H1N1 2009 pandemic influenza in Indigenous Australians

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Given the known prevalence of chronic disease in the Australian Indigenous population, and the known risk factors for severe disease from influenza infection, it is not surprising that Indigenous Australians carried a higher burden of disease during the influenza pandemic of 2009. However, other determinants apart from comorbidities might also have affected influenza morbidity in Indigenous Australia. Factors such as overcrowding, sanitation infrastructure, remoteness, access to health care and availability of the specific hardware of the pandemic (such as personal protective equipment – PPE– and antivirals) may also have been risk factors for poor outcomes at the population level. This article summarises the impact of the 2009 influenza pandemic on Australia's Indigenous population, with particular emphasis on those living remotely in the Northern Territory (NT).

Pandemic response

For health care workers serving remote Indigenous populations, the response to the pandemic presented particular challenges. While distance and isolation were important factors to overcome, it was recognised that community engagement and effective communication strategies were also crucial to an effective response[1]. Remote communities in the NT had been engaged in pandemic planning and it was agreed early that the response would be enhanced by a commitment to standardisation, an agreed communication strategy, coordination with distribution of health hardware and the establishment of a dedicated website. NT government resources and assistance were made available to both government and non-government services on an equal basis.

The communication strategy centred around a strong community-based public awareness campaign which included: word of mouth; engagement of community leaders; promotion of health worker education; community media and a website (containing radio messages). Similar strategies were implemented in the Indigenous setting in New South Wales[2], where essential components included the commitment to collaboration between community-controlled organisations and the health department, an emphasis on community-based communication and the sharing of resources.

In the NT, antivirals, PPE, microbiological sampling equipment and antibiotics were distributed to all community clinics prior to the first case being identified in a remote community. Despite logistic and infrastructure difficulties such as poor housing, poor sanitation and overcrowding, the public health measures to reduce influenza transmission such as isolation, social distancing, cough hygiene and hand washing were not ignored.

Incidence

The timing and severity of the 2009 pandemic influenza season in remote Indigenous communities varied greatly, with some communities suffering high rates of disease, while others seemed to avoid the pandemic altogether[3]. There was some evidence that the public health measures implemented during the DELAY and CONTAIN phase reduced transmission in remote communities. In Figure 1, a slowing or ceasing of influenza transmission

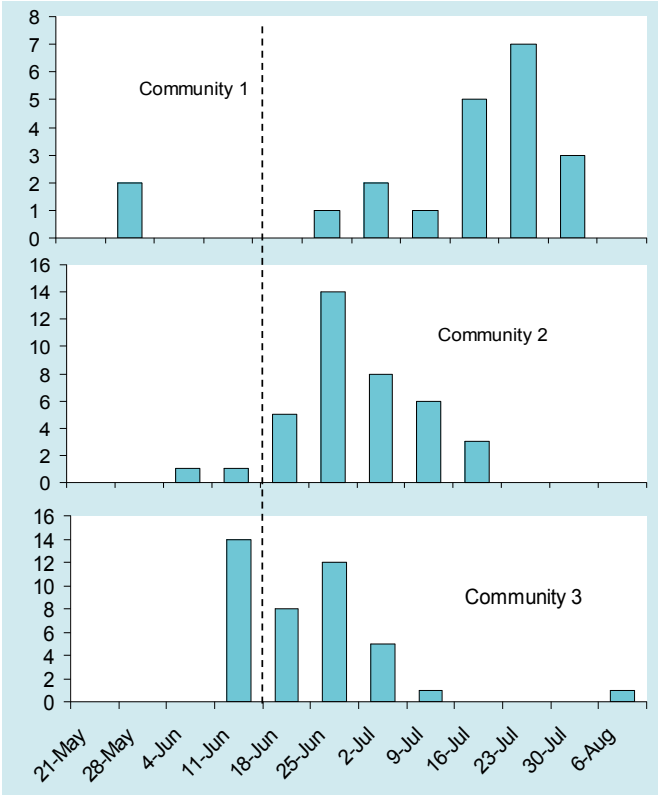

Figure 1. Cases of pandemic influenza by week of onset in three remote Indigenous communities illustrating variations in transmission during the CONTAIN phase. Community 1: transmission stopped after the early introduction of 2 cases. Community 2: transmission delayed for several weeks after initial cases. Community 3: rapid transmission after introduction. Dotted line: End of CONTAIN phase and start of PROTECT. Source: Northern Territory Notifiable Diseases System.

during the CONTAIN phase (after initial introduction of the virus) is demonstrated in Communities 1 and 2, both of which implemented the CONTAIN phase protocol of prophylaxis and isolation of contacts.

In the NT, the rate ratio for laboratory-confirmed pandemic influenza in the Indigenous population compared with non-Indigenous was 4.9 (95%CI: 4.39–5.46)[3]. Similarly, in a sample taken from a district hospital in Townsville, 34.7% of H1N1 pandemic cases were Indigenous, which was 4.8 times the proportion in the local population (7.2%)[4]. There is, however, evidence that these estimates were biased by the degree of testing with Indigenous people being more likely to get tested for influenza than non-Indigenous people[3,4]. Firstly, in the NT the initial wave of the epidemic occurred in remote Indigenous communities where 100% testing was encouraged for all influenza-like illness while urban areas were affected during the PROTECT phase when less testing was done. Secondly, testing at the beginning of each community's epidemic was strongly encouraged, irrespective of the pandemic phase; and finally, being Indigenous was identified early in the pandemic as a risk factor for severe disease which may have led to more testing.

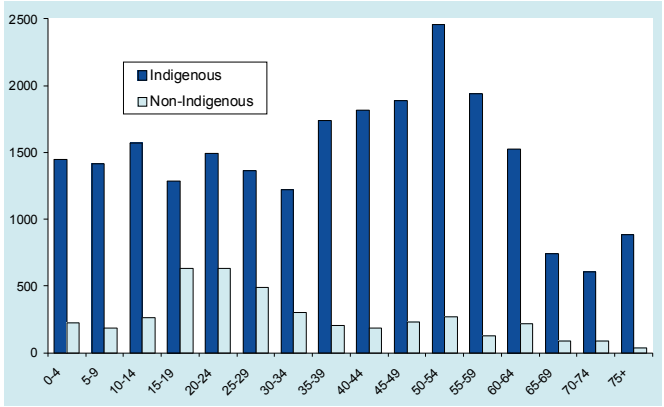

Figure 2. Age-specific rates of pandemic influenza in the Northern Territory by Indigenous status; 2009. Source: Northern Territory Notifiable Diseases System.

Testing data were available from the NT public hospital laboratories and the Indigenous/non-Indigenous rate ratio for testing at public hospitals between March and September was found to be 2.73 with 41.2% (95% CI: 37.8–44.7) of tests being positive in Indigenous clients and 26.1% (22.7–29.4) in non-Indigenous (unpublished data). These figures suggest that influenza morbidity in the Indigenous population was indeed worse and could not be explained by testing patterns. Age-specific rates of pandemic influenza in the NT Indigenous population were highest in those aged 35 to 59 years (Figure 2).

Attack rates and serological immunity

No published Australian study has reported serological immunity or attack rates specific to the Indigenous population. Cross-sectional serological studies undertaken in New Zealand suggest levels of post-pandemic immunity that are around 10% higher among Maori ethnic groups than other ethnic groups and higher again among Pacific Peoples[5]. Unpublished serological data from the NT found similar differences between Indigenous and non-Indigenous Australians. This is likely to reflect different disease dynamics due to overcrowding and living conditions in the Indigenous population.

Morbidity and mortality

Several studies have documented significantly higher hospitalisation rates for pandemic influenza in the Indigenous population compared with the non-Indigenous rates both in Australia[6-9] and overseas[10]. In Australia, the rate ratio for hospitalisation among Indigenous people compared with non-Indigenous people was 6.6 (95% CI: 6.2–7.2)[6] while in the NT it was 12.4 (95% CI: 9.3–16.4)[7]. The higher ratio in the NT is not likely to be due to testing strategies as there was a consistent testing policy for all hospitalised patients throughout the pandemic, but is more likely a consequence of higher morbidity in the NT Indigenous population or better Indigenous status ascertainment[9]. The well-documented higher prevalence of comorbidities in the Indigenous population, including chronic disease and the risk factors for severe disease following influenza, explains at least part of this risk difference.

The rate of admission of Indigenous people to intensive care units (ICUs) varied considerably across jurisdictions between

9.1/100,000 in a NSW study and 51.1/100,000 in the NT, with the national rate being 18.7/100,000[6]. The rate ratio compared with non-Indigenous people at the national level was 6.2 (5.0–7.6)[6]. The proportion of hospitalised cases admitted to ICUs was generally lower in the Indigenous admissions[7,11].

There were 24 Indigenous deaths reported nationally by October 2009 giving a crude mortality rate of 4.5/100,000 and a rate ratio of 5.2 compared with the non-Indigenous population[6]. In the NT there were no deaths of Indigenous people living in remote communities.

Vaccination

The pandemic vaccination program that rolled out in October 2009 presented further challenges to those who provide services to Indigenous Australians, particularly those who service remote communities.

In the NT, a separate communication and media strategy was developed to target the Indigenous population including written and audiovisual material in the five major language groups (including Creole) and separate messages for men and women. Commitment from local clinic staff and acceptance from the community were essential to attain high uptake.

Data collection also posed logistical difficulties because of the short time frame and the need to monitor progress of the campaign. Systems varied among jurisdictions, but in the NT, recording forms were initially centralised to facilitate a crude manual count, while the individual data were later entered onto the jurisdictional immunisation register. By the beginning of the 2010 influenza season, more than 45% of the Indigenous population in the NT had received a dose of monovalent pandemic vaccine. This estimate is appreciably higher than those of other reports, which estimated coverage rates in the Indigenous population of 20.0% in Western Australia[11] and 19.5% nationally[12].

Conclusion

During the 2009 influenza pandemic Indigenous Australians had a higher attack rate, higher incidence and greater morbidity and mortality due to the pandemic influenza than their non-Indigenous counterparts. This was due to the higher prevalence of comorbidities in Indigenous populations but easier transmission due to infrastructure such as housing and sanitation hardware was also likely to have had an influence. Implementing both the pandemic response and the vaccination program in the Indigenous setting required particular organisational and communication strategies, which should be taken into account in future pandemic planning[13].

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Biographies

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