BUILDING AN EVIDENCE-BASE FOR MITIGATING PUBLIC HEALTH EMERGENCIES

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A thesis submitted to the Faculty of Medicine, Health and Molecular Sciences, James Cook University, in fulfilment of the requirements for the degree of Doctor of Public Health

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DECLARATION ON ETHICS

The research presented and reported in this thesis was conducted within the guidelines for research ethics outlined in the National Statement on Ethics Conduct in Research Involving Humans (1999), the Joint NHMRC/AVCC Statement and Guidelines on Research Practice (1997), the James Cook University Policy on Experimentation Ethics, Standard Practices and Guidelines (2001), and the James Cook University Statement and Guidelines on Research Practice (2001). Specific ethics approval details are provided in each chapter.

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Keith Eastwood 11th April 2011

SUMMARY

Building an evidence-base for mitigating public health emergencies

Although public health emergencies are infrequently encountered at a local level, they pose a constant threat and present challenges of increased morbidity and mortality, heightened workload, stress, and management of public anxiety. In addition they test the full range of emergency logistical, operational and planning activities, and often involve multiple agencies and government departments. This thesis seeks to enhance the evidence-base in public health disaster preparation, prevention and operations at a regional health unit level responsible for community and individual care.

There are four overarching public health emergency themes.

Firstly, disasters do occur. There is rarely any warning and they are extremely labour intensive and traumatic. This thesis covers events from the first six years of my time as an epidemiologist with the Hunter New England Population Health Unit during which I experienced various emergency situations including: a large influenza outbreak in aged care facilities that resulted in the deaths of eighteen residents, a natural storm disaster that caused over AUS$1.5 billion damage, and an influenza pandemic that lasted for more than a year.

Secondly, planning and preparedness mitigate the impact of health emergencies. One of the primary responsibilities of a local population health unit is to reduce risk and prepare in advance for such events. This is achieved through generic preparedness, involving training, policy development, maintaining collegial networks and conducting exercises. Although each emergency requires a customised approach, many of the response features are shared. Thus existing plans and protocols, with adequate preceding preparation, can be adapted to changing circumstances.

The Unit's biopreparedness focus was aimed at pandemic mitigation as we considered this to represent a highly plausible threat and the most serious health emergency we were likely to confront[1]. We developed comprehensive plans that were tested during various exercises, including a mass vaccination drill conducted in the rural town of Aberdeen, NSW, and an ambitious four day field pandemic response exercise that was held just eight months before the Influenza A H1N1 pandemic of 2009. These exercises had multiple benefits, including raising staff awareness, testing plans, training surge personnel, working within the Incident Command Structure, activating the emergency operations centre and gathering evidence of the ability of planned

activities to mitigate an influenza pandemic locally, prior to its arrival. We used the learning experiences to update our population health plans and shared the results with our colleagues from NSW and other states and territories.

Thirdly, when the emergency breaks and the immediate response components have been implemented, research opportunities exist. In the immediate aftermath of the declared natural disaster resulting from violent storms that swept the Hunter Valley in June 2007 we conducted a survey to determine the community impact and pre-existing level of public preparedness, and explore communication issues confronting those affected. The community cooperation with this initiative was strong. But it was the 2009 influenza pandemic that really showed the benefit of real-time research. Once the emergency operations centre had been established and response measures were in place, the team embarked on a range of research activities to address unresolved questions of direct relevance to policy revision.

Finally, research can guide and direct interventions that provide improved public health benefits. This is demonstrated by work conducted in the aged care industry where improvements to outbreak management capability have benefitted the institutions, residents and the population health unit. In addition the findings from the storm research resulted in the preparation of a memorandum of understanding to cement an agreement between the NSW State Government and the Australian Broadcasting Corporation.

In the past, bureaucrats at state and national levels have often based policy decisions on the strength of personal opinion and presumed public sentiment. This thesis documents how scientific data obtained from robust epidemiological studies can be applied to inform policy decisions in a timely manner. The research reported in this thesis has also provided numerous advocacy opportunities to inject science into the decision-making process.

Reference:

1. The World Health Organization. WHO Influenza Pandemic Preparedness Checklist. 2004. Available from:

http://www.wpro.who.int/internet/resources.ashx/CSR/Publications/WHO+Influenza+Pandemic+Preparedness+Checklist.pdf

THESIS AIM

The overall aim of this body of research was to use operational research to expand the evidence-base used to support public health disaster preparation and operations for communicable disease control and emergency risk management.

This research is framed within the classical disaster categories of planning, preparedness, response and recovery. Effective work in these areas reduces the impact of emergencies on the community and health services.

CHAPTER SUMMARIES

Chapter 2, Residential Aged Care Study

The actual burden of communicable disease outbreaks in this high risk setting was investigated along with the impact of a computer assisted telephone interviewing (CATI) intervention for strengthening aged care facilities' ability to mitigate and contain outbreaks.

Just weeks after I arrived at Hunter New England Population Health in 2004 the unit was confronted with multiple deaths of unknown cause in a Newcastle residential aged care facility. By the time the aetiology of the outbreak was confirmed as influenza, considerable negative media publicity and community alarm had resulted, and disease had spread to other aged care facilities resulting in 132 identified cases and 18 deaths.

During our investigations we found some aged care facilities were poorly prepared to manage disease outbreaks and surveillance systems were often inadequate to detect disease clusters. Aged care facilities had been encouraged to notify respiratory disease outbreaks to the Population Health Unit but the completeness of this reporting was unknown.

We conducted a three stage intervention starting with the collection of baseline data using a CATI study. Then we provided aged care facilities with a range of practical resources to enable them to monitor and independently manage disease outbreaks. While there was always an option to obtain specialist advice from the Population

Health Unit, we aimed to build their capacity for independent control and response. The baseline survey was followed by two further CATI contacts to review progress, offer support and monitor improvements. We found that significant stated improvements had been made. More importantly, in the ensuing five years, the surveillance team reported that aged care facilities had required less direct assistance in managing outbreaks and now often just report their occurrence and confirm that the appropriate containment measures have been enacted.

Chapter 3, Hunter Storms Study

A representative cluster study was conducted in the immediate aftermath of severe destructive storms in the Hunter Valley and Central Coast regions of NSW to determine the level of preparation of affected community members, explore the effectiveness of emergency communications, and identify ways of mitigating and improving the communities' response to future extreme weather events.

The early post-storm timing of this study aimed to reduce recall bias and obtain accurate information, and test whether early post-disaster community research was feasible. This required rapid development of a survey tool and study design, prompt ethics approval, accelerated pilot testing, and conducting interviews in the field while there was still storm damage evident. But it provided a rare opportunity to assess the level of community preparedness. Furthermore, we were able to gain useful insights into the extent of storm damage and injuries, effectiveness of communications, scale of service interruptions and assistance that had been sought. The findings were reported in three publications and showed that near real-time rapid cluster surveys were feasible and could be used to direct policy to mitigate against the impact of future natural disasters.

Chapter 4, Mass Vaccination Exercise

A field exercise format was used in a rural setting to test protocols for a mass vaccination clinic, identify weaknesses and recommend improvements in preparation for a pandemic response.

Vaccination is often the most effective containment measure for combating viral diseases, including an influenza pandemic, but urgent roll out of vaccination on a large scale poses numerous logistical challenges. The NSW State protocol was tested by offering seasonal influenza vaccination to residents of a rural town in the upper Hunter Valley. Using a local school hall and ancillary facilities, 500 people were vaccinated in a session spanning an afternoon and evening. During the exercise, deficiencies in the plan were recognised. Immediate system improvements were made and their impact was evaluated in real-time.

The evaluation team included staff from the New South Wales Health Department who were able to evaluate at first hand the limitations of the existing protocol and thus readily accepted the recommendations identified at debriefings in the post-exercise period.

Chapter 5, Pandemic Field Exercise

A large-scale exercise was used to simulate the activities and predicted workload envisaged during the early containment phase of an influenza pandemic. This allowed testing of the public health control measures likely to be established. Plans, accommodation, surge staff and the Incident Command System were evaluated under exercise conditions and the particular benefits of an extended field exercise were explored.

The last recorded influenza pandemic was the 1968 H3N2 outbreak. Forty years later we anticipated another such event as the inter-pandemic period was extending beyond previous historical limits. In addition, the threat of H5N1 avian influenza had been in existence for ten years with a reported mortality rate of approximately 60%. Although this virus was showing little evidence of human to human transmission it was clear that should this strain develop pandemic characteristics, a serious global crisis could eventuate.

As a result, we prepared comprehensive pandemic plans and had in place various training initiatives but these remained untested. It was decided to conduct a field exercise to ensure that the preparations in place to manage an extended health emergency were suitable and to determine the utility of this exercise format for pandemic planning. The exercise was called Exercise Forrest Gump (XFG) as one of the principal quotations from the book and film of the same name, 'life is like a box of chocolates' reflects the uncertain timing and severity of weather and biological emergencies.

The exercise lasted a week and involved over 300 players, with evaluators from interstate, the Australian Commonwealth and Switzerland, making it the largest regional public health exercise ever conducted in Australia.

During the exercise we tested almost all of the systems that would be implemented during an actual event, including emergency department visits, infection control measures, ambulance transfers, case and contact management, home monitoring, public telephone enquiries, media messages and emergency operation centre activation. The scenario was so realistic that staff became emotional on occasions as they faced confronting situations.

All aspects of the exercise were subject to rigorous evaluation and considerable data were gathered during the event and at debriefings. As a result we made significant changes to our pandemic plans and the systems in place for managing public health emergencies. When the 2009 Influenza A H1N1 pandemic occurred we were in a strong position to respond and immediately activated the plans we had previously tested including deploying many of the surge staff trained in the exercise. If the success of containment measures can be gauged by the rate of infection, the Hunter New England health area recorded the lowest influenza rates in the country during the pandemic containment phase, although we freely admit the play of chance in virus introduction and transmission[1].

A year after the first pandemic response we revisited the experiences of the field exercise to evaluate its benefits in managing the actual pandemic. There are few detailed field exercise reports in the literature. Our experiences immediately prior to the 2009 pandemic provided a unique opportunity to assess this approach.

Chapter 6, Knowledge, Attitudes and Willingness to Accept Containment Measures Before and After the 2009 pH1N1 Influenza Pandemic

Many of the measures described for the initial containment phase in the Australian Health Management Plan for Pandemic Influenza rely heavily on public cooperation. These include social distancing, home quarantine and isolation, enhanced infection control practices, and acceptance of antiviral therapy and vaccination. During the development of this policy, the willingness of the public to accept these measures was presumed but not determined. In 2007 we embarked on a national study to gather information from a representative sample of Australian adults to identify their stated compliance and potential impediments that could impact on the implementation of public health containment measures.

The study utilised an experienced CATI team to collect data from 1166 randomly selected adult Australians. The approach proved effective due to the interviewers' diligence and the computerised survey tool requiring a response for each question, resulting in data collection completeness of 100%.

We found that the majority of respondents were prepared to comply with containment measures but in certain demographic groups cooperation could not be assumed. The high level of stated compliance was recorded despite the study indicating that there was a poor understanding of pandemic influenza and infection control measures amongst those surveyed. Study findings provided health authorities with assurance that containment measures could be effective and identified where promotional activities were best targeted.

Following the 2009 influenza pandemic we were in a unique position to repeat the study using a large subset of the original sample to see how their perceptions, knowledge and willingness to comply with public health requests had changed following the actual experience of this pandemic.

Post pandemic data indicated that the Australian public's knowledge, including that of influenza transmission modalities and infection control, remained poor. Most respondents considered the pandemic mild and reported low levels of anxiety. Although stated compliance with control measures directed specifically at individual requests (e.g. isolation of cases) remained high, there was a statistically significant reduction in willingness to cooperate with social distancing requests, such as avoiding

public events. The study confirmed concerns that public confidence in health messages had been adversely affected by experiences during 2009 and suggested that the level of cooperation with future public health interventions should not be assumed.

Chapter 7, pH1N1 Vaccine Acceptance

A national survey was conducted to investigate the Australian public's expectations, concerns and willingness to accept vaccination with the pandemic (H1N1) 2009 influenza vaccine.

Australia's initial experience with the 2009 H1N1 influenza pandemic suggested that the disease was unlikely to cause the extreme morbidity and mortality initially feared. Media and public comment downplayed the risk and it was considered likely that this influence on public perceptions would result in an unwillingness to accept the pandemic influenza vaccine.

We were successful in obtaining a National Health and Medical Research Council pandemic H1N1 special grant to re-survey those interviewed in the 2007 Perceptions Study, who had indicated a willingness to assist in future health surveys. This expedited the initiation of ethics approval and the study was able to be implemented promptly. Our findings were ready in time to inform the vaccine roll out.

The study found that perceived pandemic severity had decreased in the two years since the first survey and that this was significantly negatively correlated with vaccine acceptance. It also identified demographic groups that were more likely to require greater promotional attention. Results from the study were shared with Professor Jim Bishop, Australia's Chief Medical Officer and were used to craft national promotional messages.

Chapter 8, The Merits of Public Health Containment Measures in the Early Stages of the 2009 pH1N1 influenza pandemic

Epidemiological data and observations made during the 2009 H1N1 pandemic were used to inform debate on the merits of public health containment measures implemented in the early stages of the response.

When the World Health Organization (WHO) declared a public health event of international importance on 24 April 2009, the Hunter New England Area Health Service (HNEAHS) was quick to respond using the plans and resources tested during the pandemic field exercise conducted eight months earlier. This included activation of the emergency operation centres, implementation of the full Incident Command System, deployment of the planning team, and operations team setting up five units of trained and experienced registered nurses to conduct contact tracing and manage cases.

The containment measures described in the Australian Health Management Plan for Pandemic Influenza were vigorously implemented. While it is not possible to prove an association between the impact of local containment efforts and the low number of cases and contacts, at the point when the measures were relaxed in Australia (with the shift to the Protect Phase), there was a dramatic increase in reported infections[1].

In our health service we rigorously implemented measures and there was little or no influenza-like activity in many of the country towns during the Containment Phase.

Epidemiological experiences motivated a commentary piece critiquing the introduction of a Protect Phase on 17 June 2009 when the containment measures were relaxed. It provided an opportunity to describe the experience of a large rural health service with potential application to a future, more severe pandemic[1].

Chapter 9, Conclusion

Research embodied in this thesis demonstrates the benefits of conducting high quality research in a timely manner to guide policy decisions during public health emergencies. This approach shows how opportunity and carefully constructed study design can enable prompt operational research.

Occasionally state authorities have presumed an understanding of public perceptions. As a result of this body of research we now have additional evidence to support policy development.

During the pandemic, we enjoyed strong cooperation with the relevant committees to provide prompt ethics approval, however, delays in the peer review process of manuscripts and the ability of journals to provide a rapid publication service (including

on-line) caused frustrations and delayed sharing of relevant results with public health colleagues.

Literature review of certain aspects of the research showed a paucity of useful information, particularly real-time research during public health emergencies; compliance with public health measures under pandemic circumstances; the merits of pandemic containment measures; and the benefits of field exercises in testing health emergency plans.

There is scope for additional research in the study areas covered in this thesis. These research gaps are covered in more detail in the conclusion section. There are remaining opportunities to test plans for responding to chemical, biological and radiological threats. Additionally there is merit in re-visiting the sustainability of interventions such as the aged care facilities CATI study.

It became increasingly evident that conducting doctoral research of the standard required for publication in international peer-reviewed journals ensured the quality of study design and research conducted.

Reference:

1. Eastwood K, Durrheim DN, Massey PD, Kewley C. Australia's pandemic 'Protect' strategy: the tension between prevention and patient management. Rural and Remote Health 9 (online), 2009: 1288. Available from: http://www.rrh.org.au/articles/showarticlenew.asp?ArticleID=1288.

PUBLICATIONS AND AWARDS

The following scientific papers resulted from research conducted for this thesis:

1. Eastwood K, Osbourn M, Durrheim D, Francis L, Merritt T, Nicholas C, Cashman P, Wiggers J. Improving communicable disease outbreak preparedness in residential aged care facilities using an interventional interview strategy. Australian Journal of Ageing. 2008;27:143-149.

2. Cretikos MA, Eastwood K, Dalton C, Merritt T, Tuyl F, Winn L, Durrheim DN. Household disaster preparedness and information sources: Rapid cluster survey after a storm in New South Wales, Australia. BioMed Central Public Health. 2008;8:195, doi: 10.1186/1471-2458-8-195.

3. Cretikos MA, Merritt TD, Main K, Eastwood K, Winn L, Moran L, Durrheim DN. Mitigating the health impacts of a natural disaster-the June 2007 long weekend storm in the Hunter region of New South Wales. Medical Journal of Australia. 2007;187:670-673.

4. Cretikos M, Eastwood K, Durrheim D. Exercise Paton: a simulation exercise to test New South Wales emergency departments' response to pandemic influenza. Communicable Diseases Intelligence. 2007;31:419.

5. Carr C, Durrheim D, Eastwood K, Massey P, Jaggers D, Caelli M, Nicholl S, Winn L. Australia's First Pandemic Influenza Mass Vaccination Clinic Exercise. Australian Journal of Emergency Management. 2011;26:47-52.

6. Eastwood K, Durrheim D, Merritt T, Massey PD, Huppatz C, Dalton D, Hope K, Moran L, Speare R, Farrar K. Field exercises are useful for improving public health emergency responses. Western Pacific Surveillance and Response Journal. 2010,

1(1) doi:10.5365/wpsar.2010.1.1.003.

7. Eastwood K, Durrheim D, Francis JL,Tursan d'Espaignet E, Duncan S, Islam F, Speare R. Knowledge about pandemic influenza and compliance with containment measures among Australians. Bulletin of the World Health Organisation 2009;87:588-594.

8. Eastwood K, Durrheim DN, Jones A, Butler M. Acceptance of pandemic (H1N1) 2009 influenza vaccination by the Australian public. Medical Journal of Australia. 2010;192:33-36.

9. Eastwood K, Durrheim DN, Butler M, Jones A. Responses to Pandemic (H1N1) 2009, Australia. Emerging Infectious Diseases. 2010;16:1211-1216.

10. Eastwood K, Durrheim DN, Massey PD, Kewley C. Australia's pandemic 'Protect' strategy: the tension between prevention and patient management. Rural and Remote Health 9 (online), 2009: 1288. Available at: http://www.rrh.org.au/articles/showarticlenew.asp?ArticleID=1288.

During the course of the research the following awards were received:

1. November 2007: Government of NSW Medal for Service – Emergency and Recovery Response – 2007 Hunter and Central Coast Storms.

2. October 2009: Hunter New England Health Award for Exercise Forrest Gump in the category, "Being ready for new risks and opportunities".

3. November 2009: New South Wales Health Baxter Award for Exercise Forrest Gump in the category, “Being ready for new risks and opportunities”.

4. November 2009: Exercise Forrest Gump, NSW Premier’s Awards finalist.

PREFACE AND ACKNOWLEDGEMENTS

I have enjoyed the good fortune of working at the Hunter New England Population Health Unit where there is a strong culture of teamwork. It is clear that research is much improved through the collective wisdom of a group of people and my colleagues provided a broad range of skills that enabled all aspects of research to be more than adequately covered. I am often humbled in their company. The research described in this thesis represents a wonderful example of what can be achieved through a collaborative approach, particularly when such individuals are involved. I thank them for their professionalism, friendship and forbearance.

The Hunter New England Population Health Unit has a refreshing attitude towards encouraging staff to self-improvement through pursuing academic qualifications and personal development opportunities. Many staff members have benefitted from this enlightened approach, including myself, and it may explain why the Unit continues to grow from strength to strength. I am grateful for the level of cooperation I have received during my studies.

No one ever had a more supportive supervisor than Professor David Durrheim who motivated, guided, facilitated and enhanced the field work. On top of his many personal qualities, his work ethic, skills and knowledge are nothing short of inspirational. In conjunction with the wisdom and experience of my academic supervisor, Professor Rick Speare, they presented a formidable supervisory team. Through their expertise and generous provision of time they were able to navigate a recalcitrant soul like me through the arduous paths of academia.

Rosemary my companion and partner of over 35 years deserves special mention because she is just that, special. I have dragged her across the country in pursuit of my career and she has followed uncomplainingly despite the family traumas that have resulted. My children, Caite and Tim have also had to suffer the consequences of my itinerant and unsettled lifestyle. Despite these self-imposed challenges we remain a happy family…a testament to their resilience and tenacity.

Success in any venture is clearly dependent on the people who surround you, my sincere thanks to them all.

CONTRIBUTORS AND MY ROLE

Chapter 2, Residential Aged Care Study

My role: I was involved in the aged care outbreak investigation from the outset, focussing on laboratory liaison and the imperative of obtaining a rapid and definitive diagnosis. This entailed the coordination of specimen collection, negotiating with pathologists and key laboratory staff, and assisting with infection control concerns, such as obtaining necropsy material. I also liaised with the residential aged care facilities regarding containment methods, specimen collection and results.

Upon resolution of the outbreak, I instigated the research study including a literature review for previous interventions and outbreak response resource material. I led the project and was responsible for initial study design, drafting of questionnaires and identifying appropriate resource material. These resources were refined and augmented by a steering group. I pilot-tested the questionnaires and managed the CATI team, liaised with the residential aged care facilities, communicated findings, assisted with provision of resources and delivered feedback. Later in the project we were able to obtain funding for a project officer, Joan Maddox who took over some of the routine workload under my supervision.

I was involved in the analysis plan and conducted preliminary univariate calculations and worked with the statisticians on the more complex analyses. I prepared the initial draft paper, consulted with the co-authors and managed the manuscript submission and revision.

A steering group was established to identify the principal issues for inclusion in the research study. This consisted of Keith Eastwood (Communicable Diseases Manager and Epidemiologist); Joan Maddox (Project Officer); Maggi Osborn, Peter Massey and Patrick Cashman (Clinical Nurse Consultants); Dr Tony Merritt and Professor David Durrheim (Public Health Physicians); Dr Lynn Francis, Christophe Lecathelinais and Craig Nicholas (statisticians); Dr John Wiggers (Population Health Director); Nicole Nathan and Louise Prosser (Health Promotion); Joe-anne Bendall (New South Wales

Health representative) and Dr Edouard Tursan d'Espaignet (Service Director Surveillance).

An Advisory Group with representatives from the aged care industry, assisted in the selection of resources that were provided to the residential aged care facilities to enable self-sufficiency. The Advisory Group included: Christine Botham, Sue Bradbury, Helen Campbell, Tracey Clerke, Tina Clift, Jill Delaland, Stephanie Elliott, Julie Felberg, Tracey Garratt, Helena Grey, Sue Johnson, Tracy McDonald, Lyn McEwan, Allan Nicholson, Stephen Owens, Jill Pretty, Janelle Tevender, Chris Truscott, Robyn Ransley and Louise Watters.

The questionnaires were pilot-tested in the Central Coast Area Health Service courtesy of Dr Peter Lewis and Lucy Cook. Dr Christine Carr and Kevin McDonald provided expert technical advice and Craig Eardley assisted with the CATI III evaluation analysis.

Upon completion of the study Professor David Durrheim and I were invited to present the findings at a joint meeting of delegates from the Department of Health and Ageing in Canberra. In addition, conference presentations were made at the national Communicable Diseases Network of Australia conference on 2/5/2005 in Sydney and 14/3/2007 in Canberra; The Hunter Post Graduate Medical Institute, Newcastle on 21/7/2007; Rehabilitation and Aged Care Conference, Tamworth on 8/11/2007; National Health Emergency Coordinator's Conference, Newcastle on 15/11/2007; and GP Access Group, Newcastle on 14/8/2008.

I am grateful to the CATI team who provided excellent data collection and went beyond their normal role to assist with the roll out of the infection control resources. Sadly, Joan Maddox the project officer died before the study was completed. Despite serious illness she was enthusiastic and cheerful to the very end. I dedicate this section to her indomitable personality and friendship.

My estimated contribution was 70%.

Chapter 3, Hunter Storms Study

My role: I was both personally affected by the storms and involved in the emergency recovery work. I played a senior role in the planning team in the Public Health Emergency Operations Centre producing situation reports and liaising with the Community Health Referral and Information Centre that was later to play a pivotal function in the XFG field exercise and 2009 influenza pandemic response. The actual response was a coordinated effort involving many staff from the Population Health Unit and other Hunter New England Health Units.

Once the recovery situation was initiated, Professor David Durrheim proposed a study to investigate the impact of the storms on residents in the most affected areas and to determine the level of community preparedness. I led the initial planning for this project, preparing the project proposal and also the draft survey tool.

Dr Michelle Cretikos, a trainee public health officer, was seconded to the unit following the storms and further refined the questionnaire. Dr Craig Dalton (Public Health Physician) assisted with the sampling frame and power calculations, and Alan Willmore (NSW Health) identified the actual household addresses to be included in the two-stage sampling frame. Others involved in the study group were Dr Tony Merritt (Public Health Physician), Linda Winn (Manager of the Disaster Unit), Dr Frank Tuyl (Statistician) and Lucille Moran (Operations Manager).

Each team member, including myself, was assigned a portion of the sample to survey consisting of three clusters of ten houses. This required a home visit to conduct face-to-face interviews. I was involved with the data analysis and contributed to the three manuscript drafts.

In addition to the involvement of Hunter New England Health, funding for the study was provided by the Centre for Epidemiology and Research at the NSW Department of Health. Emergency response activity data were provided by the NSW State Emergency Services. Since the storms, a formal memorandum of understanding has been prepared between the State Emergency Management Committee and the NSW Australian Broadcasting Corporation, including the Newcastle radio station 1233, which was heavily involved in community information provision during the disaster.

Conference presentations were given at the NSW Epidemiology Grand Round, Sydney on 8/11/2007 and The Public Health Association of Australia International Congress, Brisbane on 26/7/2008.

My estimated contribution was 40%.

Chapter 4, Mass Vaccination Exercise

My role: I was involved in the reference group, assisted in refining the study protocol, assessing the exercise venue, refining the exercise methodology and was a lead evaluator during the field exercise. I was involved in the interpretation and analysis of data collected during the exercise. Dr Christine Carr (Hunter New England Population Health, Immunisation Coordinator) and I were principally responsible for preparing the manuscript.

Dr Christine Carr and Professor David Durrheim initiated the concept of conducting a mass vaccination field exercise. They chose the location and conducted much of the preliminary community negotiation, including promoting the event through media liaison, facilitated by Tanya Carlyle from the Hunter New England Health media unit.

Plans that were developed by the NSW Department of Health were tested with the assistance of Sue Campbell Lloyd (Head of NSW Immunisation Unit) and Dr Jeremy McAnulty, Acting Director of Health Protection.

Advice was obtained from the Philadelphia Health Department, USA, regarding their prior experience with conducting a mass vaccination exercise.

My estimated contribution was 30%.

Chapter 5, Pandemic Field Exercise

My role: Professor David Durrheim, Peter Massey (Communicable Diseases Manager) and I initiated the concept of using an extended field exercise to test pandemic plans. I

conducted the foundation preparations, project proposal, negotiations for the exercise, funding submission and supervised the project officer, Sheryn Sommerville.

The exercise control team consisted of myself, Kirsty Hope, Dr Clare Huppatz (Master of Applied Epidemiology student), Professor David Durrheim and Sheryn Sommerville. This group sent regular reports to the Hunter New England Health area executive team, evaluators and facilitators who had opportunities through teleconferences and email to provide feedback.

I took the lead on the overall organisation and coordination of the exercise, including liaising with the teams who were to be involved: logistics, planning, operations, facilitators, evaluators, actors, Indigenous staff, Referral and Information Centre telephonists, CATI interviewers, Area Disaster Unit and external agencies with an interest in pandemic response. Kirsty Hope and I led the development and testing of the evaluation tools.

The exercise control team produced the scenario which drove the entire project, with assistance from Professors Rick Speare (James Cook University) and Paul Kelly (Australian National University). I translated the scenario into a Microsoft Excel spreadsheet containing all demographic, contact, clinical and technical details required by those involved in the actual exercise. Using an innovative mail merge procedure, individual information sheets were prepared for approximately 200 cases and contacts that were scripted into the exercise. These were provided to actors for feeding to the operations team as the scenario unfolded. I trained these actors in individual and group instruction sessions.

I was significantly involved in the development of material that was used in the exercise and that was later revised for the pandemic response. This included a series of eight on-line training modules

(http://mylink.hnehealth.nsw.gov.au/course/view.php?id=427, note: only available on the NSW Health department's Intranet site) that provided essential information on pandemic influenza, planning and preparation, self protection, infection control, surveillance, emergency response, case and contact tracing, case and contact management, data collection and management, and other information sources that could assist surge staff. A comprehensive resource algorithm was developed by Catherine Hugo (Information Services Manager) and I to enable those staff providing

assistance to the public to rapidly and efficiently locate the latest information required on an intranet site.

Results from the structured evaluation survey and debriefs were collated and a report drafted by Kirsty Hope and I, with input from the remainder of the exercise control team. An action list specific to the HNEAHS was prepared and allocated to the appropriate members of the HNE Pandemic Influenza Executive Committee of which I am a member, secretary and occasional chairperson. Findings were disseminated at the NSW Public Health Directors Forum and were accepted for the 2009 Communicable Diseases Network of Australia conference that was postponed due to the onset of the 2009 pandemic. The findings from the exercise continue to provide valuable input into NSW Health initiatives to improve emergency response, with recent work involving telephone and communication systems, surge audits, resource algorithms and training modules drawing heavily on experiences and materials resulting from the exercise.

Professor David Durrheim and I initiated the idea of describing the value of the field exercise in preparing a regional population health unit for the actual pandemic event. I prepared the manuscript with valuable input from Professor David Durrheim, Dr Tony Merritt and Peter Massey, and additional contributions from Dr Clare Huppatz, Dr Craig Dalton, Kirsty Hope, Kris Farrar (Infection Control Consultant), Lucille Moran and Professor Rick Speare.

Conference presentations were given at the Australian Institute of Medical Scientists National Conference, Adelaide on 14/10/2009 and the National Institute of Communicable Diseases Conference, Johannesburg, South Africa on 25/11/2008.

My estimated contribution was 60%.

Chapter 6, Knowledge, Attitudes and Willingness to Accept Containment Measures Before and After the 2009 pH1N1 Influenza Pandemic

This project was conducted over three years and began as a study to examine public perceptions in Australian adults without recent experience of a pandemic. Following

the 2009 influenza pandemic, 72% of the original sample was able to be re-interviewed to see if there had been changes in perceptions and willingness to cooperate with public health control requests. This study involved a new research team.

My role: Professor David Durrheim and I initiated the idea of surveying the public for compliance with pandemic containment measures. The reference group consisted of myself, Professor David Durrheim, Dr Lynn Francis (statistician), Dr Edouard Tursan d'Espaignet (Service Director), Sarah Duncan (Project Officer), Dr Fakhrul Islam (Demographer) and Professor Rick Speare (James Cook University). I managed the project, supervised the project officer and coordinated the development of the questionnaire with the reference group. The sampling frame was prepared by Drs Edouard Tursan d'Espaignet and Fakhrul Islam, Professor David Durrheim and I. Scripting for the locally developed software used in the CATI was written by Sarah Duncan, Dr Lynn Francis and I. Sarah Duncan and I trained and supervised the interviewer team.

Dr Lynn Francis and I undertook the analysis with input from all members of the reference group. I led the manuscript preparation.

Conference presentations were given at the National Health Emergency Coordinator's Conference, Newcastle on 15/11/2007 and The Public Health Association of Australia International Population Health Congress, Brisbane on 28/7/2008.

My estimated contribution was 70%.

The second phase of this study was initiated by Professor David Durrheim and I. We were principally responsible for preparing the National Health and Medical Research Council submission, with input from Professor Alison Jones (Dean of Medicine, University of Western Sydney) and Michelle Butler (Statistician).

I led the project which included questionnaire development, CATI interviewer training and preparation of the analysis plan. Michelle Butler and I conducted the statistical analyses. I prepared the manuscript draft with involvement from all members of the research team.

A conference presentation was given at the Australian Science Communications National Conference, Canberra on 8/2/2010.

My estimated contribution was 70%.

Chapter 7, pH1N1 Vaccine Acceptance

My role: Professor David Durrheim and I initiated this project following the immediate pandemic response and prior to the availability of a specific vaccine that was under trial when the study began. We were principally responsible for preparing the National Health and Medical Research Council submission, with input from Professor Alison Jones (Dean of Medicine, University of Western Sydney) and Michelle Butler (Statistician).

The reference group consisted of the above named people with myself as project leader. My role included questionnaire development, CATI interviewer training and preparation of the analysis plan. Michelle Butler and I conducted the statistical analyses. I prepared the manuscript draft with involvement from all members of the reference group.

Conference and poster presentations were given at the National Health and Medical Research Council Pandemic Workshop, Canberra on 11/12/2009 and International Conference on Emerging Infectious Diseases, Atlanta, United States on 14/07/2010.

My estimated contribution was 70%.

Chapter 8, The Merits of Public Health Containment Measures in the Early Stages of the 2009 pH1N1 influenza pandemic

Essentially this project described the experiences of the entire Hunter New England Health pandemic response team, including those involved in the various incident command system teams: incident control, planning, logistics and operations; the

Referral and Information Centre, Area Disaster Unit, emergency departments, respiratory medicine and intensive care clinicians, and general practitioners.

My role: the project concept was initiated by Professor David Durrheim and I, with involvement from Peter Massey and Associate Professor Chris Kewley (Health Services Functional Area Coordinator). I drafted the manuscript with assistance from the co-authors.

My estimated contribution was 60%.

DEDICATION

I dedicate this thesis to my father, Bert Eastwood. He introduced me to the wonders of medical science. I was ten when given my first microscope, an antique brass monocular instrument, and at the tender age of twelve he took me to my first medical symposium. My future was clearly influenced by him. His British reserve was rarely penetrated, but it would have given him much pleasure to have followed the transition of my career from diagnostic medicine into public health. My mother, Evelyn, would have been equally excited. Needless to say, this thesis would not have been a secret at the bowl's club and I fear embellishment would have occurred.

Doctor of Public Health Course Structure

Units completed in fulfilment of requirements for the Doctor of Public Health.

Unit Code	Unit	Description	Weight
TM6015:06	Doctoral Presentations	Various	6
TM6016:06	Doctoral Specialisation	Completion of the Health in Large Populations course conducted by the International Committee of the Red Cross, University of Pretoria	6
TM6018:06	Doctoral Project	Communicable Diseases Analysis Project: a five year epidemiological review of notifiable diseases in the Hunter New England Health Area	6
TM5516	Biostatistics for public health	Masters unit	3
TM5558	Public health and bioterrorism	Masters Unit	3
Doctor of Public Health Thesis		Published chapters	48
		TOTAL	**72**

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CHAPTER 1. INTRODUCTION

THESIS INTRODUCTION

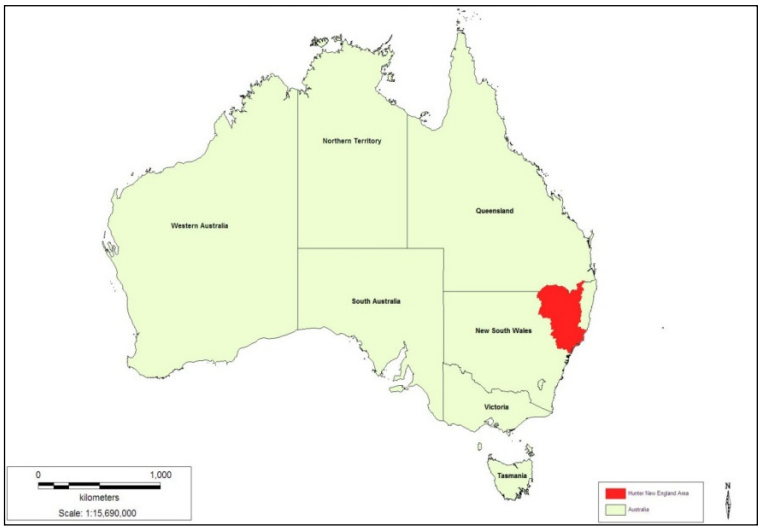
This section provides background information relevant to the research covered in this thesis. Certain literature references cited in this chapter were sourced after the thesis had commenced and are included in the interest of providing currency and completeness to the thesis background.

The Hunter New England Health Area

The research conducted in this thesis was undertaken at the Hunter New England Population Health (HNEPH) Unit which services the Hunter New England Health Area, comprising a large section of north eastern New South Wales, Australia (Figure 1.1). There are a number of unusual, possibly unique, features about this region that provide additional relevance to the studies and make the findings potentially applicable to many other parts of Australia.

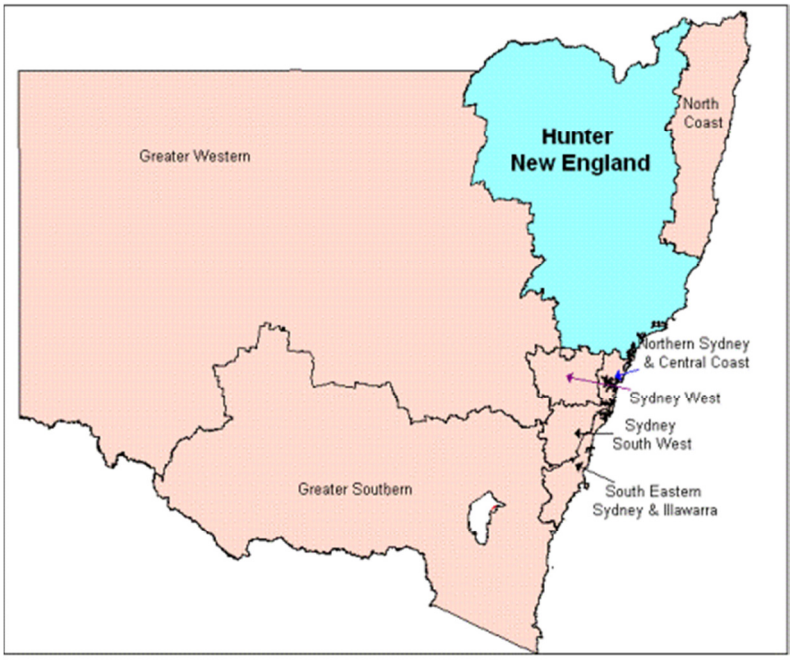
The Hunter New England health area covers approximately 130,000 km^2 of urban, rural and outback country with a population of nearly 865,000. Like much of Australia, the population is concentrated on the coastline and moderately large inland towns are strategically located throughout the rural areas. Small townships, including Aboriginal communities, can be found in the more remote regions and offer particular challenges to service delivery. In many respects, the area represents a microcosm of Australia, although it is not possible to assume that local study findings are necessarily representative.

Figure 1.1. The Hunter New England health area of New South Wales, Australia[1].



During the period of study, NSW was divided into eight area health services (Figure 1.2). In 2010 the Commonwealth government changed these boundaries and legislated towards regional management by adopting a local health governance model, however, the Hunter New England area has remained unaffected by these changes.

Figure 1.2. New South Wales health service areas, 2010[1].



The Hunter New England health area has a principal Population Health centre at Wallsend in Newcastle, and regional offices in Taree and Tamworth. The health area is sub-divided into eight administrative 'clusters' (Figure 1.3).

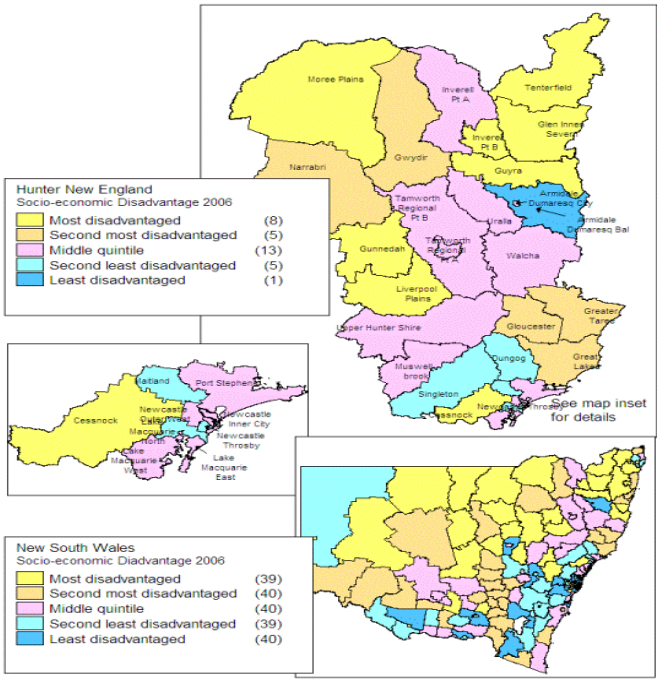
Newcastle is Australia's seventh largest city, and after Queensland's Gold Coast is the largest non-capital city in the country. The Hunter Valley is one of the world's largest exporters of coal, while the region has a diverse range of other attributes including its famous vineyards, tourism, agriculture and horse breeding industry.

Figure 1.3. Hunter New England Health Area showing administrative clusters, population centres and health service facilities[1].

Like much of Australia, there is a trend towards an ageing population with large numbers of retirees favouring the more expensive and temperate coastal suburbs (Figure 1.4). Inland there are pockets of disadvantaged people with low socio-economic indices (Figure 1.5).

Figure 1.4. Hunter New England 2010 estimated residential population and projected population in 2030 by gender and age group[1].

Figure 1.5. Index of relative social economic disadvantage, 2006[1].



The Hunter New England health area has the highest proportion of Aboriginal people in New South Wales with 3.8% of the health service's population indicating Indigenous status compared with 2.2% for the state (Table 1.1).

Table 1.1. Hunter New England 2010 population distribution by Indigenous status, sex and age group[1] (population estimates: 30 June 2010).

Age group	Sex	Indigenous population	Non-Indigenous population	Indigenous % population
0-4 yrs	Males	1867	27664	6.75
	Females	1829	26217	6.98
5-9 yrs	Males	2130	28366	7.51
	Females	2064	26936	7.66
10-14 yrs	Males	2141	29649	7.22
	Females	2081	28295	7.35
15-19 yrs	Males	2016	30720	6.56
	Females	1928	29327	6.57
20-24 yrs	Males	1636	28093	5.82
	Females	1539	26501	5.81
25-29 yrs	Males	1254	25806	4.86
	Females	1181	25141	4.70
30-34 yrs	Males	1022	25321	4.04
	Females	1029	25431	4.05
35-39 yrs	Males	967	27976	3.46
	Females	1063	28312	3.75
40-44 yrs	Males	924	28299	3.27
	Females	1097	28533	3.84
45-49 yrs	Males	871	30109	2.89
	Females	969	30457	3.18
50-54 yrs	Males	716	30000	2.39
	Females	788	30284	2.60
55-59 yrs	Males	552	28251	1.95
	Females	612	28493	2.15
60-64 yrs	Males	413	27146	1.52
	Females	444	27159	1.63
65+ yrs	Males	615	66834	0.92
	Females	773	79328	0.97
Total	Males	17124	434232	3.94
	Females	17397	440412	3.95

Aim

The overall aim of this thesis was to use operational research to expand the evidence-base used to support public health disaster preparation and operations as applied to communicable disease control and emergency risk management.

Health Emergencies

Public health emergencies, although infrequently encountered in most population health units, are events that do occur and in which health authorities need to invest. During the past five years, HNEPH has faced severe weather events including the June 2007 storms that are described in Chapter 3, two major floods in regional areas, confronted bushfires that encircled Newcastle's 600 bed referral hospital and experienced an influenza pandemic that required significant and targeted response. On three occasions, emergency operations centres (EOCs) were activated in Wallsend and the area headquarters in New Lambton, and resources were deployed using the Incident Command System (ICS) approach[2]. This is the recognised structure used by many Australian and international agencies and allows all participants in an emergency to interact efficiently with a clear understanding of communication paths and lines of command.

At HNEPH the main meeting hall at Wallsend can be transformed into an emergency operations centre within an hour and many other rooms at the three campuses are designated for emergency response and can be activated for operational use in the same time-frame. The unit has a sophisticated telephone system that allows calls to be handled through menu-based algorithms, queued or distributed according to a 'next-available' resource. Video-conferencing facilities are available at two sites to facilitate communications. The ICS team directs all prioritised 'routine' work and emergency functions from within the EOC, and from there links to other sites including the 'Bunker' at the central office of New South Wales Health.

There are four sections under the ICS framework, with the leader reporting to the incident controller[2]:

- Logistics: responsible for provisions, facilities, accommodation, rostering, transport and telecommunication support;
- Operations: performs the actual response activities e.g. case and contact management, managing public enquiries, and public health environmental assessment:
- Planning: collect data, monitors the situation, provides situation reports and forecasts resource needs: and
- Finances: obtains funding, arranges payment and monitors expenses for future recovery.

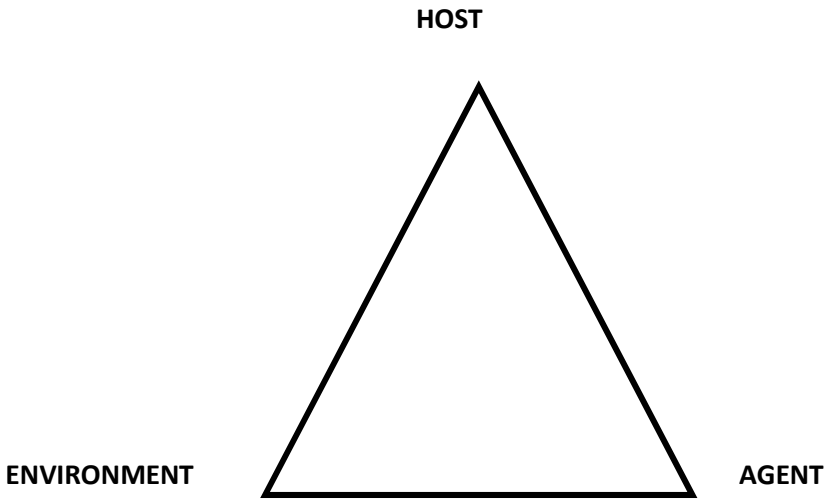
Staff within these sections report in a hierarchical fashion through their team leader to the incident controller. This provides a robust communication system that allows other agencies to inter-connect at the appropriate levels.

The planning section is the traditional domain for epidemiologists and plays a key part in collating transmission pathways in the case of a communicable disease emergency or the trail of damage caused by a weather event. If this is done successfully it assists in controlling the disaster through directing resources in a targeted and effective manner.

Emerging Infectious Diseases

Infectious diseases are affected by the interactions of the three pillars of epidemiology: host, environment and agent. A change in one parameter may provide opportunities for the emergence of a new disease with the potential for consequences to the host (Figure 1.6).

Figure 1.6. The epidemiologic triad: host, environment, agent[3].



Emerging infectious diseases have been simplistically defined as “infections that have newly appeared in a population or have existed previously but are rapidly increasing in incidence or geographic range”[4] or the WHO definition of diseases that are “newly recognised, newly evolved or occurred previously but have shown an increase in incidence or expansion of geographical, vector or host range”[5]. These definitions allow for emerging diseases that are not completely novel but may have developed characteristics or acquired an environmental niche that poses a previously unrecognised challenge to public health. For example, Legionnaires’ Disease has become a public health issue since air-conditioning systems became an integral component of building design and have provided a niche for the multiplication of the ubiquitous but relatively low pathogenic *Legionella pneumophila* bacteria. In addition, specific hosts may be predisposed to certain infections uncommon to the majority of the population. Transplant technology requiring patients to be immune suppressed has introduced a plethora of previously unrecognised disease agents[6]. Microorganisms such as *Pneumocystis jiroveci* and *Aspergillus* sp (fungi), *Prototheca* sp (an alga), and non tuberculous mycobacteria are now accepted as pathogens whereas they rarely caused infection until changes in the host immunity provided the conditions that allowed these organisms to survive and multiply[7]. Bacteria

and other microorganisms are adapting to exposure with disinfectants and antimicrobial agents and developing resistant strains. Methicillin and vancomycin resistant *Staphylococcus aureus* have caused considerable problems in institutional settings as have beta lactamase producing Gram negative bacilli that are resistant to a broad range of penicillins and cephalosporins[7].

The characteristics of emerging diseases of public health significance include human to human disease transmission, morbidity and/or mortality, global impact and an extended burden on the health sector. As such they provide the components for a communicable disease health emergency. In addition to the characteristics of the infectious agent, changes in technology, trade, population movement, politics and medical science have a significant impact on disease transmission and allow microorganisms incursion into human populations with the emergence of new health challenges.

While these factors relate to an influenza pandemic, they can also exist with agents that exhibit certain virulence properties and disease transmission characteristics. The coronavirus that causes severe acute respiratory syndrome (SARS), the human immunodeficiency virus that has resulted in the acquired immune deficiency syndrome (AIDS), variant Creutzfeldt-Jakob disease and antimicrobial resistant microorganisms are all examples. However, a range of other diseases including those caused by Hendra virus, Australian Bat Lyssa virus, Japanese Encephalitis and Hanta virus have emerged in recent times[8], and while these may not have triggered full scale public health responses they have come alarmingly close.

There are many situations that have the potential to initiate an extended health response that fall under the umbrella of this thesis including emerging infectious diseases. In addition to stimulating a pandemic-type public health response, when dealing with an unfamiliar disease there could well be an additional sense of community alarm that may further confound the task of containment.

Influenza

An influenza pandemic constitutes one of the most significant health emergencies imaginable. It is worth considering why this particular virus has attracted such attention and why biopreparedness has focussed on pandemic preparation to such an extent.

There are three influenza types; A, B and C. These are distinguishable by their internal nucleoprotein and matrix protein antigens[9]. Only types A and B are responsible for major outbreaks and type A for the antigenic shift that results in pandemic strains being produced. Human and avian influenza A types are closely genetically related. On rare occasions significant mutations occur in the avian pool, potentially through reassortment between birds, pigs and man[10]. Conditions exist in parts of Asia and Africa in particular where intimate home farming practices bring all three species into close proximity. Here, the provision of permutations of respiratory receptor sites can encourage antigenic shift and the development of novel strains that can result in reassortant strains with the potential for disease implications to man.

Like most viral diseases, influenza can result in a spectrum of symptoms and severity ranging from a subclinical infection with no overt signs to a more typical febrile illness with significant respiratory pathology and morbidity. Potentially, the disease can escalate with multi-organ impact and death on rare occasions[11]. Even in the young and healthy, it is a disease that commands respect.

Globally, an estimated 20% of children and 5% of adults suffer from symptomatic influenza annually[12]. In Australia, approximately 3000 people die from seasonal influenza each year but surveillance is flawed and this figure is likely to be an underestimate as many deaths are inadequately investigated and the real cause is often not identified[13]. US data suggest seasonal influenza leads to approximately 36,000 deaths and over 200,000 hospitalisations annually[14,15]. In addition, deaths from seasonal influenza typically affect the elderly who often have multiple medical co-morbidities and the exact cause of death is often difficult to ascertain.

The 2009 H1N1 pandemic was generally regarded as moderate[16,17] although the survey we conducted in August/September 2009 found that approximately 20% of respondents had experienced an influenza-like illness lasting on average 9 days[18]. Data from a Queensland study suggested a lower infection rate of 9.0%[19], while a study in the Hunter New England health area using laboratory confirmed results calculated a 6.2% attack rate

(range 4.4–8.2%) with an estimated case hospitalization ratio of 1.0% and case fatality ratio of 0.02%[20]. Data from eight Australian hospitals monitored between July and December 2009 showed a 9.3% admission rate for pandemic influenza[21], while in the United States an estimated 60.8 million cases, 274,000 hospitalisations and 12,469 deaths occurred[22]. A British study found the average illness duration to be 8.8 days with the approximate number of quality-adjusted life days lost being 2.9 days per person[23]. In 40% of the countries associated with the Pan American Health Organization, mortality exceeded the regional average for influenza[24].

Initial reports suggested the pandemic potential of pH1N1 was more severe than was ultimately the case[25]. Although the severity of the 2009 H1N1 pandemic has been likened to a typical seasonal influenza[16], there were some significant differences. The average age of death from pH1N1 was approximately 53 years compared to 83 years of age from seasonal influenza[17] most likely due to pre-existing immunity in the elderly. Children were more affected[26], obesity was considered by some to be risk factor[27], pregnant women were more likely to require intensive care treatment and were over-represented in death statistics[28] as were Indigenous people[29,30]. Hospitalisation rates were increased in Australia and other countries[31-35].

The 2009 H1N1 influenza strain demonstrated stability to the vaccine and showed little resistance to antiviral agents, however, occasional mutations were identified that were associated with increased virulence[36-38]. Cases of co-infection with pandemic and seasonal influenza strains were reported[39] as were opportunities for reassortment in pigs[40,41]. This demonstrates the propensity of the influenza virus to adapt and seek environmental niches that can extend transmission and pathogenicity.

The effectiveness of the influenza vaccine depends mainly on the age of the recipient and their immune competency. In healthy adults less than 65 years old it is between 70 – 90% effective when the antigen matches the circulating strain[42]. However, it is less effective in those over 65 years of age, but valuable in preventing serious disease and hospitalisation. The vaccine needs to be tailored each year to the predicted circulating seasonal strains[42]. This relates to the hallmark of the influenza virus, its propensity to mutate. Whereas the agents of most common viral illnesses are antigenically stable and lasting protection is generally provided by a single vaccine, this is not the case with influenza. The explanation lies in its genetics. Influenza viruses have an RNA genome that contains eight single stranded negative-sense RNA molecules[43]. In the host's nucleus, the virus uses its polymerase complex, RNA dependent RNA polymerase and host replication factors, DNA dependent RNA polymerase to produce a complementary

RNA from the viral RNA[44]. This is used as a template to synthesise progeny viral RNA genomes. As it replicates, the haemagglutinin protein that is responsible for viral attachment to receptors in the host cell is synthesised and cleaved into two smaller polypeptides[45]. This process is required to initiate infection. Should infection with two influenza strains occur simultaneously in a single host cell, there is a possibility of producing a progeny virus with a mixture of RNA from the parent strains. Reassortment may result in antigenic properties quite different from the parent virus that may fail to elicit a protective immune response in the host and may not be covered by vaccination[43]. Like most RNA viruses, influenza has a poor proof-reading mechanism for producing amino acids that encourages the development of mutations, with minor ongoing changes leading to antigenic drift. However, should the mutation result in more significant changes, which occurs roughly every 20-30 years, then the resulting antigenic shift creates a potentially novel virus with the properties of a pandemic strain[44,46]: universal susceptibility, human-to-human transmission and significant disease.

The influenza virus is capable of infecting a wide range of mammal and bird species but tends to be host specific. However, having close proximity to different species provides influenza viruses with the potential for antigenic shift through reassortment of specific cell receptor requirements to enable viral attachment[9]. Apart from increasing the opportunities for both spread and mutation, this allows the virus to adapt to new respiratory receptor cells, be they avian or mammalian[46]. The amino acid substitutions that arise from mutation of the haemagglutinin moiety can cause changes in viral antigenicity and receptor specificity such that the virus can transmit to other species[44].

The word pandemic originates from the Greek *pan* meaning all and *demos*, for the people. It is often defined as an epidemic that spreads across a large region or even worldwide[10]. This can be misleading, however, as seasonal influenza also meets this definition. It would be better to incorporate the additional element of universal susceptibility which then presumes a naïve population[46,47]. This is the case with antigenic shift in the influenza virus where production of a novel strain offers significant transmission opportunities in a population without prior exposure or immunity. Medical historians consider the first influenza pandemic occurred in 1510 and originated in Africa[10]. This would appear logical in the context of global population and the practicalities of international travel, neither of which would have been conducive to widespread transmission until the population base was large enough to sustain a novel communicable disease or the ability to travel between countries was well established. There were three influenza pandemics in the 20th century; 1918, 1957 and 1968. It is estimated that there were as many as 50 million deaths world-wide from Spanish influenza in 1918, although

the other two pandemics were much more moderate and resulted in approximately 0.5-2 million deaths each[10,48].

The ubiquity of the influenza virus in nature, the proximity of birds such as poultry and pigs in close farming relationships with humans, and the propensity for the RNA virus to mutate provide a unique set of survival opportunities for the continuation of the influenza virus unlike most other diseases that plague humans. It is due to these characteristics that the influenza virus provides the public health service with an annual dilemma as specific population groups, such as the elderly, immune-compromised and health care workers require vaccination each year and campaigns are required to encourage uptake[49].

The elderly are particularly prone to serious outcomes from influenza infection as many suffer comorbid disease. Although the seasonal influenza vaccine has benefit in reducing mortality, the elderly often do not mount a strong immune response and the disease can sweep through an aged care facility with tragic consequences[50,51]. Such was the case in 2005 when influenza became entrenched in aged care facilities in the Newcastle and Port Stephens areas of NSW. This event provided the impetus for the CATI interventional study reported in Chapter 2. Baseline research showed low vaccination rates amongst residents and staff that provided poor herd immunity and the opportunity for disease transmission. In such circumstances fatalities are common.

When a pandemic strain circulates, it is theoretically possible for the entire population to be affected. Management is based on containment (through social distancing, case and contact tracing, home quarantine and enhanced infection control), the judicious use of antiviral medication and widespread vaccine coverage. Australia was fortunate in having extensive stockpiles of Oseltamivir and Relenza antiviral medications along with distribution plans that were tested before the pandemic. However, even with Australia's capacity to produce its own vaccine, the development of targeted vaccine can take 4-6 months. Although there have been significant advances in vaccine developments, experts do not expect a universal influenza vaccine to be available in the foreseeable future.

In 1996 an H5N1 avian influenza strain appeared that has significantly impacted commercial poultry flocks around the world and caused morbidity and mortality in wild bird populations[46] . Avian to human transmission has been described when close association with sick birds has occurred[52]. Although the surveillance data are likely to be skewed, the mortality rate from the H5N1 strain has hovered around the alarmingly high level of 60%[53]. While this particular strain has not developed into one that can readily transmit from human to human, it serves as a stark reminder of the influenza virus's capacity to mutate into strains with the potential to create a major public health menace. Hence, the constant

attention that is placed on this viral agent and the ongoing challenge it presents to global health.

Natural Disasters

While large disease outbreaks, including pandemics, can result in protracted health response commitments, our experience with major storms shows that these can be similarly challenging. The aftermath of an extreme weather event generally requires lengthy recovery responsibilities similar to those employed in a pandemic and, like communicable diseases, the public can mitigate the impact through prudent preparation.

Hence, pandemic planning has generic value for many other emergencies although minor adaption is always necessary to suit the particular circumstances.

In the past, the Hunter region of New South Wales has experienced severe bush fires, hailstorms, earthquakes and floods. Other parts of the country have experienced cyclones, drought, bushfires, floods and hailstorms, and climate change research indicates these events are escalating under human influence[54,55]. Mitigating the impact of these events is a priority for health services.

Operational Research

Operational research is defined by the WHO as "any research producing practically-usable knowledge (evidence, findings, information, etc) which can improve program implementation (for example effectiveness, efficiency, quality, access, scale-up, sustainability) regardless of the type of research (design, methodology, approach)"[56]. Harries describes it as research into strategies, interventions, tools or knowledge which enhance program effectiveness[57], while other researchers recognise that more operational research is needed to determine the best ways to implement and monitor the impact of current interventions[58-60]. These sentiments are in accord with the underlying aim of this thesis. Ideally, operational research should be inexpensive to conduct, rapidly implemented and achieve an outcome, replicable and prioritised to the current situation. That is not to say that the study design cannot be epidemiologically robust with adequate sample size, representativeness and power.

Much of the research included in this thesis was conducted during or immediately after the actual disaster response and was aimed at improving health emergency systems and providing evidence to assist policy development. The body of work reported in this thesis represents a range of studies and observations aimed at increasing the evidence-base available for researchers and policy makers involved in the area of health emergency management. This research is founded on actual disaster-response situations within a population health unit operating at the local area health level. As such, the experiences and recommendations are directly valid for individual and community care where the full benefit of an emergency response can be appreciated.

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CHAPTER 2: RESIDENTIAL AGED CARE STUDY

2.1 Publications arising from this chapter

1. Eastwood K, Osbourn M, Durrheim D, Francis L, Merritt T, Nicholas C, Cashman P, Wiggers J. Improving communicable disease outbreak preparedness in residential aged care facilities using an interventional interview strategy. Australian Journal of Ageing. 2008;27:143-149.

2.2 Preamble

Aged care facilities are particularly prone to disease outbreaks due to the concentration of elderly residents, many with poor health status. Additionally, there are significant opportunities for exposure to infection from the public and returning residents following hospital admissions. In this context, communicable diseases often result in high levels of morbidity and mortality. Considerable risk reduction can be achieved through developing sensitive surveillance systems, outbreak planning and improving vaccine uptake. Research conducted in this chapter aimed at describing the nature and scale of risk factors and offered resources and guidelines to encourage self sufficiency. An interventional computer assisted telephone interview design was tested for its ability to achieve system change in this high risk setting.

2.3 My estimated personal contribution was 70%.

Eastwood K, Osbourn M, Durrheim D, Francis L, Merritt T, Nicholas C, Cashman P, Wiggers J. Improving communicable disease outbreak preparedness in residential aged care facilities using an interventional interview strategy. Australian Journal of Ageing. 2008;27:143-149.

CHAPTER 3: HUNTER STORMS STUDY

3.1 Publications arising from this chapter

1. Cretikos MA, Eastwood K, Dalton C, Merritt T, Tuyl F, Winn L, Durrheim DN Household disaster preparedness and information sources: Rapid cluster survey after a storm in New South Wales, Australia. Bio Med Central Public Health. 2008;8:195, doi: 10.1186/1471-2458-8-195.

2. Cretikos MA, Merritt TD, Main K, Eastwood K, Winn L, Moran L, Durrheim DN. Mitigating the health impacts of a natural disaster-the June 2007 long weekend storm in the Hunter region of New South Wales. Medical Journal of Australia. 2007;187:670-673.

3. Cretikos M, Eastwood K, Durrheim D. Exercise Paton: a simulation exercise to test New South Wales emergency departments' response to pandemic influenza. Communicable Diseases Intelligence. 2007;31:419.

3.2 Preamble

Climate change scientists suggest Australians will experience more severe weather events as global warming increases. During wide-scale disasters, individuals are expected to take primary responsibility for their own safety rather than rely on government assistance. This cannot occur without a better understanding of the issues affecting individuals and also the need for improved public education.

Following a severe storm in June 2007 many residents of the Hunter and Central Coast regions of New South Wales were affected by flood and wind damage. We took the opportunity to survey the publics' level of preparation and the effect of the storm on property and person, with the objective of identifying ways to improve household preparedness and reduce future storm impact. Conducting interviews immediately after the event encouraged participation and recall.

The third article provided an opportunity to contribute information regarding thermometer availability that had been collected during the research but not previously published.

3.3 My estimated personal contribution was 40%.

BMC Public Health

Research article

Household disaster preparedness and information sources: Rapid cluster survey after a storm in New South Wales, Australia

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Abstract

Background: A storm-related disaster in New South Wales, Australia in June 2007 caused infrastructure damage, interrupted essential services, and presented major public health risks. We investigated household disaster preparedness and information sources used before and during the disaster.

Methods: Rapid cluster survey of 320 randomly selected households in Newcastle and Lake Macquarie, New South Wales, Australia.

Results: 227 households (71%) responded to the survey. By the day before the storm, 48% (95%CI 40–57%) of households were aware of a storm warning, principally through television (67%; 58–75%) and radio (57%; 49–66%) announcements. Storm preparations were made by 42% (28–56%) of these households.

Storm information sources included: radio (78%; 68–88%); family, friends, colleagues and neighbours (50%; 40–60%); and television (41%; 30–52%). Radio was considered more useful than television (62%; 51–73% vs. 29%; 18–40%), even in households where electricity supply was uninterrupted (52%; 31–73% vs. 41%; 20–63%).

Only 23% (16–30%) of households were aware that the local government-operated radio network has a designated communication role during disasters. A battery-operated household radio and appropriate batteries were available in 42% (34–50%) of households, while only 23% (16–29%) had all of: a torch, battery-operated radio, appropriate batteries, mobile phone, emergency contact list and first aid equipment.

Conclusion: Broadcast media are important information sources immediately before and during disasters. Health services should promote awareness of broadcast networks' disaster role, especially the role of radio, and encourage general household disaster preparedness. A rapid cluster survey conducted shortly after a natural disaster provided practical, robust information for disaster planning.

Background

A severe storm that began on Thursday, 7 June 2007 brought heavy rains and gale force winds to the Newcastle, Central Coast and Sydney regions of New South Wales, Australia (Figure 1). At least ten people died as a direct result of the storms, including a family of five who died when a section of highway collapsed and a couple who died when their car was swept off a bridge.

Rainfall of up to 275 mm in 24 hours, and wind gusts exceeding 130 km/hour. [1] caused widespread flooding and damage to houses, businesses, schools, hospitals, nursing homes and community health centres. Local infrastructure was severely affected, resulting in power, water and gas supply interruptions; sewerage system failures; and rail line damage. Many roads were impassable due to floodwater, fallen trees and power lines, and abandoned cars.

The State Emergency Service responded to almost 20,000 storm-related requests for assistance [2], while widespread flooding resulted in evacuation of over 6000 residents. The failure of sewage and water utility pumps resulted in contamination of flood water, as well as difficulty in ensuring adequate quality and quantity of drinking water. A natural disaster was declared for a total of 19 local government areas with a population of over 1 million people (Figure 1). [2] The total storm damage bill is expected to reach A$1.5 billion [3].

It is well understood that the effectiveness of public communication strategies and level of community disaster preparedness can determine the success of a disaster

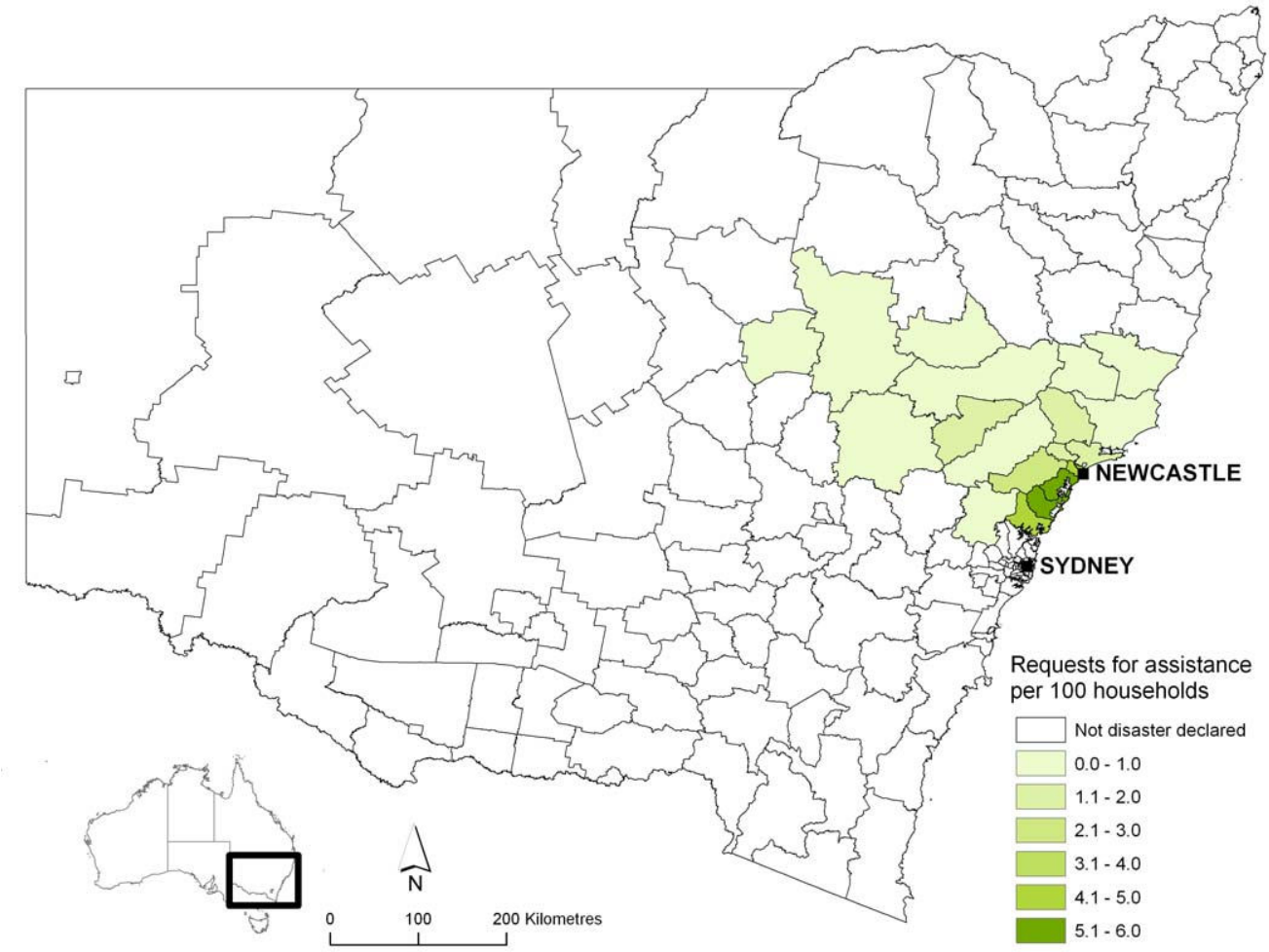


Figure 1
Requests for assistance from the New South Wales State Emergency Service per 100 households in local government areas declared natural disaster areas as a result of the storm in June 2007.

response. [4-8] While there are recommendations for household disaster preparedness in Australia, very little is known about the actual level of household disaster preparedness, or household information needs and information sources used during a disaster, although radio networks have been identified as important information sources during bushfires and other emergency situations [9,10].

Anecdotal reports suggest that access to information during the June storm was hampered by power failures, a lack of battery operated radios, and lack of community awareness of radio networks' role in providing emergency information. In the context of this natural disaster, the aim of the survey was to investigate household disaster preparedness, emergency radio network awareness, household information needs and information sources accessed by households during the disaster.

Methods

Study design

A two-stage cluster sample design was used. The primary sampling unit was the census collection district, and the unit of analysis was the household. The list of collection districts and household addresses was obtained from the 2001 Australian Census. We estimated that for a cluster size of 10 households, we would need 30 clusters to achieve acceptable precision. We randomly selected 32 collection districts from two of the worst affected local government areas within our Area Health Service: Newcastle and Lake Macquarie. We randomly selected 15 household addresses from within each collection district to ensure that 10 valid addresses were available to achieve a sample of 320 households (Figure 2).

Survey distribution and collection

The survey instrument was piloted on health services staff before use. We visited randomly selected households during the first and second rounds of survey distribution. Households were excluded if they were found to be commercial properties, vacant lots, uninhabited, non-existent or if no-one from the household had sufficient English to complete the survey. The next randomly selected household address was visited until 10 surveys had been successfully distributed in each collection district.

We asked households to select the householder aged 18 years or more who was most able to complete the survey on behalf of the household. In order to maximize the response rate, up to two home visits were made, and householders were also given the opportunity to complete the survey themselves and return it by post. Five survey teams delivered all surveys within two weeks of the storm and completed a face-to-face interview where possible.

If a householder was not at home at the time of the first visit, the survey was left in the letterbox with a reply-paid envelope provided. A minimum of two days after the first visit the survey teams revisited homes to collect completed surveys and to administer further face-to-face interviews where possible. Households that still had not completed a survey after the second visit were given a reminder to complete and return their survey using the reply-paid envelope provided. A summary of the distribution method and responses is provided in Figure 3.

Mapping

We used ArcMap version 9.2 (ArcGIS by ESRI Inc., Redlands, California, USA) to map the severity of the storm in the disaster affected areas. Storm severity was assessed using rates of requests for assistance to the NSW State Emergency Service per 100 households, which were calculated using NSW State Emergency Service request for assistance data and local government area data from the 2006 Australian Census.

Statistical analysis

To minimise error, data were double-entered into a purpose-designed Microsoft Access database. Household representativeness was assessed by comparison to the 2006 Australian Census. [11] Data were analysed using Stata statistical software (Stata Version 10.0, Stata Corp, College Station, Texas, USA). Households that reported they were away from the Newcastle or Lake Macquarie region during the storm period were excluded. Households without the relevant service connection were excluded from service interruption estimates. All estimates included missing responses in the denominator. Point estimates were adjusted using sampling weights, while confidence intervals were adjusted for the clustered design effect using Taylor-linearised variance estimation. Results are reported with 95% confidence intervals.

This study was approved by the Area Health Service Chief Executive and conducted as part of the disaster response. Ethics committee approval was not required.

Results

Survey distribution and collection

A total of 369 survey distribution attempts were required to successfully distribute 320 surveys (Figure 3). Reasons for distribution failure included: vacant lot or vacant house (20 attempts, 5.4%), commercial property (15 attempts, 4.0%), address did not exist (11 attempts, 3.0%), householders were away indefinitely (2 attempts, 0.5%) or could not speak English (1 attempt, 0.3%). Overall 227 of the 320 (70.9%) surveys were completed and returned, of which 91 (40.1%) were face-to-face interviews and 136 (59.9%) were self-administered.

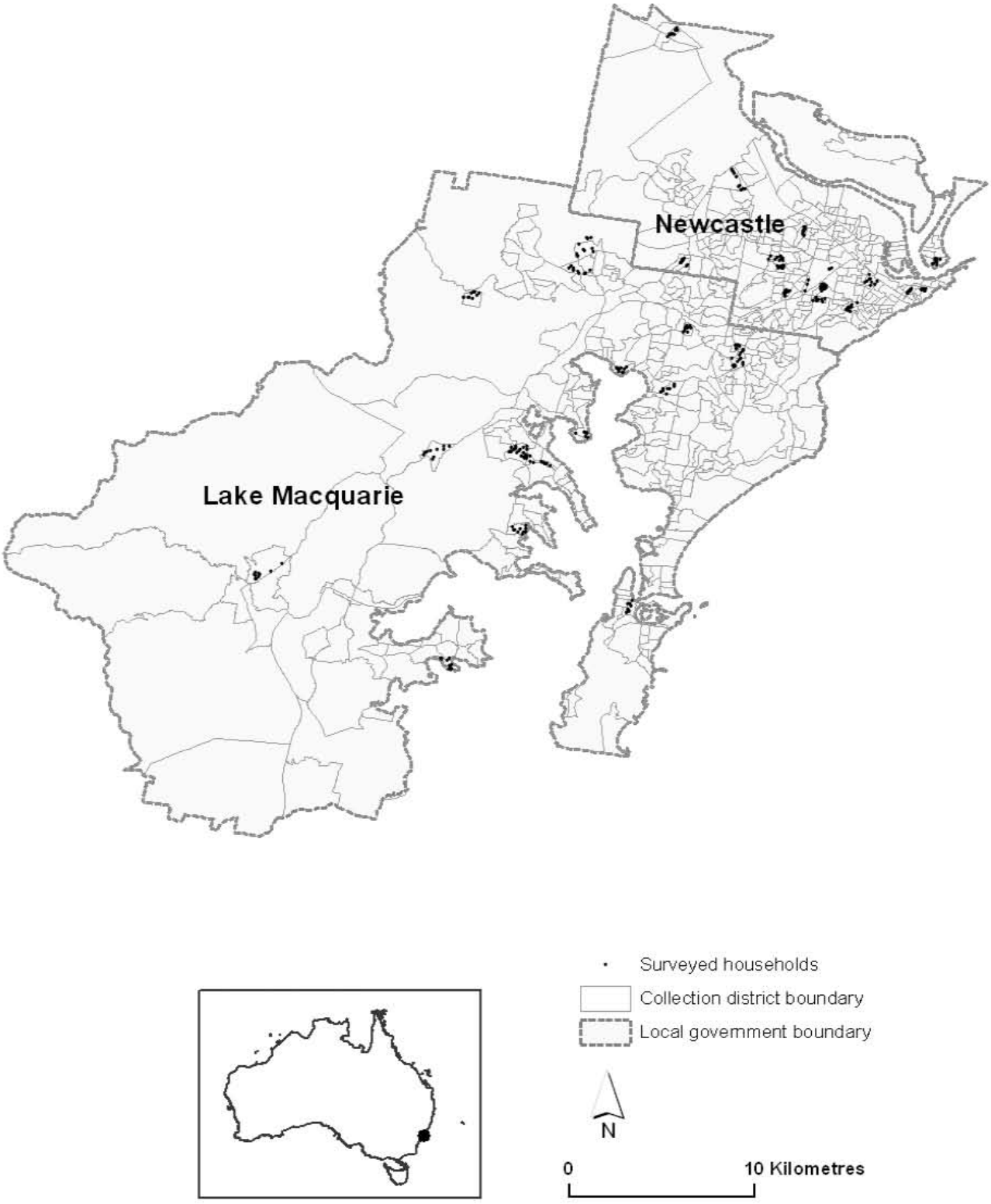


Figure 2
Location of households randomly selected from the Newcastle and Lake Macquarie local government areas of New South Wales.

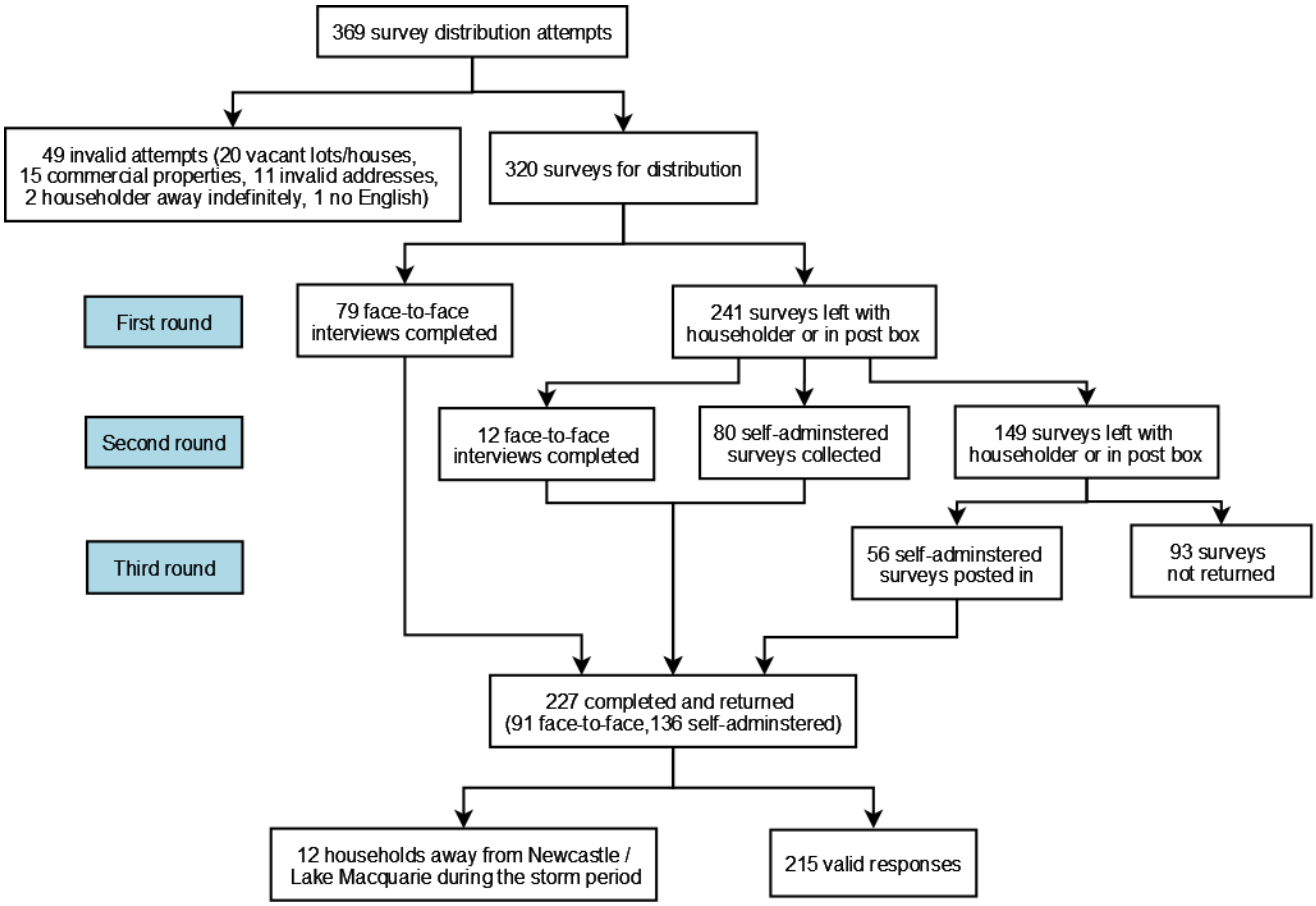


Figure 3
Distribution of surveys.

Respondent demographics

Of respondents, 94.7% (215/227) were in the Newcastle or Lake Macquarie region during the storm period of 8 to 9 June 2007. Respondents ranged from 19–90 years old, with a mean of 51 years. Most age groups were well represented (Figure 4).

Female respondents were over-represented, making up 65% of respondents compared to 52% of the study population. [11] The sample had a mean of 2.7 people per household, compared to a mean of 2.6 for the study population [11].

Impact of the storm

Flood water entered 18.6% of houses (95% CI 12.0–25.2%) and 2.9% (0.7–5.1%) of houses were temporarily or permanently vacated. Car damage was reported by 9.0% (4.1–13.8%) of households, while 1.6% (0.0–3.8%) of households reported a storm related injury of some kind. These injuries were generally minor.

The storm caused a number of major service interruptions. 73.9% (59.4–88.3%) of households experienced electricity service interruption. 20.6% (9.7–31.5%) reported electricity interruption for 48 hours or more. 43.4% (32.0–54.8%) of households with a landline telephone connection reported that this service was interrupted, and 41.2% (31.2–51.1%) of households with a mobile phone experienced service interruption.

A number of households (14.5%; 8.7–20.2%) attempted to access cash during the storm period. Cash sources included automatic teller machines (ATMs, 44.2%), electronic funds transfer (38.3%) and banks (3.2%). 45.8% (26.4–65.2%) of those who tried to access cash experienced difficulties. These were principally due to ATMs not functioning, shops being closed, and difficulty accessing shops or ATMs because of storm damage.

As a result of the storm, 30.2% (19.9–40.5%) of households received assistance from family, friends or neigh-

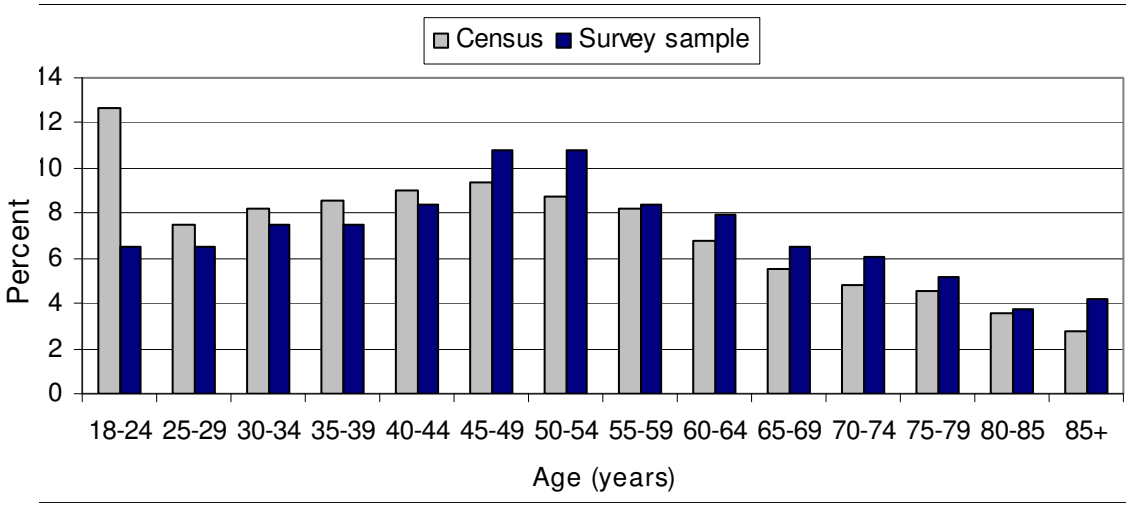
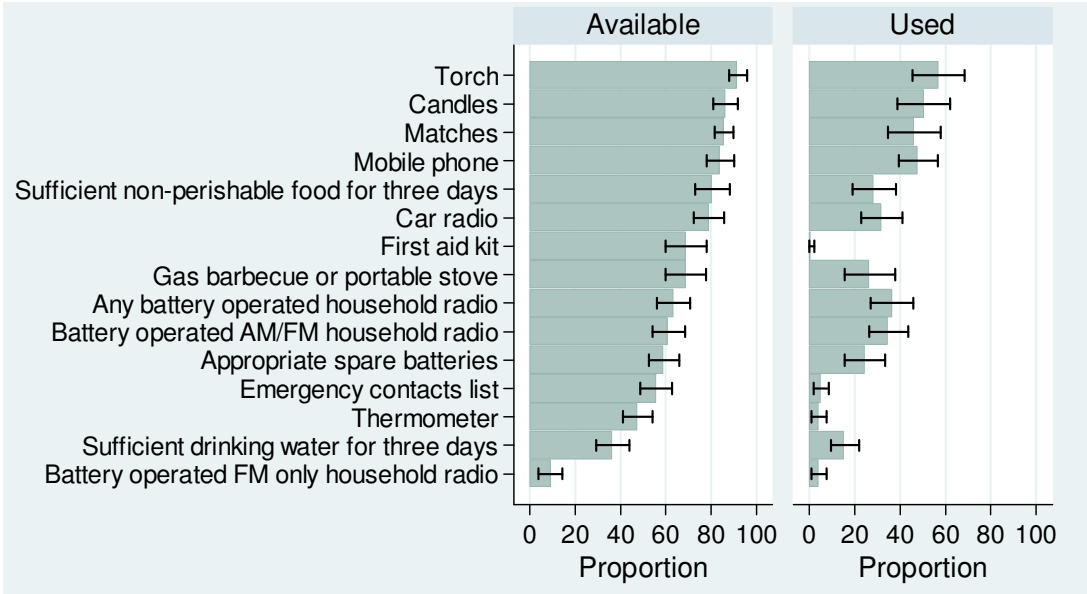


Figure 4
Age distribution of survey respondents present during the storm period.

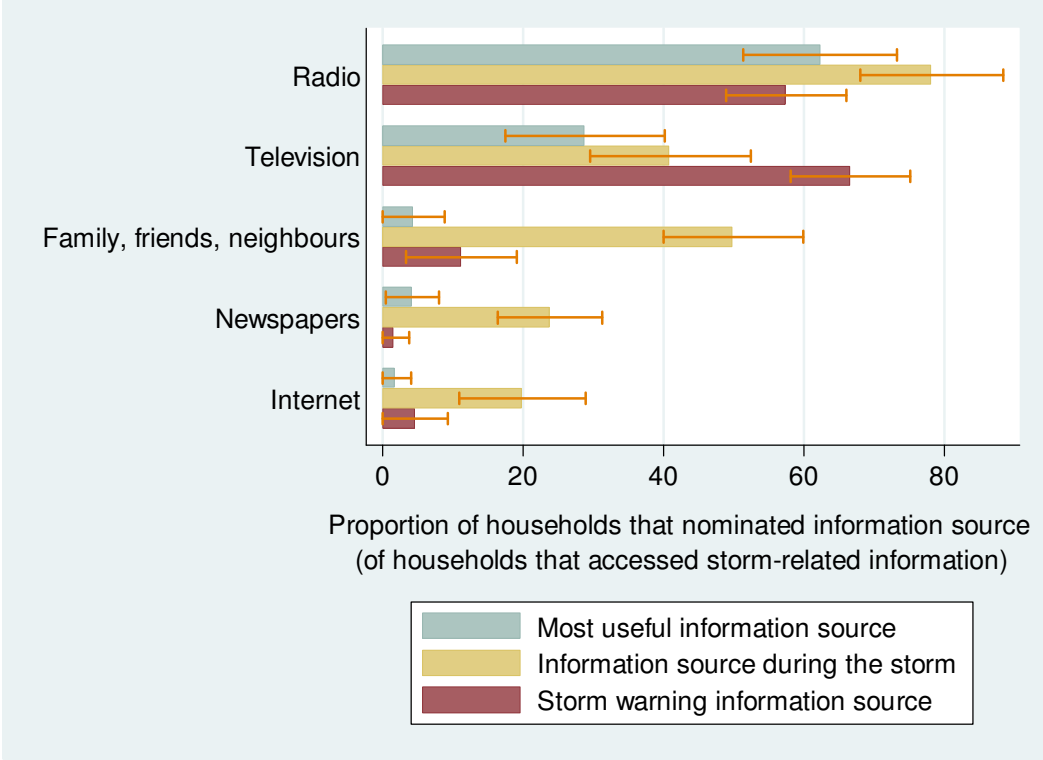
bours. In those households that received this assistance, 42.5% received one or more meals, 25% used a fridge, 24.6% stayed overnight, 18.7% loaned equipment or supplies, 13.8% were provided with hot water or hot showers, 12.5% used a washing machine and 11.8% received assistance moving household goods.

State Emergency Service assistance was requested by 4.4% (1.5–7.2%) of households. Some households experienced trouble contacting this service or received a delayed response. Assistance was most commonly requested because of fallen trees and storm damage to houses.



Error bars indicate 95% confidence intervals

Figure 5
Household disaster preparedness: proportion of households with equipment available before the storm or used during the storm.



Error bars indicate 95% confidence intervals

Figure 6
Household storm information sources.

Household storm preparedness

Household disaster preparedness was variable. Basic supplies including a mobile phone, a torch, candles, matches and a three day supply of non-perishable food were available in over 80% of households, but other important equipment including household battery-operated radios, appropriate spare batteries, emergency contact lists, first aid kits and thermometers were less commonly available. Less than half of households had sufficient drinking water for three days (Figure 5).

As expected, certain equipment was used significantly more often in households that experienced electricity interruption when compared with those households that did not. This equipment included battery operated radios (44.2%; 34.5–54.0% vs. 15.1%; 6.7–23.5%), torches (72.9%; 64.8–80.9% vs. 11.8%; 3.6–20.0%), spare batteries (32.6%; 23.0–42.1% vs. 1.6%; 0.0–4.8%), candles (65.8%; 56.1–75.4% vs. 6.9%; 0.0–14.0%), matches (61.7%; 52.4–71.1% vs. 2.6%; 0.0–6.5%) and a portable stove (34.2%; 21.0–47.5% vs. 5.5%; 0.0–12.0%).

Only 42.0% (33.9–50.0%) of households had both a battery-operated household radio and appropriate batteries available. Only 22.8% (16.2–29.4%) of households had all of: a torch, battery operated radio, appropriate batteries, mobile phone, emergency contact list and first aid kit. This equipment forms only a part of the recommended household emergency survival checklist [12].

Storm warning awareness and information sources

On the day before the storm, 48.1% (39.8–56.5%) of households were aware of a storm warning through television (66.6%; 58.1–75.1%), radio (57.4%; 48.9–66.0%), or family, friends and work colleagues (11.2%; 3.3–19.1%, Figure 6).

Preparations for the storm were made by 41.7% (27.6–55.9%) of households that received a storm warning. Preparations included clearing the yard and drains, securing windows and loose objects, making sure that emergency equipment (e.g., candles and torches) was available and cancelling travel.

Information about the storm or emergency services was accessed by 50.2% (41.6–58.8%) of households during the storm period. The three most common information sources were radio (78.1%; 68.0–88.3%), family, friends,

neighbours and work colleagues (49.9; 40.0–59.9), and television (40.9%; 29.5–52.4, Figure 6).

Most householders reported that the radio was the most useful information source. Radio was significantly more useful than the next most useful source, the television. Even in households where electricity supply was not interrupted, radio was still considered more useful than television (52.0%; 30.6–73.4% vs. 41.3%; 19.8–62.9%, Figure 6).

The information most commonly sought by households during the storm period included details on storm damage and weather reports (51.6%; 41.2–61.9%), road closures (41.7%; 32.0–51.5%), and timelines for the restoration of electricity and other essential services (22.5%; 13.6–31.4%). Householders were generally able to find the information they were seeking. Those that tried to access information during the storm reported that information on electricity and other service restoration (13.5%; 6.9–20.0) and road closures (8.4%; 2.3–14.5%) was most difficult to obtain.

An estimated 45.4% (36.8–54.1%) of households listened to the local government-operated radio station, while only 23.1% (15.7–30.4) of householders were aware that this radio station has a designated communications role during emergencies and disasters.

Discussion

Approximately half of surveyed households were aware of a storm warning by the day before the storm, with both television and radio being important sources of the warning. Almost half of these households took sensible measures to protect themselves and their property. During the storm period, radio replaced television as the most commonly accessed source of information, and was considered the most useful source of information overall, even in households that did not experience electricity interruption. Awareness of the role of the local emergency radio network during disasters was low.

Of concern, less than half of households had the basic equipment necessary – a battery operated radio and appropriate batteries – to receive emergency service messages and warnings during a disaster involving electricity interruption. Even fewer had other recommended household emergency equipment available at home [12].

Our study had a number of strengths, including the use of a randomly selected sample of households surveyed within two weeks of the storm, so that recall of storm events, information needs and equipment used was more likely to be accurate. We achieved a good response rate, and the surveyed households were representative. Although the youngest (18–24 year) age group was underrepresented, this was expected, and we believe that this was the result of requesting an adult representative to respond on behalf of the household, with older adults more likely to be selected. This should not have had a substantial impact on our survey estimates, as household experiences and preparedness were the main areas of interest, rather than individual experiences. Similarly, although the survey respondents were more commonly female this should not have had a substantial impact on the responses provided on behalf of the household.

This study covered only two of the affected local government areas and the results may therefore not be readily generalisable to all affected areas, or to Australia as a whole. In addition, only one kind of natural disaster was examined, and it is possible that the results may not be generalisable to a bioterrorist or infectious disease emergency. This study also did not explore all aspects of household disaster preparedness. Future surveys of this type could explore issues relating to vulnerable sub-groups such as young children and those with chronic illness, and could further explore general household preparedness including: household supplies of prescription medication, appropriateness of household emergency plans, and knowledge of techniques for disinfection of water

The findings from this study are already proving useful for planning for future disasters, both natural and manmade, and have important practical implications for public health emergency policy and practice. Firstly, Australian emergency plans nominate emergency warnings through radio networks as one of the main strategies for emergency public communication, particularly for rapidly evolving emergencies or disasters involving electricity interruptions. [10,13,14] This approach assumes that households have certain basic equipment such as battery-operated radios available, and that households are aware of the disaster role of radio networks. Our survey indicates that neither of these assumptions are valid for our community, although our findings confirm the importance of radio as a source of information during disasters.

Secondly, although 23% of householders were aware that the local government radio station had a designated role during emergencies, no formal agreement for such a role exists in New South Wales. A national bushfire enquiry in 2003 recommended that all Australian states develop formal arrangements with the national government-operated emergency broadcaster, but this recommendation has only been implemented by three Australian states to date. [10] The results of this survey should help to inform policy development around this issue.

Finally, we believe that rapid cluster surveys could be used more often in emergency or disaster settings, as they provide an opportunity to capture real-time, accurate and representative information about the community impact of a disaster, and the effectiveness of the disaster response.

Conclusion

A widespread natural disaster which developed rapidly in New South Wales, Australia in June 2007 resulted in substantial infrastructure damage and interruptions to essential services, and posed a serious public health risk. A rapidly conducted household survey identified that emergency radio networks form an important emergency communication tool during disasters, especially when electricity services are interrupted. The study also identified a need to improve the effectiveness of disaster warnings, and to ensure that households have the necessary equipment to allow them to receive emergency messages during a disaster. Health services should consider working with emergency service and broadcast media organisations to promote community disaster preparedness in general and awareness of local emergency radio networks in particular.

Competing interests

The authors declare that they have no competing interests.

Authors' contributions

MC designed the study, performed the statistical analysis and drafted the manuscript. KE, TM and LW participated in design and coordination of the study and critically reviewed the manuscript. CD and DD conceived of the study, participated in its design and coordination and critically reviewed the manuscript. FT assisted with the statistical analysis and critically reviewed the manuscript. All authors read and approved the final manuscript.

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CHAPTER 4: MASS VACCINATION EXERCISE

4.1 Publications arising from this chapter

Carr C, Durrheim D, Eastwood K, Massey P, Jaggers D, Caelli M, Nicholl S, Winn L. Australia's First Pandemic Influenza Mass Vaccination Clinic Exercise. Australian Journal of Emergency Management. 2011;26:47-52.

4.2 Preamble

The roll out of medication or vaccination to a large proportion of the population to mitigate a communicable disease outbreak is rarely required in Australia, however, there are occasions such as a bioterrorism event or a pandemic when this containment measure needs to be rapidly and efficiently conducted.

Field exercises offer the closest parallel to a real-life situation and permit the logistical and practical elements of a plan to be tested. We selected a rural community in the upper Hunter region of New South Wales to trial a mass vaccination plan and used seasonal influenza vaccine in the exercise. Through direct observation and participant evaluation a number of key changes were identified that improved the efficiency of the clinic and are now reflected in the revised plan.

4.3 My estimated personal contribution was 30%.

Carr C, Durrheim D, Eastwood K, Massey P, Jaggers D, Caelli M, Nicholl S, Winn L. Australia's first pandemic influenza mass vaccination clinic exercise. Australian Journal of Emergency Management. 2011; 26:47-52.

CHAPTER 5: PANDEMIC FIELD EXERCISE

5.1 Publications arising from this chapter

1. Eastwood K, Durrheim D, Merritt T, Massey PD, Huppatz C, Dalton D, Hope K, Moran L, Speare R, Farrar K. Field exercises are useful for improving public health emergency responses. Western Pacific Surveillance and Response Journal. 2010, 1(1) doi:10.5365/wpsar.2010.1.1.003.

5.2 Preamble

Considerable preparations have been made at all governance levels towards managing influenza pandemics. This type of disaster is the most serious biological event likely to be encountered as it has the potential to cause massive social disruption, placing a huge and sustained burden on our health system and requiring an extended deployment of the response team. Furthermore, many other disasters require elements of pandemic planning such as developing surge capacity, creating training programs and resources, working in sustainable operational units and conducting surveillance. Hence, pandemic planning has generic translation across all types of emergency preparedness.

The scenario of the pandemic field exercise allowed accurate testing of plans, training of staff and generally increased staff awareness. With the actual pandemic just eight months later, the health service was fortuitously positioned.

5.3 My estimated personal contribution was 60%.

Eastwood K, Durrheim D, Merritt T, Massey PD, Huppatz C, Dalton D, Hope K, Moran L, Speare R, Farrar K. Field exercises are useful for improving public health emergency responses. Western Pacific Surveillance and Response Journal. 2010, 1(1):1-7.

CHAPTER 6: KNOWLEDGE, ATTITUDES AND WILLINGNESS TO ACCEPT CONTAINMENT MEASURES BEFORE AND AFTER THE 2009 PH1N1 INFLUENZA PANDEMIC

6.1 Publications arising from this chapter

1. Eastwood K, Durrheim D, Francis JL, Tursan d'Espaignet E, Duncan S, Islam F, Speare R. Knowledge about pandemic influenza and compliance with containment measures among Australians. Bulletin of the World Health Organization. 2009;87:588-594.

2. Eastwood K, Durrheim DN, Butler M, Jones A. Responses to Pandemic (H1N1) 2009, Australia. Emerging Infectious Diseases. 2010;16:1211-1216.

6.2 Preamble

Containment of communicable disease outbreaks, especially those of a viral aetiology, mainly rely on measures such as the isolation and quarantining of cases and contacts, social distancing, enhanced infection control and increased public awareness. Reliance on public cooperation is dependent on various social, economic and educational factors that are poorly understood but which could significantly influence the outcome.

We conducted a large study before the 2009 influenza pandemic that was designed to explore Australian adults' willingness to comply with pandemic containment measures and potential influencing factors such as knowledge, family circumstances, education, finances and perceptions. Study findings identified issues that could be targeted to improve cooperation. Almost three quarters of the original sample was re-surveyed in August 2009 to see how the stated level of cooperation, perceptions and knowledge had been affected by experiences from the pH1N1 influenza pandemic.

6.3 My estimated personal contribution was 70%.

Eastwood K, Durrheim D, Francis JL,Tursan d'Espaignet E, Duncan S, Islam F, Speare R. Knowledge about pandemic influenza and compliance with containment measures among Australians. Bulletin of the World Health Organisation 2009; 87:588- 594.

CHAPTER 7: ACCEPTANCE OF THE PH1N1 VACCINE

7.1 Publications arising from this chapter

1. Eastwood K, Durrheim DN, Jones A, Butler M. Acceptance of pandemic (H1N1) 2009 influenza vaccination by the Australian public. Medical Journal of Australia. 2010;192:33-36.

7.2 Preamble

The ultimate control of an influenza pandemic requires widespread uptake of a tailored vaccine, however, sections of the public have demonstrated reluctance in accepting vaccination and there is no guarantee that a new influenza vaccine will automatically challenge this observation. Factors such as the rushed development of a novel vaccine, abbreviated clinical trials, perceptions of risk, adverse event profile and vaccine delivery modalities all may impact on vaccine acceptance.

Two years before the influenza pandemic we had determined the level of stated willingness to accept a pandemic vaccine but this was at a time when the risk, although not imminent, was presumed to be more serious than actual public perceptions following the swine influenza experience. In August 2009, just prior to vaccine roll-out and following the initial experience with the 2009 influenza pandemic, we re-surveyed the public's willingness to accept vaccination and identified issues that could affect uptake.

7.3 My estimated personal contribution was 70%.

Eastwood K, Durrheim DN, Jones A, Butler M. Acceptance of pandemic (H1N1) 2009 influenza vaccination by the Australian public. Medical Journal of Australia. 2010;192:33-36

CHAPTER 8: THE MERITS OF PUBLIC HEALTH CONTAINMENT MEASURES IN THE EARLY STAGES OF THE 2009 PH1N1 INFLUENZA PANDEMIC

8.1 Publications arising from this chapter

Eastwood K, Durrheim DN, Massey PD, Kewley C. Australia's pandemic 'Protect' strategy: the tension between prevention and patient management. Rural and Remote Health 9 (online), 2009: 1288. Available at: http://www.rrh.org.au/articles/showarticlenew.asp?ArticleID=1288.

8.2 Preamble

The Australian Health Management Plan for Pandemic Influenza was used by Australian population health units during the Containment Phase of the 2009 influenza pandemic. In some areas where influenza activity was high these plans meshed well with the level of response and the plans appeared to suit the situation. As the response drew out, the containment measures clashed with the publics' perception of severity and the Australian Commonwealth Government was placed under pressure to make changes. The Containment Phase which was introduced on 22 May 2009 was replaced with the less stringent Protect Phase on 17 June 2009. This immediately resulted in an increase of pandemic cases and with it the number of hospitalisations and those requiring intensive care rose significantly.

In areas where containment was highly effective due to reasons such as lower disease activity, natural isolation in remote areas, or where surge staff were able to maintain the containment effort, there was a reluctance to abandon control measures that appeared to be effective and were reducing the burden on the acute care health system.

This commentary piece outlines experiences gained during the pandemic response and suggests alternatives to the direct progression from one pandemic phase to another.

8.3 My estimated personal contribution was 60%.

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COMMENTARY

Australia's pandemic 'Protect' strategy: the tension between prevention and patient management

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ABSTRACT

Recent experience during Australia's initial public health response to the swine influenza pandemic provides valuable lessons for the future. An intense containment effort lasting 7 weeks was unable to prevent local community transmission in some areas of Australia; however, despite the mobility of many people living in rural and remote parts of the country, much of the outback was unaffected. By the end of the Containment Phase, most parts of rural New South Wales only recorded low rates of confirmed H1N109 infection. As Australians living in rural areas often have poorer access to health services than their urban counterparts, they are likely to be more affected by an extended emergency, even one as moderate as the present H1N109 swine influenza pandemic. There may have been benefits in extending containment measures in these less affected areas and in communities where large numbers of vulnerable people such as Indigenous Australians reside. Containment is worthwhile in limiting the spread of disease in specific situations but is unlikely to change the course of a pandemic unless it can be sustained until a large proportion of the population is vaccinated. Strenuous containment efforts should certainly be applied in outbreaks of severe disease, particularly

those caused by novel infectious agents with a low reproductive rate (R_0). Should advances in vaccine manufacture reduce the time taken to produce a new vaccine, then increased effort to extend containment will be even more worthwhile.

Key words: Australia, H1N1, human influenza, pandemic, swine influenza, transmission, prevention and control.

Background

To many who work in biopreparedness, the advent of the H1N109 swine influenza pandemic did not come as a surprise. Australian health services have been actively engaged in developing pandemic plans and conducting field exercises for some years[1-3]. One of the key motivators has been the potential risk posed by the highly virulent but poorly transmissible H5N1 avian influenza strain, which has been circulating globally for more than a decade and has a reported fatality rate among confirmed cases exceeding 60%[4]. Planning has focused on a worst-case scenario and, thus, the comparatively more moderate infection reported in H1N109 cases meant some incongruence between the perceived level of threat and the public health response.

The inconvenience of social distancing measures and the potential economic impact attracted criticism from the public, media and some sectors of the health community, and there were calls for allowing the pandemic to run its course[5-7]. However, it must be recognised that Australia was among the first affected countries in the world and soon posted one of the highest infection rates. Unlike North America and Europe, Australia was rapidly heading into its peak winter influenza season. Criticism of its public health response has to be tempered against the fact that little sound epidemiologic information was available when Australia's first cases were identified. Indeed, early data from Mexico suggested a mortality rate that warranted stringent containment measures.

H1N109 Swine influenza

The WHO declared a public health event of international importance on 24 April 2009 in recognition of human transmission of the novel influenza strain, H1N109[8]. Public health units (PHUs) in Australia were instructed to actively seek cases and apply containment measures, including home isolation/quarantine of confirmed cases and high risk contacts. Antiviral drugs from the national medical stockpile were used to treat cases and reduce the period of infectivity, and also for prophylaxis of high risk contacts. The containment response built on experience gained through field pandemic exercises conducted at Commonwealth, state and area health service level[1-3].

The first confirmed Australian swine influenza case arrived in Brisbane on 7 May 2009 on an international flight; by the end of the month 306 cases had been identified across the nation. Local Australian transmission was identified in early June 2009. Global figures reported by WHO showed a 4.4-fold increase in confirmed cases during June 2009 from 17 410 to 77 201, while in Australia, there was a 13.4-fold increase to 4090 confirmed cases over the same period. The disparity between these rates may be related to various factors, including surveillance, laboratory capacity and the progression of the epidemic but there may be other unrecognised explanations. The introduction of a novel influenza strain into countries in the southern hemisphere at the onset of their usual influenza seasons was considered a particular challenge. In Australia the peak influenza period is between July and September, when social factors such as more activities conducted indoors results in crowding and increases the risk of transmission, and low temperatures and humidity aid survival of the influenza virion[9].

Reports from North America, including Mexico, provided valuable epidemiological data[10-12]. The mortality rate of 1.1% reported from Mexico at the early stage of the outbreak was probably inflated by surveillance artefacts and biased towards recognition of cases exhibiting more severe disease.

Estimations suggest that the H1N109 virus has a high propensity for transmission with a R_0 of 1.4–3.5 compared with 1.2–1.4 for seasonal influenza[13]. Fifty to 80% of severe cases have had underlying conditions, including pregnancy, asthma or other lung pathology, cardiovascular disease, diabetes, immunosuppression and neurological disorders[14,15]. Extreme obesity is also being investigated as a potential risk factor[16]. Severe cases and deaths have occurred in young and previously healthy adults, and less often in children.

The Protect Phase

By mid-June 2009 there was widespread transmission in Victoria and this picture was starting to become evident in New South Wales (NSW), largely in western Sydney and south-western NSW bordering Victoria[17]. Infection rates varied widely across the country (Table 1) and also within states such as NSW (Table 2). On 4 June, Victoria reported 521 confirmed cases, principally from Melbourne, and this increased to 1011 by 8 June. On 17 June, the Australian Commonwealth's Department of Health and Ageing introduced the 'Protect Phase' across all states, although some parts of Queensland remained in the Contain Phase beyond this date. The Protect Phase focuses on identifying and actively managing vulnerable people with suspected swine influenza infection[17]. At this stage, testing to confirm H1N1 infection was restricted to people hospitalised for possible influenza.

During the Containment Phase considerable effort was made to actively identify cases. Media coverage advised symptomatic people with possible swine influenza risk exposures to seek medical assistance. Information was circulated to GPs and emergency departments regarding the clinical and epidemiological recognition of swine influenza and doctors were encouraged to contact their local PHU if a suspected case presented. More than 2000 people were tested in NSW alone. Data recorded in Tables 1 and 2 suggest considerable areas of Australia were spared large-scale introduction or were successful in containing the early spread of the disease, although surveillance is unlikely to capture all cases of H1N109. The heterogeneous spread of swine influenza also reflects the experience of previous pandemics, and provides further motivation for surging public health resources to bolster local containment[18]. In addition, it is appropriate to share resources with more affected areas in order to sustain containment, particularly when local capacity is compromised.

Do containment strategies provide long-term benefit?

When the Protect Phase was declared, case rates were less than 9/100 000 for most areas of Australia, except Victoria and the Australian Capital Territory which were 22-23/100 000. This raises the question of whether it was appropriate for all Australian regions to terminate their containment strategies simultaneously when many PHUs appeared to be effectively controlling transmission? A variety of factors need to be considered in the decision, including the value of persevering with containment in the face of escalating transmission in neighbouring areas, the cost of enforcing quarantine and social distancing, the ability to surge laboratory capacity and maintain other essential diagnostic services, the virulence and clinical impact of the influenza strain, the effectiveness and availability of antiviral treatment, and the timeframe for developing a targeted vaccine.

In a country as large as Australia with natural barriers of distance and geography, it is reasonable to expect that some areas can be isolated from the impact of a novel infectious disease, even if wide-scale activity is occurring elsewhere. Reducing the spread of the novel virus is in part dependent on people complying with social distancing measures, and there is evidence that Australians will cooperate with public health requests[19]. As only rare cases of antiviral resistance to H1N109 have been observed, treatment and prophylaxis must be regarded as effective control measures in this instance[20].

Table 1: Confirmed H1N109 infection rates in Australian states and territories at the end of the Contain Phase, 17 June 2009

State	State population†	Confirmed cases	Rate per 100 000
New South Wales	7 041 400	313	4.4
Victoria	5 364 800	1230	22.9
Queensland	4 349 500	194	4.5
Australian Capital Territory	347 800	75	21.6
South Australia	1 612 000	107	6.6
Western Australia	2 204 000	117	5.3
Northern Territory	221 700	35	15.8
Tasmania	500 300	41	8.2
Australia total¶	21 644 000	2112	9.8

†Population figures are based on estimated residential population 31 December 2008
¶The Australian total includes all territories.

Table 2: Confirmed H1N109 infection rates in the eight New South Wales area health services at the end of the Contain Phase, 17 June 2009

New South Wales area health service	Population†	Confirmed cases	Rate per 100 000
Rural			
Hunter New England	862 967	8	0.9
Greater Southern	483 282	42	8.7
Greater Western	301 052	9	3.0
North Coast	495 329	10	2.0
Metropolitan			
Northern Sydney/Central Coast	1 134 200	33	2.9
South Eastern Sydney Illawarra	1 209 111	46	3.8
Sydney South West	1 394 652	82	5.9
Sydney West	1 131 294	83	7.3
New South Wales total¶	7 011 886	313	4.5

†Population figures are based on estimated residential population 31 December 2008
¶The discrepancy with the NSW total in Table 1 is due to differences in population projections.

Two weeks after the introduction of the Protect Phase the number of confirmed cases in Australia doubled, despite confirmatory testing (and hence surveillance) only being focused on severe cases. In NSW, 10 cases were hospitalised in the Containment Phase and 187 in the following 2 weeks. Approximately 20% of those hospitalised have required treatment in an intensive care unit[21]. The first H1N109-associated death was reported from South Australia on 19 June and the toll has steadily increased. These statistics suggest that H1N109 influenza will result in many cases of severe disease when there is widespread community infection, an argument for containment if it could have been sustained. Similarly, rigorous containment measures are appropriate to protect vulnerable individuals and communities. This includes people with underlying medical conditions and also Indigenous Australians, a group which historically has borne a heavy burden during introductions of novel influenza infections[22]. Statistics indicate that Indigenous people are approximately five times more likely than non-Indigenous Australians to be hospitalised for swine influenza[21]. Currently (1 September 2009), the cumulative hospitalisation figures indicate that there have been

4440 swine influenza admissions to Australian hospitals, with 13.8% being Indigenous Australians, and at least 20 of the 154 people who have died with confirmed H1N109 infection are known to be Indigenous[21]. The proportion of people identifying as Indigenous in the Australian population is 2.5%[23].

Rural experiences

During the Containment Phase many towns in rural and remote parts of Australia were spared from swine influenza. Our experience dealing with GPs from country areas suggests that they were enthusiastically engaged in active case ascertainment and assisted public health authorities with the implementation of control measures. Many were reluctant to accept the relaxed measures described in the Protect Phase guidelines[24]. Furthermore, their intimate local knowledge often provided the effective surveillance necessary for successful containment. A particular concern for managing large numbers of pandemic cases once established in rural areas is the issue of inequitable access to health services and the well recognised shortage of medical officers[25]. In addition, delays in providing confirmation of cases from country towns were evident during the Containment Phase because of specimen transportation difficulties and laboratory turnaround times. The GPs in these areas may have to rely more heavily on clinical acumen to recognise cases and encourage isolation before pathology results are available.

Vaccines

The principal measure for controlling viral infections is comprehensive coverage with an effective vaccine. In the case of influenza, this has necessitated annual development of a vaccine tailored to the forecasted seasonal strains and derived from viral antigen cultured in eggs. While the influenza vaccine is generally effective, the limitations are obvious when rapid production is required for a novel influenza strain. It can take months to develop a suitable vaccine and further delays are experienced in confirming safety and efficacy through clinical trials. In addition, an effective immune response may require two doses. For some countries the vaccine may be ready as soon as mid-September 2009[14]; however, it is important that the public has confidence in its safety and that full therapeutic goods registration is obtained before it is made available. In the future, cell-line derived and genetically engineered vaccines may significantly reduce the period of time to develop a strain-specific vaccine[26]. During the swine influenza response it is possible that some areas could have maintained containment until the H1N1 vaccine was available, and this could have mitigated the impact of the novel virus, but such a strategy needs to be weighed against the increased cost, social disruption, and demand on the local health workforce.

Conclusion

Although containment measures were universally applied across Australia, their impact during the initial response to the H1N109 swine influenza pandemic was diverse. It is debatable whether the Australian health sector could have maintained the intense containment approach for long enough to preserve all areas from the affects of community wide transmission. However, a compelling argument can be lodged for an approach of maintaining containment in unaffected areas in future pandemic responses, particularly in country areas where access to health care may be problematic and there is a high proportion of at-risk individuals, including Aboriginal and Torres Strait Islanders.

In a country the size of Australia, disease patterns are influenced by a multitude of factors including population density, demographics, cultural traditions and behaviours, transport routes, geographical barriers and health service capacity. Thus, heterogeneous application of containment measures using an ‘area quarantine’ approach should be included in pandemic plans for future occasions when community transmission affects certain parts of the country but spares others. A heterogeneous approach could decrease the inherent inequities of an approach of managing only individuals at higher risk of complications. Area quarantine

would be particularly appropriate for a virulent infectious agent where the overall aim is to reduce morbidity and mortality.

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CHAPTER 9: CONCLUSIONS AND FUTURE RESEARCH DIRECTIONS

This thesis demonstrates that it is possible to conduct high quality research in a timely manner, providing evidence to inform and guide policy decisions on managing public health emergencies. Our experience shows how opportunity and carefully constructed study designs can facilitate valuable operational research. The storm study provides an example of how information was obtained immediately following a tumultuous weather event. Similarly, in the national perceptions studies, ascertaining the willingness of survey respondents helped guide public information campaigns.

This research has provided a suite of study tools, including cluster surveys, interventional plans and perceptions studies; questionnaires; skilled personnel and the expertise to implement operational research at short notice. In addition the unit has developed considerable experience and capacity to rapidly set up CATI studies.

During the pandemic, we enjoyed strong cooperation from the relevant ethics committees to provide prompt (in one case, less than 24 hours) ethics approval to enable us to conduct urgent research. Other researchers have not been so fortunate with one noting that the time taken to receive ethics approval for a controlled clinical trial during the Canadian SARS outbreak, resulted in 149 of a potential 249 patients being no longer eligible when approval was finally granted[1]. It was evident that our ethics committees appreciated the urgency of the research we submitted and did not want to interfere with the potential for implementation. On one occasion, however, we had to obtain approval from three separate committees and this caused frustrating delays. Hence there is value in streamlining the ethics process, possibly by using an umbrella organisation to provide approval across multiple facilities. There are already examples where some universities and state health services have entered into agreements so that a single ethics approval is recognised by all institutions in the group. This approach is particularly important when conducting research on communicable disease outbreaks where the situation can be extremely fluid and studies need to be initiated rapidly. It is necessary to commence data collection as soon as cases are identified as there is a high possibility that the outbreak could run its course or be redirected to an area outside of the jurisdiction of the ethics approval[1].

There is a moral responsibility to share data in a timely fashion, particularly in the context of health emergencies[2]. However, delays in the peer review process of manuscripts and the inability of some journals to provide a rapid publication service caused frustrations to

researchers. During the pandemic period in 2009, several of the more progressive journals provided on-line publication prior to the article appearing in print. They also notified regular users by email whenever new articles of interest were added to their site and allowed public access to this material. However, our experience and that of others indicates that the timeliness of the review and editing process can be improved further[3]. The Public Library of Science (PLoS) set up a blog allowing researchers to post influenza research prior to publication (http://currents.plos.org/). While this provided a service acceptable to some researchers there was debate whether the postings were breaching the agreements required by some journals which do not accept manuscripts that have already appeared elsewhere. To some extent we were able to overcome this impediment by emailing the manuscript to key decision-makers simultaneously with submission to the journal. A particular example was the vaccine acceptance study, with research findings relevant to the roll-out of the pandemic vaccine being communicated directly to the Australian Chief Medical Officer in August 2009, two months before the article was available on-line and six months before it appeared in print. Accelerated publication was available through journals such as the New England Journal of Medicine, The Lancet and the Medical Journal of Australia, but experience with the latter journal showed this was did not function efficiently in our case.

Literature review of certain aspects of the research shows a paucity of published information relevant to the research topic prior to the 2009 influenza pandemic. Such was the case with public perceptions of pandemic influenza; the communities' knowledge of infection control and disease transmission; and willingness to comply with public health measures under pandemic circumstances. This has since been addressed with contributions from a number of countries[4-9] as has the issue of pandemic vaccine acceptance[10-14]. There was also little information on the benefits and disadvantages of containment during the early stages of a pandemic. This may explain why our article in the Remote and Rural Health Journal (Chapter 8) has been one of the most accessed papers of its type[15]. Field exercise reports and their practical value in informing public health interventions are particularly poorly recorded. Most of the publications in this area have been based on bioterrorism exercises, which have parallels with communicable disease incidents but also have significant differences[16,17]. None encompassed the scope that was covered in the XFG field exercise. Even now (April, 2011), a literature search for such material is heavily weighted with work from New South Wales and the Hunter New England Area Health Service in particular. The body of work in this thesis provides pragmatic addition to the scientific literature and was specifically aimed at addressing deficiencies.

There is a pressing need for additional research in some of the study areas covered in this thesis. We are currently embarking on another ambitious multi-agency exercise to evaluate the coordinated response required to effectively manage chemical, biological and radiological incidents including those resulting from 'white powder' exposures. Experience has shown this to be a high risk area and one in which there has been inadequate preparation and policy development. A significant white powder incident that occurred in Sydney, 2010 and damage to four nuclear reactors in Japan following the massive earthquake in March 2011 have highlighted the need for more preparation.

Although we believe the pandemic plans tested during XFG and the pH1N1 pandemic response have generic value for managing communicable disease related health emergencies, there are particular challenges posed by a bioterrorism or chemical/biological/radiological event that are yet to be addressed. The white powder exercise should assist refining public health and multiagency responses and progress work towards a universal disaster plan that allows flexibility for many public health contingencies. Conducting an exercise with our colleagues from the Police Department; Fire and Rescue; local government; Department of Environment, Climate Change and Water; and the Counter Terrorism Command will provide the opportunity for each agency to test their individual plans and ensure an effective and coordinated approach is in place. An inter-agency approach is also a typical approach for a severe weather event, so the exercise will have broader value than just for a bioterrorism response. Emergency services and the community will benefit from the experience. Since we have strong interest for involvement from other health services and NSW Health, there will be opportunity for the entire state to directly gain from the experience.

In the case of the aged care study it would be appropriate to re-visit the sustainability of the original intervention to determine whether it is still effective or needs to be augmented. A superficial analysis of the data indicates a sustained willingness to report communicable disease outbreaks and discussion with the surveillance team suggests that a strong residual capacity remains from the interventional study participants to self-manage such events. However, it would be appropriate to conduct a follow up study to determine the longevity of the initial intervention and determine if further investment is merited. This may provide additional evidence for convincing the responsible regulatory authority of the necessity for more detailed accreditation audit requirements.

One of the principal concerns identified from the perceptions studies was the potential loss of public confidence in the recommendations of health authorities. Fuelled by a hard core of 'public health experts' and opportunistic journalists, the Australian public was often exposed to a negative view of the public health actions implemented to control the spread of pH1N1[18,19]. These views failed to recognise the fluidity of the situation and evolving understanding of the severity and impact of this novel disease. As a result, future cooperation with public health containment measures, such as social distancing and vaccination uptake, cannot be assured. Now is the time to review our understanding of Australian public risk communication and start rebuilding public confidence. It is appropriate to study ways in which this can best be achieved and monitor the level of willingness to cooperate with public health containment requests.

Another area that is often identified as a limitation affecting public willingness to comply with health requests is poor standards of health literacy. This was recognised in the first perceptions study with only a quarter of respondents able to correctly answer four basic questions demonstrating understanding of pandemic influenza. Other studies have also found that poor knowledge is a barrier to compliance[4,7]. Later, in 2009 after all of the publicity surrounding the swine influenza pandemic, there was no improvement in the level of understanding of influenza transmission, infection control and symptoms with just 15% of respondents able to correctly answer four straightforward questions. Furthermore, the multiple logistic regression model showed that those who had attained a tertiary level of education were more likely to cooperate with public health requests than those who had not achieved this level. We concluded that "*The public should be equipped with the appropriate knowledge and skills to positively influence their attitudes and behaviour during a future pandemic wave or communicable disease event and to enable them to better interpret broadcasted risk assessments. Such a literacy program would be useful for pandemic preparedness, generating appropriate reassurance or concern, and could potentially achieve broader health goals*"[20]. We added to that recommendation in the second perceptions study with the following statement. "*There is clearly a need to improve basic health literacy through educational initiatives in schools, public health awareness campaigns, and other creative methods, and to more effectively channel enquiries away from those working on the front lines during emergencies*"[21]. With a greater understanding of infection control measures and transmission routes, individuals should be better equipped to reduce risk through improved health practices and this could have a broader positive community impact. How this is achieved remains to be seen but there are opportunities within the school curriculum to provide education and innovative public promotions such as the 'Fifth Guy Campaign' developed by the

Department of Health in Florida have been successful in encouraging the public to improve basic hand hygiene with the potential for reducing the transmission of communicable diseases in general[22,23].

There are many advantages to improving health literacy, which can influence personal and public health standards. A greater understanding of basic microbiology and disease control can impact on improved food hygiene practices, sexually transmitted disease prevention, vaccine uptake and general infection control. This can even extend into critical areas such as the prudent usage of antibiotics to reduce the development of antimicrobial resistance[24].

Unfortunately, the WHO guidelines on conducting operational research (Table 9.2) were not published until after the study design had been established independently at HNEPH for projects like the aged care intervention. However, it is reassuring that the same elements were followed in our studies as are described in the WHO guidelines. In the conclusion of this thesis are the last steps of the 'follow-through'; that of considering ways of improving research and recommending further research opportunities. With the hindsight of the WHO document and the comprehensive coverage on this subject it is imperative that future researchers follow these steps to ensure the study covers all of these aspects. In addition, valuable advice on the evaluation of operational research is described elsewhere[25] as well as strategies for conducting operational research in the field[26].

The WHO emphasises the importance of involving local communities in the research process. This includes identifying community needs, prioritisation of research, appropriateness and relevance. Our research was determined by the population health unit for the overall benefit of the Australian public or, as in the case of the aged care study, for the staff and residents of these facilities. We included representation from the aged care industry and consulted with appropriate health authorities in the other studies. However, it is recognised that in many cases it is important to involve affected communities such that the study is conducted in a culturally appropriate and respectful manner. This provides adequate opportunity for the provision of information and input, plus it considers issues like the value of research to the community, training, building local capacity and sustainability[27]. These issues are more relevant in settings where discrete groups are affected and in particular where Indigenous or marginalised people are involved.

Table 9.2. Steps recommended by the World Health Organisation to ensure effective operational research[27].

A FLOWCHART OF THE OR/IR PROCESS
I. PLANNING
1. Organize the research group and advisory committee 2. Determine issues or problems to study and frame research questions around these 3. Develop a research proposal to answer OR/IR questions 4. Obtain ethical clearance 5. Identify funding sources and obtain support for OR/IR 6. Establish a budget and financial management procedures 7. Plan for capacity building and technical support
II. IMPLEMENTATION
8. Monitor project implementation and maintain quality 9. Pre-test all research procedures 10. Establish and maintain data management and quality control 11. Explore together with stakeholders interpretations and recommendations arising from the research findings
III. FOLLOW-THROUGH
12. Develop a dissemination plan 13. Disseminate results and recommendations 14. Document changes in policy and/or guidelines that resulted from the research 15. Monitor changes in the revised program 16. Consider ways of improving the program that can be tested through further research

Our experience with the practical aspects of conducting operational research shows the importance of a supportive research team. There is value in having a project officer to oversee the administrative and routine activities, also to ensure adequate funding and having the resources to conduct the interviewing in a professional manner.

From a research standpoint it is imperative that the question under study is crystal clear[1] and integrated into health service planning to facilitate early adoption. Constantly we referred back to the study objective (outlined in the research proposal) to ensure the study maintained the intended direction. This was a key to success; setting an appropriate aim and regularly re-aligning the study with this goal. This relates to another important lesson; ensuring the analysis matches the objective. Setting out an analysis plan before the data are collected is highly recommended. In this way it is possible to envision how the data will meet the objective and whether there are gaps or weaknesses in the scope of material being collected. Better to determine this at the outset and make

the appropriate changes than to find out at the end of the interviewing process that the data required to achieve the objectives has been missed. There is less chance that this will happen if an appropriate steering group is identified at the outset. In the aged care study, colleagues with prior experience in interventional research were engaged as well as representatives from within the aged care industry. In this way, we had a very satisfactory mix of research skills and coal-face knowledge which gave both confidence in the study methodology and credibility to the results and conclusions. As we had involvement from key industry members it provided ownership of the project which improved cooperation during the study and aided in the adoption of findings.

Summarising the findings reported in the thesis (Table 9.3) indicates there has been progress in translating the recommendations into policy, but clearly a concerted effort is required to advocate for further change.

Table 9.3. Key research recommendations and progress

Recommendation	Progress
Chapter 2: Residential aged care study	
Encourage facilities to train at least one authorised vaccinator	Adopted by Hunter New England Health
Include outbreak management in ACF accreditation	On-line resource material provided and updated regularly to enable ACFs to develop an outbreak response plan
Chapter 3: Hunter storms study	
Provide information on household disaster preparedness	Links provided on HNEPH website
Develop capacity to conduct rapid cluster analyses	Completed
Encourage MOU between NSW Health and the ABC	MOU agreed 2007
Include thermometers in the state/area stockpile	No progress
Chapter 4: Mass vaccination exercise	

Update mass vaccination plan	No current activity but is on the 2011 HSW Health agenda
Disseminate findings to NSW services	No current activity but is on the 2011 HSW Health agenda
Chapter 5: Pandemic field exercise	
Develop capacity in the Planning Team	Conducted two day workshop within HNE Health and full review of planning standard operating procedures
Advocacy regarding the role of planning	Discussed at NSW Biopreparedness Network; detailed discussion in WPRO paper
Recommendation	**Progress**
Chapter 6: Knowledge, attitudes and willingness to accept containment measures before and after the 2009 pH1N1 influenza pandemic	
Promote public health literacy	Ongoing advocacy
Improve public confidence in health requests	Ongoing media promotion
Divert public enquiries away from front line health staff e.g. GPs	Review of antiviral delivery options and potential for on-line triaging
Chapter 7: Acceptance of the 2009 pH1N1 vaccine	
Enhance adverse event surveillance	NSW Health working group established to investigate active surveillance
Improve public confidence with vaccine safety	Local media briefings
Promote better understanding of pH1N1 risk groups	Article in HNEPH Bulletin for GPs
Donate surplus pandemic vaccine	Australia offered vaccine to Pacific rim countries
Chapter 8: The merits of public health containment measures in the early stages of the 2009 pH1N1 pandemic	
Review protocols for containment measures in remote regions	More flexibility has been incorporated into the area plan

The WHO operational research guidelines dwell on the importance of disseminating results and give this similar importance to that of actually conducting the research[27]. Clearly it is imperative to have in place a dissemination plan from the outset so that the findings can be adopted for change. This is often neglected in the research process. Various advocacy methods were used to disseminate results and recommendations arising from this body of research including: peer-reviewed publications, oral and poster presentations at scientific conferences, and raising the recommendations at state-wide forums such as the influential New South Wales Health, Public Health Directors meetings and a presentation at the 2009 NHMRC Pandemic Influenza Symposium attended by the Director General of Health. In addition we have used some targeted approaches with delegations to the Department of Health and Ageing regarding the aged care study and direct communication with the Australian Chief Medical Officer for the work conducted on vaccine uptake during the 2009 influenza pandemic. Since then there have been further opportunities to improve dissemination through the state's peak health epidemiology body, the Public Health Informatics and Epidemiology Network. There is now provision to post work completed within NSW Health on an intranet site and for the author to promote the findings and recommendations, and then have these advocated through the network at a higher level. In October 2010, New South Wales Health prepared a draft document titled "Promoting the generation and effective use of population health research in NSW: a strategy for NSW Health 2011-2015" in which two key areas of operational research are reinforced. Firstly, ensuring research is appropriately directed at achieving useful health priorities and secondly, that the recommendations are given due consideration and implemented where indicated. When this strategy is enacted it will assist valuable research achieve maximum impact.

A more proactive response to our research recommendations could have bolstered public confidence in vaccine adverse-event surveillance. We noted: "*Our findings show that Australians require information on vaccine safety, and authorities need to actively provide data as they become available to ensure public confidence. This will only be possible if there is rigorous post-marketing surveillance to monitor for possible adverse events*"[28]. Had this warning been heeded perhaps an active surveillance system would have more promptly detected the increase in paediatric febrile convulsion cases first identified in Western Australia in April 2010 and this may have prevented the negative public reaction that ensued[29,30]. In 2005 a National Vaccine Safety Workshop identified deficiencies in surveillance of adverse vaccine events but the recommendations were inadequately addressed[31]. There are many other examples of unacceptable delays in the

implementation of research findings, and policy makers should take more account of the results of research and ensure an evidence-base to their decision making when formulating recommendations, while researchers have a complementary responsibility to ensure they focus their efforts on key identified policy areas[32].

It has become increasingly evident that conducting research of the standard required for publication in international peer-reviewed journals and a doctoral thesis provides a level of credibility to the work that would not be achieved if it was only targeted for local information purposes. In each of the studies reported in this thesis the intent was to publish and add to the body of scientific literature. As a result, we aimed to ensure the study design, sample size and general conduct of the research was epidemiologically sound and of peer-review standard.

The process of publishing has had additional benefits for career and personal development, with requests to provide reviews for manuscripts submitted to journals such as PLoS One, Rural and Remote Health, Vaccine, BMC Public Health, Transactions of the Royal Society of Tropical Medicine and Hygiene, and others. In addition I was invited by the New Zealand Department of Health on two occasions to review submissions and make recommendations for pH1N1 funding grants along the same lines as the National Health and Research Grant funds that we secured in 2009. I have also been privileged to be invited to present at national scientific meetings for the Australian Institute of Medical Scientists, the National Health Emergency Coordinator's Conference the Australian Science Communications Conference, the National Institute of Communicable Diseases Conference, Johannesburg, South Africa and to attend the Centers for Disease Control and Prevention, Influenza Grantees conference in Atlanta, Georgia. More recently, I have been offered a short term placement with the World Health Organization to review the response of the Western Pacific countries to the 2009 influenza pandemic.

Much of the research covered in this thesis has dwelt on influenza pandemic preparedness as this common virus has yet to be controlled through a single universal vaccination. Recently, however, there has been encouraging progress towards developing a vaccine that could potentially protect against multiple strains. Whereas the immune system normally responds to an influenza virus by making neutralizing antibodies to the haemagglutinin spike, newer vaccine approaches are targeting conserved regions within the virion which could provide broader immunity[33]. In addition, during research into the pH1N1 2009 strain, it was noted that some individuals appeared to have immunity to an influenza virus to which they had not been exposed. This

protection, known as heterosubtypic immunity, suggests that regions of the virus shared by different strains may be recognised by the immune system[33,34].

When a universal influenza vaccine becomes available it should avert the need for the elaborate and complex preparations and response plans documented in this thesis. Nature has a habit of finding a niche when an opportunity presents and it is highly likely that an emerging disease will replace the influenza virus and the issues of mitigation, risk, public perceptions, health literacy and response covered in this thesis will be equally applicable to the next generation of public health challenges.

The reports provided in this thesis represent a body of work developed within a population health unit for application in disaster preparedness at the community level. They are aimed at *'Building an evidence-base for mitigating public health emergencies.'*

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APPENDICES

List of appendices

HUNTER NEW ENGLAND
NSW HEALTH

CATI 1 QUESTIONNAIRE FOR AGED CARE FACILITIES

Introduction

Intro

Hello my name is <interviewer name>. I am calling on behalf of Hunter New England Population Health. May I speak with the Director of Nursing (DON) or the Service Director?

1 Speaking to that person
2 Person Called to the Phone
3 Person not at work
4 Wrong Number
.R Refused

WRONGNU

Sorry to bother you. Goodbye.

intro1a

Hello my name is ^_intvr_^. I am calling on behalf of Hunter New England Population Health. Am I speaking with the DON (or ADON) or service director?

1 Yes
2 No

Introduction 2

blurb

As you may be aware, a number of aged care facilities in the Hunter area had outbreaks of influenza late last year. Hunter New England population health is contacting all aged care facilities in the Hunter New England region to assess their preparedness for this year's influenza season.

Idnty Intro7

In the past fortnight you should have received an introductory letter from us regarding this influenza survey. Have you received this information?

1 Yes

2 No

desig

In this letter we asked you to nominate a person to respond to the survey. Are you the designated person to respond to this survey?

1 Yes

2 No

desig2

May I please speak to this person?

1 Person called to the phone

2 Person unavailable

desig3

Hello my name is ^_intvr_^. I am calling on behalf of Hunter New England Population Health. As you may be aware, a number of aged care facilities in the Hunter area had outbreaks of influenza late last year. Hunter New England population health is contacting all aged care facilities in the Hunter New England region to assess their preparedness for this year's influenza season through a survey, of which you have been the designated person to respond to the survey.

Read Intro8

Have you had a chance to read the letter and prepare the information requested?

1 Yes To Intro 9

2 No To call back

Ansr Intro9

Great, do you have the information at your fingertips so you can answer the questions for me? It will take approximately 20 minutes.

1 Yes

2 No Go to Call Back screen

3 Refused to participate

indty1

Would you like us to resend this by:

1 Fax

2 Email

3 Post

4 Other (please specify)

.R Refused

indty2

Please specify other way

indty3

Let me just check your contact details. Are they

<To be inserted later>

1 Yes

2 No

indty4

Can you please tell me your contact details?

indty5

I will send the information letter then ring you back in a week or so.

indty6

What would be best is if we give you a call back after you have had time to read and prepare the information

CALLBAC 2

When would be the best day and time to call back?

[INTERVIEWERS: Record response on logsheet]

cnfdl

Excellent. Just before we start let me remind you that your responses are confidential and no identifying data will be included in any reports.

Facility Details

Fac1

The first section is about your facility.

BedLcsn Fac2 NUM

How many beds are you licensed for?

1 - 400

BedOccp Fac3 NUM

How many of beds are occupied today?

1 - 400

LvlCare Fac4 MULT

What levels of care are provided in your facility? Select all relevant.

1 Self care - independent living

2 Ageing in place

3 Hostel General aged care mainstream

4 Hostel Allocated Low care only

5 Hostel Mixed high and low care

6 Hostel Dementia specific

7 Hostel Dementia secure

8 Hostel Palliative care

9 Hostel Respite care

10 Nursing home General aged care mainstream

11 Nursing home Allocated High care only

12 Nursing home Dementia specific

13 Nursing home Dementia secure

14 Nursing home Palliative care

15 Nursing home Respite care

16 Other please list To Fac5 text box

LvlCothr Fac5 TEXT

LvlSect Fac6 MULT

What sections of the facility do you have responsibility for provision of infection control? Select all relevant

1 Self care - independent living

2 Ageing in place

3 Hostel General aged care mainstream

4 Hostel Allocated Low care only

5 Hostel Mixed high and low care

6 Hostel Dementia specific

7 Hostel Dementia secure

8 Hostel Palliative care

9 Hostel Respite care

10 Nursing home General aged care mainstream

11 Nursing home Allocated High care only

12 Nursing home Dementia specific

13 Nursing home Dementia secure

14 Nursing home Palliative care

15 Nursing home Respite care

16 Other please list To Fac5 text box

17 Same as previous question

LvlSothr Fac7 TEXT

Dscr Fac8

When there are discrepancies between Fac5 and Fac6:

Is someone else responsible for infection control in the other parts of the facility?

1 Yes To Fac9

2 No to Fac11

Dsc1 Fac9 CHCE. What is their position

1 DON

2 ADON

3 Service Director

4 Infection Control Coordinator

5 Other please specify To Fac10 Text box

DsPsOthr Fac10 TEXT

StffNum Fac 11 NUM

What is the total number of staff in your facility? Please include full time, part time, casual, agency and contract staff. (note to interviewers this includes nursing, food service, ancillary, gardeners, cleaners etc **and Volunteers**)

1 - 400

Reasonable and Absolute MIN and MAX

ShftAgnc Fac12 NUM

In September 2004 how many shifts did you require to be filled by agency health care staff (eg physios or nurses) who had direct resident contact.

1 - 500

Reasonable and Absolute MIN and MAX

AttndGP Fac13 INFO

The next questions Relate to attending GPs.

NumGps Fac14 NUM

How many GPs provide services to residents in your facility?

1 - 100

GPCln Fac15 CHCE

Do you have a designated GP who provides clinical coordination and leadership? This is a single GP who has been given the responsibility to coordinate all aspects of clinical care and policy development and liaise with the other GPs on a facility wide basis.

1 Yes

2 No

GPah Fac16 CHCE

What arrangements do you have for **After Hours** medical care?

1 Individual GPs

2 GP Access

3 A designated GP

4 Call local hospital

5 Other please specify T Fac17

Immunisation

IPIntro IP1 INFO

The following questions are about resident, staff and visitors' influenza and pneumococcal immunisation. Please include volunteers in all staffing calculations.

IPTABL IP2& IP3 INFO

To answer this question you will need to refer to the completed influenza immunisation table that was requested in the information letter. Do you have this information prepared?

1 Yes

2 No (to call back screen)

IPTBL2

Now referring to your immunisation table, how many of your current residents and staff are immunised for influenza at this time. You will notice that each box is identified by number and letter. For clarity I will refer to this ID as I ask for the information.

Table of influenza immunisation 2005

	Number **currently immunised** for 2005	Number **not currently immunised** for 2005	Number **current immunisation status unknown** for 2005
Residents influenza	1a	1b	1c
Staff influenza	2a	2b	2c

IPin IP4

The information boxes in the table are identified 1a to 2c

Rci IP5 NUM

In box 1a what number of your residents are currently immunised for influenza

0 - 400

Rcni IP6 NUM

In box 1b what number of your residents are not currently immunised for influenza

0 - 400

Rcun IP7 NUM

In box 1c what number of residents are currently immunised for infl status unknown

0 - 400

Sci IP8 NUM

In box 2a what number of your staff are currently immunised for influenza

0 - 400

Scni IP9 NUM

In box 2b what number of your staff are not currently immunised for influenza

0 - 400

Scun IP10 NUM

In box 2c what number of your staff are currently immunised for influenza status unknown

0 - 400

ImVHDIP11 CHCE

Is the influenza vaccination history for all residents documented? For example were you able to easily obtain influenza immunisation of your residents and staff from a register

1 Yes

2 No

ImResRc IP12 CHCE

When is a resident's influenza immunisation status recorded?

1 On admission

2 On admission and updated when next vaccine is given

3 No specific protocol

ImRgstr IP14 CHCE

Do you maintain an up to date immunisation register recording flu vaccination details for all residents

1 Yes

2 No

ImWhVac IP15 CHCE

When was influenza vaccination for residents conducted this year 2005?

1 Month

2 Not yet

3 Don't

4 Varies according to residents care level

ImWhMnth CHCE

What month was influenza Vaccination Conducted this year 2005?

1 January

2 February

3 March

4 April

5 May

6 June

7 July

8 August

.R Refused

ImNwRes IP16 CHCE

Do you offer influenza vaccine to newly arrived unimmunised residents on admission?

1 Yes throughout the influenza season, March to October

2 No

ImNwRspt IP17 CHCE

Do you offer influenza vaccine to newly arrived unimmunised respite care residents on admission?

1 Yes throughout the influenza season, March to October

2 No

ImQStf IP18 INFO

The following questions refer to staff flu immunisation.

ImSRgstr IP19 CHCE

Do you have a staff immunisation register/file/list?

1 Yes

2 No

ImVacSS IP20INFO

This year influenza vaccine was in short supply

ImStRate IP21 CHCE

Has this affected your staff immunisation rate?

1 Yes

2 It did earlier in the year but is ok now

3 No

ImActPrm IP22 CHCE

Do you actively promote influenza vaccination to your staff?

1 Yes

2 No

ImFrSub IP23

Do you subsidise or offer free influenza vaccination to these groups?

1 Free

2 Subsidised

3 No subsidy

4 Varies

ImFrWho IP24

If influenza vaccination is offered free or subsidised, who is this offered to?

1 All staff

2 Health care staff only

ImStPrmo IP25 MULT

Which of the following promotional methods are used to encourage staff influenza immunisation (Tick all relevant)

1 Verbal one-one discussion & recommendation

2 Posters or Signs in prominent places

3 Brochures

4 Information session

5 Letters (including in payslips)

6 Newsletter promotion

7 Free/subsidised program

8 None

9 Other Please specify Go to IP26

ImPrNone

ImPrOthr IP26 TEXT

ImVcBar IP33 MULT

What do you think are barriers to achieving high levels of staff influenza immunisation coverage?

1 Cost

2 Time

3 Negative publicity or conceptions about influenza immunization (believe the vaccine gives you the flu)

4 Lack of staff policy

5 Lack of promotion by the facility

6 Other please specify Go to IP34

ImVBOthr IP34 TEXT

ImFstBar IP35

Of those that you selected which do you believe is the most significant barrier?

ImFBOthr

ImPlcRwd IP36 CHCE

Do you have a policy to restrict work duties for unimmunised staff during an influenza outbreak?

1 Yes

2 No

ImVstr IP37 INFO

The following questions are about influenza immunisation for visitors to your facility.

ImVstprm IP38 CHCE

Do you actively promote influenza vaccine to frequent (one or more visits per week) residents' visitors?

1 Yes

2 No

ImVprmHw IP39 MULT

How do you do this? Tick all relevant

1 Verbal one-one discussion & recommendation

2 Posters or Signs in prominent places

3 Brochures

4 Information session

5 Letters

6 Newsletter promotion

7 Other Please Specify To IP40Text Box

ImVPothr IP40 TEXT

ImPninfp IP42 INFO

The following questions are about resident pneumococcal immunisation. This can be offered any time of the year and is based on individual resident immunisation status. Pneumococcal vaccine is required every 5 years with a maximum of 2 doses for those 65 years and over.

ImpnTBL IP43

Table of resident pneumococcal immunisation coverage 2005

	Number who have received pneumococcal immunisation this year (do not include these residents in column 3)	Number of residents who are due to have pneumococcal immunisation this year and have not yet had it.	Number of residents who are current because they have received vaccine within the last 5 years or have had 2 doses
Residents	1a	1b	1c

Ptb2 IP44

The information boxes in the table are identified 1a to 1c

Ptb3 IP45 NUM

In box 1a how many of your residents have received pneumococcal immunisation this year

0 - 400

Ptb4 IP46 NUM

In box 1b how many of your residents are due to have pneumococcal immunisation this year and have not yet had it.

0 - 400

Ptb5 IP47 NUM

In box 1c how many of your residents are fully immunised (ie they have received vaccine within the last 5 years or have had 2 doses)

0 - 400

ImPnHstr IP48

Is the pneumococcal vaccination history for all residents documented?

1 Yes

2 No

ImPnStRc IP49

When is a resident's pneumococcal immunisation status recorded?

1 On admission

2 On admission and updated when next vaccine is given

3 No specific protocol

ImPnRgst IP51 CHCE

Do you maintain an up to date pneumococcal immunisation register recording details for all residents?

1 Yes

2 No

ImPnNRes IP53 CHCE

Do you offer pneumococcal vaccine to new unimmunised residents on admission?

1 Yes

2 No

ImPnRspC IP54 CHCE

Do you offer pneumococcal vaccine to new unimmunised respite care residents on admission?

1 Yes

2 No

ImAni IP55

Do you have an authorised nurse immuniser (nurse who has completed the College of Nursing immunisation course) at your facility?

1 Yes

2 No

ImAniInf IP56 CHCE

Would you like more information about the training program for an authorised nurse immuniser?

1 Yes

2 No

Surveillance for Respiratory and Gastrointestinal Illness

SVIntro SV1

The next questions are about identifying increasing infection rates in your facility, particularly respiratory and gastrointestinal illnesses.

Ri in 2004

Did you have an outbreak of respiratory illness in 2004?

1 Yes

2 No

Gi in 2004

Did you have an outbreak of gastrointestinal illness in 2004?

1 Yes

2 No

RiSystm SV2

Do you have a system for collecting and recording infection rates of respiratory illness in your facility eg a register or line list?

1 Yes

2 No (go to SVri)

RiRgstrt SV5

Please refer to your respiratory illness register/template/line list for the next questions. Are the following items included in your record?

RiResDOB SV7

Personal resident details eg name, DOB

1 Yes

2 No

RResOnst SV8

Date of onset of illness

1 Yes

2 No

RiResSym SV9

Resident's symptoms

1 Yes

2 No

RiResLoc SV10

Location of the resident within the facility

1 Yes

2 No

RiSVResc SV11

You mentioned that you don't have XXX in your record. Best practice guidelines recommend that such information is included in your record. Would you like to be sent a line list template for monitoring Respiratory Illness that has this information included?

1 Yes

2 No

GiSystm SV13

Do you have a similar system for collecting and recording infection rates of gastrointestinal illness in your facility?

1 Yes

2 No

GiRtnRcd

Do you have a system for collecting and recording infection rates of gastrointestinal illness in your facility eg a register or line list?

1 Yes

2 No

GiRgstr SV15

Please refer to your gastrointestinal illness register/template/line list for the next questions. Are the following items included in your record?

GiResDOB SV17

Personal resident details eg name, DOB

1 Yes

2 No

GResOnst SV18

Date of onset of illness

1 Yes

2 No

GiResSym SV19

Resident's symptoms

1 Yes

2 No

GiResLoc SV20

Location of the resident within the facility

1 Yes

2 No

GiSVResc SV21

You mentioned that you don't have XXX in your record. Best practice guidelines recommend that such information is included in your record. Would you like to be sent a line list template for monitoring Respiratory Illness that has this information included?

1 Yes

2 No

SvMntrt SV22

The next few questions are about monitoring your records about Respiratory or gastrointestinal Illness.

In the case of respiratory illness or gastrointestinal illness in your facility:

SVHO SV23

Who records this information on the register?

1 DON

2 ADON

3 Infection Control Coordinator

4 Other- please specify (go to SV24)

SVhOothr SV24

Other?

SVHM SV25

Who monitors this information?

1 DON

2 ADON

3 Infection Control Coordinator

4 Other- please specify (go to SV26)

SVHMoth SV26

Other?

SVMR SV27

Which of these statements best describes monitoring the register?

1 DON/ADON checks the register at the start of the shift

2 DON/ADON checks the register at the end of the shift

3 It is checked daily by ICC

4 It is checked as the need arises

5 It is checked when infections occur

6 It is only checked during the flu season

7 It is checked through out the year

8 It is not checked routinely

9 Other- please specify (go to SVM1)

SVMRoth SV28
Other

SVnf SV29
Who would your facility notify when there is an increase in respiratory or gastrointestinal illness? **Note to Interviewers: Do not read options out here**
1 Your parent organisation
2 Public Health Unit ie Hunter New England Population Health
3 Other- please specify (go to SV30)

SVnfoth SV30
Other

SVPR SV31
What are your criteria for notifying the Public Health Unit when there is a possible increase in respiratory illness?
Note to Interviewers: Do not read options out here
1 3 cases of influenza-like illness in the facility during a 72 hour period
2 2 laboratory confirmed cases of influenza in the facility
3 3 cases of influenza-like illness in the facility during a 72 hour period with at least one of these laboratory confirmed as influenza
4 We don't have specified criteria
5 Don't know
6 Other- please specify (go to SVp1)

SVPRoth SV32
Other

SVPG SV33
What are your criteria for notifying the Public Health Unit when there is an increase in gastrointestinal infection rates? **Note to Interviewers: Do not read options out here**
1 2 or more cases of gastrointestinal infection within 48 hours
2 We don't have specified criteria
3 Other- please specify (go to SVp2)

SVPGoth SV34
Other

Outbreak Preparedness

OP1
The next few questions relate specifically to an outbreak response plan. That is your protocol for managing an outbreak of disease within your facility.

OPResPl OP2
Do you have an outbreak response plan?
1 Yes
2 No Go to IP1

OPLRv OP3
How often is your plan reviewed?
1 12 months
2 1-3 years (Go to Resource NSW fact sheet)
3 More than 3 but less than 5 years (Go to Resource NSW fact sheet)
4 5 years or more (Go to Resource NSW fact sheet)

OPPLLyr OP4
In what year was your plan last reviewed?
(Month and year)
oppllmt
Do you know what month this was done in?

OPincFol OP5
Does your plan include the following?

OPCrdn OP6
Appointment of a coordinator to manage the outbreak
1 Yes
2 No

OPcohrt OP7

Does your plan include separating (cohorting) sick, recovering and well residents, for example using the traffic light system red, orange, green?

1 Yes

2 No

OPpals OP8

Does your plan include allocating staff to care for one resident category, eg only the sick, only the recovering, only the well, during a shift?

1 Yes

2 No

RstNAOB OP9

Does your plan include restriction of new admissions during an outbreak?

1 Yes

2 No

RstVOB OP10

Restrictions of visitors during an outbreak

1 Yes

2 No

OPRHA OP11

Does your plan specify that you inform the receiving hospital and ambulance services that the ACF is experiencing an outbreak when residents are sent to hospital?

1 Yes

2 No

OPAPPE OP12

Does your plan include access to an immediate 'in house' supply of Personal Protective Equipment (PPE) eg gloves gowns masks?

1 Yes

2 No

OPsPPE OP13

Does your plan include an arrangement with a supplier to provide bulk PPE at short notice eg sufficient gloves, masks and gowns if 50% of your residents were in isolation requiring 24 hour care for a 2 week period? **Note to interviewers: By this we mean an arrangement with a supplier beforehand**

1 Yes

2 No

OPTPPE OP14

Does your plan include training in the appropriate donning and removal of PPE?

1 Yes

2 No

OPabgsv OP15

Does your plan include the use of alcohol-based hand gel for staff and visitors?

1 Yes

2 No

OPECLn OP16

Does your plan include enhanced cleaning activities during an outbreak?

1 Yes

2 No

OPExss OP17

Does your plan include exclusion of symptomatic staff?

1 Yes

2 No

OPDsAV OP18

Does your plan include an arrangement with a pharmacy/drug supplier to provide immediate access to antiviral drugs/therapy in the event of influenza outbreak?

1 Yes (go to AVDS)

2 No (go to RxAv)

OPAVDoS OP19

Would this be enough doses to cover your residents if 50% were symptomatic and needing therapy?

1 Yes

2 No

OPRxAv OP20

Does your plan include an arrangement with a GP/GPs for rapid prescribing of antiviral treatment for residents? (Note the difference between supply and dispense will be explained to interviewers at their training).

1 Yes

2 No

OPTrnSt OP21

Has your facility provided in-service training for staff regarding implementing your disease outbreak plan?

1 Yes

2 No

OPResRsc OP22

If NO to any of ORP, CRDN - TOBP come here after going through all questions

You mentioned that you don't have XXX in your plan. Best practice guidelines recommend that such information is included in your plan. The NSW health fact sheet, *Controlling Influenza outbreaks in Aged Care Facilities* covers a number of these aspects, would you like a copy?

1 Yes

2 No

Also, the NSW Infection Control Resource Centre has a number of resources that can help in this regard. Do you want their contact details?

1 Yes

2 No

HUNTER NEW ENGLAND
NSW HEALTH

CATI 1 QUESTIONNAIRE FOR AGED CARE FACILITIES

Introduction

Intro

Hello my name is <interviewer name>. I am calling on behalf of Hunter New England Population Health. May I speak with the Director of Nursing (DON) or the Service Director?

1 Speaking to that person
2 Person Called to the Phone
3 Person not at work
4 Wrong Number
.R Refused

WRONGNU

Sorry to bother you. Goodbye.

intro1a

Hello my name is ^_intvr_^. I am calling on behalf of Hunter New England Population Health. Am I speaking with the DON (or ADON) or service director?

1 Yes
2 No

Introduction 2

blurb

As you may be aware, a number of aged care facilities in the Hunter area had outbreaks of influenza late last year. Hunter New England population health is contacting all aged care facilities in the Hunter New England region to assess their preparedness for this year's influenza season.

Idnty Intro7

In the past fortnight you should have received an introductory letter from us regarding this influenza survey. Have you received this information?

1 Yes

2 No

desig

In this letter we asked you to nominate a person to respond to the survey. Are you the designated person to respond to this survey?

1 Yes

2 No

desig2

May I please speak to this person?

1 Person called to the phone

2 Person unavailable

desig3

Hello my name is ^_intvr_^. I am calling on behalf of Hunter New England Population Health. As you may be aware, a number of aged care facilities in the Hunter area had outbreaks of influenza late last year. Hunter New England population health is contacting all aged care facilities in the Hunter New England region to assess their preparedness for this year's influenza season through a survey, of which you have been the designated person to respond to the survey.

Read Intro8

Have you had a chance to read the letter and prepare the information requested?

1 Yes To Intro 9

2 No To call back

Ansr Intro9

Great, do you have the information at your fingertips so you can answer the questions for me? It will take approximately 20 minutes.

1 Yes

2 No Go to Call Back screen

3 Refused to participate

indty1

Would you like us to resend this by:

1 Fax

2 Email

3 Post

4 Other (please specify)

.R Refused

indty2

Please specify other way

indty3

Let me just check your contact details. Are they

<To be inserted later>

1 Yes

2 No

indty4

Can you please tell me your contact details?

indty5

I will send the information letter then ring you back in a week or so.

indty6

What would be best is if we give you a call back after you have had time to read and prepare the information

CALLBAC 2

When would be the best day and time to call back?

[INTERVIEWERS: Record response on logsheet]

cnfdl

Excellent. Just before we start let me remind you that your responses are confidential and no identifying data will be included in any reports.

Facility Details

Fac1

The first section is about your facility.

BedLcsn Fac2 NUM

How many beds are you licensed for?

1 - 400

BedOccp Fac3 NUM

How many of beds are occupied today?

1 - 400

LvlCare Fac4 MULT

What levels of care are provided in your facility? Select all relevant.

1 Self care - independent living

2 Ageing in place

3 Hostel General aged care mainstream

4 Hostel Allocated Low care only

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9 Hostel Respite care

10 Nursing home General aged care mainstream

11 Nursing home Allocated High care only

12 Nursing home Dementia specific

13 Nursing home Dementia secure

14 Nursing home Palliative care

15 Nursing home Respite care

16 Other please list To Fac5 text box

LvlCothr Fac5 TEXT

LvlSect Fac6 MULT

What sections of the facility do you have responsibility for provision of infection control? Select all relevant

1 Self care - independent living

2 Ageing in place

3 Hostel General aged care mainstream

4 Hostel Allocated Low care only

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13 Nursing home Dementia secure

14 Nursing home Palliative care

15 Nursing home Respite care

16 Other please list To Fac5 text box

17 Same as previous question

LvlSothr Fac7 TEXT

Dscr Fac8

When there are discrepancies between Fac5 and Fac6:

Is someone else responsible for infection control in the other parts of the facility?

1 Yes To Fac9

2 No to Fac11

Dsc1 Fac9 CHCE. What is their position

1 DON

2 ADON

3 Service Director

4 Infection Control Coordinator

5 Other please specify To Fac10 Text box

DsPsOthr Fac10 TEXT

StffNum Fac 11 NUM

What is the total number of staff in your facility? Please include full time, part time, casual, agency and contract staff. (note to interviewers this includes nursing, food service, ancillary, gardeners, cleaners etc **and Volunteers**)

1 - 400

Reasonable and Absolute MIN and MAX

ShftAgnc Fac12 NUM

In September 2004 how many shifts did you require to be filled by agency health care staff (eg physios or nurses) who had direct resident contact.

1 - 500

Reasonable and Absolute MIN and MAX

AttndGP Fac13 INFO

The next questions Relate to attending GPs.

NumGps Fac14 NUM

How many GPs provide services to residents in your facility?

1 - 100

GPCln Fac15 CHCE

Do you have a designated GP who provides clinical coordination and leadership? This is a single GP who has been given the responsibility to coordinate all aspects of clinical care and policy development and liaise with the other GPs on a facility wide basis.

1 Yes

2 No

GPah Fac16 CHCE

What arrangements do you have for **After Hours** medical care?

1 Individual GPs

2 GP Access

3 A designated GP

4 Call local hospital

5 Other please specify T Fac17

Immunisation

IPIntro IP1 INFO

The following questions are about resident, staff and visitors' influenza and pneumococcal immunisation. Please include volunteers in all staffing calculations.

IPTABL IP2& IP3 INFO

To answer this question you will need to refer to the completed influenza immunisation table that was requested in the information letter. Do you have this information prepared?

1 Yes

2 No (to call back screen)

IPTBL2

Now referring to your immunisation table, how many of your current residents and staff are immunised for influenza at this time. You will notice that each box is identified by number and letter. For clarity I will refer to this ID as I ask for the information.

Table of influenza immunisation 2005

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IPin IP4

The information boxes in the table are identified 1a to 2c

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In box 1a what number of your residents are currently immunised for influenza

0 - 400

Rcni IP6 NUM

In box 1b what number of your residents are not currently immunised for influenza

0 - 400

Rcun IP7 NUM

In box 1c what number of residents are currently immunised for infl status unknown

0 - 400

Sci IP8 NUM

In box 2a what number of your staff are currently immunised for influenza

0 - 400

Scni IP9 NUM

In box 2b what number of your staff are not currently immunised for influenza

0 - 400

Scun IP10 NUM

In box 2c what number of your staff are currently immunised for influenza status unknown

0 - 400

ImVHDIP11 CHCE

Is the influenza vaccination history for all residents documented? For example were you able to easily obtain influenza immunisation of your residents and staff from a register

1 Yes

2 No

ImResRc IP12 CHCE

When is a resident's influenza immunisation status recorded?

1 On admission

2 On admission and updated when next vaccine is given

3 No specific protocol

ImRgstr IP14 CHCE

Do you maintain an up to date immunisation register recording flu vaccination details for all residents

1 Yes

2 No

ImWhVac IP15 CHCE

When was influenza vaccination for residents conducted this year 2005?

1 Month

2 Not yet

3 Don't

4 Varies according to residents care level

ImWhMnth CHCE

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2 February

3 March

4 April

5 May

6 June

7 July

8 August

.R Refused

ImNwRes IP16 CHCE

Do you offer influenza vaccine to newly arrived unimmunised residents on admission?

1 Yes throughout the influenza season, March to October

2 No

ImNwRspt IP17 CHCE

Do you offer influenza vaccine to newly arrived unimmunised respite care residents on admission?

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ImQStf IP18 INFO

The following questions refer to staff flu immunisation.

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Do you have a staff immunisation register/file/list?

1 Yes

2 No

ImVacSS IP20INFO

This year influenza vaccine was in short supply

ImStRate IP21 CHCE

Has this affected your staff immunisation rate?

1 Yes

2 It did earlier in the year but is ok now

3 No

ImActPrm IP22 CHCE

Do you actively promote influenza vaccination to your staff?

1 Yes

2 No

ImFrSub IP23

Do you subsidise or offer free influenza vaccination to these groups?

1 Free

2 Subsidised

3 No subsidy

4 Varies

ImFrWho IP24

If influenza vaccination is offered free or subsidised, who is this offered to?

1 All staff

2 Health care staff only

ImStPrmo IP25 MULT

Which of the following promotional methods are used to encourage staff influenza immunisation (Tick all relevant)

1 Verbal one-one discussion & recommendation

2 Posters or Signs in prominent places

3 Brochures

4 Information session

5 Letters (including in payslips)

6 Newsletter promotion

7 Free/subsidised program

8 None

9 Other Please specify Go to IP26

ImPrNone

ImPrOthr IP26 TEXT

ImVcBar IP33 MULT

What do you think are barriers to achieving high levels of staff influenza immunisation coverage?

1 Cost

2 Time

3 Negative publicity or conceptions about influenza immunization (believe the vaccine gives you the flu)

4 Lack of staff policy

5 Lack of promotion by the facility

6 Other please specify Go to IP34

ImVBOthr IP34 TEXT

ImFstBar IP35

Of those that you selected which do you believe is the most significant barrier?

ImFBOthr

ImPlcRwd IP36 CHCE

Do you have a policy to restrict work duties for unimmunised staff during an influenza outbreak?

1 Yes

2 No

ImVstr IP37 INFO

The following questions are about influenza immunisation for visitors to your facility.

ImVstprm IP38 CHCE

Do you actively promote influenza vaccine to frequent (one or more visits per week) residents' visitors?

1 Yes

2 No

ImVprmHw IP39 MULT

How do you do this? Tick all relevant

1 Verbal one-one discussion & recommendation

2 Posters or Signs in prominent places

3 Brochures

4 Information session

5 Letters

6 Newsletter promotion

7 Other Please Specify To IP40Text Box

ImVPothr IP40 TEXT

ImPninfp IP42 INFO

The following questions are about resident pneumococcal immunisation. This can be offered any time of the year and is based on individual resident immunisation status. Pneumococcal vaccine is required every 5 years with a maximum of 2 doses for those 65 years and over.

ImpnTBL IP43

Table of resident pneumococcal immunisation coverage 2005

	Number who have received pneumococcal immunisation this year (do not include these residents in column 3)	Number of residents who are due to have pneumococcal immunisation this year and have not yet had it.	Number of residents who are current because they have received vaccine within the last 5 years or have had 2 doses
Residents	1a	1b	1c

Ptb2 IP44

The information boxes in the table are identified 1a to 1c

Ptb3 IP45 NUM

In box 1a how many of your residents have received pneumococcal immunisation this year

0 - 400

Ptb4 IP46 NUM

In box 1b how many of your residents are due to have pneumococcal immunisation this year and have not yet had it.

0 - 400

Ptb5 IP47 NUM

In box 1c how many of your residents are fully immunised (ie they have received vaccine within the last 5 years or have had 2 doses)

0 - 400

ImPnHstr IP48

Is the pneumococcal vaccination history for all residents documented?

1 Yes

2 No

ImPnStRc IP49

When is a resident's pneumococcal immunisation status recorded?

1 On admission

2 On admission and updated when next vaccine is given

3 No specific protocol

ImPnRgst IP51 CHCE

Do you maintain an up to date pneumococcal immunisation register recording details for all residents?

1 Yes

2 No

ImPnNRes IP53 CHCE

Do you offer pneumococcal vaccine to new unimmunised residents on admission?

1 Yes

2 No

ImPnRspC IP54 CHCE

Do you offer pneumococcal vaccine to new unimmunised respite care residents on admission?

1 Yes

2 No

ImAni IP55

Do you have an authorised nurse immuniser (nurse who has completed the College of Nursing immunisation course) at your facility?

1 Yes

2 No

ImAniInf IP56 CHCE

Would you like more information about the training program for an authorised nurse immuniser?

1 Yes

2 No

Surveillance for Respiratory and Gastrointestinal Illness

SVIntro SV1

The next questions are about identifying increasing infection rates in your facility, particularly respiratory and gastrointestinal illnesses.

Ri in 2004

Did you have an outbreak of respiratory illness in 2004?

1 Yes

2 No

Gi in 2004

Did you have an outbreak of gastrointestinal illness in 2004?

1 Yes

2 No

RiSystm SV2

Do you have a system for collecting and recording infection rates of respiratory illness in your facility eg a register or line list?

1 Yes

2 No (go to SVri)

RiRgstrt SV5

Please refer to your respiratory illness register/template/line list for the next questions. Are the following items included in your record?

RiResDOB SV7

Personal resident details eg name, DOB

1 Yes

2 No

RResOnst SV8

Date of onset of illness

1 Yes

2 No

RiResSym SV9

Resident's symptoms

1 Yes

2 No

RiResLoc SV10

Location of the resident within the facility

1 Yes

2 No

RiSVResc SV11

You mentioned that you don't have XXX in your record. Best practice guidelines recommend that such information is included in your record. Would you like to be sent a line list template for monitoring Respiratory Illness that has this information included?

1 Yes

2 No

GiSystm SV13

Do you have a similar system for collecting and recording infection rates of gastrointestinal illness in your facility?

1 Yes

2 No

GiRtnRcd

Do you have a system for collecting and recording infection rates of gastrointestinal illness in your facility eg a register or line list?

1 Yes

2 No

GiRgstr SV15

Please refer to your gastrointestinal illness register/template/line list for the next questions. Are the following items included in your record?

GiResDOB SV17

Personal resident details eg name, DOB

1 Yes

2 No

GResOnst SV18

Date of onset of illness

1 Yes

2 No

GiResSym SV19

Resident's symptoms

1 Yes

2 No

GiResLoc SV20

Location of the resident within the facility

1 Yes

2 No

GiSVResc SV21

You mentioned that you don't have XXX in your record. Best practice guidelines recommend that such information is included in your record. Would you like to be sent a line list template for monitoring Respiratory Illness that has this information included?

1 Yes

2 No

SvMntrt SV22

The next few questions are about monitoring your records about Respiratory or gastrointestinal Illness.

In the case of respiratory illness or gastrointestinal illness in your facility:

SVHO SV23

Who records this information on the register?

1 DON

2 ADON

3 Infection Control Coordinator

4 Other- please specify (go to SV24)

SVhOothr SV24

Other?

SVHM SV25

Who monitors this information?

1 DON

2 ADON

3 Infection Control Coordinator

4 Other- please specify (go to SV26)

SVHMoth SV26

Other?

SVMR SV27

Which of these statements best describes monitoring the register?

1 DON/ADON checks the register at the start of the shift

2 DON/ADON checks the register at the end of the shift

3 It is checked daily by ICC

4 It is checked as the need arises

5 It is checked when infections occur

6 It is only checked during the flu season

7 It is checked through out the year

8 It is not checked routinely

9 Other- please specify (go to SVM1)

SVMRoth SV28
Other

SVnf SV29
Who would your facility notify when there is an increase in respiratory or gastrointestinal illness? **Note to Interviewers: Do not read options out here**
1 Your parent organisation
2 Public Health Unit ie Hunter New England Population Health
3 Other- please specify (go to SV30)

SVnfoth SV30
Other

SVPR SV31
What are your criteria for notifying the Public Health Unit when there is a possible increase in respiratory illness?
Note to Interviewers: Do not read options out here
1 3 cases of influenza-like illness in the facility during a 72 hour period
2 2 laboratory confirmed cases of influenza in the facility
3 3 cases of influenza-like illness in the facility during a 72 hour period with at least one of these laboratory confirmed as influenza
4 We don't have specified criteria
5 Don't know
6 Other- please specify (go to SVp1)

SVPRoth SV32
Other

SVPG SV33
What are your criteria for notifying the Public Health Unit when there is an increase in gastrointestinal infection rates? **Note to Interviewers: Do not read options out here**
1 2 or more cases of gastrointestinal infection within 48 hours
2 We don't have specified criteria
3 Other- please specify (go to SVp2)

SVPGoth SV34
Other

Outbreak Preparedness

OP1
The next few questions relate specifically to an outbreak response plan. That is your protocol for managing an outbreak of disease within your facility.

OPResPl OP2
Do you have an outbreak response plan?
1 Yes
2 No Go to IP1

OPLRv OP3
How often is your plan reviewed?
1 12 months
2 1-3 years (Go to Resource NSW fact sheet)
3 More than 3 but less than 5 years (Go to Resource NSW fact sheet)
4 5 years or more (Go to Resource NSW fact sheet)

OPPLLyr OP4
In what year was your plan last reviewed?
(Month and year)
oppllmt
Do you know what month this was done in?

OPincFol OP5
Does your plan include the following?

OPCrdn OP6
Appointment of a coordinator to manage the outbreak
1 Yes
2 No

OPcohrt OP7

Does your plan include separating (cohorting) sick, recovering and well residents, for example using the traffic light system red, orange, green?

1 Yes

2 No

OPpals OP8

Does your plan include allocating staff to care for one resident category, eg only the sick, only the recovering, only the well, during a shift?

1 Yes

2 No

RstNAOB OP9

Does your plan include restriction of new admissions during an outbreak?

1 Yes

2 No

RstVOB OP10

Restrictions of visitors during an outbreak

1 Yes

2 No

OPRHA OP11

Does your plan specify that you inform the receiving hospital and ambulance services that the ACF is experiencing an outbreak when residents are sent to hospital?

1 Yes

2 No

OPAPPE OP12

Does your plan include access to an immediate 'in house' supply of Personal Protective Equipment (PPE) eg gloves gowns masks?

1 Yes

2 No

OPsPPE OP13

Does your plan include an arrangement with a supplier to provide bulk PPE at short notice eg sufficient gloves, masks and gowns if 50% of your residents were in isolation requiring 24 hour care for a 2 week period? **Note to interviewers: By this we mean an arrangement with a supplier beforehand**

1 Yes

2 No

OPTPPE OP14

Does your plan include training in the appropriate donning and removal of PPE?

1 Yes

2 No

OPabgsv OP15

Does your plan include the use of alcohol-based hand gel for staff and visitors?

1 Yes

2 No

OPECLn OP16

Does your plan include enhanced cleaning activities during an outbreak?

1 Yes

2 No

OPExss OP17

Does your plan include exclusion of symptomatic staff?

1 Yes

2 No

OPDsAV OP18

Does your plan include an arrangement with a pharmacy/drug supplier to provide immediate access to antiviral drugs/therapy in the event of influenza outbreak?

1 Yes (go to AVDS)

2 No (go to RxAv)

OPAVDoS OP19

Would this be enough doses to cover your residents if 50% were symptomatic and needing therapy?

1 Yes

2 No

OPRxAv OP20

Does your plan include an arrangement with a GP/GPs for rapid prescribing of antiviral treatment for residents? (Note the difference between supply and dispense will be explained to interviewers at their training).

1 Yes

2 No

OPTrnSt OP21

Has your facility provided in-service training for staff regarding implementing your disease outbreak plan?

1 Yes

2 No

OPResRsc OP22

If NO to any of ORP, CRDN - TOBP come here after going through all questions

You mentioned that you don't have XXX in your plan. Best practice guidelines recommend that such information is included in your plan. The NSW health fact sheet, *Controlling Influenza outbreaks in Aged Care Facilities* covers a number of these aspects, would you like a copy?

1 Yes

2 No

Also, the NSW Infection Control Resource Centre has a number of resources that can help in this regard. Do you want their contact details?

1 Yes

2 No

CATI II QUESTIONNAIRE FOR AGED CARE FACILITIES

Intro1: Hello my name is <intvr>. I am calling from Hunter New England Population Health. May I speak with <name> (PERSON INTERVIEWED FOR CATI 1)

1	Speaking to that person	go to **Intro2**
2	Person called to the phone	go to **Intro3**
3	Person present but not available right now-Call back	go to **CallBack**
4	Person no longer available (position vacant, on holidays)	go to **SpkToSD**
5	Wrong number	go to **Wrongnu**
.R	Refused	go to **R_Thank**

Wrongnu: Sorry to have bothered you. Goodbye.

go to **STAT_DR**, **STAT_OS**

Intro2: In July, Population Health contacted all Aged Care Facilities to provide support for outbreak response planning. I am calling to complete the second part of this process, which is obtaining a progress update and also to provide further assistance. This follow-up interview will take about 20 minutes. Is now a good time for you to do this?

1	Yes	go to **Letter**
2	No – Call back	go to **CallBack**
3	No longer the most appropriate person	go to **SpkToSD**
.R	Refused	go to **R_Thank**

Intro3: Hello my name is <intvr>. I am calling from Hunter New England Population Health. In July, Population Health contacted all Aged Care Facilities to provide support for outbreak response planning. I am calling to complete the second part of this process, which is obtaining a progress update and to also to provide further assistance. This follow-up interview will take about 20 minutes. Is now a good time for you to do this?

1	Yes	go to **Letter**
2	No – Call back	go to **CallBack**
.R	Refused	go to **R_Thank**

SpkToSD: May I speak to the Service Director please?

1	Yes	go to **AskNmD**
2	No, not available - Call back	go to **CallBack**

3	No, not available at all (holidays, position vacant)	go to **AskNmn1**
.R	Refused	go to **R_Thank**

AskNmD: Hello, I'm from Hunter new England Population Health. In July we contacted all Aged Care Facilities to provide support for outbreak response planning. I am calling to complete the second part of this process, which is obtaining a progress update and also to provide further assistance. go to **AskNmDS**

AskNmDS: Due to the unavailability of <person interviewed for CATI 1> who was interviewed in July, would you please nominate another appropriate person, either yourself or someone else who coordinates Infection Control, to complete this interview. It will take about 20 minutes.

1	Yes - themselves	go to **Letter**
2	Nominates another	go to **NwPrsnNm**
3	Yes themselves but not right now - Call back	go to **CallBack**
4	No, not at moment – Call back	go to **CallBack**
.R	Refused	go to **R_Thank**

AskNmn1: Ok. The reason I'm phoning is that in July we contacted all Aged Care Facilities to provide support for outbreak response planning. I am now calling to complete the second part of this process, which is obtaining a progress update and also to provide further assistance. Due to the unavailability of <person interviewed for CATI 1>, and the Director, would you be able to nominate another appropriate person who is familiar with Infection Control to complete this interview?

1	Yes	go to **NwPrsnNm**
2	No, not at moment- Call back	go to **CallBack**
.R	Refused	go to **R_Thank**

NwPrsnNm

What is the name of the person you are nominating? go to **AvlblNw**

(INTERVIEWERS ALSO RECORD DETAILS ON LOGSHEET)

AvlblNw: May I speak to <nominated person's name> now?

1	Yes - transferred	go to **Intro4**
2	No - Call back	go to **CallBack**

Intro4: Hello, I'm from Hunter New England Population Health. In July we contacted all Aged Care Facilities to provide support for outbreak response planning. I am calling to complete the second part of this process, which is obtaining a progress update and also to provide further assistance. go to **Intro5**

Intro5: Due to the unavailability of <person interviewed for CATI 1> who was interviewed in July, would you be able to complete this interview? We understand that you are familiar with the Infection Control procedures in your facility. The interview will take approximately 20 minutes.

1	Yes	go to **Letter**
2	Yes, but not at moment - Call back	go to **CallBack**
3	No, nominates another	go to **NwPrsnN1**
.R	Refused	go to **R_Thank**

NwPrsnN1

What is the name of the person you are nominating? go to **AvlblNw1**

(INTERVIEWERS ALSO RECORD DETAILS ON LOGSHEET)

AvlblNw1: May I speak to <nominated person's name> now?

1	Yes - transferred	go to **Intro6**
2	No, Call back	go to **CallBack**

Intro6: Hello, I'm from Hunter New England Population Health. In July we contacted all Aged Care Facilities to provide support for outbreak response planning. I am calling to complete the second part of this process, which is obtaining a progress update and also to provide further assistance.

go to **Intro 7**

Intro7: Due to the unavailability of <person interviewed for CATI 1> who was interviewed in July, would you be able to complete this interview? We understand that you are familiar with the infection control procedures in your facility. The interview will take approximately 20 minutes.

1	Yes	go to **Letter**
2	Yes, but not at the moment - Call back	go to **CallBack**
.R	Refused	go to **R_Thank**

Letter: About a week ago we sent your organisation a letter notifying you that we'd be ringing to interview you for the second part of the influenza questionnaire and requesting for you to prepare some information for this interview. Did you receive this letter?

1 Yes go to **PrpFrInt**

2 No, Resend go to **Resend**

PrpFrInt: Have you had a chance to prepare for the interview?

1 Yes go to **Ansr**

2 No, Call back go to **CalBac1**

Ansr: Great, do you have the information with you now so you can answer the questions?

1 Yes go to **Confid**

2 No go to **CallBac1**

Resend: You will need to have the information prepared before the interview, so I will fax this out to you today. Its best that you do have all the required information ready before the interview, so just refer to the letter – it will tell you everything you need to prepare, and we will ring you back in a few days time.

go to **cncl7**

Confid: Just before we start let me remind you that your responses are confidential and no identifying data will be included in any reports.

go to **DsgnPstn**

CallBac1: OK, that's fine. Its best that you do have all the required information ready before the interview, so just refer to the letter – it will tell you everything you need to prepare, and we will give you a call in a few days time.

go to **CallBack**

DsgnPstn: What best describes your title? (ONE OPTION ONLY)

1 CEO/Director of Nursing

2 Assistant Director of Nursing

3 Infection Control Coordinator

4 Other nursing position

5 Service Director

6 Manager or Supervisor

7	Carer	
.R	Refused	all go to **LvlCr**

Facility Details

LvlCr: In your facility which **best** describes the level of care provided?

1	Hostel	go to **Bedlcsn**
2	Nursing Home	go to **Bedlcsn**
3	Combined Hostel and Nursing Home	go to **Bedlcsn**
4	Other	go to **LvlCrOthr**

LvlCrOth: Please describe the other care you provide. go to **Bedlcsn**

Bedlcsn: How many beds are you licensed for? go to **BedOccp**

BedOccp: How many beds are currently occupied? all **go to Ovrsght**

Ovrsght: Are you part of a larger Aged Care Facility group such as Anglican Care?

1	Yes	go to **Ovrsght1**
2	No	go to **InetAccs1**

Ovrsght1: What is the name of this oversight body?

1	Anglican Care	go to **Ovrsght2**
2	Uniting Care	go to **Ovrsght2**
3	Catholic Care of the Aged	go to **Ovrsght2**
4	Amity	go to **Ovrsght2**
5	Other	go to **Ovrs1Ot**

Ovrs1Ot: What is the name of your oversight organisation? go to **Ovrsght2**

Ovrsght2: Is that organisation taking the responsibility for preparing clinical protocols, such as outbreak preparedness protocols?

1	Yes	go to **Ovrsght3**
2	No	go to **InetAcs1**
3	Don't know	go to **Ovrsght3**

Ovrsght3: Have you received any outbreak preparedness protocols from them since the first interview?

1 Yes
2 No
3 Don't know

all go to **InetAcs1**

InetAcs1: Hunter New England Health has a Disease Outbreak webpage and would like to know if your facility is able to access material over the internet. Does your facility have internet access?

1 Yes go to **InetAcc2**
2 No go to **EpiFax**
3 Don't know go to **EpiFax**

InetAcc2: Have you accessed this website? (INFORMATION PROVIDED IN FAX AND LETTERS: http://www.hnehealth.nsw.gov.au/aged-care/disease-outbreaks/)

1 Yes go to **InetAcc3**
2 No go to **EpiFax**

InetAcc3: How useful did you find the site?

1 Very useful
2 Useful
3 Fair
4 Poor
5 Not useful

all go to **InetAcc4**

InetAcc4: Population Health encourages feedback about the website, and we would appreciate any suggestion or comments. These can be emailed to the contacts on that webpage. all go to **EpiFax**

EpiFax: In September we faxed out an Epidemic Alert Fax providing a report of local influenza activity. Did your facility receive this information?

1 Yes
2 No

3 Don't Know

all go to **InFlInfo**

InFlInfo: The Commonwealth Government sent out a document called Influ-Info in June 2005 which provided information to assist Aged Care Facilities in preparation and management of influenza outbreak. Did your facility receive the Influ-Info document?

1 Yes go to **InFlnfo1**
2 No go to **RiSystm**
3 Don't Know go to **RiSystm**

InFlnfo1: How useful did you find this information?

1 Very useful
2 Useful
3 Fair
4 Poor
5 Not useful at all
6 Didn't read it/lost it

all go to **RiSystm**

Surveillance for Respiratory Illness

RiSystm: The next questions are about identifying increasing levels of illness in your facility, particularly respiratory illness. Do you have a system for collecting and recording infection rates of respiratory illness in your facility, for example a register or line list (or template)?
[INTERVIEWERS: may be called any of these throughout- ie. register, line list or template]

1 Yes go to **RiRgstr**
2 No go to **RiSVReas**
3 Don't know go to **RiSVReas**

RiRgstr: Please refer to your respiratory illness register or line list for the next questions. Are the following items included in your record? go to **RiResDOB**

RiResDOB: Personal resident details, such as name or date of birth?

1 Yes
2 No
3 Don't know

all go to **RiResOnst**

RResOnst: Date of onset of illness?

1 Yes

2 No

3 Don't know

all go **to RiResSym**

RiResSym: Resident's symptoms?

1 Yes

2 No

3 Don't know

all go **to RiResLoc**

RiResLoc: Location of the resident within the facility?

1 Yes

2 No

3 Don't know

****If YES recorded for all, go to **RiSVRYes*****

If NO or DON'T KNOW recorded for any of above, go to **RiRgIntr** ******

RiSVRYes: Excellent result. You have all the necessary items listed in your respiratory illness record. go to **OPResPl**

RiRgIntr: Not all items mentioned were included in your record. go to **RiSVReas**

RiSVRe: What do you see as the main barriers to adopting and using a comprehensive respiratory illness register [or line list or template]? (MULTIPLE RESPONSES)

1 Didn't know a register was required

2 Unaware of the components required for a register (didn't know of Best Practice Guidelines)

3 No access to resources/information (eg Internet)

4 Don't believe it's important/low priority

5 Insufficient time to implement

6 Insufficient staff to implement

7 Management hasn't stipulated requirements for RI register/hasn't told us to

8 Don't know how/ Lack of skills
9 Don't know
10 Other go to **RiSvReaO**
If 1-9, go to **RiSvRea1**

RiSvReaO: Please specify the other barriers you have to adopting and using a comprehensive respiratory illness register. go to **RiSvRea1**

RiSvRea1: Of these which is the **one most important** reason? (ONE ONLY)
1 Didn't know a register was required
2 Unaware of all the components required (didn't know of Best Practice Guidelines)
3 No access to resources/information (eg Internet)
4 Don't believe it's important/low priority
5 Insufficient time to implement
6 Insufficient staff to implement
7 Management hasn't stipulated requirements for RI register/ hasn't told us to
8 Don't know how/ Lack of skills
9 Don't know
10 Other

all go to **OP1**

Outbreak Preparedness

OP1: The next few questions relate specifically to an Outbreak Response Plan, that is, the protocol for managing an outbreak of disease within your facility.

all go to **OPResPl**

OPResPl: Do you have an Outbreak Response Plan?
1 Yes go to **OBRspPr**
2 No go to **OBPr1**
3 Don't know go to **OBRspPr**

OBRspPr: Since the first interview, have you received any Outbreak Response Plan protocols from your oversight body?
1 Yes
2 No
3 Don't know all go to **OPCrdn**

OPCrdn: Does your plan include the appointment of a coordinator to manage the outbreak?

1 Yes
2 No
3 Don't know

all go to **OPcohrt**

OPcohrt: Does your plan include separating sick, recovering and well residents, for example using the traffic light system red, orange, green?

1 Yes
2 No
3 Don't know

all go to **OPpals**

OPpals: Does your plan include allocating staff to care for one resident category, for example, only the sick, only the recovering, only the well, during a shift?

1 Yes
2 No
3 Don't know

all go to **RstNAOB**

RstNAOB: Does your plan include restriction of new admissions during an outbreak?

1 Yes
2 No
3 Don't know

all go to **RstVOB**

RstVOB: Does your plan include restrictions of visitors during an outbreak?

1 Yes
2 No
3 Don't know

all go to **OPRHA**

OPRHA: Does your plan specify that you inform the receiving hospital and ambulance services that the Aged Care Facility is experiencing an outbreak when residents are sent to hospital?

1 Yes
2 No

3 Don't know all go **to OPAPPE**

OPAPPE: Does your plan include access to an immediate 'in house' supply of recommended and appropriate Personal Protective Equipment (PPE), for example, gloves, gowns, masks?

1 Yes
2 No
3 Don't know

all go to **OPsPPE**

OPsPPE: Does your plan include an arrangement with a supplier to provide bulk PPE at short notice eg sufficient gloves, masks and gowns if 50% of your residents were in isolation requiring 24 hour care for a 2 week period? *(Note to interviewers: by this we mean an arrangement with a supplier beforehand)*

1 Yes
2 No
3 Don't know

all go to OPTPPE

OPTPPE: Does your plan include training in the appropriate donning and removal of PPE?

1 Yes
2 No
3 Don't know

all go to OPabgsv

OPabgsv: Does your plan include the use of alcohol-based hand gel for staff and visitors?

1 Yes
2 No
3 Don't know

all go to **OPECLn**

OPECLn: Does your plan include enhanced cleaning activities during an outbreak?

1 Yes
2 No
3 Don't know

all go to **OPExss**

OPExss: Does your plan include exclusion of symptomatic staff?

1 Yes

2 No

3 Don't know

all go to **OPDsAV**

OPDsAV: Does your plan include an arrangement with a pharmacy supplier to provide immediate access to antiviral drugs/therapy in the event of an influenza outbreak?

1 Yes

2 No

3 Don't know

all go to **OPAVDoS**

OPAVDoS: Would this be sufficient to supply enough doses to cover your residents if 50% were symptomatic and needing therapy?

1 Yes

2 No

3 Don't know

all go to **OPRxAv**

OPRxAv: Does your plan include an arrangement with a GP or GPs for rapid prescribing of antiviral treatment for residents?

1 Yes

2 No

3 Don't know

all go to **OPTrnSt**

OPTrnSt: Has your facility provided in-service training for staff regarding implementing your disease outbreak plan?

1 Yes

2 No

3 Don't know

If NO or DON'T KNOW recorded for any of above, go to **OBPIntro** ******

****If YES recorded for all, go to **OBPrYes**

OBPrYes: That's a great result. You have all the necessary items listed in your Outbreak Response Plan.

go to **IPTABL**

OBPIntro: Not all items mentioned were included in your plan. go to **OBPr1**

OBPr1: What do you see as the main barriers for your organisation adopting and using a comprehensive outbreak response plan? (MULTIPLE responses)

1	Didn't know we had to have an ORP	go to OBPrep1
2	Unaware of all the components required (didn't know of Best Practice Guidelines)	go to OBPrep1
3	No access to resources/information (eg Internet)	go to OBPrep1
4	Don't believe it's important/low priority	go to OBPrep1
5	Insufficient time to implement	go to OBPrep1
6	Insufficient staff to implement	go to OBPrep1
7	Management hasn't stipulated requirements for ORP register/hasn't told us to	go to OBPrep1
8	Don't know how/ Lack of skills	go to OBPrep1
9	Don't know	go to OBPrep1
10	Other	go to OBPreOt

OBPreOt: Please specify other. go to **OBPrep1**

OBPrep1: Of these which is the **one most important** reason?

1	Didn't know we had to have an ORP
2	Unaware of all the components required (didn't know of Best Practice Guidelines)
3	No access to resources/information (eg Internet)
4	Don't believe its important/low priority
5	Insufficient time to implement
6	Insufficient staff to implement
7	Management hasn't stipulated requirements for ORP register/hasn't told us to
8	Don't know how/ Lack of skills
9	Don't know
10	Other

all go to **IPTABL**

Immunisation Practices

IPTABL: The next few questions relate to **current** resident immunisation status. This includes respite care residents. To answer this question you will need to refer to the completed influenza immunisation questions that were requested in the information letter. Do you have this information ready?

1 Yes go to **ImRgstn**

2 No go to **FaxTbls**

FaxTbls: If you have not prepared this we will continue the interview, but we request that you complete the information and fax it back to us on 4924 6215.

go to **ImRgstr**

ImRgstr: Do you maintain an up to date register recording influenza vaccination details for all residents?

1 Yes

2 No

3 Don't know

go to **IPT2**

IPT2: How many of your **current** residents are known to be immunised against influenza?

go to **RsOcNtIM**

RsOcNtIM: How many of your **current** residents are **not** immunised against influenza?

go to **RsOclmNk**

RsOclmNk: How many of your **current** residents' influenza immunisation status is unknown?

go to **ImNwRes**

ImNwRes: Do you offer influenza vaccine to new unimmunised residents on admission?

1 Yes during the flu season, March to October

2 No

3 Don't know

go to **ClstrFlu**

ClstrFlu: In the past 3 months, has your facility experienced any clusters of influenza-like illness? That is, 3 residents sick within a 2 day period, showing symptoms such as fever, coughs, lethargy

1	Yes	go to **ClstrFl1**
2	No	go to **ImSRgstr**
3	Don't know	go to **ImSRgstr**

ClstrFl1: On how many occasions has this happened? go to **ImSRgstr**

1 1
2 2
3 3
4 >3

ImSRgstr: The following questions refer to **staff** influenza immunisation. Do you have a staff influenza immunisation register?

1 Yes
2 No
3 Don't know

go to **ImActPrm**

ImActPrm: Do you actively promote influenza vaccination to your staff?

1 Yes
2 No
3 Don't know

go to **ImPlcRwd**

ImPlcRwd: Do you have a policy to restrict work duties for unimmunised staff during an influenza outbreak?

1 Yes
2 No
3 Don't know

go to **ImVstprm**

ImVstprm: The following questions are about influenza immunisation for visitors to your facility. Do you actively promote influenza vaccine to frequent visitors (meaning one or more visits per week) of residents?

1 Yes

2 No

3 Don't know

go to **AccInfo**

AccInfo: We are now at the end of the main part of the interview. To help us provide the best possible service, we would appreciate your feedback on this interviewing process.

go to **Accep1**

Accep1: How would you rate the acceptability of Population Health conducting phone interviews such as this? That is; sending out a letter, conducting a telephone initial interview, sending out resources, then conducting a follow up telephone interview. Would you rate this process as:

1	Very acceptable	go to **Accep2**
2	Acceptable	go to **Accep2**
3	Unsure	go to **Accep1a**
4	Unacceptable	go to **Accep1a**
5	Very unacceptable	go to **Accep1a**

Accep1a: What are the main reason/s why you feel this is the case. [**Interviewers: choose all relevant]**

1 Interviews too time consuming

2 Putting practices in place too time consuming

3 Resources didn't arrive

4 Speaking to the wrong person to answer these questions

5 I didn't know answers to questions

6 Prefer written questionnaire/fax/post

7 Prefer to use the internet for all information

8 We already have all these practices in place

9 We have other practices in place

10 Poor timing/rang at inconvenient time

11 Covered by Region, not us

12 Commonwealth dept has already covered all of this

13 Couldn't hear interviewer

14 Questions difficult to understand

15 No designated person to take responsibility

16 Other go to **Accep1a**

Accep1b: Please explain the other reason why you feel this is the case

go to **Accep1b**

Accep1c: Of these what is the **one** most important reason?

1 Interviews too time consuming
2 Putting practices in place too time consuming
3 Resources didn't arrive
4 Speaking to the wrong person to answer these questions
5 I didn't know answers to questions
6 Prefer written questionnaire/fax/post
7 Prefer to use the internet for all information
8 We already have all these practices in place
9 We have other practices in place
10 Poor timing/rang at inconvenient time
11 Covered by Region, not us
12 Commonwealth dept has already covered all of this
13 Couldn't hear interviewer
14 Questions difficult to understand
15 No designated person to take responsibility
16 Other

Accep3: Are there any other comments you would like to make about the "phone interview" process.

1 Yes go to **Accep4**
2 No go to **Cncl7**

Accep4: What would you like to add?

go to **Cncl7**

Cncl7: Before I go could I just like to check your facility's contact details.
ADDRESS: ^ADDRESS^
FAX: ^faxno^

1 Both correct go to **CoEmail**
2 Address wrong go to **Cncl8**
3 Fax Wrong go to **Cncl8a**
4 Address and fax wrong go to **Cncl8**

Cncl8:

Correct address is_____

If Cncl7=2, go to **CoEmail**

If Cncl7=4, go to **Cncl8a**

Cncl8a: Correct fax number is_____ go to **CoEmail**

note: If from **Resend**, skip to **CallBack**

CoEmail: Can I check your email address.

Is your email <email address>

1	Email correct	go to **Final**
2	Email wrong	go to **CoEmail1**

CoEmail1: Correct email is_____

go to **Final**

Final: We've now reached the end of the interview. We will send all Residential Aged Care Facilities a summary of our findings. Please feel free to contact Population Health if you need any further assistance. Also the NSW Hunter New England Health Internet site has additional information. Thank you for your time. Goodbye. go to **ENDCALL**

R-Thank: OK, that's fine. Thankyou for your time. Goodbye go to **REFUS**

REFUS:

DO NOT ASK: What is the respondent's reason for not participating in the survey?

1	No reason given
2	No time/too busy
3	Not interested
4	Person unwell
5	No-one appropriate to do interview
6	Other (please specify)

go to **REF_OTH**

REF_OTH:

[INTERVIEWERS: Please specify other] go to **END**

CallBack:

When would be a good time to call back? (INTERVIEWERS ALSO RECORD DETAILS ON LOGSHEET)

What is the best day?_____

What is the best time?_____

OK, I'll call back on <DATE> at <TIME>. Thankyou, Goodbye

go to **C_Thank**

C_Thank:

Thankyou, Goodbye.

go toSTAT_

STAT_DR, STAT_OS, STAT_CB, STAT_CQ go to **END**

CATI II QUESTIONNAIRE FOR AGED CARE FACILITIES

Intro1: Hello my name is <intvr>. I am calling from Hunter New England Population Health. May I speak with <name> (PERSON INTERVIEWED FOR CATI 1)

1	Speaking to that person	go to **Intro2**
2	Person called to the phone	go to **Intro3**
3	Person present but not available right now-Call back	go to **CallBack**
4	Person no longer available (position vacant, on holidays)	go to **SpkToSD**
5	Wrong number	go to **Wrongnu**
.R	Refused	go to **R_Thank**

Wrongnu: Sorry to have bothered you. Goodbye.

go to **STAT_DR**, **STAT_OS**

Intro2: In July, Population Health contacted all Aged Care Facilities to provide support for outbreak response planning. I am calling to complete the second part of this process, which is obtaining a progress update and also to provide further assistance. This follow-up interview will take about 20 minutes. Is now a good time for you to do this?

1	Yes	go to **Letter**
2	No – Call back	go to **CallBack**
3	No longer the most appropriate person	go to **SpkToSD**
.R	Refused	go to **R_Thank**

Intro3: Hello my name is <intvr>. I am calling from Hunter New England Population Health. In July, Population Health contacted all Aged Care Facilities to provide support for outbreak response planning. I am calling to complete the second part of this process, which is obtaining a progress update and to also to provide further assistance. This follow-up interview will take about 20 minutes. Is now a good time for you to do this?

1	Yes	go to **Letter**
2	No – Call back	go to **CallBack**
.R	Refused	go to **R_Thank**

SpkToSD: May I speak to the Service Director please?

1	Yes	go to **AskNmD**
2	No, not available - Call back	go to **CallBack**

3	No, not available at all (holidays, position vacant)	go to **AskNmn1**
.R	Refused	go to **R_Thank**

AskNmD: Hello, I'm from Hunter new England Population Health. In July we contacted all Aged Care Facilities to provide support for outbreak response planning. I am calling to complete the second part of this process, which is obtaining a progress update and also to provide further assistance. go to **AskNmDS**

AskNmDS: Due to the unavailability of <person interviewed for CATI 1> who was interviewed in July, would you please nominate another appropriate person, either yourself or someone else who coordinates Infection Control, to complete this interview. It will take about 20 minutes.

1	Yes - themselves	go to **Letter**
2	Nominates another	go to **NwPrsnNm**
3	Yes themselves but not right now - Call back	go to **CallBack**
4	No, not at moment – Call back	go to **CallBack**
.R	Refused	go to **R_Thank**

AskNmn1: Ok. The reason I'm phoning is that in July we contacted all Aged Care Facilities to provide support for outbreak response planning. I am now calling to complete the second part of this process, which is obtaining a progress update and also to provide further assistance. Due to the unavailability of <person interviewed for CATI 1>, and the Director, would you be able to nominate another appropriate person who is familiar with Infection Control to complete this interview?

1	Yes	go to **NwPrsnNm**
2	No, not at moment- Call back	go to **CallBack**
.R	Refused	go to **R_Thank**

NwPrsnNm

What is the name of the person you are nominating? go to **AvlblNw**

(INTERVIEWERS ALSO RECORD DETAILS ON LOGSHEET)

AvlblNw: May I speak to <nominated person's name> now?

1	Yes - transferred	go to **Intro4**
2	No - Call back	go to **CallBack**

Intro4: Hello, I'm from Hunter New England Population Health. In July we contacted all Aged Care Facilities to provide support for outbreak response planning. I am calling to complete the second part of this process, which is obtaining a progress update and also to provide further assistance. go to **Intro5**

Intro5: Due to the unavailability of <person interviewed for CATI 1> who was interviewed in July, would you be able to complete this interview? We understand that you are familiar with the Infection Control procedures in your facility. The interview will take approximately 20 minutes.

1	Yes	go to **Letter**
2	Yes, but not at moment - Call back	go to **CallBack**
3	No, nominates another	go to **NwPrsnN1**
.R	Refused	go to **R_Thank**

NwPrsnN1

What is the name of the person you are nominating? go to **AvlblNw1**

(INTERVIEWERS ALSO RECORD DETAILS ON LOGSHEET)

AvlblNw1: May I speak to <nominated person's name> now?

1	Yes - transferred	go to **Intro6**
2	No, Call back	go to **CallBack**

Intro6: Hello, I'm from Hunter New England Population Health. In July we contacted all Aged Care Facilities to provide support for outbreak response planning. I am calling to complete the second part of this process, which is obtaining a progress update and also to provide further assistance.

go to **Intro 7**

Intro7: Due to the unavailability of <person interviewed for CATI 1> who was interviewed in July, would you be able to complete this interview? We understand that you are familiar with the infection control procedures in your facility. The interview will take approximately 20 minutes.

1	Yes	go to **Letter**
2	Yes, but not at the moment - Call back	go to **CallBack**
.R	Refused	go to **R_Thank**

Letter: About a week ago we sent your organisation a letter notifying you that we'd be ringing to interview you for the second part of the influenza questionnaire and requesting for you to prepare some information for this interview. Did you receive this letter?

1 Yes go to **PrpFrInt**

2 No, Resend go to **Resend**

PrpFrInt: Have you had a chance to prepare for the interview?

1 Yes go to **Ansr**

2 No, Call back go to **CalBac1**

Ansr: Great, do you have the information with you now so you can answer the questions?

1 Yes go to **Confid**

2 No go to **CallBac1**

Resend: You will need to have the information prepared before the interview, so I will fax this out to you today. Its best that you do have all the required information ready before the interview, so just refer to the letter – it will tell you everything you need to prepare, and we will ring you back in a few days time.

go to **cncl7**

Confid: Just before we start let me remind you that your responses are confidential and no identifying data will be included in any reports.

go to **DsgnPstn**

CallBac1: OK, that's fine. Its best that you do have all the required information ready before the interview, so just refer to the letter – it will tell you everything you need to prepare, and we will give you a call in a few days time.

go to **CallBack**

DsgnPstn: What best describes your title? (ONE OPTION ONLY)

1 CEO/Director of Nursing

2 Assistant Director of Nursing

3 Infection Control Coordinator

4 Other nursing position

5 Service Director

6 Manager or Supervisor

7	Carer	
.R	Refused	all go to **LvlCr**

Facility Details

LvlCr: In your facility which **best** describes the level of care provided?

1	Hostel	go to **Bedlcsn**
2	Nursing Home	go to **Bedlcsn**
3	Combined Hostel and Nursing Home	go to **Bedlcsn**
4	Other	go to **LvlCrOthr**

LvlCrOth: Please describe the other care you provide. go to **Bedlcsn**

Bedlcsn: How many beds are you licensed for? go to **BedOccp**

BedOccp: How many beds are currently occupied? all **go to Ovrsght**

Ovrsght: Are you part of a larger Aged Care Facility group such as Anglican Care?

1	Yes	go to **Ovrsght1**
2	No	go to **InetAccs1**

Ovrsght1: What is the name of this oversight body?

1	Anglican Care	go to **Ovrsght2**
2	Uniting Care	go to **Ovrsght2**
3	Catholic Care of the Aged	go to **Ovrsght2**
4	Amity	go to **Ovrsght2**
5	Other	go to **Ovrs1Ot**

Ovrs1Ot: What is the name of your oversight organisation? go to **Ovrsght2**

Ovrsght2: Is that organisation taking the responsibility for preparing clinical protocols, such as outbreak preparedness protocols?

1	Yes	go to **Ovrsght3**
2	No	go to **InetAcs1**
3	Don't know	go to **Ovrsght3**

Ovrsght3: Have you received any outbreak preparedness protocols from them since the first interview?

1 Yes
2 No
3 Don't know

all go to **InetAcs1**

InetAcs1: Hunter New England Health has a Disease Outbreak webpage and would like to know if your facility is able to access material over the internet. Does your facility have internet access?

1 Yes go to **InetAcc2**
2 No go to **EpiFax**
3 Don't know go to **EpiFax**

InetAcc2: Have you accessed this website? (INFORMATION PROVIDED IN FAX AND LETTERS: http://www.hnehealth.nsw.gov.au/aged-care/disease-outbreaks/)

1 Yes go to **InetAcc3**
2 No go to **EpiFax**

InetAcc3: How useful did you find the site?

1 Very useful
2 Useful
3 Fair
4 Poor
5 Not useful

all go to **InetAcc4**

InetAcc4: Population Health encourages feedback about the website, and we would appreciate any suggestion or comments. These can be emailed to the contacts on that webpage. all go to **EpiFax**

EpiFax: In September we faxed out an Epidemic Alert Fax providing a report of local influenza activity. Did your facility receive this information?

1 Yes
2 No

3 Don't Know

all go to **InFlInfo**

InFlInfo: The Commonwealth Government sent out a document called Influ-Info in June 2005 which provided information to assist Aged Care Facilities in preparation and management of influenza outbreak. Did your facility receive the Influ-Info document?

1 Yes go to **InFlnfo1**
2 No go to **RiSystm**
3 Don't Know go to **RiSystm**

InFlnfo1: How useful did you find this information?

1 Very useful
2 Useful
3 Fair
4 Poor
5 Not useful at all
6 Didn't read it/lost it

all go to **RiSystm**

Surveillance for Respiratory Illness

RiSystm: The next questions are about identifying increasing levels of illness in your facility, particularly respiratory illness. Do you have a system for collecting and recording infection rates of respiratory illness in your facility, for example a register or line list (or template)?
[INTERVIEWERS: may be called any of these throughout- ie. register, line list or template]

1 Yes go to **RiRgstr**
2 No go to **RiSVReas**
3 Don't know go to **RiSVReas**

RiRgstr: Please refer to your respiratory illness register or line list for the next questions. Are the following items included in your record? go to **RiResDOB**

RiResDOB: Personal resident details, such as name or date of birth?

1 Yes
2 No
3 Don't know

all go to **RiResOnst**

RResOnst: Date of onset of illness?

1 Yes

2 No

3 Don't know

all go **to RiResSym**

RiResSym: Resident's symptoms?

1 Yes

2 No

3 Don't know

all go **to RiResLoc**

RiResLoc: Location of the resident within the facility?

1 Yes

2 No

3 Don't know

****If YES recorded for all, go to **RiSVRYes*****

If NO or DON'T KNOW recorded for any of above, go to **RiRgIntr** ******

RiSVRYes: Excellent result. You have all the necessary items listed in your respiratory illness record. go to **OPResPl**

RiRgIntr: Not all items mentioned were included in your record. go to **RiSVReas**

RiSVRe: What do you see as the main barriers to adopting and using a comprehensive respiratory illness register [or line list or template]? (MULTIPLE RESPONSES)

1 Didn't know a register was required

2 Unaware of the components required for a register (didn't know of Best Practice Guidelines)

3 No access to resources/information (eg Internet)

4 Don't believe it's important/low priority

5 Insufficient time to implement

6 Insufficient staff to implement

7 Management hasn't stipulated requirements for RI register/hasn't told us to

8 Don't know how/ Lack of skills
9 Don't know
10 Other go to **RiSvReaO**
If 1-9, go to **RiSvRea1**

RiSvReaO: Please specify the other barriers you have to adopting and using a comprehensive respiratory illness register. go to **RiSvRea1**

RiSvRea1: Of these which is the **one most important** reason? (ONE ONLY)
1 Didn't know a register was required
2 Unaware of all the components required (didn't know of Best Practice Guidelines)
3 No access to resources/information (eg Internet)
4 Don't believe it's important/low priority
5 Insufficient time to implement
6 Insufficient staff to implement
7 Management hasn't stipulated requirements for RI register/ hasn't told us to
8 Don't know how/ Lack of skills
9 Don't know
10 Other

all go to **OP1**

Outbreak Preparedness

OP1: The next few questions relate specifically to an Outbreak Response Plan, that is, the protocol for managing an outbreak of disease within your facility.

all go to **OPResPl**

OPResPl: Do you have an Outbreak Response Plan?
1 Yes go to **OBRspPr**
2 No go to **OBPr1**
3 Don't know go to **OBRspPr**

OBRspPr: Since the first interview, have you received any Outbreak Response Plan protocols from your oversight body?
1 Yes
2 No
3 Don't know all go to **OPCrdn**

OPCrdn: Does your plan include the appointment of a coordinator to manage the outbreak?

1 Yes
2 No
3 Don't know

all go to **OPcohrt**

OPcohrt: Does your plan include separating sick, recovering and well residents, for example using the traffic light system red, orange, green?

1 Yes
2 No
3 Don't know

all go to **OPpals**

OPpals: Does your plan include allocating staff to care for one resident category, for example, only the sick, only the recovering, only the well, during a shift?

1 Yes
2 No
3 Don't know

all go to **RstNAOB**

RstNAOB: Does your plan include restriction of new admissions during an outbreak?

1 Yes
2 No
3 Don't know

all go to **RstVOB**

RstVOB: Does your plan include restrictions of visitors during an outbreak?

1 Yes
2 No
3 Don't know

all go to **OPRHA**

OPRHA: Does your plan specify that you inform the receiving hospital and ambulance services that the Aged Care Facility is experiencing an outbreak when residents are sent to hospital?

1 Yes
2 No

3 Don't know all go **to OPAPPE**

OPAPPE: Does your plan include access to an immediate 'in house' supply of recommended and appropriate Personal Protective Equipment (PPE), for example, gloves, gowns, masks?

1 Yes
2 No
3 Don't know

all go to **OPsPPE**

OPsPPE: Does your plan include an arrangement with a supplier to provide bulk PPE at short notice eg sufficient gloves, masks and gowns if 50% of your residents were in isolation requiring 24 hour care for a 2 week period? *(Note to interviewers: by this we mean an arrangement with a supplier beforehand)*

1 Yes
2 No
3 Don't know

all go to OPTPPE

OPTPPE: Does your plan include training in the appropriate donning and removal of PPE?

1 Yes
2 No
3 Don't know

all go to OPabgsv

OPabgsv: Does your plan include the use of alcohol-based hand gel for staff and visitors?

1 Yes
2 No
3 Don't know

all go to **OPECLn**

OPECLn: Does your plan include enhanced cleaning activities during an outbreak?

1 Yes
2 No
3 Don't know

all go to **OPExss**

OPExss: Does your plan include exclusion of symptomatic staff?

1 Yes

2 No

3 Don't know

all go to **OPDsAV**

OPDsAV: Does your plan include an arrangement with a pharmacy supplier to provide immediate access to antiviral drugs/therapy in the event of an influenza outbreak?

1 Yes

2 No

3 Don't know

all go to **OPAVDoS**

OPAVDoS: Would this be sufficient to supply enough doses to cover your residents if 50% were symptomatic and needing therapy?

1 Yes

2 No

3 Don't know

all go to **OPRxAv**

OPRxAv: Does your plan include an arrangement with a GP or GPs for rapid prescribing of antiviral treatment for residents?

1 Yes

2 No

3 Don't know

all go to **OPTrnSt**

OPTrnSt: Has your facility provided in-service training for staff regarding implementing your disease outbreak plan?

1 Yes

2 No

3 Don't know

If NO or DON'T KNOW recorded for any of above, go to **OBPIntro** ******

****If YES recorded for all, go to **OBPrYes**

OBPrYes: That's a great result. You have all the necessary items listed in your Outbreak Response Plan.

go to **IPTABL**

OBPIntro: Not all items mentioned were included in your plan. go to **OBPr1**

OBPr1: What do you see as the main barriers for your organisation adopting and using a comprehensive outbreak response plan? (MULTIPLE responses)

1	Didn't know we had to have an ORP	go to OBPrep1
2	Unaware of all the components required (didn't know of Best Practice Guidelines)	go to OBPrep1
3	No access to resources/information (eg Internet)	go to OBPrep1
4	Don't believe it's important/low priority	go to OBPrep1
5	Insufficient time to implement	go to OBPrep1
6	Insufficient staff to implement	go to OBPrep1
7	Management hasn't stipulated requirements for ORP register/hasn't told us to	go to OBPrep1
8	Don't know how/ Lack of skills	go to OBPrep1
9	Don't know	go to OBPrep1
10	Other	go to OBPreOt

OBPreOt: Please specify other. go to **OBPrep1**

OBPrep1: Of these which is the **one most important** reason?

1	Didn't know we had to have an ORP
2	Unaware of all the components required (didn't know of Best Practice Guidelines)
3	No access to resources/information (eg Internet)
4	Don't believe its important/low priority
5	Insufficient time to implement
6	Insufficient staff to implement
7	Management hasn't stipulated requirements for ORP register/hasn't told us to
8	Don't know how/ Lack of skills
9	Don't know
10	Other

all go to **IPTABL**

Immunisation Practices

IPTABL: The next few questions relate to **current** resident immunisation status. This includes respite care residents. To answer this question you will need to refer to the completed influenza immunisation questions that were requested in the information letter. Do you have this information ready?

1 Yes go to **ImRgstn**

2 No go to **FaxTbls**

FaxTbls: If you have not prepared this we will continue the interview, but we request that you complete the information and fax it back to us on 4924 6215.

go to **ImRgstr**

ImRgstr: Do you maintain an up to date register recording influenza vaccination details for all residents?

1 Yes

2 No

3 Don't know

go to **IPT2**

IPT2: How many of your **current** residents are known to be immunised against influenza?

go to **RsOcNtIM**

RsOcNtIM: How many of your **current** residents are **not** immunised against influenza?

go to **RsOclmNk**

RsOclmNk: How many of your **current** residents' influenza immunisation status is unknown?

go to **ImNwRes**

ImNwRes: Do you offer influenza vaccine to new unimmunised residents on admission?

1 Yes during the flu season, March to October

2 No

3 Don't know

go to **ClstrFlu**

ClstrFlu: In the past 3 months, has your facility experienced any clusters of influenza-like illness? That is, 3 residents sick within a 2 day period, showing symptoms such as fever, coughs, lethargy

1	Yes	go to **ClstrFl1**
2	No	go to **ImSRgstr**
3	Don't know	go to **ImSRgstr**

ClstrFl1: On how many occasions has this happened? go to **ImSRgstr**

1 1
2 2
3 3
4 >3

ImSRgstr: The following questions refer to **staff** influenza immunisation. Do you have a staff influenza immunisation register?

1 Yes
2 No
3 Don't know

go to **ImActPrm**

ImActPrm: Do you actively promote influenza vaccination to your staff?

1 Yes
2 No
3 Don't know

go to **ImPlcRwd**

ImPlcRwd: Do you have a policy to restrict work duties for unimmunised staff during an influenza outbreak?

1 Yes
2 No
3 Don't know

go to **ImVstprm**

ImVstprm: The following questions are about influenza immunisation for visitors to your facility. Do you actively promote influenza vaccine to frequent visitors (meaning one or more visits per week) of residents?

1 Yes

2 No

3 Don't know

go to **AccInfo**

AccInfo: We are now at the end of the main part of the interview. To help us provide the best possible service, we would appreciate your feedback on this interviewing process.

go to **Accep1**

Accep1: How would you rate the acceptability of Population Health conducting phone interviews such as this? That is; sending out a letter, conducting a telephone initial interview, sending out resources, then conducting a follow up telephone interview. Would you rate this process as:

1	Very acceptable	go to **Accep2**
2	Acceptable	go to **Accep2**
3	Unsure	go to **Accep1a**
4	Unacceptable	go to **Accep1a**
5	Very unacceptable	go to **Accep1a**

Accep1a: What are the main reason/s why you feel this is the case. [**Interviewers: choose all relevant]**

1 Interviews too time consuming

2 Putting practices in place too time consuming

3 Resources didn't arrive

4 Speaking to the wrong person to answer these questions

5 I didn't know answers to questions

6 Prefer written questionnaire/fax/post

7 Prefer to use the internet for all information

8 We already have all these practices in place

9 We have other practices in place

10 Poor timing/rang at inconvenient time

11 Covered by Region, not us

12 Commonwealth dept has already covered all of this

13 Couldn't hear interviewer

14 Questions difficult to understand

15 No designated person to take responsibility

16 Other go to **Accep1a**

Accep1b: Please explain the other reason why you feel this is the case

go to **Accep1b**

Accep1c: Of these what is the **one** most important reason?

1 Interviews too time consuming
2 Putting practices in place too time consuming
3 Resources didn't arrive
4 Speaking to the wrong person to answer these questions
5 I didn't know answers to questions
6 Prefer written questionnaire/fax/post
7 Prefer to use the internet for all information
8 We already have all these practices in place
9 We have other practices in place
10 Poor timing/rang at inconvenient time
11 Covered by Region, not us
12 Commonwealth dept has already covered all of this
13 Couldn't hear interviewer
14 Questions difficult to understand
15 No designated person to take responsibility
16 Other

Accep3: Are there any other comments you would like to make about the "phone interview" process.

1 Yes go to **Accep4**
2 No go to **Cncl7**

Accep4: What would you like to add?

go to **Cncl7**

Cncl7: Before I go could I just like to check your facility's contact details.
ADDRESS: ^ADDRESS^
FAX: ^faxno^

1 Both correct go to **CoEmail**
2 Address wrong go to **Cncl8**
3 Fax Wrong go to **Cncl8a**
4 Address and fax wrong go to **Cncl8**

Cncl8:

Correct address is_____

If Cncl7=2, go to **CoEmail**

If Cncl7=4, go to **Cncl8a**

Cncl8a: Correct fax number is_____ go to **CoEmail**

note: If from **Resend**, skip to **CallBack**

CoEmail: Can I check your email address.

Is your email <email address>

1	Email correct	go to **Final**
2	Email wrong	go to **CoEmail1**

CoEmail1: Correct email is_____

go to **Final**

Final: We've now reached the end of the interview. We will send all Residential Aged Care Facilities a summary of our findings. Please feel free to contact Population Health if you need any further assistance. Also the NSW Hunter New England Health Internet site has additional information. Thank you for your time. Goodbye. go to **ENDCALL**

R-Thank: OK, that's fine. Thankyou for your time. Goodbye go to **REFUS**

REFUS:

DO NOT ASK: What is the respondent's reason for not participating in the survey?

1	No reason given
2	No time/too busy
3	Not interested
4	Person unwell
5	No-one appropriate to do interview
6	Other (please specify)

go to **REF_OTH**

REF_OTH:

[INTERVIEWERS: Please specify other] go to **END**

CallBack:

When would be a good time to call back? (INTERVIEWERS ALSO RECORD DETAILS ON LOGSHEET)

What is the best day?_____

What is the best time?_____

OK, I'll call back on <DATE> at <TIME>. Thankyou, Goodbye

go to **C_Thank**

C_Thank:

Thankyou, Goodbye.

go toSTAT_

STAT_DR, STAT_OS, STAT_CB, STAT_CQ go to **END**

CATI III QUESTIONNAIRE FOR AGED CARE FACILITIES

1. Introduction, "hello my name is…etc"

2. Review scorecard

SCORE = …

a) Q1. Since these data were collected in November, has there been any change (i.e. NO changed to YES, record change in spare column)? Y/N

b) Q2. IF YES TO Q1: Is there a single principal reason why your facility has made changes to your outbreak capacity since November?

Option 1. Instructions from higher up e.g. overarching body, owner
Option 2. Recognised as a need by the ACF itself
Option 3. Stimulated by HNEPH actions
Option 4. Other (specify)……

* * *

c) Resp illness register: If 2 or more 'NOs', review importance

d) OB response plan: If 4 or more 'NOs', review

e) Immunisation: If 'NO' review importance/impediments

Recommend from website:
i) Checklist for developing your plan
ii) Guidelines for the prevention and control of influenza outbreaks in residential care facilities in Australia

RECOMMEND ALL ACFs SAVE HNEPH WEBSITE IN FAVOURITES AND ENSURE ALL STAFF HAVE ACCESS TO THIS SITE

For facilities that have scored $\geq$ 16 ; praise them and suggest they review

their plans during a mock exercise using an observer to monitor progress. Conduct a debrief then put into place any recommendations.

3. Staff and visitor immunisation is recognised as a key control measure to prevent the introduction of influenza into the ACF.

   a) Q3. This year, has your facility introduced mechanisms to encourage staff vaccination coverage Y/N

   b) Q4. This year, has your facility introduced mechanisms to encourage visitor vaccination coverage Y/N

4. What is the next step?

   a) Q5. In light of the report, scorecard and interview today, what are going to be the next steps in maintaining your outbreak response capacity (tick as many as required)?

   Option 1. Review use and operation of the disease register

   Option 2. Review OB response plan

   Option 3. Review methods to improve resident immunisation coverage

   Option 4. Review methods to improve staff immunisation coverage

   Option 5. Conduct mock exercise

   Option 6. Other…

5. Evaluation:

   Q6. How would you rate the process of sending out a report and scorecard

   Option 1. Very acceptable

   Option 2. Acceptable

   Option 3. Unsure

   Option 4. Unacceptable

Option 5. Very unacceptable

Comments……

Q7. How would you rate the process of conducting this telephone review?

Option 1. Very acceptable
Option 2. Acceptable
Option 3. Unsure
Option 4. Unacceptable
Option 5. Very unacceptable

Comments……..

6. Is there any other comment you would like to make?.....

Thank you for your time.

Hunter Storm Study

HUNTER NEW ENGLAND
NSW HEALTH

Dear fellow Hunter resident,

As part of the recovery effort following the recent storms, the Hunter New England Area Health Service is seeking information from residents of your area. Your address has been chosen at random to represent the local community. We hope that you can spare 10 minutes to provide information that we will use in planning for future disaster events.

Thank you for your assistance.

We are interested in your experiences over the Queen's birthday long weekend when severe storms hit the Hunter area of NSW. This is principally from the morning of Friday 8th June to midnight Saturday 9th June 2007 (referred to as the "storm period" in the survey):

1 Were you in the Newcastle or Lake Macquarie region on any of these two days? ☐ Yes ☐ No

2 How many people slept at this address on Friday night, 8 June 2007 _____ people
(the first night of the storm)?

3 Please provide an indication of the nature of storm damage to your home?
(tick all that apply)

☐ None
☐ Floodwater entered house
☐ The house had to be temporarily or permanently vacated

4 Were any cars belonging to household members damaged during the storm period? ☐ Yes ☐ No
(If yes, please provide details)_____

5 Was anyone in your household injured during the storm period? ☐ Yes ☐ No
(If yes, please provide details)_____

6 As a result of the storm were any of the following services interrupted *(tick all that apply and estimate the number of hours from the morning of Friday 8th June to midnight on Saturday 9th June….maximum 48 hours)*:

Electricity	☐ Yes	No. Hours: _____	☐ No	☐ Don't Know	☐ Not Applicable
Water	☐ Yes	No. Hours: _____	☐ No	☐ Don't Know	☐ Not Applicable
Gas	☐ Yes	No. Hours: _____	☐ No	☐ Don't Know	☐ Not Applicable
A landline telephone	☐ Yes	No. Hours: _____	☐ No	☐ Don't Know	☐ Not Applicable
A mobile telephone	☐ Yes	No. Hours: _____	☐ No	☐ Don't Know	☐ Not Applicable

7 Did anyone in your household try to access cash during the storm period *(Friday and Saturday)*?

☐ Yes ☐ No

☐ ATM
☐ Bank
☐ Eftpos
☐ Credit Union
☐ Other

_____

8 If you answered Yes to question 7, were any problems experienced accessing cash? ☐ Yes ☐ No

(If yes, please provide details)

_____

9 Please indicate the nature of assistance your household received from friends, family or neighbours because of the storm *(tick all that apply)*?

☐ None
☐ Provided a meal
☐ Provided more than one meal
☐ Allowed use of washing machine
☐ Allowed householder to stay overnight
☐ Allowed refrigerated goods to be stored
☐ Provided assistance moving household goods
☐ Loaned utensils, equipment or supplies
☐ Other (please provide brief description)

_____

10 Did anyone in your household request assistance from the State Emergency Service (SES)? ☐ Yes ☐ No

(If yes, please provide details)_____

11 Which of the following equipment did you have in your household **before** the storm (before Friday 8th June 2007). Please also indicate which equipment was used during the storm period? *(tick all that apply)*

Already had at home before storm		***Used during storm***	
☐	Mobile Phone.	☐ Yes	☐ No
☐	Battery operated AM or AM/FM radio	☐ Yes	☐ No
☐	Battery operated (FM only) radio	☐ Yes	☐ No
☐	Car radio	☐ Yes	☐ No
☐	Torch	☐ Yes	☐ No
☐	Appropriate spare batteries	☐ Yes	☐ No
☐	Candle.	☐ Yes	☐ No
☐	Matches.	☐ Yes	☐ No
☐	First aid kit.	☐ Yes	☐ No
☐	Thermometer.	☐ Yes	☐ No
☐	List of emergency contacts.	☐ Yes	☐ No
☐	Sufficient non-perishable foods to last 3 days (eg dry goods, cans)	☐ Yes	☐ No
☐	Sufficient stored drinking water to last 3 days.	☐ Yes	☐ No
☐	A gas barbecue or portable gas stove	☐ Yes	☐ No

12 Was anyone in your household aware of a storm warning on Thursday 7th June (the day before the storm)?

☐ Yes ☐ No ☐ Don't Know (***If 'no/don't know', skip to Question 13)***

If yes, was the source of the warning on TV?
☐ Yes ☐ No ☐ Don't Know

If so, which channel? _____

If yes, was the source of the warning on radio?
☐ Yes ☐ No ☐ Don't Know

If so, which radio station? _____

If yes, and a source other than TV or radio, what was the source?

_____

If yes, did your household take action to prepare for the storm?

☐ Yes ☐ No

If yes, action taken

_____

13 During the storm period (Friday and Saturday inclusive), did anyone in your household try to access any information about the storm or emergency services, such as information on weather warnings, road closures or emergency service messages?

☐ Yes ☐ No (***If no, skip to Question 18)***

14 If YES to question 13, what information sources were accessed during this time *(tick all that apply)*?

☐ TV Which channels? _____
☐ Radio Which stations? _____
☐ Newspapers Which papers? _____
☐ Internet sites Which sites? _____
☐ Family
☐ Friends
☐ Neighbours
☐ Other Sources

_____

15 Please describe the information you were attempting to find.

1. _____
2. _____
3. _____

16 Was there any specific information that you were unable to obtain?

1. _____
2. _____
3. _____

17 Please identify the source of information that your household found most useful (eg TV **channel**, radio **station**, newspaper, website, friend, relative, etc)

_____

18	Did your household listen to Newcastle ABC Local Radio 1233 at any time during the storm period (Friday 8th and Saturday 9th June)?	☐ Yes ☐ Don't Know	☐ No
19	Were you aware that ABC local radio has a dedicated role in providing special coverage and information in emergencies and disasters?	☐ Yes	☐ No
20	Were you aware of the Health hotline number (1800 063 635) that was established after the storm to provide health advice?	☐ Yes	☐ No

Finally, we would like to ask some questions about yourself

21	Are you:	☐ Male	☐ Female
22	What is your age? _____ years		

Please place the completed survey in the plastic sleeve provided and place it under your front doormat or nearby location for the survey team to collect on Monday 24th June 2007.Alternatively, place the completed survey in the stamped, return-addressed envelope and post.

Thank you for your time and cooperation.

For more information please see the brochure provided. We will post a report of the study on our website *(http://www1.hnehealth.nsw.gov.au/hneph/)* in August.

☐ **Face-to-face interview** ☐ **Self-administered interview**

HUNTER NEW ENGLAND
NSW HEALTH

PANDEMIC INFLUENZA COMMUNITY PERCEPTIONS STUDY

Hello, my name is < > I'm calling from the Department of Health.
Could I please talk to the person in your household who is over 18 and most recently celebrated a birthday?

Recently we posted a letter to your household regarding a health study that we are conducting.
Have you seen the letter?
Yes/No/Unsure/Refused
Provide answer options:

Refused: thankyou for your time
Yes: Good…
No/Unsure

(When that person becomes available.)

Hello my name is < > I'm calling from the Department of Health. Who am I talking to?

Initial contact information

1. (If they supply a name voluntarily otherwise ignore)
Name < >

2. Gender
Male, female

3. Post code (included from the database)
Postcode < >

This will only take about 15 minutes of your time and will help the Department of Health with disaster planning. The questions relate to the way you may respond during a natural disaster such as an earthquake, cyclone, flood, bushfire or disease outbreaks. Your participation is entirely voluntary and you may stop at any time. However we would appreciate your assistance. Do you have time now to complete this interview?

Intro, demographics and knowledge questions

4. Have you ever been personally caught up in a natural disaster like an earthquake, flood, disease outbreak or bushfire?
Yes/No/Don't know/refused

5. If yes….what type of natural disaster was it?
(Mult) Earthquake, bushfire, flood, disease outbreak, other describe

6. If no…is your area prone to natural disasters like earthquakes, floods or bushfires? Yes/No/Don't know/refused

7. If yes….what type of natural disaster? ……

Note: questions 8-13 are designed to differentiate interviewees into 'informed' and 'non-informed'. Informed = yes to Q8 plus a correct answer to at least 4 of 5 of this set of questions.

8. Are you familiar with the term "Pandemic Influenza" or "Pandemic Flu"?
Know what the term means, have heard of it but not sure what it means, have never heard of the term, don't know, refused.

If they say no to Q8 skip to Q15 and inform this group that:

"Pandemic flu is an illness that is spread between people"

9. Which of the following two statements best describes your understanding of the term pandemic flu?
a) it's a disease that mainly affects chickens
b) it's a disease that mainly affects humans

10. Which of these statements most accurately describes pandemic flu?
a) it is usually a mild illness which rarely causes death
b) it can be a serious illness and we must expect some deaths

11. Which of these statements best describes pandemic flu?
a) it's a disease that could spread through a whole country
b) it's a disease that could spread through all countries

12. Which of these statements is most accurate?
a) all ages could be affected
b) the young **and** the elderly are most likely to be affected

13. Which of these statements is most accurate?
a) it's a disease that's easily spread between people by coughing and shaking hands
b) it's a disease that's not easily spread between people by coughing and shaking hands

14. Have you heard of any cases of pandemic flu occurring in the past 5 years?
Yes/No/Don't know/refused

15. How likely do you think it is that there will be cases of pandemic flu among humans in Australia during the next 12 MONTHS?
Do you think it is very likely, somewhat likely, not too likely, or not at all likely, (don't know, refused)?

Containment compliance questions #1

Knowledge, Attitudes and Willingness to Accept Containment Measures 1

Now I'm going to read you a list of steps that public health authorities might advise if a pandemic occurs. These actions would be to prevent the spread of severe flu and help protect you and your family from catching it. As I read each one, please tell me if you would follow such a recommendation, or not.

16. If public health authorities thought you might have been in contact with someone who had pandemic flu … so you stood a chance of catching the disease yourself, …and they asked you to stay at home for 7 to 10 days so that you would not expose other people to the disease, would you?
Yes/ No/ Don't know/ Refused

17. What if they said that for ONE MONTH you needed to avoid public events like movies, sporting matches or meetings? Would you do that, or not?
Yes/No/Don't know/refused

18. What if they said that for ONE MONTH you needed to postpone social gatherings such as parties and weddings. Would you do that, or not?
Yes/No/Don't know/refused

19. Have you used public transport in the past year?
Yes/No/Don't know/refused

20. If public transport is used. What if they said that for ONE MONTH you should limit your use of public transportation, buses and trains? Would you do that, or not?
Yes/no/not applicable/don't know/refused

21. Influenza is best controlled by vaccination. Have you received a flu shot (vaccination) in the past 12 months?
Yes/No/Don't know/refused

22. If pandemic flu occurred in Australia and a vaccine became available…would you accept it?
Yes/No/Don't know/refused

Demographics and household description

I'd now like to ask you a few questions about yourself and your household. This is to make sure we have spoken to a good cross-section of Australians in our study.

23. In which year were you born?
Year < >

24. Is any language other than English spoken at home?
No, English only/Yes, Italian/Yes, Greek/Yes, Cantonese/Yes, Mandarin/Yes, Arabic/Yes, Vietnamese/Yes, other-please specify……

25. How many people in total, including yourself, usually live in your house (adults and children)
Number < >

26. Including yourself, how many of them are adults, 18 or older?
1/2/3/4/5+

27. (If children) How old are the children?
Ages < > < > < > < >< >< >

28. (If pre-school children) During the day, who **principally** takes care of the pre-school (child/children under 5) in your household
Child's parent, child's grandparent, older sibling, they look after themselves, child care centre, day care, private arrangement, mixture of these, other.

29. What is your highest educational level
never attended school, completed primary, completed year 10, completed to year 12 TAFE certificate or diploma, Uni degree
Completed Primary School; Completed years 7-9; Completed School Certificate/ Intermediate/ year 10/4th Form; Completed HSC/Leaving/year 12/ 6th Form; TAFE Certificate or Diploma; University, CAE or some other tertiary institute degree or higher; Other [specify]_____ ; Don't know; Refused

30. Which of the following best describes where you live?
A city, large town, small town, rural area

31. When you get sick and need medical care which health provider do you normally attend (one only list choices) GP, medical centre, hospital, community health centre, don't attend, refused.

Work status

32. Currently, are you in paid employment full-time, part-time, or not at all?
Employed full time/ employed part time/not at all/refused

33. (if employed) Are you self employed, or do you work for someone else?
self employed/ work for someone else/don't know/ refused

34. (if employed) Do you ever work from home?
Yes/ No/ Don't know/ Refused

35. (If other adults) How many (other) adults in your household are employed full-time?
Number < >

36. (If other adults) How many (other) adults in your household are employed part-time?
Number < >

Pandemic information and re-asking of containment questions

We are particularly interested in how people will respond to measures that the government is recommending will be used to manage a flu pandemic in the community. I apologise if you already know this but we want to ensure that everyone has the same understanding of pandemic flu. So, by pandemic flu I mean:

Knowledge, Attitudes and Willingness to Accept Containment Measures 1

When an entirely new type of influenza virus develops that easily spreads from person to person. No one would have natural immunity to it, so every age group could be affected. Potentially a quarter to a third of the entire population could get sick. In the 1918 Spanish flu pandemic at least 40 million people died and a third of the world's population was affected. In this circumstance, the usual flu vaccine would not have prevented illness.

For those who answered Q9 – 13. I will repeat some earlier questions so that you can adjust your previous answer if you choose to (start asking Q37).

For those who answered No to Q8. These are some steps that public health authorities might advise in the case of a pandemic occurring. This is to prevent the spread of severe flu and help protect you and your family from catching it. As I read each one, please tell me if you would follow such a recommendation, or not.

37. If public health authorities thought you might have been in contact with someone who had pandemic flu … so you stood a chance of catching the disease yourself, …and they asked you to stay at home for 7 to 10 days so that you would not expose other people to the disease, would you?
Yes/ No/ Don't know/ Refused

38. If No. Why not when specifically asked to stay at home?
Text (categorise responses)……

39. What if they said that for ONE MONTH you needed to avoid public events like movies, sporting events or meetings? Would you do that, or not?
Yes/No/Don't know/refused

40. If No. Why would you attend these events when specifically asked not to?
Text (categorise responses)……..

41. What if they said that for ONE MONTH you needed to postpone social gatherings such as parties and weddings. Would you do that, or not?
Yes/No/Don't know/refused

42. If No. Why would you attend these events when specifically asked not to?
Text (categorise responses)……..

43. For those in employment. If there were a severe outbreak of Pandemic flu in your community and you had to stay away from work, would you still get paid?
Yes/No/Don't know/refused

44. If answered no to Q43. How long would it be before you experienced financial difficulties?
Days < > or Weeks < > (max >26 weeks)

45. Do you have a thermometer to measure fever at home?
Yes/No/Don't know/refused

Knowledge, Attitudes and Willingness to Accept Containment Measures 1

46. If you had been exposed to someone with pandemic flu but still felt well and the authorities offered you some medication to help prevent you getting sick would you take the medication?
Yes/No/Don't know/refused

47. If Yes to Q 46. Would you still take the medication if you were told the it could help but wasn't guaranteed to be effective and there could be some minor side effects like minor stomach discomfort?
Yes/No/Don't know/refused

48. Have you travelled by plane in the past 12 months?

49. If Yes to Q48. What if they said that for ONE MONTH you should avoid air travel? Would you do that, or not?
Yes/no/not applicable/don't know/refused

50. Suppose there was a serious outbreak of pandemic flu in the area where you live and health officials recommended that you and members of your household stay in the area. How likely is it that you would stay?
very likely, somewhat likely, not too likely, or not at all likely?

Home quarantine

51. If you were sick with pandemic flu and you had to remain at home for 7 to 10 days, is there someone who could care for you at home?
Yes/No/Don't know/refused

52. At the moment, about how many days of food storage do you have in your house before you would need to restock?
Days < >

53. Is there anyone living at home who requires daily medication?
Yes/No/Don't know/refused

54. During a pandemic, would you wear a surgical-type mask when mixing with people in public places if you were instructed to do so?
Yes/No/Don't know/refused

55. (If pre-school or school age children) If public health officials closed schools and child care for A MONTH and your family was asked to keep the children at home, do you think you would do that, or not?
Yes/ No/ Depends/Don't know/ Refused

56. Who would mainly take care of the children who live in your household if schools and childcare were closed?
Parent, grandparent, older sibling, they look after themselves, private arrangement, mixture of these options, other < > , don't know.

57. If employed. If public health officials said you should stay home from work, would you be able to work from home?
Yes/No /don't know/refused

58. If employed. Has your employer indicated that they have plans for a pandemic or other emergency situation?
Yes/No/Don't know/refused

59. When a pandemic vaccine becomes available who should get access to it **first**?
The elderly or children or people who provide essential services to the public (police, health workers), just accept the decision of the health authorities, don't know, refused

60. If during a pandemic, public health authorities asked people who got sick with flu not to go to their GP for medical assistance but to attend a special assessment clinic at their nearest hospital would you do that?
Yes, No, Depends < >, don't know, refuse…

There are just a few questions remaining…

Communications

61. Do you have access to the internet at home?
Yes/No/Don't know/refused

62. Which is your preferred method for receiving detailed information on important health issues (respondent to nominate one)?
Newspapers, radio, TV, magazines, internet, mail to home, other-specify, none, refused

63. Which one of these people do you trust most to provide reliable health information?
The Prime Minister, the Premier of your state (or Chief Minister in the territories), the Chief Medical Officer, the local Public Health spokesperson.

Final questions

64. If we need to contact you to clarify any of the issues discussed today, do you mind if we give you a quick call back?
Yes/No

65. Would it be OK if we contacted you in the future for other health studies?
Yes/No

66. If no, thank you etc (as per below).
If yes. Could you tell me your name please?
< >

67. Do you have a convenient telephone number that you can be contacted on eg work or mobile?
< >

* * *

Thank you for your help, I really appreciate your time.
Should you require further information on pandemic influenza you can visit our website at…… http://www1.hnehealth.nsw.gov.au/hneph/ website. A project report will be posted here in September 2007.

HUNTER NEW ENGLAND
NSW HEALTH

PANDEMIC INFLUENZA COMMUNITY PERCEPTIONS STUDY #2

Hello, my name is < > I'm calling from the Population Health Unit at Hunter New England Health in NSW.
In 2007 we spoke to <name> about pandemic flu. Is <he/she> available please, I would like to ask <him/her> some additional questions in light of the current swine flu pandemic.

OPTIONS

1 speaking to that person
2 person called to phone
3 person not at home (record on log sheet) CB
4 person unwell at the moment (record on log sheet) CB
5 person has died (record on log sheet) OS
6 someone in household recently died (record on log sheet) DO
7 person physically or mentally incapable (record on log sheet) OS
8 non English speaking and no help available (record on log sheet) OS
9 person has moved – and has forwarding contact details
10 person has moved, no forwarding contact details (record on log sheet)
11 other (record on log sheet) OS or DO
R Refused DR

Recently we posted a letter to your household.

Summary of the letter

If you recall, in 2007 you were interviewed as part of the first National Disaster Study. Now we find ourselves faced with new health emergency challenges and a growing need for more information on Australian behaviours and concerns. In the last study you kindly agreed to allow us to re-contact you to assist us with further research.

This new study will be shorter and will provide information to assist national policy and disaster management

Knowledge, Attitudes and Willingness to Accept Containment Measures 2

All information collected will be treated in strict confidence. No personal information will be provided to anyone else. Your participation is entirely voluntary and you may chose to withdraw from the research, and have your information removed at any stage, without giving a reason for your decision. However these issues are important to Australians and we would really appreciate your assistance.

a) If the person can be interviewed:

Have you seen the letter?
Yes/No
Provide answer options:

Refused: thankyou for your time
Yes: Good…
No/Unsure

If YES, see introduction below.

If NO, collect data on reason for declining (se coded options).

b) If the person still lives at the address but is not currently present arrange to call back and obtain a time when they are likely to be home.

c) If they have moved but there is a forwarding number (or they are prepared to contact the person and call the interviewer), arrange to call them at the new location and collect contact details from the person you are speaking to at the house, 'should we not be able to reach <…….> it would be really helpful if we could call you back on this number. Attempt to interview the person on the phone (review numbers and cost each week). Provide summary of letter.

Record name <…….>, landline < >, mobile < >

Knowledge, Attitudes and Willingness to Accept Containment Measures 2

d) If it is not going to be possible to contact the original interviewee ask if another person in the household who is over 18 (and preferably next to have a birthday) would be prepared to be interviewed. The interviewer will need to identify this person as a 'new interviewee' on the CATI questionnaire.

Record name <…….>, landline < >, mobile < >

Hello (interviewee's name from b) or c) above) < > my name is < > I'm calling from the Population Health Unit at Hunter New England Health in NSW.

Initial contact information

1. (If they supply a name voluntarily otherwise ignore) record the name/gender here of the person previously interviewed, check against our records, or add it if we don't have it on record
Name < >
Gender < >

This will take about 15 minutes of your time. It's a shorter study than the previous one and will help the Commonwealth and <State> Health Departments respond to health emergencies. The questions follow on from the issues we discussed with you in the first study. Your participation is entirely voluntary and you may choose to withdraw from the study, and have your information removed at any stage, without giving a reason for your decision. However we would really appreciate your assistance. Do you have time now to complete this interview? When answering these questions your immediate response will be the most accurate. In some cases we'll ask you to provide an answer on behalf of your family.

Knowledge, anxiety and impact questions

2. Have you heard of the term "Swine Flu" or "Swine influenza"?
Yes, No, don't know, refused.

Knowledge, Attitudes and Willingness to Accept Containment Measures 2

If 2= No, don't know, or refused, check that this is their final response and then end the interview: "Thankyou for your time, that's all the information that we need for today. Should you wish to find out about swine flu please go to the Department of Health and Ageing website. Goodbye."

3. We'd like to start with some general questions about swine flu. Please answer True or False to the following statements.

a) swine flu spreads very easily in the community T/F/DK

b) swine flu has affected many countries in the world T/F/DK

c) cough and rash are typical of swine flu T/F/DK

d) swine flu never seriously affects people who have good health T/F/DK

e) handwashing and using a tissue to cover your mouth when coughing are practical ways of reducing the spread of flu T/F/DK

4. Which one of the following three choices most accurately describes the current swine flu situation in the world?

a) There have been about ten thousand swine flu cases mainly affecting people in Mexico, the United States and the United Kingdom.

b) There have been over a hundred thousand cases of swine flu reported from countries all around the world.

c) There have been about ten thousand swine flu cases mainly reported from here in Australia.

d) don't know.

e) refused

5. We are interested in your personal experience of flu since May of this year. Flu, including swine flu, usually produces fever (a temperature), cough and tiredness:

a) do you think you have had flu since May? Y/N/DK/R

b) do you think a family member has had flu since May? Y/N/DK/R

c) do you think a friend has had flu since May? Y/N/DK/R

d) do you think a close work colleague or study mate has had flu since May? Y/N/NA/DK/R

6. (If 5a) = Y). You said you thought you may have had flu:

a) For how many days were you sick (time when you experienced cough, fever, tiredness)? Days <number>, DK, R

b) (If 5a) = Y) Was your flu diagnosed by a doctor or laboratory? Yes doctor/Yes lab/N/DK/R

c) (If 6a = >0 days or DK) did you leave home at any time in the five days from when you first became ill maybe for work, shopping, studies or other reasons? Y/N/DK/R

7. From what you have heard or experienced, which best describes your impression of swine flu as a disease?

Always mild, mostly mild but occasionally severe, mostly severe, always severe, don't know, refused

8. At the present time, how concerned are you that you or an immediate family member could get swine flu and become ill?

Not concerned at all, a little concerned, quite concerned, extremely concerned, don't know.

9. (If 8= quite concerned or very concerned) What is your main concern (Free response but try and categorise, one answer only)? a) Respondent is pregnant, b) Respondent has underlying illness, c) Respondent is Indigenous, d) near family member or friend in one of these groups, e) you or the family breadwinner/s can't afford time off work, f) fear of you or someone close getting sick but no specific risk factors, g) fear of serious health risk including death, h) other.

10. Since May this year when swine flu first arrived in Australia, health authorities introduced various control measures to reduce the spread of disease including school closures, placing people in home quarantine and cancelling sporting events like swimming carnivals. How would you describe the impact of these measures on your family's lifestyle?

No impact at all, minor impact on lifestyle, moderate impact on lifestyle, major impact on lifestyle, don't know.

Behaviour questions

11. I'm going to run through a short list of questions in which you just have to answer whether you or anyone in your household have done any of these things, since May to specifically avoid getting infected with swine flu:

a. have you or anyone in your household increased the frequency of hand washing or use of hand gel?
b. purchased a face mask
c. worn a face mask at home or in public places to protect against swine flu (a health care worker wearing a mask at work doesn't count)
d. spent more time than usual cleaning your house to remove germs
e. for people who eat pork products (N/A if NO) have you reduced consumption of pork products such as bacon, ham, sausages because of swine flu (Include N/A option)
f. for people who have used public transport, including bus, train, tram, ferry and plane, at least three times so far this year (N/A if NO), have you at any time avoided public transport because of concern about getting swine flu (Include N/A option)
g. purchased (not just been prescribed) an antiviral drug like Tamiflu or Relenza
h. asked someone outside of your family who has been coughing or sneezing near you to cover their nose or mouth
i. stocked up with more food or drink than usual to prepare for an emergency
j. from the following list, have you sought information on swine flu from any of the following (ask one at a time, MULT):
   a) the Department of Health hotline number
   b) your GP
   c) another health care worker (eg pharmacist, nurse)
   d) a government website
   e) a public health department

12. During a pandemic do you think health authorities should post hygiene messages at bus terminals, train stations and airports, such as avoiding travel when sick and covering your nose and mouth when sneezing?
Y/N/DK/R

13. (If 12=No) Why do you disagree with this suggestion (Free response but try and categorise)?
a) Infringement of civil liberties
b) not important
c) good to spread the disease
d) too inconvenient to avoid public travel

d) other

Compliance questions

Now I'm going to read you a number of actions that public health authorities might advise for future flu pandemics. These actions are to prevent the spread of pandemic and help protect you and your family from catching it. They would be general instructions and not only for people either infected with swine flu or their family. As I read each one, please tell me if you would follow such a recommendation.

14. What if they said that for ONE MONTH you needed to avoid public events like sporting matches, swimming meetings, horseracing events, and other occasions where crowds gather ? Would you do that, or not?
Yes/No/Don't know/refused

15. What if they said that for ONE MONTH you needed to postpone social gatherings such as parties and weddings. Would you do that, or not?
Yes/No/Don't know/refused

16. What if they said that you should wear a surgical-type mask when mixing with people in public places. Would you do that, or not?
Yes/No/Don't know/refused

17. What if they thought you might have been in contact with someone who had pandemic flu… so you stood a chance of catching the disease yourself, …and they asked you to stay at home for a week so that you would not expose other people to the disease, would you do that, or not?
Yes/ No/ Don't know/ Refused

18. What if there was a serious outbreak of pandemic flu in the area where you live and health officials recommended that you and members of your household stay in the local area. Would you do that, or not?
Yes/ No/ Don't know/ Refused

Knowledge, Attitudes and Willingness to Accept Containment Measures 2

Vaccination questions

19. Do you consider yourself in a risk group for getting more severe swine flu than other people? (Don't provide examples)
Yes/No/Don't know/refused

20. (If 19=YES) Can you describe your risk
Free response but try and categorise: a) elderly, b) underlying disease, (eg kidney disease, heart complaint, asthma…), c) Indigenous, d) obese, e) pregnancy, f) other (this is a MULT)

21. Have you received the usual seasonal flu shot/ flu jab this year (since January 2009)?
Yes/No/Don't know/refused

22. (If 21=YES) Did you have this because of the threat of swine flu?
Yes/one of the reasons/No/Don't know/refused

23. The swine flu vaccine will shortly be available in Australia. Do you expect that it will be offered to you?
Yes/No/Don't know/refused

24. (If 23=YES). Why do you expect to be offered the vaccine?
a) I expect all Australians to be offered the vaccine, b) I am in a high risk group, c) I deserve it as I pay my taxes, d) other (record).

25. The swine flu vaccine is likely to be free of charge from a GP. Will you accept the vaccination if it is offered to you?
Yes/No/I do not have a GP so won't bother/I do not have a GP but will try and see one/Don't know/refused/

26. (If 25=YES or don't know) It Is possible that two jabs of swine flu vaccine a month apart will be required. Will you accept and ensure you attend for both doses?
Yes/No/Don't know/refused

Knowledge, Attitudes and Willingness to Accept Containment Measures 2

27. (If 25=YES or Don't know) If the vaccine was not available through GPs but rather through a vaccination centre set up in a hall in your town, would you still accept the vaccine?
Yes/No/Don't know/refused

28. (If 25=NO) Can you explain why you said you would not be vaccinated with the swine flu vaccine? (Free response but try and categorise)
a) don't believe in vaccination, b) have a medical condition that precludes vaccination c) concerned about swine flu vaccine safety, d) flu vaccine causes flu, e) other (add more after the first few days if there are other frequently recorded answers).

29. If safety information was available on a website or in newspapers are you likely to access it BEFORE getting vaccinated?
Very likely, likely, unlikely, will not access the information/DK/R

30. The health authorities will let the public know beforehand who may get the free swine flu vaccine. If you are not amongst those offered the swine flu vaccine how concerned would you be?
Unconcerned, a little concerned, quite concerned, extremely concerned, DK/R.

Communications

31.Since May this year, have you actively searched for news on swine flu in the media (that is TV, radio, newspapers, Internet)? Not at all, at least once a month, at least once a week, almost every day of the week, don't know, refused.

32. Do you think the health authorities have provided sufficient information on swine flu?
Did not see any information, too little information, just the right amount, too much information, don't know, refused

33. (If 32 doesn't = didn't see any information) Did the information make you change any of the following behaviours:
a) paid more attention to covering coughs and sneezes, Y/N/DK/R
b) increased frequency of handwashing, Y/N/DK/R
c) stayed at home when sick to reduce spreading disease, Y/N/DK/R

Knowledge, Attitudes and Willingness to Accept Containment Measures 2

34. How honest do you think health authorities have been in providing information on swine flu?
Always honest, usually honest, rarely honest, never honest, don't know, refused.

35. In the last two months, roughly how many swine flu "advertisements" did you hear or see in any media outlet including radio, TV, newspapers Internet?
I noticed them daily, about once a week, about once in the last month, I never heard any, don't know, refused.

36. (If 35 = I noticed them daily, about once a week, about once in the last month) Did the information in the advertisements make you change your behaviour in any way?
Not at all, a little, quite a lot, to a great extent, don't know, refused.

Final questions

37. Is there any particular aspect of swine flu that you would have liked us to have asked about in this study…maybe something that you think is important but which we didn't cover? Free text comment ……

38. Can I check your post code details please (we need it to make sure we have good representation around Australia)?
Postcode < >

39. In which year were you born (this is needed to ensure we have a good cross section of age groups)?
Year < >

40. If we need to contact you to clarify any of the issues discussed today, do you mind if we give you a quick call back?
Yes/No

41. Should we need to call you back, is the telephone number that we contacted you on the preferred one? (If not change the details.)

Thank you for your help, we really appreciate your time.

Knowledge, Attitudes and Willingness to Accept Containment Measures 2

Should you require further information on pandemic flu the Commonwealth have a website for the public, Google 'Department of Health and Ageing'

Should anyone request information on the first perceptions study refer them to the WHO Bulletin site and give them a search description. Google "bulletin WHO" for the Bulletin of the World Health Organisation, and search under past issues for "pandemic influenza Australians 2009".