

Australia's health 2010: an overview of infectious diseases

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Identifying the emerging threats for which we must be vigilant

In 1922, infectious diseases accounted for 15% of all deaths in Australia, but this rate declined dramatically to 1% by 2007 due to a combination of antibiotics, vaccination and public health measures. Yet infectious diseases continue to feature prominently in Australia. The Australian Institute of Health and Welfare has just released its biennial publication on the health of the nation, *Australia's health 2010* — a statistical and informed commentary that examines a variety of health issues dominating the national landscape.¹ Here, I summarise the report's chapter on infectious diseases to paint a picture of where we are today and the challenges we may well face in our future.

Among vaccine-preventable diseases, invasive meningococcal disease remains one of the most feared. However, notification data continue to show a pleasing trend of decreasing cases annually.¹ Much of this decline can presumably be attributed to the introduction of the meningococcal C conjugate vaccination program in 2003.² Not surprisingly, cases of the B strain, for which there is no vaccine, dominate the notifications, although numbers have been stable and certainly haven't increased. Similarly, rates of invasive pneumococcal disease remain steady and well below those seen before the introduction of universal infant vaccination in 2005.¹ Concerns continue that there will be a surge of invasive pneumococcal disease due to non-vaccine serotypes — so-called serotype replacement — following introduction of the conjugate vaccination program that will offset any reductions from the program; however, this has not yet happened. Pertussis notifications reached unprecedented levels in 2008 and 2009, with a particularly large increase in the proportion of cases in 0–4-year-olds — the group most vulnerable to severe disease from pertussis.¹ Yet it is likely that this increase in notifications can at least partly be explained by increased testing and easier access to better tests, such as polymerase chain reaction (PCR).

The world experienced its first influenza pandemic in 41 years with the outbreak of pandemic (H1N1) 2009 influenza (popularly known as “swine flu”). There were over 45 000 laboratory-confirmed notifications of influenza in Australia in 2009, eclipsing those of previous years — by comparison, in 2007, the other severe influenza year in recent times, there were 10 445 notifications. However, there was undoubtedly more testing conducted in 2009. The figure shown in the Box elegantly demonstrates how the swine flu virus behaved like a typical pandemic strain, predominantly affecting adolescents and young adults, while the 2008 “standard” seasonal strain mainly targeted people at the extremes of age.¹

Although pandemic influenza has had the highest profile in recent times, chlamydia, with over 62 000 notifications, was the most highly notified infection in Australia in 2009 and remains an important issue among the sexually active. However, as with pertussis and influenza, increased testing has almost certainly contributed to the large number of infections seen recently.¹

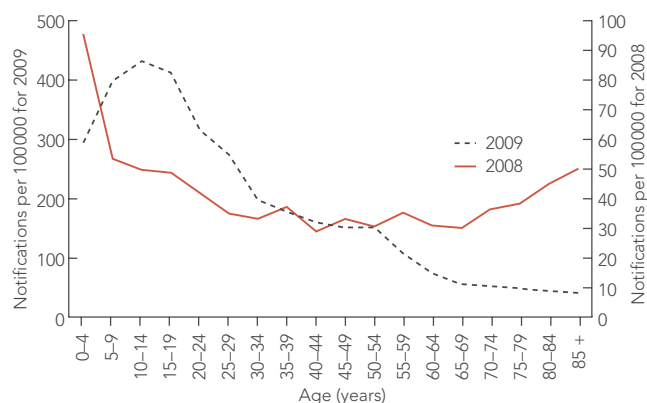
From 2000 to 2009, there was a decline in rates of newly diagnosed hepatitis B and C infections. Particularly among adolescents and young adults, this decline may be due to factors such as a reduction in injecting drug use and a vaccination program for

adolescents against hepatitis B infection. Despite this, however, chronic hepatitis B and C infections are looming as long-term challenges for Australia.¹ One model predicts that the 2008 figure of 187 000 people living in Australia with chronic hepatitis B infection could markedly increase to 276 000 cases in 2017 if current practices and resources remain unchanged. This would be associated with a large increase in hepatitis B-related deaths, including those from hepatocellular cancer.³ It is estimated that 212 000 people were living with chronic hepatitis C infection in Australia in 2008, and these people are at risk of similar chronic sequelae as those with chronic hepatitis B infection.⁴ Challenges include increasing awareness of the diseases and improving access to treatment for affected people, many of whom are from marginalised groups (eg, non-English speaking migrants, Indigenous Australians and injecting drug users). The federal government has responded to these challenges by releasing its first national hepatitis B strategy and third national hepatitis C strategy.^{4,5}

A dengue outbreak featured prominently in northern Queensland between November 2008 and June 2009. Around 1000 cases occurred during this 8-month period, matching the total for the preceding 9 years. The outbreak was characterised by all four strains of dengue circulating, including a virulent DENV-3 strain that had a shorter incubation period within both mosquitoes and humans.¹ Hendra virus infection remains unique to Queensland, where outbreaks continue to occur, causing much angst among the public and communicable disease services alike. In 2008 and 2009, Hendra virus, which is transmitted to humans from infected horses, caused the deaths of two veterinary workers.¹

There are two emerging infections of concern in Australia. First, hypervirulent *Clostridium difficile* (also known as PCR ribotype 027 or NAP1) infection has become well established in the health care systems of many northern hemisphere nations in recent years, with high case-fatality and bowel-resection rates. Although a milder

Age distribution of influenza notifications in a pandemic year (2009) versus a standard seasonal year (2008)*



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form of the infection has been well established here for years, Australia had remained free of this particular hypervirulent strain until our first imported case was detected in Western Australia in 2009.⁶ This was followed in May 2010 by an outbreak among patients in a Melbourne hospital,⁷ raising concerns that it may become established in Victoria before spreading elsewhere.

Second, the appearance of multiresistant gram-negative organisms such as *Escherichia coli* in returning travellers, especially those arriving from Asia, is of concern. Although colonisation with these organisms in the bowel is asymptomatic, the problem arises when they cause symptomatic illness, typically in the urinary tract. Few antibiotics are available to treat such infections, and they are often expensive (eg, carbapenems) or dangerous (eg, potential nephrotoxicity and ototoxicity from amikacin). One study found that, while 8% of travellers were colonised with multiresistant *E. coli* before leaving Australia, almost 50% were colonised on their return.^{1,8} (It appears that Customs officials may have to worry about more than concealed drugs in travellers' bowels on their return to Australia!)

The health inequities experienced by Australia's Indigenous peoples are well recognised and apply to many infectious diseases. One example is acute rheumatic fever and rheumatic heart disease. Indigenous people in the Northern Territory have one of the highest rates in the world of these conditions and are around 20 times more likely to die from rheumatic heart disease than non-Indigenous Australians.⁹

Despite the advances in combating acute and chronic infectious diseases over the past century, both continue to present challenges to our health system, especially for certain Indigenous populations. Multiresistant gram-negative bacterial infections acquired from overseas and hypervirulent *C. difficile* infection are emerging threats in Australia for which we must be vigilant. This is in addition to infections caused by the already established multi-resistant nosocomial pathogens such as vancomycin-resistant enterococci. The need to isolate affected patients and use expensive antibiotics to treat them only further burdens the hospital system. A mandatory reporting system for certain hospital-acquired infections could be one way to address this. Although childhood immunisation programs have generally been successful, we need to be watchful for resurgent infections, such as pertussis, where immunity from childhood vaccination has waned. Finally, as last year's swine flu outbreak demonstrated, a pandemic has the potential to consume considerable resources and generate widespread concern. While the 2009 influenza outbreak has passed,

the potential for further pandemics and the need to prepare for them persist. Avian influenza, which continues to cause human infections overseas, immediately comes to mind in this regard.

Competing interests

I wrote the infectious diseases chapter in *Australia's health 2010* on which this article is based. This work was done purely on a voluntary basis.

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