



Investigation into the Impact of Infection Control Breaches at Four Sydney Dental Clinics

**Communicable Diseases Branch
Health Protection NSW**

and

NSW Public Health Units

Summary

- Following an assessment of reports of poor infection control at two Sydney dental practices operating four clinics, NSW Health advised approximately 13,400 patients to seek testing for hepatitis B, hepatitis C and HIV infection.
- Patients who were subsequently notified with a positive test following an invasive dental procedure were interviewed about risks and their past medical history reviewed.
- There is no definitive evidence of transmission of infection at the clinics, however four patients with hepatitis B infection and four with hepatitis C infection reported no other risk factors.
- Good infection control in accordance with the Dental Board of Australia's *Guidelines on infection control* is critical to preventing blood borne virus transmission during dental procedures.

Background

The Dental Council of NSW reported infection control concerns at two dental practices (practice A and practice B) to Health Protection NSW (HPNSW) in late 2014. Following multiple assessments, the Dental Council suspended the registration of six dentists including the directors of the clinics and a further six dentists had conditions placed on their registration.

The key concern about poor infection control in such a situation is that patients may be placed at risk of acquiring hepatitis B, hepatitis C or HIV, collectively referred to as blood borne virus (BBV) infections. These infections may be spread within the dental clinic environment (most likely via dental instruments that are contaminated with blood from a patient with the infection) from one patient to another if infection control practices are not meticulous.

BBVs are spread when body fluids containing the virus from an infected person enter the blood stream of another person. The risks of transmission vary by the virus, but are associated with injecting drug use, skin penetration or medical procedures using contaminated instruments, sex with infectious partners, and transmission from mother to infant around the time of birth. Some countries, including many of those in Asia, Africa and the Middle East, have a high prevalence of hepatitis B. In these countries, transmission of infection from mother to child during pregnancy or birth is one of the most common exposures¹.

Most people who are infected with hepatitis B virus or hepatitis C viruses do not have any symptoms at the time of infection. Some (over 95% of adults with hepatitis B and approximately 20% of adults with hepatitis C) will clear the infection spontaneously² within six months, and those who remain infected may remain symptom free for decades. Similarly, around 30-50% of people with HIV infection do not have any symptoms at the time that they acquire the virus, though almost all will develop symptoms within five to ten years³. Even if people do have symptoms at the time of infection with these viruses, the symptoms may be mild and non-specific and may not be recognised as symptoms of a BBV infection.

Because there are no or few symptoms at the time of BBV infection, most people are not tested for the virus at the time that they are infected. In Australia, infections are more frequently detected by screening of people who are otherwise well, or who have developed complications of chronic infection, than by testing at the time that symptoms develop.

It has been mandatory for hepatitis B, hepatitis C and HIV infections to be notified to NSW Health under the NSW *Public Health Act* since 1991. For hepatitis B, laboratories notify people who have

acute or chronic infection based on the detection of virus antigen in the blood stream. As above, fewer than 5% of adults with acute infection go on to have a life time infection. For those with chronic infection, only a proportion of people will have detectable virus in their bloodstream, depending on the person's immune response to the virus at any one point in time. For hepatitis C, laboratories notify people who have antibodies to hepatitis C virus; these people have all been infected with hepatitis C virus but around 20% will have cleared the virus spontaneously and won't have detectable virus in their blood. For HIV infection, laboratories notify people with antibodies to HIV, as well as those with antigen when the antigen test has been done in order to diagnose HIV infection (however it is noted that notifications for HIV are provided to NSW Health in a de-identified format).

When someone is diagnosed with hepatitis B or hepatitis C, it is often difficult to be sure how the person acquired their infection since there are many possible risk factors and at the time of diagnosis it is usually not clear how long ago the infection had been acquired. People may be reluctant to report a history of risk behaviours such as injecting drug use or unprotected sex.

Dental practices A and B that were reported to HPNSW to have poor infection control processes involved two clinics each, in operation at different times, from 1990-2007 and 2005-2014 (for practice A), and 2005-2015 and 2008-2015 (for practice B). It is estimated that practice A treated 800 patients at both clinics and practice B treated 40,000 patients during those years. Practice B was known to have an unusually high proportion of patients from the Asian community, which is significant because in some Asian countries the population has a high prevalence of hepatitis B.

HPNSW worked with local public health units, dental and infection control experts, and NSW Health's Blood Borne Viruses Advisory Panel (BBVAP) to assess the risk to patients at these practices.

Practice A generally had incomplete patient records and it was not possible to accurately assess the individual risk to each patient. Practice B had more complete records and experts in dental care categorised patients according to procedure type.

Those patients who had undergone invasive dental procedures (where reusable instruments had penetrated the gum) were assessed to be at risk (albeit a low risk) of exposure to blood borne viruses (BBVs) should they have had procedures done using contaminated instruments that had been previously used on patients infectious with a BBV

Because effective therapies have become available to treat patient with BBVs in recent years, advising patients that they were at risk of infection would allow any infected patient to benefit from early diagnosis and treatment.

It was not possible to identify which patients at practice A had undergone invasive procedures, and so it was recommended that all 800 patients from practice A's two clinics, and 12,600 patients who were recorded as having invasive procedures from practice B's two clinics should be notified of the risk and advised to seek blood borne virus (BBV) testing by their local doctor. 46% of patients from practice A and 97% of patients from practice B had complete address details in their patient records. Because of the high proportion of patients from practice A for whom address details were incomplete, NSW Health sought addresses from Medicare; these were available for two thirds of the patients with missing details and were received in June 2015.

In July 2015 NSW Health wrote to approximately 12,000 patients who were assessed to be at risk, and sought to advise patients with incomplete address details through a media statement and a web page. In addition, an information line was advertised for patients to call to determine if they were in the group of patients recommended for testing. NSW Health wrote to another 1,600 patients from practice B In September 2015, when further address details were available for these people.

Aim

To assess whether there was evidence to indicate that patients had acquired infection during invasive dental procedures at practice A or practice B.

Methods

HP NSW obtains data each month from 15 pathology laboratories (which report 95% of NSW notifications of these infections) of the number of tests performed. The number of tests performed in July 2015 was compared to the number in previous months and years.

The names of dental clinics patients identified to be at risk of BBV infection were:

- a) matched with past notifications of newly acquired hepatitis B and hepatitis C from 1991 to 30 June 2015; and
- b) matched with new notifications of any BBV reported between 1 July 2015 and 1 August 2015.

Where a patient's first notification with a BBV infection was after an invasive procedure at practice A or practice B, then the patient and doctor were interviewed and medical records reviewed (with consent) to identify possible risk factors for infection.

These cases were then reviewed by a panel with expertise in infectious diseases, virology and public health to assess the likelihood that their infection was acquired at the clinic.

Results

The number of tests performed in 15 laboratories for each of hepatitis B, hepatitis C and HIV infection increased by approximately 10,000 in July 2015 compared to the baseline of previous months.

No BBV infections were notified among patients for practice A. There were 17 hepatitis B, eight hepatitis C and one HIV infection notified for patients from both clinics of practice B (Table 1). No two patients notified with a BBV attended the same clinic for an invasive procedure on the same day, or the day before, as another patient notified with a BBV after a high risk procedure.

Of these 26 patients, five with hepatitis B, three with hepatitis C and one with HIV infection reported risk factors other than attending practice B that the panel assessed as being reasonably likely to be the source of infection (including birth in a high prevalence country, invasive procedures or skin penetration procedures in a high prevalence country, prior intravenous drug use, or male homosexual sex).

Table 1: Classification of BBV cases from the dental panel review

	Hepatitis B	Hepatitis C	HIV	Total
Other likely risk factors for BBV infection	5	3	1	9
Other possible risk factors for BBV infection	8	1	0	9
No other risk factors identified	4	4	0	8
Total	17	8	1	26

A further eight patients with hepatitis B and one with hepatitis C reported risk factors other than attending practice B that the panel assessed as possibly being the source of infection (including birth in high or medium prevalence country and/or invasive procedures or skin penetration procedures in a high or medium prevalence country and/or sexual partners from high prevalence countries).

Four patients with hepatitis B and four with hepatitis C reported no risk factors other than attending practice B.

Discussion

Around 12,000 patients of practices A and B were advised to be tested for BBVs and laboratory testing data suggests that around 10,000 may have been tested, suggesting good uptake of NSW Health's recommendations.

Of the 26 patients notified with a BBV infection following an invasive procedure at practice B, eight (31%) had no other explanation for their infection. For comparison, of all NSW Health notifications of patients with newly acquired hepatitis B and hepatitis C, 60% have risk factors recorded (largely injecting drug use, unprotected sexual intercourse) and 40% have no known risk factor recorded, reflecting that a considerable proportion of people who are infected do not recall or recognise and report exposures.

The available evidence is inconclusive as to whether patients were infected during invasive procedures at practice A or practice B. However there are several limitations to this investigation.

First, it is likely that not all infections among patients at the dental clinics were identified. This is because:

1. some patients may not have been tested;
2. some patients may have been tested and have naturally cleared the infection. Laboratory notification only occurs for patients who have evidence of current infection for hepatitis B (i.e. who are have virus antigen in their blood), so any patients who were infected but cleared it would not be notified; and
3. it is possible that some patients had an invasive procedure at one of the clinics but it was not correctly recorded in the notes (although there is no evidence for this).

Second, it is possible that some patients with no other explanation for their infection may have either forgotten or chosen not to disclose a risk factor that could have explained their infection.

There are reports in the published literature about similar investigations to this one, following the identification of serious breaches of infection control within dental practices. In two instances, some patients were found to have a BBV infection, but it was not possible to find evidence that the infections were acquired during their time at the dental clinic^{4,5}. In another report, the authors undertook a risk assessment in three instances of dental clinics where poor infection control had been reported and concluded that patient notification of infection risk was not justified because of the low probability of detecting BBV transmission⁶. Hepatitis B transmission in a dental practice in patients who had oral surgery in the United States was reported in 2007, but this was the only report in the previous two decades⁷. In contrast, hepatitis B or hepatitis C transmission have been reported in a number of other healthcare settings including haemodialysis units, haematology units, and a variety of other hospital and community based settings⁸.

Since the serious infection control breaches at the dental practices were identified, HPNSW has been working with the Dental Council of NSW to prevent similar incidents in the future. The Dental Board of Australia wrote to every registered dental practitioner in Australia to remind them of their

obligations under the National Law as well as actions practitioners may need to take to improve their infection control knowledge and practice. The Board published a [fact sheet](#) which outlines the infection control obligations of dental practitioners, and what members of the public can do to ensure they receive safe care. The NSW Dental Council has also established a working group to consider additional actions in relation to infection control standards in NSW, such as the development of a desk-top audit tool. The NSW Dental Council is also working with education providers and other stakeholders on other measures to strengthen the infection control framework, including reviewing university curricula and accreditation of dental practices.

References

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