

The National Measles Surveillance Strategy

*Tim Heath, Margaret Burgess, Peter McIntyre
The National Centre for Immunisation Research and
Surveillance of Vaccine Preventable Diseases
Michael Catton, Victorian Infectious Diseases Reference Laboratory*

Background

This surveillance plan has been formulated to help prepare for national measles elimination. It updates and expands upon the surveillance methodology previously outlined in *Measles: Guidelines for the control of outbreaks in Australia* which was developed by the National Health and Medical Research Council (NHMRC).¹ The NHMRC document also contains recommendations about individual case management and outbreak control, which will require revision once the Measles Control Campaign (MCC) has commenced. However, enhanced measles surveillance is needed as soon as possible, as the first phase of the MCC will take place between July and October, 1998.* Therefore, all jurisdictions should comply as closely as possible with these guidelines from 1 July 1998.

These guidelines have been developed in collaboration with the Measles Elimination

Advisory Committee and The Communicable Diseases Network of Australia and New Zealand. They are intended as best practice guidelines for all those who are likely to contribute towards measles surveillance and elimination in Australia, including: general practitioners, paediatricians and physicians, pathologists, diagnostic and public health laboratories, and disease control officers in State and Territory health departments.

As best practice guidelines, they assume resources that may not yet be available, but are needed for successful measles elimination. In particular, laboratory diagnostic methods and case investigation formats must be standardised, and an agreement made by all States and Territories that they collect the same minimum data set. Measles elimination requires coordinated efforts, perhaps more than any previous health initiative in Australia, and comprehensive surveillance is a critical element for success.

* The first phase of the Measles Control Campaign was completed in the second half of 1998, after this article was accepted for publication. The results of the primary schools immunisation campaign have been reported in *CDI*. See for example *Commun Dis Intell* 1998; 22:270. Prior to the campaign, NHMRC endorsed the change in timing of the second dose MMR which is now due prior to school entry at age 4 to 5 years.

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Introduction

In Australia, and worldwide, measles remains the leading cause of vaccine preventable deaths.²⁻⁴ Even with near universal single dose childhood vaccination it seems, with currently available vaccines, measles outbreaks can still occur.⁵ However, in the 1990s, major advances have been made in measles control, particularly in the Americas. Indigenous measles transmission has been interrupted in several Latin American countries, the English speaking Caribbean, and the United States.^{6,7} In Latin America and the United Kingdom, measles control has been achieved through mass vaccination programs, administered regardless of vaccination history, to preschool and school-age children. In Finland and the United States, similar achievements have been attained by maintaining high coverage for a prolonged period with a two dose measles vaccination schedule.⁶ Substantial progress has also been achieved in the Western Pacific Region other than Australia.⁸ Mass campaigns are able to interrupt endemic transmission quite quickly. However, to prevent the reappearance or reintroduction of measles, very high routine vaccination coverage or smaller follow-up campaigns are needed.

In July 1996, a joint meeting of the World Health Organization (WHO), the Centers for Disease Control and Prevention (CDC), and the Pan American Health Organisation was convened to consider the feasibility of global measles eradication.⁶ This group recommended the goal of global measles eradication, with a target date of 2005-2010. In July 1997, Australia's National Centre for Disease Control established a Measles Elimination Advisory Committee (MEAC). The MEAC provisionally recommended a national, predominantly school-based measles vaccination campaign to commence in the first quarter of 1999. It also recommended that after this campaign: the second dose of measles-mumps-rubella vaccine should be given prior to school entry, and the adolescent MMR program should cease in 1999. In April 1998, the Australian Technical Advisory Group on Immunisation, after considering implications for rubella immunisation, endorsed this change in the Standard Vaccination Schedule. To support these measles control initiatives, substantial enhancements of measles surveillance are required.

Measles elimination objectives

The principal objectives of the Australian measles elimination initiative are:

1. To cease measles related morbidity and mortality, by interrupting indigenous transmission of measles; and
2. To prevent reintroduction of measles until global eradication is achieved, by maintaining uniformly low levels of population susceptibility.

Measles control targets

In order to achieve the elimination objectives outlined above, very high vaccination coverage and low susceptibility levels are needed, especially in closed settings such as schools where contact rates are high. Uniformity of coverage is also important, because pockets of susceptible persons are capable of perpetuating

endemic transmission. The following vaccination coverage targets have been set, and should be pursued in all socioeconomic and ethnic groups, and in all regions.

By 2000:

- 95 per cent coverage of school children with an additional dose of vaccine in a school based campaign;
- 80 per cent coverage of children with two doses of measles-containing vaccine by school entry. **

By 2001:

- 95 per cent coverage of children with one dose of measles containing vaccine by their second birthday (10% susceptibility);
- 95 per cent coverage of children with at least one dose, and 90 per cent with two doses of measles containing vaccine by school entry (5% susceptibility).

Subsequent targets will depend upon progress towards measles elimination.

Measles Surveillance Tasks

Surveillance is an essential component of enhanced measles control initiatives. Very high quality active and passive surveillance is now necessary to determine whether measles elimination objectives and coverage targets are being achieved. In this strategy, measles surveillance tasks are described under the following headings:

1. Case definitions, diagnosis, and investigation.
2. Enhancing surveillance.
3. Outbreak investigation.
4. Monitoring measles vaccination coverage and population susceptibility.
5. Monitoring vaccine safety and effectiveness.

1. Case definitions, diagnosis, and investigation

For a measles elimination initiative, disease surveillance must fulfil several functions. In addition to measuring case rates and characterising populations at high risk for infection, we need to be able to:

- Detect cases and the source of infection rapidly so that timely control measures can be implemented;
- Detect interruption or resurgence of indigenous measles transmission;
- Detect importation of measles;
- Monitor serious complications of measles infection (death, encephalitis, seizures, and pneumonia).

1.1. Measles case definitions

1.1.1. Suspected infection

A sensitive clinical definition is needed for the early detection of outbreaks and imported infection, and for timely interventions.

*A suspected case is an illness with all of the following features: morbilliform rash, cough, and fever present at the time of rash onset.*⁹

** This was the target prior to the campaign, although 90 per cent may now be more appropriate

(The Pan American Health Organisation accepts any illness diagnosed as measles by a clinician as a suspected case. This more sensitive definition may need to be adopted as we approach elimination.⁶)

1.1.2. Laboratory confirmed infection

As measles becomes well controlled, the positive predictive value of clinical diagnosis becomes poor, especially for young children and sporadic disease, and laboratory based surveillance becomes increasingly important.¹⁰ Laboratory confirmation should be sought on all sporadic clinical notifications, and at least two cases during an outbreak. However, case investigation should not be delayed pending laboratory results (see section 1.3).

Criteria for laboratory confirmation:

- A positive test for measles-specific IgM; or
- Isolation of wild measles virus from a clinical specimen; or
- A diagnostic rise in measles antibody titres in paired sera.

A laboratory confirmed case does not need to meet any clinical criteria (except for serologically diagnosed cases who received a measles containing vaccine 6-45 days prior to testing - see section 1.2.4).

1.1.3. Rejected measles infection

A **rejected case** is an illness which is:

- Initially categorised as suspected measles; and
- Subsequently found to have negative measles serology, and/or diagnosed as having an alternative cause based on laboratory evidence.

1.1.4. Epidemiological linkage

This category can provide additional evidence for measles infection in instances where laboratory confirmation is unavailable, or is equivocal (e.g. serodiagnosis following immunisation).

A measles case is **epidemiologically linked** if:

- There was exposure to a laboratory confirmed case during their infectious period (4 days before to 4 days after rash onset); and
- This exposure occurred within the expected incubation period of the case under investigation: 7-18 days (mean 14 days) before rash onset.¹¹

Exposure must be face-to-face or in a confined setting such as a class room.

1.1.5. Imported infection

Importation of infection poses an ongoing risk during the elimination phase of measles control. An increasingly large proportion of measles notifications in Britain and in the USA are attributable to imported infection.^{10,12}

International importation:

A confirmed case whose rash onset is within 18 days of arrival in Australia.

The last country visited prior to arrival in Australia should be recorded on the case investigation form (Appendix A).

All other cases are considered **indigenous**. All indigenous cases are further categorised as either epidemiologically linked to an internationally imported case (see above definition of linkage); or not linked epidemiologically to an internationally imported case.¹³

Interstate importation

A confirmed case whose rash onset is within 18 days of entering the State or Territory. All other cases are considered local to the State or Territory.

These definitions are intended to maximise detection of importation, and therefore will incorrectly label some locally acquired infections as imported.**

1.2. Laboratory diagnosis

1.2.1. Serological diagnosis

Serum anti-measles IgM antibody testing is recommended for diagnosis of acute measles infection. The indirect enzyme immunoassay (EIA) is recommended for routine laboratory diagnosis, because it is relatively quick and convenient to perform. The test characteristics of commercially available indirect IgM EIAs are variable. The sensitivity and specificity of one such assay were estimated to be 86 per cent and 81 per cent respectively.¹⁵ Until further data are available, any of the commercially available kits for measles IgM are considered satisfactory for routine diagnosis.

Timing of specimen collection

Detailed data regarding the optimum timing of specimens for IgM serology has been obtained using a measles capture IgM assay developed by the Centers for Disease Control and Prevention (CDC). This assay was frequently positive at the onset of rash illness, about 80 per cent sensitive within 72 hours of onset, 100 per cent between 4-14 days, falling to 94 per cent at 4 weeks and 64 per cent at 6 weeks.¹⁶ Therefore, a negative EIA test for IgM on serum sampled more than 72 hours after rash onset is very reliable, especially when measles is rare. However, when initial anti-measles IgM antibody is negative, but serum was sampled within the first 72 hours of rash onset, repeat serum sampling for IgM and IgG estimation is recommended after 14 days (range 10-30 days).

Blood collection requirements

Laboratories generally require a minimum of 1mL clotted blood for serology. Blood can be tested from a finger-prick or heel-prick, but venipuncture is less traumatic in the hands of an experienced person. The testing laboratory should be consulted if doubts exist regarding the minimum volume of blood required. It is also possible to test blood which has been collected onto filter paper and air-dried, but this method is not routinely available in Australia.

1.2.2. Confirmatory testing and quality assurance

As the incidence of true measles declines, so too will the positive predictive value of measles serodiagnosis; while the reliability of a negative test improves. Confirmatory testing of IgM positive cases will be needed to achieve

** A more specific definition for interstate importation is recommended by the Centers for Disease Control: A confirmed case who was outside the State/Territory for the entire incubation period (7-18 days before rash onset).¹⁴

acceptable diagnostic accuracy. In Australia, during inter-epidemic periods, all measles IgM positive and equivocal sera should be forwarded to a reference laboratory for confirmatory testing. During measles outbreaks, when positive tests are more likely to be reliable, a random sample only of IgM positive sera should be forwarded.

In Australia, the recommended reference laboratory confirmatory test for acute measles infection is the IgM capture EIA assay. This assay has been evaluated by the Centers for Disease Control and Prevention (CDC), and its sensitivity and specificity have been estimated to be 97 per cent and 99 per cent respectively.^{17,18} This assay has also been used in regional reference laboratories by the Pan American Health Organisation (PAHO) for confirmatory testing of all sera positive or indeterminate by commercial indirect IgM measles assays in screening laboratories, as well as a 10 per cent random sample of negative sera.⁶ A reference laboratory network is currently being established in Australia to provide confirmatory measles testing and serological quality assurance.

1.2.3. Alternative methods of diagnosis

Serodiagnosis may also be made by demonstrating IgG seroconversion (change from negative to positive) or rise in measles specific IgG antibodies. Measles specific IgG generally peaks approximately two weeks after onset of rash.¹⁹ Paired sera are collected 10 to 30 days apart, the first of which should be sampled in the week following rash onset, and the sera are tested simultaneously. For reasons of convenience and timeliness, IgG testing is not recommended for routine measles diagnosis, but is necessary for measuring population susceptibility.

A variety of methods are available for detection of measles IgG or total antibody. Plaque reduction neutralisation (PRN) is the gold standard assay for determining protective immunity to measles,²⁰ although measles specific antibody detectable by any test has been considered to represent immunity.²¹ Quantitative assays such as immunofluorescent assays, neutralisation, haemagglutination inhibition (HAI), complement fixation tests (CFT) and PRN, may be used to demonstrate four fold rises in measles antibody, unlike EIA which is a semi-quantitative assay, and cannot be routinely used in this manner.²² CFT are no longer recommended for measles diagnosis, and HAI is known to have inferior sensitivity compared to more modern assays.¹⁹

1.2.4. Serodiagnosis following immunisation

Following measles immunisation, seroconversion usually occurs, and measles specific IgM may be detected for one to two months. Serologically diagnosed cases who received a measles containing vaccine 6-45 days prior to testing should be classified as confirmed measles only if they are also linked epidemiologically to another confirmed case.¹⁴ Viral culture and molecular methods can distinguish between vaccine virus and wild strains.²³

1.2.5. Viral culture and molecular epidemiology

Viral culture is not currently recommended for routine diagnosis of acute measles. However, characterisation of measles isolates will become important in discerning whether future measles outbreaks are caused by strains of

domestic origin - which implies failure to interrupt local transmission - or by imported strains of measles.

In the USA, molecular epidemiological analysis based on nucleotide sequencing of either haemagglutinin or nucleoprotein genes has been used together with standard epidemiological techniques to provide this capability. It appears that a single indigenous measles genotype was once prevalent in the USA. Now the situation is more heterogeneous, and an increasing proportion of cases are caused by measles strains previously seen largely in Japan, Europe, and Africa.²⁴ Currently, eight genotypic groups of measles are known to be circulating worldwide.²⁵ A global network and a standard system of genotype nomenclature is being developed to help track measles transmission world wide.

Characterisation of a representative sample of current and past Australian isolates is required prior to the vaccination campaign, to enable these powerful molecular epidemiological tools to be employed during the elimination phase.

When to collect specimens for culture

Specimens for culture should be collected from at least one case in every chain of measles transmission (2 or more epidemiologically linked cases), and from at least two cases during an outbreak investigation (Section 3.1.2). The yield from sporadic cases is likely to be low, because clinical diagnosis is unreliable in this setting. A nasopharyngeal aspirate is the specimen of choice for measles culture. Urine, heparinised blood and throat swabs are also suitable specimens. Culture should be performed simultaneously with initial serology, rather than waiting for serological confirmation, as measles virus is rarely shed for more than a few days after onset of rash. The virus may be present in respiratory secretions for up to one to two days after onset of rash,²⁶ and in the urine for up to 10 days.²⁷ Contact a reference laboratory regarding the best method of specimen collection and transportation before sending specimens for culture. All positive measles cultures must be referred for molecular typing.

1.2.6. Salivary antibody testing

For diagnosis

It can be difficult to obtain serological confirmation for a large number of suspected measles cases, and considerable interest has been focussed on the possibility of convenient, non-invasive diagnosis of measles using salivary specimens. Saliva has been shown to contain measles specific IgM antibodies in greater than 90 per cent of cases where measles IgM is present in serum.^{16,28} Salivary measles IgM testing is now in routine use in measles surveillance in the United Kingdom, but not as yet in the USA.¹⁰ There are technical difficulties with serological tests of saliva, and currently these tests are not available for routine diagnosis of measles in Australia.

For serological surveys

Salivary antibody tests have also been used for seroprevalence studies in paediatric populations. Unfortunately, salivary detection of measles IgG antibodies is very insensitive compared with their detection in serum, and it is unlikely that this method will be useful for population surveys of susceptibility.²⁹

1.2.7. Differential diagnosis

Several other infectious diseases can mimic measles, and when measles is well controlled, the majority of suspected cases have alternative aetiologies. The most common of these are: Human herpes virus 6 (exanthem subitum), rubella, enterovirus, and Human parvovirus B19.¹⁰ In cases of suspected measles which are rejected on the basis of serological testing, it is recommended to test for rubella, and other diseases as clinically indicated. Measles reference laboratories will intermittently measure prevalent causes of rash illness by cross-sectionally testing negative sera for a variety of pathogens. This will provide supportive evidence for measles elimination in later stages of the campaign.

1.3. Case investigation

All cases (suspected and confirmed)

Following a report of suspected measles, clinical information needs to be collected to establish whether a notified case meets the clinical case definition described in Section 1.1.1. As soon as possible after notification, collect serum for testing on all suspected cases, and specimens for culture where indicated (see section 1.2.5).

It is important to collect accurate and complete immunisation histories on all cases, including the number of doses and dates when measles-containing vaccines were given. Wherever possible, documentation of vaccination should be sought from written records or registers. This may be difficult for teenagers and adults, for whom self report may be the only available source of information. Document the source of immunisation information on the data collection form (Appendix A).

Collecting demographic data helps characterise cases and detect temporal or geographic clustering of cases. Monitoring disease outcomes, such as death and encephalitis is also important, because the main purpose of measles control is to prevent severe illness and death. Enhanced surveillance is likely to increase notifications of suspected measles, but an increasing proportion of these may be mild or modified by prior vaccination.

Look for the source of infection in all cases of measles. When no apparent history of exposure exists, look for situations where unrecognised exposure may have occurred, such as: day care, school, air travel, indoor sporting events, and contact with overseas visitors.

Appendix A is a sample form which summarises the core data that should be collected during case investigation. These data will be collected and collated at a national level, but additional data will be required for individual case follow up and evaluation of surveillance at a local level, including: the identifying data for reporting authorities, doctors and laboratories, affected institutions, and contacts; dates of laboratory specimen reception and reporting.

Confirmed and epidemiologically linked cases

Identify contacts, establish their immunisation status, and assess the potential for further transmission. Contacts are persons who have been exposed, for any length of time, to a laboratory confirmed or epidemiologically linked case during their infectious period (4 days before to 4 days after rash onset); exposure must be face-to-face or in a

confined setting such as a class room. Measles is highly infectious and brief exposure can result in infection. Transmission is most likely to occur in confined settings and institutions, and to those without documented vaccination. Contacts aged 12 months to four years should receive measles-mumps-rubella (MMR) vaccination if they do not have documented evidence of prior vaccination. Contacts aged 5 years and over who are attending primary and secondary schools should be vaccinated with MMR if they are not up to date with the new MMR schedule - that is, have not received two doses of a measles containing vaccine. Contacts should be vaccinated within 72 hours of exposure. Vaccination is not harmful if given later, but it is unlikely to prevent infection.

Refer to the NHMRC document *Measles: guidelines for the control of outbreaks in Australia* for current recommendations regarding: the use of normal human immunoglobulin in contacts who are immunosuppressed or aged less than 12 months; vaccination of high risk populations such as Northern Territory Aboriginals; exclusion of cases and contacts.¹

1.4. Data flow, analysis and reporting

Notification data should be forwarded weekly to State authorities, and fortnightly to the National Centre for Disease Control. Case investigation data for both suspected and confirmed cases should be forwarded for State and national collation.

Notification data should be reviewed daily at a local level, and fortnightly nationally. Data should be presented by age, sex, vaccination status, and locality at the local government area (by States), and by State and Statistical Division nationally. Data analysis and interpretation should be disseminated at State and national levels at least fortnightly, preferably in a dedicated measles control report.

2. Enhancing surveillance

Existing state-based disease notification systems - which rely primarily upon unsolicited reports from doctors, laboratories, and hospitals - provide a sound basis for enhanced measles surveillance. However, enhancing surveillance through additional case finding is required for successful measles elimination.

2.1. Improving case ascertainment

New cases must be notified by telephone to the local or State/Territory health authority, and an attempt must be made to confirm the diagnosis within 24 hours of notification. Case investigation will help identify source cases and subsequent transmission to other settings. Additional cases must be sought intensively and notified separately. In this way, a chain of measles transmission must be pursued as far as possible. For sporadic cases this will usually involve interviewing: the person who notified the case, the case or one of their family members and the case's school or workplace. As a rule of thumb, seek additional cases with rash onset three weeks before and after that of the index case.

2.2. Active surveillance

Active surveillance is the process of seeking measles cases other than through routine unsolicited reports. It should be used to evaluate, stimulate, and hasten routine

surveillance mechanisms where deficiencies are expected, for example in areas of low vaccination coverage and low measles incidence. Active surveillance can involve contacting schools, doctors, laboratories, and hospitals, seeking cases that have not already been notified. Reviewing additional disease registers or data sets which are not analysed routinely - such as emergency department and laboratory registers - can help determine the magnitude, geographic extent, and beginning and end of outbreaks. Case finding methods need to be tailored to local health services and surveillance objectives. For example, determining the extent of a measles outbreak in a remote community will require a different approach to evaluating the sensitivity of passive surveillance for hospital admissions in an urban health area. In view of the measles vaccination campaign, by July 1998 local health authorities must review mechanisms for quickly instituting active surveillance for measles via local laboratories and health services, and in local communities and institutions at high risk for measles outbreaks.

Alternative data sources

Inpatient statistics and mortality data provide valuable alternatives for examining secular trends in rates of severe disease. These data may be less affected by ascertainment bias than notifications. However, medical and administrative staff of hospitals must ensure that cases admitted for treatment of measles complications, have measles mentioned in the admission and discharge diagnoses. These data sets should be examined and compared to disease notification data at least annually. In addition, where identifying fields are available, cross checking these data against measles notifications can identify deficiencies in the completeness of case ascertainment and outcome monitoring.

2.3. Monitoring surveillance quality

There is no single disease control indicator for measles - such as acute flaccid paralysis for poliomyelitis - which allows an independent means of monitoring measles control. Therefore, quality assurance is operational, rather than validating using an alternative measure for measles incidence. The following will be used as key operational indicators of measles surveillance quality:

1. The proportion of all cases that are subjected to laboratory testing for measles;
2. The median time from rash onset to specimen collection;
3. The median time from specimen collection to notification of the local / State health authority; and
4. Percentage of cases with data on immunisation status.

3. Outbreak investigation

Monitoring and investigating measles outbreaks provides valuable information for control initiatives, and helps strengthen surveillance. Outbreak investigations help characterise populations at risk, and may be used to answer specific research questions. They provide an excellent opportunity to measure vaccine effectiveness, and to evaluate new diagnostic methods.^{30,31} A full description of an approach to outbreak investigation is beyond the scope of this document, and only a framework is provided.

3.1.1. Outbreak definition

Two or more laboratory confirmed cases which are related in time and place, or a single laboratory confirmed case in an institution (e.g. school).

As a rule of thumb, cases are considered related in time if the serial interval (time from rash onset in the first to rash onset in the second) is three weeks or less. As we move to towards elimination every confirmed measles case should be considered an outbreak.

3.1.2. Outbreak investigation

When clusters of suspected measles occur, an attempt should be made to obtain serological confirmation, and samples for culture, on at least two cases. For confirmed measles cases, the standard case investigation form can be used, but it may not be possible to complete these data for all suspected cases.

A minimum outbreak investigation would:

- Ascertain age and immunisation status for all suspected cases;
- Assign a unique outbreak name or number to help identify the cases which form part of an outbreak (Appendix A);
- Complete the data collection form for the index case and at least two confirmed cases; and
- Estimate age-specific immunisation coverage for the population/region affected by the outbreak. These data may be extracted from immunisation registers, by examining data from previous surveys, or by performing a new survey.

3.1.3. Monitoring outbreaks

Collecting outbreak investigation data in this way will allow outbreaks to be evaluated in more detail using surveillance data. The regional frequency of outbreaks will be compared - a dot map showing the distribution of outbreaks by health area is a helpful way to present these data. The interval between outbreaks may also be examined by region, and can be used to anticipate the timing of outbreaks.

Performance indicators will also be used to monitor the quality of outbreak investigations. For example, the proportion of outbreak cases with vaccination data; and the proportion of outbreak investigations where at least one specimen was submitted for viral culture.

4. Monitoring vaccination coverage and population susceptibility

Measuring vaccination coverage and population susceptibility determines whether control targets are being reached, and helps predict outbreaks and plan vaccination strategies.

4.1. Vaccination coverage

Vaccination coverage is a key indicator of campaign success and predicts measles control. The following are some important principles regarding vaccination coverage monitoring in the setting of a measles elimination initiative.

4.1.1. Monitoring the routine immunisation schedule

The Australian Childhood Immunisation Register (ACIR) is now yielding quarterly reports for measles coverage on cohorts of 2 year old children who were born since the ACIR commenced in January 1996. These coverage reports are presented by State, but similar tabulations will be used to report data to the level of local government area for use by local immunisation program managers. Routine performance indicators are currently being developed to monitor the quality of ACIR coverage data. In addition, a mechanism is being developed to quickly identify regions or providers that are not achieving coverage targets, so that appropriate improvements can be planned.

At present data are scanty regarding coverage with the second dose of MMR. When the second dose of measles vaccination is brought forward and is given to preschool children instead of adolescents, this dose will also be monitored using the ACIR.

In addition, surrogate measures of coverage, such as vaccine distribution, should be monitored. This will aid interpretation of trends in ACIR data during the initial years of its operation, when apparent improvements in coverage may actually represent improved participation. Intermittent cross-sectional surveys will also be used to validate ACIR coverage data. Coverage should also be measured during outbreak investigations (see section 3.1.2).

4.1.2. Mass vaccination campaign

Vaccination registers are not suitable for measuring coverage during the school based campaign. The ACIR collects data only for children under 7 years of age, so tally sheets will be used by school vaccination teams to count vaccine doses versus students enrolled. Preschool doses, given by the child's usual provider, will be measured using the ACIR.

4.2. Measles susceptibility

As measles is controlled and fewer cases occur, estimates of population susceptibility obtained from serological surveys become an increasingly important source of information regarding the success of the measles elimination program. The National Centre for Immunisation Research and Surveillance of Vaccine Preventable Diseases (NCIRS) plans to conduct regular serological surveys every two to three years for persons aged 2 to 60 years. These regular serosurveys will be conducted by testing serum residues from blood samples which are referred routinely to major public health laboratories in all States and Territories. These sera will be tested for a range of vaccine preventable diseases including measles and rubella. Blood samples referred from immunosuppressed persons will be excluded.

This serological surveillance will help evaluate the effects of moving the second dose of MMR from adolescence to preschool. It will allow us to monitor changes in measles susceptibility, and confirm that the prevalence of rubella susceptibility remains low in women of child bearing age. Susceptibility data can also be used in conjunction with mathematical modelling to predict the expected timing, size, morbidity, mortality, and age distribution of outbreaks.^{32,33} Serological surveillance has been used

routinely in Britain for the past 10 years, and using these data it was predicted that a large measles outbreak would occur in Britain in 1994.³⁴ A mass vaccination campaign of school children was implemented in response to this, and it appears that the expected outbreak has been successfully prevented or delayed.^{10,35,36} More recently, it was predicted that a measles outbreak would occur in New Zealand during the years 1997-98, and an outbreak did occur in early 1997.³⁷

5. Monitoring vaccine safety and effectiveness

5.1. Vaccine safety

The MMR vaccine licensed in Australia has an excellent safety record. Fever, occurring 6 to 11 days after vaccination is the most commonly reported adverse event.³⁸ However, the majority of persons in catch-up campaigns are already immune to measles, and consequently vaccine virus related adverse event rates (AEs) are usually lower than for vaccination at 12 months of age.⁵ Despite this, because catch-up campaigns are necessarily well publicised and a large number of vaccinations are administered over a short period of time, the absolute number of events in any reporting period is increased. As a result, public anxiety regarding AEs is often heightened during mass campaigns.³⁹

In order to maintain public confidence, adverse events to vaccines used in mass vaccination campaigns should be given a high priority. It is important to inform doctors and measles campaign staff regarding possible AEs, and remind doctors regarding the importance of AE reporting. A detailed description of the adverse events associated with MMR vaccination is available in the 6th Edition of the *Australian Immunisation Handbook*.² Reports of adverse events should be made to the State/Territory health departments, or to measles campaign staff. Providing a 24 hour telephone hot-line may also improve the timeliness of AE reports and public confidence. However, the staff supporting such services must be well briefed on recent controversies regarding MMR vaccine safety, and capable of fielding AE reports or referring them appropriately.

During the mass vaccination campaign, State/Territory AE reports, including outcomes of serious events such as convulsions, should be updated daily and sent to the State or Territory vaccination team. For the routine schedule, AE rates will be calculated using the number of vaccinations reported to the ACIR as the denominator. During mass campaigns, vaccination tallies collected by the vaccination teams will be used for this purpose. Background national rates for some of the diseases which may be confused with vaccine related events - such as encephalitis and Guillain-Barré syndrome - can be estimated using alternative data sources such as inpatient statistics data and surveillance for acute flaccid paralysis. These comparative data will be useful during the vaccination campaign, to evaluate whether reporting rates during the campaign differ from pre-existing rates.

5.2. Vaccine effectiveness

In the future, when more accurate coverage data are available and vaccination status is collected for measles notifications, surveillance data will be used to monitor measles vaccine effectiveness (VE).⁴⁰ Accurate coverage statistics are needed, because small changes in coverage

can markedly influence calculations of VE using the 'screening' method. Coverage data, must also reflect the populations and age groups from which notification data originate. Notification biases influence 'screening' estimates of VE, so trends will be more reliable than absolute values. Outbreak investigations can also be used to evaluate measles vaccine effectiveness.³¹

5.3. Cold chain monitoring

Monitoring the cold chain is an important quality control measure which cannot be addressed adequately in this surveillance plan. Guidelines for transport and storage of vaccines are outlined in the Australian Immunisation Handbook.² MMR vaccine is distributed as a freeze dried preparation, and prior to reconstitution it is relatively resistant to fluctuations in temperature. Data regarding the adequacy of MMR vaccine storage and transport do not need to be collated and analysed nationally.

Conclusion

This strategy recommends numerous surveillance enhancements that are required to support a measles elimination initiative in Australia. The key elements of this strategy are:

1. Revised control targets both for measles vaccination coverage and population susceptibility (page 42).
2. Uniform, simple, and sensitive measles case definitions; including a definition for imported infection (Section 1.1).
3. Pursuing serological testing (IgM) for all suspected measles cases; and referral of all positive sera from sporadic cases to a reference laboratory for confirmation (Sections 1.2 and 1.3).
4. Collecting specimens for culture from at least two cases in a measles outbreak, and referring all positive cultures for molecular typing (Section 1.2.5).
5. Uniform case investigation, and (minimum) data collection which includes vaccination status for all notifications (Section 1.3).
6. The use of active surveillance to evaluate and enhance routine surveillance mechanisms (Section 2.2).
7. The use of standard indicators to monitor the quality of surveillance data (Section 2.3).
8. Investigation of all measles outbreaks, collecting uniform (minimum) data regarding the outbreak (Section 3).
9. Enhancing surveillance of adverse events following immunisation (Section 5.1).
10. National serological surveys to monitor the effectiveness of the measles immunisation program and the effects of changes to the MMR vaccination schedule.

The surveillance enhancements outlined in this strategy should be instituted as soon as possible, so that they are functioning before the first stage of the elimination campaign commences in July 1998. Undoubtedly, these activities will require considerable additional resources, quite apart from the costs of a mass vaccination campaign. Costing estimates of these surveillance activities are needed. High quality surveillance is integral to successful measles elimination, and should not be considered as a separate cost. It is possible that the Measles Control Campaign will eliminate rubella and mumps. Similar, and

integrated surveillance strategies are required for these diseases.

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Appendix A

Measles Data Collection Form

State/Territory	Reporting GP/Clinic/Laboratory/Hospital		Address		Phone	
	Patient Surname		First Name			
	Address (No. & Street)		Town/Suburb		Phone	
Patient Details	Postcode	State/Territory	Notification date - state		State/Territory Identification No.	
	Date of Birth		Date received - national			
	Day Month Year		Day Month Year		<input type="checkbox"/> M=Male, F=Female, U=Unknown <input type="checkbox"/> A=Aboriginal or Torres Strait Islander <input type="checkbox"/> N=Not Aboriginal or Torres Strait Islander <input type="checkbox"/> U=Unknown	
	Age	Unit (if DOB unknown)		ATSI origin		
Unknown=99		Y=Years, M=Months (if < 2 years)		<input type="checkbox"/> U=Unknown		
Clinical data	<input type="checkbox"/> Morbilliform rash? <input type="checkbox"/> Cough? <input type="checkbox"/> Fever at time of rash onset? Y=Yes, N=No, U=Unknown		Date of rash onset			
			Day Month Year			
Complications	Hospitalised?		Date of hospitalisation		Date of death	
	<input type="checkbox"/> Y=Yes, N=No, U=Unknown		Day Month Year		<input type="checkbox"/> Died? Day Month Year	
	Days hospitalised		Pneumonia?		Cause of death	
	Unknown=99		<input type="checkbox"/> Y=Yes <input type="checkbox"/> N=No <input type="checkbox"/> U=Unknown			
Laboratory	Was laboratory testing for measles done?		If laboratory confirmed, date of first positive test report			
	<input type="checkbox"/> Y=Yes, N=No, U=Unknown		Day Month Year			
	Serum IgM	Date specimen taken	Result	P=Positive N=Negative R=Diagnostic rise / seroconversion I=Intermediate E=Pending X=Not done U=Unknown		
	Serum IgG*	Day Month Year	<input type="checkbox"/>	Note: positive diagnosis by IgG requires seroconversion or diagnostic rise in paired sera. *For IgG specimen date, only provide the date the second serum was taken.		
Culture	Day Month Year	<input type="checkbox"/>				
Epidemiological	Date case investigation started		Where did this case most likely acquire measles? (1-9)		1=Home 2=Day care/pre school 3=Primary school 4=Secondary school 5=University/college 6=Workplace 7=Health care facility 8=Remote community 9=Other 10=Spread to > 1 setting 99=Unknown	
	Day Month Year		<input type="checkbox"/>		If yes, country arriving from _____ If yes, State/Territory arriving from _____	
	<input type="checkbox"/> Epi-linked? Y=Yes, N=No, U=Unknown <input type="checkbox"/> Was there further documented spread from this case? Y=Yes, N=No, U=Unknown		<input type="checkbox"/>			
	<input type="checkbox"/> If epi-linked, was this case linked to an imported case? Y=Yes, N=No, U=Unknown		<input type="checkbox"/> If yes, where did it spread to? (1-10)			
	<input type="checkbox"/> Outbreak related?		<input type="checkbox"/> Did this case arrive from overseas less than 18 days before rash onset? Y=Yes, N=No, U=Unknown			
	Outbreak name / number		<input type="checkbox"/> Did this case arrive from interstate less than 18 days before rash onset?			
Vaccination	<input type="checkbox"/> Ever had measles containing vaccine?		Date given		Information source	
	<input type="checkbox"/> Number of doses of measles containing vaccine prior to illness onset?		1st Day Month Year		<input type="checkbox"/> 1=Parental recall / self report <input type="checkbox"/> 2=Parent record <input type="checkbox"/> 3=Provider record <input type="checkbox"/> 4=ACIR record <input type="checkbox"/> 5=State/Local govt. register <input type="checkbox"/> 6=Other <input type="checkbox"/> 9=Unknown	
			2nd Day Month Year			
			3rd Day Month Year			
Final	Final case classification					
	<input type="checkbox"/> S=Suspected, C=Laboratory confirmed, X=Lost to follow-up					

Implementing a system of enhanced surveillance for measles in Victoria

The Enhanced Measles Surveillance Working Party

Abstract

In response to identified deficiencies in the passive surveillance system for measles in Victoria and the move towards local disease elimination and global disease eradication, a system of enhanced measles surveillance was introduced in 1997. Each case is contacted and a structured telephone questionnaire is completed, collecting information on symptomatology and encouraging serological confirmation, if not already performed. The introduction of a paediatric phlebotomy service to collect serum specimens in the case's home, has led to a dramatic increase in the proportion of cases where testing is performed, reaching nearly 90 per cent by the end of 1998. The median time from notification to specimen collection is one day. The Victorian approach to the enhanced surveillance of measles provides a framework for similar systems as Australia approaches disease elimination. *Commun Dis Intell* 1999; 23:51-54

Introduction

In 1996, the Centers for Disease Control and Prevention (CDC), the Pan American Health Organization (PAHO), and the World Health Organization (WHO), jointly acknowledged the importance of surveillance in measles elimination and that laboratory confirmation of measles will play an increasingly important role as incidence declines.¹ They recommended that surveillance data be collected on a case-by-case basis at an early stage of the elimination program, and that all single cases of measles and at least one case from each chain of transmission be laboratory confirmed.

In 1997, the Enhanced Measles Surveillance Working Party was established to oversee the running of measles surveillance in Victoria. This is a collaborative group with representatives from the Department of Human Services (DHS), the Microbiological Diagnostic Unit (MDU), and the Victorian Infectious Diseases Reference Laboratory (VIDRL). We report details of the methods used to enhance passive surveillance of measles in Victoria.

Enhanced surveillance methods

In Victoria, medical practitioners and laboratories are required to notify DHS immediately on initial diagnosis of measles whether presumptive or confirmed. In addition to this, informal reports are frequently received from other sources, such as child care centres and schools. These informal reports are followed up and those patients who have not consulted a medical practitioner are advised to do so. Medical practitioners who have diagnosed measles but failed to notify are contacted to both verify the diagnosis and advise of the requirement to notify.

For each notification of measles, we attempted to interview the case or the case's guardian using a structured telephone questionnaire. We collected a range of detailed information including: clinical symptoms of suspected measles as specified by the National Health and Medical Research Council;² self-reported immunisation history and past history of disease. We confirmed demographic details and, if not already performed, encouraged serological confirmation of disease. After the first six months we enhanced our efforts to obtain serological confirmation by

offering the services of an experienced paediatric phlebotomist who collected clinical specimens in the case's home at no charge to the patient.

We established an enhanced measles surveillance database to collate the detailed information from interviews and test results. We review the measles database for completeness and accuracy at a weekly meeting between DHS and VIDRL staff.

Laboratory methods

Specimens

Specimens for laboratory confirmation of clinical measles are collected during a nurse's visit immediately upon notification to DHS, Victoria. A 5 mL tube of clotted blood for serology is always collected subject to consent. Since mid 1998, specimens for recovery of measles viruses have been sought. A further 5 mL tube of anticoagulated blood and a 5-10 mL specimen of urine are collected for viral culture and/or direct polymerase chain reaction (PCR) if these can be obtained within one week of rash onset. The nurse was also equipped to obtain a nasopharyngeal aspirate, or failing this a throat swab if these can be obtained within five days of rash onset.

When neither measles IgM or IgG antibody are detected in serum obtained within four days of rash onset, and in the absence of an alternative laboratory diagnosis, a second tube of clotted blood for convalescent serology is sought approximately three weeks after rash onset.

Serology

Sera are tested for measles specific IgM and IgG antibodies on the day of specimen receipt by enzyme immunoassay (EIA) (Behring Enzygnost). Sera in which measles specific IgM is not detected are tested for IgM and IgG antibodies to parvovirus B19 by EIA (Biotrin), to rubella by EIA (Sorin BioMedica and PanBio respectively) and human herpes virus type 6 by in house IFA using standard methods.

Viral Culture

Measles virus culture is undertaken from urine, nasopharyngeal aspirates, throat swabs and peripheral blood leucocytes (PBLs) using a primate lymphocyte cell

line (B95a) as previously described.³ Cells are examined for cytopathic effect for up to 14 days incubation and presence of measles virus is confirmed using PCR. Measles virus RNA is purified from cell culture isolates and directly from clinical specimens using standard methods RT-PCR is performed using PCR primers targeting the COOH terminal 450bp of the nucleoprotein gene as previously described.⁴

Is it measles?

We established a decision tree in order to classify suspected cases as measles in one of five categories: laboratory confirmed, rejected, epidemiologically linked to a laboratory confirmed case, compatible or not compatible (Figure 1). For reporting purposes we consider all cases to be measles unless proven otherwise (that is, classified as 'rejected' or 'not compatible').

Our aim is to classify all suspected cases as either 'laboratory confirmed' or 'rejected' but this is not always possible, particularly if no specimen has been collected. If serum is collected early (within 72 hours of rash onset), 23 per cent of true measles cases may not have developed an IgM response.⁵ These cases can be rejected if they are measles IgG positive but some cases are both measles IgM and IgG negative and have no alternate diagnosis. In this situation we classify cases on the basis of their clinical symptoms² and attempt to obtain convalescent sera for those considered clinically 'compatible'. Detection of measles virus may assist in resolving the status of some of these cases since the collection of suitable specimens commenced in mid 1998.

Although measles IgM positive, we classify cases who have been vaccinated within 45 days of specimen collection as 'rejected' (unless they are epidemiologically linked to a laboratory confirmed case) as the antibody response is considered due to the vaccine virus.

Monitoring surveillance quality

In this issue of *Communicable Diseases Intelligence*, the National Centre for Immunisation Research and the Surveillance of Vaccine Preventable Diseases (NCIRS) presents a framework for measles surveillance as Australia approaches disease elimination.⁶ Part of this framework suggests specific process measures to be used for monitoring surveillance quality. The four suggested process measures are:

1. the proportion of all cases that are subjected to laboratory testing for measles;
2. the median time from rash onset to specimen collection;
3. the median time from specimen collection to notification of the local/state health authority; and

4. percentage of cases with data on immunisation status.

These measures appear to be designed for a system where the normal sequence of events is rash onset, specimen collection, and then notification. With the introduction of enhanced surveillance in Victoria, the normal sequence of events is rash onset, notification, and specimen collection arranged by DHS. For this reason we present modified process measures 2 and 3:

2. the median time from reported onset date to notification; and
3. the median time from notification to specimen collection.

Data are presented in six month time periods from the introduction of the paediatric phlebotomy service, July 1997.

There were 317 notifications of measles received from medical practitioners and laboratories by DHS between 1 July 1997 and 31 December 1998 (Table 1). Following introduction of the paediatric phlebotomy service, the proportion of cases who had serum collected has increased dramatically (Figure 2). We now obtain specimens from almost 90 per cent of notified cases. The specimens are collected with a median delay of one day from notification, and we have the results within 24 hours. Throughout the period the median delay from onset to notification has remained in the vicinity of six days. For those cases identified as 'laboratory confirmed' the median delay from onset to notification is 14 days.

Figure 2. Measles notifications by six month period of notification and serology status, Victoria, 1997 to 1998

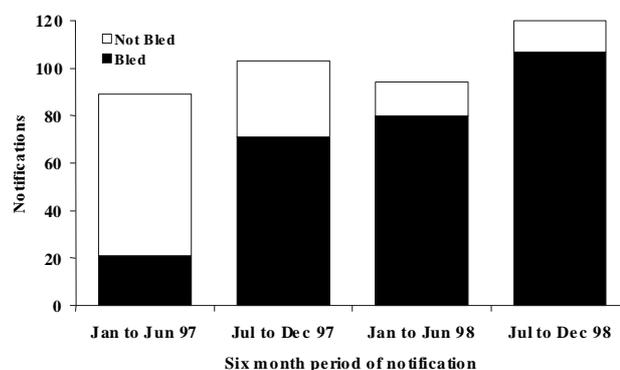


Table 1. Process measures for measles notifications in Victoria, July 1997 to December 1998

Six month period	Serum collected	Median delay illness onset - notification (number)	Median delay Notification - specimen collection (number)	Data on immunisation status
Jul 97 to Dec 97	71 / 103 (69%)	7 days (103)	1 day (57)	97 / 103 (94%)
Jan 98 to Jun 98	80 / 94 (85%)	8 days (94)	1 day (58)	92 / 94 (98%)
Jul 98 to Dec 98	107 / 120 (89%)	6 days (120)	1 day (92)	119 / 120 (99%)
Total	258 / 317 (81%)	7 days (317)	1 day (207)	308 / 317 (97%)

Discussion

Surveillance for measles in Victoria has been enhanced substantially through collaboration between the Victorian Department of Human Services and the Victorian Infectious Diseases Reference Laboratory. We believe a structured approach to each notification of measles and accurate recording of laboratory testing is necessary to determine when local transmission of disease has been interrupted and should be an essential component of a national strategy for elimination in Australia.

The use of process measures to monitor program quality is important. We know from our data that we are collecting specimens from a very high proportion of notified cases and that these are being collected within a day of notification (seven days from onset of illness). We consider that surveillance of measles in Victoria is now very high quality but we still need to reduce reporting delay.

A number of changes have been proposed to further augment the enhanced surveillance system, and to improve the quality of the data being collected. We intend to contact all laboratories in Victoria, making them aware of the enhanced measles surveillance program, and inviting their cooperation in providing measles IgM positive serum to VIDRL for confirmatory testing. With this contact, we will also identify those laboratories who perform in-house measles serology, and ask them to collect a core minimum dataset for each measles test performed. This will provide important supplementary information about testing patterns for measles virus in Victoria.

Finally, we intend to develop a pilot study involving active surveillance for rash illness. This study will be conducted in sentinel general practices and child care centres. The aim of this study is to identify the cause of rash illness in our community, and to ascertain if there are cases of measles going unrecognised by the current passive surveillance system.

The outcomes of the serological testing, and how these relate to various case definitions, are still being examined. However, in keeping with findings in the United Kingdom⁷ and Finland,⁸ the vast majority of notified cases who have testing performed are in fact not measles.

The Enhanced Measles Surveillance Working Party

Department of Human Services, Victoria

Ross Andrews

Debbie Gercovich

Stephen Lambert

Rosemary Lester

Pauline Lynch

Melissa Morgan

Victorian Infectious Diseases Reference Laboratory

Mike Catton

Heath Kelly

Jennie Leydon

Microbiological Diagnostic Unit, University of Melbourne

Geoff Hogg

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Early influenza A outbreak in a Sydney nursing home

Reported by Mark Ferson, Director, South Eastern Sydney Public Health Unit

South Eastern Sydney Public Health Unit is investigating an outbreak of acute respiratory illness among residents of a local nursing home.

Of the 70 residents, 35 were affected with fever, cough and lethargy with onset between 11 and 20 February 1999. Eight residents have been hospitalised with pneumonia. Throat swabs collected on 13 February were processed at SEALS Virology Laboratory and to date influenza A has been isolated from three of 14 specimens. Serological studies are also in hand. A small number of deaths have occurred.

A vaccination program for residents and staff has been conducted. The use of amantadine was being considered but decided against.

(Due to delayed publication it has been possible to provide this recent information.)

Surveillance data in *CDI*

The Communicable Diseases Surveillance section of *Communicable Diseases Intelligence (CDI)* includes reports from a number of national surveillance schemes. These schemes are conducted to monitor the occurrence of communicable diseases in Australia, to detect trends, to highlight needs for further investigation and to implement or manage control measures. This article describes the surveillance schemes which are routinely reported on in *CDI*.

Surveillance has been defined by the World Health Organization as the 'continuing scrutiny of all aspects of the occurrence and spread of disease that are pertinent to effective control'. It is characterised by 'methods distinguished by their practicability, uniformity, and frequently by their rapidity, rather than complete accuracy'.¹ Although some surveillance schemes aim for complete case ascertainment, some include only a sample of all cases of the conditions under surveillance, and these samples are subject to systematic and other biases.

Results generated from surveillance schemes must be interpreted with caution, particularly when comparing results between schemes, between different geographical areas or jurisdictions and over time. Surveillance data may also differ from data on communicable diseases which may be gathered in other settings.

The major features of the surveillance schemes for which *CDI* publishes regular reports are described below. Other surveillance schemes for which *CDI* publishes occasional reports include the National Mycobacterial Surveillance System (*Commun Dis Intell* 1998;22:173-183), the Australian Mycobacterium Reference Laboratory Network (*Commun Dis Intell* 1998;22:183-188), the Hib Case Surveillance Scheme (*Commun Dis Intell* 1997 21:173-176) and the National Neisseria Network (*Commun Dis Intell* 1998;22:205-211 and *Commun Dis Intell* 1998;22:212-216).

National Notifiable Diseases Surveillance System

National compilations of notifiable diseases have been published intermittently in a number of publications since 1917.² The National Notifiable Diseases Surveillance System (NNDSS) was established in 1990 under the auspices of the Communicable Diseases Network Australia New Zealand (CDNANZ).

The system coordinates the national surveillance of more than 40 communicable diseases or disease groups endorsed by the National Health and Medical Research Council (NHMRC).³ Under this scheme, notifications are made to the State or Territory health authority under the provisions of the public health legislation in their jurisdiction. Computerised, de-identified unit records of notifications are supplied to the network secretariat at the Department of Health and Aged Care for collation, analysis and publication in *CDI*.

Data provided for each notification include a unique record reference number, State or Territory code, disease code, date of onset, date of notification to the relevant health

authority, sex, age, Aboriginality, postcode of residence, and the confirmation status of the report (as defined by each State or Territory).

Each fortnight, State and Territory health authorities submit a file of notifications received for the year to date; the data files therefore include notifications for both the current reporting period and updated notifications for all previous reporting periods in the current year.

The data are presented on the *Communicable Diseases - Australia* Internet site each fortnight. They are also published in *CDI* every four weeks. Cases reported to State and Territory health authorities for the current reporting period are listed by State or Territory, and totals for Australia are presented for the current period, the year to date, and for the corresponding periods of the previous year. HIV infection and AIDS notifications are not included in this section of *CDI*. Surveillance for these conditions is conducted separately by the National Centre for HIV Epidemiology and Clinical Research and is reported in the HIV and AIDS Surveillance reports (see below).

A commentary on the notification data is included with the tables in each issue and graphs are used to illustrate trends in the data.

The interval from the end of a reporting period to the date of publication of collated data in *CDI* is currently 15 days.

The quality and completeness of data compiled in the National Notifiable Diseases Surveillance System are influenced by various factors. Tables, graphs and commentary must be interpreted with caution, particularly when comparisons are made between States and Territories and with data from previous years. Each State or Territory health authority determines which diseases will be notifiable within its jurisdiction, and which notifications are accepted as satisfying criteria. In some cases these differ from the NHMRC case definitions. In addition, the mechanism of notification varies between States and Territories. Notifications may be required from treating clinicians, diagnostic laboratories or hospitals. In some cases different diseases are notifiable by different mechanisms. The proportion of cases seen by health care providers which are the subject of notification to health authorities is not known with certainty for any disease, and may vary among diseases, between jurisdictions and over time.

Australian Sentinel Practice Research Network

The Research and Health Promotion Unit of the Royal Australian College of General Practitioners operates the Australian Sentinel Practice Research Network (ASPREN). ASPREN is a national network of general practitioners who report on a number of conditions each week. The aim of ASPREN is to provide an indicator of the burden of disease in the primary health care setting and to detect trends in consultation rates.

There are currently about 100 participating general practitioners in the network from all States and Territories. Seventy-five per cent of these are in metropolitan areas

and the remainder are rural based. Between 7,000 and 8,000 consultations are recorded each week.

The list of conditions is reviewed annually by the ASPREN management committee, and an annual report is published.

For 1999, 12 conditions are being monitored, seven of which are related to communicable diseases issues.

These include first attendance for an episode of influenza, rubella, measles, chickenpox, gastroenteritis, post operative wound sepsis and asthma (which is included because exacerbations can be related to respiratory infection).

Data for communicable diseases are published every four weeks in *CDI*. For each of the four reporting weeks reviewed, the number of cases is presented in tabular form together with the rate of reporting per 1,000 consultations. Brief comments on the reports accompany the table.

The case definitions are as follows:

Influenza

- (a) Viral culture or serological evidence of influenza virus infection, or
- (b) influenza epidemic, plus four of the criteria in (c), or
- (c) six of the following:
 - (i) sudden onset (within 12 hours)
 - (ii) cough
 - (iii) rigours or chills
 - (iv) fever
 - (v) prostration and weakness
 - (vi) myalgia, widespread aches and pains
 - (vii) no significant respiratory physical signs other than redness of nasal mucous membrane and throat
 - (viii) influenza in close contacts.

Rubella

- (a) An acute exanthem with enlarged lymph nodes, most prominently suboccipital and post auricular, with a macular rash on the face, spreading to the trunk and proximal portions of the limbs, or
- (b) serological evidence of rubella infection.

Measles

- (a) Serological or virological evidence of acute measles, or
- (b) two of the following:
 - (i) prodrome including injected conjunctivae, fever and cough
 - (ii) white specks on a red base in the mucous membranes of the cheek (Koplik's spots)
 - (iii) confluent maculopapular eruption spreading over the face and body, or
- (c) an atypical exanthem in a partially immune person during an epidemic of measles.

Chickenpox

An acute, generalised viral disease with a sudden onset of slight fever, mild constitutional symptoms and a skin eruption which is maculopapular for a few hours, vesicular for 3 to 4 days, and leaves a granular scab.

Gastroenteritis

Intestinal disease, presumed or proven to be infective in origin, recorded once only.

New diagnosis of asthma

Any consultations at which the diagnosis of asthma is made, where the patient had not previously been diagnosed as such.

Post operative wound sepsis

Any consultation at which wound sepsis following recent day surgery, is diagnosed. (Does not include minor surgery carried out at the doctor's rooms.)

HIV and AIDS Surveillance

National surveillance for HIV and AIDS is coordinated by the National Centre in HIV Epidemiology and Clinical Research (NCHECR) within the University of New South Wales, in collaboration with State and Territory health authorities and the Commonwealth of Australia.

Cases of HIV infection are notified to the National HIV Database on the first occasion of diagnosis in Australia, either by the diagnosing laboratory (Australian Capital Territory, New South Wales, Tasmania and Victoria) or by a combination of laboratory and doctor sources (Northern Territory, Queensland, South Australia and Western Australia). Cases of AIDS are notified through the State and Territory health authorities to the National AIDS Registry. Diagnoses of both HIV infection and AIDS are notified with the person's date of birth and name code, to minimise duplicate notifications while maintaining confidentiality.

Currently, two tables presenting HIV infection diagnoses, AIDS diagnoses and AIDS deaths are published in each issue of *CDI* when available.

Tabulations of diagnoses of HIV infection and AIDS are based on data available three months after the end of the reporting period, to allow for reporting delay and to incorporate newly available information. More detailed information on diagnoses of HIV infections and AIDS is published quarterly in the Australian HIV Surveillance Report, available from the NCHECR. The Centre produced an annual surveillance report on HIV/AIDS and related diseases in Australia, in 1997 and 1998.

National Influenza Surveillance

Influenza surveillance in Australia is based on several schemes collecting a range of data which can be used to measure influenza activity. From autumn to spring, the results of each of the schemes are published together as National Influenza Surveillance to facilitate a national view of influenza activity.

In 1998, four sentinel general practitioner schemes contributed reports of influenza-like illness: the Australian Sentinel Practice Research Network, Tropical Influenza Surveillance from the Northern Territory, the New South Wales Sentinel General Practice Scheme and the Victorian Sentinel General Practice Scheme. The number of cases of influenza and the total consultations for each week are reported, and a graph depicts the data for the season to date.

National absenteeism surveillance data are provided by Australia Post. Reports are based on the proportion of their employees (approximately 37,000) absent on sick leave for a selected day each week. Absenteeism data for the reporting period is published in each issue.

The CDI Virology and Serology Laboratory Reporting Scheme contributes laboratory reports of influenza diagnoses, by week of specimen collection, virus type and method of diagnosis. Graphs of the data for the year to date are presented. The WHO Collaborating Centre for Influenza Reference and Research at the Commonwealth Serum Laboratories, Melbourne provides information on antigenic analysis of isolates received from Australia, New Zealand, other countries of the region and South Africa.

Sentinel Chicken Surveillance Programme

The Sentinel Chicken Surveillance Programme is used to provide an early warning of increased flavivirus activity in Australia. The main viruses of concern are Murray Valley encephalitis (MVE) and Kunjin which cause the potentially fatal disease Australian encephalitis in humans. These viruses are enzootic in parts of the north-east Kimberley region of Western Australia and the Northern Territory but are epizootic in other areas of the Kimberley and in north Queensland. MVE virus is also responsible for occasional severe epidemics of Australian encephalitis in eastern Australia. The most recent was in 1974 when there were 13 fatalities and cases were reported from all mainland States. Since then, 67 cases have been reported and all but two of these were from the north of Australia.

Since 1974, a number of sentinel chicken flocks have been established in Australia to provide an early warning of increased MVE virus activity. These programs are supported by individual State health departments. Each State has a contingency plan which will be implemented if one or more chickens in a flock seroconverts to MVE virus.

Currently 27 flocks are maintained in the north of Western Australia, eight in the Northern Territory, seven in New South Wales and ten in Victoria (Figures 1, 2, 3 and 4). The flocks in Western Australia and the Northern Territory are tested all year round but those in New South Wales and Victoria are tested only in the summer months, during the main MVE risk season.

Figure 1. Sentinel chicken flock sites, Western Australia

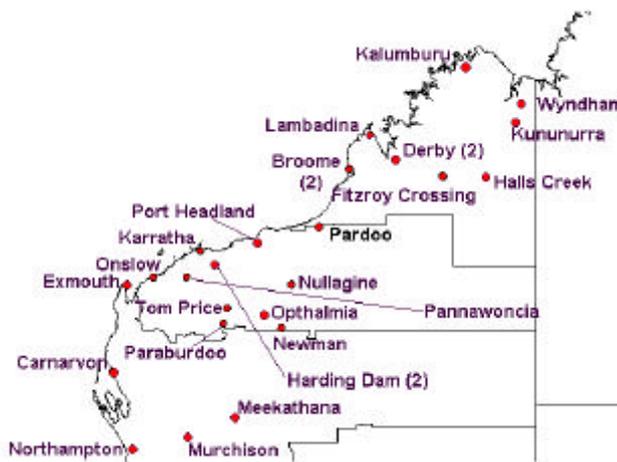


Figure 2. Sentinel chicken flock sites, Victoria

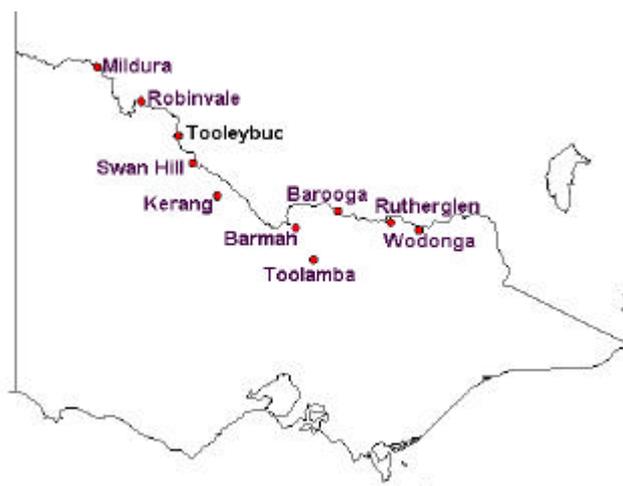


Figure 3. Sentinel chicken flock sites, New South Wales

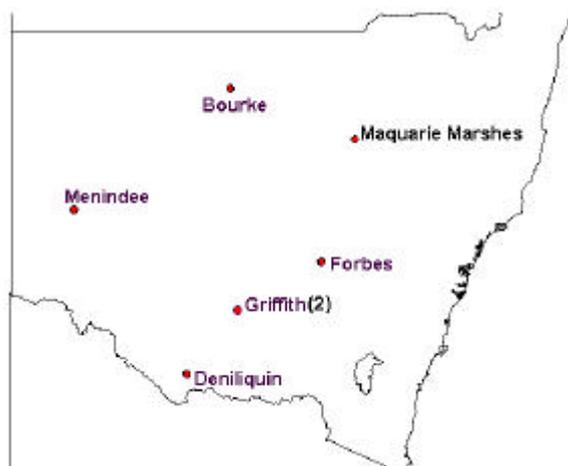
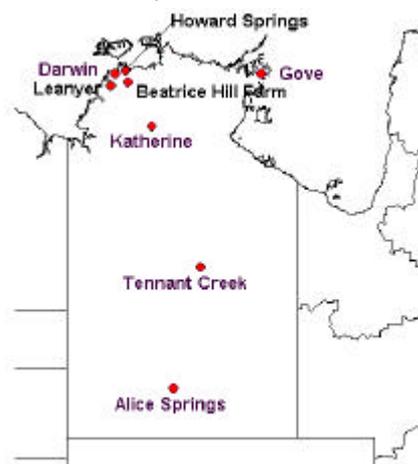


Figure 4. Sentinel chicken flock sites, Northern Territory



Results are coordinated by the Arbovirus Laboratory in Perth and reported bimonthly.

Gonococcal surveillance

The Australian Gonococcal Surveillance Programme (AGSP) includes ten reference laboratories in all States and Territories and in New Zealand. These laboratories report data on sensitivity to an agreed 'core' group of antimicrobial agents quarterly. The antibiotics which are currently routinely surveyed are the penicillins, ceftriaxone, ciprofloxacin and spectinomycin, all of which are administered as single dose regimens. When in vitro resistance to a recommended agent is demonstrated in 5% or more of isolates, it is usual to reconsider the inclusion of that agent in current treatment schedules. Additional data are also provided on other antibiotics from time to time. At present all laboratories also test isolates for the presence of high level resistance to the tetracyclines. Comparability of data is achieved by means of a standardised system of testing and a program-specific quality assurance process. Reports of the program are published quarterly.

Surveillance of Serious Adverse Events Following Vaccination

The Serious Adverse Events Following Vaccination Surveillance Scheme is a national surveillance scheme initiated through the National Childhood Immunisation Program. The scheme aims to identify and report in a timely fashion all serious adverse events which follow childhood vaccination. This permits:

- (i) the identification of illnesses of infrequent occurrence that may be associated with vaccination;
- (ii) the estimation of rates of occurrence of events temporally associated with vaccination;
- (iii) monitoring for unusually high rates of adverse events;
- (iv) the provision of information to inform the debate on the risks and benefits of vaccines and;
- (v) the identification of areas that require further research.

A serious adverse event following vaccination is defined as:

- (a) The occurrence of one or more of the following conditions within 48 hours of the administration of a vaccine:
 - (i) persistent screaming (for more than three hours)
 - (ii) a temperature of 40.5°C or more, unexplained by any other cause
 - (iii) anaphylaxis
 - (iv) shock
 - (v) hypotonic/hyporesponsive episode, or
- (b) the occurrence of one or more of the following conditions within 30 days of the administration of a vaccine:
 - (vi) encephalopathy
 - (vii) convulsions
 - (viii) aseptic meningitis
 - (ix) thrombocytopenia
 - (x) acute flaccid paralysis
 - (xi) death
 - (xii) other serious event thought to be associated with a vaccination.

Reports on serious adverse events are collected by State and Territory health authorities and forwarded to the Department of Health and Aged Care every fortnight. Information collected on each case includes the vaccine(s) temporally associated with the event, possible risk factors in the child's medical history and details about the nature, timing and outcome of the event. Methods of collecting reports vary between States and Territories. Telephone reporting is accepted to minimise health care provider paperwork. States and Territories also report on follow up at 60 days.

Reports of the surveillance scheme are published quarterly. Acceptance of a report does not imply a causal relationship between the administration of the vaccine and the medical outcome, or that the report has been verified as to its accuracy.

Virology and Serology Laboratory Reporting Scheme (LabVISE)

The Virology and Serology Laboratory Reporting Scheme began operating in 1977. The scheme comprises 21 sentinel laboratories from all States and the Australian Capital Territory. Contributors submit data on the laboratory identification of viruses and other organisms. Laboratories elect to submit data either on computer disk using LabVISE software (written in Epi Info), or on paper forms in the same format. Each record includes mandatory data fields (laboratory, specimen collection date, a patient identifier code, specimen source, the agent detected and the method of diagnosis), and optional fields (specimen code number, sex, date of birth or age, postcode of residence, clinical diagnosis, risk factors and comments).

Reports are collated, analysed and published currently every four weeks. Each report includes two summary tables. The delay between date of specimen collection and date of publication ranges from two weeks to several months. A commentary on the laboratory reports includes the observation of recent trends with accompanying graphical presentation.

Data derived from this scheme must be interpreted with caution. The number and type of reports received is subject to a number of biases. These include the number of participating laboratories which has varied over time. The locations of participating laboratories also create bias, as some jurisdictions are better represented than others. Also changes in diagnostic practices, particularly the introduction of new testing methodologies, may affect laboratory reports. The ability of laboratory tests to distinguish acute from chronic or past infection must also be considered in interpretation of the data.

This is a sentinel scheme hence changes in incidence cannot be determined. However general trends can be observed, for example with respect to seasonality and the age-sex distribution of patients.

References

1. Last JM. A dictionary of epidemiology. New York: Oxford University Press, 1988.
2. Hall R, Notifiable diseases surveillance, 1917 to 1991. *Commun Dis Intell* 1993;226-236
3. National Health and Medical Research Council. Surveillance Case Definitions. Canberra: NHMRC, 1994.

CDI Instructions for authors

Communicable Diseases Intelligence (CDI) is a four weekly publication of the National Centre for Disease Control, Commonwealth Department of Health and Aged Care and the Communicable Diseases Network Australia. Its aim is to provide timely information about communicable diseases in Australia to those with responsibility for their control. *CDI* has a particular emphasis on public health issues.

CDI invites contributions dealing with any aspect of communicable disease incidence, risk factors, surveillance or control in Australia. Submissions can be in the form of original articles, short reports, surveillance summaries, reviews or correspondence.

On receipt of an article, *CDI* sends a brief acknowledgment indicating that it will be considered for publication. The article will then undergo a review process which may include peer review by two experts in the topic area. Articles may be rejected without peer review. Occasionally reports of urgent public health importance may be published immediately, at the discretion of the Editor. Authors may be asked to revise articles as a result of the review process and the final decision about publication is made by the Editor.

CDI is published on every fourth Thursday of the year. It is finalised for printing on the Monday prior to the publication date. Very topical brief contributions (for example reports of current outbreaks) may be published in the period of receipt, by arrangement with the editorial staff.

Submission procedure

A single copy of the contribution should be submitted to The Deputy Editor, Communicable Diseases Intelligence, at the address below. A covering letter should identify the corresponding author and be signed by all authors agreeing to possible publication.

The contribution should be provided in hard copy and on diskette (3.5 inch disks). Microsoft Word for Windows or Rich Text Format (RTF) files should be used. Either Times New Roman or Arial font is preferred. Short contributions may also be sent by email.

Authors

Authors of articles should be identified by their first name, last name, institution and address, with phone and fax contacts for the corresponding author. Each author should have participated sufficiently to take public responsibility for the article. Others contributing to the work should be recognised in the acknowledgments.

Articles and short reports

The text of articles should be structured to contain abstract, introduction, methods, results, discussion, acknowledgments and references, as far as is possible. Short contributions may need fewer subsections. There is no strict word limit for articles but manuscripts of 2,000 words or less are preferred. A word count should be included with the contribution.

Tables and figures

All tables and figures should be referred to within the results section and should not duplicate information in the text. Graphs published are produced in Microsoft Excel. If graphs are to be included, the numerical data on which these are based should also be provided to enable production in house style. Black and white illustrations or photographs can be included if required.

Tables should be produced in Word rather than other packages such as Excel.

References

References should be identified consecutively in the text by the use of superscript numbers. The Vancouver reference style is used by *CDI* (see International Committee of Medical Journal Editors. Uniform requirements for manuscripts submitted to biomedical journals. *Ann Intern Med* 1997;1126:36-47). All unpublished material should be referred to within the text (instead of the reference list) as personal communication or unpublished observation. The only exception is material which has been accepted for publication (in press).

Protection of patients' rights to privacy

Identifying details about patients should be omitted if they are not essential, but data should never be altered or falsified in an attempt to attain anonymity. Complete anonymity may be difficult to achieve, and written informed consent should be obtained if there is any doubt. Informed consent for this purpose requires that the patient be shown the manuscript to be published.

When informed consent has been obtained it should be included in the article.

Contact details

Contributions and requests for further information should be sent to: The Deputy Editor, *Communicable Diseases Intelligence*, National Centre for Disease Control, Department of Health and Aged Care, MDP 6, GPO Box 9848, Canberra, ACT 2601. Telephone: (06) 289 6895 Fax: (06) 289 7791 Email: cdi.editor@health.gov.au

Communicable Diseases Surveillance

Highlights

Communicable Diseases Surveillance consists of data from various sources. The National Notifiable Diseases Surveillance System (NNDSS) is conducted under the auspices of the Communicable Diseases Network Australia New Zealand. The *CDI* Virology and Serology Laboratory Reporting Scheme (LabVISE) is a sentinel surveillance scheme. The Australian Sentinel Practice Research Network (ASPREN) is a general practitioner-based sentinel surveillance scheme. In this report, data from the NNDSS are referred to as 'notifications' or 'cases', whereas those from ASPREN are referred to as 'consultations' or 'encounters' while data from the LabVISE scheme are referred to as 'laboratory reports'.

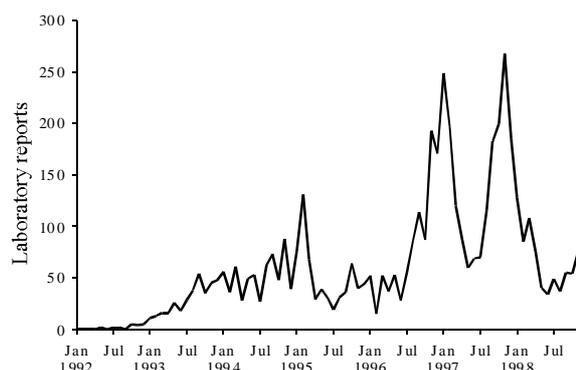
Vaccine Preventable Diseases

When examined by date of onset, pertussis notifications increased in the July to October period of 1998 and appear to have now declined somewhat. The number of notifications with onset in December 1998 is the lowest since July 1996 (Figure 1). For the current reporting period, the highest proportion of notifications (21%) are in the 10-14 year age group and 12 per cent are in the 5-9 year age group. Twelve notifications were in children under 1 year of age. The male to female ratio was 1:1.14.

A similar pattern can be seen in the laboratory reports of pertussis from the LabVISE system (Figure 2).

Measles notifications remain at a low level. The completion of the primary schools vaccination campaign in the second half of 1998 combined with the moving of the second dose of MMR to be due prior to school entry (at age 4 to 5 years) and ongoing efforts to maintain a high level of vaccination coverage continue to move Australia into a measles elimination phase. Articles in this issue of *CDI*

Figure 2. Laboratory reports for pertussis, Australia, 1992 to 1998, by date of specimen collection



discuss the importance of enhanced measles surveillance during this phase.

Arboviruses

An increase in the number of notifications for Ross River virus infection is expected at the start of the warmer months, with a peak of activity in the early months of each year (Figure 3). A higher number of notifications has been received for this reporting period than for the same period of last year. The majority of cases (84%) are in the 20 to 59 year age groups with the highest proportion (18%) in the 35 to 39 year age group. The male to female ratio is approximately 1.

Figure 1. Notifications of pertussis, Australia, 1992 to 1998, by month of onset

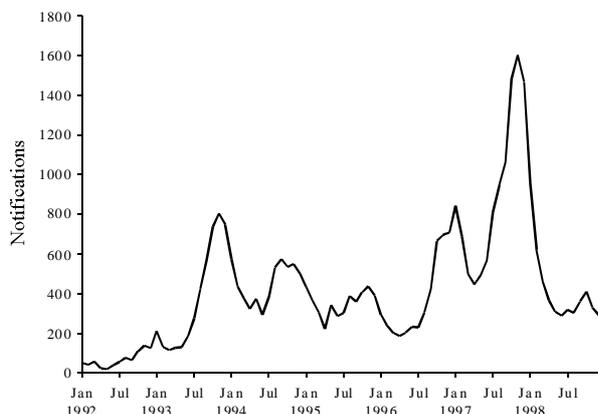
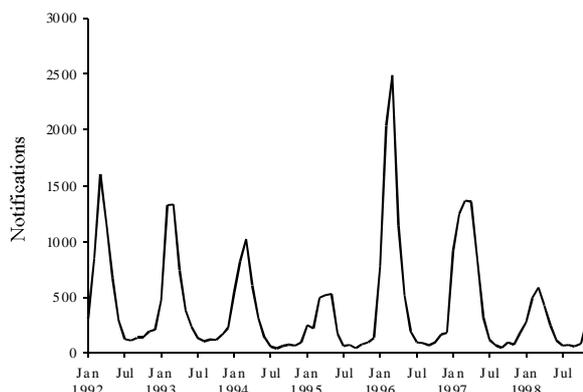


Figure 3. Notifications of Ross River virus, Australia, 1992 to 1998, by month of onset



The number of notified cases of dengue continues to be higher than historical data with most cases occurring in Queensland. Cases are reported fairly evenly over a wide

range of age groups with most in persons between 10 and 64 years; the male to female ratio is 1:1.35.

Tables

There were 6,815 notifications to the National Notifiable Diseases Surveillance System (NNDSS) in the four week period, 6 January to 2 February 1999 (Tables 1 and 2). The numbers of reports for selected diseases have been compared with historical data for corresponding periods in the previous three years (Figure 4).

There were 1,677 reports received by the *CDI* Virology and Serology Laboratory Reporting Scheme (LabVISE) in the four week period, 31 December 1998 to 27 January 1999 (Tables 2 and 3).

The Australian Sentinel Practice Research Network (ASPREN) data for weeks 48 to 51, ending 27 December 1998, are included in this issue of *CDI* (Table 5). A new list of conditions to be reported by ASPREN in 1999 is given on pages 55-56 of this issue of *CDI*.

Correction:

The figures for clamydya and chancroid in Table 2 of the last issue of *CDI* were reversed.

Table 1. Notifications of diseases preventable by vaccines recommended by the NHMRC for routine childhood immunisation, received by State and Territory health authorities in the period 6 January to 2 February 1999

Disease ^{1,2}	ACT	NSW	NT	Qld	SA	Tas	Vic	WA	This period 1999	This period 1998	Year to date 1999	Year to date 1998
Diphtheria	0	0	0	0	0	0	0	0	0	0	0	0
<i>H. influenzae</i> type b infection	0	0	1	1	0	0	0	2	4	0	4	1
Measles	5	3	0	0	0	1	0	3	12	33	14	37
Mumps	1	0	0	0	0	0	1	2	4	12	5	12
Pertussis	11	105	1	140	0	1	80	25	363	1,126	389	1,243
Rubella ³	3	8	0	9	0	0	6	1	27	63	31	67
Tetanus	0	0	0	0	0	0	0	0	0	1	0	1

NN. Not Notifiable

1. No notification of poliomyelitis has been received since 1978.
2. Totals comprise data from all States and Territories. Cumulative figures are subject to retrospective revision, so there may be

discrepancies between the number of new notifications and the increment in the cumulative figure from the previous period.

3. Includes congenital rubella.

Table 2. Notifications of diseases received by State and Territory health authorities in the period 6 January to 2 February 1999

Disease ^{1,2,3,4}	ACT	NSW	NT	Qld	SA	Tas	Vic	WA	This period 1999	This period 1998	Year to date 1999	Year to date 1998 ⁵
Arbovirus infection (NEC)	0	0	0	5	0	0	14	0	19	4	21	6
Barmah Forest virus infection	0	13	0	21	0	0	3	1	38	59	45	61
Brucellosis	0	0	0	1	0	0	0	0	1	10	2	10
Campylobacteriosis ⁶	31	0	17	376	0	26	413	258	1,121	1,108	1,300	1,221
Chancroid	0	0	0	0	0	0	0	0	0	0	0	0
Chlamydial infection (NEC) ⁷	13	154	50	323	0	26	208	210	984	584	1,074	591
Cholera	0	0	0	0	0	0	0	0	0	0	0	0
Dengue	0	0	2	55	0	0	0	4	61	16	64	19
Donovanosis	0	0	1	0	0	0	0	2	3	2	3	2
Gonococcal infection ⁸	0	84	73	111	0	2	53	97	420	398	491	406
Haemolytic uraemic syndrome ⁹	0	0	0	0	0	0	0	0	0	1	0	1
Hepatitis A	0	34	4	78	0	0	8	30	154	253	165	272
Hepatitis B incident	2	4	2	5	0	3	6	7	29	24	31	24
Hepatitis B unspecified ¹⁰	4	165	0	64	0	4	183	14	434	550	462	611
Hepatitis C incident	10	9	0	0	0	1	1	19	40	16	40	18
Hepatitis C unspecified ^{5,10}	23	467	17	189	0	27	569	118	1,410	1,682	1,650	1,803
Hepatitis (NEC) ¹¹	0	1	0	0	0	0	0	0	1	4	1	4
Hydatid infection	0	1	0	2	0	0	1	0	4	7	4	7
Legionellosis	0	2	0	2	0	0	7	6	17	11	19	12
Leprosy	0	0	0	0	0	0	0	0	0	0	0	0
Leptospirosis	0	3	0	19	0	0	4	1	27	15	32	15
Listeriosis	0	3	0	0	0	0	1	2	6	10	6	10
Malaria	1	12	1	31	0	1	7	3	56	48	63	52
Meningococcal infection	0	19	3	9	0	1	5	8	45	18	47	21
Ornithosis	0	0	0	0	0	0	8	0	8	3	8	3
Q Fever	0	11	0	24	0	0	0	0	35	44	44	47
Ross River virus infection	1	111	52	166	0	3	55	47	435	239	481	257
Salmonellosis (NEC)	4	170	36	262	0	16	155	125	768	885	902	956
Shigellosis ⁶	0	0	10	13	0	0	9	21	53	66	58	69
SLTEC, VTEC ¹²	0	0	0	0	0	0	0	5	5	2	5	2
Syphilis ¹³	0	37	15	84	0	1	0	5	142	101	149	106
TTP ¹⁴	0	0	0	0	0	0	0	0	0	0	0	0
Tuberculosis	2	43	3	10	0	1	29	10	98	103	107	105
Typhoid ¹⁵	0	0	0	1	0	0	3	0	4	13	5	13
Yersiniosis (NEC) ⁶	0	0	0	20	0	0	4	1	25	41	25	42

1. Diseases preventable by routine childhood immunisation are presented in Table 1.

2. For HIV and AIDS, see Tables 6 and 7.

3. Totals comprise data from all States and Territories. Cumulative figures are subject to retrospective revision so there may be discrepancies between the number of new notifications and the increment in the cumulative figure from the previous period.

4. No notifications have been received during 1999 for the following rare diseases: lymphogranuloma venereum, plague, rabies, yellow fever, or other viral haemorrhagic fevers.

5. Data from Victoria for 1998 are incomplete.

6. Not reported for NSW because it is only notifiable as 'foodborne disease' or 'gastroenteritis in an institution'.

7. WA: genital only.

8. NT, Qld, SA and Vic: includes gonococcal neonatal ophthalmia.

9. Nationally reportable from August 1998.

10. Unspecified numbers should be interpreted with some caution as the magnitude may be a reflection of the numbers of testings being carried out.

11. Includes hepatitis D and E.

12. Infections with *Shiga*-like toxin (verotoxin) producing *E. Coli* (SLTEC/VTEC) became nationally reportable in August 1998.

13. Includes congenital syphilis.

14. Thrombotic thrombocytopenic purpura became nationally reportable in August 1998.

15. NSW, Qld: includes paratyphoid.

NN Not Notifiable.

NEC Not Elsewhere Classified.

- Elsewhere Classified.

Table 3. Virology and serology laboratory reports by State or Territory¹ for the reporting period 31 December 1998 to 27 January 1999, and total reports for the year

	State or Territory ¹								Total this period	Total reported in <i>CDI</i> in 1999	
	ACT	NSW	NT	Qld	SA	Tas	Vic	WA			
Measles, mumps, rubella											
Measles virus		1			1		2			4	7
Mumps virus								4		4	4
Rubella virus					1		1	1		3	8
Hepatitis viruses											
Hepatitis A virus		3		6	3		1	11		24	46
Arboviruses											
Ross River virus		3	8	31	12		2	19		75	123
Barmah Forest virus				3				4		7	12
Dengue type 3				20						20	20
Dengue not typed			2					9		11	11
Flavivirus (unspecified)				2						2	3
Adenoviruses											
Adenovirus type 1							1			1	10
Adenovirus type 2								1		1	3
Adenovirus type 40								10		10	12
Adenovirus not typed/pending		28		10	14		33	46		131	233
Herpes viruses											
Cytomegalovirus		17		5	35		35	13		105	140
Varicella-zoster virus		10	1	19	44		39	64		177	270
Epstein-Barr virus		16		20	94		19	24		173	390
Other DNA viruses											
Molluscum contagiosum								1		1	1
Contagious pustular dermatitis (Orf virus)								2		2	3
Poxvirus group not typed							1			1	1
Parvovirus				2	3	2	8	19		34	52
Picornavirus family											
Coxsackievirus B3							1			1	1
Echovirus type 5		1								1	1
Echovirus type 6							1			1	3
Echovirus type 9		4								4	14
Echovirus type 11		2								2	15
Echovirus type 18		1								1	8
Echovirus type 30		3								3	13
Poliovirus type 2 (uncharacterised)		2								2	8
Rhinovirus (all types)		17			1		1	12		31	74
Enterovirus not typed/pending		6		1			22	51		80	115
Ortho/Paramyxoviruses											
Influenza A virus		13		1	21		5	1		41	136
Influenza B virus					2		1	6		9	15
Parainfluenza virus type 1							3	1		4	8
Parainfluenza virus type 2					2		3			5	5
Parainfluenza virus type 3		14		3	20		18	54		109	171
Parainfluenza virus type 4								2		2	2
Respiratory syncytial virus		11		4	8	1	12	37		73	130

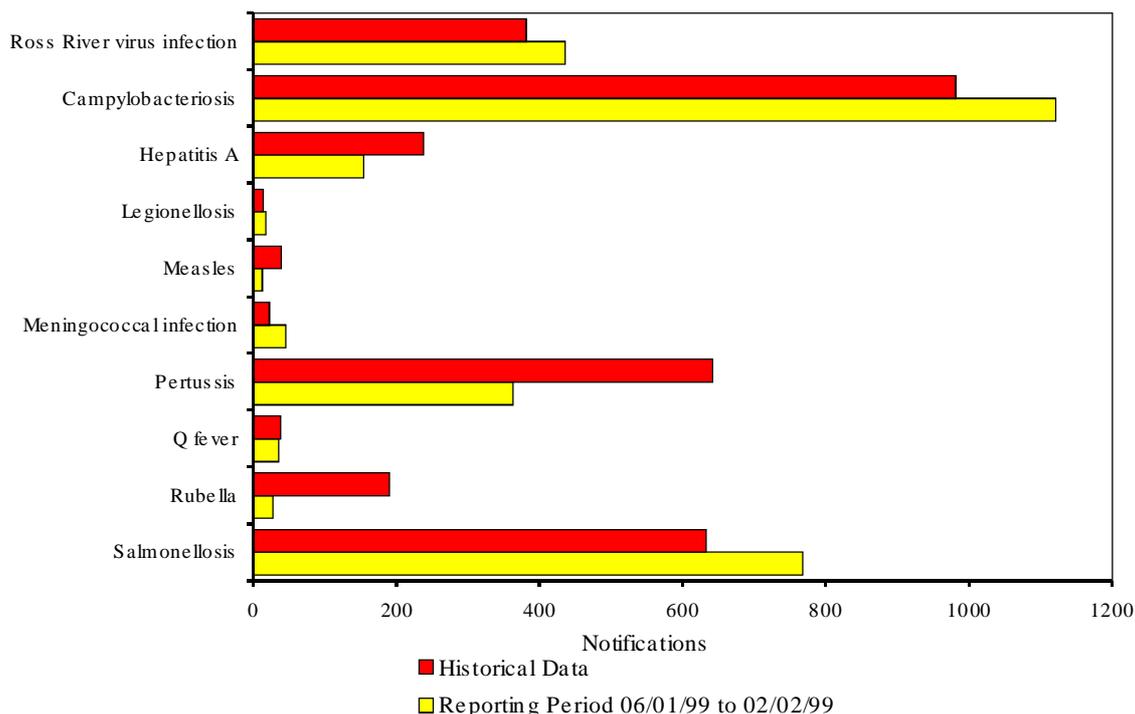
Table 3. Virology and serology laboratory reports by State or Territory¹ for the reporting period 31 December 1998 to 27 January 1999, and total reports for the year (continued)

	State or Territory ¹								Total this period	Total reported in <i>CDI</i> in 1999
	ACT	NSW	NT	Qld	SA	Tas	Vic	WA		
Other RNA viruses										
HTLV-1								2	2	3
Rotavirus		21			14	1	23	33	92	198
Norwalk agent							8		8	9
Other										
<i>Chlamydia trachomatis</i> not typed		32	12	37	40	1	11	104	237	361
<i>Chlamydia psittaci</i>							4	2	6	9
<i>Mycoplasma pneumoniae</i>		19	1	7	26		51	7	111	207
<i>Coxiella burnetii</i> (Q fever)		3		3	1		1		8	11
<i>Rickettsia australis</i>						2			2	2
<i>Bordetella pertussis</i>		1		12			30	4	47	66
<i>Legionella pneumophila</i>		1			1				2	3
<i>Legionella longbeachae</i>					3			3	6	15
<i>Leptospira hardjo</i>							1		1	1
TOTAL		229	24	186	346	7	338	547	1,677	2,953

1. State or Territory of postcode, if reported, otherwise State or Territory of reporting laboratory.

Table 4. Virology and serology laboratory reports by contributing laboratories for the reporting period 31 December 1998 to 27 January 1999

State or Territory	Laboratory	Reports
New South Wales	Institute of Clinical Pathology & Medical Research, Westmead	37
	New Children's Hospital, Westmead	20
	Royal Prince Alfred Hospital, Camperdown	56
	South West Area Pathology Service, Liverpool	106
Queensland	Queensland Medical Laboratory, West End	168
	Townsville General Hospital	41
South Australia	Institute of Medical and Veterinary Science, Adelaide	345
Tasmania	Northern Tasmanian Pathology Service, Launceston	5
Victoria	Monash Medical Centre, Melbourne	61
	Royal Children's Hospital, Melbourne	182
	Victorian Infectious Diseases Reference Laboratory, Fairfield	97
Western Australia	PathCentre Virology, Perth	471
	Princess Margaret Hospital, Perth	88
TOTAL		1,677

Figure 4. Selected National Notifiable Diseases Surveillance System reports, and historical data¹

1. The historical data are the averages of the number of notifications in the corresponding 4 week periods of the last 3 years and the 2 week periods immediately preceding and following those.

Table 5. Australian Sentinel Practice Research Network reports, weeks 48 to 51, 6 December to 27 December 1998

Week number	48		49		50		51	
Week ending on	6 December 1998		13 December 1998		20 December 1998		27 December 1998	
Doctors reporting	55		55		52		44	
Total encounters	6940		6712		6866		4518	
Condition	Rate per 1,000		Rate per 1,000		Rate per 1,000		Rate per 1,000	
	Reports	encounters	Reports	encounters	Reports	encounters	Reports	encounters
Influenza	7	1.0	11	1.6	8	1.2	2	0.4
Rubella	0	0.0	2	0.3	0	0.0	1	0.2
Measles	1	0.1	0	0.0	0	0.0	0	0.0
Chickenpox	26	3.7	17	2.5	13	1.9	9	2.0
Pertussis	1	0.1	3	0.4	2	0.3	1	0.2
HIV testing (patient initiated)	9	1.3	10	1.5	10	1.5	8	1.8
HIV testing (doctor initiated)	4	0.6	3	0.4	2	0.3	2	0.4
Td (ADT) vaccine	52	7.5	47	7.0	45	6.6	0	0.0
Pertussis vaccination	47	6.8	61	9.1	45	6.6	0	0.0
Reaction to pertussis vaccine	1	0.1	0	0.0	0	0.0	0	0.0
Ross River virus infection	1	0.1	0	0.0	0	0.0	0	0.0
Gastroenteritis	78	11.2	108	16.1	81	11.8	61	13.5

The NNDSS is conducted under the auspices of the Communicable Diseases Network Australia New Zealand. The system coordinates the national surveillance of more than 40 communicable diseases or disease groups endorsed by the National Health and Medical Research Council (NHMRC). Notifications of these diseases are made to State and Territory health authorities under the provisions of their respective public health legislations. De-identified core unit data

are supplied fortnightly for collation, analysis and dissemination. For further information, see *CDI* 1999;23:55.

LabVISE is a sentinel reporting scheme. Twenty-one laboratories contribute data on the laboratory identification of viruses and other organisms. Data are collated and published in *Communicable Diseases Intelligence* every four weeks. These data should be interpreted with caution as the number and type of reports received is subject to a number of biases. For further information, see *CDI* 1999;23:58.

ASPREN currently comprises about 100 general practitioners from throughout the country. Up to 9,000 consultations are reported each week, with special attention to 12 conditions chosen for sentinel surveillance in 1999. *CDI* reports the consultation rates for seven of these conditions. For further information, including case definitions, see *CDI* 1999;23:55-56.

Additional Reports

HIV and AIDS Surveillance

National surveillance for HIV disease is coordinated by the National Centre in HIV Epidemiology and Clinical Research (NCHECR), in collaboration with State and Territory health authorities and the Commonwealth of Australia. Cases of HIV infection are notified to the National HIV Database on the first occasion of diagnosis in Australia, by either the diagnosing laboratory (ACT, New South Wales, Tasmania, Victoria) or by a combination of laboratory and doctor sources (Northern Territory, Queensland, South Australia, Western Australia). Cases of AIDS are notified through the State and Territory health authorities to the National AIDS Registry. Diagnoses of both HIV infection and AIDS are notified with the person's date of birth and name code, to minimise duplicate notifications while maintaining confidentiality.

Tabulations of diagnoses of HIV infection and AIDS are based on data available three months after the end of the reporting interval indicated, to allow for reporting delay and to incorporate newly available information. More detailed information on diagnoses of HIV infection and AIDS is published in the quarterly *Australian HIV Surveillance Report*, available from the National Centre in HIV Epidemiology and Clinical Research, 376 Victoria Street, Darlinghurst NSW 2010. Telephone: (02) 9332 4648 Facsimile: (02) 9332 1837 (website address: <http://www.med.unsw.edu.au/nchechr>).

HIV and AIDS diagnoses and deaths following AIDS reported for 1 September to 30 September 1998, as reported to 31 December 1998, are included in this issue of *CDI* (Tables 6 and 7).

Table 6. New diagnoses of HIV infection, new diagnoses of AIDS and deaths following AIDS occurring in the period 1 September to 30 September 1998, by sex and State or Territory of diagnosis

									Totals for Australia				
		ACT	NSW	NT	Qld	SA	Tas	Vic	WA	This period 1999	This period 1998	Year to date 1999	Year to date 1998
HIV diagnoses	Female	0	3	1	1	0	0	1	2	8	10	69	58
	Male	0	34	0	5	3	0	9	1	52	59	477	542
	Sex not reported	0	0	0	0	0	0	0	0	0	1	6	12
	Total ¹	0	37	1	6	3	0	10	3	60	70	552	613
AIDS diagnoses	Female	0	0	0	0	0	0	0	0	0	1	7	21
	Male	0	7	0	5	0	1	1	0	14	21	170	240
	Total ¹	0	7	0	5	0	1	1	0	14	22	177	261
AIDS deaths	Female	0	0	0	1	0	0	0	0	1	1	7	10
	Male	0	5	1	2	1	0	5	0	14	16	81	177
	Total ¹	0	5	1	3	1	0	5	0	15	17	88	188

1. Persons whose sex was reported as transgender are included in the totals.

Table 7. Cumulative diagnoses of HIV infection, AIDS and deaths following AIDS since the introduction of HIV antibody testing to 31 December 1998, by sex and State or Territory

		State or Territory								Australia
		ACT	NSW	NT	Qld	SA	Tas	Vic	WA	
HIV diagnoses	Female	22	566	8	132	54	4	198	99	1,083
	Male	183	10,430	99	1,851	640	77	3,708	866	17,854
	Sex not reported	0	259	0	0	0	0	24	0	283
	Total ¹	205	11,274	107	1,989	694	81	3,943	968	19,261
AIDS diagnoses	Female	8	162	0	45	20	2	64	23	324
	Male	82	4,439	32	773	325	43	1,559	337	7,590
	Total ¹	90	4,612	32	820	345	45	1,630	362	7,936
AIDS deaths	Female	2	113	0	30	15	2	46	16	224
	Male	62	3,071	24	535	222	27	1,221	241	5,403
	Total ¹	64	3,191	24	567	237	29	1,273	258	5,643

1. Persons whose sex was reported as transgender are included in the totals.

Overseas briefs

Source: World Health Organization (WHO)
This material has been condensed from information on the WHO Internet site. A link to this site can be found under 'Related sites' on the CDI homepage.

Cholera

Zambia

The government of Zambia has informed WHO of a cholera outbreak in Ndola, in the northern part of the country near the border with the Democratic Republic of the Congo. So far, a total of 66 cases has been reported, with 4 deaths. In view of heavy rainfalls, the Ministry of Health has already taken the necessary action and alerted the national cholera task force. Control measures are being taken.

Zambia has been seriously affected by cholera epidemics in the past, with 13 154 cases in 1991, 11 659 cases in 1992 and 6 766 cases in 1993. Since 1994, the total number of cases has continued to decrease.

Kenya

The Ministry of Health, Kenya, has informed WHO of an outbreak of cholera in Nyanza, Eastern, Rift Valley and Nairobi Provinces which started on 27 December 1998. As of 19 January 1999 a total of 1025 cases with 25 deaths is estimated to have occurred.

The Ministry of Health has set up a National Cholera Control Task Force in collaboration with WHO. Similar Task Forces have been formed at provincial and district levels. The outbreak has been brought under control and the number of cases is declining rapidly. Surveillance and health education activities continue to take place.

Kenya has been suffering from a major cholera epidemic since mid-1997. The cumulative total number of cases reported to WHO was 17200 in 1997 and 22432 in 1998 with 555 and 1237 deaths respectively.

Yellow fever in Bolivia

As of January 1999 a total of 27 confirmed cases with 13 deaths have been reported to the Pan American Health Organization (PAHO/WHO)*. All cases occurred in rural settings of the department of Santa Cruz, located within 120 - 200 km south of the city of Santa Cruz de la Sierra. Twenty-two cases (82%) were male and 5 (18%) female. The age distribution of the cases was 82% of over 15 years of age, 11% of 10 to 15 years, and 7% of 5 to 10 years. Fifteen cases were not vaccinated with yellow fever, two have presumptively received the vaccine, and the status of 10 was unknown. Mass immunization was started immediately after the confirmation of the first reported cases. No suspected cases have been reported in the last two weeks despite increased surveillance.

In the last 10 years, Bolivia has reported 461 cases of yellow fever. Sixty three cases were reported in 1997 and fifty seven in 1998. During 1997, the primarily affected Departments were Cochabamba (74%) and Beni (15%). In 1998, the areas involved were lowlands of the Department of La Paz (44%) and west counties of the Department of Santa Cruz (30%). In 1999 all cases have been reported from the southeast counties of Santa Cruz. The trend suggests a southeastward spread of the disease through the country. The current lower reporting of cases outside of the department of Santa Cruz may be attributed to vaccinations implemented during the 1997 and 1998 outbreaks. The presence of the *Aedes aegypti* mosquito in

Santa Cruz has continuously presented a serious risk to the urbanization of yellow fever.

Bolivia has recently developed with the assistance of PAHO a 5 year project to strengthen its immunization program. This initiative will be in part financed by the World Bank and includes plans to increase the vaccination coverage of all age groups in the enzootic areas and to introduce the yellow fever vaccine in the routine national immunization program.

* Source: Ministry of Health, Bolivia, February 1999

Meningococcal meningitis in Sudan - Update

Meningococcal meningitis has been reported from the following communities in the Northern Darfur region: El Fashir (population 657 852) - 21 cases, 4 deaths; Kutum (population 348 000) - 135 cases, 11 deaths; Kabkabiyya (population 240 017) - 43 cases, 15 deaths. Cases have continued to be reported, reaching a total of 199 cases and 30 deaths by 20 January.

A WHO team is assisting with the assessment of the epidemiological situation and needs. Team members visited the areas affected by the outbreak together with the Sudanese health authorities and other international partners, including UNICEF, *Médecins sans frontières* and

the International Federation of Red Cross and Red Crescent Societies. So far, 91 000 people have been vaccinated by 40 vaccination teams. While it appears that the number of new cases has diminished over the last few days, plans are being drawn up to strengthen surveillance and control measures throughout the country in preparation for any further outbreaks of the disease.

Rift Valley Fever in South Africa

Outbreak amongst Wildlife in South Africa and Associated Human Cases

A laboratory confirmed outbreak of Rift Valley Fever (RVF) amongst wild animals in and near the Kruger National Park in South Africa has been reported by the National Institute for Virology in Johannesburg (a WHO Collaborating Centre for Viral Haemorrhagic Fevers and Arboviruses). Three associated human cases have also been reported, all with a benign febrile illness.

Large outbreaks of RVF occurred in South Africa's inland plateau in 1974-76, and a small outbreak was recorded in 1981 in a coastal area of KwaZulu-Natal, but no disease activity has been detected in the intervening period. Several consecutive years with high rainfall have favoured the explosion of the *Aedes* mosquito population which is the vector for the virus.

Editorial and Production Staff

Nicole Gilroy, Peter Mazzarol, Alison Milton, John Mohoric, Kim Moser, Eddie O'Brien

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CDI is produced every four weeks by the National Centre for Disease Control, Department of Health and Aged Care, GPO Box 9848, Canberra, ACT, 2601; Fax: (02) 6289 7791, Phone: (02) 6289 7240; email: cdi.editor@health.gov.au.

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Subscriptions

Canberra Mailing, PO Box 650, Fyshwick ACT 2609, Fax (02) 6269 1212

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Contributions

Contributions covering any aspects of communicable diseases are invited. All contributions are subject to the normal refereeing process. Instructions to authors can be found in *CDI* 1999;23:60.

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