The changing phases of pandemic (H1N1) 2009 in Queensland: an overview of public health actions and epidemiology

Ranil D Appuhamy, Frank H Beard, Hai N Phung, Christine E Selvey, Frances A Birrell and Terry H Culleton

ABSTRACT

- A graded public health response was implemented to control the pandemic (H1N1) 2009 outbreak in Queensland.
- Public health measures to contain the outbreak included border control, enhanced surveillance, management of cases and contacts with isolation or quarantine and antivirals, school closures and public education messages.
- The first confirmed case in Australia was notified on 8 May 2009, in a traveller returning to Queensland from the United States.
- In Queensland, 593 laboratory-confirmed cases were notified with a date of onset between 26 April and 22 June 2009, when the Protect phase of the Australian Health Management Plan for Pandemic Influenza was implemented; 16 hospitalisations and no deaths were reported during this time.
- The largest number of confirmed cases was reported in the 10–19-years age group (167, 28% of cases), followed by the 20–29-years age group (153, 26% of cases).
- With ongoing community transmission, the focus has shifted from public health to the clinical domain, with an emphasis on protecting vulnerable groups.
- Considerable resources have been invested to prevent and control the spread of disease in Indigenous communities in Far North Queensland.
- The capacity of clinical services to cope with increased admissions, the potential for widespread antiviral resistance, and rollout of mass vaccination campaigns remain future challenges.

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In April 2009, a novel influenza virus, currently termed pandemic (H1N1) 2009, was identified in the United States and Mexico.[1,2] The situation evolved rapidly and, on 11 June 2009, the World Health Organization declared it to be a pandemic.[3] Queensland implemented a graded response (Box 1) in line with the Australian Health Management Plan for Pandemic Influenza (AHMPPI).[4]

Here, we provide an overview of the public health actions undertaken in Queensland in the initial phases of the pandemic, and present the epidemiological findings up to the declaration of the "Protect" phase of the response[5] on 22 June 2009.

Going through the phases in Queensland

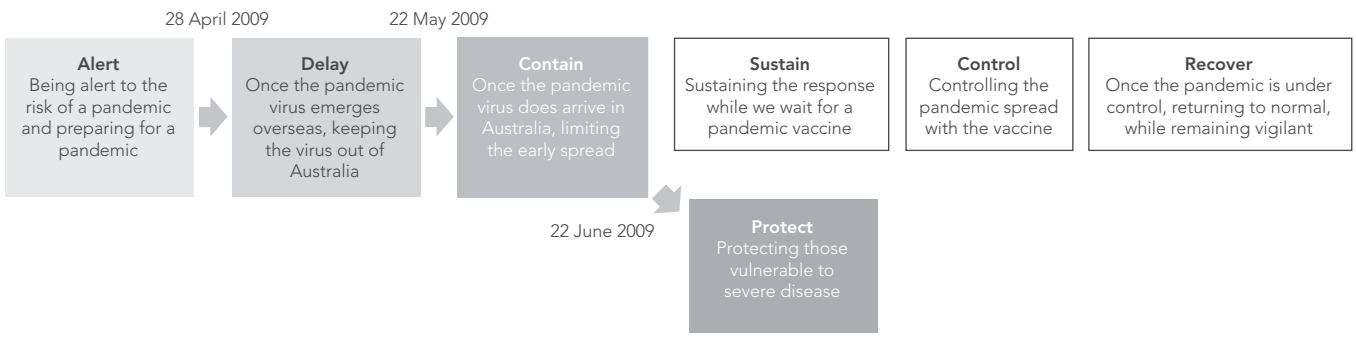
The Queensland Health pandemic influenza plan was activated on 28 April 2009. A state health emergency coordination centre was established to coordinate the large-scale response, which involved multiple agencies.

Delay phase (28 April – 21 May 2009)[7]

The focus of the Delay phase was the early identification and management of cases and contacts. Clinicians were asked to strengthen infection control and notify suspected cases to population health units for follow-up and contact tracing. A suspected case was defined as someone with an acute febrile respiratory illness who had been to a country with sustained community transmission or had close contact with a confirmed or suspected case within the past 7 days.[8] Patients with confirmed or suspected disease were treated with antiviral drugs and isolated for 7 days. Close contacts were given antiviral prophylaxis and quarantined for 7 days.[4] If a patient with suspected disease tested negative, then antiviral therapy and isolation were ceased.

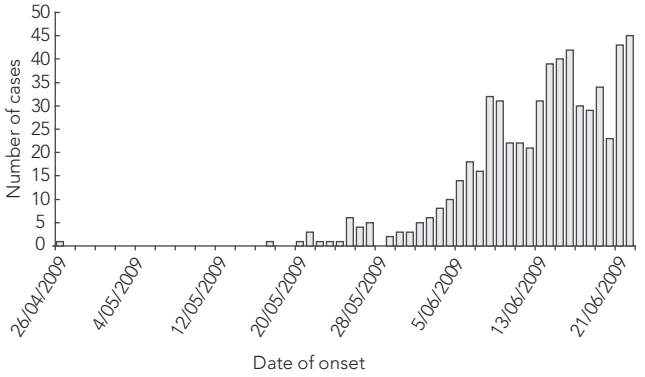
Border measures to identify potential cases included positive pratique (notification of the health status of passengers by pilots), self-declaration by passengers through health declaration cards, and thermal scanners at airports to identify those with high fevers.[9,10] At Queensland airports, 780 travellers identified by

1 Pandemic phases according to the Australian Health Management Plan for Pandemic Influenza (AHMPPI)[4,5]



Boxes represent the stages of the AHMPPI response, and arrows show the pathway followed by Queensland. Victoria commenced a "modified sustain" phase on 3 June 2009.[6] ◆

2 Notifications of laboratory-confirmed cases of pandemic (H1N1) 2009 infection in Queensland by date of onset, 26 April – 22 June 2009



3 Sex and age distribution of laboratory-confirmed cases of pandemic (H1N1) 2009 infection notified in Queensland with onset 26 April – 22 June 2009

Age (years)	Female	Male	Total (%)	Age-specific rate*
0–4	28	31	59 (9.9%)	21.6
5–9	25	24	49 (8.3%)	16.8
10–14	40	44	84 (14.2%)	28.7
15–19	38	45	83 (14.0%)	27.6
20–24	44	43	87 (14.7%)	30.6
25–29	31	35	66 (11.1%)	22.7
30–34	15	20	35 (5.9%)	11.2
35–39	15	18	33 (5.6%)	10.9
40–44	12	16	28 (4.7%)	9.3
45–49	10	12	22 (3.7%)	8.0
50–54	13	11	24 (4.0%)	9.4
55–59	5	8	13 (2.2%)	4.7
60–64	2	3	5 (0.8%)	2.3
⩾65	4	1	5 (0.8%)	1.0
Total	282	311	593 (100.0%)	14.2

* Per 100 000, calculated using the 2007 Australian Bureau of Statistics estimated residential population.[20]

4 Age distribution of laboratory-confirmed cases of pandemic (H1N1) 2009 infection notified in Queensland with onset 26 April – 22 June 2009

these measures were screened by border nurses, and 52 who met the case definition were tested and referred to population health units for follow-up. Of these, four tested positive for pandemic (H1N1) 2009 infection.

Contain phase (22 May – 21 June 2009)[11]

A key public health measure in the Contain phase was school closures. Early reports from other countries and from Victoria showed that children and young adults were disproportionately affected, and that outbreaks had spread rapidly in schools.[2,12-15] The closure of schools to reduce spread was also supported by modelling.[4] Schools and childcare centres were closed if a person with confirmed disease had attended while infectious, for a week from their last attendance. Close contacts (including students and staff in the same class) were given antiviral prophylaxis and quarantined for 7 days. These measures continued until 26 June 2009, when school holidays started. A total of 48 schools (2.8% of all schools in Queensland) and five childcare centres were closed. Parents were also requested to keep their children away from school for 7 days if they had returned from an area of sustained community transmission.

To reduce the demand on hospitals and general practices, "flu clinics" were set up, usually as a short-term response to clusters necessitating the assessment and management of large numbers of contacts. Nine flu clinics, mostly hospital-based, were set up and assessed 2551 patients.

Protect phase (22 June 2009 onwards)

In light of evidence showing that the disease was not as severe as initially thought, and to enable a response proportionate to the risk, a new phase — Protect — was introduced, and an annex was added to the AHMPPI.[5] With the disease established in the community, the focus shifted to identifying and treating those who were most vulnerable to severe disease. Considerable resources were invested to prevent the spread of disease in Indigenous communities in remote areas of Far North Queensland, given concerns about the higher prevalence of medical risk factors and poorer access to medical services in these communities.[16]

Epidemiology

Population health units entered data on suspected and confirmed cases into a web-based, outbreak case-reporting tool (NetEpi), administered by the Australian Government Department of Health and Ageing. Five hundred and ninety-three laboratory-confirmed cases were notified in Queensland with onset of illness between 26 April and 22 June 2009 (Box 2). Sixteen patients were hospitalised, but no deaths were reported.

The true incidence of infection was probably considerably higher than reported as not all of those infected would have been tested because of the often mild nature of the illness. Notification data from 22 June onwards will be less representative, as testing in the Protect phase was limited to those in vulnerable groups or with more severe disease.

The first case in Australia of pandemic (H1N1) 2009 infection was notified in Queensland on 8 May 2009, in a traveller returning

from the US who had illness onset on 26 April. The second case in Queensland was also in a returned traveller from the US, with illness onset on 17 May. The next five cases, notified on 25 May, were passengers on a cruise ship that had a large outbreak of the disease. A family member of one of these passengers and then a co-worker were subsequently diagnosed with the disease. The first school clusters occurred in North Queensland and were linked to a student who had recently returned from the US and had symptom onset on 23 May 2009.

The use of personal protective equipment among health practitioners in the pandemic was not always ideal.[17] Population health units reported several clinicians requiring prophylaxis and quarantine because of inadequate infection-control precautions. A cluster of six cases was also reported in a Queensland public hospital, linked to a health care worker.

In the initial stages of the outbreak, notified cases were confined to discrete clusters, with links to travel overseas or to Victoria. Evidence of community transmission then increased, with cases identified (especially in Brisbane) among people with no travel history or known contact with a confirmed case.

Males and females were affected similarly (52% male). The mean and median ages of notified patients were 25 and 21 years, respectively (range, 0–76 years). The median age was similar in Queensland to that reported in Victoria (21 years) and Western Australia (22 years).[18] Median ages reported by the WHO elsewhere were: 17 years in Canada, 12 years in the United Kingdom, 13 years in Chile, 24 years in the WHO European region, and 23 years in the WHO Western Pacific region.[19]

In Queensland, the highest rate of confirmed cases was in the 20–24-years age group (30.6 per 100 000). Age-specific rates are summarised in Box 3 and Box 4. Over-representation of younger age groups has been reported from other countries as well as Australia and may represent greater social mixing, increased susceptibility or biases towards testing these age groups.[1,18,19]

Conclusion

Although the AHMPPI was written on the assumption that the pandemic would be more severe, it was a useful framework to guide the public health response. A key challenge for clinicians and public health officials alike was keeping up with the stream of changing information. Priorities for public health action, case definitions and testing criteria changed regularly as the pandemic evolved, because of emerging information about the behaviour of the virus and change in phases. Other challenges were delays in obtaining test results in remote areas because of the distance from laboratories, the volume of requests for tests stretching laboratories to capacity, and the logistical difficulties of distributing antiviral drugs in remote areas of Queensland.

Border measures required the investment of significant clinical and public health resources and had only a low pick-up rate. The low sensitivity and usefulness of border measures were questioned after the 2003 outbreak of severe acute respiratory syndrome (SARS).[21,22] We recommend that border screening should be formally evaluated in the context of the influenza pandemic and in reviews of pandemic plans.

As the pandemic progressed, the response shifted from predominantly public health to a clinical domain, with focus on preparing for the expected surge in admissions and requirement for intensive care services. Ongoing concerns are the potential for resistance to oseltamivir[23,24] (the most widely used antiviral) to become more widespread, and the possibility of a second pandemic wave.[25]

The rollout of the pandemic vaccine, prioritised according to risk group, commenced nationally on 30 September 2009.[26] Although this should have triggered a switch to the Control phase (according to the AHMPPI), the Protect phase will continue, with ongoing measures to reduce morbidity and mortality in vulnerable groups.[27]

The pandemic (H1N1) 2009 virus has not caused the severe pandemic that was feared, but the story is far from over. Ongoing analysis of the epidemiology, laboratory data, antiviral resistance, severity and health service use will provide a clearer picture of the impact of the pandemic. A comprehensive evaluation of the pandemic plan and response is required so that we are better prepared for dealing with the next, and possibly worse, pandemic.

Competing interests

None identified.

Author details

Ranil D Appuhamy, BSc, MB ChB, MIPH, Public Health Registrar[1]
Frank H Beard, MB ChB, FAFPHM, Senior Medical Officer[2]
Hai N Phung, MD, MPH, PhD, Principal Epidemiologist[3]
Christine E Selvey, MB BS, MSc, State Health Incident Controller[3]
Frances A Birrell, MPH, MAppEpid, GCSc(Stats), Epidemiologist[3]
Terry H Culleton, GradCertMgmt, BHlthServMgmt, RN, Public Health Nurse[3]

1 Population Health, Queensland Health, Brisbane, QLD.
2 Communicable Diseases Branch, Queensland Health, Brisbane, QLD.
3 State Health Emergency Coordination Centre, Queensland Health, Brisbane, QLD.

Correspondence: ranil_appuhamy@health.qld.gov.au

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