



Disease WA^tch

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From the Director's Desk

Welcome to the latest edition of *DiseaseWA^tch*. In this issue we look back on the notifiable diseases of 2010, a year in which the number of communicable disease notifications was the second highest on record.

Chlamydia, for which the largest increase in notifications was recorded, is the focus of another article in this edition. *Chlamydia. Could I have it? Is it working?* examines the impact of our annual chlamydia campaigns on the reported incidence of chlamydia in WA and the campaigns' effectiveness in changing behaviours in high-risk groups.

We're also reminded of the importance of maintaining cold chain protocols when transporting and storing vaccines in our feature on cold chain breaches.

We hope you're enjoying the convenience of our online format and, if you haven't yet done so, that you will take the time to subscribe to this free online bulletin and stay abreast of the latest communicable disease news and issues in WA.

Paul Armstrong
Director, Communicable Disease Control

Limited opportunity for increased protection

Children aged between 12 and 35 months have the opportunity to receive a single dose of the pneumococcal vaccine Prevenar 13.

The dose, available until 30 September next year, will broaden their protection against pneumococcal disease.

In July 2011, Prevenar 13 replaced Prevenar on the National Immunisation Program. Prevenar 13 guards against 13 strains of pneumococcal disease, six more than its predecessor Prevenar.

A single dose of Prevenar 13 has been made available to children who fall shy of receiving a dose of the new 13-valent conjugate vaccine as part of the primary vaccination series.

These children will already have received a primary course of Prevenar – given at 2, 4 and 6 months of age.

The strain of pneumococcal bacteria responsible for the majority of invasive

pneumococcal disease in children under three years is among the additional serotypes provided in the supplementary dose.

Medicare will write to parents and carers of eligible children advising them of their entitlement. The Commonwealth Government Chief Medical Officer will notify immunisation providers of the initiative.

For more information about Prevenar 13 visit the Immunise Australia Program website at: www.immunise.health.gov.au

Contents

From the Director's Desk.....	1
More children to get Prevenar 13.....	1
<i>Chlamydia. Could I have it?</i>	
Is it working?	2
Recent trends in HIV notifications.....	3
Register now for immunisation updates	6
Protecting vaccine potency	7
Review of notifiable diseases, 2010	10

‘Chlamydia. Could I have it?’ Is it working?

Chlamydia is the most commonly notified disease in Western Australia. Last year more than 10,200 cases were reported here. In the same period, our rate of chlamydia notifications was 33% higher than the national rate.

The highest incidence of chlamydia infection occurs consistently in the 15 to 24 years age group.

Immediately after the Department of Health’s 2010/11 annual chlamydia campaign, an online evaluation was conducted with a sample size of 450 sexually active 16 to 29 year olds living in Western Australia.

The sample included an equal gender split, spread of ages and minimum quota of 100 ‘at risk’ young people (i.e. those who did not use condoms, who considered but did not necessarily use condoms or who had changed partners within the past 12 months). The evaluation data was compared with research conducted in 2008 and 2009.

The campaign carried a “get tested for chlamydia” call to action, along with a secondary message to practise safe sex.

Awareness and understanding of chlamydia increased this year, returning to — and in some aspects surpassing — WA levels seen in 2008 when the *Safe Sex No Regrets* campaign was promoted heavily on television.

In 2011, the number of people surveyed who — without prompting — identified chlamydia as a serious sexual health issue, was almost double that of the previous year. With prompting, awareness returned to 2008 levels when more than 90% of respondents recognised it as an issue.

Importantly, about 75% of respondents strongly believed that if a person thought they had chlamydia they should see a GP.

Young people could still improve their knowledge about chlamydia, including that it:

- can be spread easily
- has no symptoms
- can be detected easily using a urine test.

Respondents’ intentions to adopt desirable behaviours have made small but steady improvements since 2008, particularly their intentions to use condoms or to tell a sex partner to use condoms. However, there is still a gap between intentions and behaviour.

Visits to the chlamydia website, ‘couldihaveit.com’, were higher during periods of campaign activity than at other times of the year.

While notifications continue to rise, testing rates have also increased. In 2010, the rate of 15 to 24 year olds being tested for chlamydia rose by 13% on the previous year while the rate among people aged 25 to 34 years increased by 17% over the same period.

In 2011 desirable behaviours returned to 2008 levels but there is still room for improvement.

The latest campaign data indicates:

- there has been a marked improvement in the uptake of testing for chlamydia
- health and information-seeking behaviour has improved
- awareness and knowledge of chlamydia as a serious health problem for young people has increased.

The challenge remains to improve the adoption of desirable behaviours, including the consistent use of condoms with casual or regular partners and seeking testing for chlamydia from a general practitioner.

Recent trends in HIV notifications in WA

There were 113 new notifications of HIV in Western Australia in 2010, a 27% increase on the number of notifications reported in 2009.

HIV notifications have increased in number each year since 2005 and the epidemiology of HIV in WA has changed considerably over this period. While HIV notifications have increased, notifications of AIDS and deaths in people with HIV infection have remained relatively stable for more than a decade (Figure 1).

Increase in notifications acquired through heterosexual exposure

A rise in the number of HIV infections acquired through heterosexual exposure has been the main contributor to this recent increase. Between 2005 and 2010, HIV notifications with a reported heterosexual exposure doubled from 32 to 65 cases and accounted for 57% of new cases in 2010 (Figure 2). Over the same period, HIV notifications among men who have sex with men (MSM) increased by 48% and accounted for 35% of notifications in 2010. The figures highlight a notable shift from the period prior to 2005, when the majority of new HIV notifications were in MSM (Figure 2). The number of newly reported HIV cases acquired through injecting drug use has continued to remain low in WA (Figure 2).

Figure 1: Number of notifications for HIV, AIDS and deaths in persons infected with HIV, WA, 1983 to 2010

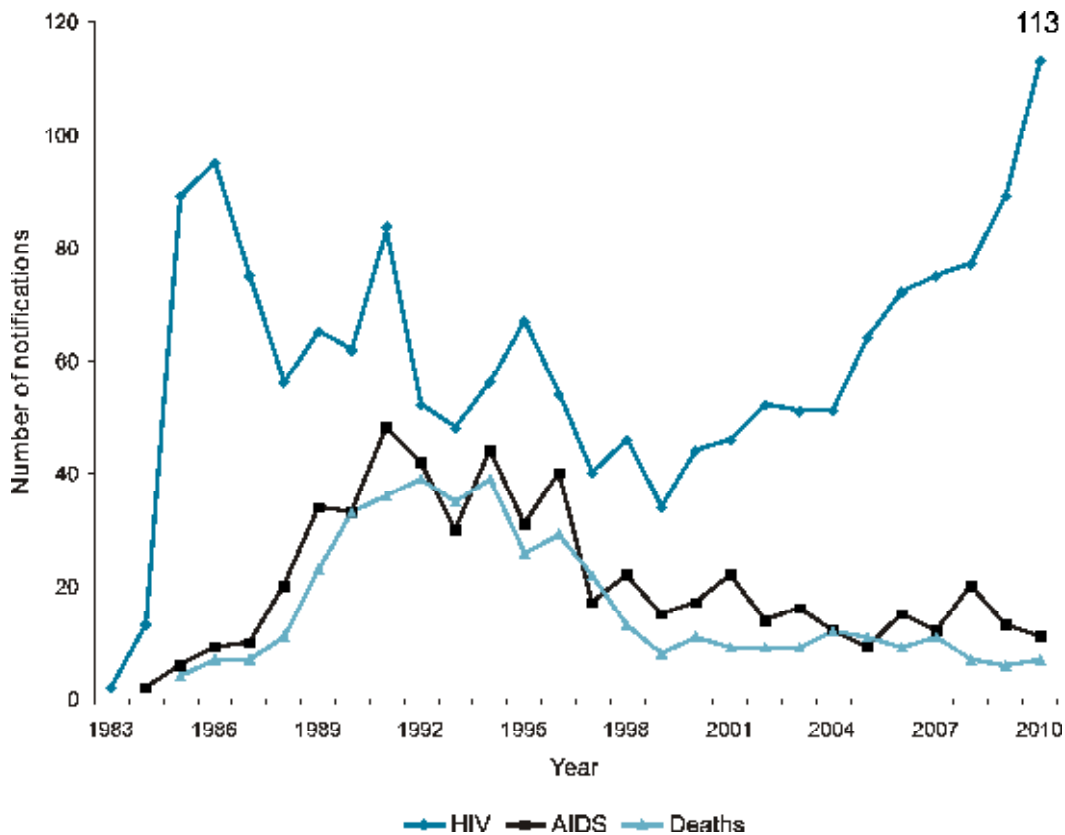
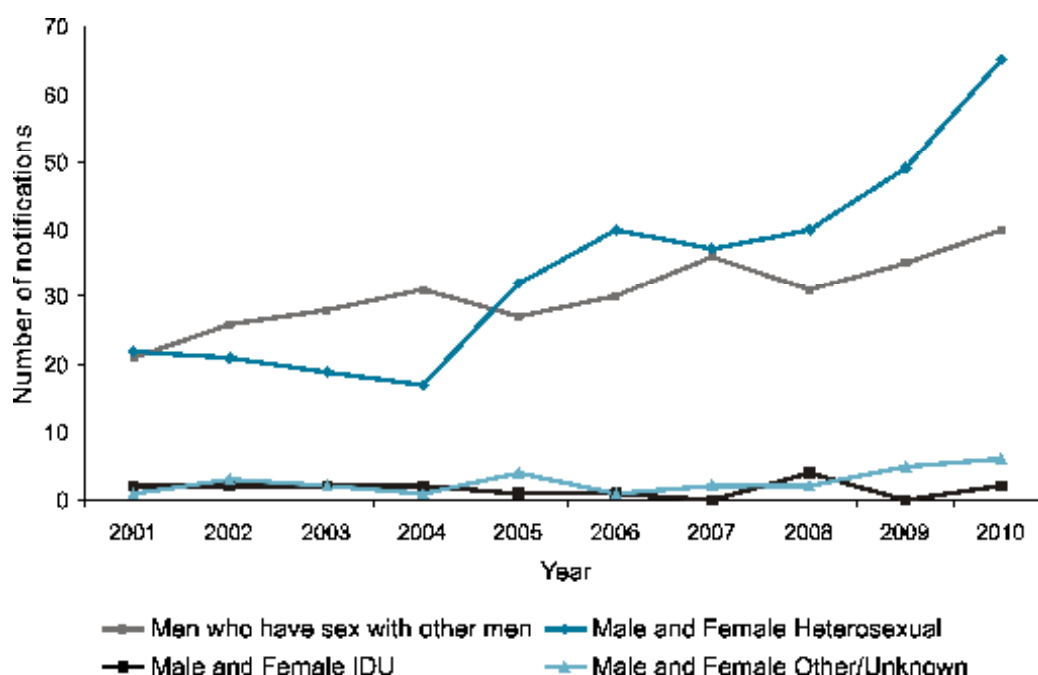


Figure 2: HIV notifications by exposure category, WA residents, 2001 to 2010



Overseas born and acquired notifications

The majority of recent heterosexually acquired cases has been among people born overseas who acquired HIV infection outside Australia, particularly within their region of birth, most commonly in Africa or southeast Asia (Figure 3). Between 2004 and 2010, overseas born and acquired notifications increased from 8 to 49 cases, and since 2007 most new cases were in this category (Figure 4). In 2010 there was a particularly high number of overseas-born females who acquired HIV overseas (n=28), a 40% increase on the 2009 figure. Most of these women (89%) acquired the infection through a heterosexual exposure. By comparison, the number of newly reported cases of HIV acquired in Australia, both overall and those attributed to heterosexual exposure, has been relatively stable over the same period (Figures 3 & 4).

Australians travelling overseas

There were also more Australians acquiring HIV overseas in 2010. After decreasing between 2006 and 2009, HIV notifications in Australian-born people who acquired the virus overseas more than doubled to 16 new cases. A higher number of heterosexual men infected in countries with a high prevalence of HIV, particularly in southeast Asia, explained most of this increase (Figures 3 & 4).

Figure 3: HIV notifications with a reported heterosexual exposure by place born and acquired, WA residents, 2001 to 2010

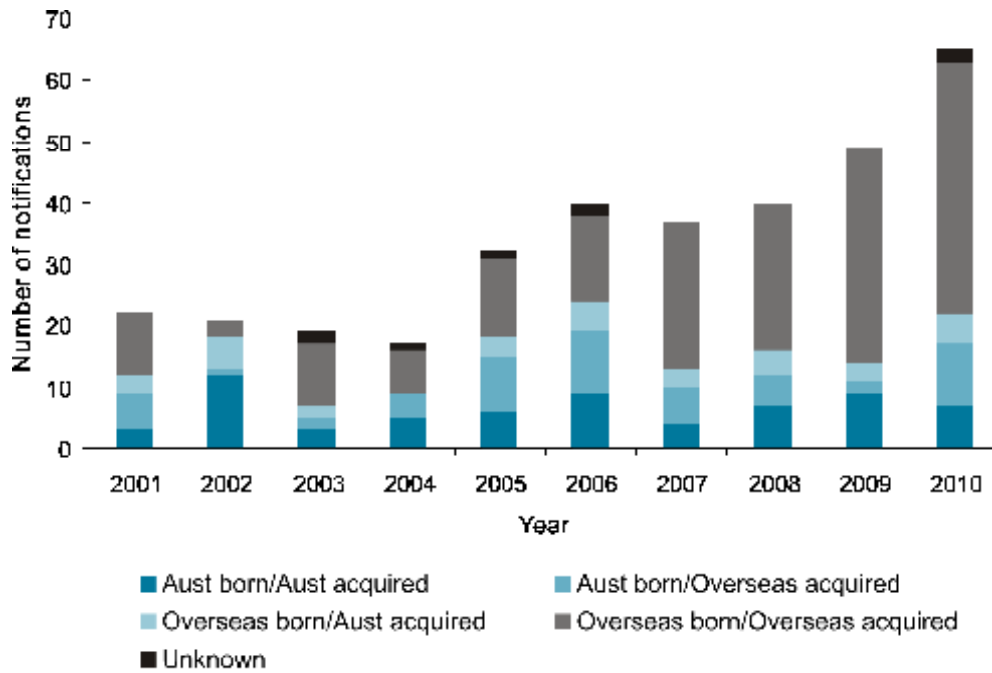
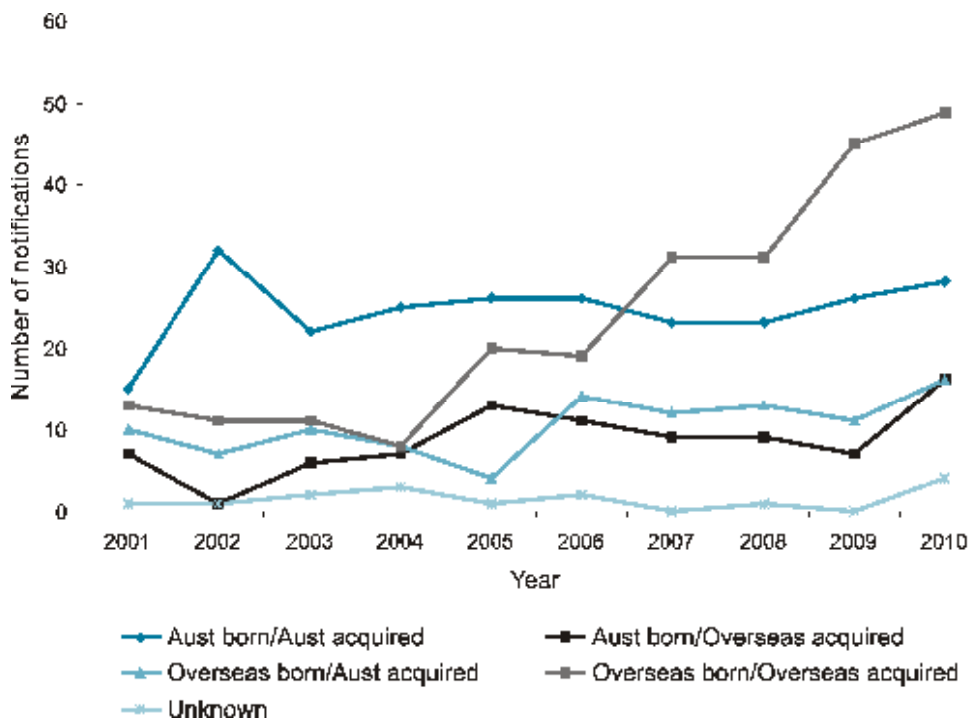


Figure 4: HIV notifications by place born and acquired, WA residents 2001 to 2010



HIV and ethnicity

While overall notifications of HIV increased in 2010, the number of notifications in Aboriginal people remained stable. The crude HIV notification rate in 2010 for Aboriginal people was half the rate reported for non-Aboriginal people (Table 1).

Table 1: Number and crude rate of HIV notifications in WA by Aboriginality, 2009 to 2010

Aboriginality	2010		2009	
	Number	Rate	Number	Rate
Aboriginal	2	2.7	3	4.1
Non-Aboriginal	111	5.0	86	4.0
Aboriginal: Non-Aboriginal ratio	0.02	0.5	0.03	1.0
Total	113	4.9	89	4.0

Notes: Rate = Crude notification rate per 100,000 population

Summary and conclusions

There has been a significant increase in the number of heterosexually-acquired HIV notifications in WA in recent years, mostly among people born in high-prevalence countries who acquired HIV in their regions of birth. These data suggest that doctors should consider the place for opportunistic targeted HIV screening of persons from high-prevalence countries who have not been screened as part of visa or residency requirements. In addition, the importance of safe sex messages targeting Australians travelling to HIV-prevalent countries is highlighted.

Register now for immunisation updates

Immunisation providers can now have immunisation alerts and updates delivered straight to their inboxes.

The Communicable Disease Control Directorate is urging providers to register their details to receive important vaccine updates.

Providers should email their name and email address to:
vaccineupdates@health.wa.gov.au

Provider details will be kept in accordance with Department of Health protocols and used solely to distribute immunisation advice.

Immunisation updates
Sign up now

Registered nurses and health professionals working in immunisation programs are encouraged to register their email address with the **Communicable Disease Control Directorate** to enable them to receive ongoing **Immunisation Updates**.

Email addresses will be maintained by Department of Health protocol and not given to another source without permission or used for any other purpose other than to send you updated immunisation information.

To subscribe please email your full name and email address to vaccineupdates@health.wa.gov.au

Protecting vaccine potency

Immunisation providers are reminded of the need to comply with cold chain protocols for vaccines — including reporting procedures following a breach.

These protocols play a vital role in ensuring the efficacy and safety of administered vaccines, large numbers of which are now stored within general practices. Given the significant cost of these vaccines, minimising wastage is also imperative.

The cold chain

The “cold chain” is a system of transporting and storing vaccines within a recommended temperature range.

This range — +2°C to +8°C — is set by the World Health Organization to protect vaccine immunogenicity and minimise loss of potency due to damage from temperature extremes¹. Protecting the chain is a shared responsibility that begins with the vaccine’s manufacture and ends with its administration to a patient.

Vaccine providers are required to use cold chain protocols provided by the Communicable Disease Control Directorate, the *National Vaccine Storage Guidelines: Strive for 5*³ and the current edition of the *Immunisation Handbook*² to ensure correct and consistent cold chain monitoring.

Cold chain breach

The cold chain is breached when temperatures fall outside this range. Breaches can occur at any point during the cold chain process. Refrigeration failure, power outages, overheating during transportation and freezing of vaccines are common causes of cold chain breaches.

Any deviation from the recommended temperature range can compromise the efficacy of a vaccine, so it is imperative proper protocol is followed after a cold chain breach.

In the event of a cold chain breach:

- Isolate affected vaccines. Move them to an alternative +2°C to +8°C location and mark them clearly ‘DO NOT USE’.

- Complete the checklist on page 2 of the **Cold Chain Incident/Vaccine Wastage Report** form then fax or email it to your local regional immunisation coordinator (RIC). Forms can be downloaded from the Public Health website at http://www.public.health.wa.gov.au/3/471/2/cold_chain_immunisation.pm.
- Telephone your RIC for further advice. The RIC will advise you whether it will be necessary to dispose of the affected vaccines. Given the expense of vaccines, immunisation providers should not discard any vaccines until authorised to do so by the RIC.

On receipt of a Cold Chain Incident Report the RIC will act to establish the efficacy of the affected vaccines and minimise wastage. The RIC will also help the immunisation provider with ongoing education and support for safe, effective immunisation delivery.

Reporting vaccine wastage

Fridge failure, power outages, cold chain breaches, breakage, vaccine expiry or the administration of an incorrect dosage or incorrect vaccine can all lead to vaccine wastage.

Reporting such wastage is mandatory under the vaccine procurement contract with the Commonwealth Government. Reports are forwarded to the Commonwealth on a quarterly basis under the current National Partnership Agreement for Essential Vaccines.

Wastage that has resulted from events beyond human control, such as natural disasters, power outages and refrigeration failure, is taken into consideration by the Commonwealth when calculating the wastage of each State and Territory.

Under the National Partnership Agreement for Essential Vaccines, wastage is a performance indicator and tied to additional payments used to fund State vaccination programs.

All vaccine wastage, and the circumstances surrounding it, should be documented to provide accountability and help WA achieve performance benchmarks.

Immunisation service providers are required to document vaccine wastage as it occurs and report it to their RIC using the **Cold Chain Incident/Vaccine Wastage Report** form. The form can be used to report all wastage, irrespective of whether it involved a cold chain breach. Reports should be faxed or emailed to the RIC using contact details at the bottom of the form. The Communicable Disease Control Directorate uses these reports to acquit the Commonwealth vaccines under the National Partnership for Essential Vaccines agreement.

Vaccine disposal

Vaccines requiring destruction should be disposed of in accordance with medical waste disposal procedures operating within the practice/clinic.

Re-vaccination following a cold chain breach

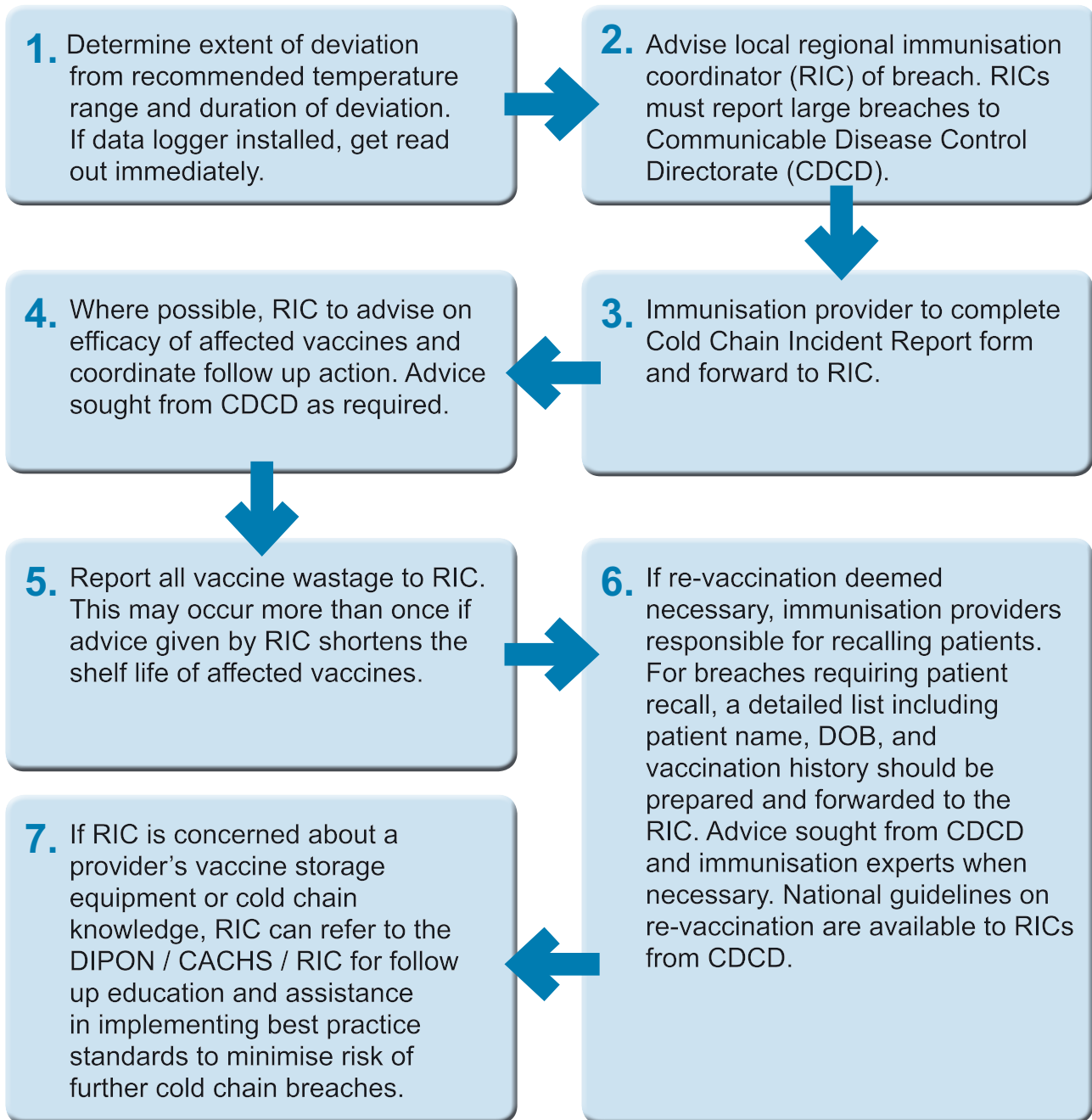
Re-vaccination following a cold chain breach is rare but sometimes necessary. RICs or the Communicable Disease Control Directorate can advise whether such action will be necessary. RICs should notify the Communicable Disease Control Directorate of all complex or large-scale re-vaccinations undertaken.

Providers should assist by compiling a complete list of all children immunised with vaccine potentially compromised by a cold chain breach. This list should include the date of birth and complete vaccination history (dates of vaccine series) of each child and be forwarded to the RIC.

References

1. World Health Organization (2006). *Temperature sensitivity of vaccines*. View this reference at <http://www.who.int/vaccines-documents/DocsPDF06/847.pdf>
2. National Health and Medical Research Council. (2008). *The Australian Immunisation Handbook 9th Ed*. Commonwealth of Australia. View this reference at <http://immunise.health.gov.au/internet/immunise/publishing.nsf/Content/handbook-home>
3. Australian Government Department of Health and Ageing. (2005). *National Storage Guidelines: Strive for 5*. Commonwealth of Australia. View this reference at <http://immunise.health.gov.au/internet/immunise/publishing.nsf/Content/provider-store>

Flow chart summary of procedures involved in reporting and dealing with cold chain breach



Review of notifiable diseases, 2010

(See Tables 1 and 2 for data on pages 16–18)

There were 25,215 communicable disease notifications in WA in 2010, the highest number yet recorded, with the exception of 2009, in which the total was inflated by notifications of pandemic influenza A (H1N1) 2009. The largest increases in notifications, compared to levels in 2009, were exhibited by chlamydia, pertussis, dengue fever, varicella-zoster infection and rotavirus infection.

The most frequently notified diseases in 2010 were genital chlamydia (10,250 cases), campylobacteriosis (2,337 cases), varicella-zoster infection (2,007 cases), influenza (1,633 cases), pertussis (1,454 cases), gonorrhoea (1,405 cases), and salmonellosis (1,276 cases).

Enteric Diseases

The total number of enteric disease notifications in 2010 (4,566 cases) was similar to the number recorded in 2009, but 10% higher than the mean of the previous 5 years. As usual, *Campylobacter* infection was the most commonly notified enteric disease in 2010, comprising 51% of enteric notifications. *Salmonella* and rotavirus infections were the second and third most commonly notified enteric infections, respectively.

Notification rates were highest in the 0 to 4 year age group for all of the major enteric infections, with the exception of hepatitis A. Notification rates for most of the enteric diseases were also higher for Aboriginal people compared to non-Aboriginal people. The greatest difference was for shigellosis, with the notification rate for Aboriginal people 15 times that for non-Aboriginal people. Notification rates for most enteric diseases were higher in rural and remote regions, among both Aboriginal and non-Aboriginal people.

The Kimberley had the highest rates for *Salmonella*, *Cryptosporidium* and *Shigella* infections. The notification rate for ***Campylobacter*** infection was similar to the mean of the previous 5 years, but the ***Salmonella*** rate was 30% higher than the previous 5-year mean. The proportion of overseas-acquired *Salmonella* cases has increased steadily between 2005 and 2010, to the point where overseas-acquired cases exceeded locally-acquired cases in 2010 (45.6% versus 39.2%, respectively). The increased *Salmonella* notification rate was largely attributable to an increase in the number of infections acquired in Bali, Indonesia.

For cryptosporidiosis, shigellosis and hepatitis A, notification rates were lower in 2010 than the mean of the previous 5 years. The notification rate for **rotavirus** in 2010 was 10% higher than the mean of the previous 3 years.

The majority of ***Shigella*** isolates in 2010 were *Shigella sonnei* (70%), and particularly *Shigella sonnei* biotype G (54%), which was predominantly acquired overseas (72% of cases). The proportion of overseas-acquired *Shigella* cases in 2010 was double that of the previous year (40.4% versus 20.8%); with 67.4% of overseas-acquired cases travelling to Indonesia.

There were no **hepatitis A** notifications in Aboriginal people during the 4-year period 2007 to 2010. This was unusual given the mean annual notification rate for the 10 years prior to 2007 was 10 times higher in Aboriginal (40 cases per 100,000 population) than non-Aboriginal (4 per 100,000) people. These data indicate that the hepatitis A vaccination program introduced for Aboriginal children in November 2005 has been effective in reducing hepatitis A incidence in all age groups of Aboriginal people, not just the target age of young children.

There were 11 cases of **typhoid fever** notified in WA in 2010 and 10 had a history of recent overseas travel, including India (4), Indonesia (3), Bangladesh (1), South Africa (1) and Thailand (1). Six of these cases were born in countries where typhoid is endemic. There were 3 cases of **listeriosis** notified in 2010, compared to the previous 5-year average of 5 cases per year. All the cases were non-pregnancy related, had immunocompromising illnesses and reported eating foods considered to be high risk for *Listeria* infection.

Gastrointestinal disease outbreaks

There were 12 outbreaks of food-borne or suspected food-borne disease investigated in WA in 2010. Five outbreaks were caused by *Salmonella* species, 2 by norovirus, 1 each by *Clostridium perfringens* and *Cyclospora*, while for 3, the infectious agent or toxin was unknown. While not a notifiable disease, the largest food-borne outbreak was caused by *Cyclospora*, with more than 300 passengers and crew on a cruise ship reporting illness. The suspected food vehicle was fresh produce. The next largest food-borne outbreak, with 30 people ill, was caused by norovirus, and occurred amongst members of a club who attended a function at a reception centre. *Salmonella* Typhimurium (STM) phage type 170, pulsed field gel electrophoresis (PFGE) type 11, was the cause of 5 separately identified outbreaks, each affecting between 3 to 25 people. Three of these outbreaks were associated with dishes containing eggs served at restaurants that sourced eggs from a producer implicated previously in outbreaks due to STM PFGE 11.

There were 105 non food-borne gastroenteritis outbreaks reported in WA in 2010, 40% fewer than in the previous year. The causative agent for 44% (n=46) of these outbreaks was confirmed as norovirus. Other outbreaks for which organisms were identified were caused by rotavirus (n=14) and *Cryptosporidium* (n=1). Non food-borne outbreaks were predominantly associated with institutional settings, particularly aged-care facilities (79%) and hospitals (10%).

Vaccine-preventable diseases

There has been no endemic measles transmission in WA since the late 1990s, and the number of **measles** notifications remains low, associated with importation from overseas and occasional limited local transmission. There were 4 importations of measles in 2010, 1 each from the United Kingdom, Singapore, Indonesia and either Malaysia or Cambodia. Only the latter case was associated with local transmission, resulting in 8 locally-acquired cases, with transmission centred around healthcare facilities attended by the index or secondary cases. Of these cases, 4 were healthcare workers and 3 were patients. The median age of measles cases in 2010 was 30 years (range: 6 to 55 years); 6 were unvaccinated, 3 reported having had 1 dose of measles-containing vaccine and 3 were said to have had 2 doses.

Only 3 cases of rubella were notified in 2010. All were adult males who worked in the same office and were thought to have acquired the infection from a co-worker who had an undiagnosed fever and rash illness following a trip to the Philippines.

Mumps activity remained low in 2010, with 15 notifications, primarily adults living in the Perth metropolitan area. There were 2 notifications of invasive *Haemophilus influenzae* **type B (Hib)** infection in 2010; both were Aboriginal children from remote areas, aged 6 months (partially vaccinated) and 9 months (fully vaccinated for age), respectively. In the 5-year period 2006–2010, there have been only 8 notifications of invasive Hib disease in WA.

The number and rate of notifications of **invasive pneumococcal disease** (IPD) increased significantly from 150 cases (6.8 per 100,000 person-years) in 2009 to 200 cases (8.7 per 100,000) in 2010. The increase was mostly attributed to a 2-fold increase in cases in Aboriginal people, from 34 to 69 cases (112 per 100,000), the highest number and rate on record. From 2001 to 2010, the IPD rate due to organism serotypes covered by the 7-valent conjugate pneumococcal vaccine Prevenar declined steadily from 7 per 100,000 person years to 0.4 per 100,000 person years. Conversely, the rate due to serotypes contained in the 23-valent polysaccharide vaccine (Pneumovax), but not present in Prevenar, increased from 1.8 per 100,000 person years to 4.7 per 100,000 person years. In 2010, these increases were particularly seen in Aboriginal people for serotypes 1 (23% of Aboriginal cases) and 12F (21%).

There was a dramatic decrease in **influenza** notifications in 2010, following the 2009 pandemic year, with activity reflecting a relatively moderate season. The A-H1N1 2009 pandemic strain predominated, comprising 40.8% of cases, followed by influenza B (32.2%), untyped influenza A strains (23.0%) and A-H3 (3.9%). It was a relatively late season, with notifications peaking in September, and an extended tail into December.

Pertussis notifications increased for the third consecutive year to 1,454 cases, from a nadir of 134 notifications in 2007. This is the highest number of pertussis cases notified in WA, excepting the large epidemic of 2004 when 1,996 cases were reported. In 2010, 23.7% of cases were aged 0-9 years and 16.3% 10-19 years, but a substantial 54.0% of cases were aged 30 years and above. The highest notification rates were recorded by the Great Southern and Southwest regions, around 3-fold higher than the overall WA rate.

Varicella-zoster virus notifications increased by 16% from 1,736 cases in 2009 to 2,007 cases in 2010, comprising 20% chickenpox, 36% shingles and a high 44% of unspecified laboratory-confirmed cases.

Vector-borne diseases

Notifications of both **Ross River virus** (n=426) and **Barmah Forest virus** (n=78) each declined by around 50% in 2010, compared to 2009, and were at their lowest level since 2005. The Kimberley and Pilbara regions again recorded the highest notification rates for both these viruses. No cases of **Murray Valley encephalitis** were reported in 2010, following 2 cases in 2009.

The number of **dengue fever** notifications increased dramatically from 134 cases in 2009 to 509 cases in 2010, following the upwards trend observed since 16 cases were reported in 2006. All cases were acquired overseas, and the increase reflects a surge in Bali-acquired infections, from an average of around 2 cases per year (14% of all dengue cases) in the period 2001–2006 to 35%, 44%, 65% and 82% of notified cases in 2007, 2008, 2009 and 2010, respectively. The estimated notification rate for dengue fever among WA air travellers to Bali increased from 3 to 77 cases per 100,000 passengers between 2005 and 2010. Serotype data available from 2008 onwards shows that all four dengue virus serotypes circulate in Bali, although serotype 2 predominates, comprising 50% of cases. Around 20% of Bali-acquired dengue fever cases in the period 2006–2010 required hospitalisation, and there were at least 3 cases of dengue haemorrhagic fever.

There were 11 **Chikungunya virus** notifications in 2010. All infections were acquired in Indian Ocean (India, Maldives) or Southeast Asian (Indonesia – Bali and Lombok; East Timor) countries. **Malaria** notifications (n=56) were 33% lower in 2010 than in each of the previous 3 years, and it was the lowest number recorded since 2004.

Zoonotic diseases

Notifications for brucellosis, leptospirosis, psittacosis and Q fever continue to be infrequent. No cases of **brucellosis** were reported in 2010 while 6 cases of **leptospirosis** were reported, 1 acquired on a farm in WA, 1 while white water rafting in Queensland, and others associated with overseas travel in West Papua, Borneo, Bali and New Zealand, respectively. Of the 3 reported cases of **psittacosis** in 2010, 2 were associated with home budgerigars and 1 infection was acquired overseas. There were 8 notifications of **Q fever**, four in individuals who worked with livestock, 1 associated with a tick bite on Barrow Island, and 3 cases in residents of rural areas who did not have obvious direct exposures.

Blood-borne viral diseases

There were 33 “newly acquired” **hepatitis B** notifications in 2010, 22% lower than the previous 5-year average of 42 notifications per year. The number of “unspecified” hepatitis B notifications (n=783) was 12% greater than that reported in 2009 and 35% higher than the previous 5-year average of 580 notifications per year. The Kimberley region had the highest notification rate of “unspecified” hepatitis B — 15 times the state rate — but 87% of the notifications attributed to the Kimberley were among asylum seekers detained on Christmas Island, who originated from countries where hepatitis B is endemic, and who are systematically screened as part of arrival health checks.

The number of “newly acquired” **hepatitis C** notifications reached a 10-year low of 77 in 2010, 19% lower than the average for the previous 5 years. Notification rates were greatest in males and in Aboriginal people (Aboriginal: non-Aboriginal rate ratio 9.7:1), at least in part reflecting the substantial contribution that serial screening in custodial settings makes to the identification of newly acquired hepatitis C infections. “Unspecified” hepatitis C notifications declined by 5% in 2010 to 1,033 cases. “Unspecified” hepatitis C notification rates were highest in the Kimberley region, more than double the overall state rate.

Sexually transmissible infections

There were 10,250 notifications of **genital chlamydia in 2010**, 15.3% higher than in 2009, and more than 3-fold higher than in 2001 (n=2,707). In 2010, 84% of notified cases were in people aged under 30 years, and females were more commonly notified than males in those aged under 25 years, whereas the converse was true in older individuals. The notification rate for chlamydia was 4.8 times higher in Aboriginal people compared to non-Aboriginal people.

Gonorrhoea notifications (n=1,405) increased by 4% compared to 2009 levels, but remained significantly lower than numbers reported in the years from 2005 to 2008. In 2010, 69% of notified cases were in people aged under 30 years, and females were more commonly notified than males in those aged under 20 years, whereas the converse was true in older individuals. The notification rate for gonorrhoea was markedly higher (36 times) in Aboriginal people compared to non-Aboriginal people, although this was the lowest rate ratio observed in the last 10 years. Notification rates for both chlamydia and gonorrhoea were highest in the Kimberley, Pilbara and Goldfields regions.

After a 9-fold increase in **infectious syphilis** notifications over the period 2005 to 2008 (from 19 to 176 cases, respectively), the number dropped sharply to 88 cases in 2009, and stabilised at 85 cases in 2010. The decline reflects the control of outbreaks in men who have sex with men from the Perth metropolitan region and among Aboriginal people from the Pilbara region. The majority of infectious syphilis notifications in 2010 were in males and more than half were in people aged 20 to 34 years. The Aboriginal: non-Aboriginal rate ratio was 8:1. The downward trend in the number of **non-infectious syphilis** notifications continued in 2010, with 68 cases, 49% lower than the previous 5-year average. The Aboriginal: non-Aboriginal rate ratio was 18:1. Notification rates for both infectious and non-infectious syphilis were many times higher in the Kimberley than in other WA regions.

No cases of **donovanosis** have been notified in WA since 2 cases were reported in 2005, suggesting the eradication program for this disease may have been successful. Similarly, no cases of **chancroid** were reported in 2010.

In the past 10 years, annual notifications of **human immunodeficiency virus (HIV) infection** have more than doubled, with 113 cases reported in 2010, a 27% increase on 2009. Most cases notified in 2010 lived in the Perth metropolitan area (84%), and there were 76 (67%) male cases (median age 37 years), and 37 (33%) female cases (median age 31 years). In the 2006 to 2010 period, most male cases acquired their infection in Australia (53%) and most of these cases (78%) were men who have sex with men. Between 2006 and 2010, the majority of male (66%) and female (91%) cases who acquired their infection overseas reported a heterosexual exposure. (More detailed information on the epidemiology of HIV infection is provided in a separate article in this edition of *Disease WAtch*).

Other diseases

There were 14 **acute rheumatic fever** notifications in 2010, an increase from 4 notifications in 2009, at least in part due to better reporting. All were Aboriginal people, with most living in remote areas of the state.

Invasive meningococcal disease notifications declined to 22 cases in 2010, 6 fewer than in 2009, and far below the peak of 86 cases recorded in each of 1999 and 2000. The majority of cases were serogroup B (19 cases, 86%); with the others comprising 1 serogroup Y, 1 untypeable, and 1 serogroup C case (an elderly person not eligible for the conjugate serogroup C vaccine). Of the cases notified in 2009, 45% were aged less than 5 years, and 23% were aged 15-24 years, reflecting the usual age-related peaks observed with this disease. There were 4 deaths, giving an unusually high case fatality rate of 22%, as compared with the average for WA over the period 1997–2010 of 4.7%.

The number of **legionellosis** notifications in 2010 (n=54) was similar to that of 2009 (n=51), and significantly fewer than the 92 cases reported in 2006. As is typical for WA, the majority of infections were due to *Legionella longbeachae* (85%), which is associated with exposure to gardening soils and potting mixes, and the remainder were caused by *L. pneumophila* infection, associated with spray mists from warm water sources such as air conditioning cooling towers, spas, fountains and hot water systems. Six of the 8 *L. pneumophila* cases notified in 2010 acquired their infections in Bali, Indonesia, and 5 of these cases stayed at a particular hotel in Kuta, Bali. Further cases associated with this hotel or a nearby exposure source were identified in Victorians, Europeans and other Western Australians, extending into 2011.

There was a small decline in **tuberculosis (TB)** notifications from 112 in 2009 to 105 in 2010, 6 of which were relapses. The majority (86%) of cases were born overseas and of 10 Australian-born cases, 2 were Aboriginal. Three cases had multi-drug resistant TB.

Four cases of **meliodosis** were notified in 2010, with an age range of 15 to 60 years. One case was most likely acquired in the Kimberley region, 1 in the Northern Territory, 1 in Malaysia, and, surprisingly, the fourth case may have been infected in the Great Southern region. Three of the 4 had diabetes as an underlying illness. There were 2 **leprosy** notifications in 2010, 1 in an Aboriginal adult from the Kimberley region and 1 in an immigrant from the Philippines.

Table 1. Number of notifications in WA by year, 2006 to 2010 (See page 18 for notes).

Disease Category/Disease	Year				
	2006 (n=2,059,381)	2007 (n=2,106,119)	2008 (n=2,171,197)	2009 (n=2,245,057)	2010 (n=2,290,075)
Enteric diseases					
Campylobacteriosis	1953	2099	1837	2598	2337
Cholera	0	0	2	0	1
Cryptosporidiosis	251	611	164	235	140
Hepatitis A	71	21	22	35	32
Hepatitis E	1	0	6	5	3
Listeriosis	13	2	8	15	3
Paratyphoid fever	1	3	3	5	13
Rotavirus	235	727	426	421	612
Salmonellosis	798	985	852	1124	1276
Shigellosis	129	102	169	122	117
Shiga/Vero-toxin producing <i>E. coli</i>	3	2	0	6	8
Typhoid fever	11	9	8	8	11
<i>Vibrio parahaemolyticus</i>	3	9	7	9	10
Yersiniosis	3	5	7	3	3
Vaccine-preventable diseases					
<i>H. influenzae</i> type B	0	2	0	4	2
Influenza	213	1038	1018	5573	1633
Measles	30	1	8	10	12
Mumps	17	109	95	20	15
Pertussis	269	134	468	784	1454
Pneumococcal infection	134	132	161	150	200
Rubella	2	3	7	5	3
Tetanus	0	0	1	0	0
Varicella (chicken pox)	248	323	356	319	401
Varicella (shingles)	166	386	517	543	725
Varicella (unspecified)	198	659	757	874	881
Vector-borne diseases					
Arboviral encephalitis	3	0	1	2	0
Barmah Forest virus	183	133	163	146	78
Chikungunya virus infection	NN	NN	2	10	11
Dengue fever	16	54	98	134	509
Malaria	120	85	85	84	56
Ross River virus	871	581	881	852	426
Schistosomiasis	272	357	338	272	189
Typhus (Rickettsial infection)	21	7	19	23	13
Zoonotic diseases					
Brucellosis	1	1	0	1	0
Leptospirosis	3	5	1	1	6
Psittacosis	4	3	6	2	3
Q fever	5	7	6	2	8
Blood-borne viral diseases					
Hepatitis B (newly acquired)	50	42	48	38	33
Hepatitis B (unspecified)*	555	571	701	697	783
Hepatitis C (newly acquired)	104	79	100	93	77
Hepatitis C (unspecified)*	1001	1159	1260	1062	1003
Hepatitis D	1	4	6	0	0
Sexually transmissible infections					
Chancroid (soft sore)	0	0	0	2	0
Chlamydia (genital)	6147	7740	8657	8887	10250
Donovanosis	0	0	0	0	0
Gonorrhoea	1675	1761	1696	1347	1405
HIV*	72	75	77	89	113
Syphilis (infectious)	50	103	176	88	85
Syphilis (non-infectious)*	143	124	117	101	68
Syphilis (congenital)	1	0	0	0	1
Other diseases					
Acute rheumatic fever	NN	NN	6	5	14
Haemolytic Uraemic Syndrome	0	0	0	0	0
Creutzfeldt-Jakob disease	5	5	3	6	5
Legionellosis	92	82	73	51	54
Leprosy	3	2	2	0	2
Melioidosis	5	4	6	7	4
Meningococcal infection	21	20	24	28	22
Tuberculosis*	115	58	95	112	105
Total	16,288	20,424	21,546	27,010	25,215

NN = not notifiable in this year

Table 2. Number and rate of notifications in WA by region, 2010 (see next page for notes)

Disease Category/Disease Population	Region												Total (n=2,290,075)							
	North Metro (n=947,878)		South Metro (n=834,700)		Central (n=65,493)		Goldfields (n=59,783)		Great Southern (n=59,389)		Kimberley (n=55,774)			Midwest (n=65,493)		Pilbara (n=48,489)		Southwest (n=161,746)		
	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate		Cases	Rate	Cases	Rate	Cases	Rate	
Enteric diseases																				
Campylobacteriosis	1019	107.5	759	90.9	82	125.2	57	95.3	68	114.5	39	109.0	45	68.7	33	68.1	211	130.5	2337	102.0
Cholera	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.0
Cryptosporidiosis	21	2.2	37	4.4	11	16.8	6	10.0	3	5.1	20	55.9	12	18.3	13	26.8	17	10.5	140	6.1
Hepatitis A	16	1.7	10	1.2	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	2.1	5	3.1	32	1.4
Hepatitis E	1	0.1	1	0.1	0	0.0	0	0.0	0	0.0	1	2.8	0	0.0	0	0.0	0	0.0	3	0.1
Listeriosis	1	0.1	1	0.1	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.6	3	0.1
Paratyphoid fever	5	0.5	4	0.5	0	0.0	0	0.0	0	0.0	2	5.6	0	0.0	0	0.0	0	0.0	13	0.6
Rotavirus	282	29.8	209	25.0	20	30.5	4	6.7	9	15.2	7	19.6	12	18.3	26	53.6	38	23.5	612	26.7
Salmonellosis	499	52.6	411	49.2	40	61.1	18	30.1	24	40.4	85	237.6	37	56.5	42	86.6	97	60.0	1276	55.7
Shiga/Vero-toxin producing <i>E. coli</i>	2	0.2	2	0.2	0	0.0	0	0.0	3	5.1	0	0.0	0	0.0	0	0.0	1	0.6	8	0.3
Shigellosis	34	3.6	20	2.4	9	13.7	1	1.7	2	3.4	27	75.5	10	15.3	6	12.4	5	3.1	117	5.1
Typhoid fever	1	0.1	5	0.6	0	0.0	0	0.0	0	0.0	1	2.8	0	0.0	0	0.0	3	1.9	11	0.5
<i>Vibrio parahaemolyticus</i>	7	0.7	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	2	4.1	1	0.6	10	0.4
Yersiniosis	2	0.2	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	2.1	0	0.0	3	0.1
Vaccine-preventable diseases																				
<i>H. influenzae</i> type B	0	0.0	0	0.0	0	0.0	1	1.7	0	0.0	0	0.0	0	0.0	1	2.1	0	0.0	2	0.1
Influenza	668	70.5	583	69.8	68	103.8	34	56.9	76	128.0	29	81.1	29	44.3	55	113.4	76	47.0	1633	71.3
Measles	5	0.5	4	0.5	1	1.5	0	0.0	0	0.0	0	0.0	0	0.0	1	2.1	0	0.0	12	0.5
Mumps	2	0.2	7	0.8	1	1.5	2	3.3	1	1.7	0	0.0	0	0.0	0	0.0	1	0.6	15	0.7
Pertussis	446	47.1	431	51.6	48	73.3	40	66.9	105	176.8	3	8.4	15	22.9	46	94.9	314	194.1	1454	63.5
Pneumococcal infection	67	7.1	48	5.8	4	6.1	16	26.8	5	8.4	18	50.3	5	7.6	16	33.0	17	10.5	200	8.7
Rubella	0	0.0	3	0.4	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	3	0.1
Tetanus	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Varicella (chicken pox)	117	12.3	139	16.7	21	32.1	42	70.3	9	15.2	24	67.1	6	9.2	3	6.2	38	23.5	401	17.5
Varicella (shingles)	233	24.6	255	30.5	46	70.2	21	35.1	33	55.6	22	61.5	10	15.3	15	30.9	83	51.3	725	31.7
Varicella (unspecified)	438	46.2	337	40.4	9	13.7	1	1.7	6	10.1	16	44.7	15	22.9	15	30.9	28	17.3	881	38.5
Vector-borne diseases																				
Arboviral encephalitis	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Barmah Forest virus	21	2.2	35	4.2	3	4.6	3	5.0	0	0.0	4	11.2	2	3.1	4	8.2	5	3.1	78	3.4
Chikungunya virus infection	3	0.3	6	0.7	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.6	11	0.5
Dengue fever	223	23.5	178	21.3	10	15.3	7	11.7	3	5.1	9	25.2	15	22.9	15	30.9	33	20.4	509	22.2
Malaria	19	2.0	22	2.6	4	6.1	5	8.4	0	0.0	2	5.6	1	1.5	0	0.0	3	1.9	56	2.4
Ross River virus	85	9.0	182	21.8	14	21.4	9	15.1	14	23.6	34	95.0	14	21.4	33	68.1	37	22.9	426	18.6
Schistosomiasis	105	11.1	79	9.5	1	1.5	1	1.7	0	0.0	1	2.8	1	1.5	0	0.0	1	0.6	189	8.3
Typhus (Rickettsial infection)	3	0.3	5	0.6	0	0.0	0	0.0	2	3.4	1	2.8	0	0.0	0	0.0	2	1.2	13	0.6
Zoonotic diseases																				
Brucellosis	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Leptospirosis	1	0.1	3	0.4	0	0.0	0	0.0	0	0.0	0	0.0	1	1.5	0	0.0	1	0.6	6	0.3
Psittacosis	0	0.0	2	0.2	0	0.0	0	0.0	0	0.0	0	0.0	1	1.5	0	0.0	0	0.0	3	0.1
Q fever	1	0.1	1	0.1	2	3.1	0	0.0	1	1.7	1	2.8	1	1.5	0	0.0	1	0.6	8	0.3
Blood-borne viral diseases																				
Hepatitis B (newly acquired)	16	1.7	17	2.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	33	1.4
Hepatitis B (unspecified)*	264	27.9	239	28.6	13	19.8	25	41.8	6	10.1	186	519.9	9	13.7	16	33.0	17	10.5	783	34.2
Hepatitis C (newly acquired)	38	4.0	24	2.9	1	1.5	2	3.3	3	5.1	1	2.8	2	3.1	0	0.0	6	3.7	77	3.4
Hepatitis C (unspecified)*	349	36.8	347	41.6	28	42.8	51	85.3	28	47.1	36	100.6	24	36.6	23	47.4	78	48.2	1003	43.8
Hepatitis D	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0

Table continues next page

Table 2. Number and rate of notifications in WA by region, 2010 (see notes below) cont.

Disease Category/Disease Population	Region																		Total			
	North Metro (n=947,378)		South Metro (n=834,700)		Central (n=65,493)		Goldfields (n=59,783)		Great Southern (n=59,389)		Kimberley (n=35,774)		Midwest (n=65,493)		Pilbara (n=48,489)		Southwest (n=161,746)					
	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate				
Sexually transmissible infections																						
Chancroid (soft sore)	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0		
Chlamydia (genital)	3795	400.4	3687	441.7	162	247.4	413	690.8	143	240.8	143	240.8	673	1881.3	408	841.4	508	314.1	10250	447.6		
Donovanosis	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0		
Gonorrhoea	313	33.0	207	24.8	7	10.7	161	269.3	4	6.7	377	1053.8	40	61.1	262	540.3	17	10.5	1405	61.4		
Syphilis (infectious)	37	3.9	19	2.3	1	1.5	5	8.4	2	3.4	14	39.1	3	4.6	4	8.2	0	0.0	85	3.7		
Syphilis (non-infectious)*	23	2.4	23	2.8	1	1.5	2	3.3	1	1.7	14	39.1	2	3.1	1	2.1	1	0.6	68	3.0		
Syphilis (congenital)	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	1.5	0	0.0	0	0.0	1	0.0		
Other diseases																						
Acute rheumatic fever	2	0.2	0	0.0	0	0.0	2	3.3	0	0.0	0	0.0	7	19.6	2	3.1	1	2.1	0	0.0	14	0.6
Creutzfeldt-Jakob disease	2	0.2	1	0.1	0	0.0	1	1.7	0	0.0	0	0.0	0	0.0	1	1.5	0	0.0	0	0.0	5	0.2
Haemolytic Uraemic Syndrome	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Legionellosis	22	2.3	23	2.8	0	0.0	0	0.0	1	1.7	0	0.0	3	4.6	2	4.1	3	1.9	54	2.4		
Leprosy	1	0.1	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	2.8	0	0.0	0	0.0	2	0.1		
Melioidosis	1	0.1	0	0.0	0	0.0	0	0.0	1	1.7	1	2.8	0	0.0	0	0.0	1	0.6	4	0.2		
Meningococcal infection	9	0.9	8	1.0	2	3.1	0	0.0	0	0.0	1	2.8	1	1.5	0	0.0	1	0.6	22	1.0		
Tuberculosis*	45	4.7	45	5.4	0	0.0	4	6.7	1	1.7	4	11.2	0	0.0	1	2.1	3	1.9	105	4.6		
Total	9244	975.2	8419	1008.6	609	929.9	934	1562.3	554	932.8	1661	4643.0	684	1044.4	1046	2157.2	1655	1023.2	25102	1096.1		

Notes on Tables 1 and 2

1. Data were extracted from WA Notifiable Diseases Database (WANIDD) on 31 May 2011.
2. All data were analysed on basis of the earliest available date reflecting date of onset of disease ("optimal date of onset" in WANIDD), with the exception of diseases marked with * which were analysed by date of receipt of notification.
3. Rate = crude rate per 100,000 population. Rates were calculated using the Rates Calculator Version 9.5.3 (Department of Health, Western Australia)
4. Totals include cases where the postcode is unknown or outside WA, but the case was diagnosed in WA.

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