Solomon Islands do not have the capacity and mechanism to conduct locally appropriate research projects to inform their own health service. The AHRG model serves as an example of how this gap can be filled at Atoifi Adventist Hospital and Atoifi College of Nursing and the surrounding communities – a remote location with no road access (an hour in motorised canoe to the nearest road and 3-5 hour truck ride to nearest urban centre), a monthly cargo boat from Honiara and two flights per week to the adjacent airstrip – with all travel dependent on weather conditions.

History

In 2008 public health researchers from JCU were invited to conduct introductory research workshops by Atoifi Adventist Hospital and community leaders (Redman-MacLaren et al., 2009; Redman-Maclaren et al., 2010). The long-term involvement by JCU public health specialists had already built a strong connection between Atoifi Adventist Hospital and the University. In 2009, a group of 102 health workers, auxiliary staff, community leaders and *kastom* (traditional culture) chiefs attended the first 5-day research workshop. At the end of this workshop, a call was made by local people to challenge the historical dominance of foreign stakeholders in public health research and to *"do more research themselves"* (Redman-MacLaren et al., 2009). Plans were made for subsequent, longer workshops to build research capacity for stakeholders, including members of the rural community.

The 2009 workshop inspired health workers at Atoifi Adventist Hospital and Atoifi College of Nursing, community leaders and public health researchers at JCU to establish the Atoifi Health Research Group (AHRG) to build health research capacity that would meet local needs (Redman-MacLaren et al., 2009; Redman-MacLaren et al., 2010). The AHRG network expanded over the years to include researchers from Hunter New England Local Health District (Australia), the London School of Hygiene & Tropical Medicine (United Kingdom), Kilu`ufi Hospital (Auki, Malaita Province) and the Solomon Islands Ministry of Health and Medical

Services. AHRG provides a hub for local and international health research projects in East Malaita. The structure of the AHRG model is shown in (Figure 8.).



(Developed by author)

Figure 8: Petal structure of Atoifi Health Research Group model

Measuring the impact of Atoifi Health Research Group projects

A formal academic measure of the impact of AHRG is to identify publication outputs by Solomon Islands participants. As with the other models, publications alone do not give a complete picture of the experience of HSRCB. I interviewed people who had participated in AHRG to capture their experience of how effective the training had been in improving their capacity and effectiveness in delivering health related research.

Introduction of the results

In this section I list the academic publication outputs from Solomon Islanders participating in AHRG between 2008 and 2018. Twenty-seven people (15M, 12F) were interviewed, these include health institution leaders, health workers, coastal Christian representatives, mountain traditional representatives, religious leaders and a hospital administrator. There was a range of experience with the AHRG model, some people newly arrived at the area, some engaged since inception of the model, and some with quite limited

experience, who were interviewed because it was important to get their views on why they were not as deeply involved in this model as their colleagues, providing potentially different perspectives on the AHRG model implementation. Qualitative data from study participant interviews is grouped under the seven thematic categories.

Findings

Academic publication outputs

Using a Medline search, 20 publications were identified from the AHRG model between 2008 and 2018. Five of these articles had a Solomon Islander as the first author. Publication details of all 20 papers are shown in Appendix 4.

Individual interviews

1. Participant experiences and perspectives on Atoifi Health Research Group model

A senior hospital leader who went to Australia for the health conference and returned to Atoifi to help establish AHRG explained the history of the group and the catalyst for the model:

> *I'm one of the pioneer of establishing research team capacity building in Atoifi, ating the first thing we do is - well research is a new thing to everybody, so we we negotiate. Me three fala wea go attendim health conference lo cairns, hem fest taim blo iumi lo Atoifi. Datfala time mifala rolim wan fala visit to ia, mifala kasem Cairns fo seekim help, ask someone to teach us what is research. Come baik lo Atoifi and den mifala discuss with leaders. **(2A11)**.* (I'm just one of the pioneers in establishing research team capacity building at Atoifi, I think the first thing we did was to – well research is a new thing to everybody, so we negotiated. Three of us went to attend a health conference ["Creating future for mental health"] in Cairns. This was the first time for us at Atoifi to attend this conference. We made one visit at that time to Cairns to look for help, asking someone there to teach us what research is. We came back to Atoifi and discussed it with the leaders).

A traditional Kwaio village chief from the mountains who also attended the health conference in Australia elaborated further:

> *Iumi go lane lane and heherem kam lelbet ba, lo wanfala health conference lo Australia, that was in 2008. ... Time oketa herem kam finis den oketa requestim help kam lo dea ba. Den Time oketa kam back, tok save lo oketa leaders lo Atoifi and from dea nao hao iumi start na ia. **(3A2)**.* (We went and learned and listened to some extent at the health conference in Australia in 2008. After listening [to the health conference] we [the village chief and hospital leaders] asked for

help. On their return we discussed this with leaders at Atoifi [Adventist Hospital] and it was from there that we started).

AHRG was created to establish a system where members of local communities, Atoifi Adventist Hospital and Atoifi College of Nursing, with an interest in research, could be actively involved in the capacity building process, supported by experienced local and international researchers. A community leader from both coastal and mountain communities who was involved with AHRG from very early in the capacity building programme, said:

> *Capacity building provided by AHRG osem hemi open for any one nomoa ia… oketa community, oketa health workers, oketa teachers, oketa man lo bush, oketa wea interest for save or learnim what na research hemi all about and how for doim research through learn by doing* ***(3A4)****.* (Capacity building provided by AHRG… is open to anybody… community people, health workers, teachers, people from [Kwaio Mountains] and those with an interest to learn and understand what research is about and how to do research through 'learn by doing').

A church and hospital leader/administrator highlighted that the model was appropriate for community-based contexts because it provides capacity building for people regardless of their academic background or community origin:

> *I think good thing blo AHRG is, hem makem research training available, open not only people wea save, ium say academic people but hem open to simple people probably oketa no garem big level of education. Iumi come on volunteer basis, hem open even to the grassroots people to be part of the research work. Hem one of the biggest if me say of all the impact blo disfala research group ia. Hem invitim everybody nomoa, no matter level of education you come, you included inside lo dea* ***(2A4)****.* (I think the good thing about AHRG is it makes research training available, open not only to people who are academic, but it is open to people who do not have a high level of education. We come voluntarily; it is open even to the grassroots people so that they can be part of the research work. I think it is one of the biggest of all the impacts of the research group. That it invites everybody despite their level of education, you come and you are included).

A nurse educator at the faith-based health institution shared his experience, and said that he was sent to join AHRG because he had been given a research role at the College of Nursing:

> *…. Also me participate and involve lo learn by doing because oketa lo School of Nursing appointim me for osem wanpala research person lo school so that's why me have to joinim AHRG.* ***(2A2)****.* (… I also participated and was involved in 'learn by doing' because the School

of Nursing appointed me to be a research person at the school so I had to be involved with AHRG in any case).

The open access to the AHRG model enabled inclusive participation in research activities and capacity building. A nurse educator at a faith-based health institution reflected:

> *Open invitation hem nice ia, hem good lo me because that's where bae you can identifym who na really interest ia, barava like tumasi for go participate or joinim na dispala health research ia. Apply ia save excludem people for joinim health research capacity building ia. People might be interested tumasi but because oketa no meetim entry criteria lo application ia so oketa miss out na (**2A2**).* (Open invitation is nice, it is good for me because that is where you can identify who is really interested, really wanting to participate or join in health research. Having to go through an application process to attend training can exclude people from joining health research capacity building activities. People might be interested but miss out because they do not meet the entry criteria to apply).

The Atoifi Adventist Hospital acts as the admininstration hub and manages ethics, and internal commuications between the AHRG model and Atoifi were reported to be good by a senior staff member at Atoifi Adventist Hospital:

> *Over the years iumi garem good collaboration between AHRG and Atoifi Hospital so there's always communication happening within these groups so that everything hem clear. Go through administrative committee blo hospital and so those process has to be followed. ADCOM ia hem too act as ethics committee. (**1A7**).* (Over the years we have good collaboration between AHRG and Atoifi Hospital so there is always communication happening with these groups so that everything is clear. Everything goes through the administrative committee of the hospital and process has to be followed. The ADCOM [Atoifi Administrative Committee] also act as the ethics committee).

Yet some Atoifi Adventist Hospital staff were not supportive of the inclusive nature of the AHRG model, stating the Hospital's partnership and involvement within AHRG must conform to the tenets of the Seventh-day Adventist church. A senior church and hospital leader at the time described the context as a 'church mission' and the 'church' rather than the 'hospital' or 'health service' to be the primary stakeholder in the AHRG.

> *Context hem mission base context, mission and vision that context ia na ones iumi save aligned follow den bae iumi save doim na research or what iumi like for doim. Hem nomoa I think hem problem and everyone bae connect come nomoa ia lo man where bae drivim ia. Hem nomoa place osem lelebet hiccough lo hem. Patchim lelebet or sit downim good so that oketa activity*

*hem work according to mission and vision statement blo SDA church because hem na osem primary stakeholder ia. Hem nao bae leadim iumi, Atoifi or church because time iumi say Atoifi ma church na ia. So suppose iumi say Atoifi you no nap detachim from SDA philosophy you must always attachim wetem na… everything context (**2A4**).* (The context is based on the Church mission, if the mission and vision is followed, we will be able to carry out research and work well together. I think that this is the only problem and everyone should connect through the organisation that drives it [the research work]. That is the part that has issues. We need to patch that issue or have a discussion to sort it out properly so that activities work according to the mission and vision statement of SDA church because the church is the primary stakeholder. That will lead us forward because when we talked about Atoifi, you talked about the church, but you cannot detach it from the SDA philosophy, you must always keep them together... all of it is included in the context).

This interviewee continued:

*Negative impact blo hem in that time, research hem lelebet done out of that context ia so time hem out of context na hem causim lelebet hiccough, people are not come out to help or people are reluctant to contribute, people are hesitant so time datwan hemi happen… you no nap achievim anything at all na ia because we are communal so ones hemi disturbim na something drivim mifala lo what we believe as a people bae you expectim no anyone for contribute. So you must come from context blo communal. (**2A4**).* (The negative impact of AHRG at that time, some research was done outside of that [church] context. When it is out of context it causes a bit of a problem, people don't come to help or people are reluctant to contribute, people are hesitant. When that happens… you cannot achieve anything at all because we are a community, and once something that drives us is disturbed, like what we believe as people, you can't expect anyone to contribute. So you must respect the context of the [Christian] community).

Despite the stance of this particular senior leader, many local village leaders, who were also Christians, maintained a commitment to the open collaborative partnership approach of the AHRG model. A village leader provided his view using a metaphor of people eating from a single table:

Think think blo me research come lo iumi lo AHRG hem osem table wea you putim different kaikai lo hem. Sampala kaikai me no save kakaem like, eiii me no save kaikaim fish ia, me livim me no kaikaim, me only pickim oketa kaikai mi save kaikaim. So side lo culture or even iumi Christian, if activity hem no fitim iumi you away from you pickim part lo culture hemi good lo chrsitians or in line wetem Christianity, in line wetem Bible you pickim. Sampala wea hem no fitim you no pickim, because hemi no fitim you. Culture is very important, even example long children of Israel oketa garem culture too ia, Moses na write about like oketa women, thirty

*days stap lo dea, culture blo oketa ia but iumi Christian iumi no adoptim today... letem culture where hem no fitim Christian, no adoptem but where hem fitim iumi pickim (**3A1**).* (I think the research coming to us through AHRG is like a table with different kinds of food. Some of the food on the table that I cannot eat, like fish, I do not eat, I only eat food that I can eat. In terms of culture or even as Christians, if the activity does not fit our context we stay away, and just participate in culture that fits our Christian context or conforms to Biblical teaching. You do not involve yourself with things that do not fit your context. Culture is very important, even for the children of Israel, who had their culture too. Moses wrote about this culture, for example women having to be isolated for thirty days at certain times. This is their culture but we Christians today do not adopt the same practice... we are free to choose from those cultural practices which fit with our Christianity).

2. Training and teaching approach in Atoifi Health Research Group model

Participants perceived the AHRG model approach to teaching and learning was effective in the local context and appropriate for the mix of individuals and institutions within the AHRG. There was consensus that the 'learn by doing' approach enabled participants to put research theory into practice through direct involvement in small research projects. A medical doctor and senior excutive at Atoifi Adventist Hospital, said:

*The good thing about "learn by doing" ia, in our setting is that practical learning hem very important because to most, research is a very new thing for our setting ia. So time iumi doim osem in a practical side blo research, at least people actually graspim concepts ia (**1A7**).* (The good thing about 'learn by doing' in our setting is that practical learning is very important because to most [people] research is a new thing. When you involve people in practical research activities, as a minimum they will actually grasp the concepts).

The AHRG model was viewed by many as culturally appropriate because in Melanesian society individuals are accustomed to learning from their elders, using a 'learn by doing' method. A research leader at Atoifi Adventist Hospital, highlighted:

*Iumi ol Melanesians, learning blo iumi hem, hem 'learn by doing' ia. Man save rememberim and understandim more lo learn by doing than by just theory ia. So time oketa actually involve lo practical blo hem and theory blo hem wantaem ahhh wetem assistance blo oketa mentor moa hem barava good something ia. And hem na me lookim hem appropriate for iumi oketa Melanesians especially side lo English hem hard lelebet for iumi too ia. No matter iumi readim but iumi no save understandim sometimes so time oketa mentors ol professors and Doctors oketa really assistim iumi by learn by doing - coaching hem barava helpful lo iumi na (**2A5**).* (As Melanesians, our learning style is 'learn by doing.' People can remember and understand

better if they learn by doing than if they just learn theory. So it is a very good thing when people are actually involved in practice and theory at the same time with the assistance of the mentors. And I see this as appropriate for us Melanesians in particular because [learning in] English is a bit difficult for us. Sometimes when we read something we do not understand it, so mentors, professors and doctors really assist us through 'learn by doing' – their coaching has helped us a lot).

Because of the inherent flexibility and local appropriateness of the 'learn by doing' approach used by the AHRG model, a village leader advocated for training to occur in his village:

> *Suppose traing hemi come, come inside lo area blo mi pala babae young people, new generation distaem babae oketa benefit lo hem ia. New generation must inside lo hem ia. For me, sampala training come, come lo here, oketa nurse lo here nomoa save benefit and most of the young people lo rural area no involve. But most population ia hem lo rural area ia, so iumi try to make that training go lo rural area, lo centre church lo villages, putim go training there. Hem nomoa mipala likem, makem sampala pikini, young people, girls, boys lo rural oketa involve for future blo oketa (**3A1**).* (Suppose we receive training in our locality, it will be our young people, the current new generation, who will benefit from it. In my experience, sometimes training happened here [at the hospital], and only the nurses here benefited from the knowledge – most of the young people in rural areas were not involved. But most of the population lives in the rural area, so we encourage training to be conducted in the rural area, at church centres in the village, do the training there – that's what we want – so that some of our rural young children, people, girls, and boys, will be involved for their future benefit).

Participants valued the theoretical knowledge and practical research experience gained from AHRG training enabling independent research, yet participants were aware that future mentoring would be necessary. As a hospital department leader expressed:

> *After oketa learnim iumi - iumi save nao, bae iumi start involve and work together wetem oketa for certain time, for iumi save how for conductim research lo any place (context) - iumi doim seleva nao. Oketa come learnim iumi, iumi takem information iumi conductim research seleva. but then iumi must also thinkim that bae iumi no work seleva olove ia, still bae iumi go back lo oketa man where teachim iumi ba, for iumi askem go sampala something more, no good sampala something iumi no save, iumi no kasem good more, bae iumi still requestim. Collaboration ia bae continue – until iumi go kasem stage where iumi save conductim research independently (**2A14**).* (After they teach us, we gain knowledge and this enables us to be involved and work together with the international research partners for a while to gain experience on how to conduct research in any place or context. Then we can do research for

ourselves. They came to teach us, and we received information on how to do research ourselves. But we must also realise that we will still work with our international research partners, we will still go back to them to ask some more questions or advice, we might not fully understand some other areas. Collaboration will continue until such time that we will reach a stage that we can conduct research independently).

Individuals sometimes found the sequence of topics in AHRG training was difficult to follow, and expressed preference for a logical structure. One of the senior nurses of Atoifi Adventist Hospital shared her experience by saying:

> *Wanfala weakness blo hem……..oketa topics blo oketa ia osem nara training different topic, nara training different topic so hem no followim particular order like – introduction, middle hem osem. I think wanfala disadvantage nomoa na datwan I mean for me personally **(2B2)*** (One weakness of AHRG model……the topics covered are different in each training session and do not follow a particular order like introduction, middle, something like that. For me personally I think that is one disadvantage of the AHRG model).

A common critique of the AHRG training programme was that even though participants gained research knowledge and skills from the training, they did not get a formal qualification. A student probationer nurse at Atoifi Adventist Hospital expressed this concern saying:

> *I think me no taken any formal qualification lo hem, look osem me joinim group hem oright, because knowledge me takem **(2A1)**.* (I think I did not get any formal qualification however my involvement with the groups is valuable to me because I gain knowledge).

Some participants did not acknowledge the local capacity available to teach and support research within the AHRG model when the international research partners were not there. The lack of understanding of local capacity within the AHRG model was evident in interviews with some participants. A senior nurse working at Atoifi Adventist Hospital said:

> *Wanfala no good something aboutim AHRG moa, osem oketa main man, oketa research experts ia or facilitators ia, osem no anyone bae hem stay wetem iumi lo here. Anyone lo iumi lo here, lo place where programmeia oketa come runim lo hem, hem must stay one lo here so that man like doim research, you garem any question you save go approachim hem, stret nomoa osem for hem helpim you out kind osem **(2B9)**.* (Another disadvantage of the AHRG model, is that the top men, the international research experts or facilitators, don't remain with us here. Someone needs to stay with us in the programme location so that if someone is doing research and has any questions they can go and ask for help).

A community leader and facilitator in AHRG described the difficulties he saw in teaching and mentoring participants:

> *I think challenge blo datwan na ia is more interested and like for learnim research but no enough local facilitators, no resources like funding… you sparkim interest ia but time everyone like for come learnim research but no enough na. Time too nara something, no time to train others at this stage ia and may be needim confident to teach others (**3A4**).* (I think challenge of [the AHRG model] is, more people are interested and want to learn research, but we do not have enough local facilitators, not enough resources like funding… we spark the interest of the people in research and when everyone wants to come to learn research we cannot help them because we do not have enough [facilitators/people]. Time is another challenge; we do not have time to teach and mentor others at this stage and we need confidence to teach others).

3. Finance in Atoifi Health Research Group model

In the AHRG model, research training was mostly conducted at Atoifi Adventist Hospital and/or Atoifi College of Nursing, free of charge. A student probationer nurse at the hospital said:

> *I think training come lo iumi,i ino iumi na go lo hem, not expensive, no torovem seleni. It cost others but mifala barava nomoa na, osem iumi no pay nomoa (**2A1**).* (I think training comes to us, we don't go to it, it's not expensive, we don't spend money. It costs others but not us, we did not have to pay).

Participants employed in the health system appreciated that the AHRG research training was conducted in the workplace. Individuals do not have to travel to attend training and remain in their health service role. A senior nurse working at Atoifi Adventist Hospital said:

> *Iumi no spendim selen for iumi go out lo Honiara, because national research blo iumi lo Honiara ia… iumi learnim research lo here na, lo institution blo iumi lo here na, come to us ia. So that is one positive thing about AHRG research training ia (**2B7**).* (We do not spend money to go out to Honiara, although our national research is in Honiara… we learn research here, in our institution here, it comes to us. So that is one positive thing about AHRG research training).

A lack of understanding was expressed by some participants on how research funds were used within AHRG. Some health workers had ill feelings towards other health workers who participated in AHRG research activities based on perceptions of how people were remunerated and funds were allocated. A senior nurse working at Atoifi Adventist Hospital described this concern:

*Hem garem challenge too ia, sampala staff not really enthusiastic or supportive lo research work. They resist and still not sure if research hem good something or nomoa to them. Oketa something osem na me can lookim lo oketa staff ia and may be oketa think of selen too ia. Oketa think say iumi takem big seleni lo research ia, but nomoa ia, sampala misconception. (**2B10**).* (There is a challenge too, some staff are not very enthusiastic or supportive of research work. They resist and are still not sure if research is a good thing or not for them. These are things that I can observe from the staff and it may be they are thinking about money too. They think we [research leaders] are making big money from research, but it's not the case, it's a misconception).

Community participants received casual payments for their time. Because these included weighting for the lack of pension provision, sick pay and holiday pay, and no accommodation, the payments at a gross level were sometimes misinterpreted by hospital staff as indicating a higher salary rate. A research leader at Atoifi Adventist Hospital commented about how research project funds were used to pay community participants:

*Wanfala something come out too financial attachment lo oketa research ia. Understanding blo iumi na is me work man lo hospital, me doim research ia, pay blo me ia hem for datwan nao ia. Okay hem true so, work man that work in one of the ward in the hospital said, why should I do the work of a research nurse for the hospital? Because even if me stap stap nomoa lo ward blo me and not doing research nurse work but by salary blo me bae come nomoa nao ia. So how because iumi save takem research project with fundings, there should be some incentive lo dea ia for nurse who works at his ward and appointed to work as research nurse for the hospital at the same time. Time no any incentive come, ae ma me stay, stay lo ward blo me ma bae me tetekem same seleni nomoa ia. Why should I involve in research? Kind financial attachment osem nomoa hem na me think for iumi discussion ia - financial attachment osem. (**2A5**).* (Something that came out too is financial arrangements for the research work. Our understanding is I'm working for the hospital, if I do research, my pay is to do research work. Okay that's true, so if someone who works on a hospital ward asks why they should do the work of a research nurse for the hospital, it's because even if they stayed on the ward and were not doing the work of a research nurse for the hospital they will still get their salary. So because we know research projects take funding, there should be some extra pay for a nurse who works on the ward and at the same time is appointed to be a research nurse for the hospital. When there is no incentive, even if they [the nurses] stay on the ward they [the nurses] will still take the same money [salary]. So why should they get involved in research? That is the kind of financial arrangement that I think we need to discuss).

Some permanent Atoifi Adventist Hospital staff were unhappy when they thought that casual wages received by trained community people who worked as research assistants in AHRG community-level research projects were higher than their own wages as hospital staff, even though they were working on the same projects. A research leader at Atoifi Adventist Hospital continued to elaborate:

> *Okay sampala mifala work for hospital salary blo mifala small. Sampala man work for AHRG salary blo oketa big, but iumi work lo same work nomoa, Atoifi research ba nomo ia. Mifala hospital payim mifala, nara work man research payim oketa but hem lelebet higher than us ia. So question is on what base should it be different and iumi work lo same project nomoa? So all these things hem come up. Suppose osem bae sampala man bae tok osem, ma me sastap lo here but salary come, come nomoa. If man where hem lazy for learn about research bae think, think blo hem bae osem ia. (**2A5**).* (Okay some of us work for the hospital, for a small salary. Some people work for AHRG and are paid a lot, but we are working on the same project - Atoifi research. We are paid by the hospital, the other people are paid by research, but they are paid a bit more than us. So the question is on what basis should it be different while we work on the same project? So all these things came up. If this is the case now some people will say, even if I stay here (hospital) my salary will still be paid. If that person is not interested in learning about research, they will think in that way).

Even though research training provided by the AHRG model was free to individuals, the approach to funding used in the AHRG model meant the finance available for projects and training was sporadic. A senior nurse working at Atoifi Adventist Hospital noted this concern:

> *Weakness blo hem nomoa hem no consistently continuous, osem hem adhoc nomoa man. Look osem lo time iumi garem selen nomoa iumi go heti, time nomoa selen nomoa na osem. Stay, stay, go, go, go seke training mao, hem come up. (**2B9**).* (A weakness of AHRG model is, that it is not consistently continuous, it is adhoc. It seems when the funds are available, we do the training. At times when we don't have funding there is no training. Training just happens suddenly at no fixed time).

4. Communication in Atoifi Health Research Group model

Participants highlighted that in Melanesian society people practice communal understanding and communal achievement, which means people work together to get things done. However, communalism at Atoifi Adventist Hospital is also contextual and often means to conform to the tenants of the SDA church. This church-based communalism that is characteristic at Atoifi Adventist Hospital can then be exclusionary and be problematic for

partnerships with 'others' such as international researchers or non-Christian people from the surrounding communities. A senior person who is new to AHRG reflected:

> *Ia lo negative, bae me say nomoa, suppose iumi no passim proper information osem before come, come blo oketa ia so bae – staka people garem different think, think too ia so sampala people bae no really likem na idea of outsiders coming in and –ol garem different think, think lo – otherwise hem should oright nomoa ia osem negative side nomoa ia datwan may be bae ol no understandim na research programme– so proper explanation. So oketa negative think, think lo workshop, may be because oketa lookim na oketa Whiteman na come runim or – but suppose ol look, go, go, go distaem oketa staka lo most people come, come na – den iumi deal wetem oketa lo bush more – oketa bae say eiiiii how more ia? So bae iumi need for explainim good for oketa no garem oketa kind think, think osem (**2B8**)* (I would say it is a negative if we do not provide proper information before the arrival of [the international research partners], many people have different ideas, some people don't like the idea of outsiders coming in and others have different thoughts about this. Otherwise, it should be okay, the only negative side of it is they will not understand the research programme, so a proper explanation [is necessary]. The negative thought of people regarding the workshop may be because they see white men come to do the training but if this becomes the usual thing, most people will come along. And then when you deal with [non-Christian] traditional highlands people, they will ask about it. They will ask 'what's the deal here?' So we will need to explain it well to them [Seventh-day Adventist Christians] so that they don't develop this kind of thinking).

Staff at Atoifi Adventist Hospital expressed different experiences of the quality of internal communication within Atoifi Adventist Hospital about AHRG activities. Some nurses said that internal hospital communication systems work well because they were well informed by the leaders about the AHRG research programmes before activities were implemented, while others said that internal hospital communication systems did not work well. One of the senior nurses working at Atoifi Adventist Hospital explained the process:

> *Usually what hem happen lo here nomoa is, bae oketa save notify nurses about the upcoming training or leaders writim memo or talk save during nurses meeting. Oketa awerim oketa nurse that bae hem garem wanpala training lo research happen and any one where hem interested, you most welcome for come and attend the research trainings. (**2B2**).* (Usually what happens here is, they notify nurses about the upcoming training or leaders write memos or announce it during the nurses meetings. They informed the nurses that there will be a research training event and anyone that is interested is most welcome to come and attend any research training).

However, a student probationer nurse felt more needed to be done:

> *Educatim people aboutim too ia, promotim, educatim people because sampala mipala say research hem blo head nomoa osem sampala people talk about. Educateim people about the importance of health research man. Because sampala ia osem lelebet negative lo hem ia , oketa say eiiii school blo man ia nomoa ia osem, no benefit lo oketa say. Educatim first time people for oketa garem clear mind aboutim because hem nice programmeia (**2A1**).* (Educate people about [the AHRG model] too, promote it, and educate people about it because some of us thought that research was only for high ups, some people have actually said this. Educate people about the importance of health research because some people were a bit negative about it, they said this is for this man's educational benefit, it did not benefit them. Educate the people first so that they have a clear mind about [the AHRG model] because it is a good programme).

Some community members expressed they were not well informed by Atoifi Adventist Hospital about AHRG programmes before they were implemented. For example a coastal village leader said:

> *For research before sampala people come for runim training sometimes mipala lo rural area, mipala no save nomoa ia. Only iupala health man nomoa aware long hem. So look osem hospital and JCU nomoa sostory ia, den something happen. But mipala lo rural no save, mipala no understandim what na gogoheti ia. For me, hemi no good ia, because reses come for mipala, and mipala must undersytandim, rural area people must understandim. What nao educated people save mipala too must save ia, whether hem something for spoilem mipala or something for benefitim mipala, mipala must save (**3A1**).* (Before people came to run the research training, sometimes people in the rural area did not know. Only the health workers were aware of the training. So it seemed that the hospital and JCU discussed it before something happened. But the people in the rural area did not know, we did not understand what was going on. To me this is not good, because research comes to us and we need to understand it too. We also need to understand what educated people know about research capacity building done through the AHRG model. We must know whether that research is going to benefit us or not).

5. Leadership and management in Atoifi Health Research Group model

The AHRG model leadership and management principles were set up to be based on social equality, inclusivity and respectful collaboration. This leadership and management style is celebrated and encouraged in Melanesian society. A church and hospital leader and administrator highlighted that:

> *Different people contribute inside lo AHRG model ia osem. Iumi lo here no matter oketa people no save read or write or may be oketa no academic good but at least oketa understandim nao*

research and den time oketa understandim research oketa work wetem iumi rather than people work on top lo oketa osem before. I think the keyword is "with" and not "top down" time hem "with" hem more collaborative in nature, hem bringim togetherness and communal understanding and communal achievement rather than a single person's achievement. Simply because lo context blo iumi lo Melanesia communal na osem hem important, not individual. It is communal attitude na blo mifala man lo Melanesia… so time you openen research to everybody lo that level hem applicable and its achievable for many more other things that bae hem happen. Iumi like for changim attitude, iumi like for bringim a good outcome ***(2A4)***. (Different people contributed to AHRG model. It doesn't matter to us if people cannot read or write or maybe not good academically but at least they understand research and when they understand research they work with us rather than people work top down like before. I think the keyword is "with" and not "top down" when we work "with" it is more collaborative in nature, it brings togetherness and communal understanding and communal achievement rather than a single person's achievement. Simply because in our context in Melanesia, the community is important, not the individual. It is a communal attitude. This is what it is like in Melanesia and even in Polynesia too, so when you open research to everybody at that level it is applicable and achievable for many more other things that will happen. We want to change attitudes, we want good outcomes).

Leadership and management in the AHRG model were described as appropriate because they provided an environment for individuals to develop and build research capacity. To develop and build research capacity individuals must be interested to learn about and do research, and need to see the importance of doing research for improving health outcomes. The same church and hospital leader, said:

Voluntary nomoa ia, osem oketa invitim iumi nomoa. Hem lelebet different more lo sampala capacity building wea oketa choosim who nomoa for go ia man, but lo here oketa invitim you to be part of the training, any one where like go, hem go, any one where hem busy hem stay, any one hemi lazy hem lazy, so voluntary base nomoa before oketa undertakim. I think hem way for boostim na capacity building ia. Lo context blo iumi hem meanim osem, we want as much people who have the heart to involve in it. So time you usim the concept of volunteer hem encompassim kind people where oketa garem heart for improve something. Oketa like for make sure whatever area oketa study lo hem bae hem do things differently, based on their findings ia ***(2A4)***. (They invite us on a voluntary basis. It's a bit different from some capacity building where people are selected to take part, here when you are invited to be part of the training anyone can go. Anyone who is too busy or too lazy can stay at home. So the training is voluntary. I think this is the way to boost capacity building. For us, in this context, we really

want people to get involved whose hearts are in it. So when you consider the concept of a 'volunteer', this encompasses the sort of people who have the heart to improve things. They want to make sure that whatever they study, the people will do things differently based on their findings).

Establishing an internal research system/structure within Atoifi Adventist Hospital that could coordinate the hospital's partnership with the AHRG model was described as important. This internal system needed to provide a clear process for how the hospital and attached College of Nursing staff and students can systematically access the AHRG research activities. A senior health and research leader at Atoifi Adventist Hospital who has been an active and supportive member of AHRG from the very beginning, stated:

> *When we talked about staff and students lo here hem, garem road for linkim go na oketa ia lo AHRG ia. For students bae hem through lo College of Nursing. College of Nursing hem garem research officer wea hem responsible for enablem nao oketa research activities for happen lo school. Time oketa come doim research blo oketa lo hospital bae oketa come through lo hospital. Lo oketa staff lo hospital mifala creatim research department wea mifala garem research nurse for look afterim oketa hospital workers, include nurses, paramedics. Everyone bae come under research nurse nomoa for link go lo AHRG. So who ever garem interest for doim or conductim research osem come through na lo oketa system or process ia (**2B10**).* (When we talked about staff and student here, there is a road to link them to AHRG. For students they go through the College of Nursing. The College of Nursing has a research officer who is responsible for enabling the research activities to happen at the school. When they come and carry out their research at the hospital they come through the hospital [system]. For the staff who work at the hospital, we created a research department that a research nurse looks after. The hospital workers, including nurses, paramedics, everyone comes under the research nurse to link to AHRG. So whoever has an interest in doing or conducting research has to come through these systems or processes).

Despite the establishment of the internal system and the support for research culture that was present, some health workers highlighted that the system did not work for them. For example a senior nurse working at Atoifi Adventist Hospital, said:

> *Only one wea me barava joinim na disfala symposium ia nomoa, me barava joinim fulltime – other trainings wea hem been come ia oketa no really, really osem clarify guti lo mifala who na for go osem. So time oketa come doim training lo here oketa no clarfym guti okay you na bae full time, everyone bae come or osem. So sometimes me no save joinim too ia because me barava no save but me like joinim ia, but mifala especially me, no clear. But time me lookim*

*certain people come ohhh, I think blo oketa nomoa ia osem but then after me findim out that nomoa, evening too bae nara session moa ia and iufala save come attend, time ia na just save ohhh so hem blo mifala everyone nomoa osem. Hemi open invitation nomoa ia but invitation ia na hem no clear samfala mifala (**2B4**).* (The only [training] that I attended was the symposium – which I attended fulltime. In other training we had before, nobody made it clear who should go to them. So when they came and did the training here they did not clearly inform us as to who should attend full time, it was just like everyone could come. So sometimes I didn't know to come because I was not well informed but I really want to join the training but this wasn't clear to my group and especially me . But when I saw certain people attend, I thought the training was just for them but after I found out later it wasn't the case. In the evening there was another session and they said that anybody can come and attend, that's the time that I realised that it was for everybody. It's an open invitation, but the invitation was not clear to some of us).

Some Atoifi Adventist Hospital staff were frustrated with the leadership and management of the hospital and its ability to support the internal hospital systems required to fully engage with the AHRG model. A nurse research leader at the hospital, commented:

*If we really serious about this issue - Atoifi research department, I think office hem very important. Me think, think osem, iumi raisim diswan lo national research department blo iumi lo ministry of health for establishim wanfala office lo here now, because iumi likem Atoifi to take the lead for research lo iumi lo hospital and/or province ia. They could assist in that and assist in research ahhhh budget, equipment's ia for hospital and training of research nurse for save what for doim or research director. Because appointment to be a research nurse for the hospital just come but we need training (**2A5**).* **(**If we are really serious about this issue - Atoifi research department, I think the office is very important. I think like this, we raise this to our national research department at the ministry of health to establish an office here now, because we want Atoifi to take the lead in research here in our hospital and province. They could assist in that and assist in research, um, budget, equipment for the hospital and training of the research nurse to know what to do or the research director. Because the appointment to be a research nurse for the hospital just happened but we need training).

However, some people would prefer the AHRG model to be under top-down control of the SDA church. A community leader and facilitator called for AHRG to conform to the rules of the Seventh-day Adventist church:

I think side lo guideline na is – like for example lo Atoifi hospital it has to be guided by the principle and the policy of the church and the institution. I think hem nomoa the only thing where hem have to osem guidim iumi na ia, because we operate under church insitution. So lo

*oketa rules blo iumi, there must be a respect between ol different partners and different institution where iumi garem relationship wetem oketa (**3A4**).* (I think in terms of the guideline, like for example in Atoifi Hospital, it has to be guided by the principle and the policy of the church and the institution. I think that is the only thing that will guide us, because we operate under the institution of the church. So by our rules, there must be a respect between the different partners and different institutions we have a relationship with).

A medical doctor at Atoifi Adventist Hospital expressed similar sentiments:

*Importantly everything iumi doim must reflectim na mission and vision blo church because this is church institution ia man and hem primary stakeholder ia. Inside lo institution hem na osem bae controlim and accommodatim everyone (**1A7**).* (Importantly everything we do must reflect the mission and vision of the church because this is a church institution and it is the primary stakeholder. Inside the institution, this will manage and accommodate everyone).

6. Impact of Atoifi Health Research Group model

Many positive impacts were described by participants, including effective capacity building in research, and the application of the programme to help find solutions to local issues. There was also praise for the way in which it brought diverse community stakeholders together for a common purpose. People discussed how it broadened their perspective on both local and international research as well as providing an introductory pathway to further formal training. A medical doctor and a senior executive at Atoifi Adventist Hospital noticed participants had gained knowledge of the research process:

*Those who are part of health research group, oketa where joinim ia, oketa garem that knowledge on how to do research… at least oketa save doim small research blo oketa, finding information, so time discuss wetem oketa you can see… their training has led them to have research mind set, for find information (**1A7**).* (Those who are part of the health research group, those that joined, they have that knowledge on how to do research… they know how to conduct their own small research, finding information, so when you talk with them you can see… their training has led them to have a research mindset, to find information).

The AHRG model of capacity building was valued by Kwaio people and many Atoifi Adventist Hospital health workers as providing a general understanding of research processes and how research findings help provide solutions to local health problems. A community leader of both coastal and mountain communities stated:

Think, think blo me, capacity building hemi training where helpim iumi for understandim what na research is all about, especially oketa health research and for trainim iumi for iumi look

*save what na research is and also why na research hem important and then what na sampala good something about research (**3A4**).* (I think that capacity building is a training that helps us to understand what research is all about, especially this health research and to train us to understand what is research and also why research is important and what are some of the good things about research).

The AHRG principle of inclusivity challenged the negative attitude of Atoifi Adventist Hospital health workers toward Kwaio people. A senior nurse working at the hospital discussed this and a change she had noticed:

*"I can say hem improve little more – before hem garem challenge wetem communities but now – though hem still garem challenge lo dea but you can work freely wetem community, you can talk openly and all these – ol community if ol garem some challenges wetem iumi but oketa talk openly wetem iumi too – so there's some clear collaboration wetem community and hospital" **(2B10)**. (*I can say it improves a little more. In the past we had challenges with the communities but now even though we still have challenges there, you can work freely with the community, you can talk openly and all of that - communities if they have some challenges with us, but they can talk openly with us too - so there's some clear collaboration between community and hospital).

The AHRG model promotes relationship building between health workers and the communities they serve. It creates an environment for individuals, groups and/or institutions to come together to learn and do research in a way that meets everybody's learning needs and promotes equality and equity. A senior hospital leader observed health workers were engaging with community to address local health needs and priorities:

*Me lookim that disla training or capacity building activities ia, hem barawa buildim relationship blo ota community and health workers ia. Before health workers just sitting on their desk or in the clinics or in outpatient just waiting for ota people wetem problem to come and then ota interviewim patient while they sick. But when oketa doim disfala research training or capacity building, health workers go down to the community and talk with the people, asking them thier problems and what can we do together to address them,. In this way relationship ia hem build na. Health workers and the community plan together for solvim problem. So ota people in the community ota recievim that care, find better solution lo issue blo oketa. Last time ba mifala go nomoa iumi just maybe force them to accept our services and how for usim, bae mifa kam nillam iufala osem, we never discuss and elaborate more lo why we do things and get response from oketa what is the best way to do things, osem so, in that way me feelim that community are feel respected (**2A11**).* (I see these training or capacity building activities really

build a relationship between the community and health workers. In the past health workers just sit at their desk or in their clinic or in the outpatient [department] just waiting for people with problem to come and then interviewing the patient while they are sick. But when they do the research training or capacity building, health workers go down to the community and talk with the people, asking them about their problems and what we can do together to address them. In this way we build a relationship. Health workers and the community plan together to solve problems. So the community people receive that care, find better solution to their issues. In the past we just go and maybe forced them to accept our services and how to use them, we've come to inject you, we never discussed and explained why we do things and get a response from them [about] what is the best way to do things, so in that way I feel that the community feel respected).

One church and Atoifi Adventist Hospital leader and administrator also saw this as a positive outcome:

*I think good thing of AHRG… hem open even to the grassroots people to be part of research work. Hem one of the greatest and biggest if me say of all the impact blo disfala research group ia. Hem invitim everybody nomoa, no matter level of education you come, you included inside lo dea (**2A4**).* (I think the good thing about AHRG… it was open even to the grassroots people to be part of the research work. It was one of the greatest and biggest if I can say of all the impacts of this research group. It invites everybody, no matter the level of education you have, you are included in it).

The AHRG model provided a mechanism that connects various individuals and institutions and was highlighted as a positive impact. For example one senior leader of Atoifi Adventist Hospital said:

*Time me joinim, side lo research osem me garem staka avenue or places where me save seekim help or something osem. Me garem team lo dea for helpim me because mifala work lo wanfala same something, try for achievim same goal example for me, me link wetem [name] at JCU so hem save helpim me lo sampala things hem lookim, ohh you should osem for improvim work blo me. So you garem network for you save hook up lo hem, anything you no save you save seekim advice through lo network ia (**2A8**).* (When I joined, in the research field I have many avenues or places to seek help. I have team there to help me because we work on the same thing. Try to achieve the same goal, in my example, I linked with [name] at JCU so she usually helped me on some things that she saw I need to improve in my work place. So you have network that you can connect with, anything you do not know you can seek advice through this network).

Participants from Atoifi Adventist Hospital acknowledged the AHRG model provides them opportunities to attend and present at national and international health conferences. Attending health conferences helps them to realise the scope and importance of their respective work responsibilities at the hospital. The same senior leader highlighted:

> *important lo hospital ia osem even people oversea ia oketa barava think big tumasi lo hem ia, so time me come back na me just, ia man ino something you doim den you rest, den next week more you involve back lo hem, nomoa ia. Hem should everyday work na ia, but hospital leader just say wanfala time lo one week nomoa you come work osem infection control. So me request and oketa letem me for work three more days, so me lookim barava helpim me moa time me inside lo disfala programmeia. Den me go out exposed osem lo conference den me come back me lookim dat disfala work hem important lo hospital (**2A8**).* (Man, after I went to the conference, I realised that my work is not a small thing, it's very important to the hospital, even people overseas think that work is very important. So when I came back I thought that is not something that you do once and then rest until next week when you do some more, no. It should be the usual work, but the hospital leader just told me to do it once a week in infection control. So I asked and they gave me three more days of work a week. I could see that this helped me when I was working on that programme. When I experienced the conference and came back – I could see the importance of this work to the hospital).

Senior health workers at Atoifi Adventist Hospital reported that the AHRG model played an important role in preparing health workers for university level research training. Some said the AHRG model of capacity building makes learning about research easier in their undergraduate studies. As one senior nurse working at Atoifi Adventist Hospital commented:

> *Some of them where oketa go out for doim trainings I mean school blo oketa – oketa come back oketa talem that – disfala research where iumi dodoim lo here hem lelebet helpin iumi for time iumi go out – sampala oketa barava no even herem about research den oketa go doim ahhhhm school blo oketa so oketa findim hard tumas osem – so lo me time oketa come doim oketa small training osem – hem helpim mifala every one for prepare mifala seleva (**2B4**).* (Some of them that went out [overseas] to do training, I mean their study, they came back and said that 'this research that we do here helped us a bit when we went out [overseas].' Some of them had not even heard of research before going to do their study, so they found it very difficult – so it seems to me that doing the short training helps us all prepare ourselves).

The AHRG model of capacity building also created opportunities to connect and collaborate with international research partners. As a nurse research leader at Atoifi Adventist Hospital, explained:

*[Name] hemi joinim iumi na because iumi go report lo Honiara ba kind osem. So hem wanfala iumi go lo symposium lo Honiara and that iumi linkim [Name] from London School of Hygiene and Tropical Medicine. (**2A5**). (*[Name] joined us because of our report at the health conference in Honiara. So we went to a symposium in Honiara and then we linked up with [Name] from the London School of Hygiene and Tropical Medicine).

The research capacity that has been built at Atoifi Adventist Hospital and Atoifi College of Nursing through their active partnerships within the AHRG model is now being recognised throughout the Solomon Islands. Staff from Atoifi Adventist Hospital and College of Nursing are now being invited to other hospitals within the Solomon Islands to collaborate on research projects and explain the AHRG model. A senior church leader and administrator explained how AHRG trained staff are seen as especially skilled members of the Atoifi Adventist Hospital community:

*Oketa other hospital lo country ol look lo Atoifi and ol start for interest too- ol like for doim research so last year oketa invitim – Kilu'ufi hospital invitim group lo Atoifi for go conductim simple research methodology and how for conductim research lo dea – something has never happen in the past – we are seeing that nao. Ministry of Health oketa very supportive lo Atoifi – time me attendim oketa meetings especially – what na oketa callem? Symposium hem na me herem oketa talk very high lo Atoifi – outcome ia – from what iufala start although hem very little but now people begin to realize that Atoifi staff oli especially those in the AHRG – oketa gat skills and knowledge that bae oketa sharim with other colleagues round the country in terms of health research. Hem na how me lookim go ia – staka iumi no realizim (**2A9**).* (The other hospitals in the country all watched Atoifi and they begin to get interested too. They want to do research, so last year Kilu'ufi hospital invited the Atoifi group to go and conduct simple research methodology, how to conduct research there. Something that has never happened in the past - we are seeing that now. The Ministry of Health [and Medical Services] is very supportive to Atoifi, when I attended the meetings especially – what do they call them? Symposium that's when I heard them talk very highly of Atoifi – result! – from what you have started even though it is very little but now people begin to realise that Atoifi staff especially those in the AHRG, they have the research skills and knowledge that they will share with other colleagues around the country in terms of health research – that's how I see it - many of us don't realise this).

However, not all participants reported entirely positive impacts. One of the probationer nurses, just graduated from nursing school but engaged with AHRG since being a student,

highlighted that they did not feel there was always enough time to complete projects, and they lacked knowledge of how to disseminate their findings. The nurse said:

> *Challenge blo AHRG nomoa is, sometimes umi doim research but no save publishim nomoa work blo iumi or hem no complete. Oh ia umi garem findings from research but then no anything nomoa umi doim afterall – findings done but no implementation, no change to policy or practice. Research ia hem oraet nomoa, time of delivering or doim research ia hem short tumas for me fala hem. [Leader] just givim me fala ating how many weeks nomoa but me thinkim for doim research hem should tekem long time* ***(2B6)****.* (The big challenge for AHRG is, sometimes we do research but don't know how to publish it or it was not completed. Oh yes we have findings from research but then we did not do anything with it after all. Findings are done but there is no implementation, no change to policy or practice. Research is really good, time to implement or do the research is too short for us. [Leader] just gave us… thinking how many weeks, not enough? But I think to do research it should take a long time).

7. Unique Issues of Atoifi Health Research Group model

The collaborative principles that underpin the AHRG are a strong characteristic of the AHRG model. The AHRG model, in theory, helps to develop and establish relationships between the different individuals and institutions within the group. The AHRG model poses a challenge to the historic power dynamics at Atoifi Adventist Hospital as it demands the inclusion of non-Christian people in projects undertaken at the hospital. Historic and contemporary intolerance openly expressed by some Seventh-day Adventists toward Kwaio people who continue to observe traditional non-Christian cultural practices creates a degree of tension in the AHRG model. Some health workers at Atoifi Adventist Hospital believe that the main aim of the hospital is to convert pagans to become Christians. As one nurse research leader at Atoifi Adventist Hospital explained:

> *Iumi work, work, ia but tufala think, think ia stap asta why iumi no work, work good yet ia. Me feelim, majority say we do not need because iumi encouragim paganism ia, iumi should reach out lo everyone and everyone should be converted into Christianity something osem hem na main aim and why AAH [Atoifi Adventist Hospital] stap lo here, ino for encouragim datwan so time hem come oketa man no interest lo hem na* ***(2A5)****.* (We work a lot, but there are two conflicting ideas here, that's why we still do not work well together. My feeling is that the majority say we do not need [research work] because we encourage paganism, we should reach out to everyone and everyone should be converted into Christianity, that sort of thing is the main aim and why AAH [Atoifi Adventist Hospital] is here, not to encourage that [paganism]. So when it [research work] comes people are not interested on it).

Other health workers at Atoifi Adventist Hospital described the omnipresent tension as an epic struggle between good and evil. People who are Christians are described as on the side of good and people who are not Christian are described as on the side of evil. Health service provision, local evidence from local research, research capacity building and collaborative models such as the AHRG model may be perceived through this lens. A senior faith-based health institution leader and administrator, stated:

> *People need to be educated before ol save acceptim oketa kind ia because lo view lo church - think, think blo oketa for helpim people hem for make people change from paganism into Christianity. So time iumi doim oketa activities where strongim yet oketa traditional custom ia, ol lookim osem hem againstim na principle blo churh na ia. Oketa lookim Kwainaisi as a heathen or pagan entity so time iumi involveim oketa come wetem health research blo iumi and iumi doim sampala health project like herbs for example ma people ia bae takem wrong idea about it na ia, so asta why there will be always a challenge in that area, bae iumi educate oketa about it. Paganism and Christianity hem tufala entity where always go against each other lo here. Lo teaching blo iumi the great controversy between good and evil na ia, ol lookim Kwainaisi as darkness, side blo Satan, and ol lookim iumi lo Atoifi as side blo church, so time iumi combinim tufala it doesn't fall in well in the minds of the local community Christian people asta why ol no save happy (**2A9**).* (People need to be educated before they can accept those kind of things because the church point of view, they think you help people by converting them from paganism to Christianity. So when we do these activities that strengthen traditional customs, they see that as against the church principles. They saw *Kwainaa`isi* as a heathen or pagan entity so when we involve them with our health research and we do a health project like herbs [traditional medicine] for example people will get the wrong idea about it. That's why there will always be a challenge in that area. We should educate them (Christian health workers) about it. Paganism and Christianity are two entities that always go against each other here. In our teaching this is the great controversy between good and evil. They see *Kwainaa`isi* as darkness (aligned with Satan) and they see us at Atoifi as aligned with the church. So when we combine the two it doesn't go down well in the minds of the local Christian people that is why they are not happy).

The more conservative Atoifi Adventist Hospital staff are unhappy with what they see as the disrespect some outsiders have for faith-based SDA rules and practices and want outsiders to conform. A new member in the AHRG and a senior health leader stated that:

> *Seeing somebody going down to the research room at the School of Nursing. Understanding the context that this is a Seventh-day Adventist institution. The timing that it is appropriate for them to go down there is important to consider, example we are Sabbath keepers, in the*

*agreement or the understanding do we honour the regulations of the use of the facility blo church? – hem ia oketa save nomoa ia SDA place ia oketa lookim go but Sabbath everyone go inside lo research room. For any reason iumi should rest. Time oketa come lo here oketa must respect, oketa hard for say ohh ,me likem iufala Atoifi for accomodatim what me believe lo hem and osem, no – because setting lo Atoifi was set to be a light house and our purpose is to evangelise so within our setting rules and regulations must be respected. Purpose blo God is set up here and bring the gospel to the heathen. For iumi denym that purpose for oketa people ia nomoa (**2B1**).* (Seeing somebody going down to the research room at the School of Nursing. Understanding the context, that this is a Seventh-day Adventist institution. The timing that is appropriate for them to go down there is important to consider, for example we are Sabbath keepers, in the agreement or the understanding do we honour the regulations of the use of the church facility? They know this is an SDA place, everybody saw them go into the research room on the Sabbath. No matter what, we should rest [on the Sabbath]. When they come here, they must show respect, they cannot say 'ohh Atoifi people must accommodate what I believe', no. Because Atoifi was set to be a beacon and our purpose is to evangelise, so within our setting rules and regulations must be respected. God's purpose is to set up here and bring the gospel to the heathen. We cannot deny that purpose).

Many Christian health workers could not understand the holistic approach to health that included research projects that focused on environmental health impacts, including the role of clean air, water and traditional medicinal plants. Some were unsupportive of the AHRG focus on these determinants of health, seeing them as an unrelated environmental conservation issue. A senior nurse working at Atoifi Adventist Hospital clearly expressed that:

*for me, me no understandim na how na hem link come ia – so osem think, think blo me nomoa, how if health seleva and conservation seleva na and if there is any health issue iumi save go research lo hem but otherwise should be separate (**2B4**).* (To me, I don't understand how it connects up – so this is what I think, how about if health is one thing and conservation is another thing, and if there is any health issue we can go and research it but otherwise it should be separate).

Another nurse and research leader at Atoifi Adventist Hospital, who participates in AHRG, went further to advocate for the separation of hospital activities from conservation and cultural activities under the AHRG banner unless there are very clear health related links because of potential confusion between conservation, culture, and health issues:

Think, think blo me – let hospital alone but we can understand each other ia… maybe we can link somewhere in the future but at this early stage ia we need to separate. Anything where hem

*related to health, datwan hem topic blo health ia, hem no garem any boundary wetem conservation osem - it's not conservation, hem come under health research, no problem. But letem conservation and cultural operate/work differently from health research, letem Kwainaa`isi osem petal nomoa so that this Atoifi health research department hem deal directly with the Ministry of Health not AHRG (**2A5**).* (I think leave the hospital alone but we can understand each other… maybe we can link somewhere in the future but at this early stage we need to separate. Anything that relates to health is a health topic, there is no boundary with conservation, it's not conservation, it comes under health research, no problem. But let conservation and cultural [matters] operate or work differently from health research, let *Kwainaa`isi* [the *Kwaio* cultural centre] be a petal so that this Atoifi Health Research Department deals directly with the Ministry of Health [and Medical Services] and not AHRG).

However, despite evidence of historic and contemporary conflict of ideas and perceived purposes, not everyone advocated for a complete separation between Christian and non-Christian organisations/institutions within the AHRG model. A faith-based health institution leader and administrator stated that Christian people should not avoid non-Christian people, but be friendly to them:

*So long as iumi avoidim oketa, asta why problem, problem, problem olove but suppose iumi friendim oketa people and provide for oketa bae relationship strong think, think nomoa (**2A9**).* (So long as we (Christian people) avoid them (people who have not converted to Christianity), that is why we face problem after problem always. But if we are friendly to those people and provide for them, I think our relationship will be strong).

Community leaders often had very different perspectives from the more conservative health workers at Atoifi Adventist Hospital. While acknowledging the historic intolerance, a young community leader advocated for strengthening networks, partnerships and relationships, stating:

*For success lo research you have to garem linkage na ia, network, partnership na ia. Datwan hem very, very, important and so lo me – me no findim any problem lo linkage and network wantaem oketa lo bush. Because for garem that network hem bae hem easy for bae iumi garem relationship wetem oketa people lo Bush ia (**3A4**).* (For successful research you have to have a linkage, network and partnership. This is very, very important and so to me I did not see any problem linking or connecting with people from the bush [*Kwaio* mountain people]. Because to make that network makes it easier for us to have a relationship with people who live in the mountains).

The same person continued to describe the principles of collaboration on which the AHRG was established. Although not a health worker, he articulated the principles of the Hippocratic Oath and the Nurse's Pledge, and advocated for 'health for all'. He expressed the need to see everyone's values and beliefs as equally important:

> *Lo me it's a good idea, me support because when you talk about health it is health for all ia. Iumi sing about, iumi talk about. What do we mean by health for all? Oketa people lo bush oketa people too ia. We need to see things from other people's perspective too, staka time iumi osem look from church and insitution's point of view which is hem good but iumi must also look too lo what na need blo oketa people, how na bae iumi addressim. Hem very important for people lo bush where oketa custom and culture, iumi need for respectim oketa, for look save what na need blo oketa too osem (**3A4**).* (To me it is a good idea, I support it because when you talk about health, it is health for all. We sing and we talk about it. What do we mean by health for all? Bush people are people too. We need to see things from other people's perspective too. Many times we look at things from the church and institutional point of view, which is good but we must also look at what people's needs are, how we can address their needs. That is very important for bush people, we need to respect their custom and culture, to also recognise their needs).

Summary of Atoifi Health Research Group results

In this chapter I have described the complex issues that are fundamental to the AHRG model for building health research capacity in Solomon Islands. Several key issues were identified from the data. The AHRG model was open to all people interested in becoming involved in learning about research, and the system fit the local context very well. Some Atoifi Adventist Hospital staff expressed negative views on the inclusion of non-Christian stakeholders, whereas community people wanted open collaboration.

A 'learn by doing' approach was employed in the AHRG model for training and teaching. This enabled collaboration between all stakeholders and was viewed positively by village leaders. However, newcomers were confused by the 'learn by doing' approach and some had difficulties relating to the structure of the training programme. To answer research queries, international support was preferred, reflecting a lack of trust in local capacity to support and teach research at Atoifi.

Finance came from multiple stakeholder sources, and participants could attend and learn at no cost to them. There were no travel costs as training was workplace-based. However, funding was intermittent and unpredictable, and there was limited understanding of how funds

were used by leaders. The effectiveness of communication was variable throughout the programme. Consultation and collaboration was established and discussed between stakeholders when the AHRG model was established. The importance of clear and open communication between stakeholders was emphasised, but communication within Atoifi was not evenly distributed to non Seventh-day Adventist participants. There were issues with maintaining open communication between the internal Atoifi Adventist Hospital participants and non-Atoifi Adventist Hospital participants.

The leadership and management style was based on principles of equality between all participants, which supported building research capacity. There was a demand for the establishment of clearer internal structures to improve management. There was also support from Atoifi Adventist Hospital managers for the AHRG to be more closely aligned with church principles or to be directly managed by the Hospital.

There were positive impacts of the AHRG model. The model increased participant knowledge and understanding of research, helped to break down barriers between Christian health workers and non-Christian communities, and enabled open dialogue between health workers and community stakeholders. The AHRG model also offered participants opportunities to make connections with international researchers. AHRG provided a mechanism for connecting a wide range of individuals and institutions and opportunities to present at national and international health conferences. Participation also prepared health workers for next-level research training, however some less experienced individuals experienced difficulties in completing projects and disseminating results.

There were unique issues in the AHRG model that arose from bringing together a diverse community of stakeholders including Christian, international and non-Christian participants from health and community backgrounds. The necessity to understand the systems and beliefs of all participants and value them as equally important was a very positive aspiration sometimes difficult to achieve. Traditional medicine and cultural values associated with the environment and conservation were not considered appropriate topics by some Atoifi Adventist Hospital health workers. The AHRG model exposed the tensions between Christian health workers and traditional non-Christian communities. Some Christian health workers stated their priority was to convert non-Christians, above consideration of health needs. Health workers at Atoifi Adventist Hospital sometimes conflated their belief system with their health practices, causing issues in equality of delivery.

In the next chapter I will describe the cross-case study of the four health system research capacity building models. This will include the factors that influence the successes and challenges of building health research capacity in the country by applying the different models.

Chapter 8: Cross Case Analysis

Chapter outline

In this chapter I compare and contrast the key concepts/ideas identified across the four health systems research capacity building models by thematic category. I will start by providing a summary table of the results from all four case studies (Table 5.). I will follow this with a comparative evaluation of the results for each case for each of the seven thematic categories.

Table 5. Summary of result Chapters Four to Seven

Seven thematic categories	Chapter 4: Higher Degree Research model	Chapter 5: International Health Research projects model	Chapter 6: Structured Operational Research and Training IniTiative model	Chapter 7: Atoifi Health Research Group model
1 Participants experience & perspectives on the models	-Highly bureaucratic process of working with multiple government committees, departments and Ministries to apply for scholarships and international university HDR (MPhil or PhD) programmes.	-Some IHRPs directly support the Ministry of Health and Medical Services and provide training workshops throughout the project, -Not all are willing to build the capacity of locals, -Many locals are employed as casual research assistants for specific component of the project.	-A WHO programme, modified for local context, -Run in collaboration between Solomon Islands MHMS and international partners.	-AHRG is open to all people who are interested in becoming involved in learning about research, -The system fits the local context very well, -Some AAH staff express a negative perspective on the inclusion of non-Christian stakeholders, -Community people want open collaboration.
2 Training & Teaching approach in the models	-HDR candidate is taught a set of research tools at an international university that are the foundation to be an independent researcher after graduation, -Some HDR graduates teach others on their return to Solomon Islands.	-Training is specific to the aims of specific project, not generic research skills or capacity building approach.	-Research training delivered at the workplace using a 'learn by doing' approach, -Open to all health workers in Solomon Islands and, -Health workers provided with Solomon Islands and international mentor for each project	-A 'learn by doing' approach is employed, -Village leaders are positive about this approach being applied in their villages, -It enables collaboration between all stakeholders, -Some newer participants are confused by the 'learn by doing' approach and some had difficulties relating to the structure of the training programme-Some participants do not respect local capacity to support and teach research at Atoifi and prefer international support.

Seven thematic categories	Chapter 4: Higher Degree Research model	Chapter 5: International Health Research projects model	Chapter 6: Structured Operational Research and Training IniTiative model	Chapter 7: Atoifi Health Research Group model
3 Finance in the models	-Solomon Islanders require financial scholarships to study in HDR programmes at international universities, -No HDR scholarships from faith-based organisations for HDR study, -Some delays experienced in release of funds causing hardship.	-Some IHRPs support Ministry of Health and Medical Services to implement locally identified projects, -Some IHRPs come with a large budget for topics that are not defined as priority issues by the local authorities, -Unease with (real or perceived) large salary disparities within and across the projects.	-Many projects do not require money because they were within workplace, -Some health workers expected extra payments when attending the training, -Others think research knowledge and the skills obtained from the training are more important, -The cost of internet to access emails to communicate with facilitators and mentors is expensive for some.	-Funding comes from multiple stakeholder sources, -Participants were able to attend and learn at no cost to them, -There are no travel costs as training is workplace-based, -Funding is intermittent and unpredictable, -Participants were often unclear about how funds are used by leaders.
4 Communication within the models	-Lack of a coordinated communication and coordination system to connect the Solomon Islands Government scholarship system and foreign government scholarship systems, -Language and cultural difficulties for HDR candidates in non-English speaking countries/universities, -Good experiences in opening up personal	-Proposals often designed and written outside Solomon Islands and sent for endorsement. -Misunderstandings and miscommunication are common when international projects are conducted in rural/remote villages.	-Information about applying for SORT-iT programme was communicated to health workers by government email system, -Some international researchers teaching SORT-iT could speak Solomon Islands Pijin which helped some participants, -Communication between mentors and health workers using email between workshops was not always effective.	-Consultation and collaboration was established and discussed between stakeholders from the very beginning, -Participants talked about the importance of clear and open communication between stakeholders, -Communication within Atoifi was not evenly distributed to participants, -There were issues with maintaining open communication between the internal AAH participants & non-AAH participants.

Seven thematic categories	Chapter 4: Higher Degree Research model	Chapter 5: International Health Research projects model	Chapter 6: Structured Operational Research and Training IniTiative model	Chapter 7: Atoifi Health Research Group model
	perspectives, living and working to different cultural standards, and being in a novel cultural environment.			
5 Leadership & Management in the models	-No specific discussion about the leadership of the 'HDR model' to build health research capacity in Solomon Islands per se, beyond internal bureaucratic processes for specific tasks.	-Solomon Islanders perceive themselves as just workers on IHRPs with little leadership or management of project itself or research capacity building processes	-Partnership model of leadership and management between MHMS and International University and sustaining ongoing SORT-iT model on Solomon Islands requires active leadership from within MHMS.	-Based on principles of equality between all participants. -This leadership style was found to be appropriate for helping to build research capacity. -Some called for the establishment of clearer internal structures to improve management. -Some participants expressed a desire for AHRG to be more closely aligned with church principles or be directly managed by AAH.
6 Impact of the models	-Ministry of Health and Medical Services can leverage international aid if HDR candidates return to Solomon Islands after training, -Attaining skills to conduct locally appropriate research projects,	-Increases national and international networks, -Increases critical thinking processes and exposure to international issues, -Limited research capacity systems and Solomon Islanders concerned about being used (often as just data collectors) by	-Inspired individuals to use local evidence for low-cost improvements, -New knowledge to connect health research with health provision, -It 'opens peoples' minds' to identify research questions and approaches and be aware of strengths and weaknesses at their workplace,	-People reported effective capacity building that increased their knowledge and understanding of research, -It helped to break down barriers between Christian health workers and non-Christian communities and enabled open dialogue between health workers and community stakeholders as well as opportunities for them to connect with international researchers, -It provided a mechanism for connecting a wide range of individuals and institutions,

Seven thematic categories	Chapter 4: Higher Degree Research model	Chapter 5: International Health Research projects model	Chapter 6: Structured Operational Research and Training IniTiative model	Chapter 7: Atoifi Health Research Group model
	-Not all people with a PhD are leaders when they return.	international researchers to achieve researchers' project.	-It enables participants to question things, -Develop critical thinking skills and conduct relevant and achievable research while recognising the 'big picture,' -Improved confidence in how to use research evidence and connect with international researchers, -Presenting research findings at national and international conferences.	-There were also opportunities to present at national and international health conferences, -It prepared health workers for next-level research training. Some less experienced participants reported difficulties with completing projects and dissemination of results.
7 Unique issues of the models	-Separation from family, many graduates do not return to Solomon Islands, -No specific position for PhD graduates in the Ministry of Health and Medical Services are unique issues emerged from HDR model.	-Large external projects often with limited research capacity building that "just come in and collect data and then go away."	-Training can be disrupted by workplace responsibilities, -Lack of computers in some locations limits participant access to materials and communications, -In-country mentors are sometimes not helpful, International mentors are often too busy to respond to queries.	-It was difficult to bring together such a diverse community of stakeholders including Christian, international and non-Christian participants from health and community backgrounds, -The necessity to understand the systems and beliefs of all participants and value them as equally important was a very positive aspiration that was sometimes difficult to achieve, -Traditional medicine and cultural values associated with the environment and conservation were not considered appropriate topics by some AAH health workers, -The AHRG model exposed the tensions between Christian health workers and traditional non-Christian communities,

Seven thematic categories	Chapter 4: Higher Degree Research model	Chapter 5: International Health Research projects model	Chapter 6: Structured Operational Research and Training IniTiative model	Chapter 7: Atoifi Health Research Group model
				-Some Christian health workers stated their first priority was to convert non-Christians, above consideration of health needs, -Health workers at Atoifi often conflated their belief system with their health practices, causing issues in equality of delivery. (Developed by author)

Academic Publications

A search of peer reviewed publications from Solomon Islands between 2008 and 2018 identified relevant publications to be allocated to each of the four HSRCB models. The number of publications and the proportion of Solomon Islands authors were HDR: 9, IHRP: 97, SORT-iT: 1 and AHRG: 20. For HDR and SORT-iT publications the first author in all the publications are Solomon Islanders. In AHRG and IHRP the majority of first authors are international researchers.

Academic publications are only one indicator of research capacity developed within each model. A list of academic publications offers a very thin, surface level assessment of the activities within each model, the impact of each model, and the actual capacity developed within each model. This study has explored the lived experiences of people directly engaged in each of the research capacity building models. This enables an in-depth understanding of how each of the models were planned and implemented and the impact of each model from the perspectives of those directly involved. This in-depth process entailed more than 50 interviews, and generated 1,402 pages of interview transcripts. This detailed data set has been the foundation for the findings presented in the case study chapters.

The Participants

Interviewees represent a wide range of participants and stakeholders with experience of the different capacity building models. For the HDR model, interviewees are graduate students and people who have completed their studies, government officials and administrators and some hospital leaders. IHRP model respondents are composed of government officials and administrators as well as local casual research workers. SORT-iT interviewees are composed of health workers, organisational, provincial and ministerial health leaders. For AHRG, interviewees are mountain and coastal community people and health workers and leaders who participated in AHRG initiatives.

Description of the models from the perspective of participants

The HDR and SORT-iT models of research capacity building in Solomon Islands both use structured training programmes. The planning and implementation of these models has relied on a network of individuals and units/departments within Solomon Islands Ministry of Health and Medical Services, Solomon Islands Ministry of Public Service, foreign government

diplomatic posts and foreign universities as well as individual national and international researchers. The IHRP model uses a project specific approach to research capacity building. The planning and implementation of the IHRP model is often led by international research experts in collaboration with local health service leaders, local research leaders and paid research assistants. The AHRG model uses a 'learn by doing' approach to research capacity building. The planning of the AHRG model is a bottom-up organic process based on principles of collaboration to working together to identify local issues, design projects, collect and analyse data and disseminate findings. Implementation of the AHRG model did, however, expose some religious intolerance that made this more difficult, with some individuals expressing their reluctance to collaborate with others based on their own personal interpretations of Christian doctrine.

Participants across all four models emphasised that cooperative and collaborative understanding of context and mutual respect has a significant impact on implementing HSRCB in Solomon Islands. However, results from the four case studies demonstrate that cooperation and collaboration was implemented very differently across the four models.

The HDR model appears to work for targeted actions at the national level and has a naturally more academic focus as well as being tailored to individual professional development. This makes it well suited to specialist research and building local capacity to facilitate ministry engagement with international partners as well as building the higher academic research capacity of Solomon Islands. Participants report that the HDR process and management is highly bureaucratic, however, and involves a large number of agencies and a high burden of paperwork, and it is not very transparent.

By contrast, the IHRP model appears to have very limited direct impact on building local research capacity. IHRPs are described as being managed at high levels within the Ministry of Health and Medical Services with limited engagement with local and community people until the project delivery stage. The IHRP model appears to lack a robust mechanism for community consultation and participation.

The SORT-iT model was described as well suited for developing research capacity of provincial level health managers, but some provincial level participants struggled with the heavily structured training programme and time-bound milestones. The SORT-iT model has fostered skills to identify local issues, and design and implement small research projects to gather evidence to be used by health service leaders to inform local health policy and practice.

The AHRG model was designed to implement HSRCB activities in a culturally appropriate way, based on a principle of inclusion where everybody is invited to be involved in research capacity building activities. However, despite the model being designed to be inclusive, some Seventh-day Adventists health workers at Atoifi Adventist Hospital do not wish to work with *Kwaio* people who practice their own ancestral religion unless they are willing to convert to Christianity.

Training and teaching

The SORT-iT and AHRG, models used a "learning by doing" approach to teaching and learning. The AHRG model is flexible and designed to respond to local needs. Some participants within this model found the unstructured approach challenging, preferring a more linear and formal structure. HDR and IHRPs are more proscriptive and rigidly structured given that they are formal academic programmes with university milestones or formal pre-designed research projects with definitive tasks and timelines.

The AHRG model was designed to respond to the needs of the local communities of East Malaita. The needs on the ground determine the research question, an assessment of local and international capacity, training that is required to address the question and then builds a structure for training for the specific research project, but that also builds capacity in generic research skills as a basis for ongoing research projects within the group. Some health workers who are perhaps used to a more structured, hierarchical health system, struggled with the more flexible approach of this collaborative 'developmental' approach to research capacity building.

Mentoring and support

The level of supervision, mentoring and support varied significantly between the models. In the HDR model, university academic supervisors (often Professors) are assigned to Masters by Research or PhD candidates. In SORT-iT each participant may be taught by a skilled academic within the training workshops but is also provided and assigned two additional support people to help develop their research skills. Each SORT-iT trainee is linked with an international mentor from an international university and an in-country mentor with some existing research experience to assist in developing and implementing their projects. In the IHRP and AHRG models international and local researchers support trainees on an as needed basis to develop research skills and expand capacity to conduct research in response to the existing skills, experience and capacity of each trainee. This enables the successful

implementation of the research project and provides focused support to develop research skills for immediate and future projects.

Finance

Funding for health research in Solomon Islands is highly dependent on external funders, and external resources. This has a direct influence on how research is prioritised and the capacity building approaches within each research initiative. Funding can be proscriptive and may or may not encourage collaboration or build research capacity in individuals or health systems. Timing of funding rounds, individual and institutional financial literacy and reporting requirements back to funders, impact on the consistency and frequency of research projects and subsequently capacity building initiatives in Solomon Islands.

Financial structures and requirements vary across each of the capacity building models in Solomon Islands. The HDR model requires individuals to be granted a scholarship (from either the Solomon Islands Government or a foreign government) to formally undertake HDR study at an international university. IHRPs are almost exclusively funded from sources external to Solomon Islands. SORT-iT receives considerable funding from outside Solomon Islands but is aided by local direct and in-kind funding from the Ministry of Health and Medical Services. Likewise, the AHRG model receives most of its direct and in-kind funding from outside Solomon Islands, but is also dependant on substantial in-kind support from local health institutions, cultural centres and surrounding communities who partner in each project.

HDR funding is primarily focused on individual research students enrolled at an international university. Solomon Islands and foreign governments prioritise scholarships in response to areas of need for research skills and leadership in Solomon Islands. Some participants who work for faith-based organisations described their commitment to the institution, but that there was no direct financial support available for HDR study through the faith-based organisation. This creates competition with government workers for Solomon Islands government scholarships but does not restrict their ability to apply for the 'open' category of foreign government scholarships

All models rely on sources of funding external to Solomon Islands. The different sources and levels of funding between models influence the scale and scope of research and research capacity building. However, Solomon Islanders in all models were able to attend research capacity building training at no direct cost to themselves. The only model that requires

international travel for research training is HDR. All other models conduct research capacity building training and support within Solomon Islands.

Many interviewees expressed surprise that a simple research project in their workplace (in particular SORT-iT and AHRG) could be successfully implemented without any external funding and utilising only their time or other human or institutional resources.

Financial management capacity

Interviewees across all the models stated they sometimes had difficulty in understanding and trusting the financial arrangements that are imposed by funders or research programme leaders. This is especially acute when financial expectations of external funders did not match local financial customs or practices. This was particularly highlighted within some IHRPs when there were differences between local and international salaries and travel allowances. The AHRG model was perhaps the most open and collaboratively financed model, with specific training on funding sources, expectations of external funders and financial management systems embedded within RCB workshops. However, there was still considerable distrust of financial arrangements by Solomon Islander partners in AHRG.

Communication

Communication systems, styles and expectations varied greatly across all four RCB models. Interviewees stated that communication within the HDR model was complex because of the number of stakeholders and bureaucratic systems that needed to be engaged with to secure work release, financial scholarships, institutional permissions and enrolment to study at an international university. Initial communication within IHRPs seemed to be limited to high-level stakeholders in the establishment of projects and much of the communication is then top-down. Solomon Islanders expressed their difficulty in reciprocating comfortably according to their own cultural standards. This style of communication in developing IHRPs was perceived as a barrier to building generalisable skills in the local research work force and made it easy to misinterpret or misunderstand each other. Communications within the SORT-iT model were based on existing long-term relationships which may have influenced the more open and reciprocal communication described in this model. This motivated Solomon Islanders to negotiate and manage cultural factors through discussion with international partners.

Communication systems were designed within the AHRG model to be collaborative and respectful of all members of the AHRG. Some people expressed reservations about the

quality and extent of communication within the hospital and between the hospital and other partners, and it is questionable whether this could be attributed in part to the very structured systems of the hospital, which were not ideally suited to open communications, or have been influenced by faith-based tensions between SDA and non-SDA participants in the model.

Leadership & Management

Leadership and management systems, styles and expectations varied greatly across all four HSRCB models. Interviewees discussed the bureaucratic processes within Solomon Islands and internationally to secure a scholarship and enrol in a Masters by Research or PhD programmes but not the leadership or management of the 'HDR Model' to build research capacity in Solomon Islands. This may be linked to the fact that many HDR graduates do not return to Solomon Islands and have limited ability to become research leaders in Solomon Islands if they do return.

Many of the Solomon Islanders interviewed described IHRPs as having a very hierarchical and top-down system of leadership and management predicated on the fact that the project is usually initiated and funded from outside the country. Given the primary focus is not on HSRCB but on producing evidence to address specific national or regional health issues, only high-level Ministry of Health and Medical Services representatives seem to have active roles in the leadership and management of IHRPs.

Because of the limited financial contribution Solomon Islands makes to many of these IHRPs, interviewees expressed that the project (and project funds) can be perceived as a gift rather than a partnership. Therefore, IHRPs can be difficult to refuse or robustly critique because of the traditional Solomon Islands cultural values attached to gift giving and reciprocity. If one party has not made a contribution, then they do not have the right to refuse or argue against particular components or characteristics of the project. It also means suggesting or enforcing changes to suit local conditions is difficult as it goes against deeply engrained cultural expectations surrounding the roles of gift giver and gift recipient.

Although SORT-iT was initiated from outside, its leadership and management are more mutual and based on respectful longstanding relationships. Because the Ministry of Health and Medical Services contributed resources it was able to argue for design changes and local modifications that suited the local conditions.

Impact

Each of the four models builds research capacity at different levels and in different ways. Each have different impacts on individuals, institutions and the health system.

Impact at individual level

The HDR model has provided research knowledge and skills that enable individuals to build skills and confidence to conduct research independently through a robust academic process that results in a university degree in research. However, if these individuals do not return to Solomon Islands, or when they do, they are not employed in research positions, their internationally recognised skills in research design, theory, philosophy, analysis and interpretation have very limited benefit to Solomon Islands or impact on building research capacity within the country's institutions or health system at large.

The SORT-iT model has provided practical research knowledge and skills to individuals, and some research design, analysis and interpretation skills through small workplace research projects that many stated they would not have thought possible without leaving the country for more formal study. Health workers engaged in the SORT-iT model not only gained a certificate of participation but also expressed how SORT-iT had opened their eyes to see the importance of research in improving their practices and informing health decisions. SORT-iT had helped participants to individually identify research needs and priorities, and helped them think deeper, broader and systemically. Similarly, the AHRG model has helped individuals to gain research knowledge and skills, and confidence to conduct research and partner with international researchers on locally prioritised projects. Certificates of participation were received by people who completed skills workshops. Some of the local partners had never been to school and some did not speak English. Despite this, they were essential to the success of the local projects and received recognition through the AHRG model that was not available from the other models in this study. The AHRG model was also able to provide early career health workers working in a remote provincial location with skills that would prepare them for ongoing research training through SORT-iT, IHRP or HDR models.

Impact at institution and system levels

AHRG was specifically designed to facilitate an environment that brings community people, health workers and international researchers together to learn from each other and design and conduct locally appropriate research. The purpose of this locally appropriate research was to directly and rapidly provide evidence about community health issues to the

local health service (Atoifi Hospital) and the health system (Malaita Province Health Service and Ministry of Health and Medical Services). The impact of AHRG on the health system is to provide a mechanism for evidence-based improvements to the health outcomes of the people the system is there to serve. Despite the complex religious, cultural and communication issues outlined in this thesis, AHRG seems to be the most successful model in terms of direct engagement with a single health care institution over an extended period of time. People graduating from HDR programmes with formal MPhil or PhD qualifications expressed their desire to work within institutions or the health system more broadly, but also expressed their dismay that the health system seemed to have no capacity (or at times willingness) to employ them or utilise their skills to benefit the country. Although IHRPs employed Solomon Islanders as research assistants and provided valuable evidence for national disease control programmes, it was not apparent how IHRPs actually strengthened research capacity at institutional or health system levels, or how clearly governmental policies were aligned with them.

Employing a cohort of skilled HDR qualified people within institutions and/or the health system at large is a means to gain the natural internal capacity to design and deliver research projects relevant to Solomon Islands as a country. It also is a means to deliver Masters and PhD training in Solomon Islands in the future, rather than traveling overseas. This could increase the accessibility of advanced training and have the potential to increase the retention of HDR graduates. Currently the impact of HDR training in general is limited given the tendency for individuals to not return, and for health workers specifically there is the issue that the Solomon Islands health system does not have the capacity to absorb and utilise those talented HDR graduates who do return home to Solomon Islands.

Unique Issues

Each model of research capacity building in this study has issues unique to that particular model. These issues have structural, ideological and/or historic underpinnings. Although interviewees described numerous minor issues that influence each model to reach its potential, only the major and persistently described issues are analysed here.

The unique structural issue that defines the HDR model of research capacity building in Solomon Islands is that there is no domestic capacity to deliver Master of Philosophy or Doctor of Philosophy degrees in the Solomon Islands. Solomon Islanders wishing to formally study research through the HDR pathway therefore need to enrol at university in a foreign country. Financial support in the form of student scholarships and international student fees are

therefore required for a Solomon Islander to study at the foreign university and to live in that foreign country, often for many years. The complexity of engaging in multiple bureaucratic and administrative processes, living away from family and irregular and unpredictable payments of Solomon Islands Government Scholarships to students in a foreign country are all inherent issues for Solomon Islanders in the HDR model. Some HDR graduates do not return to Solomon Islands because of a lack of research systems, research infrastructure and research positions.

The defining and unique structure of the IHRP model of research capacity building is that, by definition, the projects are large and internationally led. Projects are often designed overseas and implemented in Solomon Islands to an agenda largely determined outside Solomon Islands. Capacity building is not the primary objective of this model, but an additional, and welcome, by-product of employing Solomon Islanders as project workers and/or research assistants to implement the project. Training within this model is to build capacity to achieve specific project outcomes rather than research capacity building per se.

Unique in the structure of the SORT-iT model of research capacity building is the structured series of workshops tailored to specific needs of local health services throughout Solomon Islands. A structural challenge of this model was the allocation of international and in-country mentors to SORT-iT trainees. Cross-cultural and cross disciplinary communication proved to be difficult, exacerbated by slow and expensive internet and lack of computers in some locations. In addition, because of the workplace-based structure, some participants struggled with completing research tasks in addition to existing workload.

Solomon Islands has a history of tensions between Christians and non-Christians, and even between different Christian denominations. This tension emerged as a unique issue for the AHRG model of research capacity building in contrast with the other models, for which participants do not mention faith-based impacts. Some Christian health workers explicitly stated their first priority was to convert non-Christians and providing health services or engaging in health research was a secondary endeavour. However, the majority of participants reported their satisfaction with the opportunities AHRG gave them to participate in genuinely collaborative community projects and to help build a better relationship between the Christian and non-Christian communities.

The insights into these four RCB models demonstrate that donor countries, and by extension international researchers, need to be aware of the complex social, cultural, religious and systemic factors that vary within and between Solomon Island settings. International researchers need to listen to, and learn from, local advice and expertise within Solomon Islands. Donor countries hosting HDR students from Pacific Island countries need to be aware of how a lack of financial support, living away from family and cultural isolation can negatively impact the wellbeing of HDR candidates studying abroad. These donor countries also need to be aware that many HDR graduates do not actually return to Solomon Islands, so their investment in research capacity building in Solomon Islands may never manifest if HDR graduates do not return. International researchers also need to know that just because the employment of local health workers in large international projects may be named 'capacity building' in written proposals, this is not always the reality for Solomon Islanders employed in these roles.

Should community-based models of health system research capacity building such as AHRG model be considered in other settings in Solomon Islands, other Pacific island nations or other LMICs it is crucial to understand the specificities of the local context in which such a model would be implemented. While the tensions between Christian health workers and non-Christian community members was a key feature of the AHRG, there will be other inherent tensions in other settings. To retain such a model's locally-situated effectiveness and inclusivity, it is crucial to understand and actively incorporate a range of voices from people who will be conducting the research projects and people utilising the research evidence. Community members are often best placed to identify research priorities and to partner with others to develop their own projects, but local social, cultural, political and historical issues must be clearly understood from the outset.

Summary of this chapter

In this section I have summarised the key similarities and differences in each model, described unique structural, historical and ideological issues for each. In the next chapter I will discuss the possible causes and implications of the perspectives expressed by the interviewees in the more general context of HSRCB and HSRCB in Solomon Islands and explore various systemic factors that may need to be addressed.

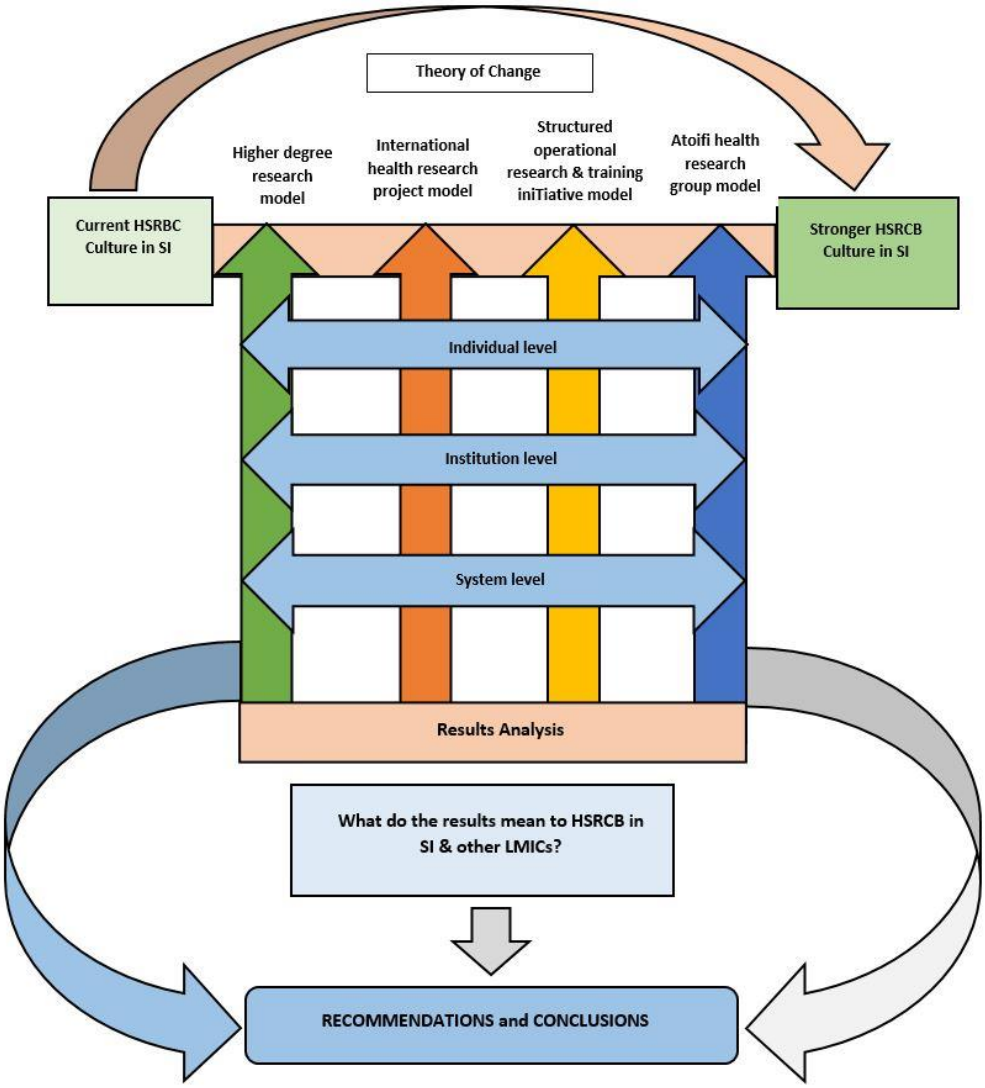
Chapter 9: Discussion

Chapter outline

In this chapter I begin by revisiting the aims and objectives of this study, and the conceptual framework from Chapter one that has informed the analytical framework and interpretation of the findings. I then discuss the findings that emerged from examining the results and considering them in the context of current literature. The focus then moves to how systemic features that impact HSRCB in Solomon Islands health system are identifiable in the perspectives of the interviewees. This includes important social, cultural and structural factors that local health leaders, academic leaders and international researchers need to understand and incorporate when working together in Solomon Islands. I begin by summarising individual and systemic capacity that has been built over the 2008-2018 period and discuss how this capacity can be used to shape a stronger research culture in Solomon Islands. The comprehensive and detailed evidence base created by this study is unique in its ability to inform a more integrated response to HSRCB in Solomon Islands. I conclude by critiquing the strengths and limitations of my study overall, and then list specific recommendations to improve HSRCB in Solomon Islands based on the evidence created by this study.

Putting the aims, objectives and conceptual framework of this study into context

The aims and objectives of this study were to describe how the four separate models of HSRCB are planned and implemented in the Solomon Islands, then to identify and explore the impact of these models on individual, institutional and health system capacity. This included identifying unique features, challenges and limitations of the models. This evidence base then informs recommendations for strategies to improve future planning and implementation of HSRCB in Solomon Islands. This thesis has outlined how the models operate in the local context and the similarities and differences in how they build capacity in the country. Evidence will be discussed within the multiple case study conceptual framework for this study, originally described in Chapter 3, to understand how the theory of change can inform decision making in Solomon Islands (Anderson, n.d.; Knowlton & Phillips, 2013).



(Developed by author)

Figure 9. Conceptual framework

The findings from this study provide a wealth of information about the individual, institutional and systemic factors that cut across the four models outlined in Chapters four to seven. The perspective expressed by participants within each case study enables the cross case analysis outlined in Chapter eight. This informs decision makers to consider multiple opportunities for changes to build a stronger HSRCB culture in Solomon Islands (Yin, 2008). The following discussion of major findings, their impacts and possible causes, leads naturally to recommendations for how to achieve this greater aim.

Summary of main findings: The health systems research capacity building models in context

All models make individual and joint contributions to HSRCB in Solomon Islands. All have made positive impacts in building capacity in Solomon Islands, although the differences in structure of each, the planning and implementation of each and the unique issues inherent in each means that their contribution varies considerably across any given criteria. There are clear social, cultural and systemic issues that strongly influence the implementation and impact of the different models. Examples described in this thesis have revealed differences between international and local social, professional and cultural worldviews and communication styles as well as the historical and contemporary tensions between Christian and non-Christian people in some parts of Solomon Islands, and all of these can be causes of systematic exclusion (Asugeni, 2014; MacLaren & Kekeubata, 2007). Examples have also provided evidence of a high degree of reliance on overseas funds, trainers/supervisors and training facilities that impedes research capacity building in Solomon Islands (Van der Veken, Belaid, Delvaux, & De Brouwere, 2017).

Complementarity of health systems research capacity building across the models

It is notable that many participants referred to the potential of starting to work and learning about research in a particular model (like AHRG or SORT-iT) and then being able to 'graduate' to more complex models and approaches as they build their research capacity (e.g. HDR). In a country like Solomon Islands, where access to higher education is limited by the very design of the national education system, a significant number of interviewees do not have the levels of formal qualification that might be expected in higher income countries to incorporate research into their particular health service roles. The range of HSRCB models being used in Solomon Islands seem to be well suited for accommodating the different entry levels of participants. Capacity that was built within AHRG meant that some participants were recruited by IHRP researchers to work on IHRP projects. Other health workers who built capacity in AHRG then successfully applied to SORT-iT training programmes. AHRG training was a solid base for others to thrive in later undergraduate health studies at Solomon Islands National University. Other health workers who built research capacity in the SORT-iT model went on to successfully apply to Higher Degree by Research programmes at overseas universities. Some participants found the academic standard of training, workshop structure, or theoretical, methodological or workload intensity sometimes problematic in SORT-iT and AHRG (Franzen, Chadler, Siribaddna, Atashili, & Angus, 2017). This especially affects people

with lower level qualifications and limited research experience. This is unsurprising given the fact that AHRG purposefully includes people regardless of academic qualification and the WHO SORT-iT model was originally designed for health professionals with existing Masters qualifications, but was modified in the Solomon Islands model to be more inclusive of people who did not have any postgraduate qualifications. This wide range of options for capacity building from different starting levels of skill and education is actually a strength for Solomon Islands as a country. It offers an opportunity to integrate a broad coalition of community leaders, health institution leaders, national and international researchers to work together to strengthen health research in the Solomon Islands in a well-informed, evidence-based manner, cognizant of the complexities inherent within each model, across the national health system and central to the population (Kok, Rodrigues, Silva, & Haan, 2012).

The significance of social, cultural and historical context

In this study participants consistently talked about the importance of considering the influence of cultural beliefs, practices and traditions within each specific context (Harrington et al., 2015; Speare et al., 2014). Given the country was still a colony of Great Britain four decades ago, the strength and influence of the Christian churches, the cultural and linguistic diversity inherent with having over 70 language groups within a population of just 700,000 people, any given study (whether incorporating capacity building or not) in any given location within Solomon Islands will encounter tension between different social, cultural, religious and/or professional groups. AHRG offers an example of what is possible despite the ever-present tension and ideological differences between Christian groups and the Kwaio Mountain traditional group (Ausgeni, 2014; Ninomiya & Pollock, 2016). It is very apparent that these groups have different world views, and the way they live their life, based on their belief systems, is not easily reconciled (MacLaren & Kekeubata, 2007). Context is important to understand and be able to implement research and HSRCB effectively (Harrington et al., 2015; Manehoua et al., 2021). It is not surprising that the strongest expressions of cultural conflict are apparent in the AHRG model, as this is the model that works most closely with the broadest range of community stakeholders. The AHRG approach in delivering projects in local communities is evidence of a group of community leaders, health workers and researchers attempting to work together that specifically recognises the issues in that specific context (MacLaren, Asugeni, & Redman-MacLaren, 2015; Redman-MacLaren et al., 2010). The gap between the traditional beliefs and practices of Kwaio mountain people and the introduced beliefs of the SDA church leaders that inform practice at Atoifi Adventist Hospital is an

extreme case. A reason the hospital was established in East Kwaio by the SDA church in the 1960s was to convert 'heathens' to Christianity, and this historical context enables an understanding of the origins of the contemporary ideology and practice of health workers at the Atoifi Adventist Hospital (MacLaren, 2006). Regardless of the specific social, cultural or religious specificities of any one context, the AHRG model demonstrates that it is possible for research capacity building initiatives to bring together a very diverse set of partners should individuals be able to transcend historical or ideological dogmas within their group. AHRG offers an example to other parts of the country that collaborative, bottom-up, 'learn by doing' initiatives can work in remote locations across Solomon Islands while being fully cognisant of the local level tensons that may be present in any particular place (Redman-MacLaren et al., 2010). It is important to realise and recognise that everybody has different beliefs, ways of doing things, and perspectives, and this is the key to successful integration of models, communities and systems (MacLaren, Asugeni, Asugeni, & Kekeubata, 2009).

Both AHRG and SORT-iT models enable the participation of cultural and community representatives who may have little or no formal education or training, but whose perspectives and local knowledge are extremely valuable, especially when we consider the powerful stresses that are created by social, cultural, religious and historical contexts across Solomon Islands. Despite some challenges, having specific cultural mediators and/or facilitators has been a success factor for both AHRG and SORT-iT models (MacLaren et al., 2015). Community representatives can guide and assist researchers in contextually appropriate behaviour, and also perform the role of spokespeople for the effective communication and dissemination of research in their communities (MacLaren et al., 2015). This can build an inclusive environment for engaging with the broader community. These community participants have the potential to be the 'engine of change' that drives local uptake of better health practices inspired by evidence based on research findings. However, it is not the role of community leaders alone to use research evidence to inform better health practices. If health service institutions and the health system at large do not utilise research evidence within their own decision making process, the impact of community leaders will be limited. The negative experiences of Solomon Islanders working within an IHRP highlighted the inequality of power and leadership, and inability of Solomon Islanders to communicate or address these issues inherent within this model. The colonial history of Solomon Islands established social, professional and cultural hierarchies that remain 45 years after independence and are foundational to understand the challenges

faced by the IHRP model of HSRCB in Solomon Islands (Pratt & Loff, 2014; Redman-Maclaren et al., 2012; Thambinathan & Kinsella, 2021).

Collaboration with international researchers

International funding mechanisms and foreign expertise play an important role in research activities within countries with limited internal research activity (Lokot & Wake, 2021; Mwangi, Gitau, Bates, & Pulford, 2022; Pratt & Loff, 2014). In this study participants were not uniformly satisfied with the delivery and outcomes of international research projects across a number of issues, but specifically with research capacity building components. This study offers a unique insight into some of these issues, given my role as an 'insider' researcher that facilitated my fellow Solomon Islanders to express and articulate thoughts that may not have been revealed should this study have been undertaken by a non-Solomon Islander. Raising the awareness of international researchers of the contextual difficulties and issues experienced by local people as a result of historical, social, cultural or professional structures is important. Solomon Islander researchers also need to be aware of these structural determinants that underpin the IHRP model and be able to individually and collectively engage in these issues with international partners. A shared understanding of these issues is a foundation on which more mutual relationships, research outcomes and research capacity can be built to benefit the population of Solomon Islands (Cunningham et al., 2015; Lokot & Wake, 2021). This may include both-ways training about the differences between Solomon Island social, cultural and religious values and expectations and those of the international researchers and their teams (Mayhew, Doherty, & Pitayarangsarit, 2008).

A specific example of misunderstandings within cross cultural research teams in this study was the concept of gift giving and perceptions of imbalance that may have skewed expectations of interpersonal interaction and development of friendships. Many local participants stated their unhappiness at being treated simply as data collectors (IHRP), that they felt ignored by overseas mentors (SORT-iT) and they expected a much more personal relationship (across all models). Given all Solomon Islanders come from collective societies and that social relations are fundamental to personal and collective success, despite professional positions or academic qualifications, many participants expressed an unhappiness with purely professional interactions. Some of this may be addressed by educating Solomon Islands researchers and participants about the research systems and theoretical processes used in the design and delivery of international research projects, but this will only be partial given

the collective worldviews that sustain Solomon Islanders on a day by day basis, despite their professional or academic standing. Again some of this may be addressed by educating international researchers on the expectations of Solomon Islanders within their teams, but this will only be partial given the strength of individual professional and academic standing of many international research leaders. Despite the challenges, working to understand each other's worldviews and drivers of individual and collective behaviour would upskill all team members and be a basis for the capacity that has been built to date to be deployed to develop and implement in-country research projects that can utilise both local and international expertise. This could be one step towards better integration of HSRCB in Solomon Islands.

The participants in this study stated that as individuals they had learned a great deal with many empowered to use the capacity they had learned (or were learning) to implement effective research projects and develop new skills and partnerships. (Redman-Maclaren et al., 2010, Bates, Boyd, Smith, & Cole, 2014). A benefit of being an insider / outsider researcher conducting qualitative interviews in your own country is that ability to specifically engage in a wide range of personal views and understandings and analyse these interviews for common themes and/or common ideological, theoretical or philosophical issues. The multiple case study methodology and cross case analysis has allowed for these cross cutting issues to become evident and inform future HSRCB. It also allows for a clear understanding of the capacity that has been built at a national level and the gaps that need to be filled to further strengthen research in Solomon Islands (Jessani, Lewy, Ekirapa-Kiracho, & Bennett, 2014).

This study provides in-depth evidence from the experiences and perspectives of Solomon Islanders. As a complementary subject for further study, it would be useful to systematically gather evidence from international researchers who have been involved across all four HSRCB models in Solomon Islands to identify how their evidence may assist to understand and address specific technical and procedural issues raised by participants in this study and beyond.

Individual capacity building

To build health system research capacity in Solomon Islands, individual health professionals need to have research skills to design and implement studies and analyse and interpret results. These research skills need to be identified and incorporated into capacity building models to suit the needs of the country. This study has identified that the HSRCB models used in Solomon Islands between 2008 and 2018 have improved the skills and

confidence of individuals but that these individuals often find it difficult to utilise these skills because of limited institutional and/or systems capacity. This is exemplified by many interviewees who stated that after their training there was an apparent disconnect between research projects, institutional goals and national priorities. The logical implication is that to build and strengthen health research capacity it is important for the country to develop a clear long-term plan that identifies which individuals should be trained, why they should be trained, for how long and what models it is appropriate to use. Attached to this is the need to identify specific research needs and how to prioritise them. This has structural implications in terms of government departments' and non-government organisations' responsibilities and resources, and systemic support for long term planning of this kind.

Impact of cultural values attached to giving and receiving gifts

This study has identified the importance of financial management and understanding the multiple professional, social and cultural obligations that underpins financial management. In the Solomon Islands it is considered impolite to refuse a gift, and there is the concern that if a gift is refused there will be no further support from the gift giver. At any community gathering or event, family or community members are expected to contribute. If a community member does not contribute, they would be too embarrassed to attend. When it comes to research projects that are primarily funded by international researchers with limited or no contributions from the Solomon Islands government or institutions, this can cause uneasy feelings for Solomon Islanders in the partnership, who feel that they have no right to influence or contribute to planning and implementation of these projects. In-kind contributions of intangible resources are not considered to have the same value as physical gifts of money, food or resources in Solomon Islands. Many interviewees did not explain the extremely valuable in-kind contribution of time as essential for the success of international projects, nor research projects in general. No one expressed this as a gift that could be contributed by the Solomon Islands institution or organisation to the project. A more nuanced discussion between Solomon Islanders and international partners on different financial models and the value of non-cash or non-physical things such as time may be a way forward to improve financial and resource management across all projects or HSRCB models in Solomon Islands.

This study has also identified the very strong opinion of interviewees that research leaders will use research funding for their own (often personal) purposes, even if there is no direct evidence for this within any of the research projects described. A 2021 study by

Transparency International found that 97% of Solomon Islanders thought corruption was a big problem in government and 90% thought corruption was a big problem in business. The Transparency International study found that, of all countries in the Pacific, Solomon Islands has the highest corruption indicators (Transparency International: The global coalition against corruption. 2021). It is therefore well understood by the general population that there is an established history of official and bureaucratic corruption that extends throughout government and business in Solomon Islands, and it is unsurprising that this attitude persists towards other activities that involve financial arrangements, including research.

Workplace-based projects

This study has identified that most participants were happy to develop skills that enabled them to carry out small scale workplace-based projects. On one level, this is unsurprising given that two of the models, SORT-iT and AHRG, were based on small scale work-placed projects. The ability to learn how to do research independently and an opportunity to build complementary local self-reliant research skills while still at their workplace, but with access to community partners and international researchers/mentors was expressed by many as well suited for the Solomon Islands. Some however, did not want to work with anyone outside of their immediate organisation or institution, whether this be from a different religion, cultural group or country. Some expressed their disregard for international researchers in such a strong way that they would not work with them again. This is another example of how HSRCB in Solomon Islands needs to encompass social, cultural, religious and structural factors that directly impact capacity building in the country.

The impact of Christian beliefs

A significant theme that emerges in this study is the impact of the influence of church and introduced religious beliefs on Christian health workers and their working practices and perspectives. Some workers at church run health institutions appear to struggle with professional ethics due to the strength of their beliefs. Some senior administrators at Atoifi Adventist Hospital were uncomfortable with some health research conducted through the collaborative AHRG model because of the degree of engagement with non-Christians. Some of these administrators wanted research activities to take place at AAH, and were proud of the acknowledgement received by other hospitals around the country, but wanted this to be guided and managed by the church rather than independent health professionals, and consequently there is a risk that professional standards and ethical guidelines could be weakened where these

conflict with church doctrine and established practices. A few administrators openly expressed a preference to exclude non-Christians from their projects. Such strong religious and ideological sentiments have caused disharmony within the AHRG. Such beliefs and sentiments are not exclusive to Atoifi Adventist Hospital or the AHRG, however, and so need to be carefully considered across all HSRCB models should inclusive and comprehensive health systems research be an objective of HSRCB in Solomon Islands, and so that research does not benefit some members of society to the exclusion of others.

System capacity to absorb talent and use it

The ability for health workers with research skills and qualifications to find appropriate work in the Solomon Islands health system after training was highlighted as a major barrier to HSRCB in the country. The capacity of the national health system needs to be improved to employ trained individuals in appropriate positions within government or non-government health systems and/or the Ministry of Health and Medical Services. This is an obvious necessity for building or strengthening health system research capacity. To fully utilise the skills of the individuals who have been trained on how to do research to produce evidence calls for a system that enables them to use their skills and talents within the health system to build health research capacity for the country (Pryor, 2009).

Need for health system readiness to support research and researchers

For the Solomon Islands health system to utilise the research capacity that has been built over the past decade, it will be necessary to make some changes. This study has identified that research results are not commonly used to inform health system decision making and that people are not satisfied with the support provided for research capacity building. Participants in the AHRG and SORT-iT models discovered that local research can be very effective without significant funding or highly specialised training, but a different picture emerges when considering the lack of professional development pathways open to people working towards higher qualifications. A very clear example comes from a newly qualified HDR graduate returning to the Solomon Islands and finding that the government didn't know what to do with them, or where to place them. So, although Solomon Islands has achieved some local HSRCB through community stakeholder participation in AHRG and SORT-iT, the system lacks structures that can incorporate HDR-trained research leaders. Although HDR is seen as the highest level of individual research training, and the government provides financial scholarships for people to study at foreign universities for many years at a time, the country's

capacity to utilise HDR graduates as research leaders on their return is still underdeveloped. Appointing local people with research training and experience as SORT-iT mentors has had mixed success due to the comparatively small number of trained Solomon Islands researchers who have reached and continued to develop research experience at the HDR level. However, this was a good start and an example of integrating the capacity created by one model (HDR) to strengthen another model (SORT-iT). The majority of locally available mentors within the SORT-iT model did not have HDR qualifications, nor sufficient skills and experience to fulfil research mentoring roles successfully, however again this was a good start and demonstrated the need to build capacity in supporting new Solomon Islands researchers who are coming through these programmes.

System capacity to use evidence

Building system capacity to use evidence is also important to consider at the national level (Nutley & Reynolds, 2013), but the findings of this study suggest that many health decisions are made without use or proper awareness of locally generated evidence. Having clear and realistic plans based on health priorities and training individual health professionals to acquire research skills is important, but if there is no system in place to use the research evidence generated by trained and skilful health professionals the capacity building work cannot deliver the impacts that it is designed for (Jessani et al., 2014). A Solomon Islands National Health System that enables the uptake and use of evidence to influence policy and practice and guide decision making within government and non-government health services and throughout the Ministry of Health and Medical Services will increase the likelihood of achieving national health priorities for public health, disease prevention and control (Jessani et al., 2014; Minja et al., 2011).

Research results do not inform heath system decision making

This study discovers two ways in which research evidence can be overlooked in Solomon Islands. Firstly, at ministry level decisions are made based on personal preferences, or on the priorities attached to (often external) funding agencies. As a result, government decision making tends to be reactive rather than evidence based. This may sometimes be effective in dealing with an immediate health crisis or to respond to internationally funded priorities, but does not support a culture of evidence based decision making within the Solomon Islands health system that can build the foundations for long-term improvements in public health and the associated significant social and economic benefits to the country that follow.

The limited internal finances available within Solomon Islands makes it difficult to reject large donor driven programmes. This dynamic may actually exacerbate the problem and undermine momentum towards building a culture of evidence based decision making within the Solomon Islands health system. This dynamic also leads to uncritical welcoming of IHRPs almost regardless of their subject matter or intent, or the lack of robust capacity building embedded within such IHRPs.

One obvious solution to this lack of systemic capacity could be appointing newly trained HDR professionals to roles that support decision making and planning. This could create an efficient and effective way of retaining highly trained individuals, making good use of their improved capacity, and reducing the workload and stress currently being put on government officers. Looking back at the global efforts to respond to the COVID-19 pandemic, governments struggle to follow best public health practices because they are influenced by so many other factors, including economic impacts and the demands of an often poorly informed public (Bates et al., 2014).

Secondly, at a local level, social, cultural and religious differences can divert attention and resources away from appropriate health interventions to the detriment of some groups (Theobald et al., 2009). This appears to be the case in Solomon Islands, and government decision making might be improved by better communication of research and appropriate lobbying of government representatives by qualified and experienced community and research stakeholders who are aware of and seek to resolve these differences. This study has revealed details of the ideological divide between Christians and non-Christians at Atoifi Adventist Hospital. The ongoing tension is because of differences in faith, ideology and organisational affiliation. The philosophical underpinning of Christian health workers at AAH is revealed by the importance they assign to religious belief, rules and regulations, and converting people into the SDA faith. Some Christians were unhappy about HSRCB being delivered through Atoifi Hospital to people of all faiths, social and cultural backgrounds, and would have preferred that all non-Christian participants be converted to Christianity as a pre-requisite for participation. A few SDA participants chose not to participate in AHRG research activities at all if they felt that participation would promote the continuation of non-Christian beliefs and traditions. This is an issue to be taken seriously, and it can affect the international reputation of Solomon Islands healthcare and policy when overseas experts and specialists encounter faith-based prejudice that has real-world impacts on the health outcomes of ordinary people. This appears to be a rejection of evidence-based knowledge by some people in preference for faith-based

conviction. Many professionals who currently rely on faith for decision making also express their desire to learn more about research. There is a potential for these people to have a more nuanced understanding of evidence-based policy and practice in the future.

Integration as the key to successful health systems research capacity building

Many participants discussed actions for building health research capacity in Solomon Islands. The key components of research capacity are: i) individual capacity to do research, ii) the system capacity to absorb trained and skilled individuals; and iii) the system capacity to use the evidence in a way that will improve Solomon Islands health outcomes (Peters & Adam, 2013). The findings in relation to each of these have been discussed above. These are all important findings and point to the need for a systemic solution. Without a system that can coordinate, manage the planning, and the systemic research activities within the Ministry of Health and Medical Services it will be challenging for the country to effectively and efficiently build health system research capacity (Compaore et al., 2021). Being able to organise, coordinate, monitor and evaluate the planning and implementation of all these research capacity building activities in a way that fully utilises human resources, and builds a strong research capacity within the country is something that we need to work towards. A need for integration emerges from the gaps identified by participants in current implementation of HSRCB. This suggests that the nuanced integration of all these research activities beginning from planning, implementing, monitoring and evaluation will and can enable a strong health research and health systems research capacity building outcome within the country.

Conclusions and recommendations

Personal Perspective

One thing among many others that I have learned on this PhD journey is an understanding of how to develop questions on areas of need, and how to utilise relevant research methods to collect relevant data to answer the research question. PhD candidates are taught to be good at developing research questions, selecting and utilising appropriate methods and collecting, analysing and interpreting appropriate and relevant data. This makes HDR candidates expert in the process of creating new knowledge, but this is context specific. This also develops the understanding that invididuals working on research projects are their own content experts, and their capacity building needs need to be contextually relevant.

An issue that becomes apparent when looking at the systemic issues around health systems research capacity building in Solomon Islands is that many of the limitations and problems raised by the interview participants are not really about health problems (or specific diseases) at all, but personal belief, ideological positioning and historical anomalies that arise from government, political and cultural attitudes, actions, and expectations, often subject to financial constraints. To address these comprehensively is beyond the scope of this thesis, because the underlying factors influencing these observations cut across several differing domains of knowledge and experience. This thesis raises many issues and questions. Solving them will require the participation and collaboration of people with experience in these different domains.

Building appropriate health system capacity

Based on key results from this study, features of a strong health research capacity system in Solomon Islands may include:

1. Health professionals who possess appropriate research knowledge and skills to produce, critically appraise and apply health research evidence in the Solomon Islands context.
2. A health system that places trained individuals in the right positions to continue to teach research to other health professionals, to develop knowledge and skills, and to continue to conduct health research to produce evidence.
3. Planners in the health system that use new knowledge and evidence to guide decision making to inform policy and practice. This will improve the health services provided, and in turn improve the health outcomes of the people.
4. A system to assess the impact of research education, teaching and creation of new knowledge where evidence is applied to new decision making, policy and practice to continuously improve the health system and the health status of the population it is there to serve.

To achieve this state of strong HSRCB in Solomon Islands, health institutions must consider the needs of health institution research capacity building. This requires commitment to long term plans to build this capacity. Individual health professionals will need to be skilled in identifying issues, designing, collecting, analysing and writing up research outcomes. Individuals working in different roles within the health system will be engaged in different elements of research projects depending on their experience, skills, and level of relevant

training. Individual assessments can be used to determine the type of HSRCB model that is best suited for an individual to build the skills and capacity they need in their departmental role.

In the rural settings it is important for frontline health workers to possess health research skills so they can understand how research works to improve decisions and services provided to people, and support research work that provides evidence to improve health outcomes for the local community. Understanding research can also help health workers and community members advocate for appropriate health research to serve their institutions and communities and to understand how to apply evidence-based clinical practice in their own unique contexts / settings.

Health leaders need to understand research and how research works to improve decision making for policy and practice. Reliable local evidence is needed for this to be effective. Understanding research and how it is important to improve practice can help leaders to provide appropriate support to health workers under their leadership in terms of resources and fostering an environment conducive to conducting health research. Understanding research also helps leaders to identify the level of training required for individuals in various research positions, and to identify research issues and priorities. This understanding will also help leaders to establish and develop systems that can accommodate trained individuals in the right positions to do research.

Strength and Limitation of this research

Strengths

Insider / outsider researcher

As a Solomon Islander experienced in working on projects delivered under all four models described here, I'm an insider in having personal experience and perspectives from working within the cultural and systemic context which influences the way people in Solomon Islands think about HSRCB. I have also been an HDR student and researcher working overseas and with international researchers for extended periods since 1999, first in New Zealand, and more recently in Australia. I have experience working on HSRCB with other LMIC and PICT participants in their own countries, in Fiji and Indonesia. These experiences have enabled me to learn about different cultural and academic perspectives and ways of engaging with research and the broader research community, which put me in a possibly unique position as a Solomon

Island researcher and has been instrumental in making this study possible (Beals, Kidman, & Funaki, 2019; Dwyer & Buckle, 2009).

Strong understanding of context

Being respected and having a good existing relationship with study participants makes them more comfortable about openly expressing their thoughts, ideas and feelings about their experience of Solomon Islands HSRCB. My family background includes people from both Christian and non-Christian cultures, I work as a healthcare professional in Solomon Islands, and have connections with government representatives. My personal situation and reputation has been instrumental in giving me access to a diverse and representative range of participants across the broad group of stakeholders in the different models. These include health professionals, local community representatives, and health and government leaders.

Multiple case study methodology applied with clear case study definitions

Working across four different case studies has been invaluable in identifying common features and factors that can be attributed to systemic impacts and separating these from unique issues that affect individual models. An added benefit is that the four HSRCB models being investigated are dissimilar in their structures, agency and approaches, which adds richness to the analytical framework.

Strong participation in interviews, and these done in the participants' language

Interviews were conducted in Solomon Islands Pijin. Although English is the official language of Solomon Islands, people speak local languages specific to their region and communicate with people from other regions in Solomon Islands Pijin. Most community members and non-professionals have a low proficiency in English. Being able to explain and discuss their experiences in Pijin, with the option of choosing to use English if they preferred, opened the data collection to the contributions of people who would be less likely to come forward if the interviewer was not fluent in their language. Conducting interviews in Pijin enabled a broad perspective to be gathered from community people, health professionals and health and government leaders, and the literature, and to be able to triangulate the findings.

Perspective and fact checking of preliminary results

Preliminary results were presented back to the study participants and their leaders to check how I organised their ideas, and to check if I had authentically and fairly interpreted what they said. As a qualitative method, and in contrast to participant experiences with some IHRPs, this was

intended both to verify the accuracy of my reporting and initial analysis, and to respect the cultural and personal expectations of the community. This helps to build a strong translational opportunity for new knowledge to be received by the government and health leaders because not only do I have positive relationships with them, I have also already engaged with them on this topic by presenting the preliminary findings.

Limitations

The cultural context of the use of Solomon Islands Pijin in research interviews

Solomon Islands Pijin is largely derived from colonial languages, principally English, and many words used appear immediately familiar to non-Pijin speakers who are fluent in those languages. However, Pijin is a language that has evolved over time and the origin meanings of words are often based on historic uses or local contexts that have not followed the same pathway as modern English use of the same words. This means that there are many 'false friends' that can be confusing or misunderstood by non-native speakers. The fact that Pijin is lingustically structured in speech more like local Solomon Islands languages than a European language adds to the difficulty in making direct translations unless you are a native speaker embedded in the cultural context. Solomon Islands Pijin relies more on context for the meaning of words and expressions than having a large vocabulary of words with specific meaning and nuance. This is the opposite of English, which relies on a much larger vocabulary and more precise structure to communicate clearly. This can make it difficult for non-native speakers to understand what participants mean outside of context or to respect why they may seem unwilling to describe complicated ideas in a few words. A possible limitation with including Solomon Islands Pijin in research data is that even non-native speakers with a high degree of fluency sometimes commit cultural linguistic errors in their use of Pijin, and this may be compounded when people encounter the language casually.

Other health systems research capacity building models in Solomon Islands

There are other HSRCB models that I did not explore in this study, these include informal approaches, such as conferences and in-house training, as well as government sponsored training events and programmes for specific purposes, such as one-off or short courses in epidemiology. Most of these are ad hoc events and opportunities, the exception being the government sponsored epidemiology training, but this was developed and delivered part way through my thesis and could not be included for that reason.

Lack of available documentation for triangulation of findings

Although the multiple case design can be considered a strength, there was a limitation in the idea to use documentation to triangulate the findings. Availability of documentation was poor, and confidentiality policies made it almost impossible to gain access to meaningful records. This was in itself a finding of this study.

Interviews limited to local participants

It is important to note that I did not interview the international researchers or experts. I only interviewed Solomon Islanders. The literature calls for perspectives from LMICs, because the majority of HSRCB literature originates from researchers based in HICs, and it seemed the best use of my limited resources to focus on the local context. However, we find a significant number of interviewees expressed concerns about how they perceived IHRPs in particular were implemented, and also some SORT-iT participants were dissatisfied with the level of engagement they experienced with international researchers. It would perhaps be a useful future study to explore the perspectives of international researchers on these issues and their possible resolution.

Lessons learned

Bearing in mind the ideal version of the health system we would like to see, we can now consider the realities exposed by the experiences of the interview participants and the associated research conducted for this study.

All the four models are needed to build research capacity in Solomon Islands

The capacity building approaches employed in Solomon Islands are diverse, comprising HDR, short-term workshops and on-the-job based projects, using a range of delivery models. It is important to note that all the different models are needed in Solomon Islands. All the four models are useful in their own way, and they complement each other. One model alone does not fit all contexts and different levels of research capacity needed within the health system of Solomon Islands. The findings from this study do not imply that one model can do everything. Each model has a useful role in the whole business of HSRCB.

Religious tensions have a serious negative impact on health systems research capacity building

Individual tensions between Christian and non-Christian participants have significantly influenced the actions and perspectives of many of the interviewees. This clearly has a

damaging effect on capacity building, and also potentially on the international reputation of Solomon Islands society, as HIC visitors and collaborators accustomed to equality of service based on scientific evidence will be concerned about the impact on health outcomes arising from decisions that put personal preferences above medical realities.

Leadership, research outputs, and research activities are historically dominated by initiatives led from High Income Countries.

From the literature reviews conducted for this study it is obvious that HSRCB in Solomon Islands has not produced a large number of publications or other research projects compared to ones created by HICs. This seems to reflect a lack of active and supported in-country academic researchers and is more of a systemic issue than anything else.

The historic leadership of IHRPs by HIC researchers and institutions has built a track record of research outputs and actions that are instigated and led by overseas partners, and due to the funding history this is dominated by HIC representation. Other important issues are limited research collaboration between HICs and LMICs, research funding dominated by overseas sources, and strategic knowledge translation where research evidence is not well communicated to potential users.

Solomon Islands researchers and research stakeholders are both unclear about the mechanics of IHRPs, and also often unhappy with the fact that they often do not clearly address local priorities and may fail to respect local cultural standards and expectations for collaboration and cooperation as equals.

Assessing health systems research capacity building is difficult due to a lack of in country research evidence

There are difficulties in assessing impacts and outcomes, however, because the indicators are often merely quantitative and lack qualitative assessments of the local impacts of different HSRCB approaches. This is the first study by a PICT researcher that is exclusively focused on this topic.

Health systems research capacity building is not delivering desired outcomes

From the interviews, the importance of HSR and HSRCB to PICTs is clear, but currently does not appear to be achieving the desired outcomes. There is little evidence of systemic changes taking place that could embed the benefits of HSRCB in Solomon Islands.

Changes in Solomon Islands health systems are required to make progress

Systemic factors have a significant negative impact on the ability for HSRCB in Solomon Islands to lead effective change in health care delivery. This includes underutilisation of HDR trained people when they return to Solomon Islands. Government capacity to embed evidence-based research in policy formation is limited. Incremental changes in the way Solomon Islands deploys the health workforce and attention being paid to a process of redesigning the structure of the health system may be necessary to achieve long-term gains.

The health system in Solomon Islands needs to make better use of the results of research and better use of the skills of people who have improved their research capacity. If the system is not set up to make better use of the results of research to improve healthcare, then it is not working properly, and likewise if it is not employing people in positions where their increased skills and knowledge can make a difference then it is not spending its money wisely.

Recommendations

It is good to be able to come to meaningful conclusions as a result of conducting an in-depth research project such as this, but we have to put these results into the context of a Pacific Island Country that has many real and urgent public and clinical health issues. It is not enough to simply consider and agree that there are problems and there are challenges, we need to take positive action to meet these challenges and solve these problems. Responding to urgent health issues that are very visible to the community is a priority for health planners, who may not recognise the importance and potentially enormous impact of HSRCB, whose benefits become increasingly visible over a longer period of time. The following recommendations are intended as practical and realistic ways to make changes that will improve health outcomes through building health system research capacity in Solomon Islands without radical modifications to existing structures and systems.

All health systems research capacity building models in Solomon Islands should be continued

All the HSRCB models studied demonstrate their value, and offer a diversity of approaches that captures the full range of health research needs; even though they have individual unique issues, this is not a reason to discontinue any of them.

Continuous improvement processes should be applied to health systems research capacity building models

It is recommended that HSRCB is constantly monitored and the country's health system research capacity regularly evaluated by a coalition of health system leaders, academic insitutions, community leaders and international partners to ensure the continuous development of individuals, institutions and health systems in Solomon Islands to respond to the health research needs of the country. There is a need for continued qualitative research to identify and assess how HSRCB approaches can support sustainable outcomes in context-specific PICTs. For example, some participants had difficulties in keeping up with training in both SORT-iT and AHRG models and did not complete or were unable to disseminate results, some revision of these models to support less experienced or less highly qualified participants may be necessary.

Funding policies should guarantee equal access to health for all community members

Funding for health care providers should be linked to a requirement to provide equal and fair access to all community members regardless of cultural background or beliefs. This is a straightforward way of addressing tensions identified through their impact on HSRCB, which arise from service provision customs and practices that are based on beliefs rather than evidence-based medical needs.

Build in-country capacity

Research priorities should be based on local country contexts and health system changes aimed at retaining skilled researchers. These should be collaboratively implemented and led by local Pacific Island researchers, supported by international research experts. To build sustainable HSCRB initiatives, training content in HSRCB should develop both research skills and the ability to teach and facilitate research.

A mechanism be created to support health professionals who have come through any of the research capacity building models to write research applications, apply for research funding and/or link with local, national or international research collaborators. This would assist in both upskilling local researchers and government staff as well as demystifying the financial processes used to manage funds and also provide direct access for funding to support policy driven research-based activities that more closely match the country's priorities. One

expected outcome would be enabling Solomon Islands participants to recognise the value of their time and contributions as being equal to those of international research partners.

When international research programmes want to establish projects in Solomon Islands, this mechanism should be used to identify if there are potential locally developed research collaborations and small projects for inclusion that can be made a condition of planning for the international research project to go ahead.

Solomon Islands health research capacity advisory group

To achieve these recommendations, a Solomon Islands health systems research capacity building advisory group should be created and tasked with devising policies and leading actions to improve health systems for health systems research capacity building. Because many of the issues identified in this study are related to gaps in existing systems, and underutilisation of existing people with potentially valuable skills and experience, this group should comprise of a broad range of government and non-government health system managers, finance experts, social and cultural leaders as well as health professionals and researchers. The advisory group should comprise people with expertise across all four HSRCB models described in this study and other capacity building initiatives or programmes also implemented across Solomon Islands.

This group would have the potential to facilitate policy recommendations to improve healthcare outcomes based on locally produced and international research evidence. This group could also advise on a Solomon Islands research grants application scheme to extend existing research capacity building initiatives for Solomon Islanders. The group could also provide advice to future IHRPs coming to work within the Solomon Islands. In addition it could also advise Solomon Islands National University on in-country HDR provision, and other in-country support for research training and facilitation. This may be an effective way of making best use of the skills of existing Solomon Islanders who have returned from overseas with HDR qualifications, supplemented by the existing internal research capacity built within the three other HSRCB models over the past decade.

Summary

Reaching these conclusions and recommendations has only been possible because of the participation of a significant number of Solomon Islanders who are directly involved in the implementation of HSRCB in the local context. The findings of this study are derived from

first-hand experiences of the benefits, issues, and challenges that are the features of HSRCB in our country. The authenticity, and the sometimes uncomfortably brutal honesty, of the primary sources offers the most powerful and insightful messages that we can use to improve HSRCB in Solomon Islands, for the benefit of all Solomon Islanders, but only if we are all prepared to demonstrate an equally high level of honesty and commitment to building a future health research system that meets their needs.

Epilogue

A Solomon Islander doing research with Solomon Islanders is a golden opportunity. Having a good relationship and earning respect from people you do research with is magical and precious. To be an insider and outsider in all four health systems research capacity building models investigated in this study is not easy. Moving between these two perspectives creates discord in your mind and in your soul.

In facing the challenges of expressing what you know and understand about your research in a different language, you discover the reality that exists in the help, support and guidance of the supervisors, friends and families that help you succeed.

My stubbornness and determination certainly play a huge role in getting over my many challenges during my PhD journey. I feel I have grown up personally and professionally from all the experiences that I have gone through during my study. I have certainly learned a lot of things but also realise how much more there is to learn.

The PhD journey is filled with a lot of twists and turns, discomfort, pain, and the stress of adjusting to academic culture. All these experiences purify your character, and eventually give you the strength to endure the process of writing of your thesis.

Completing PhD study and graduating is not the end of the academic and intellectual journey but just the beginning of new opportunities. It opens many doors to step through in life. My PhD was a risky journey that I dared to take, and that risk has been overcome despite a lot of falling down and getting up again along the way, In Solomon Islands Pijin, it is the ‘ministry of get up and go.’

References

Abawi, K., Chandra-Mouli, V., Toskin, I., Festin, M. P., Gertiser, L., Idris, R., . . . Campana, A. (2016). E-learning for research capacity strengthening in sexual and reproductive health: the experience of the Geneva Foundation for Medical Education and Research and the Department of Reproductive Health and Research, World Health Organization. *Human Resources for Health, 14*(1), 76. Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5142418/pdf/12960_2016_Article_173.pdf

Adanu, R., Mbizvo, M. T., Baguiya, A., Adam, V., Ademe, B. W., Ankomah, A., . . . Temmerman, M. (2015). Sexual and reproductive health research and research capacity strengthening in Africa: Perspectives from the region. *Reproductive Health, 12*, 64. doi:10.1186/s12978-015-0055-2

Akin, D. (1993). *Negotiating culture in East Kwaio, Malaita, Solomon Islands. An Arbor*: University Microfilms International.

Amado, A., Dalelo, A., Adomßent, M., & Fischer, D. (2017). Engaging teacher educators with the sustainability agenda: A case study of a pilot professional development program from Ethiopia. *International Journal of Sustainability in Higher Education, 18*(5), 715-737. doi:10.1108/IJSHE-02-2016-0029

Ambert, A. M., Adler, P. A., Adler, P., & Detzner, D. F. (1995). Understanding and evaluating qualitative research. *Journal of Marriage and Family, 57*(4), 879-893

Anderson, A. A. (n.d.). *The community builder's approach to theory of change. a practical guide to theory development*. Retrieved from https://www.actknowledge.org/episode-24-the-middle-road-interviews-dr-helene-clark-founder-and-director-of-actknowledge-and-board-chair-of-the-center-for-theory-of-change/

Asugeni, T. R. (2014). *Community and health service responses to culturally safe tuberculosis ward at Atoifi Adventist Hospital, Solomon Islands.* (Masters in Leadership and Develoment). Pacific Adventist University.

Atkins, S., Varshney, D., Meragia, E., Zwarenstein, M., & Diwan, V. (2016). 'Research clinics': Online journal clubs between south and north for student mentoring. *Global Health Action, 9*(1). doi:10.3402/GHA.V9.30434

Aveling, N. (2013). Don't talk about what you don't know': On (not) conducting research with/in Indigenous contexts. *Critical studies in education, 54*(2), 203-214. doi:10.1080/17508487.2012.724021

Ayah, R., Jessani, N., & Mafuta, E. M. (2014). Institutional capacity for health systems research in East and Central African schools of public health: knowledge translation and effective communication. *Health Research Policy and Systems, 12*, 20. doi:10.1186/1478-4505-12-20

Bates, I., Ansong, D., Bedu-Addo, G., Agbenyega, T., Akoto, A. Y. O., Nsiah-Asare, A., & Karikari, P. (2007). Evaluation of a learner-designed course for teaching health research skills in Ghana. *BMC Medical Education, 7*. doi:10.1186/1472-6920-7-18

Bates, I., Boyd, A., Smith, H., & Cole, D. C. (2014). A practical and systematic approach to organisational capacity strenthening for research in the health sector in Africa. *BMC: Health Research Policy and Systems, 12*(11), 10. Retrieved from http://www.health-policy-systems.com/content/12/1/11

Bates, I., Phillips, R., Martin-Peprah, R., Kibiki, G., Gaye, O., Phiri, K., . . . Purnell, S. (2011a). Assessing and strengthening African universities' capacity for doctoral programmes. *PLoS Medicine, 8*(9), e1001068-e1001068. doi:10.1371/journal.pmed.1001068

Bates, I., Taegtmeyer, M., Squire, S. B., Ansong, D., Nhlema-Simwaka, B., Baba, A., & Theobald, S. (2011b). Indicators of sustainable capacity building for health research: Analysis of four African case studies. *Health Research Policy and Systems, 9*. doi:10.1186/1478-4505-9-4

Baxter, P., & Jack, S. (2008). Qualitative case study methodology: Study design and implementation for novice researchers. *Qualitative Report, 13*(4), 544-559. Retrieved from http://nsuworks.nova.edu/tqr/vol13/iss4/2

Beals, F., Kidman, J., & Funaki, H. (2019). Insider and outsider research: Negotiating self at the edge of the emic/etic divide. *Qualitative Inquiry, 26*(6), 593-601. doi:10.1177/1077800419843950

Birks, M. (2014). *Practical philosophy. In J.Mills & M.Birks (Eds.), Qualitative methodology; A practical guide.* London, United Kingdom: Sage.

Birks, M., & Mills, J. (2015). *Grounded theory: A practical guide* (2nd ed.). Thousand Oaks: CA: Sage.

Bosch-Capblanch, X., Lavis, J. N., Lewin, S., Atun, R., Rottingen, J. A., Droschel, D., . . . Haines, A. (2012). Guidance for evidence-informed policies about health systems: rationale for and challenges of guidance development. *PLoS Medicine, 9*(3), 8. doi:10.1371/journal.pmed.1001185

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in psychology, 3*, 77-101

Brinkmann, S., & Kvale, S. (2015). *Interview: Learning the craft of qualitative research interviewing* (3rd ed.). Thousand Oaks: CA: Sage.

Carlisle, S., & Cropper, S. (2009). Investing in lay researchers for community-based health action research: implications for research, policy and practice. *Critical Public Health, 19*(1), 59-70. doi:10.1080/09581590802225712

Casale, M. A. J., Flicker, S., & Nixon, S. A. (2011). Fieldwork challenges: lessons learned from a north-south public health research partnership. *Health Promotion Practice, 12*(5), 734-743. doi:10.1177/1524839910369201

Casey, D., & Houghton, C. (2010). Clarifying case study research: Examples from practice. *Nurse Researcher, 17*(3), 41-51

Cater, S. M. L., M. (2007). Justifying knowledge, justifying method, taking actions: Epistemologies, methodologies and methods in qualitative research. *Qualitative Health Research, 17*(10), 1316-1328. doi:10.1177/104973230736927

Charmaz, K. (2002). Stories and silences: disclosures and self in chronic illness. *Qualitative Inquiry, 8*(3), 302-328

Charmaz, K. (2014). *Constructing grounded theory* (2nd ed.). Thousand Oaks: CA: Sage.

Cheer, K., MacLaren, D., & Tsey, K. (2016). The use of grounded theory in studies of nurses and midwives' coping processes: A systematic literature search. *Contemporary Nurse, 51*(2-3), 200-219. doi:10.1080/10376178.2016.1157445

Clifford, K. L., & Zaman, M. H. (2016). Engineering, global health, and inclusive innovation: focus on partnership, system strengthening, and local impact for SDGs. *Global Health Action, 9*, 30175. doi:10.3402/gha.v9.30175

Clive, M. (1985). Kanaka. A history to Queensland: An oral history approach. *Bikmaus, 3*(1), 57-71.

Cockburn, C. (2015). *'Standpoint theory: Chapter 15', in Mojab, S. (ed), Marxism and feminism.* . London: Zed books.

Colaizzi, P. F. (1978). *Psychological research as the phenomenologists views it. In R.S. Valle & M. King (Eds), Existential phenomenological alternatives for psychology*. New York: Oxford University Press.

Cole, D. C., Boyd, A., Aslanyan, G., & Bates, I. (2014). Indicators for tracking programmes to strengthen health research capacity in lower- and middle-income countries: A qualitative synthesis. *Health Research Policy and Systems, 12*(1). doi:10.1186/1478-4505-12-17

Commission on Health Researchfor Development. (n.d.). Essential health research. Retrieved from https://www.ghwatch.org/sites/www.ghwatch.org/files/E7.pdf

Compaore, R., Brizuela, V., Khisa, M., A, Gomez, L., A, Baguiya, A., Bonet, M., . . . Kouanda, S. (2021). 'We always find things to learn from'. Lessons from the implementation of the global maternal sepsis study on research capacity: a qualitative study. *BMC, 21*(208), 1-11. doi:10.1186/s12913-021-06195-9

Contreras, J., Raventos, H., Rodriguez, G., & Leandro, M. (2014). Call for a change in research funding priorities: the example of mental health in Costa Rica. *Revista panamericana de salud publica = Pan American journal of public health, 36*(4), 266-269. Retrieved from https://scielosp.org/article/ssm/content/raw/?resource_ssm_path=/media/assets/rpsp/v36n4/08.pdf

Corris, P. (1973). *Passage, port and plantation. A history of Solomon Islands labour migration 1870-1914*. Melbourne: University of Melbourne Press.

Creswell, J., W. (1998). *Qualitative inquiry and research design: Choosing among five traditions.* Thousand Oaks: CA: Sage.

Creswell, J. W. (2013). *Qualitative Inquiry and research design: Choosing among five approaches* (3rd ed.). Thousand Oaks: CA: Sage.

Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches.* (International Student ed.). Thousand Oaks: CA: Sage.

Creswell, J. W., Hanson, W. E., Plano Clark, V. L., & Morales, A. (2007). Qualitative research design: Selection and implementation. . *Counseling Psychologist, 35*(2), 236-264. doi:10.1177/0011000006287390

Creswell, J. W., & Poth, C. N. (2018). *Qualitative inquiry & research design: Choosing among five approaches* (4th ed.). Thousand Oaks: CA: Sage.

Crotty, M. (1998). *The foundations of social research: Meaning and perspective in their research process.* London: Sage.

Cuboni, H. D., Finau, S. A., Wainiqolo, I., & Cuboni, G. (2004). Fijian participation in health research: Analysis of Medline publications 1965-2002. *Pacific Public Health, 11*(1), 59-78

Cunningham, J., Miller, S. T., Joosten, Y., Elzey, J. D., Israel, T., King, C., . . . Wilkins, C. H. (2015). Community-engaged strategies to promote relevance of research capacity-building efforts targeting community organizations. *Clinical and Translational Science, 8*(5), 513-517. doi:10.1111/cts.12274

Datta, R. (2013). A relational theoretical framework and meanings of land, nature, and sustainability for research with Indigenous communities. *Local Environment, 20*(1), 102-113. doi:10.1080/13549839.2013.818957

De Savigny, D., Kasale, H., Mbuya, C., & Reid, G. (2004). *Fixing health systems* (2 ed.). Ottawa, Canada: International Develoment Research Centre.

Dinnen, S. (2008). The Solomon Islands intervention and the instabilities of the post-colonial state. *Global change, peace & security, 20*(3), 339-355. doi:10.1080/14781150802394063

Dodani, S., & LaPorte, R. E. (2008). Ways to strengthen research capacity in developing countries: effectiveness of a research training workshop in Pakistan. *Public Health, 122*(6), 578-587. doi:10.1016/j.puhe.2007.09.003

Dwyer, C. S., & Buckle, L. J. (2009). The space between: on being an insider-outsider in qualitative research. *International journal of qualitative methods, 8*(1), 54-63

Dye, C., Boema, T., Evans, D., Harries, A., Lienhardt, C., McManus, J., . . . Zachariah, R. (2013). *The world health report 2013: Research for universal coverage*. Retrieved from Geneva: https://www.who.int/publications/i/item/9789240690837

Dye, C., Reeder, J. C., & Terry, R. F. (2013). Research for universal health coverage. *Science Translational Medicine, 5*(199), 199ed113. doi:10.1126/scitranslmed.3006971

Eisenhardt, K. M., & Graebner, M. E. (2007). Theory building from cases: opportunities and challenges. *Academy of Management Journal, 50*(1), 25-32. doi:10.5465/AMJ.2007.24160888

Ekeroma, A. J., Kenealy, T., Shulruf, B., McCowan, L. M. E., & Hill, A. (2014). Building reproductive health research and audit capacity and activity in the Pacific Islands (BRRACAP) study: methods, rationale and baseline results. *BMC Medical Education, 14*, 121. doi:10.1186/1472-6920-14-121

Ekeroma, A. J., Kenealy, T., Shulruf, B., Nosa, V., & Hill, A. (2015). Building capacity for research and audit: outcomes of a training workshop for pacific physicians and nurses. *Journal of Education and Training Studies, 3*(4). doi:10.11114/jets.v3i4.774

Ekeroma, A. J., Pollock, T., Kenealy, T., Shulruf, B., Sopoaga, F., Montorzi, G., . . . Hill, A. (2013). Pacific Island publications in the reproductive health literature 2000-2011: with New Zealand as a reference. *Australian and New Zealand Journal of Obstetrics and Gynaecology, 53*(2), 197-202. doi:10.1111/ajo.12039

El Lawindi, M. I., Galal, Y. S., & Khairy, W. A. (2015). Health research and millennium development goals: identifying the gap from public health perspective. *Global journal of health science, 8*(5), 1-10. doi:10.5539/gjhs.v8n5p1

Ellen, G. W. W. (n.d.). "Gospel of health" was to be the "right arm" of the third angel's message. Retrieved from https://ssnet.org/links/health-resources/health-message-right-arm/

Elmusharaf, K., Tahir, H., O' Donovan, D., Brugha, R., Homeida, M., Abbas, A. M. O., & Byrne, E. (2016). From local to global: A qualitative review of the multi-leveled impact of a multi-country health research capacity development partnership on maternal health in Sudan. *Globalization and Health, 12*(1). doi:10.1186/s12992-016-0153-0

ESSENCE on Health Research. (2011). *Planning, monitoring and evaluation framework for capacity strengthening in health research*. Retrieved from Geneva: https://dpcpsi.nih.gov/sites/default/files/Final%20Report%20%2811-5201%20FIC%29%2010-17-11-%20ESSENCE.pdf

ESSENCE on Health Research. (2014). Seven principles for strengthening research capacity in low- and middle-income countries: simple ideas in a complex world. Retrieved from http://www.cohred.org/wp-content/uploads/2012/09/ESSENCE-2014.pdf

Ezeanolue, E. E., Menson, W. N. A., Patel, D., Aarons, G., Olutola, A., Obiefune, M., . . . Sturke, R. (2018). Gaps and strategies in developing health research capacity: Experience from the Nigeria Implementation Science Alliance. *Health Research Policy and Systems, 16*(1), 6. doi:10.1186/s12961-018-0289-x

Fraenkel, J. (2004). *The manipulation of Custom: From Umprising to Intervention in the Solomon Islands*. Canberra: Pandanus.

Franzen, S. R. P., Chandler, C., Siribaddna, S., Atashili, J., Angus, B., & Lang, T. (2017). Strategies for developing sustainable health research capacity in low and middle-income countries: a prospective, qualitative study investigating the barriers and enablers to locally led clinical trial conduct in Ethiopia, Cameroon and Sri Lanka. *British Medical Journal*, 1-15. doi:10.1136/bmjopen-2017-017246

Franzen, S. R. P., Chandler, C., & Lang, T. (2017). Health research capacity development in low and middle income countries: Reality or rhetoric? A systematic meta-narrative review of the qualitative literature. *BMJ Open, 7*(1), 1-15. doi:10.1136/bmjopen-2016-012332

Frenk, J., Chen, L., Bhutta, Z. A., Cohen, J., Crisp, N., Evans, T., . . . Zurayk, H. (2010). Health professionals for a new century: transforming education to strengthen health systems in an interdependent world. *The Lancet, 376*(9756), 1923-1958. doi:10.1016/s0140-6736(10)61854-5

Gadsby, E. W. (2011). Research capacity strengthening: donor approaches to improving and assessing its impact in low- and middle-income countries. *International Journal of Health Planning and Management, 26*(1), 89-106. doi:10.1002/hpm.1031

Ghaffar, A., IJsselmuidien, C., & Zicker, F. (2008). *Changing mindsets: Research capacity strengthening in low and middle income countries.* Retrieved from http://apps.who.int/tdr/svc/publications/tdr-research-publications/changing_mindsets

Gilson, L. (2012). *Health policy and systems research.a methodology reader alliance for health policy and systems research.* Retrieved from https://ahpsr.who.int/what-we-do/what-is-health-policy-and-systems-research-(hpsr)

Goel, S., Kumar, A. V., Aggarwal, A., Singh, R., Lal, P., Kumar, R., . . . Gupta, D. (2018). Capacity building through operational research training in tobacco control: Experiences and lesson learned. *Indian Journal of Community Medicine, 43*(2), 77-81. doi:10.4103/ijcm.IJCM_160_17

Gotham, D., Meldrum, J., Nageshwaran, V., Counts, C., Kumari, N., Martin, M., . . . Post, N. (2016). Global health equity in United Kingdom university research: a landscape of current policies and practices. *Health Research Policy and Systems, 14*(1), 76. Retrieved from http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=med8&NEWS=N&AN=27724907

Goyet, S., Sauvegrain, P., Schantz, C., & Morin, C. (2018). State of midwifery research in France. *ELSEVIER: Midwifery, 64*, 101-109. doi:10.1016/j.midw.2018.06.021

Greco, G., Lorgelly, P., & Yamabhai, I. (2016). Outcomes in economic evaluations of public health interventions in low- and middle-income countries: health, capabilities and subjective wellbeing. *Health Economics (United Kingdom), 25*, 83-94. doi:10.1002/hec.3302

Grinnell, R. M., & Unrau, Y. A. (2008). *Preface. Social work research and evaluation: Foundations of evidence-based practice* (8th ed.). New York: Oxford University press.

Grinnell, R. M., Unrau, Y. A., & Williams, M. (2014). *Introduction. In R.M. Grinnell & Y.A. Unrau (Eds), Social work research and evaluation: foundations of evidence-based practice* (10th ed.). New York: Oxford University press.

Grix, J. (2010). *The foundations of research* (2nd ed.). New York: Palgrave Macmillan.

Harrington, H., Asugeni, J., Jimuru, C., Gwalaa, J., Ribeyro, E., Bradbury, R., . . . Speare, R. (2013). A practical strategy for responding to a case of lymphatic filariasis post-elimination in Pacific Islands. *BMC: Parasites and Vectors, 6*(1), 218-218. doi:10.1186/1756-3305-6-218

Harrington, H., Bradbury, R., Taeka, J., Asugeni, J., Asugeni, V., Igeni, T., . . . Speare, R. (2015). Prevalence of soil-transmitted helminths in remote villages in East Kwaio, Solomon Islands. *Western Pac Surveill Response J, 6*(3), 51-58. doi:10.5365/WPSAR.2015.6.1.016

Harrison, H., Birks, M., Franklin, R., & Mills, J. (2017). Case study research: Foundations and methodology orientations. *Forum Qualitative Sozialforschung/Forum: Qualitative Social Research, 18*(1), 1-12. Retrieved from http://www.qualitativeresearch.net/index.php/fqs/article/view/2655/4079

Harvestime Books. (2004). *The medical missionary manual*. United States of America: Harvestime Books.

Heimburger, D. C., Warner, T. L., Carothers, C. L., Blevins, M., Thomas, Y., Gardner, P., . . . Vermund, S. H. (2013). Recruiting trainees for a global health research workforce: the National Institutes of Health Fogarty International Clinical Research Scholars Program selection process. *The American journal of tropical medicine and hygiene, 89*(2), 281-287. doi:10.4269/ajtmh.12-0677

Heller, R. F., Machingura, P. I., Musa, B. M., Sengupta, P., & Myles, P. (2015). Mobilising the alumni of a Master of Public Health degree to build research and development capacity in low- and middle-income settings: The Peoples-uni. *BMC: Health Res Policy Syst, 13*, 71. doi:10.1186/s12961-015-0064-1

Hentz, P. (2016). *Overview of case study research. In M. De Chesnay (Ed.), Nursing research using case studies*. New York: Springer.

Hiller, H. H., & Diluzio, L. (2004). The interviewee and the research interview: Analysing a neglected dimension in research. *The Canadian review of sociology, 41*(1), 1-26. doi:10.1111/j.1755-618X.2004.tb02167.x

Hodge, N., Slatyer, B., & Skiller, L. (2015). *Solomon Islands health system review (health system in transition)* (W. Maxine Ed. Vol. 5). Switzerland: World Health Organization Press.

Holliday, A. (2016). *Doing and writing qualitative research* (3rd ed.). London, United Kingdom: Sage.

Indexmundi. (2010). GDP per capita (constant 2010 US$) - country ranking - Oceania. Retrieved from https://www.indexmundi.com/facts/indicators/NY.GDP.PCAP.KD/rankings/oceania

Itogo, N., Hill, P. C., Bissell, K., Harries, A. D., Viney, K., & Gounder, S. (2014). Tuberculosis notifications, characteristics and treatment outcomes: urban vs. rural Solomon Islands, 2000-2011. *Public Health Action, 4*(Suppl 1), S25-28. doi:10.5588/pha.13.0078

Jessani, N., Kennedy, C., & Bennett, S. (2016). The human capital of knowledge brokers: An analysis of attributes, capacities and skills of academic teaching and research faculty at Kenyan schools of public health. *BMC: Health Research Policy and Systems, 14*(1), 58. doi:10.1186/s12961-016-0133-0

Jessani, N., Lewy, D., Ekirapa-Kiracho, E., & Bennett, S. (2014). Institutional capacity for health systems research in East and Central African schools of public health: experiences with a capacity assessment tool. *BMC: Health Res Policy Syst, 12*, 21. doi:10.1186/1478-4505-12-21

Jönsson, K., Tomson, G., Jönsson, C., Kounnavong, S., & Wahlström, R. (2007). Health systems research in Lao PDR: Capacity development for getting research into policy and practice. *BMC: Health Research Policy and Systems, 5*. doi:10.1186/1478-4505-5-11

JTA International. (2014). *Solomon Islands Health Legislation Review*. Retrieved from Honiara:

Kagan, J., Giang, D. D., Iademarco, M. F., Phung, V. T., Lau, C.-Y., & Quang, N. N. (2016). Assessing clinical research capacity in Vietnam: A framework for strengthening capability for clinical trials in developing countries. *Public Health Reports, 131*(3), 396-403. Retrieved from http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=medc&NEWS=N&AN=27252559

Kanoute, A., Faye, D., & Bourgeois, D. (2012). Current status of oral health research in Africa: an overview. *International Dental Journal, 62*(6), 301-307. doi:10.1111/j.1875-595X.2012.00123x

Kincheloe, J. L., McLaren, P., & Steinberg, S. R. (2011). *Critical pedagogy, and qualitative research: Moving to the bricolage. In N.K. Denzin & Y. S. Lincoln (Eds), The Sage handbook of Qualitative research.* (4th ed.). Thousand Oaks: CA: Sage.

Kirigia, J. M., Pannenborg, C. O., Amore, L. G. C., Ghannem, H., Ijsselmuiden, C., & Nabyonga-Orem, J. (2016). Global Forum 2015 dialogue on "From evidence to policy - thinking outside the box": perspectives to improve evidence uptake and good practices in the African Region. *BMC: Health Services Research, 16 Suppl 4*, 215. doi:10.1186/s12913-016-1453-z

Knowlton, W. L., & Phillips, C., C. (2013). *The logic model guidebook: better stratigies for great results.* (2 ed.). London: Sage.

Kohrt, B. A., Upadhaya, N., Luitel, N. P., Maharjan, S. M., Kaiser, B. N., MacFarlane, E. K., & Khan, N. (2014). Authorship in global mental health research: recommendations for collaborative approaches to writing and publishing. *Annals of Global Health, 80*(2), 134-142. doi:10.1016/j.aogh.2014.04.007

Kok, O. M., Rodrigues, A., Silva, P. A., & Haan, d. S. (2012). The emergence and current performance of a health research system: lessons from Guinea Bissau. *BMC: Health Research Policy and Systems, 10*(5), 11. Retrieved from http://www.health-policy-systems.com/content/10/1/5

Kuper, A., Reeves, S., & Levinson, W. (2008). An introduction to reading and appraising qualitative research. *BMJ, 337*(7666), 404-407. doi:10.1136/bmj.a288

Lansang, M. A., & Dennis, R. (2004). Building capacity in health research in the developing world. *Bulletin of the World Health Organization, 82*(10), 764-770

Larkins, S., Carlisle, K., Harrington, H., MacLaren, D., Lovo, E., Harrington, R., . . . Whittaker, M. (2020). From the frontline: Strengthening surveillance and response capacities of the rural workforce in the asia-pacific region. how can grass-roots implementation research help? *Frontiers in Public Health, 8*, 507. doi:10.3389/fpubh.2020.00507

Lawrence, D., Mitrou, F., & Zubrick, S. R. (2011). Global research neglect of population-based approaches to smoking cessation: time for a more rigorous science of population health

interventions. *Addiction (Abingdon, England), 106*(9), 1549-1554. doi:10.1111/j.1360-0443.2011.03451.x

Lembani, M., Teddy, G., Molosiwa, D., & Hwabamungu, B. (2016). Post-doctoral research fellowship as a health policy and systems research capacity development intervention: a case of the CHESAI initiative. *BMC: Health Research Policy and Systems, 14*(1), 89. Retrieved from http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=med8&NEWS=N&AN=27993140

Liamputtong, P. (2013). *Qualitative research methods* (4th ed.). Melbourne: Oxford University Press.

Liamputtong, P. (2017). *Research methods in health foundations for evidence-based practice,* (3rd ed.). Melbourne: Oxford university press.

Lincoln, Y. S., Lynham, S. A., & Guba, E. G. (2011). *Paradigmatic controversies, contradictions, and emerging confluences, revisited. In N. K. Denzin & Y. S. Lincoln (Eds.), The SAGE hankbook of qualitative research.* (4th ed.). Thousand Oaks: CA: Sage.

Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. Beverly Hills: CA: Sage.

Lokot, M., & Wake, C. (2021). *The co-production of research between academics, NGO's and community in humantarian responses: a practice guide.* London, United Kingdom: London School of Hygiene & Tropical Medicine.

Lui, P. S. C., Sarangapany, J., Begley, K., Coote, K., & Kishore, K. (2014). Medical and nursing students perceived knowledge, attitudes, and practices concerning human immunodeficiency virus. *ISRN Public Health, 2014*, 1-9. doi:10.1155/2014/975875

MacDonald, N. E., Bortolussi, R., Kabakyenga, J., Pemba, S., Estambale, B., Kollmann, K. H. M., . . . Appleton, M. (2014). MicroResearch: finding sustainable local health solutions in East Africa through small local research studies. *Journal of epidemiology and global health, 4*(3), 185-193. doi:10.1016/j.jegh.2014.01.002

MacLaren, D. (2006). *Culturally appropriate health care in Kwaio, Solomon Islands: An action research approach.* (Doctor of Philosophy). Griffith University.

MacLaren, D., Asugeni, J., Asugeni, R., & Kekeubata, E. (2009). Incorporating sociocultural beliefs in mental health services in Kwaio, Solomon Islands. *Australasian Psychiatry, 17 Suppl 1*, S125-127. doi:10.1080/10398560902948381

MacLaren, D., Asugeni, J., & Redman-MacLaren, M. (2015). Strengthening research capacity in the Pacific: an example from the Atoifi Health Research Group, Solomon Islands. *Australasian Psychiatry*, 44

MacLaren, D., & Kekeubata, E. (2007). Reorientating health services through community health promotion in Kwaio, Solomon Islands. *Promotion & Education, 14*(2), 78-79

Maike, P. (2010). *Framework for priorities in health: Solomon Islands country case study* Noumea: Secretariat of the Pacific Community.

Manehoua, L., Carlisle, K., Whittaker, M., Larkins, S., Harrington, H., Massey, P. D., . . . MacLaren, D. (2021). Patient experiences of the community phase of the directly observed treatment short-course for tuberculosis in Malaita province, Solomon Islands. *Asia-Pacific Journal of Public Health, 33*(6-7), 794-796. doi:10.1177/10105395211035255

Marvasti, A. B. (2004). *Qualitative research in sociology*. London: Sage.

Maxwell, J. A. (2013). *Qualitative research design: An interactive approach* (3rd ed.). Thousand Oaks: CA: Sage.

Mayhew, S. H., Doherty, J., & Pitayarangsarit, S. (2008). Developing health systems research capacities through north-south partnership: an evaluation of collaboration with South Africa and Thailand. *BMC: Health Res Policy Syst, 6*, 8. doi:10.1186/1478-4505-6-8

Mclellan, E., MacQueen, M., & Neidig, J., L. (2008). "Beyond the qualitative interview: Data preparation and transcription. *Field Methods, 15*(1).

Memiah, P., Ah Mu, T., Penner, J., Owour, K., Ngunu-Gituathi, C., Prevot, K., . . . Komba, P. (2018). Bridging the gap in implementation science: evaluating a capacity-building program in data management, analysis, utilization, and dissemination in low-and middle-income countries. *Population Health Management, 21*(3), 245-251. doi:10.1089/pop.2017.0093

Mertens, D. M. (2010). *Research and evaluation in education and psychology: Integrating diversity withquantitative, qualitative, and mixed methods* (3rd ed.). Thousand Oaks: CA: Sage.

Mills, A. (2012). Health policy and systems research: defining the terrain; identifying the methods. *Health Policy and Planning, 27*(1), 1-7. doi:10.1093/heapol/czr006

Mills, J., & Birks, M. (2014). *Qualitative methodology: A practical guide*. London, United Kingdom: Sage.

Ministry of Education and Human Resource Development. (2018). *Ministry of education and human resource develoment annual report 2018*. Honiara: Ministry of Education and Human Resource Development

Ministry of Education and Human Resource Development. (2018). *Ministry of Education and Human Resource Development annual report 2018*. Honiara: Ministry of Education and Human Resource Development. Reterieved from https://www.google.com/search?q=solomon+islands+ministry+of+education+annual+report+2018&rlz=1C1GCEB_enAU906AU906&oq=So&aqs=chrome.4.69i59l3j0i67i395j35i39i395l2j69i60j69i61.8304j1j7&sourceid=chrome&ie=UTF-8

Ministry of Health and Medical Services. (2020). *Role delineation policy for Solomon Islands: infrastructure, human resources and equipment for improved health services provision towards a happy, healthy and productive Solomon Islands*. Honiara: Ministry of Health Retrieved from https://solomons.gov.sb/wp-content/uploads/2020/02/MHMS-Role-Delineation-Policy.pdf

Minja, H., Nsanzabana, C., Maure, C., Hoffmann, A., Rumisha, S., Ogundahunsi, O., . . . Launois, P. (2011). Impact of health research capacity strengthening in low- and middle-income countries: The case of WHO/TDR Programmes. *PLoS Neglected Tropical Diseases, 5*(10). doi:10.1371/journal.pntd.0001351

Moore, C. (2004). *Happy isles in crisis: the historical courses for a failing state in Solomon Islands. 1998-2004*. Canberra: Asia Pacific Press.

Morgan, D. L. (1997). *Focus groups as qualitative research*. Thousand Oaks: CA: Sage.

Morse, M. J. (1999). The armchair walkthrough. *Qualitative Health Research, 9*(4), 435 - 436. Retrieved from https://journals.sagepub.com/doi/pdf/10.1177/104973299129121956

Mwangi, L., Gitau, E., Bates, I., & Pulford, J. (2022). Strengthening capacity for communityand public engagement (CPE): a mixed-method evaluationof the DELTAS Africa CPE seed fund pilot (Version 1: peer review: awaiting peer review). *Wellcome Open Research, 7*(96), 1-10. doi:10.12688/wellcomeopenres.17665.1

Naidoo, S., Dimba, E., Yengopal, V., Folayan, M. O., & Akpata, E. S. (2015). Strategies for oral health research in Africa and the Middle Eastern region. *Advances in Dental Research, 27*(1), 43-49. doi:10.1177/0022034515575539

Nangami, M. N., Rugema, L., Tebeje, B., & Mukose, A. (2014). Institutional capacity for health systems research in East and Central Africa schools of public health: enhancing capacity to design and implement teaching programs. *Health Research Policy and Systems, 12*, 22. doi:10.1186/1478-4505-12-22

Nchinda, T. C. (2002). Research capacity strengthening in the south. *Social Science and Medicine, 54*, 13

Ninomiya, M. E. M., & Pollock, J. N. (2017). Reconciling community-based Indigenous research and academic practices: Knowing principles is not always enough. *Elsevier: Social science & Medicine, 172*, 28-36

Nutley, T., & Reynolds, H. W. (2013). Improving the use of health data for health system strengthening. *Global Health Action, 6*, 10. doi:10.3402/gha.v6i0.20001

Nuyens, Y. (2005). *No development without research: a challenge for capacity strengthening.* Geneva Switzerland: Global Forum for Health Research

Pang, T., Sadana, R., Hanney, S., Bhutta, Z. A., Hyder, A. A., & Simon, J. (2003). Knowledge for better health - a conceptual framework and foundation for health research systems. *Bulletin of the World Health Organization: Policy and Practice, 81*, 815-820

Paradies, Y. (2018). Whither standpoint theory in a post-truth world? *Cosmopolitan Civil Societies: An Interdisciplinary Journal, 10*(2), 119-129. doi:10.5130/ccs.v10i2.5980

Patton, M. Q. (2016). *Qualitative research and evaluation methods* (4th ed.). Thousand Oaks: CA: Sage.

Peter, D., H., Tran, N., T., Adam, T. (2013). *Implementation research in health: a practical guide.* Alliance for Health Policy and System Research: WHO press Retrieved from https://apps.who.int/iris/bitstream/handle/10665/91758/9789241506212_eng.pdf?sequence=1&isAllowed=y

Petersen, P., E. (2009). Global policy for improvement of oral health in the 21st century--implications to oral health research of World Health Assembly 2007, World Health Organization. *Community Dentistry and Oral Epidemiology, 37*(1), 1-8. doi:10.1111/j.1600-0528.2008.00448.x

Pinto, A. D., Cole, D. C., Kuile, A. t., Forman, L., Rouleau, K., Philpott, J., . . . Muntaner, C. (2014). A case study of global health at the university: implications for research and action. *Global Health Action, 7*, 24526. doi:10.3402/gha.v7.24526

Pratt, B., & Loff, B. (2014). A framework to link international clinical research to the promotion of justice in global health. *Bioethics, 28*(8), 387-396. doi:10.1111/bioe.12009

Provenzano, A. M., Graber, L. K., Elansary, M., Khoshnood, K., Rastegar, A., & Barry, M. (2010). Short-term global health research projects by US medical students: ethical challenges for partnerships. *The American journal of tropical medicine and hygiene, 83*(2), 211-214. doi:10.4269/ajtmh.2010.09-0692

Pryor, J., Prasad, S., Koloi, M. (2009). *National health research systems in pacific island countries*. WHO, Western Pacific Regional Organisation: WHO press.

Ramsay, A., Harries, A. D., Zachariah, R., Bissell, K., Hinderaker, S. G., Edginton, M., . . . Reeder, J. C. (2014). The Structured Operational Research and Training Initiative for public health programmes. *Public Health Action, 4*(2), 79-84. doi:10.5588/pha.14.0011

Redman-MacLaren, M., MacLaren, D. J., Harrington, H., Asugeni, R., Timothy, H. R., Kekeubata, E., & Speare, R. (2012). Mutual research capacity strengthening: A qualitative study of two-way partnerships in public health research. *International Journal for Equity in Health, 11*(1), 79-79. doi:10.1186/1475-9276-11-79

Redman-MacLaren, M., Solomon, J., Asugeni, R., Asugeni, J., Harrington, H., Muse, A., & Kekeubata, E. (2009). *'Introduction to health research' Workshop Report*. Cairns: James Cook University.

Redman-MacLaren, M. L., MacLaren, D. J., Asugeni, R., Fa'Anuabae, C. E., Harrington, H., Muse, A., . . . Clough, A. R. (2010). "We can move forward": Challenging historical inequity in public health research in Solomon Islands. *International Journal for Equity in Health, 9*(1), 25-25. doi:10.1186/1475-9276-9-25

Redman-MacLaren, M. L., Maclaren, D. J., Solomon, J., Muse, A., Asugeni, R., Harrington, H., . . . Clough, A. R. (2010). Research workshop to research work: initial steps in establishing health research systems on Malaita, Solomon Islands. *Health Research Policy and Systems, 8*(1), 33-33. doi:10.1186/1478-4505-8-33

Richards, L., & Morse, J. M. (2013). *Readme first for a user's guide to qualitative methods* (3rd ed.). Thousand Oaks: CA: Sage.

Ritchie, J., & Lewis, J. (2003). *Qualitative research practice: A guide for social science students and researchers*. London, United Kingdom: Sage.

Robert, E. S. (2006). *Multiple case study analysis*. New York: Guilford press.

Rolleston, A. K., Doughty, R., & Poppe, K. (2016). Pounamu: Integration of kaupapa Maori concepts in health research: a way forward for Maori cardiovascular health? *Journal of Primary Health Care, 8*(1), 60-66. doi:10.1071/HC15034

Rottingen, J.-A., Chamas, C., Goyal, L. C., Harb, H., Lagrada, L., & Mayosi, B. M. (2012). Securing the public good of health research and development for developing countries. *Bulletin of the World Health Organization, 90*(5), 398-400. doi:10.2471/BLT.12.105460

Rottingen, J.-A., Regmi, S., Eide, M., Young, A. J., Viergever, R. F., Ardal, C., . . . Terry, R. F. (2013). Mapping of available health research and development data: what's there, what's missing, and what role is there for a global observatory? *Lancet, 382*(9900), 1286-1307. doi:10.1016/S0140-6736(13)61046-6

Rukia, A. (1989). *Digging. In: H. Laracy, and S. Alasia. (Eds.). Ples blong iumi: Solomon Islands - the past four thousand years.* . Suva: Institute of Pacific Studies of University of South Pacific.

Saldana, J. (2013). *The coding manual for qualitative researchers*. Thousand Oaks: CA: Sage.

Scotland, J. (2012). Exploring the philosophical underpinnings of research: Relating ontology and epistemology to methodology and methods of the scientific, interpretive, and critical research paradigms. *English Language Teaching, 5*(9), 9-16. doi:10.5539/elt.v5n9p9

Sewankambo, N., Tumwine, J. K., Tomson, G., Obua, C., Bwanga, F., Waiswa, P., . . . Peterson, S. (2015). Enabling dynamic partnerships through joint degrees between low- and high-income countries for capacity development in global health research: experience from the Karolinska Institutet/Makerere University partnership. *PLoS medicine: Health in Action, 12*(2), e1001784. doi:10.1371/journal.pmed.1001784

Sharma, G., & Sturges, P. (2007). Making use of ICT to facilitate poor people's access to public services: An action research programme. *Information Development, 23*(1), 15-24. doi:10.1177/0266666907075623

Shelley, F. M. (2013). *Nation shapes: The story behind the world's borders*. Santa Barbara: CA: ABC-CLIO.

Simba, D., Mukose, A., & Bazeyo, W. (2014). Institutional capacity for health systems research in East and Central African Schools of Public Health: strengthening human and financial resources. *BMC: Health Research Policy and Systems, 12*, 23. doi:10.1186/1478-4505-12-23

Siron, S., Dagenais, C., & Ridde, V. (2015). What research tells us about knowledge transfer strategies to improve public health in low-income countries: a scoping review. *International Journal of Public Health, 60*(7), 849-863. doi:10.1007/s00038-015-0716-5

Sitthi-amorn, C., Somrongthong, R., Reeder, J. C., & Simon, J. (2000). Strengthening health research capacity in developing countries: a critical element for achieving health equity (Education and Debate). *British Medical Journal, 321*(7264), 813-813

Solomon Isands, N. S. O. (2020). *2019 National population and housing census project (provisional count)*. Honiara: Solomon Islands National Statistic Office, Ministry of Finance and Treasury.

Solomon Islands Ministry of Health and Medical Services. (2017). *Descriptive health core indicator report*. Honiara: Solomon Islands Ministry of Health and Medical Services.

Solomon Islands Statistics office. (2011). *Report on 2009 population and housing census. Basic tables and census description*. Honiara: Solomon Islands Ministry of Finance.

Solomon Islands Statistics office. (2020). *2019 National population and housing census (provisional count)*. Honiara: Solomon Islands Minsitry of Finance.

Speare, R., Harrington, H., Canyon, D., & Massey, P. D. (2014). A systematic literature review of pediculosis due to head lice in the Pacific Island Countries and Territories: what country specific research on headlice is needed? *BMC: Dermatology, 14*(11), 1-6

Squires, A. (2008). Language barriers and qualitative nursing research: Methodological considerations. *International Nursing Review, 55*(3), 265-273.

Stenson, A. L., Kapungu, C. T., Geller, S. E., & Miller, S. (2010). Navigating the challenges of global reproductive health research. *Journal of women's health (2002), 19*(11), 2101-2107. doi:10.1089/jwh.2010.2065

Suaalii-Sauni, T., Aiavao, F., Faafeu-Hope, E., Sopoaga, T., Paul, C., Righarts, A., . . . Fuatai, F. L. (2011). Strengthening health research capacity from within Samoa. *Asia-Pacific Journal of Public Health, 23*(1), 100-109. doi:10.1177/1010539510390782

Swanson, R. C., Cattaneo, A., Bradley, E., Chunharas, S., Atun, R., Abbas, K. M., . . . Best, A. (2012). Rethinking health systems strengthening: key systems thinking tools and strategies for transformational change. *Health Policy and Planning, 27 Suppl 4*, iv54-61. Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3529625/pdf/czs090.pdf

Taika, F. (1989). *Chronology. In: Laracy, and S. Alasia. (Eds.). Ples blong iumi: Solomon Islands - the past four thousand years*. Suva: Institute of Pacific Studies of University of South Pacific.

Thambinathan, V., & Kinsella, E. A. (2021). Decolonizing methodologies in qualitative research: creating spaces for transformative praxis. *International journal of qualitative methods, 20*. doi:10.1177/16094069211014766

Theobald, S., Taegtmeyer, M., Squire, S. B., Crichton, J., Simwaka, B. N., Thomson, R., . . . Bates, I. (2009). Towards building equitable health systems in Sub-Saharan Africa: lessons from case studies on operational research. *BMC: Health Res Policy Syst, 7*, 26. doi:10.1186/1478-4505-7-26

Transparency International: The global coalition against corruption. (2021). Global corruption barometer Pacific: A first for people voices on corruption. Retrieved from https://www.transparency.org/en/news/gcb-pacific-2021-survey-people-voices-corruption-bribery.pdf

Travis, P., Bennett, S., Haines, A., Pang, T., Bhutta, Z., Hyder, A. A., . . . Evans, T. (2004). Overcoming health-systems constraints to achieve the Millennium Development Goals. *Lancet, 364*(9437), 900-906. doi:10.1016/s0140-6736(04)16987-0

Tripathy, J. P., Kumar, A. M., Guillerm, N., Berger, S. D., Bissell, K., Reid, A., . . . Harries, A. D. (2018). Does the Structured Operational Research and Training Initiative (SORT IT) continue to influence health policy and/or practice? *Glob Health Action, 11*(1), 10. doi:10.1080/16549716.2018.1500762

Van der Veken, K., Belaid, L., Delvaux, T., & De Brouwere, V. (2017). Research capacity building through North-South-South networking: towards true partnership? An exploratory study of a network for scientific support in the field of sexual and reproductive health. *BMC: Health Res Policy Syst, 15*(1), 39. doi:10.1186/s12961-017-0202-z

Vasquez, E. E., Hirsch, J. S., Giang, L. M., & Parker, R. G. (2013). Rethinking health research capacity strengthening. *Global Public Health, 8*(Suppl.1), S104-S124. doi:10.1080/17441692.2013.786117

Wahyuni, D. (2012). The research design maze: understanding paradigms, cases, methods and methodologies. *Journal of Applied Management Accounting Research, 10*(1), 69

Wainwright, E. (2003). *Our failing neighbour. Australia and the future of Solomon Islands*. Canberra: Australian Strategic Policy Institute.

White, G., Gegeo, D., Akin, D., & watson, K. (1988). *Bikfala faet: Olketa Solomon Aelanda rimembarem Wol Wo Tu = the big death: Solomon Islanders remember World War II.*

Honiara and Suva: Solomon Islands College of Higher Education and University of South Pacific.

Whitworth, J. A. G., Kokwaro, G., Kinyanjui, S., Snewin, V. A., Tanner, M., Walport, M., & Sewankambo, N. (2008). Strengthening capacity for health research in Africa. *Lancet, 372*(9649), 1590-1593. doi:10.1016/S0140-6736(08)61660-8

World Health Organization. (2009). *Scaling up research and learning for health systems: now is the time. Report of a high level task force on research for health 2008, Bamako, Mali.* . Retrieved from Geneva https://www.yumpu.com/en/document/view/11288040/scaling-up-research-and-learning-for-health-systems-now-is-the-time

World Health Organization. (2012). *Strategy on health policy and systems research: changing mindset*. Geneva: Worl Health Organization.

World Health Organization. (2017). Alliance for health policy and system research. Retrieved from https://ahpsr.who.int/what-we-do/what-is-health-policy-and-systems-research-(hpsr)

Yazdizadeh, B., Majdzadeh, R., Janani, L., Mohtasham, F., Nikooee, S., Mousavi, A., . . . Karami, M. (2016). An assessment of health research impact in Iran. *BMC: Health Research Policy and Systems, 14*(1), 56. doi:10.1186/s12961-016-0129-9

Yin, K. R. (2014). *Case study research: Design and methods* (5th. ed.). Thousand Oaks: CA: Sage.

Yin, K. R. (2008). Book review: case study research: design and methods. *Australasian Emergency Nursing Journal, 5*, 59-60

Zachariah, R., Ford, N., Maher, D., Bissell, K., Van den Bergh, R., van den Boogaard, W., . . . Harries, A. D. (2012). Is operational research delivering the goods? The journey to success in low-income countries. *Lancet: Infectious Diseases, 12*(5), 415-421. doi:10.1016/s1473-3099(11)70309-7

Appendices

Appendix 1: Details of systematic literature review method and results

Search terms and PRISMA diagrams

The Scopus and Medline Ovid health and education databases as well as Google scholar were used to retrieve full text of the publications. The PRISMA methodology was used to search for peer reviewed literature using the following search terms: Pacific Islands OR Pacific island countries and territories OR Pacific island countries and territories OR Pacific Island Forum countries OR Melanesia OR Polynesia OR Micronesia OR American Samoa OR Cook Islands OR Federated State of Micronesia OR Fiji OR French Polynesia OR Guam OR Kiribati OR Marshall Islands OR Nauru OR New Caledonia OR Niue OR Northern Mariana Islands OR Palau OR Papua New Guinea OR Pitcairn Island OR Samoa OR Solomon Islands OR Tokelau OR Tonga OR Tuvalu OR Vanuatu OR Wallis OR Futuna OR Developing countries OR Least developing countries OR Poor resource countries OR Low income countries OR Low and middle income countries OR Africa OR African countries AND Health AND Research training OR research education OR Research capacity development OR Research capacity building OR Research capacity strengthening OR Research program.

Inclusion criteria used were:

- Studies that refer to health systems research capacity building and/or strengthening – planning and implementation
- Studies that refer to outcome/impact of health systems research capacity building to individuals, institutions and health systems.
- Peer-reviewed literature
- Publications between 2007 to 2018,
- Publications in English language, and
- Target population/setting is LMICs;

Exclusion criteria were:

- Studies that do not refer to health systems research capacity building approach - planning, implementation and evaluation.
- Studies that do not refer to outcome/impact of health systems research capacity building to individuals, institutions and health systems.
- Literature that are published before 2007 and after 2018
- Literature that are not published in English language, and
- Populations that are not from LMICs

Duplicates were removed. If the content appeared relevant, abstracts were examined. Articles that were found non-relevant after reading the abstract were removed and the reason for their removal recorded. The full text of the remaining relevant publications were assessed. The literatures were classified into descriptive, exploratory, evaluative, case study and commentary categories. The relevant publications were intensively reviewed **i**) for the descriptions and approaches to HSRCB in LMICs and how this can inform HSRCB activities in the Pacific, **ii**) to identify different health research training approaches, how they are implemented including their impact to individual, institutions and health system, **iii**) for obvious gaps in HSRCB activities in LMICs and Pacific Island forum countries. HSRCB frameworks, underlying constructs and theoretical underpinning were also identified and examined. Because of the limited number of articles identified, it was decided to retain non peer-reviewed literature in the final analysis.

Results

Thirty four publications were selected from the original 1,675 found. The reasons for rejecting the papers were: i) 1,385 are outside of the publication year limit (2007-2018), ii) 25 were not in English, iii) three were duplicates, iv) 202 were not relevant based on the title screening, v) six were irrelevant based on abstract screening, vi) 20 were irrelevant based on full text screening [not from the area of immediate interest of this study].

PRISMA FLOW DIAGRAM

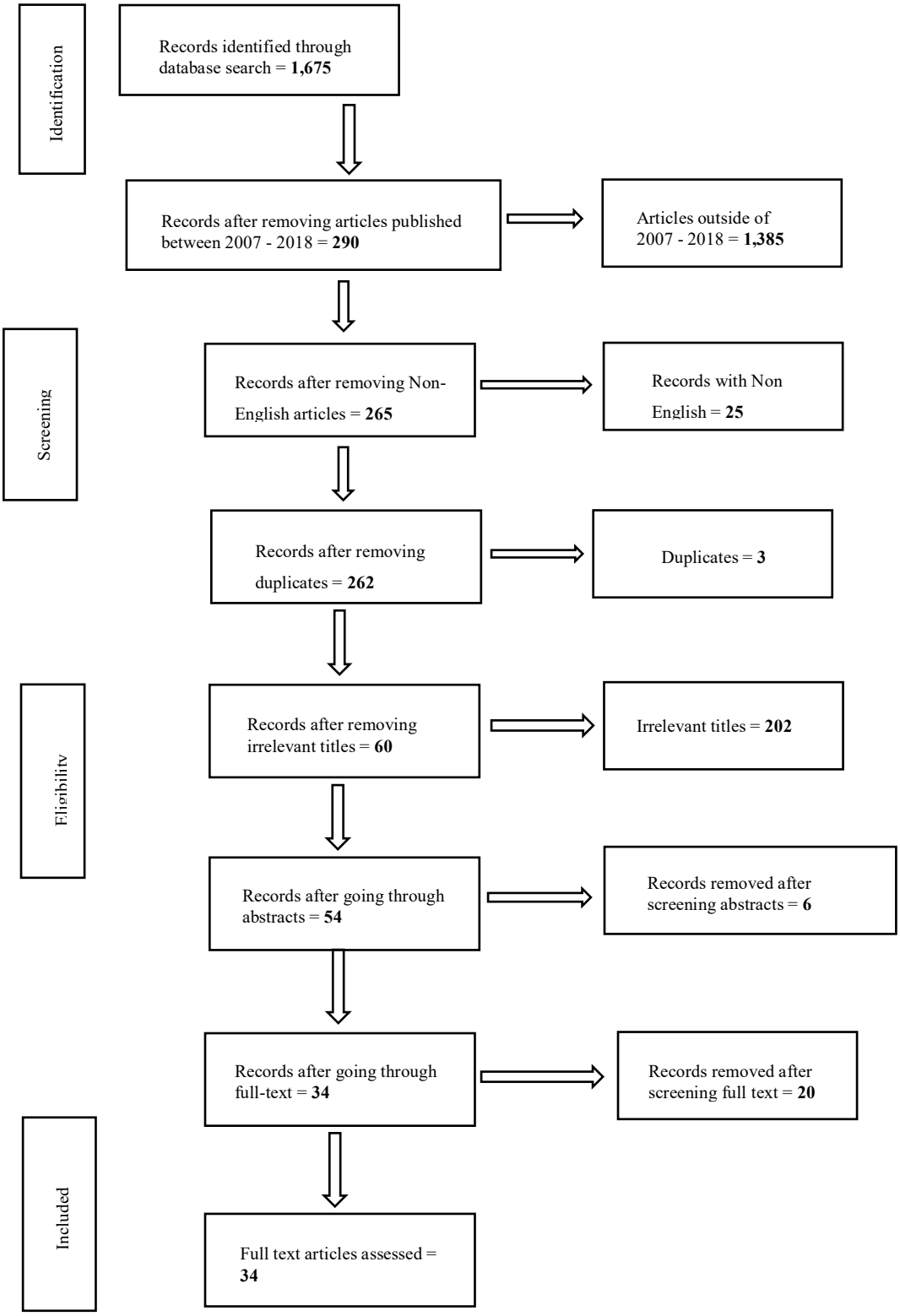


Figure 1. Prisma Flow Diagram

Summary of findings from systematic review on HSRCB in LMICs 2007-2018

Author (Year) citation No.	Title	Type of study	Country of Authorship at time of publication
Abawi, Karim et al (2016)	E-learning for research capacity strengthening in sexual and reproductive health: the experience of the Geneva Foundation for Medical Education and Research and the Department of Reproductive Health and Research, World Health Organization	Original research	Geneva - Switzerland First Author - High income country Last Author – High income Most authors High income countries
Adanu, Richard et al (2015)	Sexual and Reproductive Health Research and Research Capacity Strengthening in Africa: Perspectives from the region	Commentary or Discussion paper	Ethiopia Most authors from Low and middle income-countries First Author – Low and middle income (Africa) country Last Author – High income country
Ayah, Richard et al (2014)	. Institutional capacity for health systems research in East and Central African schools of public health: knowledge translation and effective communication	Original research	HEALTH Alliance – Africa Hub – a consortium of seven schools of public health (SPHs) in East and Central Africa First Author – Low and middle income country Last Author – Low and middle income country Majority of authors : Low and middle income-countries

Author (Year) citation No.	Title	Type of study	Country of Authorship at time of publication
Bates, I. et al (2007)	Evaluation of a learner-designed course for teaching health research skills in Ghana	Original research	Ghana First Author – High income country Last Author – Low and middle income country Majority authors LMIC
Bates, Imelda, et al (2011)	Assessing and strengthening African universities' capacity for doctoral programmes	Original research	Africa First Author – High income country Last Author – Low and middle income country Majority authors: LMIC
Casale, Marisa A. J. et al (2011)	Fieldwork challenges: lessons learned from a north-south public health research partnership	Original research	South Africa First and last authors : LMIC Majority of authors LMIC
Contreras, Javier et al (2014)	Call for a change in research funding priorities: the example of mental health in Costa Rica	Commentary or Discussion paper	Costa Rica First last and all authors LMIC
Dodani, Sunita et al (2008)	Ways to strengthen research capacity in developing countries: effectiveness of a research training workshop in Pakistan	Original research	Pakistan First last and all authors HIC
Ekeroma, Alec J. et al (2014)	Building reproductive health research and audit capacity and activity in the Pacific Islands (BRRACAP) study: methods, rationale and baseline results	Original research	Six Pacific Islands - Fiji, Samoa, Tonga, Vanuatu, Cook Islands and the Solomon Islands First last and all authors HIC

Author (Year) citation No.	Title	Type of study	Country of Authorship at time of publication
El Lawindi et al (2015)	Health Research and Millennium Development Goals: Identifying the Gap From Public Health Perspective	Original research	Cairo Egypt First last and all authors LMIC
Elmusharaf, Khalifa et al (2016)	From local to global: a qualitative review of the multi-leveled impact of a multi-country health research capacity development partnership on maternal health in Sudan	Original research	Africa and Ireland First, and majority authors LMIC Last author HIC
Ezeanolue, E. E. et al (2018)	Gaps and strategies in developing health research capacity: Experience from the Nigeria Implementation Science Alliance	Original research	Nigeria First and last author HIC Majority authors LMIC
Goel, S. et al (2018)	Capacity building through operational research training in tobacco control: Experiences and lesson learned	Original research	First last and all authors LMIC (India)
Heller, Richard F et al (2015)	Mobilising the alumni of a Master of Public Health degree to build research and development capacity in low- and middle-income settings: The Peoples-uni	Original research	First and last authors HIC, majority authors LMIC
Jessani, Nasreen et al (2016)	The Human Capital of Knowledge Brokers: An analysis of attributes, capacities and skills of academic teaching and research faculty at Kenyan schools of public health	Original research	Kenya First last and all authors HIC

Author (Year) citation No.	Title	Type of study	Country of Authorship at time of publication
Jönsson, K. et al (2007)	Health systems research in Lao PDR: Capacity development for getting research into policy and practice	Original research	Lao - Vietnam First and last authors HIC Majority HIC
Kanoute, Aida et al (2012)	Current status of oral health research in Africa: an overview	Original Research	Subregions of Africa First and last author HIC one from LMIC
Kirigia, Joses et al (2016)	Global Forum 2015 dialogue on "From evidence to policy - thinking outside the box": perspectives to improve evidence uptake and good practices in the African Region	Commentary or Discussion paper	First and last authors LMIC. Equal mix LMIC and HIC authors
Kohrt, Brandon A. et al (2014)	Authorship in global mental health research: recommendations for collaborative approaches to writing and publishing	Review	Nepal and Haiti First, last and majority authors LMIC
Lawrence, David et al (2011)	Global research neglect of population-based approaches to smoking cessation: time for a more rigorous science of population health interventions	Commentary or Discussion paper	First last and all authors LMIC
Lembani, Martina et al (2016)	Post-doctoral research fellowship as a health policy and systems research capacity development intervention: a case of the CHESAI initiative	Original research	African countries First last and all authors LMIC
MacDonald, N. E. et al (2014).	MicroResearch: finding sustainable local health solutions in East Africa through small local research studies	Original research	Sub-Saharan African countries First and last authors HIC Majority LMIC

Author (Year) citation No.	Title	Type of study	Country of Authorship at time of publication
Memiah, P. et al (2018)	Bridging the Gap in Implementation Science: Evaluating a Capacity-Building Program in Data Management, Analysis, Utilization, and Dissemination in Low-and Middle-Income Countries	Original research	Kenya and Tanzania First and last authors HIC Majority LMIC
Naidoo, S. et al (2015)	Strategies for Oral Health Research in Africa and the Middle Eastern Region	Commentary or Discussion paper	First last and all LMIC
Nangami, Mabel N. et al (2014)	Institutional capacity for health systems research in East and Central Africa schools of public health: enhancing capacity to design and implement teaching programs	Original research	East and Central Africa First last and all LMIC
Petersen, Poul Erik (2009).	Global policy for improvement of oral health in the 21st century--implications to oral health research of World Health Assembly 2007, World Health Organization	Commentary or Discussion paper	No LMIC author only HIC
Rottingen, John-Arne et al (2012).	Securing the public good of health research and development for developing countries	Commentary or Discussion paper	First HIC Last LMIC Majority LMIC
Rottingen, John-Arne et al (2013)	Mapping of available health research and development data: what's there, what's missing, and what role is there for a global observatory?	Commentary or Discussion paper	All HIC
Sewankambo et al (2015)	Enabling dynamic partnerships through joint degrees between low- and high-income countries for capacity development in global	Commentary or Discussion paper	Karolinska Institute in Sweden and Makerere University in Uganda

Author (Year) citation No.	Title	Type of study	Country of Authorship at time of publication
	health research: experience from the Karolinska Institute/ Makerere University partnership		First LMIC Last HIC Majority LMIC
Sharma, G. Sturges, P. (2007)	Using ICT to Help the Poor Access Public Services: An action research programme	Commentary or Discussion paper	Croatia, India, Nigeria and Pakistan Indian project First LMIC Last HIC
Simba, Daudi et al (2014)	Institutional capacity for health systems research in East and Central African Schools of Public Health: strengthening human and financial resources	Original research	Seven (7) Africa Hub SPHs in East and Central Africa All LMIC
Siron et al (2015).	What research tells us about knowledge transfer strategies to improve public health in low-income countries: a scoping review	Original research	All HIC authors
Stenson, Amy L et al (2010)	Navigating the challenges of global reproductive health research	Commentary or Discussion paper	Low resource setting All HIC authors
Yazdizadeh et al (2016)	An assessment of health research impact in Iran	Original research	Iran All LMIC authors

Appendix 2: Ethics approvals

Appendix 3: Interview questions

I have developed twelve general semi-structured questions to interview the participants. The questions were designed in such a way that it was fit for the context of the four HSRCB approaches.

1 Tell me your understanding of health research in Solomon Islands?

Tell me what is your understanding of health systems research capacity building (HSRCB)?

2 Can you explain to me the process or steps in implementing HSRCB in your organization/institution/department/division?

3 Do you think RCB is important in your organization/institution/department/division? Why?

4 What is the system used for Solomon Islanders to undertake:

- Higher Degree by Research capacity building approach from 2007 to 2018?
- International health research project capacity building approach from 2007 to 2018?
- WHO structured operational research and training initiative (SORT-iT) approach from 2007 to 2018?
- Atoifi health research group learn by doing (AHRG) approach from 2007 to 2018

5 How many Solomon Islanders have undertaken:

- Higher Degree by Research capacity building approach from 2007 to 2018?
- International health research project capacity building approach from 2007 to 2018?
- WHO structured operational research and training initiative (SORT-iT) approach from 2007 to 2018?
- Atoifi health research group learn by doing (AHRG) approach from 2007 to 2018

6 Where are the Solomon islanders who have undertaken:

- Higher Degree by Research capacity building approach from 2007 to 2018, employed after the training?
- International health research project capacity building approach from 2007 to 2018 employed after the training?
- WHO structured operational research and training initiative (SORT-iT) approach from 2007 to 2018 employed after the training?
- Atoifi health research group learn by doing (AHRGLD) approach from 2007 to 2018 employed after the training?

7 What health research capacity has been build/strengthen through:

- Higher Degree by Research capacity building approach from 2007 to 2018?
- International health research project capacity building approach from 2007 to 2018?
- WHO structured operational research and training initiative (SORT-iT) approach from 2007 to 2018?

- Atoifi health research group learn by doing (AHRGLD) approach from 2007 to 2018

8 What health research outcomes has been produced through:

- Higher Degree by Research capacity building approach from 2007 to 2018?
- International health research project capacity building approach from 2007 to 2018?
- WHO structured operational research and training initiative (SORT-iT) approach from 2007 to 2018?
- Atoifi health research group learn by doing (AHRGLD) approach from 2007 to 2018

9 What are the positives or negatives of:

- Higher Degree by Research capacity building approach from 2007 to 2018?
- International health research project capacity building approach from 2007 to 2018?
- WHO structured operational research and training initiative (SORT-iT) approach from 2007 to 2018?
- Atoifi health research group learn by doing (AHRGLD) approach from 2007 to 2018

10 Which approach best suit your context and why?

11 Next time. What or How would you like to see HSRCB approach done differently?

12 Any other comments, recommendation or advice about the overall HSRCB approach in Solomon Islands so far?

Appendix 4: Literature search results for each of the four case studies

Higher Degree by Research model literature search result 2008 - 2018

No	Year of publication	Author	No of Solomon Island authors	Title	Journal
1	2014 March	Lui P, Jeganathan S, Begley K, Katherine C, &Kishore K.	1/5	Medical and Nursing Student's Perceived Knowledge, Attitudes, and Practices concerning Human Immunodeficiency Virus	ISRN Public health, Hindawi Publishing Corporation
2	2018 Sep	Lui PSC, Dunne MP, Baker P, Isom V.	2/4	Adverse Childhood Experiences, Mental Health, and Risk Behaviors Among Men in the Solomon Islands	Asia Pac J Public Health.
3	2017 Aug	Lui PSC, Dunne MP, Baker P, Isom V.	2/4	Sexual difficulties faced by men in the Solomon Islands: a mixed-methods study	Sex Health.
4	2015	Maukera R, Blignault I.	1/1	A decade of peace: Mental health issues and service developments in the Solomon Islands since 2003	Australas Psychiatry
5	2015 Aug	Pikacha N, Murray N.	1/2	Cataract Surgery Outcomes From a Resident Training in a Low-Resource Setting in the Pacific	Asia Pac J Ophthalmol (Phila)
6	2014 Feb	Bugoro H, Hii JL, Butafa C, Iro'ofa C, Apairamo A, Cooper RD, Chen CC, Russell TL.	4/8	The bionomics of the malaria vector Anopheles farauti in Northern Guadalcanal, Solomon Islands: issues for successful vector control	Malar J.
7	2011 May	Bugoro H, Cooper RD, Butafa C, Iro'ofa C, Mackenzie DO, Chen CC, Russell TL.	3/7	Bionomics of the malaria vector Anopheles farauti in Temotu Province, Solomon Islands: issues for malaria elimination	Malar J.
8	2011 Sep	Bugoro H, Iro'ofa C, Mackenzie DO, Apairamo A, Hevalao W, Corcoran S, Bobogare A, Beebe NW, Russell TL, Chen CC, Cooper RD.	4/11	Changes in vector species composition and current vector biology and behaviour will favour malaria elimination in Santa Isabel Province, Solomon Islands	Malar J.

No	Year of publication	Author	No of Solomon Island authors	Title	Journal
9	2011 Sep	Bugoro H, Hii J, Russell TL, Cooper RD, Chan BK, Iro'ofa C, Butafa C, Apairamo A, Bobogare A, Chen CC.	5/10	Influence of environmental factors on the abundance of Anopheles farauti larvae in large brackish water streams in Northern Guadalcanal, Solomon Islands	Malar J.
10	2010 June	Qoqonokana MQ, Brian G, Ramke J, Garcia J, Szetu J.	2/5	Diabetic retinopathy in a hospital eye clinic population in Honiara, Solomon Islands	Clin Exp Ophthalmol

International Health Research Project model literature search result 2008 - 2018

No.	Year of publication	Author	No. of Solomon Islands authors	Title	Journal
1	2017	Martiniuk A, Jagilli R, Natuzzi E, Ilopitu JW, Oipata M, Christie AM, Korini J, Vujovich-Dunn C, Yu W.	3/8	Cancer in the Solomon Islands	Cancer Epidemiol
2	2015	Tin ST, Iro G, Gadabu E, Colagiuri R.	1/4	Counting the Cost of Diabetes in the Solomon Islands and Nauru	PLoS One
3	2015	Ryan B, Orotaloa P, Araitewa S, Gaoifa D, Moreen J, Kiloe E, Same W, Goding M, Ng C.	5/8	Mental health in the Solomon Islands: developing reforms and partnerships	Australas Psychiatry
4	2018	Boghossian A, Wang M, Nagu A, Tong A, Knox D.	1/5	Profile of gynaecology surgeries from Western Province, Solomon Islands	Rural Remote Health
5	2018	Gartrell A, Jennaway M, Manderson L, Fangalasuu J, Dolaiano S.	1/5	Social determinants of disability-based disadvantage in Solomon islands	Health Promot Int
6	2011	Martiniuk A, Negin J, Hersch F, Dalipanda T, Jagilli R, Houasia P, Gorringe L, Christie A.	3/8	Telemedicine in the Solomon Islands: 2006 to 2009	J Telemed Telecare
7	2018	Sandakabatu M, Nasi T, Titiulu C, Duke T.	2/4	Evaluating the process and outcomes of child death review in the Solomon Islands	Arch Dis Child

No.	Year of publication	Author	No. of Solomon Islands authors	Title	Journal
8	2018	Butcher RMR, Sokana O, Jack K, Kalae E, Sui L, Russell C, Houghton J, Palmer C, Holland MJ, Le Mesurier RT, Solomon AW, Mabey DCW, Roberts CH.	3/13	Active Trachoma Cases in the Solomon Islands Have Varied Polymicrobial Community Structures but Do Not Associate with Individual Non-Chlamydial Pathogens of the Eye	Front Med (Lausanne)
9	2011	Singh AN, Orotaloa P.	1/2	Psychiatry in paradise - the Solomon Islands	Int Psychiatry
10	2018	Tosif S, Nasi T, Gray A, Sadr-Azodi N, Ogaoga D, Duke T.	2/6	Assessment of the quality of neonatal care in the Solomon Islands	J Paediatr Child Health
11	2011	Natuzzi ES, Kushner A, Jagilly R, Pickacha D, Agiomea K, Hou L, Houasia P, Hendricks PL, Ba'erodo D.	6/9	Surgical care in the Solomon Islands: a road map for universal surgical care delivery	World J Surg
12	2018	Craig AT, Joshua CA, Sio AR, Teobasi B, Dofai A, Dalipanda T, Hardie K, Kaldor J, Kolbe A.	5/9	Enhanced surveillance during a public health emergency in a resource-limited setting: Experience from a large dengue outbreak in Solomon Islands, 2016-17	PLoS On
13	2016	Mason DS, Marks M, Sokana O, Solomon AW, Mabey DC, Romani L, Kaldor J, Steer AC, Engelman D.	1/9	The Prevalence of Scabies and Impetigo in the Solomon Islands: A Population-Based Survey	PLoS Negl Trop Dis
14	2018	Mohamed Y, Durrant K, Huggett C, Davis J, Macintyre A, Menu S, Wilson JN, Ramosaea M, Sami M, Barrington DJ, McSkimming D, Natoli L.	1/12	A qualitative exploration of menstruation-related restrictive practices in Fiji, Solomon Islands and Papua New Guinea	PLoS One
15	2014	Baker ML, Painter G, Hewitt AW, Islam FM, Szetu J, Qalo M, Keeffe J.	2/7	Profile of ocular trauma in the Solomon Islands	Clin Exp Ophthalmol
16	2018	Craig AT, Joshua CA, Sio AR, Donoghoe M, Betz-Stablein B, Bainivalu N, Dalipanda T, Kaldor J, Rosewell AE, Schierhout G.	4/10	Epidemic surveillance in a low resource setting: lessons from an evaluation of the Solomon Islands syndromic surveillance system, 2017	BMC Public Health

No.	Year of publication	Author	No. of Solomon Islands authors	Title	Journal
17	2018	Kluckow H, Panisi L, Larui J, Jatobatu A, Kim D, Hodges L, Black KI.	3/7	Socio-demographic predictors of unintended pregnancy and late antenatal booking in Honiara, Solomon Islands	Aust N Z J Obstet Gynaecol
18	2018	Jeanne I, Chambers LE, Kazazic A, Russell TL, Bobogare A, Bugoro H, Otto F, Fafale G, Amjadali A.	3/9	Mapping a Plasmodium transmission spatial suitability index in Solomon Islands: a malaria monitoring and control tool	Malar J
19	2018	Kaspar A, Newton O, Kei J, Driscoll C, Swanepoel W, Goulios H.	1/6	Prevalence of otitis media and risk-factors for sensorineural hearing loss among infants attending Child Welfare Clinics in the Solomon Islands	Int J Pediatr Otorhinolaryngol
20	2018	Liu LT, Dalipanda T, Jagilly R, Wang YH, Lin PC, Tsai CY, Lai WT, Tsai JJ.	2/8	Comparison of two rapid diagnostic tests during a large dengue virus serotype 3 outbreak in the Solomon Islands in 2013	PLoS One
21	2018	Hoy DG, Raikoti T, Smith E, Tuzakana A, Gill T, Matikarai K, Tako J, Jorari A, Blyth F, Pitaboe A, Buchbinder R, Kalauma I, Brooks P, Lepers C, Woolf A, Briggs A, March L.	2/17	Use of The Global Alliance for Musculoskeletal Health survey module for estimating the population prevalence of musculoskeletal pain: findings from the Solomon Islands	BMC Musculoskelet Disord
22	2016	Marks M, Joshua C, Longbottom J, Longbottom K, Sio A, Puiahi E, Jilini G, Stenos J, Dalipanda T, Musto J.	4/10	An outbreak investigation of scrub typhus in Western Province, Solomon Islands, 2014	Western Pac Surveill Response J
23	2014	Gresty KJ, Gray KA, Bobogare A, Wini L, Taleo G, Hii J, Cheng Q, Waters NC.	3/8	Genetic mutations in Plasmodium falciparum and Plasmodium vivax dihydrofolate reductase (DHFR) and dihydropteroate synthase (DHPS) in Vanuatu and Solomon Islands prior to the introduction of artemisinin combination therapy	Malar J
24	2014	Gresty KJ, Gray KA, Bobogare A, Taleo G, Hii J, Wini L, Cheng Q, Waters NC.	3/8	Genetic mutations in pfcrt and pfmdr1 at the time of artemisinin combination therapy introduction in South Pacific islands of Vanuatu and Solomon Islands	Malar J

No.	Year of publication	Author	No. of Solomon Islands authors	Title	Journal
25	2018	Craig AT, Joshua CA, Sio AR, Lauri M, Kaldor J, Rosewell AE, Schierhout G.	2/7	Towards effective outbreak detection: a qualitative study to identify factors affecting nurses' early warning surveillance practice in Solomon Islands	BMC Health Serv Res
26	2014	Marks M, Chi KH, Vahi V, Pillay A, Sokana O, Pavluck A, Mabey DC, Chen CY, Solomon AW.	1/9	Haemophilus ducreyi associated with skin ulcers among children, Solomon Islan	Emerg Infect Dis
27	2015	Marks M, Kako H, Butcher R, Lauri B, Puiahi E, Pitakaka R, Sokana O, Kilua G, Roth A, Solomon AW, Mabey DC.	4/11	Prevalence of sexually transmitted infections in female clinic attendees in Honiara, Solomon Islands	BMJ Open
28	2016	Shortus M, Musto J, Bugoro H, Butafa C, Sio A, Joshua C.	4/6	Vector-control response in a post-flood disaster setting, Honiara, Solomon Islands, 2014	Western Pac Surveill Response J
29	2018	Kaspar A, Newton O, Kei J, Driscoll C, Swanepoel W, Goulios H.	1/6	Prevalence of ear disease and associated hearing loss among primary school students in the Solomon Islands: Otitis media still a major public health issue	Int J Pediatr Otorhinolaryngol
30	2017	Kaspar A, Newton O, Kei J, Driscoll C, Swanepoel W, Goulios H.	1/6	Parental knowledge and attitudes to childhood hearing loss and hearing services in the Solomon Islands	Int J Pediatr Otorhinolaryngol
31	2016	Durski KN, Tituli C, Ogaoga D, Musto J, Joshua C, Dofai A, Leydon J, Nilles E.	3/8	An outbreak investigation of congenital rubella syndrome in Solomon Islands, 2013	Western Pac Surveill Response J
32	2015	Marks M, Vahi V, Sokana O, Puiahi E, Pavluck A, Zhang Z, Dalipanda T, Bottomley C, Mabey DC, Solomon AW.	2/10	Mapping the epidemiology of yaws in the Solomon Islands: a cluster randomized survey	Am J Trop Med Hyg
33	2012	Orotaloa P, Blignault I. (SI first author)	1/2	Mental health services in the Solomon Islands	Asia Pac Psychiatry
34	2018	Jeanne I, Chambers LE, Kazazic A, Russell TL, Bobogare A, Bugoro H, Otto F, Fafale G, Amjadali A.	3/9	Correction to: Mapping a Plasmodium transmission spatial suitability index in Solomon Islands: a malaria monitoring and control tool	Malar J

No.	Year of publication	Author	No. of Solomon Islands authors	Title	Journal
35	2016	Sokana O, Macleod C, Jack K, Butcher R, Marks M, Willis R, Chu BK, Posala C, Solomon AW. (SI first author)	2/9	Mapping Trachoma in the Solomon Islands: Results of Three Baseline Population-Based Prevalence Surveys Conducted with the Global Trachoma Mapping Project	Ophthalmic Epidemiol
36	2017	Smith J, Tahani L, Bobogare A, Bugoro H, Otto F, Fafale G, Hiriasa D, Kazazic A, Beard G, Amjadali A, Jeanne I.	4/11	Malaria early warning tool: linking inter-annual climate and malaria variability in northern Guadalcanal, Solomon Islands	Malar J
37	2015	Waltmann A, Darcy AW, Harris I, Koepfli C, Lodo J, Vahi V, Piziki D, Shanks GD, Barry AE, Whittaker M, Kazura JW, Mueller I.	1/12	High Rates of Asymptomatic, Sub-microscopic Plasmodium vivax Infection and Disappearing Plasmodium falciparum Malaria in an Area of Low Transmission in Solomon Islands	PLoS Negl Trop Dis
38	2016	Jones FK, Ko AI, Becha C, Joshua C, Musto J, Thomas S, Ronsse A, Kirkwood CD, Sio A, Aumua A, Nilles EJ.	3/11	Increased Rotavirus Prevalence in Diarrheal Outbreak Precipitated by Localized Flooding, Solomon Islands, 2014	Emerg Infect Dis
39	2017	Breakwell L, Anga J, Dadari I, Sadr-Azodi N, Ogaoga D, Patel M.	2/6	Evaluation of storing hepatitis B vaccine outside the cold chain in the Solomon Islands: Identifying opportunities and barriers to implementation	Vaccine
40	2016	Butcher RM, Sokana O, Jack K, Macleod CK, Marks ME, Kalae E, Sui L, Russell C, Tutill HJ, Williams RJ, Breuer J, Willis R, Le Mesurier RT, Mabey DC, Solomon AW, Roberts CH.	2/16	Low Prevalence of Conjunctival Infection with Chlamydia trachomatis in a Treatment-Naïve Trachoma-Endemic Region of the Solomon Islands	PLoS Negl Trop Dis
41	2013	Nogareda F, Joshua C, Sio A, Shortus M, Dalipanda T, Durski K, Musto J, Puiahi E, Dofai A, Aaskov J, Cao-Lormeau VM, Musso D, Dutta N, Fleisch J, Nilles E.	4/15	Ongoing outbreak of dengue serotype-3 in Solomon Islands, January to May 2013	Western Pac Surveill Response J
42	2016	Russell TL, Beebe NW, Bugoro H, Apairamo A, Collins FH, Cooper RD, Lobo NF, Burkot TR.	2/8	Anopheles farauti is a homogeneous population that blood feeds early and outdoors in the Solomon Islands	Malar J

No.	Year of publication	Author	No. of Solomon Islands authors	Title	Journal
43	2012	Negin J, Martiniuk AL, Farrell P, Dalipanda T.	1/4	Frequency, cost and impact of inter-island referrals in the Solomon Islands	Rural Remote Health
44	2014	Cao-Lormeau VM, Roche C, Musso D, Mallet HP, Dalipanda T, Dofai A, Nogareda F, Nilles EJ, Aaskov J.	2/9	Dengue virus type 3, South Pacific Islands, 2013	Emerg Infect Dis
45	2016	Burnett E, Dalipanda T, Ogaoga D, Gaiofa J, Jilini G, Halpin A, Dietz V, Date K, Mintz E, Hyde T, Wannemuehler K, Yen C.	4/12	Knowledge, Attitudes, and Practices regarding Diarrhea and Cholera following an Oral Cholera Vaccination Campaign in the Solomon Islands	PLoS Negl Trop Dis
46	2014	Negin J, Vizintin P, Houasia P, Martiniuk AL.	1/4	Barking up the wrong tree: injuries due to falls from trees in Solomon Islands	Med J Aust
47	2009	Atkinson JA, Bobogare A, Fitzgerald L, Boaz L, Appleyard B, Toaliu H, Vallely A.	2/7	A qualitative study on the acceptability and preference of three types of long-lasting insecticide-treated bed nets in Solomon Islands: implications for malaria elimination	Malar J
48	2016	Hoy D, Saketa ST, Maraka RR, Sio A, Wanyeki I, Frison P, Ogaoga D, Iniakawala D, Joshua C, Duituturaga S, Lepers C, Roth A, White P, Souares Y.	4/14	Enhanced syndromic surveillance for mass gatherings in the Pacific: a case study of the 11th Festival of Pacific Arts in Solomon Islands, 2012	Western Pac Surveill Response J
49	2016	Marks M, Bottomley C, Tome H, Pitakaka R, Butcher R, Sokana O, Kako H, Solomon AW, Mabey DC.	3/9	Mass drug administration of azithromycin for trachoma reduces the prevalence of genital Chlamydia trachomatis infection in the Solomon Islands	Sex Transm Infect
50	2018	Vasileva H, Butcher R, Pickering H, Sokana O, Jack K, Solomon AW, Holland MJ, Roberts CH.	2/8	Conjunctival transcriptome profiling of Solomon Islanders with active trachoma in the absence of Chlamydia trachomatis infection	Parasit Vectors
51	2016	Butcher RM, Sokana O, Jack K, Macleod CK, Marks M, Kalae E, Sui L, Russell C, Tutill HJ, Williams RJ,	2/16	Correction: Low Prevalence of Conjunctival Infection with Chlamydia trachomatis in a	PLoS Negl Trop Dis

No.	Year of publication	Author	No. of Solomon Islands authors	Title	Journal
		Breuer J, Willis R, Le Mesurier RT, Mabey DC, Solomon AW, Roberts CH.		Treatment-Naïve Trachoma-Endemic Region of the Solomon Islands	
52	2011	Wijesinghe RS, Atkinson JA, Bobogare A, Wini L, Whittaker M.	2/5	Exploring provider and community responses to the new malaria diagnostic and treatment regime in Solomon Islands	Malar J
53	2018	Butcher R, Sokana O, Jack K, Sui L, Russell C, Last A, Martin DL, Burton MJ, Solomon AW, Mabey DCW, Roberts CH.	2/11	Clinical signs of trachoma are prevalent among Solomon Islanders who have no persistent markers of prior infection with Chlamydia trachomatis	Wellcome Open Res
54	2010	Ballif M, Hii J, Marfurt J, Crameri A, Fafale A, Felger I, Beck HP, Genton B.	1/8	Monitoring of malaria parasite resistance to chloroquine and sulphadoxine-pyrimethamine in the Solomon Islands by DNA microarray technology	Malar J
55	2011	O'Sullivan M, Kenilorea G, Yamaguchi Y, Bobogare A, Losi L, Atkinson JA, Vallely A, Whittaker M, Tanner M, Wijesinghe R.	3/10	Malaria elimination in Isabel Province, Solomon Islands: establishing a surveillance-response system to prevent introduction and reintroduction of malaria	Malar J
56	2016	Getahun A, Baekalia M, Panda N, Lee A, Puiahi E, Khan S, Tahani D, Manongi D.	3/8	Seroprevalence of hepatitis B surface antigen in pregnant women attending antenatal clinic in Honiara Solomon Islands, 2015	World J Hepatol
57	2016	Marks M, Sokana O, Nachamkin E, Puiahi E, Kilua G, Pillay A, Bottomley C, Solomon AW, Mabey DC.	1/9	Prevalence of Active and Latent Yaws in the Solomon Islands 18 Months after Azithromycin Mass Drug Administration for Trachoma	PLoS Negl Trop Dis
58	2016	Win Tin ST, Laesango N, Gadabu E, Colagiuri R.	1/4	Comparing metabolic control and complications in type 2 diabetes in two Pacific Islands at baseline and following diabetes care intervention	J Clin Transl Endocrinol
59	2016	Whiting S, Dalipanda T, Postma S, Jamshaid de Lorenzo A, Aumua A.	1/6	Moving towards Universal Health Coverage through the Development of Integrated Service Delivery Packages for Primary Health Care in the Solomon Islands	Int J Integr Care

No.	Year of publication	Author	No. of Solomon Islands authors	Title	Journal
60	2015	Stewart MJ, Negin J, Farrell P, Houasia P, Munamua AB, Martiniuk A.	2/6	Extent, causes and impact of road traffic crashes in the Solomon Islands 1993-2012: data from the orthopaedic department at the National Referral Hospital, Honiara	Rural Remote Health
61	2016	Natuzzi ES, Joshua C, Shortus M, Reubin R, Dalipanda T, Ferran K, Aumua A, Brodine S.	2/8	Defining Population Health Vulnerability Following an Extreme Weather Event in an Urban Pacific Island Environment: Honiara, Solomon Islands	Am J Trop Med Hyg
62	2013	Kelly GC, Hale E, Donald W, Batarii W, Bugoro H, Nausien J, Smale J, Palmer K, Bobogare A, Taleo G, Vallely A, Tanner M, Vestergaard LS, Clements AC.	2/14	A high-resolution geospatial surveillance-response system for malaria elimination in Solomon Islands and Vanuatu	Malar J
63	2011	Furusawa T, Furusawa H, Eddie R, Tuni M, Pitakaka F, Aswani S.	2/6	Communicable and non-communicable diseases in the Solomon Islands villages during recovery from a massive earthquake in April 2007	N Z Med J
64	2012	Westcott M, Martiniuk AL, Fowler RA, Adhikari NK, Dalipanda T.	1/5	Critical care resources in the Solomon Islands: a cross-sectional survey	BMC Int Health Hum Rights
65	2012	Atkinson JA, Johnson ML, Wijesinghe R, Bobogare A, Losi L, O'Sullivan M, Yamaguchi Y, Kenilorea G, Vallely A, Cheng Q, Ebringer A, Bain L, Gray K, Harris I, Whittaker M, Reid H, Clements A, Shanks D.	2/18	Operational research to inform a sub-national surveillance intervention for malaria elimination in Solomon Islands	Malar J
66	2010	Kuwahata M, Wijesinghe R, Ho MF, Pelecanos A, Bobogare A, Landry L, Bugora H, Vallely A, McCarthy J.	1/9	Population screening for glucose-6-phosphate dehydrogenase deficiencies in Isabel Province, Solomon Islands, using a modified enzyme assay on filter paper dried bloodspots	Malar J
67	2013	Gray KA, Dowd S, Bain L, Bobogare A, Wini L, Shanks GD, Cheng Q.	2/7	Population genetics of Plasmodium falciparum and Plasmodium vivax and asymptomatic malaria in Temotu Province, Solomon Islands	Malar J

No.	Year of publication	Author	No. of Solomon Islands authors	Title	Journal
68	2014	Farrell PC, Negin J, Houasia P, Munamua AB, Leon DP, Rimon M, Martiniuk AL.	1/7	Hospital visits due to domestic violence from 1994 to 2011 in the Solomon Islands: a descriptive case series	Hawaii J Med Public Health
69	2016	Russell TL, Burkot TR, Bugoro H, Apairamo A, Beebe NW, Chow WK, Cooper RD, Collins FH, Lobo NF.	2/9	Larval habitats of the Anopheles farauti and Anopheles lungae complexes in the Solomon Islands	Malar J
70	2013	Win Tin ST, Gadabu E, Iro G, Tasserei J, Colagiuri R.	1/5	Diabetes related amputations in Pacific Islands countries: a root cause analysis of precipitating events	Diabetes Res Clin Pract
71	2010	Harris I, Sharrock WW, Bain LM, Gray KA, Bobogare A, Boaz L, Lilley K, Krause D, Vallely A, Johnson ML, Gatton ML, Shanks GD, Cheng Q.	2/13	A large proportion of asymptomatic Plasmodium infections with low and sub-microscopic parasite densities in the low transmission setting of Temotu Province, Solomon Islands: challenges for malaria diagnostics in an elimination setting	Malar J
72	2012	Colquhoun S, Ogaoga D, Tamou M, Nasi T, Subhi R, Duke T.	3/6	Child health nurses in the Solomon Islands: lessons for the Pacific and other developing countries	Hum Resour Health
73	2014	Win Tin ST, Kenilorea G, Gadabu E, Tasserei J, Colagiuri R.	1/5	The prevalence of diabetes complications and associated risk factors in Pacific Islands countries	Diabetes Res Clin Pract
74	2018	Marks M, Fookes M, Wagner J, Butcher R, Ghinai R, Sokana O, Sarkodie YA, Lukehart SA, Solomon AW, Mabey DCW, Thomson N.	1/11	Diagnostics for Yaws Eradication: Insights From Direct Next-Generation Sequencing of Cutaneous Strains of Treponema pallidum	Clin Infect Dis
75	2009	Atkinson JA, Bobogare A, Vallely A, Boaz L, Kelly G, Basifiri W, Forsyth S, Baker P, Appleyard B, Toaliu H, Williams G.	2/11	A cluster randomized controlled cross-over bed net acceptability and preference trial in Solomon Islands: community participation in shaping policy for malaria elimination	Malar J
76	2016	Russell TL, Beebe NW, Bugoro H, Apairamo A, Cooper RD, Collins FH, Lobo NF, Burkot TR.	2/8	Determinants of host feeding success by Anopheles farauti	Malar J

No.	Year of publication	Author	No. of Solomon Islands authors	Title	Journal
77	2008	Hasan AU, Suguri S, Fujimoto C, Itaki RL, Harada M, Kawabata M, Bugoro H, Albino B.	2/8	Genetic diversity in two sibling species of the Anopheles punctulatus group of mosquitoes on Guadalcanal in the Solomon Islands	BMC Evol Biol
78	2010	Yamauchi T, Nakazawa M, Ohmae H, Kamei K, Sato K, Bakote'e B.	1/6	Impact of ethnic conflict on the nutritional status and quality of life of suburban villagers in the Solomon Islands	J Nutr Sci Vitaminol (Tokyo)
79	2018	Marks M, Fookes M, Wagner J, Ghinai R, Sokana O, Sarkodie YA, Solomon AW, Mabey DCW, Thomson NR.	1/9	Direct Whole-Genome Sequencing of Cutaneous Strains of Haemophilus ducreyi	Emerg Infect Dis
80	2010	Frances SP, Bugoro H, Butafa C, Cooper RD.	2/4	Field evaluation of deet against Anopheles farauti at Ndendo (Santa Cruz) Island, Solomon Islands	J Med Entomol
81	2010	Tu HP, Chen CJ, Tovosia S, Ko AM, Lee CH, Ou TT, Lin GT, Chang SJ, Chiang SL, Chiang HC, Chen PH, Wang SJ, Lai HM, Ko YC.	1/14	Associations of a non-synonymous variant in SLC2A9 with gouty arthritis and uric acid levels in Han Chinese subjects and Solomon Islanders	Ann Rheum Dis
82	2018	Burkot TR, Bugoro H, Apairamo A, Cooper RD, Echeverry DF, Odabasi D, Beebe NW, Makuru V, Xiao H, Davidson JR, Deason NA, Reuben H, Kazura JW, Collins FH, Lobo NF, Russell TL.	2/16	Spatial-temporal heterogeneity in malaria receptivity is best estimated by vector biting rates in areas nearing elimination	Parasit Vectors
83	2016	Russell TL, Beebe NW, Bugoro H, Apairamo A, Chow WK, Cooper RD, Collins FH, Lobo NF, Burkot TR.	2/9	Frequent blood feeding enables insecticide-treated nets to reduce transmission by mosquitoes that bite predominately outdoors	Malar J
84	2018	Romani L, Marks M, Sokana O, Nasi T, Kamoriki B, Wand H, Whitfeld MJ, Engelman D, Solomon AW, Steer AC, Kaldor JM.	2/11	Feasibility and safety of mass drug coadministration with azithromycin and ivermectin for the control of neglected tropical diseases: a single-arm intervention trial	Lancet Glob Health
85	2017	Echeverry DF, Deason NA, Makuru V, Davidson J, Xiao H, Niedbalski J, Yu X, Stevenson JC, Bugoro H, Aparaimo 88A, Reuben H, Cooper R, Burkot TR, Russell TL, Collins FH, Lobo NF.	1/16	Fast and robust single PCR for Plasmodium sporozoite detection in mosquitoes using the cytochrome oxidase I gene	Malar J

No.	Year of publication	Author	No. of Solomon Islands authors	Title	Journal
86	2017	Thriemer K, Ley B, Bobogare A, Dysoley L, Alam MS, Pasaribu AP, Sattabongkot J, Jambert E, Domingo GJ, Commons R, Auburn S, Marfurt J, Devine A, Aktaruzzaman MM, Sohel N, Namgay R, Drukpa T, Sharma SN, Sarawati E, Samad I, Theodora M, Nambanya S, Ounekham S, Mudin RN, Da Thakur G, Makita LS, Deray R, Lee SE, Boaz L, Danansuriya MN, Mudiyanselage SD, Chinanonwait N, Kitchakarn S, Nausien J, Naket E, Duc TN, Do Manh H, Hong YS, Cheng Q, Richards JS, Kusriastuti R, Satyagraha A, Noviyanti R, Ding XC, Khan WA, Swe Phru C, Guoding Z, Qi G, Kaneko A, Miotto O, Nguitragool W, Roobsoong W, Battle K, Howes RE, Roca-Feltrer A, Duparc S, Bhowmick IP, Kenangalem E, Bibit JA, Barry A, Sintasath D, Abeyasinghe R, Sibley CH, McCarthy J, von Seidlein L, Baird JK, Price RN.	2/66	Challenges for achieving safe and effective radical cure of Plasmodium vivax: a round table discussion of the APMEN Vivax Working Group	Malar J
87	2008	Martiniuk AL, Millar HC, Malefoasi G, Vergeer P, Garland T, Knight S.	1/6	Cooperation, integration, and long-term commitment: what Solomon Islanders and development workers say about health sector aid	Asia Pac J Public Health
88	2015	Marks M, Taotao-Wini B, Satorara L, Engelman D, Nasi T, Mabey DC, Steer AC.	3/7	Long Term Control of Scabies Fifteen Years after an Intensive Treatment Programme	PLoS Negl Trop Dis
89	2014	Marks M, Goncalves A, Vahi V, Sokana O, Puiahi E, Zhang Z, Dalipanda T, Bottomley C, Mabey D, Solomon AW.)	2/10	Evaluation of a rapid diagnostic test for yaws infection in a community surveillance setting	PLoS Negl Trop Dis
90	2013	Burkot TR, Russell TL, Reimer LJ, Bugoro H, Beebe NW, Cooper RD, Sukawati S, Collins FH, Lobo NF.	1/9	Barrier screens: a method to sample blood-fed and host-seeking exophilic mosquitoes	Malar J
91	2018	Marks M, Engelman D, Romani L, Mason D, Sokana O, Kama M, Whitfeld M, Steer AC, Kaldor J.	1/9	Exploration of a simplified clinical examination for scabies to support public health decision-making	PLoS Negl Trop Dis

No.	Year of publication	Author	No. of Solomon Islands authors	Title	Journal
92	2010	Horii T, Shirai H, Jie L, Ishii KJ, Palacpac NQ, Tougan T, Hato M, Ohta N, Bobogare A, Arakaki N, Matsumoto Y, Namazue J, Ishikawa T, Ueda S, Takahashi M.	1/15	Evidences of protection against blood-stage infection of Plasmodium falciparum by the novel protein vaccine SE36	Parasitol Int
93	2018	Thriemer K, Bobogare A, Ley B, Gudo CS, Alam MS, Anstey NM, Ashley E, Baird JK, Gryseels C, Jambert E, Lacerda M, Laihad F, Marfurt J, Pasaribu AP, Poespoprodjo JR, Sutanto I, Taylor WR, van den Boogaard C, Battle KE, Dysoley L, Ghimire P, Hawley B, Hwang J, Khan WA, Mudin RNB, Sumiwi ME, Ahmed R, Aktaruzzaman MM, Awasthi KR, Bardaji A, Bell D, Boaz L, Burdam FH, Chandramohan D, Cheng Q, Chindawongsa K, Culpepper J, Das S, Deray R, Desai M, Domingo G, Duoquan W, Duparc S, Floranita R, Gerth-Guyette E, Howes RE, Hugo C, Jagoe G, Sariwati E, Jhora ST, Jinwei W, Karunajeewa H, Kenangalem E, Lal BK, Landuwulang C, Le Perru E, Lee SE, Makita LS, McCarthy J, Mekuria A, Mishra N, Naket E, Nambanya S, Nausien J, Duc TN, Thi TN, Noviyanti R, Pfeffer D, Qi G, Rahmalia A, Rogerson S, Samad I, Sattabongkot J, Satyagraha A, Shanks D, Sharma SN, Sibley CH, Sungkar A, Syafruddin D, Talukdar A, Tarning J, Ter Kuile F, Thapa S, Theodora M, Huy TT, Waramin E, Waramori G, Woyessa A, Wongsrichanalai C, Xa NX, Yeom JS, Hermawan L, Devine A, Nowak S, Jaya I, Supargiyono S, Grietens KP, Price RN.	2/98	Quantifying primaquine effectiveness and improving adherence: a round table discussion of the APMEN Vivax Working Group	Malar J
94	2017	Taleo F, Macleod CK, Marks M, Sokana O, Last A, Willis R, Garae M, Bong A, Chu BK, Courtright P, Kool J, Taleo G, Rory JJ, Solomon AW; Global Trachoma Mapping Project.	1/15	Integrated Mapping of Yaws and Trachoma in the Five Northern-Most Provinces of Vanuatu	PLoS Negl Trop Dis

No.	Year of publication	Author	No. of Solomon Islands authors	Title	Journal
95	2015	Marks M, Vahi V, Sokana O, Chi KH, Puiahi E, Kilua G, Pillay A, Dalipanda T, Bottomley C, Solomon AW, Mabey DC.	2/11	Impact of Community Mass Treatment with Azithromycin for Trachoma Elimination on the Prevalence of Yaws	PLoS Negl Trop Dis
96	2016	Ko R, Macleod C, Pahau D, Sokana O, Keys D, Burnett A, Willis R, Wabulembo G, Garap J, Solomon AW.	1/10	Population-Based Trachoma Mapping in Six Evaluation Units of Papua New Guinea	Ophthalmic Epidemiol
97	2016	Craig AT, Kama M, Samo M, Vaai S, Matanaicake J, Joshua C, Kolbe A, Durrheim DN, Paterson BJ, Biaukula V, Nilles EJ.	1/11	Early warning epidemic surveillance in the Pacific island nations: an evaluation of the Pacific syndromic surveillance system	Trop Med Int Health

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No	Year of publication	Author	No of Solomon Island authors	Title	Journal
1	2014 Jun	Itogo N, Hill PC, Bissell K, Harries AD, Viney K, Gounder S.	1/6	Tuberculosis notifications, characteristics and treatment outcomes: urban vs. rural Solomon Islands, 2000-2011	Public Health Action.

Atoifi Health Research Group model literature search result 2008 - 2018

No.	Year of publication	Author	No. of Solomon Islands authors	Title	Journal
1	2009 Aug	MacLaren D, Asugeni J, Asugeni R, Kekeubata E.	3/4	Incorporating sociocultural beliefs in mental health services in Kwaio, Solomon Islands	Australas Psychiatry.
2	2010 Nov	Redman-Maclaren ML, Maclaren DJ, Asugeni R, Fa'anuabae CE, Harrington H, Muse A, Speare R, Clough AR.	4/8	"We can move forward": challenging historical inequity in public health research in Solomon Islands	Int J Equity Health.
3	2010 Oct	Redman-Maclaren ML, Maclaren DJ, Solomon J, Muse A, Asugeni R, Harrington H, Kekuabata E, Speare R, Clough AR.	5/9	Research workshop to research work: initial steps in establishing health research systems on Malaita, Solomon Islands	Health Res Policy Syst.

No.	Year of publication	Author	No. of Solomon Islands authors	Title	Journal
4	2012; Oct	Massey PD, Wakageni J, Kekeubata E, Maena'adi J, Laete'esafi J, Waneagea J, Fangaria G, Jimuru C, Houaimane M, Talana J, MacLaren D, Speare R.	9/12	TB questions, East Kwaio answers: community-based participatory research in a remote area of Solomon Islands	Rural Remote Health.
5	2012 Dec	Redman-MacLaren M, MacLaren DJ, Harrington H, Asugeni R, Timothy-Harrington R, Kekeubata E, Speare R.	4/7	Mutual research capacity strengthening: a qualitative study of two-way partnerships in public health research	Int J Equity Health.
6	2013 Jul	Harrington H, Asugeni J, Jimuru C, Gwalaa J, Ribeyro E, Bradbury R, Joseph H, Melrose W, MacLaren D, Speare R.	4/10	A practical strategy for responding to a case of lymphatic filariasis post-elimination in Pacific Islands	Parasite Vectors
7	2014 Sep	Oloifana-Polosovai H, Gwala J, Harrington H, Massey PD, Ribeyro E, Flores A, Speare C, McBride E, MacLaren D, Speare R.	3/10	A marked decline in the incidence of malaria in a remote region of Malaita, Solomon Islands, 2008 to 2013	Western Pacific Surveillance Response Journal.
8	2014 Jun	Speare R, Harrington H, Canyon D, Massey PD.	1/4	A systematic literature review of pediculosis due to head lice in the Pacific island countries and territories: what country specific research on head lice is needed?	BMC Dermatol.
9	2015 Aug	Harrington H, Bradbury R, Taeka J, Asugeni J, Asugeni V, Igeni T, Gwala J, Newton L, Fa CE; anuabae, Kilivisi FL, Esau D, Flores A, Ribeyro E, Liku D, Muse A, Asugeni L, Talana J, Shield J, MacLaren DJ, Massey PD, Muller R, Speare R.	10/23	Prevalence of soil-transmitted helminths in remote villages in East Kwaio, Solomon Islands	Western Pac Surveillance Response J.
10	2015 Dec.	Asugeni J, MacLaren D, Massey PD, Speare R.	1/4	Mental health issues from rising sea level in a remote coastal region of the Solomon Islands: current and future	Australas Psychiatry
11	2015 Sep	Diau J, Jimuru C, Asugeni J, Asugeni L, Puia M, Maomatekwa J, Harrington H, MacLaren D, Speare R, Massey PD.	7/10	Measles outbreak investigation in a remote area of Solomon Islands, 2014	Western Pac Surveill Response J.

No.	Year of publication	Author	No. of Solomon Islands authors	Title	Journal
12	2015 Dec	MacLaren D, Asugeni J, Redman-MacLaren M; Atoifi Health Research Group.	1/4	Strengthening research capacity in the Pacific: an example from the Atoifi Health Research Group, Solomon Islands	Australas Psychiatry.
13	2015 Feb	Massey PD, Asugeni R, Wakageni J, Kekeubata E, Maena'aadi J, Laete'esafi J, Waneagea J, Asugeni V, MacLaren D, Speare R.	7/10	Steps on a journey to TB control in Solomon Islands: a cross-sectional, mixed methods pre-post evaluation of a local language DVD	BMC Int Health Hum Rights.
14	2015 May	MacLaren D, Redman-MacLaren M, Timothy-Harrington R, Asugeni R, Muse E, Jimuru E, Moutoa K, Speare R.	5/8	Strengthening capacity for local evidence to inform local responses to HIV in a remote Solomon Islands health service	Western Pac Surveill Response J.
15	2017 Feb	Bradbury RS, Hii SF, Harrington H, Speare R, Traub R.	1/5	Ancylostoma ceylanicum Hookworm in the Solomon Islands	Emerg Infect Dis.
16	2017 Mar	Kositz C, Talina J, Diau J, Asugeni R, Whitehorn C, Mabey D, Chaccour C, Marks M.	3/8	Incidental mosquitocidal effect of an ivermectin mass drug administration on Anopheles farauti conducted for scabies control in the Solomon Islands	Trans R Soc Trop Med Hyg
17	2017 March	Sparke VL, MacLaren D, Mills J, Asugeni R, Moutoa K, West C.	2/6	IMPROVING INFECTION PREVENTION AND CONTROL PRACTICES IN A CULTURALLY, LINGUISTICALLY AND SPIRITUALLY DIVERSE ENVIRONMENT	Aust Nurs Midwifery J.
18	2018 Apr	Bradbury RS, Harrington H, Kekeubata E, Esau D, Esau T, Kilivisi F, Harrington N, Gwala J, Speare R, MacLaren D.	7/10	High prevalence of ascariasis on two coral atolls in the Solomon Islands	Trans R Soc Trop Med Hyg.
19	2018 Sep	Coscione S, Esau T, Kekeubata E, Diau J, Asugeni R, MacLaren D, Steer AC, Kositz C, Marks M.	4/9	Impact of ivermectin administered for scabies treatment on the prevalence of head lice in Atoifi, Solomon Islands	PLoS Negl Trop Dis.

No.	Year of publication	Author	No. of Solomon Islands authors	Title	Journal
20	2018 Apr	Marks M, Esau T, Asugeni R, Harrington R, Diau J, Toloka H, Asugeni J, Ansbro E, Solomon AW, Maclaren D, Redman-Maclaren M, Mabey DCW.	6/12	Point-of-care tests for syphilis and yaws in a low-income setting - A qualitative study of healthcare worker and patient experiences	PLoS Negl Trop Dis.

Appendix 5: Modified Structured Operational Research and Training IniTiative implemented in Solomon Islands

The modified approach to SORT-IT in Solomon Islands took the form of:

(a) expanding the focus on qualitative and mixed methods implementation research,

(b) increasing the focus on the policy brief as a key research output,

(c) changing the software used for quantitative analysis from Epi-data to Excel, and

(d) reducing the expectation of prior research experience for selection into the training.

(Larkins et. al. 2020)

MODIFIED SORT-IT TRAINING PROGRAM
Workshop 1: (7 days; Developing a research proposal)
Infectious diseases: surveillance and response refresher
Contextualizing implementation research
Developing an implementation research proposal
Milestone 1 (due two weeks after completion of Workshop 1): Completion of draft research proposal and ethics application submitted to local ethics committees (if required)
Workshop 2: (4 days; Data analysis)
Planning and conducting an implementation research project: ethics submission
Planning data analysis and presentations
Milestone 2 (due two weeks after completion of Workshop 2): Completion of data collection and analysis plan
Undertake small work-based implementation research project with support from local and international mentor
Milestone 3 (due one week before start of Workshop 3): Evidence of data collection
Workshop 3: (5 days; Dissemination and translation)
Data analysis
Writing and publishing
Disseminating the findings (Dissemination Event)
Milestone 4 (due two months after completion of Workshop 3): Policy brief and/or draft manuscript

(Larkins et. al., 2020)

Appendix 6: Comparative research skills focus for each model

	Higher Degree by Research	International Health Research Projects	Structured Operational Research and Training IniTiative	Atoifi Health Research Group
Skills focus	1– Undertake supervised piece of original research that includes: – Identify research questions, –Design research project, –Choose appropriate methods, –Collect, analyse and interpret data, – Make recommendations based on the findings. 2 – Thesis writing 3 – Professional development of research related skills 4 – Participate in national and international health conference(s) 5 – Publish work 6 – Learn how to embed and apply knowledge into real–world practice (evidence–based research) 7 – Learn how to adjust to different cultures, setting and context	1– Training to meet aims and objectives specific to individual project roles.	1 – Learn to conduct simple research using existing data 2 – Publish research findings 3 – Respectful collaboration 4 – Conduct research training at the workplace 5 – Skills to find ways to address specific issues 6 – Learn to use research evidence 7 – Help to understand or make sense of routine data 8 – Critical thinking and broadening perspectives 9 – Identify issues in the work place 10 – National and international health conference presentation 11 – Develop/improve research networks	1 –Work in partnership with international researchers 2 – Identify priority research issues 3 – Connect and collaborate with international research partners 4 – Design project 5 – Collect, analyse data 6 – Disseminate findings 7 – Conduct locally appropriate research projects to inform own health service 8 – Broaden perspective on both local and international research work 9 – Understand research process and findings 10 – Promote relationship between community people and health workers 11 – Present at the national and international health conference 12 – Prepare health workers for university level research training