Three cases in three weeks - Leprosy presentations at Royal Darwin Hospital

Sarah Haffan, Vicki Krause, Joan Fong, Jim Burrow and Bart Currie.

Royal Darwin Hospital, Menzies School of Health Research, Disease Control Centre

The cases described briefly below are of patients admitted recently to the Royal Darwin Hospital (RDH) for the investigation and management of leprosy.

Case Study 1
The first patient was a previously well 63 year old Aboriginal man who was born in the rural Katherine region. He lived in a boys' home from age 8 to 18 with several children who were diagnosed with leprosy years later. He later moved to Darwin, although spent time in rural communities with work and leisure. He worked for fourteen years with a man who was diagnosed with leprosy soon after their working relationship ended. The workmate's brother, also known to the patient, had lepromatous leprosy. A family member worked at the East Arm leprosy hospital, but no immediate family members were known to have leprosy. He had no history of diabetes mellitus or alcoholism.

He presented with a nine month history of pain and reduced sensation in the feet, and had noticed skin lesions for a similar period of time. He had traumatised both feet and hands, notably burning his feet in a fire. He was seen by both rural health and hospital medical staff, with the results of a sural nerve biopsy prompting his admission for leprosy investigation.

On examination he had multiple skin lesions over the trunk varying in size from 2 cm to 30 cm in diameter. They were well demarcated and had an erythematous raised margin. Skin hair was present. Sensation to pinprick was reduced over the lesions, as was sweating. Sensory loss was also present over two fingers in both hands and there was more marked sensory loss in the lower limbs bilaterally up to the lower calf. Multiple thickened nerves were noted peripherally, including the left supraorbital, distal radial and distal common peroneal nerves. There was mild left ulnar weakness.

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otherwise power was normal. Reflexes were symmetrical with absent ankle jerks. Ophthalmological review found no evidence of ocular involvement.

Microscopy of a skin smear of the right eyebrow found two non fragmented acid fast bacilli (AFB) and one from a smear of a lesion on the back. Nasal discharge swabs were negative for AFB. Nerve conduction studies showed widespread, asymmetrical sensorimotor neuropathy in the upper and lower limbs. Neuropathy was more marked in the lower limbs, with motor conduction velocities in the left common peroneal nerve and right posterior tibial nerve being very slow. The asymmetrical features were consistent with a mononeuritis multiplex type illness. The sural nerve biopsy revealed scattered AFB in the endoneurium of many nerve fascicles, with an extensive chronic inflammatory response.

A skin biopsy showed a few isolated AFB with inflammatory infiltrate. The leprosy ELISA was non reactive (see article to follow). The diagnosis was borderline borderline (BB) leprosy. Multidrug therapy (MDT) with rifampicin, dapsone and clofazimine is planned for at least 2 years.

Case Study 2
The second patient was a 25 year old Aboriginal man whose father was diagnosed with lepromatous leprosy in 1962, and whose great uncle and aunt are on the Western Australia (WA) leprosy register. He has worked and travelled widely throughout the NT and northern WA. He reported a 6-8 month history of skin lesions without any neurological symptoms. He had no history of diabetes mellitus or alcoholism. His skin lesions were recognised as probable leprosy by an Aboriginal Health Worker, (trained by the recently retired leprologist Dr. John Hargrave), and he was referred into RDH for investigation.

On examination there were multiple pigmented lesions over the face, trunk and lower limbs. The lesions were not raised and only moderately well demarcated. His eyebrows were intact although the skin appeared thickened. The ear lobes were clinically normal. There was patchy sensory impairment to pinprick, although not always over the lesions. Sensory loss was present over two fingers on the right and one on the left hand. Fungal rash, consistent with Trichophyton rubrum was present on the trunk, limbs and fingernails. Power and reflexes were normal, and clinically there was no ocular involvement. Thickened peripheral nerves were felt including bilateral ulnar, radial and common peroneal nerves.

Nasal discharge swabs were negative for AFB on microscopy. Multiple AFB were seen on skin smears, especially from the eyebrow (32 fragmented and 54 non fragmented AFB). A skin biopsy revealed numerous AFB throughout the dermis which were seen singularly and in clusters (globi). The leprosy ELISA was moderately reactive. The diagnosis was lepromatous lepromatous (LL) leprosy and MDT with rifampicin, dapsone and clofazimine is planned for at least 2 years.

Case Study 3
The third patient was a 72 year old Aboriginal man who has lived in Arnhemland all his life and had travelled extensively in the Top End of the NT. He recalls that his mother may have had leprosy although this is not confirmed. Apart from well controlled hypertension he was in good health, with no history of diabetes mellitus or alcoholism.

He presented with a three year history of paraesthesiae in both hands and feet and had noticed skin lesions over the last three months.

On examination he had a loss of eyebrows with marked thickening in that area and the ear lobes. There were multiple raised pigmented lesions up to 4 cm diameter over the trunk and legs. The lesions were well demarcated and had reduced sensation to pinprick. In addition, the patient had widespread tinea. Sensation was reduced in a patchy distribution on the palmar aspect of the hands and the left foot. Sensation was intact over the eyebrows. Nerve conduction studies showed significant defects, with a mononeuritis multiplex pattern consistent with multibacillary leprosy.

Skin smears contained multiple AFB, but nasal swabs were negative for AFB. The leprosy ELISA was strongly reactive. The skin biopsy revealed numerous AFB singularly, and many globi (clusters) were present throughout the dermis. The diagnosis was lepromatous lepromatous (LL) leprosy. MDT with rifampicin, dapsone and clofazimine is planned for at least two years.

Discussion
Leprosy was first reported in the NT among indentured Chinese migrants in the 1890s. The first diagnosis in an Aboriginal person was in 1890. The disease was firmly established among the Aboriginal population by the turn of the century. Surveys taken in the 1950s found up to 10% of the Aboriginal population affected by leprosy, with a case detection rate in 1961 of 3.7 cases per 1000.1 The incidence gradually declined, through active case finding and effective medication. Since the introduction of MDT (rifampicin, dapsone, +/ clofazimine) in the early 1970s, the incidence of leprosy in the Aboriginal population has fallen by ten-fold.2 A 1993 article reported, "and in the NT, while the endemicity has been effectively contained, there are still cases in Aboriginals but, as with the rest of Australia, most new cases are in migrants."3 The cases reported from 1993 to the present have proven this statement wrong, with six of the seven notified leprosy cases being in Aboriginal people.
References

Editorial
A communicable disease in decline is always difficult to deal with. As community awareness dwindles, so does health staff experience and recognition of the disease. This is the present difficulty with leprosy control in the NT. Health care providers need to know that leprosy is still present in the NT.

The major diagnostic features are:
1. In the skin: Hyperpigmented or hypopigmented macules (often anaesthetic) with well defined edges are typical. Any unexplained macule, plaque, nodule, infiltration or erythema nodosum in subjects from endemic regions is suspect.

2. The nerves: Ulnar, median, lateral popliteal, posterior tibial and facial nerves are commonly affected. The clinical effects are nerve enlargement (may be difficult to assess for the inexperienced), anaesthesia, muscle weakness.

3. Acid-fast bacilli (AFB): AFB in slit skin smears or skin biopsies or nasal mucous/discharge (only in borderline and lepromatous patients) are found.

Skin lesions or neuropathy in at-risk patients, ie mainly Aboriginal people and migrants from high risk countries, need to have leprosy considered in their differential diagnosis.

AND HOW WILL SKIN LESIONS BE SEEN? Only if health staff disrobe and examine the patient. As Dr Hargrave always taught, you must examine the torso including the buttocks of patients. Attempts must be made to do this in a respectful, private and educating manner. If skin or neurologic findings are present, THINK LEPROSY. As regards examining nerves for enlargement, experience will only be gained if examinations of at risk patients are continually carried out.

The NT has combined its leprosy and TB control programs, as is happening in many places in the world, for mutual benefit of both programs. Certainly in the NT the risk groups are similar. Whenever a person is screened for TB, a brief evaluation for leprosy should also be made. Videos which demonstrate the skin and neurologic examination for leprosy are available from TB/Leprosy Control in Darwin and from the Disease Control Centres in Katherine, Nhulunbuy, Tennant Creek and Alice Springs. In addition, a photographic CD portfolio of clinical leprosy will soon be available from TB/Leprosy Control in Darwin. The following page is offered as a proforma to aid in clinical review and documentation of suspected leprosy patients.

The ELISA Test in Leprosy Diagnosis

Douglas Lush. Disease Control, Darwin.

Leprosy should be considered in the differential diagnosis of all patients with hyperpigmented or hypopigmented skin lesions and/or unexplained loss of sensory or motor function. The finding of enlarged peripheral nerves in a patient with other signs makes the diagnosis of leprosy likely, and requires further investigation.

The leprosy ELISA test measures antibody to a specific antigen of Mycobacterium leprae, the bacteria that causes leprosy. Although a positive ELISA test indicates that a person has been in contact with M. leprae, it cannot differentiate the small number (<5%) who will develop clinical leprosy from those who will not. For this reason the ELISA test has no role as a screening test, and is of limited use in the diagnosis of patients who have signs of leprosy.

The spectrum of disease in leprosy can be divided into multibacillary (MB), with lower cell mediated immunity and relatively large numbers of AFB, and paucibacillary (PB), with a good immune response and very sparse AFB. Patients with MB leprosy are much more likely to have a positive ELISA test (90%) than those with PB leprosy (30-50%).

A positive skin smear test showing AFB is a more specific test for leprosy than the ELISA, but this procedure requires a level of expertise that is not always available. PB disease does not show AFB on skin smears and diagnosis depends on clinical findings, nerve conduction studies and histology. The ELISA is most useful in the monitoring of treated MB patients, as regular testing allows relapses to be detected through rising ELISA values.
Clinical Check for Leprosy
Check all over the body for leprosy patches - including the buttocks. If you find any patches or loss of feeling and think they could be leprosy then draw them below.

Patient Name_____________________

DOB____________________

Check for enlarged nerves
☑ if normal
☒ if enlarged and leprosy suspected

Discuss with TB/Leprosy Control
Disease Control Centre in your area
or phone 228 044 in Darwin and ask for Leprosy Control
The potential arbovirus diseases in the Top End of the Northern Territory and the outlook for the remainder of the 1995/96 wet season

Peter Whelan, Medical Entomology, Disease Control, Darwin.

Background
There have been nine different arboviruses isolated from mosquitoes collected in the Top End of the NT that are either known or suspected of causing disease in humans. These include: the alphaviruses Ross River virus (RRV) and Barmah Forest virus (BFV), which are the most frequently confirmed causes of arbovirus disease in Australia; and the flaviviruses Murray Valley Encephalitis virus (MVE) and Kunjin virus (KUN) which can cause serious illness and have been responsible for periodic outbreaks and isolated cases of disease in the Northern Territory. Disease surveillance, virus isolation from mosquitoes, vector monitoring and sentinel chicken surveillance results suggest that there is a significant seasonal disease potential for these four arboviruses in the Top End of the NT. There are also a number of other alpha and flaviviruses and arboviruses in other groups that may be responsible for some of the arbovirus disease in the NT.

One significant gap in our knowledge is the range and impact of the arboviruses that are causing disease in the NT. By giving general practitioners information about arboviruses and making them more aware of those known to occur in the NT, including the periods of greatest risk for disease, a better understanding may be gained. When symptoms and circumstances suggested arboviruses, more detailed antibody testing may prove useful.

Arboviruses known to occur in the NT
Since 1982 there has been a concerted program by the Medical Entomology Branch of THS (Territory Health Services), in cooperation with the Department of Primary Industry and Fisheries (DPI&F), to detect the presence of the various arboviruses in mosquitoes collected from different areas in the NT. The initial results of this program have been the isolation of nine different arboviruses including:

- **Alphaviruses**
  - Sindbis
  - Ross River
  - Barmah Forest

- **Flaviviruses**
  - Murray Valley Encephalitis
  - Kunjin
  - Edge Hill
  - Kokobera (previously isolated)

- **Bunyaviruses**
  - Gan Gan
  - Trubanaman

Alphaviruses are the most frequently isolated. Among these Sindbis virus is most commonly found and primarily from *Culex annulirostris* (the common banded mosquito), which is the most abundant and widespread mosquito in the Top End of the NT. Sindbis virus has not currently been shown to cause human disease in Australia but is known to cause disease in other countries. Next in abundance are Ross River virus and Barmah Forest virus, which are primarily isolated from three species of mosquito including *Culex annulirostris*, *Aedes normanensis* (the flood water mosquito) and *Aedes vigilax* (the salt marsh mosquito).

The flaviviruses are isolated infrequently, with a single isolate of MVE virus from Mataranka in March 1984 and four isolates of Kunjin from Darwin and Jabiru from April to June in 1983. These were all from *C. annulirostris* mosquitoes. In follow up studies an additional isolate of MVE has been made from *Ae. normanensis* mosquitoes collected at Mataranka in March 1984. Significantly the isolates of MVE and KUN were all in the post "wet" period.

Edge Hill has been implicated in cases of polyarthritic disease in other States of Australia. This virus was isolated from the *Ae. vigilax* mosquitoes collected in January 1983 in the Darwin area (R. Weir pers. comm.). The flavivirus Kokobera was isolated from the Beatrice Hill area from *C. annulirostris* mosquitoes collected in 1974 to 1976. Kokobera is also suspected to be involved in polyarthritic disease.

Trubanaman (TRU) was isolated from the Darwin area and Gan Gan (GAN) from the Katherine area. Both arboviruses were isolated from *Anopheles* mosquitoes collected from March to May. Both of these viruses have been implicated in polyarthritic disease. Many other arboviruses that are neither flav, alpha or bunyaviruses have been identified but it is not known if these are involved in human disease.

Current outlook for March and April
So far in the 1995/96 wet season there have been 24 cases of RRV and 8 cases of BFV reported in the Darwin region from December to February. In comparison there were 210 cases of RRV in the Darwin region over the corresponding period during the 1994/95 wet season. This very significant reduction in disease is due to both vector control and environmental conditions.

The single case of Kunjin virus disease this year occurred in a rural community near Darwin in January. The absence of any flavivirus disease in Darwin, with its population density, must be due to the relative freedom from *C. annulirostris* mosquitoes in the urban areas.

The numbers of salt marsh mosquitoes in the Darwin area are at a very low level. This situation is likely to persist except in certain areas such as sand dune habitats near coastal areas that only flood after extensive periods of rain. However, as the wet season finishes, the numbers of the 'common banded mosquito' tend to
increase. This species can transmit both RRV and BFV and the flaviviruses. While the remainder of the wet season may be relatively free from RRV disease in the Darwin urban area, the post wet to early dry season still poses a risk for alphavirus infection in other areas, and flaviviruses in the general Top End area. The areas of highest potential for flavivirus infection in the Darwin and northern coastal areas are associated with the large brackish reed swamps and the extensive and shallow freshwater swamps associated with the larger river flood plains and smaller ill draining creek systems.

In the Arnhem region and Nhulunbuy in particular there has been relatively high numbers of salt marsh mosquitoes associated with recent high tides and rainfall. The potential for both RRV and BF virus is likely to be quite high in this region during March.

The Katherine area has a history of relatively high RRV infection in the January to March period. There have been 15 cases of RRV in the Katherine district over the last few months. The potential for further RRV cases is relatively high for the remainder of March until the rain ceases. The potential for alphavirus infection is possibly below average if there is little further heavy and widespread rain.

In the Roper, McArthur and the eastern Barkly areas there has been recent high rainfall and the numbers of both the flood water mosquito Ae. normanensis and the 'common banded mosquito' are expected to be high for at least the remainder of March. This will lead to a relatively high risk for alphavirus infection and a higher than usual flavivirus risk.

In the VRD area recent rains are likely to lead to high numbers of the 'common banded mosquito' and there will be a relatively high potential for alphavirus and flavivirus transmission.

The Alice Springs area is relatively dry. Unless there is heavy and widespread rain in the next few weeks, the potential for arbovirus infection for March and April is very low.

Conclusion
The arboviruses which could cause disease in the Top End of the NT are: the alphaviruses Ross River virus, Barmah Forest virus and Sindbis virus; the flaviviruses Murray Valley Encephalitis virus, Kunjin virus, Kokobera virus and Edge Hill virus; the bunyaviruses, Gan Gan virus and Trubanaman virus; and a number of other known viruses which remain to be linked to human disease.

The prevalence of many of these arboviruses and the role they play in viral illness in the NT has not been accurately established. More information on case symptoms and specific requests for testing for the presence of antibodies to the arboviruses known to occur in the NT or associated with disease in other areas may shed light on these viral illnesses.

References

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**Testing patients with seronegative polyarthritis**

Following media attention on the "mystery" virus transmitted by mosquitoes, a number of doctors have phoned Disease Control seeking additional arbovirus testing for their seronegative patients with polyarthritis of recent onset.

Dr David Smith, State Health Laboratory Services in Perth, is collecting sera from similar patients for inclusion in a serum bank. As new panels of arbovirus tests are developed, these sera will be examined.

Any doctor interested in participating in this collection should contact Dr Angela Merianos on 22 8265. Acute sera and paired sera are preferred. Testing will be free of charge, but doctors should emphasise to their patients that reporting of results will be slow and will not change their clinical management.
Adult Immunisation Campaign
Sue Reid and Vicki Krase, Disease Control, Darwin.

Immunisation of adults has never received the same priority as immunisation of children, despite the fact that deaths from vaccine preventable diseases occur predominantly in adults. The uptake of influenza vaccine is only about 30% in at risk groups, with 80% of influenza deaths occurring in adults over the age of 65 years. A large outbreak of influenza affected the Top End in late February to May 1995. Uptake of the vaccine was generally slow and too late to diminish the full extent of the outbreak.

The NT has the highest rate in the nation of invasive pneumococcal disease. Pneumococcus is responsible for 40% of community acquired bacteremia pneumonia in adults admitted to Royal Darwin Hospital with mortality up to 21% and 32% of other adults requiring intensive care. Despite this, only nineteen people in the Darwin district received pneumococcal vaccine in 1994. Pneumococcal vaccine is grossly underutilised both nationally and locally despite being effective in reducing the morbidity and mortality in people with high risk of the infection.

Tetanus is now a disease of elderly adults with waning immunity. One recent Australian study showed the average age of cases of tetanus to be 67 years and another said 60% of all cases were over 75 years.* A case of tetanus reflects the failure of the health care delivery system to provide immunisation. Clearly, more emphasis needs to be placed on ten yearly adult diphtheria tetanus (ADT) booster shots.

Concerns about the lack of awareness amongst both the public and health care providers about the importance of adult immunisation, prompted the planning and implementation of an NT wide adult immunisation campaign which was launched on 25 February 1996, by Health Services Minister, the Honourable Fred Finch.

The campaign has utilised TV and radio commercials, newspaper advertising, newsletters, posters, pamphlets and other promotional items including coasters and coffee mugs. See following pages for a copy of the campaign message in poster form and the NT Adult Vaccination Schedule.

To assess the overall impact of the campaign, the following three parameters will be looked at:

1. The distribution of ADT 6 months prior to the campaign (August 1995 to January 1996), compared with the 6 months following the campaign (February 1996 to July 1996).

A full report on the impact of the campaign will be published in the September Bulletin.

Reference

Editorial
The most recent WA Communicable Diseases Bulletin highlights the need for up-to-date adult immunisation by reporting three cases of tetanus, all in adults over 50 years of age. The most recent case in January 1996, was a 69 year old man who related a three day history of malaise, neck stiffness, dysphagia, trismus and spasms in his arm prior to hospitalisation, which included intensive care therapy (the norm for tetanus cases). He had no history of trauma, but had undergone an uncomplicated sinus operation three weeks earlier. His most recent tetanus vaccination had been 20 years ago. This suggested association with surgery was similar to that found by Wooley and Speed in Victoria and underscores the appropriateness of opportunistic immunisation of adults in the hospital setting (eg, as a routine pre-operative check).

A school based ADT and 5th dose OPV immunisation program for 15 year olds will be implemented in NT schools in August - October 1996, and then annually.

References
Adults are at risk.

Make Time
Get Immunised

Children need to be immunised, but so do ADULTS! More adults die from vaccine-preventable diseases than children.

Diseases such as influenza (flu) can be fatal. Older people, or those with long-term medical conditions such as diabetes, lung, heart or kidney disease are particularly at risk. In fact, 80% of flu deaths occur in those over 65 years of age. For high risk groups, flu immunisation is necessary every year. Tetanus can be caused by activities as simple as gardening or even stubbing your toe. It is most common in older adults who have not maintained adequate protection through booster injections. Tetanus immunisations should be updated every 10 years.

Influenza, tetanus, diphtheria, pneumococcal disease, hepatitis B, measles, mumps and rubella are all vaccine-preventable diseases. If you are older or think you are in a special risk group, talk to your local doctor or Community Care Centre.

Make Time. Get Immunised.
# Northern Territory Adult Vaccination Schedule

## All Adults

<table>
<thead>
<tr>
<th>Age</th>
<th>Vaccine</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 years and then every 10 years throughout life</td>
<td>Adult diphtheria, tetanus (ADT)</td>
</tr>
<tr>
<td>15 years</td>
<td>Oral polio vaccine (OPV) Measles-mumps-rubella (MMR) if not received in year six at school</td>
</tr>
<tr>
<td>50 years (Aboriginal)</td>
<td>Pneumococcal Influenza (yearly thereafter)</td>
</tr>
<tr>
<td>65 years (Non-Aboriginal)</td>
<td>Pneumococcal Influenza (yearly thereafter)</td>
</tr>
</tbody>
</table>

## Special Groups of Adults

### Immunocompromised

<table>
<thead>
<tr>
<th>Condition</th>
<th>Vaccine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anatomic or functional asplenia</td>
<td>Meningococcal Pneumococcal (five yearly thereafter) Influenza (yearly) Haemophilus influenzae type b (Hib)</td>
</tr>
<tr>
<td>Diabetes, malignant diseases and chronic medical conditions eg alcohol dependency lung &amp; cardiac disease renal disease</td>
<td>Pneumococcal Influenza (yearly)</td>
</tr>
<tr>
<td>HIV infection</td>
<td>Meningococcal Pneumococcal Influenza (yearly) Hib</td>
</tr>
<tr>
<td>Haemodialysis or transplant recipients</td>
<td>Pneumococcal Influenza (yearly) Hepatitis B Hib</td>
</tr>
<tr>
<td>Chronic liver disease</td>
<td>Pneumococcal Influenza (yearly) Hepatitis A Hepatitis B</td>
</tr>
</tbody>
</table>

### Lifestyle

<table>
<thead>
<tr>
<th>Condition</th>
<th>Vaccine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men who have sex with men and injecting drug users</td>
<td>Hepatitis A Hepatitis B</td>
</tr>
<tr>
<td>Multiple sexual partners and/or sexually transmissible diseases</td>
<td>Hepatitis B</td>
</tr>
<tr>
<td>Women considering pregnancy</td>
<td>Rubella antibody check, if negative MMR 2 months before conception</td>
</tr>
</tbody>
</table>

## Travellers - Vaccine requirements will depend on itineraries

*Certain occupations require specific vaccine protection.*

For more information contact your nearest Disease Control Centre, Community Care/Health Centre, local doctor or in Darwin "International Vaccination Clinic".

- **22 8044** Darwin
- **51 7550** Alice Springs
- **62 4259** Barkly
- **73 8795** Katherine
- **87 0232** East Arnhem

- **81 7492** International Vaccination Clinic
Highlights of the 1995 NT AIDS/STD Program Report

Frank Bowden, AIDS/STD Unit, Disease Control, Darwin.

Sexually transmitted diseases (STD) remain one of the most important causes of morbidity in the Northern Territory (NT). The short and long term effects of STDs are often neglected by both patient and health care provider alike.

This document aims to provide an overview of the epidemiology of STDs in the NT and to offer strategies for control of particular conditions at an individual and a public health level.

There have been a number of important changes in the epidemiology, diagnosis and treatment of STDs in the NT in 1995. Each is dealt with in more detail in the full Program Report, but the highlights are listed below.

Epidemiology

The most exciting feature of this report is the decrease in the rates of notification of STDs in most parts of the NT in 1995. Overall, there was a 28% decrease in the notification of chlamydia, a 30% decrease in gonorrhoea and a 27% decrease in syphilis. The data are summarised in Table 1 (page 12).

There are marked regional differences in the notification rates: Alice Springs showed an increase in chlamydia and syphilis notifications for 1995 as a result of the intensive activity of the Tristate Project in STDs. A similar increase in notifications as a result of screening activity was noticed in the Top End at the end of 1994, beginning of 1995. All other districts in the NT showed a substantial decrease in the number of notifications with the Darwin District (Urban and Rural) showing the greatest fall in numbers: 44% less chlamydia, 55% less gonorrhoea and 40% less syphilis.

The data represent the lowest notifications of gonorrhoea and syphilis since 1981 when accurate data collection began Figure 1 (see overleaf).

Do these data reflect a true decrease in the incidence of disease?

There is no doubt that the notification data underestimate the actual incidence of disease in the community - active surveillance for STDs in many NT communities shows that the prevalence of several STDs is higher than the data collected by Disease Control would suggest. However, surveillance conducted for the past four years has been augmented to ensure that all available information is collected and this has led to a progressive increase in gonorrhoea, chlamydia and donovanosis notifications for the years 1993 and 1994. Chlamydia and gonorrhoea notifications are now laboratory based.

In some areas there is a clear reason for a decrease in notifications: in 1993 there were 89 notifications of urethral gonorrhoeal infection at the Alice Springs gaol and 109 in 1994. In 1995 only 24 notifications were received as a result of a decrease in screening activities. In addition several community health centres underwent significant structural changes in 1995 and this may have led to a decrease in STD control related activities.

Nevertheless, the decrease in notifications in the Top End is in accord with anecdotal experience: in the past two years Clinic 34 operating in Darwin has had a marked increase in patient attendances with a concomitant decrease in the proportion of patients presenting with disease. Similarly the experience of a number of District Medical Officers in the Darwin Rural District has shown that despite unchanged screening practices, the number of positive results has fallen. In the Katherine district a review of the laboratory testing data has revealed that the number of tests performed has increased but the proportion of positives has fallen.

The reasons for this improvement are complex but can be attributed to a number of factors:

- Safer-Sex Practices

Educational and health promotional activities have resulted in a marked increase in the number of condoms distributed throughout the NT. Anecdotal reports of increased condom usage will be substantiated with a formal study to be performed in 1996.

- Increased clinical activity.

Over the past two years the AIDS/STD unit in Darwin and Communicable Disease Officers in Katherine and East Arnhem have responded to numerous requests from communities for assistance in screening for STDs. (The Tristate Project in Central Australia has been involved in a number of intensive programs in 1995. It is anticipated that the benefits of these activities will be seen in the next 18 months). The availability of sexual health services has been improved in the urban districts with the establishment and widespread media promotion of Clinic 34 throughout the NT.

- Better contact tracing.
The concept of “super-spreaders” or “core-group” members (see Section 4) has been widely embraced and health care professionals are willing to invest considerable effort in the counselling and treatment of this group. Contacts are now more likely to receive effective empiric therapy.

- Improved treatment regimens
  See Treatment section.

Diagnosis
Major advances in the diagnostic testing available for STDs have been made in the last 12 months. Urine testing for chlamydia and gonorrhoea has been pursued by the AIDS/STD unit for several years, but has been impeded by the technical and logistical difficulties of establishing bush laboratories. The commercial release of PCR for the diagnosis of chlamydia and gonorrhoea has allowed urine screening of men in remote settings to be undertaken. The Tristate Project has led the way in this area and protocols are now available. The urine test will soon replace urethral swabs in men.

The situation for screening in women is less clear, although there is encouraging evidence that urine may be a suitable specimen for chlamydia and gonorrhoea. More work is needed in this area before recommendations can be made.

The AIDS/STD unit is currently undertaking a two-year project to investigate the acceptability and suitability of self-administered tampon specimens for the diagnosis of chlamydia, gonorrhoea, trichomoniasis, human papilloma virus and other STDs using PCR technology. Preliminary results are very encouraging, with excellent acceptability (more than 90% of women agreed to participate). The sensitivity and specificity of the technique will be determined in the course of the study but is expected to be comparable (and probably superior) to conventional testing.

The future of STD screening is therefore bright: practitioners in the field will be able to investigate the common STDs with minimally-invasive, painless specimens which are not as sensitive to heat and transport delays as conventional specimens (see Section 4 of the full Report for further discussion).

Treatment
Azithromycin was introduced into the country in late 1994 and the NT became the first place in Australia to recommend the drug for the treatment of uncomplicated genital chlamydia. The condition can now be treated with single dose therapy which has eliminated the significant problem of poor compliance. In addition, a study conducted in the Darwin, Katherine and East Arnhem districts showed that azithromycin is highly effective in the treatment of donovanosis and the drug has now become the first-line therapy for this condition in the Top End. A trial of azithromycin in the treatment of donovanosis is continuing in Central Australia.

There is evidence that azithromycin is effective in the treatment of primary and secondary syphilis, although penicillin remains the necessary treatment for the disease. It is interesting to speculate that the more widespread use of azithromycin may be responsible for the significant decrease in syphilis notifications throughout the NT (See Section 3 of the Report).

A full copy of the Report can be obtained from the AIDS/STD Unit, Disease Control, pH: 22 8874.

References
Table 1. NT Notifications of STDs 1994 v 1995: By District

<table>
<thead>
<tr>
<th>District</th>
<th>Chlamydia</th>
<th>Gonorrhoea</th>
<th>Syphilis</th>
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<tbody>
<tr>
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<td></td>
<td></td>
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</tr>
<tr>
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<td>367</td>
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<tr>
<td>% change</td>
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<td>-22</td>
<td>+3</td>
</tr>
<tr>
<td>Barkly</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1994</td>
<td>19</td>
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</tr>
<tr>
<td>% change</td>
<td>-63</td>
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</tr>
<tr>
<td>Darwin</td>
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<td></td>
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<td>1994</td>
<td>378</td>
<td>198</td>
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</tr>
<tr>
<td>% change</td>
<td>-44</td>
<td>-55</td>
<td>-40</td>
</tr>
<tr>
<td>East Arnhem</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1994</td>
<td>51</td>
<td>39</td>
<td>82</td>
</tr>
<tr>
<td>1995</td>
<td>47</td>
<td>43</td>
<td>24</td>
</tr>
<tr>
<td>% change</td>
<td>-8</td>
<td>+10</td>
<td>-71</td>
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<td></td>
</tr>
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<td>89</td>
</tr>
<tr>
<td>1995</td>
<td>71</td>
<td>96</td>
<td>62</td>
</tr>
<tr>
<td>% change</td>
<td>-17</td>
<td>-7</td>
<td>-30</td>
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<tr>
<td>NT</td>
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<td>1995</td>
<td>526</td>
<td>524</td>
<td>336</td>
</tr>
<tr>
<td>% change</td>
<td>-28</td>
<td>-30</td>
<td>-27</td>
</tr>
</tbody>
</table>

Figure 1  NT STD Notification Rates: Gonorrhoea and Syphilis
1981-1995

[Graph showing notification rates for Gonorrhoea and Syphilis from 1981 to 1995]
Indications For HIV Testing
Territory Health Services, Disease Control Centre

The availability of free, confidential and appropriate HIV testing is one of the cornerstones of the management of HIV infection in our community. Early diagnosis benefits the individual and reduces transmission of disease. The provision of HIV testing must be tailored to the specific needs of particular population groups. The following is a list of individuals who should be routinely offered HIV testing with informed consent.

1. Individuals presenting with a sexually transmitted disease (e.g. syphilis, gonorrhoea etc).
2. Patients presenting with signs or symptoms consistent with HIV and its associated infections (including TB at any site).
3. Sexual contacts of known HIV positive individuals.
4. Individuals who report high risk behaviour e.g. unprotected sexual contact, needle sharing.
5. Recipients of blood transfusions (or individuals who have received blood products) in Australia between 1980 and 1985.
6. Individuals reporting unprotected sexual activity in countries of high HIV prevalence e.g. Africa, South East Asia, India Sub-continent and the United States of America.
7. “Source” patient and “recipient” in bio-hazard injuries.
8. All antenatal women.
9. Individuals requesting HIV testing.

All HIV tests performed in the NT should be coded. For any other HIV/STD concerns please contact DCC in your regional centre, weekdays 8am-5pm.

<table>
<thead>
<tr>
<th>City</th>
<th>Contact number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Darwin</td>
<td>22 8007</td>
</tr>
<tr>
<td>Katherine</td>
<td>73 8795</td>
</tr>
<tr>
<td>Tennant Creek</td>
<td>62 4218</td>
</tr>
<tr>
<td>Alice Springs</td>
<td>51 7550</td>
</tr>
<tr>
<td>Nhulunbuy</td>
<td>87 0536</td>
</tr>
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</table>

Review of the NT immunisation “database”
Sandra Thorman and Angela Merianos, Disease Control, Darwin.

Enhancing immunisation coverage through the rapid access of client immunisation details by vaccine providers is the primary objective of the Surveillance & Immunisation Section, Disease Control, and the Immunisation Help Desk specifically.

A short history of computerised immunisation databases in NT
There are currently eight Territory Health Services immunisation databases used in the NT. Those with corporate memory will know that attempts to computerise immunisation data in the NT have had variable success between districts and in urban versus rural and remote areas. Problems included lack of quality assurance, especially in maintaining an accurate, active client base from which to calculate immunisation coverage rates, timely access to information by vaccine providers and a single user platform which meant only one person could use the system at any given time in their district.

This review presents some of the improvements to the immunisation system in the last twelve months.

The immunisation database upgrade project
The project aimed to systemise the way immunisation data were recorded at the clinic level and in the computerised databases. In 1994 two new positions were created within DCC Darwin to improve the quality of immunisation data and their retrieval for vaccine provider use. Problem areas in work practice with respect to the recording and archiving of immunisation records and in the immunisation database software were identified and quality assurance mechanisms for data recording and entry were implemented. NCOM was contracted to correct software problems and upgrade the system to meet new retrieval requirements.

Improvements and new initiatives introduced in 1995 included:
1. Amalgamating records of the five urban Darwin data bases into one central database held in DCC Darwin;
2. Standardising immunisation schedules and data entry procedures at all eight immunisation database sites;
3. Reviewing and validating existing records;
4. Encouraging all NT immunisation providers to participate in the Territory Health Services’ data collection program;
5. Archiving records of mobile clients to maintain the accuracy of the client base;
6. Entering the backlog of immunisation data;
7. Maintaining a handwritten log of each vaccine given and the provider for statistical purposes (Darwin Urban only);
8. Providing “read only” access between urban and rural databases in each district;
9. Ensuring the development of an appropriate immunisation database within the broader framework of the Community Care Information Technology Project;
10. Installing software for electronic data transfer in preparation for participation in the Australian Childhood Immunisation Register (ACIR).

Help Desk
Vaccine providers are invited to telephone the Immunisation Help Desk (ph: 228382) in DCC Darwin for immediate answers to queries regarding the immunisation status of their clients with the view to opportunistic immunisation at each visit.

Parents also use the Help Desk service to confirm immunisation details or obtain an immunisation certificate to be used at school entry.

Program Evaluation
The cooperation of vaccine providers in the public and private sectors, has enabled the immunisation database to progress towards a reliable service that can rapidly trace children around the NT and check immunisation histories.

The following tables are examples of the data generated by analysing the immunisation data. Table 1 presents data on the number of vaccine doses administered in Darwin urban clinics and the Barkly district from May - December 1995. A total 19 503 doses were administered by participating clinics during the observation period; an average of 235 doses per month. As expected Casuarina Community Care Centre had the highest throughput, closely followed by Palmerston CCC. Private medical practitioners are provided with free vaccines in exchange for participation in data collection. These data can help planners determine the workload generated by the Childhood Immunisation Program at each clinic for recommendations on staffing levels. Table 2 presents the immunisations given by vaccine providers and provides useful information. The gratifyingly low number of CDT immunisations reflect awareness of the revised absolute contraindications for DPT vaccine and the importance of pertussis vaccine. In addition, the number of DPT and OPV doses administered are similar, indicating that vaccine providers are correctly giving these vaccines at the same time. The doses of hepatitis B vaccines administered in Darwin Private Hospital (DPH) are a proxy measure of the average number of births per month, and when compared to the total births registered, provides an estimate of hepatitis B vaccine coverage at DPH.

The client base
Client details of most children aged 0-6 years, and all children born in NT hospitals after 1 January 1995 are now computerised. From 1 January 1996, new immunisation encounters of children at participating centres aged 0-6 years will be electronically transferred to ACIR. Vaccine providers across the NT have been invited to participate in the National Register in order to provide an accurate estimate of immunisation coverage in Australia, and to track children across States and Territories. Most vaccine providers in the NT have agreed to participate in ACIR.

Overdue Immunisations
Each month a list of clients with overdue immunisations is printed from each database and sent to most participating immunisation providers so that they are able to implement their own recall/reminder systems locally. Computer generated recall lists have worked well in most rural areas with well defined client bases, and will be implemented in urban sites once inactive files are archived.
Table 1
Total Vaccination doses administered in urban Darwin Clinics & the Barkly May - Dec 1995

<table>
<thead>
<tr>
<th>Month</th>
<th>Total doses</th>
<th>Cas</th>
<th>Kar</th>
<th>Dwn</th>
<th>Nic</th>
<th>Ptn</th>
<th>AdR</th>
<th>Bch</th>
<th>Bgt</th>
<th>RDH</th>
<th>GPs</th>
<th>DPH</th>
<th>Bky</th>
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<td>1983</td>
<td>829</td>
<td>260</td>
<td>185</td>
<td>683</td>
<td>26</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>June</td>
<td>2367</td>
<td>917</td>
<td>273</td>
<td>159</td>
<td>262</td>
<td>648</td>
<td>19</td>
<td>55</td>
<td>196</td>
<td>28</td>
<td>26</td>
<td>196</td>
<td>10</td>
</tr>
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<td>July</td>
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<td>744</td>
<td>231</td>
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<td>August</td>
<td>2504</td>
<td>654</td>
<td>306</td>
<td>206</td>
<td>284</td>
<td>658</td>
<td>14</td>
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<td>129</td>
<td>16</td>
<td>66</td>
<td>114</td>
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<td>September</td>
<td>2437</td>
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<td>239</td>
<td>199</td>
<td>638</td>
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<td>56</td>
<td>13</td>
<td>84</td>
<td>13</td>
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<td>October</td>
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<td>806</td>
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<td>213</td>
<td>199</td>
<td>723</td>
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<td>65</td>
<td>15</td>
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<td>44</td>
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<td>18</td>
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<tr>
<td>November</td>
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<td>720</td>
<td>250</td>
<td>185</td>
<td>160</td>
<td>800</td>
<td>39</td>
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<td>168</td>
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<td>158</td>
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<td>492</td>
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<td>120</td>
<td>12</td>
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<tr>
<td>Average</td>
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<td>252</td>
<td>192</td>
<td>212</td>
<td>674</td>
<td>18</td>
<td>45</td>
<td>12</td>
<td>151</td>
<td>22</td>
<td>58</td>
<td>123</td>
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NB: See Table 2 for Clinic (immunisation provider)* abbreviation
Doses administered at each clinic are only shown for the months in which data are complete.

Table 2
Average number of immunisations per month by clinic May - December 1995

<table>
<thead>
<tr>
<th>Clinic</th>
<th>*Abbr</th>
<th>BCG</th>
<th>HepB</th>
<th>Sabin</th>
<th>DPT</th>
<th>Hib</th>
<th>MMR</th>
<th>CDT</th>
<th>ADT*</th>
<th>Total</th>
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<tr>
<td>Casuarina CHC</td>
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<td>2</td>
<td>121</td>
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<td>206</td>
<td>146</td>
<td>78</td>
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<td>761</td>
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<td>Karama Infant H C</td>
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<td>1</td>
<td>40</td>
<td>73</td>
<td>76</td>
<td>55</td>
<td>18</td>
<td>1</td>
<td>1</td>
<td>265</td>
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<td>Darwin CHC</td>
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<td>1</td>
<td>42</td>
<td>62</td>
<td>68</td>
<td>46</td>
<td>17</td>
<td>1</td>
<td>1</td>
<td>238</td>
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<td>Nic</td>
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<td>31</td>
<td>60</td>
<td>63</td>
<td>42</td>
<td>10</td>
<td>1</td>
<td>1</td>
<td>208</td>
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<td>Palmerston CHC</td>
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<td>1</td>
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<td>696</td>
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<td>Adelaide River CHC</td>
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<td>Batchelor CHC</td>
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<td>1</td>
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<tr>
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<td>1</td>
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<td>3</td>
<td>1</td>
<td>1</td>
<td>1</td>
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<tr>
<td>GP's Darwin Urban</td>
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<td>2</td>
<td>5</td>
<td>4</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>18</td>
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<td>Darwin Private Hospital</td>
<td>DPH</td>
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<td></td>
<td></td>
<td></td>
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<td>57</td>
<td></td>
</tr>
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<td>Average Doses per month Darwin Urban</td>
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<td>39</td>
<td>512</td>
<td>603</td>
<td>646</td>
<td>448</td>
<td>171</td>
<td>8</td>
<td>27</td>
<td>2453</td>
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<tr>
<td>Average doses per month Barkly District CHC</td>
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<td>28</td>
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<td>21</td>
<td>9</td>
<td>2</td>
<td>6</td>
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* ADT doses administered do not reflect the School ADT and polio program due to commence in August 1996.

Determination of vaccine uptake
Determination of vaccine coverage rates are the principal epidemiological function of the immunisation database for program evaluation and planning. Darwin urban coverage statistics are presented in this edition of the Bulletin.
Review of voluntary documentation of immunisation status in NT child care services

Darren Mitchell, Disease Control, Darwin.

Background
In 1982, the National Health and Medical Research Council (NH&MRC) recommended that all State and Territory governments adopt a system which requires evidence of immunisation status prior to school or child care entry.

The need for immunisation documentation was identified because of the problems experienced in child care settings (and schools) for controlling outbreaks of vaccine preventable diseases. Further it was anticipated that such an initiative would result in increased immunisation coverage rates.

Since the initial NH&MRC recommendation, New South Wales, Victoria and the ACT have legislated for immunisation documentation as a compulsory requirement on entry into child care and schools.

During 1993/94, Disease Control held discussions with child care representatives to investigate options for the voluntary implementation of such an immunisation documentation program. In 1994, the National Child Care Accreditation Council’s Quality Improvement and Accreditation System addressed issues of child health and safety, and specifically Principle 43: requiring child care to maintain records of children’s immunisation.

During early 1995 Disease Control initiated procedures and resources to assist child care centres to comply with this accreditation standard. The resources included reminder postcards detailing the recommended vaccination schedule, parent information sheets on immunisation records and exclusion during disease outbreaks, immunisation recording forms for use by centres and an exclusion wall chart.

A survey was undertaken during June-July 1995, to review the success of this ‘voluntary’ program of immunisation documentation. The survey also sought to provide baseline immunisation coverage data on children in child care in 1995. ‘Age-appropriate’ vaccine uptake data were sought for the child care population of children two years of age.

The Survey
Immunisation records and attendance rolls were reviewed for 39 of the 45 licensed child care centres in the Northern Territory. Two centres were not operating during the survey period and four centres only catered for older children.

In addition to immunisation details the following demographic data were recorded: ethnicity; language spoken at home; family arrangements - ie. single or dual care givers; birth order and number of siblings.

A total of 406 two year old children (24 months to less than 36 months of age) were identified as being enrolled in NT child care centres during June 1995. The survey excluded those children enrolled for less than one month prior to the survey date. This represented some 11 per cent of the expected NT two year old birth cohort. Of these, 58 (14%) were Aboriginal children and 71 (18%) single-parent families. 48% of the children were ‘first borns’ and 36% sole children.

Results
The centres had immunisation documentation for 66% of all child care children (n=269). Whilst the compliance falls short of ideal levels, it is most encouraging given that the program had only been in place for six months and in the absence of legislation.

Overall 67% of child care children who provided immunisation documentation were appropriately immunised for their ages (Table 2).

Excellent vaccine-specific coverage rates were achieved for the primary series of DTP, OPV and the initial Hib dose, generally above 95%; figures equivalent to coverage levels achieved in most NT rural areas. The coverage level for MMR vaccine was 92%. The coverage levels decrease considerably for the 18 month dose of DPT and OPV (22-26% decrease from the third dose).

Immunisation coverage or provision of immunisation documentation were not significantly associated with the demographic variables, with the exception of single parenthood. Whilst single parents provided immunisation documentation less often than dual parent families (p<0.01), there was no significant difference in vaccine coverage amongst children from single parent families who did provide documentation and dual parent families.

A comparison of these figures with the two year old cohort from the Darwin urban area (reported in this edition of the Bulletin) generally suggests higher coverage rates among children in child care, than in the general population of two year olds.
Table 1. Immunisation documentation in Child Care Centres, Northern Territory, 1995

<table>
<thead>
<tr>
<th></th>
<th>Number</th>
<th>%</th>
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</thead>
<tbody>
<tr>
<td>Immunisation documentation held at centre</td>
<td>269</td>
<td>66.3</td>
</tr>
<tr>
<td>No documentation held</td>
<td>137</td>
<td>33.7</td>
</tr>
<tr>
<td>Total child care enrolment</td>
<td>406</td>
<td>100.0</td>
</tr>
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</table>

Table 2. Immunisation status of 2 year old children with immunisation documentation in Northern Territory Child Care Centres

<table>
<thead>
<tr>
<th></th>
<th>Number</th>
<th>%</th>
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</thead>
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<tr>
<td>Complete immunisation</td>
<td>179</td>
<td>66.5</td>
</tr>
<tr>
<td>Incomplete immunisation</td>
<td>90</td>
<td>33.5</td>
</tr>
<tr>
<td>Total</td>
<td>269</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 3. Immunisation status of 2 year old children by vaccine

<table>
<thead>
<tr>
<th>Vaccine (Dose)</th>
<th>DPT1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>OPV1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>HBV1</th>
<th>2</th>
<th>3</th>
<th>Hib1</th>
<th>2</th>
<th>3</th>
<th>MMR</th>
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<td>94</td>
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<td>76</td>
<td>92</td>
</tr>
</tbody>
</table>

Immunisation coverage in the urban Darwin area

*Darren Mitchell and Angela Merianos, Disease Control, Darwin.*

Data on immunisation coverage for Northern Territory urban areas have been unavailable for several years (see *Review of the NT immunisation “database”*). A review of the Territory’s immunisation databases was conducted during 1995 in order to determine coverage rates and to improve data quality. This paper reports on a review of the Darwin Urban immunisation database undertaken during February 1996 following a twelve month data quality assurance project.

**Vaccine providers**

For the purposes of analysis, the Darwin Urban area was divided into three discrete areas corresponding to the Australian Bureau of Statistics’ (ABS) Statistical Divisions and Subdivisions; Darwin City, Palmerston and the Litchfield Shire (which included areas serviced by urban service providers such as Howard Springs, Humpty Doo, Bees Creek etc).

Within this area, the main service providers were Territory Health Services Community Care Centres at Darwin (including Nightcliff subclinic), Casuarina (including Karama subclinic) and Palmerston (including Humpty Doo subclinic).

During 1995 other providers, including Royal Darwin Hospital, Darwin Private Hospital, Bagot Health Centre, Adelaide River Health Centre, Batchelor Health Centre and several general practitioners, started forwarding immunisation data to the database.

These clinics administered some 28 200 doses of vaccine to children registered on the database.
Completeness of the computerised immunisation records

A comparative audit of the number of DPT vaccine doses ordered by the major urban Community Health Centres and the data returns for DPT vaccine was conducted to estimate the completeness of the vaccine record on the Darwin Urban immunisation database. 91% of vaccine records were received for the period February-April 1995. With improved measures of accountability, this increased to 98% by the period August-October 1995.

Client demographics

The following table details the number of children registered on the database for each sampled birth group by residential location.

For the 1995 birth group, some 79% of children registered on the Darwin Urban immunisation database resided in the Darwin Urban area.

Table 1

Place of residence of children sampled from the Darwin Urban immunisation database

<table>
<thead>
<tr>
<th>Residential Location</th>
<th>2 yr</th>
<th>1 yr</th>
<th>1995 births</th>
</tr>
</thead>
<tbody>
<tr>
<td>Darwin City SD</td>
<td>1344</td>
<td>1279</td>
<td>1209</td>
</tr>
<tr>
<td>Palmerston</td>
<td>313</td>
<td>373</td>
<td>437</td>
</tr>
<tr>
<td>Litchfield</td>
<td>221</td>
<td>214</td>
<td>249</td>
</tr>
<tr>
<td><strong>Total Darwin Urban</strong></td>
<td><strong>1878</strong></td>
<td><strong>1866</strong></td>
<td><strong>1895</strong></td>
</tr>
<tr>
<td>Darwin Rural</td>
<td>39</td>
<td>73</td>
<td>287</td>
</tr>
<tr>
<td>Alice Springs</td>
<td>7</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>Barkly</td>
<td>1</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>East Arnhem</td>
<td>11</td>
<td>21</td>
<td>46</td>
</tr>
<tr>
<td>Katherine</td>
<td>8</td>
<td>10</td>
<td>33</td>
</tr>
<tr>
<td>Interstate/OS</td>
<td>58</td>
<td>75</td>
<td>99</td>
</tr>
<tr>
<td>Unknown</td>
<td>144</td>
<td>109</td>
<td>35</td>
</tr>
<tr>
<td>Total other</td>
<td>268</td>
<td>300</td>
<td>506</td>
</tr>
<tr>
<td><strong>Total Database</strong></td>
<td>2146</td>
<td>2166</td>
<td>2401</td>
</tr>
</tbody>
</table>

1 Includes transients and missing data.

Completeness of the child record

From May 1995 birth records were forwarded directly from the Royal Darwin Hospital to the database for registration of newborns. This included children born in Darwin but residing elsewhere in the Darwin District. In addition, each new record was annotated for the child's birthplace.

To determine the completeness of the data as a population denominator, a comparison was made between children registered on the database and data on live births over a six month period in 1995. The Northern Territory Perinatal Collection Statistical Report, 1992 which cited 2007 live births in the Darwin Urban and Darwin Rural Districts in that year, was used to estimate the expected number of births for the Darwin District over 6 months in 1995. 1039 births (expected 1003) were recorded on the database indicating that virtually all births have been notified for immunisation registration purposes since 1 January 1995.

Vaccine coverage

Crude immunisation coverage was analysed by: (1) age group; (2) individual vaccine; and (3) location. The child’s place of residence was aggregated by the ABS Statistical Division or Subdivision. (SD/SSD). Age-appropriate or timeliness immunisation coverage analysis was not done.

The recommended immunisation series for children by 24 months of age is 4 doses of DPT and oral polio vaccine (OPV), 3 doses of hepatitis B vaccine, either 3 or 4 doses of Hib vaccine (depending on the preparation) and one dose of MMR vaccine.

Tables 1-3 present the crude vaccine coverage ie immunised children as a percentage of all children registered on the database, for three birth groups by vaccine type and location. Tables 1 and 2 show immunisation coverage for children who on 1 June 1995 were aged 24-35 months or ‘2 year olds’ and 12-23 months or ‘1 year olds’ respectively. Table 3 presents data on children born between January and June 1995.

For the 1995 birth group initial immunisation uptake rates were greater than 90% across all SSDs for all vaccines.

Initial uptake of DPT and OPV was high eg DPT1 at 95-92%. However, a comparison across the three age groups shows a general decrease in coverage for the total Darwin Urban population and when residents of Darwin City are considered alone. The fall in immunisation uptake is particularly evident for the third and fourth doses. For Darwin City - DPT3 85-73%, DPT4 66-62%, OPV3 85-71%, OPV4 66-60%. (Figure 1). The decrease in the third dose of DPT represents a substantial percentage decrease, ranging from 10% to 19% among the shires.

For hepatitis B vaccine, there was a slight increase in uptake of the first dose among children born in 1995 compared to the older children (HBV1 89-92), but a similar falling trend is evident by the third dose (HBV3 74-66%, Figure 2).
MMR vaccine for both the 2 year old and 1 year old group was well below target levels of 95%. MMR coverage was only 77% in Darwin City residents. Age-appropriate Hib coverage rates were not calculated.

**Figure 1**

**Crude Coverage - Darwin Urban**

Diphtheria, pertussis, tetanus (DPT) by 3 years of birth

**Figure 2**

**Crude Coverage - Darwin Urban**

Hepatitis B (HBV) by 3 years of birth

---

**Table 1**

<table>
<thead>
<tr>
<th>Location</th>
<th>no.</th>
<th>DPT  1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>OPV 1</th>
<th>2</th>
<th>3</th>
<th>HBV 1</th>
<th>2</th>
<th>3</th>
<th>Hib1 2</th>
<th>3</th>
<th>MMR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Darwin City (SSD)</td>
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<td>95</td>
<td>91</td>
<td>85</td>
<td>66</td>
<td>95</td>
<td>91</td>
<td>85</td>
<td>56</td>
<td>89</td>
<td>85</td>
<td>74</td>
<td>85</td>
<td>71</td>
</tr>
<tr>
<td>Palmerston</td>
<td>313</td>
<td>94</td>
<td>89</td>
<td>83</td>
<td>42</td>
<td>94</td>
<td>89</td>
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<td>89</td>
<td>85</td>
<td>73</td>
<td>84</td>
<td>85</td>
</tr>
<tr>
<td>Litchfield</td>
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<td>90</td>
<td>86</td>
<td>48</td>
<td>95</td>
<td>90</td>
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<td>89</td>
<td>86</td>
<td>76</td>
<td>87</td>
<td>88</td>
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<td>95</td>
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<td>86</td>
<td>60</td>
<td>95</td>
<td>91</td>
<td>86</td>
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<td>89</td>
<td>86</td>
<td>74</td>
<td>85</td>
<td>70</td>
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</table>

2 Dataset as at March 1996
3 Includes immediate rural Darwin e.g. Howard Springs, Humpty Doo, Bees Creek etc.

**Table 2**

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<th>4</th>
<th>OPV 1</th>
<th>2</th>
<th>3</th>
<th>HBV 1</th>
<th>2</th>
<th>3</th>
<th>Hib1 2</th>
<th>3</th>
<th>MMR</th>
</tr>
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<td>Palmerston</td>
<td>373</td>
<td>94</td>
<td>87</td>
<td>80</td>
<td>52</td>
<td>93</td>
<td>86</td>
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<td>87</td>
<td>82</td>
<td>69</td>
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<td>83</td>
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<td>90</td>
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</table>

**Table 3**

<table>
<thead>
<tr>
<th>Location</th>
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<th>OPV 1</th>
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<th>3</th>
<th>HBV 1</th>
<th>2</th>
<th>3</th>
<th>Hib1 2</th>
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<td>73</td>
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<td>92</td>
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Editorial

Childhood immunisation is a priority public health intervention as one of the safest and most cost effective preventive health measures. In this edition of the Bulletin, we have presented three articles on evaluation of the immunisation program following quality assurance mechanisms introduced in 1995 to improve the quality of data collected and recorded and the ease of data extraction.

Timely access to information about immunisation coverage rates in Australia for identification of children at risk during outbreaks of vaccine preventable diseases, and for program planning and evaluation purposes, has been difficult because of:

- fragmentation of immunisation services within and across the States and Territories;
- differences in the methodologies used to estimate immunisation uptake; and
- difficulties in maintaining an accurate database of active client files. This last problem results in an inaccurate denominator (population base) from which to calculate immunisation coverage, and is important when population size is small.

Some of the national initiatives to improve immunisation program delivery include: establishment of the Education and Consultative Sub-Committees of the National Childhood Immunisation Committee with Aboriginal and Torres Strait Islander representation; coordination of a national, multi-media immunisation awareness campaign (the Yellow Hand of contagion); implementation of the National Child Care Accreditation Council’s Quality Improvement and Accreditation System, which requires documentation of immunisation status of children attending child care; and implementation of the Australian Childhood Immunisation Register (ACIR) from 1 January 1996. Participation in ACIR is tied to funding for vaccine purchase under the Bilateral Agreement between the Commonwealth and States.

The NT has traditionally been ahead of the other States and Territories in introducing both childhood and adult vaccines, such as hepatitis B, Hib and pneumococcal vaccines. Second dose MMR administered to Year 6 students was introduced in January 1994, and a school based ADT and fifth dose OPV immunisation program is being introduced in 1996 targeting Year 10 students. The voluntary documentation of immunisation status on entry into child care, preschool, transition and Year 8 has been the focus of greater attention in 1996, and its success will be reviewed in 1997. Improvements in our ability to extract data from the eight Territory Health Services (THS) immunisation databases and appropriate archiving of inactive files from all the databases means that in the future, immunisation coverage data will be more reliable than previously. THS also funded the Australian Bureau of Statistics to increase the sample size of the National Health Survey in urban Darwin and Alice Springs in order to increase the reliability of the NT statistics, including the immunisation survey results.

These are important initiatives, given the coverage rates described in the article by Mitchell and Merianos “Immunisation coverage in the Darwin Urban area”. Immunisation data on children born after 1 January 1995 are the most reliable data to date, and validate the data on the one and two year olds used as comparison groups. There is a worrying downward trend in coverage with later doses of the childhood immunisation schedule, which is reflected in the increasing incidence of vaccine preventable diseases in Australia. The data show that most children (92-95%) start their course of immunisation but many fail to complete the primary immunisation series, or their immunisation is significantly delayed. Uptake of the third DPT falls to 71-86% among the three birth groups described, and to 60% by the fourth. 76% of children under 3 years have received MMR, well below the 95% population immunity required to stop transmission of measles. On a positive note, coverage is consistent among vaccines due at the same time (eg the first and second doses of DPT, OPV and Hib), indicating that vaccine providers are succeeding in administering most age-specific immunisations together.

Unfortunately, Australia still falls far behind many industrialised and developing countries in reaching immunisation targets. Identifying ways to improve immunisation coverage rates will be the focus of the NT Immunisation Program and the National Childhood Immunisation Strategy for a while yet.
The NT Pap Smear Register

NEW RECORD SYSTEM
NT women will benefit from a centralised and confidential Register of Pap smears and other cervical tests that started on 11 March 1996. Laboratories will forward results of Pap smears and other cervical tests to the Register, unless a woman chooses not to have her results included. Pap Smear Registers have been set up in most States as a part of the National Cervical Screening Program. The NT Pap Smear Register is being established and coordinated by the Women's Cancer Prevention Program, Territory Health Services.

CONFIDENTIALITY
The confidentiality of information held by the register is protected by law and security protocols. The register is not linked to any other record system.

BENEFITS TO REGISTERED WOMEN
* The register is a tool to monitor and evaluate the number and characteristics of women having Pap smears in the NT, and the proportion with abnormalities including cervical cancer.
* This will help with planning, promotion and education campaigns and appropriate services for women, as well as research into cervix cancer, its prevention and treatment.

PRACTITIONERS
Women have the right to choose whether they want to have their results included in the Register. The practitioner's role in informing women about the Register, its purpose and benefits, is supported by resources in the practitioners kits distributed recently.

WHO TO CONTACT
The NT Cervical Cancer Screening Coordinator, Jill Bell, or Aboriginal Project Officer Linda Hill, can be contacted to answer questions and discuss the Register. They will also arrange to talk with staff at clinics and offer inservices. Please phone the Women's Cancer Prevention Program (089) 998809 or fax 998803 for further information.

Letters to the Editor are welcome.
Notified cases of Vaccine Preventable Diseases in NT by Report Date 1994 and 1995

<table>
<thead>
<tr>
<th>DISEASES</th>
<th>TOTAL</th>
<th>No. cases among children aged 0-5 years</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>'95</td>
<td>'94</td>
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<tr>
<td>Congenital rubella syndrome</td>
<td>0</td>
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<tr>
<td>Diphtheria</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><em>Haemophilus influenzae</em> type b</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Hepatitis B</td>
<td>14</td>
<td>26</td>
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<tr>
<td>Measles</td>
<td>114</td>
<td>402</td>
</tr>
<tr>
<td>Mumps</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>Pertussis</td>
<td>105</td>
<td>140</td>
</tr>
<tr>
<td>Poliomyelitis, paralytic</td>
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<td>0</td>
</tr>
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<td>Rubella</td>
<td>11</td>
<td>49</td>
</tr>
<tr>
<td>Tetanus</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

- Mumps is largely under-reported
- Only one of the four children with *Haemophilus influenzae* type b was vaccinated

**NT wide Notifiable Diseases**

1994 and 1995

![Graph showing rates of notifiable diseases in NT 1994 and 1995](chart.png)

*NT est. resid. pop 165,504 as of 30 June 1993, ABS cat. no. 3201.0 pub 19 Jan 1995*
### NT Notifications of Diseases by Districts 1994 and 1995

<table>
<thead>
<tr>
<th>Diseases</th>
<th>Alice Springs '94</th>
<th>Barkly '94</th>
<th>Darwin '95</th>
<th>East Arnhem '94</th>
<th>Katherine '94</th>
<th>Total '94</th>
</tr>
</thead>
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<td>Acute Rheumatic Fever</td>
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<td>Adverse Vaccine React.</td>
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<td>Measles</td>
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<td>256</td>
<td>11</td>
<td>116</td>
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<td>16</td>
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<td>Meningococcal Infect.</td>
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<td>0</td>
<td>5</td>
<td>2</td>
<td>0</td>
<td>2</td>
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<td>Mumps</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<td>Pertussis</td>
<td>12</td>
<td>47</td>
<td>1</td>
<td>50</td>
<td>1</td>
<td>55</td>
</tr>
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<td>0</td>
<td>19</td>
<td>16</td>
<td>5</td>
<td>17</td>
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<tr>
<td>Rotavirus</td>
<td>97</td>
<td>17</td>
<td>24</td>
<td>29</td>
<td>33</td>
<td>45</td>
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<td>Rubella</td>
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<td>3</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
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<td>Salmonella</td>
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<td>90</td>
<td>12</td>
<td>175</td>
<td>35</td>
<td>30</td>
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<tr>
<td>Shigella</td>
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<td>56</td>
<td>11</td>
<td>3</td>
<td>18</td>
<td>10</td>
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<tr>
<td>Syphilis</td>
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<td>204</td>
<td>13</td>
<td>46</td>
<td>24</td>
<td>62</td>
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<td>Tuberculosis</td>
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<td>7</td>
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<td>1</td>
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<td>Yersiniosis</td>
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### Total

<table>
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<tr>
<th>Alice Springs</th>
<th>Barkly</th>
<th>Darwin</th>
<th>East Arnhem</th>
<th>Katherine</th>
<th>Total</th>
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<td>1788</td>
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**Points to note regarding notifications:**
- NN - Not notifiable
- Rotavirus notifications in 1994 are for May-December only.
- Chlamydia, gonococcal disease and syphilis differences for 1994/95 are discussed in Frank Bowden's article, page 10.
- The measles cases in 1994 reflect the outbreak in Alice Springs starting July 1994.
- Following a downward trend in TB cases since 1990, cases increased in 1994 from 31 to 40 in 1995. This is accounted for in part by 4 cases in fishermen and boat persons, 4 related cases in a Central Australian community (with a further 4 cases from this community already notified in 1996) and 6 cases from one Top End community.
MALARIA NOTIFICATIONS, NORTHERN TERRITORY
October to December 1995

Three notifications of malaria were received for the last quarter of 1995. The following table provides details about where the infection was thought to be acquired, the infecting agent and whether chemoprophylaxis was used.

<table>
<thead>
<tr>
<th>ORIGIN OF INFECTION</th>
<th>REASON EXPOSED</th>
<th>AGENT</th>
<th>CHEMOPROPHYLAXIS</th>
<th>COMMENTS</th>
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<tbody>
<tr>
<td>PACIFIC</td>
<td></td>
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<td></td>
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<tr>
<td>PNG</td>
<td>Travel/holiday</td>
<td>P. Vivax</td>
<td>P. falciparum</td>
<td>Yes</td>
</tr>
<tr>
<td>ASIA/SE ASIA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indonesia</td>
<td>Working Overseas</td>
<td>P. Vivax</td>
<td>Yes</td>
<td>Lived in eastern provinces for a long period.</td>
</tr>
<tr>
<td>Indonesia</td>
<td>Holiday</td>
<td>P. Vivax</td>
<td>No</td>
<td>Relapse following 14 days of primaquine Sept 95.</td>
</tr>
</tbody>
</table>

Total malaria case count for 1995 was 33.

-----------------------------

Reporting arbovirus infections

Doctors please note that since 1994, arbovirus infections are laboratory notified. The old reporting form distributed to doctors by the Medical Entomology Branch is no longer used.

Doctors are still encouraged to report any clusters of unusual rash illness with or without the other symptoms of arbovirus disease, especially if the patients are seronegative for the viruses considered in the differential diagnosis. These include Ross River virus and Barmah Forest virus, and rubella in susceptible children and adults. Testing for Barmah Forest virus, the second most common arbovirus infection in the NT, should be specifically requested on the pathology form because only reference laboratories can do additional testing without a doctor’s request under Medicare.

Disease Control thanks doctors for their ongoing support of our disease surveillance activities.
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Vol. 1 Nos.(1-10) to Vol. 3 No.1

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To Mailing List
Jean Smith
Disease Control Centre
AIDS/STD Unit
PO Box 40596
Casuarina NT 0811

☐ I wish to be placed on the mailing list for the Northern Territory Communicable Diseases Bulletin

☐ I wish to change my address

Name: ..........................................................

Organisation: .............................................

Address: ......................................................
Staff Updates and Profiles

Tarun Weeramanthri
Community Physician
Darwin
Tarun started work as Community Physician in early February. His job will be to help plan and provide specialist internal medical services to the Top End, with particular emphasis on rural and remote communities. He will also focus on non-communicable diseases (e.g. diabetes, heart disease, renal disease), promoting best practice standards of care and working on policy development within THS. He will be available as a resource person for primary care practitioners and will look at ways to improve the hospital-community interface. Tarun trained as a general physician in Western Australia and has spent the last five years at the Menzies School of Health Research doing public health research on adult Aboriginal mortality. He is particularly interested in talking about soccer at any time (work phone 228513, fax 228310, cc mail tarun.weeramanthri@nt.gov.au).

Jan Savage
Medical Officer - AIDS/STD Unit
Darwin
Jan recently joined the AIDS/STD team as the new Medical Officer. Prior to this she was working as a clinician at the Melbourne Sexual Health Centre, as well as lecturing at the Venereology and Infectious Diseases Unit (Monash Medical School).

Cate Coffey
Public Health Nurse - AIDS/STD Unit
Darwin
Cate is on temporary transfer from Community Care, filling in for Vicki Chamberlain who is currently on maternity leave.

Sue Dubow
Public Health Nurse - AIDS/STD Unit
Darwin
Sue has temporarily transferred to the Women’s Cancer Prevention Unit, as a Promotion Officer. Carole Whittles is acting in Sue’s position for the duration of the transfer.

Julie McKeon
Administrative Officer
AIDS/STD Unit
Darwin
Julie is on temporary transfer from pathology, replacing Jacqui Sutcliffe who is currently on maternity leave.

Olive Aumann
Public Health Nurse - TB Control
Alice Springs
After spending a year as a remote area nurse in central Australia, Olive recently opted for a change of focus and is now the new TB Control Public Health Nurse. Her background includes Community Health nursing in Victoria, as well as working in a variety of remote area and town based settings in Northern Australia, including the Top End, the Kimberley and North Queensland.

Departures
Gregor Sutherland
Medical Officer
DCC
Alice Springs
Jacki Mein
Medical Officer
AIDS/STD Unit
Darwin