THE NORTHERN TERRITORY

# COMMUNICABLE DISEASES BULLETIN

TERRITORY HEALTH SERVICES
Disease Control Centre

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## Trachoma six months after the first azithromycin program in Australia

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### Introduction

Trachoma is the second leading cause of blindness in Aboriginal people after cataracts and should be preventable. It has remained a persistent ocular infection among children in places where crowding, poor hygiene and poverty nullify attempts to control it. Azithromycin, a long acting azalide derivative of erythromycin is simple to administer as part of a community treatment initiative and has already been used in this fashion overseas.[1] It has the potential to reduce trachoma to sub-endemic levels for a period of time that is dependent upon factors such as the number of missed or failed treatments, community conditions and disease reintroduction.

Although the origins of the problem are unclear, trachoma's endemicity was confirmed in the 1940s,[2,3] with the first coordinated initiatives using oral sulfonamides occurring three decades later.[4] With rare but severe adverse reactions and possible resistance, sulfonamides were replaced by oxytetracycline cream, ointment and oily drops during the school-based mass treatment initiatives across central Australia in the 1980s. Enormous amounts of administrative, clinical and distributive resources were invested. The gains were significant but short lived. Pre-school age children and absentees missed treatment, face washing was not generally adopted[5] and underlying living conditions changed little.[6] Since 1990, trachoma control programs have fragmented, with total cessation in many regions. The evaluation of azithromycin for the treatment of trachoma in Australia followed the first studies of this application in the Gambia.[1] Prevalence of active trachoma in remote Aboriginal Australia varies from less than 10% along the coastal regions of the Northern Territory to endemic proportions (20-50%) throughout much of the centre. In pockets of isolated and poorly serviced people in the centre and west of the country follicle prevalence approaches 100%. Nevertheless, disease severity and rates of ocular scarring have declined overall. This has prompted calls for the major focus to be improving living conditions rather than directing resources towards antibiotic programs.

**Contents**



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Without knowledge of optimal protocols nor long term data on reinfection rates, further evaluation in the clinical setting was needed prior to widespread adoption of azithromycin therapy. Key issues were the effectiveness and sustainability of a single dose of azithromycin and the difficulties faced in community implementation, (acceptance, health clinic workload, transmigration).

## Patients and methods

This work is evaluating the incorporation of azithromycin into the current clinical practices of an isolated community health clinic with time and resource limitations. It followed ethical approval from the Joint Institutional Ethics Committee of the Royal Darwin Hospital and the Menzies School of Health Research. The local clinical staff conducted the treatment initiative, while the external evaluation group diagnosed the trachoma, collected clinical photographs and conjunctival swabs and performed the post-treatment follow-up visits.

The study was restricted to Aboriginal children between 6 months and 14 years of age (n=200). Single dose azithromycin (20mg/kg) was administered to all children with follicles seen on the reflected tarsal plate of either eye. Within two weeks of diagnosis, all contacts below 14 years of age with WHO defined follicular trachoma were located and treated. *Contacts were defined as: a person below 14 years of age nominated by a senior household member or health worker as being a resident of the household most (>50%) of the time.* Absentees were seen and treated where appropriate within a month of their return at the follow-up visits. In women of child bearing age, a negative pregnancy test or a current and effective means of contraception was obligatory.

Clinical assessments were performed by two independent observers simultaneously, using x2 loupes. WHO criteria were employed. There was 90% interobserver grading concurrence, with 98% concurrence regarding presence/absence of disease. Clinical photographs were externally and blindly assessed with a 90% concurrence.

Follow-up occurred at 3 weeks, 2, 3, 4 and six months post-initial treatment at the school. Although newly diagnosed cases were treated when seen during this time, no re-treatments were administered.

## Results

***1: Community trachoma levels at baseline*** (present study italicised)

**Local criteria** (any follicles)

| | |
|---|---|
| School 1993 | 63% |
| School 1994 | 48% |
| *School* 1995 | 52% (74/143) |
| *age*<5 1995 | 81% |

**WHO defined criteria** ( ≥5 follicles)

| | |
|---|---|
| School 1994 | n/a |
| School 1994 | n/a |
| School 1995 | 39% (56/143) |
| *All under 14s* | *44%(75/170)* |

**2: WHO *defined trachoma detected during azithromycin program %(n)***

| Time | Age<5 | Age5+ | Total |
|---|---|---|---|
| Pretreatment | n/a (19/27)† | 39% (56/143) | 44% (75/170) |
| 2 months post | 46% (18/39) | 23% (32/141) | 28% (50/180) |
| 6 months post | 19% (9/47) | 13% (16/119) | 15% (25/166) |

† Only contact traced under 5s (those with affected siblings at school) were seen at visit one.

* Not all children were assessed at each visit.

## Discussion

Follicle prevalence rates have fallen at the school to subendemic levels 6 months after the treatment initiative. This is despite a 6 month reinfection rate of 11% among those initially clear. Between 2 and 6 months, there were 6 new cases of disease and 12 resolutions, suggesting that outcomes should be reviewed again at one year, given the implications for the strategy being employed annually. Although there was only weak family clustering of trachoma among the children at baseline, it was more evident for persistent disease after treatment. In addition, mild disease was more likely to resolve than severe disease. Whether single dose therapy is inadequate for more severe disease or whether there has been rapid reinoculation by siblings cannot be determined. Monthly examinations have not identified a period of resolution in 'persistent' cases, nor intervening episodes of intense disease. This suggests that follicles have persisted over the six months despite treatment and that more than single dose therapy may be appropriate for a small number of severely affected families

Despite azithromycin being a potent chlamydiacidal agent, there was a follicle eradication rate of 72% in this community. The impact of treatment upon the infectivity of the persistent cases (28%) is unknown.

There appears to be good reason to switch from local to WHO defined diagnostic criteria for trachoma apart from permitting international comparisons. Implementation may better focus contact tracing strategies and pathology such as conjunctival concretions would be less likely to be misclassified. Time and resources will be required to promote such a change amongst health staff.

## Recommendations

Further protocol modifications could be considered, given the experience gained during this implementation.

They include:

1: *Considering mass treatment of children in hyperendemic situations only as a 'one-off' enterprise, followed by more judicious targeted treatments in subsequent years when the disease is contained to subendemic levels.*

2: *Replacing contact tracing of older children and adults, particularly if they are mild or isolated cases, with a targeted program for children under 15 years of age.*

3: *Evaluating three doses of azithromycin given over seven days for severe cases of trachoma or within households where numerous cases exist.*

4: *Including caregivers of infants in the screening protocol.*

**Conclusion**

The trachoma profile in the community has changed substantially in the first two months post-treatment and small net improvement continues at six months. This has been achieved by examining only those below the age of 15, and by treating only 17% of the community.

A targeted strategy saves money, resources and side-effects. It addresses the reinfective nature of the disease by treating selected siblings, caregivers and other contacts simultaneously. If the prevalence of trachoma and the incidence of new disease remain low, such a strategy will be attractive for trachoma endemic communities world-wide. Important additional areas are the assessment of possible emerging of bacterial azithromycin resistance and the challenge to address economic, social and hygiene factors concurrently.

**Acknowledgements**

The authors thank the NT Aboriginal Eye Health Committee, the Lajamanu School, Lajamanu Community Council, and Lajamanu Health Clinic staff Mandy Halkett, Bessie and Marianne Dixon and Theresa Matthews. Senior field worker was Mr George Kruger. Drs Ivan Bastian, Brian Dwyer, Sriprakash and Masoud Mahmood gave specialist advice and Professor Hugh Taylor provided ophthalmological supervision and graded the clinical photographs. Co-evaluators were Amanda Leach, Drs John Carapetis and Peter Morris, Tania Shelby-James, Mark Mayo and Celina McKean.

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2. Flynn F. Trachoma among Aborigines in the Northern Territory of Australia. International College of Tropical Medicine Newsletter; July 1970:No 9.
3. Mann I. Ophthalmic survey of the Kimberley Division of WA. Occasional paper, WA Public Health Dept. Government printer, 1954.
4. National Trachoma and Eye Health Program of the Royal Australian College of Ophthalmologists, Promail printing group, Sydney 1980.
5. Peach H, Piper S, Devanesen D et al. NT Trachoma Control and Eye Health Committee. A randomised controlled trial of the effect of eye drops and eye washing on follicular trachoma among Aboriginal children. NT Trachoma and Eye Health Committee Annual Report, 1987.
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## Azithromycin arrives in the Pilbara region of WA

*Dorothy Jones, Pilbara Public Health Unit, WA*

The Pilbara Public Health Unit and community health bases have been using azithromycin as a single dose therapy for genital chlamydia since June 1994. Initially, supplies were obtained from Sydney and then repackaged within the Port Hedland Regional Hospital Pharmacy and provided to community health bases. Azithromycin has been well accepted by health practitioners and patients as 1g single dose therapy for genital chlamydia infection, or as combined therapy with Amoxil 3g and probenecid 1g in the treatment of urethritis and cervicitis. The drug is now available on the PBS.

More recently, the STD Unit has been using azithromycin for the treatment of donovanosis and have found improved compliance with weekly azithromycin when compared with daily doxycycline therapy. Lesions have healed well.

We have also been interested in exploring the use of azithromycin for the treatment of trachoma in community based surveys. Unfortunately a major barrier to the use of azithromycin for trachoma is the unavailability of the paediatric suspension in Australia. During discussions with the manufacturing drug company in Sydney we were advised that an application to the Therapeutic Goods Administration (TGA) for use under the Special Access Scheme (SAS) would be our only option to secure access. Therefore, I recently wrote to the TGA requesting permission to import the paediatric suspension of azithromycin into Australia for use in Aboriginal paediatric trachoma programs.

We have been granted permission to use azithromycin suspension under category A of the SAS and negotiations are now proceeding with Pfizer to import this drug to Australia. Our trachoma program will be adapted to provide for single dose treatment to be given to those individuals diagnosed with trachoma during screening. The trachoma program operates within a public health framework which includes attention to environmental health conditions and education about personal hygiene.

It is my view that the use of azithromycin in remote Australia needs to occur in a coordinated fashion. Its use should be restricted to specific indications and monitored. I believe that with a careful approach, combining public health policy and informed chemotherapeutic use, we can meet the two goals of effective single dose antibiotic therapy and control of trachoma.

Azithromycin is an exciting new addition to the rural health worker's armamentarium and should be used to treat the endemic chlamydial infections so prevalent in our communities.

*Dr Dorothy Jones is the Director of the Pilbara Public Health Unit and can be contacted on Tel: (091)720247 Fax: (091)721335.*

## Use of Azithromycin in the Northern Territory

*Bart Currie Royal Darwin Hospital and Menzies School of Health Research*

The preceding articles demonstrate the rationale for azithromycin use in trachoma. The Northern Territory (NT) study confirms the overseas work showing single dose azithromycin to be at least as efficacious in trachoma as the prolonged tetracycline eye drops or oral erythromycin treatments previously used.

The other two situations where azithromycin has major advantages over previous treatments are:

(1) Single dose azithromycin for treatment of genital chlamydial STDs. For around one year, single dose azithromycin has replaced the 10-14 days of erythromycin or doxycycline for chlamydia in the Northern Territory STD urethritis/cervicitis protocol, except in pregnant women. Coverage of possible co-infection with gonorrhoea remains for most circumstances combination with amoxycillin and probenecid.

(2) Supervised azithromycin therapy for donovanosis. Work by Dr Frank Bowden and colleagues throughout the NT and interstate has confirmed that azithromycin is an excellent drug for donovanosis, which has often been difficult to cure because of the long duration of therapy required.

The advantages of azithromycin over erythromycin and roxithromycin are its increased tissue/cell penetration and prolonged blood and tissue half-lives. However, because of persistence of azithromycin in low levels in tissues for longer than a week after even single dose therapy, selection of antibiotic resistant organisms is a potential problem. Resistance of chlamydia to the macrolide/azalide antibiotics (including erythromycin, roxithromycin and azithromycin) has not been documented. However, emergence of resistance in throat and skin bacteria is well documented. Erythromycin resistant *Streptococcus pyogenes* has become a major problem overseas and emerged in Western Australia (WA) some years ago. At present, around only 1% of NT *S pyogenes* isolates are erythromycin/roxithromycin/azithromycin resistant. This proportion could increase under antibiotic selection pressure. Amanda Leach from the Menzies School of Health Research has shown some selection for erythromycin/azithromycin resistant *Streptococcus pneumoniae* in the nasopharynx of NT children treated with azithromycin for trachoma.

The marketing of azithromycin in Australia has been directed at the financially lucrative area of use in adults for respiratory and skin infection, in addition to use in genital chlamydia. A paediatric formulation available overseas remains unavailable in Australia, although the efforts of Dr. Dorothy Jones in WA (see above), will provide interim access to a paediatric suspension until marketing approval is obtained. The manufacturer of azithromycin has yet to apply for this approval in Australia. Using Xantham Gum, in the NT the azithromycin capsules have been turned into a syrup for use in the trachoma protocol.

Because of the concerns of emergence of drug resistance with overuse, azithromycin is being restricted in NT protocols to use in: 1) chlamydial STD; 2) trachoma; and 3) donovanosis. In these three situations there is a clear advantage of azithromycin over other therapies, while for both skin and respiratory infections the standard protocols currently in place remain adequate. In particular, skin sores almost always respond excellently to single dose IM benzathine penicillin, while single dose azithromycin has not been shown to be adequate for streptococcal skin or throat sepsis.

The 1996/1997 edition of *Antibiotic Guidelines (9th edition)* will include the three indications for azithromycin as follows:

**1) Urethritis and Cervicitis**

Amoxycillin 3 g orally, with probenecid 1 g orally, both as single dose TOGETHER WITH azithromycin 1 g orally, as a single dose.

If (possibly) pregnant or breastfeeding, replace azithromycin with erythromycin 500 mg orally 12-hourly, or roxithromycin 300 mg orally daily for 10 to 14 days.

**2) Donovanosis**

Azithromycin 500 mg orally once daily for 7 days, or 1 g orally once weekly for 4 weeks.

If (possibly) pregnant or breastfeeding, erythromycin 500 mg orally, 6-hourly or roxithromycin 300 mg orally, once daily for 2 to 6 weeks.

**3) Trachoma**

Azithromycin orally, as a single dose if 6 kg and over.

If (possibly) pregnant or breastfeeding or under 6 kg, use erythromycin orally 12-hourly, or roxithromycin orally daily for 14 days OR oily tetracycline eye drops topically 1 drop 12-hourly for 3 to 6 weeks.

Treatment of all household child contacts over 6 kg is recommended.

If prevalence of trachoma in a community is above 20% consider treatment of all children over 6 kg, although the public health implications of this would need widespread consultation.

**Single dose azithromycin for trachoma - dose table**

| 3 Kg to under 6 Kg | 6 Kg to under 10 Kg | 10 Kg to under 15 Kg | 15 Kg to under 20 Kg | 20 Kg to under 30 Kg | 30 Kg to under 40 Kg | 40 Kg and over |
|---|---|---|---|---|---|---|
| N/A | 120 mg<br>3 ml | 240 mg<br>6 ml | 400 mg<br>10 ml | 500 mg<br>(2 capsules) | 750 mg<br>(3 capsules) | 1000 mg<br>(4 capsules) |

250 mg capsule
600 mg/15 ml suspension (not available yet in Australia)

## Branded: A perpective on safe sex and alcohol consumption

*Sue Smith, Education Project Officer, AIDS/STD Unit Darwin*

*Branded*, a dynamic music theatre show produced by Corrugated Iron Youth Theatre (CIYT), recently enjoyed a successful performance season in Darwin from August 9 - 19. Over 1500 people saw the show and at least 75% of the audience were young people. The production explored issues of adolescent risk taking, sexuality, peer pressure and alcohol and other drugs in an informative and entertaining format. The play focused on the lives of seven members of a band who are gearing up for their debut performance at a nightclub. The performance style and content reflects the language, culture, music and humour of today's youth. Original and contemporary music is a strong feature of the show along with some energetic choreographed dance scenes.

Territory Health Services, through the AIDS/STD Unit and Living With Alcohol Program funded CIYT to develop a drama production addressing substance abuse and sexuality issues in youth that contained sensible drinking and safe sex messages. To promote discussion and awareness of these important public health issues amongst young people in Darwin, the theatrical medium was chosen because of its ability to inform in an appealing and non-threatening format. Consistent with current research, the production acknowledges that many young people are sexually active and do consume alcohol. A harm minimisation approach was adopted for these issues. Education Officers Sue Smith and Barry Newell collaborated with Maggie Miles CIYT Artistic Director, on the educational aspects of the script. The project also incorporated education sessions for the 23 members of the cast who were aged 13 - 23. Topics included HIV/AIDS, STDs, safe sex, underage drinking and the effects of alcohol and other drugs. Cast members also received a personal insight into living with HIV/AIDS when an HIV positive person addressed the group. Some of the ideas and lines that were developed by the cast during these sessions and rehearsals were incorporated into the script.

The majority of the audience were young people in the target age group for this project (13 - 20) and the show sold out in the second week, indicating that there is strong support for quality youth theatre productions. The success of this project also reflects the dedication of the cast and production team at CIYT who devoted so much energy to the project. Plans to conduct a tour of the show outside of Darwin are currently being investigated. Evaluation of the project has been undertaken and a copy of the final report can be obtained from Sue Smith on 089 228814.

# Antenatal HIV Screening Policy

*Frank Bowden, AIDS/STD Unit, Disease Control, Territory Health Services*

## 1. Background

HIV remains a rare infection in the Australian antenatal population. Up until December 1994 vertically transmitted HIV infections accounted for only 0.3% of the total number. Nevertheless, the transmission of HIV from an infected mother to child is a serious event and there are many reasons why a pregnant woman should know her HIV status:

- she is able to inform her partner(s) and protect them from infection;
- she can decide whether to continue with the pregnancy;
- she can decide upon birthing options;
- she can decide whether or not to breastfeed; and
- she can plan her future fertility and general health needs.

**Most importantly, it is now known that intervention with zidovudine (AZT) in the second trimester can reduce the transmission from infected mother to child from 26% to 8%.[1]**

Antenatal services in the NT are provided by Territory Health Services and Aboriginal Medical Services employees, private obstetricians and midwives, and general practitioners. This policy paper is intended to be a guide for each of these groups.

## 2. HIV testing

*Introduction*

The policy of the AIDS/STD unit is that all women presenting for antenatal care should be offered HIV testing.

It should be noted that the majority of HIV diagnoses in the NT since 1990 have been made by health staff who have recognised that a patient should be tested. It is uncommon in the NT for an individual who is subsequently found to be HIV infected to present for testing because of self-assessed risk. In addition, patients in the NT do not usually belong to an obvious "risk group" and assessment of the individual's HIV risk may be very difficult.

*Informed consent*

Women should be able to decide about *all* antenatal serological testing and HIV is no exception. Information regarding the HIV test should be given prior to taking the blood. The amount and complexity of the information presented should be tailored to the particular needs of the patient and should reflect the individual's cultural and educational background. Practitioners should have printed materials available to reinforce the verbal information.

Public Health Nurses attached to Disease Control in each district are available to assist practitioners in designing testing protocols and in obtaining permission to perform an HIV test in particular instances. A list of numbers can be found at the end of this protocol.

*Risk assessment*

Part of the antenatal screening should include an assessment of the patient's risk of HIV, other sexually transmitted diseases and blood borne pathogens e.g hepatitis B and C. Many patients will have had multiple sexual partners prior to pregnancy. A past history of injecting drug use is surprisingly common and is often forgotten, if not denied, by the patient. A history of blood transfusion or occupational exposure should also be sought.

**Risk behaviours or history that place an individual at higher risk of HIV infection**

- Injecting drug use - past or present
- Current or previous sexually transmitted disease
- Previous blood transfusion (testing for HIV in Australia commenced in late 1984)
- Multiple sexual partners
- Partner of gay or bisexual man
- Partner of known HIV-infected individual
- Sexual contact with partners in or from overseas countries with known high HIV prevalence e.g Africa, SE Asia, Indian sub-continent, USA.

*Coding of specimens*

The current practice is to code specimens sent for HIV testing. The standard method is to use the first two letters of the surname and first name plus the date of birth e.g. Jane Smith becomes SM JA 27/9/59. Some clinics use a local coding system (e.g. STD-D-000) and keep a masterfile linking the code with the patient's details. The security of this file must be maintained at all times. The coded specimen should be sent to the laboratory in a separate biohazard bag, with a separate request form, if other tests are being performed using the patient's full name.

***Results***

Although a negative test result may be available in the NT within 3-4 working days, up to two weeks is required to obtain confirmation of a positive test due to the need to send positive specimens to reference laboratories in Adelaide or Perth. For this reason the policy is to inform patients that no test results will be available routinely within two weeks. Exceptions to this must only be made after consultation with specialist medical staff.

A specific arrangement regarding the conveying of test results must be made with the patient. The AIDS/STD unit has a policy of not giving HIV results (either positive or negative) over the telephone or by mail. If an HIV test is performed in an urban centre and the patient has returned to a remote area, arrangements should be made with the patient's local health service concerning the delivery of test results.

*Negative results*
A patient with a negative HIV antibody result but with risk factors for HIV should receive re-inforcement concerning safe sex, safe injecting etc at the visit to receive results. Follow-up testing may be indicated if the exposure/contact occurred within the preceding three months.

*Positive results*
A pregnant woman with a positive HIV antibody result will require intensive support and counselling. The test must be repeated immediately and assessment of the patient's immunological status made. Referral for specialist care is essential. Counselling should address the issue of termination of pregnancy.

Contact tracing should be instituted with the patient's consent and assistance and specific interventions to reduce the transmission risk to the foetus instituted (see below). Advice or assistance in contact tracing is available from the AIDS/STD unit or Public Health Nurses in each district.

*Recording of results*
HIV infection will affect the clinical management of both mother and child and is therefore essential clinical information. A patient's HIV antibody status should therefore be available to those involved in decision-making regarding the antenatal care of the woman and postnatal care of the child.

**3. Management of a pregnant HIV infected woman**
A pregnant woman who is known to be HIV infected should be referred for specialist management. In Darwin this can be arranged through the AIDS/STD unit of Disease Control or through the Disease Control Centre in Alice Springs. Special arrangements will need to be made for women living in remote areas and may involve transfer to Darwin or Alice Springs for initial assessment.

Guidelines for the management of antenatal care, breast-feeding and zidovudine prophylaxis are available in another policy document of the AIDS/STD Unit.

AIDS/STD Unit
September 1995
Clinic 34 Darwin

**Contact areas for assistance in HIV testing and/or management in the Northern Territory**

Block 4
Royal Darwin Hospital
Telephone 228007

East Arnhem
Communicable Disease Unit
Gove Hospital
Telephone 870356

Clinic 34 Katherine
Communicable Disease Unit
Telephone 738656

Tennant Creek
Communicable Disease Unit
Tennant Creek Hospital
Telephone 624218

Clinic 34 Alice Springs
Disease Control Centre
Gap Road, Alice Springs Hospital
Telephone 517750

**Reference**
1. Connor EM, Sperling RS, Gelber R, Kiselev P, et al. Reduction of maternal-infant transmission of human immunodeficiency virus type 1 with zidovudine treatment *N Engl J Med* 1994;331:1173-80.

## **Apology** - Re: Reprint of article from *Venereology 1995;* 8:34-36 in *NT Comm Dis Bull* Vol.2, No.6, June 1995

We wish to state that data used in the preparation of the article entitled "Trichomoniasis is a problem in Aboriginal Women - fact of fiction?" were used without the knowledge or the consent of women whose specimens were the basis of the data.

We apologise to those women and to all the doctors and staff of Aboriginal Health Services and to private medical practitioners who submitted the specimens.

We realise that these data were used without ethical approval of individual patients, although no breach of confidentiality occurred at any stage. The study did not require or involve the identity of any patient or community.

Gordon Rich
Western Diagnostic Pathology

# Review of the surveillance of invasive meningococcal infections in the Northern Territory, 1987 - 1995

*Angela Merianos, Disease Control, Darwin*

The following report presents data on invasive meningococcal disease extracted from the official NT Notifiable Diseases data sets for the period November 1987 - August 1995, and identifies problems with the quality and accuracy of this surveillance system. It is used as an example of why surveillance data must be collected diligently and with as much accuracy as possible if they are to provide useful epidemiological and health resource planning information.

The NT participates in national surveillance of a number of important infectious diseases, and transmits anonymous data on these notifiable conditions to the Commonwealth Department of Human Services and Health (DHSH) in Canberra on a fortnightly basis.

*The minimum data needed for a complete notification in the NT are:*

- *a unique identifier (this is usually a name at the district level or a code such as the first two letters of the first name and first two letters of the surname)*
- *date of birth*
- *gender*
- *ethnicity*
- *suburb or community of residence*
- *district of residence or district generating the report if the patient is from interstate or overseas*
- *date of onset of illness*
- *date of death if applicable*
- *the basis of the diagnosis ie clinical only or laboratory confirmed*
- *type of test done.*

Meningococcal disease reports should also include results of microscopy (the presence of intracellular Gram negative diplococci), latex agglutination (tested for ACYW135 and serogroup B), culture, serogrouping and as they become routinely available, serotyping and sero-subtyping.

The aims of the review were to:

- determine the sensitivity of surveillance for meningococcal disease ie does the system detect all cases of invasive meningococcal disease;
- determine the efficiency of the official reporting system ie did all known cases appear on the official NT Notifiable Diseases data sets;
- describe the epidemiology of invasive meningococcal disease based on the final count of cases.

## Methods

Cases of invasive meningococcal infection entered in the official Notifiable Diseases data sets for 1988-95 were compared to more detailed computerised files of meningococcal infections also kept at the Disease Control Centre (DCC), Darwin, laboratory log books of isolates from sterile sites (Darwin and Alice Springs), records held by Public Health Nurses (formerly Disease Control Officers, CDOs) in each district, Infection Control Officers at RDH and ASH, and the Registry File for invasive meningococcal infections containing correspondence about meningococcal disease in the NT.

The NHMRC case definition of invasive meningococcal disease (ie isolation of *Neisseria meningitidis* or detection of intracellular Gram negative diplococci or meningococcal antigen in a specimen from a sterile site) was used to review notifications whenever there was sufficient information to identify the patient.[1] Annual totals after validation of the combined data sets were compared to official totals provided to the DHSH to determine under-enumeration or over-enumeration of cases. Missing data (names, dates of birth, gender, ethnicity, and dates of illness onset) were opportunistically entered on the database when found from these other sources and from the Hospital Information System (HIS). Data entry errors, omissions and duplications were also corrected when found, especially the ad hoc entry of serogroup results.

Australian Bureau of Statistics 1991 census data were used as the denominators to calculate incidence rates.[2]

## Results

### *Enumeration of meningococcal disease*

Table 1 shows the difference between the official annual totals reported to the DHSH and the final numbers after audit of the data sets.

Table 1

*Comparison of official and revised cases counts of invasive meningococcal infection*

| Year of notification | Corrected data sets | DHSH totals* | % notified |
|---|---|---|---|
| 1988 | 17 | 23 | 135.3 |
| 1989 | 17 | 15 | 88.2 |
| 1990 | 28 | 26 | 92.8 |
| 1991 | 14 | 13 | 92.8 |
| 1992 | 14 | 11 | 78.6 |
| 1993 | 3 | 2 | 66.7 |
| 1994 | 5 | 5§ | 80.0 |
| 1995 (Jan-Aug) | 5 | 7‡ | 140.0 |

*Official annual totals transmitted to the Commonwealth Department of Human Services and Health.

§ Although the final case count was correct, there was one omission and one incorrect entry.

‡ Two cases were acquired outside the NT and are identified as such under the code for NT District.

In 1988, 23 cases were reported to the DHSH; only 17 of these were laboratory confirmed. From 1989 to

August 1995, 77 of the 86 diagnoses of meningococcal disease (89.5%) appeared on the official database. However, almost all cases appeared on at least one meningococcal database and/or were the subject of correspondence in the Registry File and had been followed up appropriately.

Contributing to the problem of under- and over-enumeration, two cases appeared twice each and at least one case in 1992 did not fulfil the NHMRC case definition (isolation of *N meningitidis* from a throat swab in an STD Clinic client). Six cases notified in Alice Springs in 1991 could not be validated by a laboratory report or record held at Disease Control.

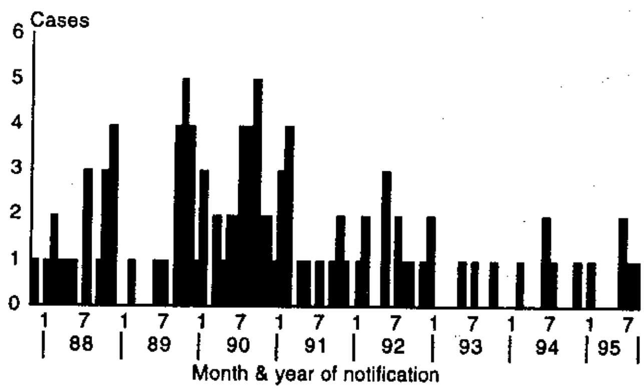
Other poorly recorded details were date of birth and ethnicity.

**The epidemiology of invasive meningococcal disease based on the final case count**

104 cases of invasive meningococcal infection were diagnosed in the NT since the first NT case of the Central Australian outbreak in November 1987 (Figure 1).

Figure 1

*Invasive meningococcal disease in the NT Nov 1987-Aug 1995. Final case count after validation of the combined Notifiable Diseases data sets (n=104)*




*Geographical distribution*

66 cases (63.5%) were reported from the Alice Springs district, 13 cases (12.5%) from Darwin, 12 (11.5%) from East Arnhem, 11 cases (10.6%) from Katherine and 2 cases from the Barkly Tablelands.

*Serogroups*

Serogroup C accounted for 37.5% of cases (39/104). Due to the serogroup A outbreak in Central Australia, this was the second most common serogroup identified (24 cases, 23%). An additional 18.3% (19 cases) were positive on latex agglutination for the ACYW135 group, and managed epidemiologically as serogroups C or A. Serogroup B disease (8 cases, 7.7%) is associated with sporadic disease in the NT (1-2 cases per year). There was one isolate of W135 from a 48 year old woman from South Australia infected while travelling within the NT.

*Demographic characteristics*

53 cases (51%) were male and 82 (79%) Aboriginal. The median age of cases was 7.0 years (range of 4 months to 74 years). As expected, most cases occurred in children aged 0-4 years, and 76% of all cases occurred before age 20. Table 2 presents the age distribution of patients.

Aboriginal children aged 0-14 years had 18.6 times the risk of disease than non-Aboriginal children (95% CL 7.8, 47.7) during the study period. The highest incidence rates occurred in Aboriginal children aged 0-4 years (65.5 per 100 000 person years of observation), except during the Central Australian outbreak when there was a relative shift in age to the 5-14 year age group.[3] This is consistent with the introduction of a new virulent strain in a community (serogroup A in this outbreak).

Table 2

*Age distribution of patients with invasive meningococcal infections in the NT November 1987 - August 1995*

| Age groups | Aboriginal (n) | Non-Aboriginal (n) | % of total |
|---|---|---|---|
| 0-4 | 30 | 3 | 31.7 |
| 5-9 | 20 | 4 | 23.1 |
| 10-14 | 12 | 0 | 11.5 |
| 15-19‡ | 6 | 3 | 9.6 |
| 20-29 | 4 | 8 | 11.5 |
| 30-39 | 4 | 1 | 4.8 |
| 40 & over | 6 | 2 | 7.7 |
| *Total cases* | *82* | *21* | *104‡* |

‡ Ethnicity unknown in one case

**Discussion**

Well collected surveillance data provide useful information about seasonal and long term disease trends, populations at risk of disease, effectiveness of interventions such as immunisation, the emergence of new diseases, and detect outbreaks. This review highlights a number of deficiencies in the way invasive meningococcal disease has been reported in the NT.

Identification of *N meningitidis* from a sterile site requires immediate notification to Disease Control by telephone or facsimile. All reports are followed-up as a matter of urgency by Disease Control to collect demographic details, the date of onset of symptoms, details of recent travel and a comprehensive list of close contacts who may require prophylactic antibiotics.

- *Under- and over-enumeration of cases*
  The 'official' count of invasive meningococcal disease reported to the DHSH obviously under-represents the true number of cases over this time period in the NT. Overall, surveillance for meningococcal disease detects most cases (sensitivity of the system). Using all data sets and additional information
  The more sensitive case definition used in 1988 during the Central Australian outbreak accounts for the additional 6 cases reported to the DHSH in that year.

- *Failure of routine quality assurance in maintaining databases*
  The supplementary data sets for meningococcal disease were counter productive for accurate reporting because cases entered there were not routinely copied to the official Notifiable Diseases data base. Routine quality assurance measures should be an integral part of any surveillance system.

Deficiencies in meningococcal disease reporting which currently apply to all our surveillance data:

- *Failure to ensure that reports fulfil case definitions*
  This was addressed in 1994 by release of *Communicable Disease Surveillance in the Northern Territory - New Guidelines for the Reporting of Notifiable Conditions*, distributed to all health care professionals responsible for reporting communicable diseases.

  The case definition for invasive meningococcal disease requires laboratory confirmation and may be too specific in large outbreaks.

- *Failure to routinely record the serogroup*
  Details of serogrouping are needed to determine whether a cluster of meningococcal disease is vaccine preventable. Serotyping and sero-subtyping can link cases of apparently sporadic disease.

- *Failure to record demographic information*
  Failure to indicate Aboriginality in disease and vital statistics leads to under-representation of the burden of disease experienced by Aboriginal communities and under-resourcing of Aboriginal health. Date of birth, gender, and place of residence are essential to check for duplications when validating anonymous case reports.

**Data should only be collected if they are used.** Surveillance data should result in public health action and can only be useful if they are complete, accurate and collected systematically. Some of the problems highlighted in this review of invasive meningococcal disease surveillance are applicable to all surveillance systems and are being addressed by Disease Control. Close cooperation between the reporting doctor or clinic, the laboratories, Infection Control Officers and Disease Control staff is essential to ensure the usefulness of the vast amounts of data laboriously collected.

**Acknowledgements**
I wish to acknowledge the following people who provided the data to validate our invasive meningococcal disease surveillance system: Public Health Nurses, Disease Control in all districts, Albert Lowe and Jo Hagger RDH and ASH laboratories, Ann Arthur and Alison Piper, Infection Control RDH and ASH and Htoo Myint, Commonwealth Department of Human Services and Health.

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## Receipt of pneumococcal vaccine without cold chain monitoring

The Rural Public Health Unit in Darwin reported that at least two Top End communities received pneumococcal vaccine (*Pneumovax*) from a private Darwin-based pharmacy without accompanying cold chain monitors. The pharmacy involved has been contacted about cold chain monitoring standards in the NT. *Pneumovax* should be stored and transported at 2-8°C as other vaccines. **Vaccines must never be accepted unless accompanied by approved cold chain monitors indicating that the vaccine has been transported under appropriate conditions** (refer NHMRC *Keep it cool: the vaccine cold chain.* Canberra: Australian Government Publishing Service, 1994). Any health care provider requiring further information about the vaccine cold chain should contact Nan Miller, Senior Project Officer, Disease Control Darwin on 22 8564.

# Arbovirus update

*Angela Merianos, Disease Control, Darwin and Peter Whelan, Medical Entomology Branch*

### Ross River Virus and Barmah Forest Virus

The 1994/95 wet season (November to May) recorded the second highest number of Ross River virus (RRV) cases (358 reports) since the near record wet of 1990/91 (446 reports).

*Figure 1*

*RRV in the NT 1 Jan 1991 - 13 Sep 1995*
*Laboratory notified cases*

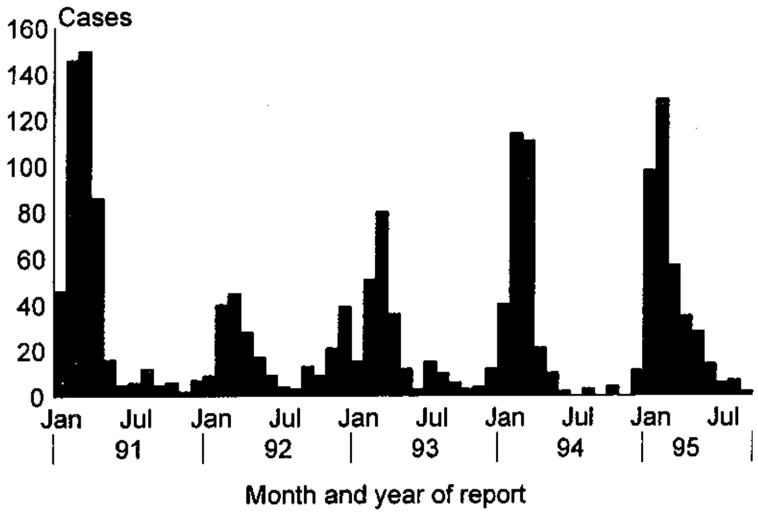
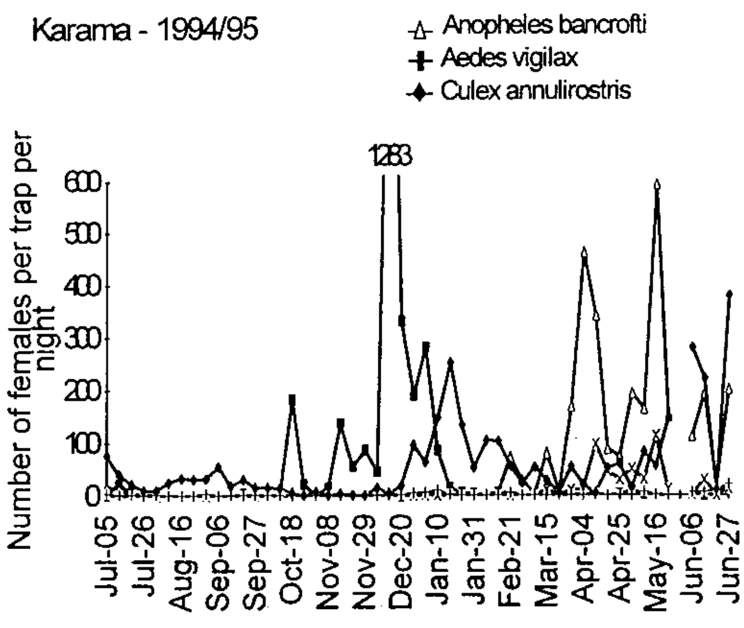



Figure 1 shows the epidemic curve of RRV notifications by month of report for the period January 1990 to 13 September 1995; 284 cases (75.5%) of RRV were reported from Darwin district, 37 from Katherine (9.8%), 37 from Central Australia and 18 (4.8%) from East Arnhem. The unexpectedly high numbers of cases from Central Australia led to an investigation to confirm local transmission.[1]

Mosquito control activities for Darwin Urban include regular monitoring of mosquito populations, rainfall and tides. Figure 2 presents female mosquito numbers recorded for 1994 as a representation of the seasonal patterns of mosquito breeding and trapping.

*Figure 2*

*Darwin adult mosquito monitoring program*
*$CO_2$ traps placed in Karama*




### Predictions for Darwin, 1995/96 wet season

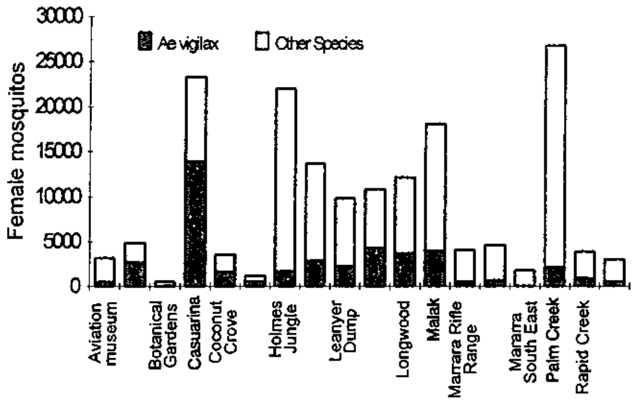
Although increases in *Aedes vigilax* numbers are expected in Leanyer, Malak, Karama and Tiwi 9 days after the 26 October high tides, the start of the risk period for RRV and Barmah Forest virus (BFV) transmission is not expected until the end of November. Figure 3 shows the number of mosquitoes caught at the various trap sites and the proportion of *Ae vigilax* in the traps.

The highest tide of the year will occur on 24 December. Very high numbers of *Ae vigilax* will occur 9 days later unless rains cause earlier flooding of the breeding sites. *Ae vigilax* numbers are likely to persist for 1-2 weeks following either tides or rain in this period. The highest incidence of RRV and BFV is likely to occur in the first two weeks of January 1996. As 75% of notifications of RRV are reported within one month of the date of symptom onset or date of laboratory test, the epidemic curve actually reflects the levels of transmission in the preceding 2-4 weeks.

### Australian Encephalitis

The risk period for Murray Valley Encephalitis virus (MVE) transmission is the post-wet period of March to June when higher numbers of *Culex annulirostris* occur. There have been no clinical cases of Australian Encephalitis in the NT since the outbreak in 1993.

*Figure 3*
*Total number of female mosquitoes at each trap site 1994/5*

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### Stop press 12 October 1995

Since writing this article, there has been early hatching of *Ae vigilax* in the Karama area. The Bureau of Meterology has reported an end to the El Nino effect which means a return to the 'normal' wet season pattern of more regular rainfall in October and November.

The early *Ae vigilax* hatching means that the annual increase in cases of RRV may occur earlier this wet season. Medical Entomology Branch will undertake adult mosquito control in swamps around Darwin.

## Measles control measures for contacts of presumed cases - the revised protocol

*Angela Merianos, Disease Control, Darwin*

Guidelines for the management of contacts of measles (refer *NT Measles Control Protocol: Guidelines for Disease Control. A manual for health care providers, 1994*) have been revised to reflect current practice for contacts under the recommended age at vaccination with the measles-mumps-rubella vaccine (MMR). The following page presents the new protocol in the form of a comprehensive flow chart which has attempted to cover most contact tracing situations dealt with by health care providers. The management of contacts not falling into the categories described in this protocol should be decided on a case by case basis. Disease Control have ordered laminated copies of the chart for distribution to doctors and clinics. Bands of colour (shown in grey) will be used to make tracking of the decision tree easier for each of the five contact groups:

- *under usual age for MMR* (9 months for Aboriginal infants and 12 months for non-Aboriginal infants);
- *usual age for MMR or older AND no contraindications to vaccination with MMR;*
- *vaccine contraindicated;*
- *vaccine and immunoglobulin refused; and*
- *immunocompromised (any age).*

Measles control measures should begin when a patient is diagnosed clinically. **Presumptive measles should be notified to Disease Control on the same day by telephone or facsimile.** Measles should be suspected in any person presenting with the following signs:

- fever greater than 38°C if measured AND
- a maculopapular rash AND
- one of cough or coryza or conjunctivitis or Koplik spots.

The presence of fever, a maculopapular rash and cough at the time of presentation strengthens the clinical diagnosis of measles. If present, Koplik spots are usually seen on the buccal mucosa opposite the molars. History of vaccination with a measles containing vaccine (monovalent measles, bivalent measles-mumps or trivalent MMR) should always be sought, as should a history of clinical measles in childhood diagnosed by a doctor when investigating suspected measles in adults. The flow chart has two main arms; immunocompromised and immunocompetent. Although we have defined the immunocompromised group as persons with malignancies, HIV/AIDS, or on immunosuppressive treatment etc, a severely malnourished child, for example, may also fall into this category at the discretion of the attending clinician.

In the immunocompetent category, the contact is regarded as either :

- immune if they fulfil one of the following

  previous documented vaccination after 1980 at the recommended age for a measles containing vaccine
  OR
  serologic evidence of immunity (past measles or documented seroconversion after immunisation)
  OR
  age over 30 years with or without a history of clinical measles

- susceptible and a direct contact of a measles

- susceptible and potentially at risk during an outbreak (no direct contact with measles).

The following scenario is included to demonstrate the decision pathways used in the new flow chart.

*A 35 year old non-Aboriginal woman visits some friends with her children aged 7 months and 3 years, her sister who is 29, and her nephew aged 11 months who had serologically confirmed measles at age 9 months. The friends are a 24 year old man who is feeling "off colour" with high fevers, sore eyes, sore throat and cough, and his pregnant wife aged 23 years. The next day the sick friend develops a maculopapular rash and presents to your surgery/clinic. You diagnose measles clinically and collect blood for serology. The results will be available in 3-4 days. You also determine that the couple had just returned from a 3 week trip down south and had not been back to work. It is now 6pm on Monday and the visit took place between 1pm and 3pm the previous day. Following the flow chart and the NT Measles Protocol, what measures should you take to prevent the spread of measles?*

*The index case*

- Notify Disease Control as soon as possible and isolate until 4 days after the appearance of the rash.

*The history you obtain from his wife is that she received monovalent measles vaccine when 12 months of age in 1973.* (Monovalent measles vaccine became available in 1968 but the first generation vaccine was heat labile. A heat stable monovalent vaccine was introduced in 1979).

- She is a direct contact who may be susceptible to measles. Because MMR is a live vaccine and is contraindicated in pregnancy, offer Normal Immunoglobulin (Human), NIGH, 0.2 ml/Kg. Offer MMR post-partum.

*While the index case was in your waiting room, two children aged 5 and 10 years were also in the surgery. They have attended with a mild URTI and are afebrile. The 10 year old was vaccinated in the school program but the 5 year old is unvaccinated.*

- Vaccinate the 5 year old if you store MMR or arrange for vaccination within the next 72 hours through a Community Care Centre. Mild illness (temperature less than 38°C is not a contraindication to vaccination). Update MMR vaccination if needed to all children who subsequently attend your surgery on the same day. Check that no other children seen before the index case were in the waiting room at the same time, and recall them if MMR vaccination or NIGH is required.

*You ask Disease Control to assist in further contact tracing. They learn that the 3 year old child of the visiting family is fully vaccinated.*

*The 29 year old woman cannot recall measles as a child but remained well when her child had measles at 9 months of age.*

- The 3 year old is considered immune and requires no further vaccination for this episode. Revaccinate routinely at age 10 years (MMR2 School Program).
- Both women are considered immune because of their age (35 year old) and failure to develop clinical measles following previous direct contact (29 year old).
- The 7 month old baby who is under the usual age for vaccination can be given post-exposure MMR because the time of exposure is known with certainty to be within 72 hours of the time of vaccination. (Measles can be successfully prevented by post-exposure vaccination because vaccine-induced immunity develops within the incubation period of infection with the wild strain of virus). Flag the case notes to revaccinate at 12-15 months of age, and routinely at age 10 years.
- The 11 month old child should be vaccinated at 12 months to protect against rubella and mumps, and routinely at age 10 years.

*Disease Control also notifies health authorities in the state in which the infection was acquired to extend contact tracing appropriately.*

Because the results of serologic testing for measles are usually reported after the critical 72 hour limit for post-exposure vaccination, disease control measures are implemented on the clinical diagnosis of measles (presumptive measles). A detailed history and clinical examination are essential to determine whether a presumptive diagnosis of measles should be made; this is particularly important when the number of false positive clinical diagnoses of measles increases as the incidence of measles in a community falls.

TERRITORY HEALTH SERVICES
Protocol updated September 1995

# MEASLES CONTROL MEASURES FOR CONTACTS

Presumptive case of measles

Notify Disease Control ☎

| | |
|---|---|
| Alice Springs | 51 7550 |
| Barkly | 62 4259 |
| Darwin | 22 8044 |
| East Arnhem | 87 0282 |
| Katherine | 73 8795 |

Identify all contacts

## Immunocompromised contact (any age) eg leukaemia childhood malignancies, HIV/AIDS

Offer NIGH 0.5 ml/Kg (maximum dose 15ml)

Recommend exclusion for 14 days after the last reported case (for outbreaks in child care, schools etc)

*Post-outbreak follow-up in consultation with paediatrician and/or oncologist:*

If asymptomatic HIV +ve or after cessation of immunosuppressive Rx & in remission for 3 mths or more

Offer MMR

## Immunocompetent contact

| | | |
|---|---|---|
| Under usual age for MMR (Refer NT Immunisation Schedule for MMR) | Immune | Vaccinate with MMR at age 12-15 mths to cover rubella and mumps. Revaccinate routinely at age 10 yrs. |
| | Susceptible - direct contact with measles | If contact known with certainty to be within previous 72 hrs offer MMR (age 6-11 If contact >72 hrs to 7 days or time from exposure unknown or age <6mths, offer NIGH 0.2 ml/Kg. If contact >7 days, isolate and monitor for measles. |
| | Susceptible - Community outbreak | Lower age at vaccination to 6 mths if indicated by incidence rate (>5%) in this a Revaccinate at age 12-15 mths and routinely at age 10 yrs. |
| Usual age for MMR or older AND no contraindications to vaccination with MMR | Immune | No further action for this episode. Revaccinate at age 10 yrs if only one MMR. |
| | Susceptible - direct contact with measles | If contact within previous 72 hrs offer MMR. If contact >72 hrs to 7 days, offer NIGH 0.2 ml/Kg. If contact >7 days, isolate and monitor for measles. |
| | Susceptible - Community outbreak | Offer MMR for this episode. Consider revaccination of 10-30 yr olds if only one MMR and incidence is high. |
| Vaccine contraindicated (Refer to NT Measles Protocol for contraindications to MMR) | Immune | No further action. |
| | Susceptible - direct contact with measles | If contact >72 hrs to 7 days offer NIGH 0.2 ml/Kg. If >7days, isolate and monitor for measles. |
| | Susceptible - Community outbreak | No further action unless direct contact occurs during outbreak. |
| Vaccine and immunoglobulin refused | Immune | No further action. |
| | Susceptible - direct contact with measles | Exclude for 14 days. |
| | Susceptible - Community outbreak | No further action unless direct contact occurs, then exclude until mass vaccination completed (institutions). |

## GLOSSARY OF TERMS

NIGH = Normal Immunoglobulin (Human)

A contact is regarded as IMMUNE if:
Previous documented vaccination after 1980 at recommended ag or older OR
Serologic evidence of immunity (ie past measles or seroconversion after vaccination) OR
Age >30 yrs with or without a history of clinical measles.

DIRECT CONTACT with measles ie household, childcare, schoo medical setting, child <5 yrs old in an Aboriginal community.

COMMUNITY OUTBREAK ie no direct contact but measles trans reported in the population.

MMR IN CHILDREN UNDER THE USUAL AGE FOR VACCINA
**Applies to exposure at a known time/date eg contact in a medic airline etc.

## CASE DEFINITION -PRESUMPTIVE MEASLES

Fever >38C AND
Maculopapular rash AND
Cough or coryza or conjunctivitis or Koplik spots

NB: Fever, rash and cough are most important diagnostic signs/symptoms (highest predictive value for measles).

# Gastroenteritis closes children's camp

*Fay Johnston[1,2], Douglas Lush[1,2], Tracy Ward[3], Celia Drake[3], Angela Merianos[2].*

[1] *National Centre for Epidemiology and Population Health, ANU, Canberra*

[2] *Disease Control Centre, Darwin* [3] *Environmental Health, Darwin Urban District*

**Background**

On 12 July 1995, the Disease Control Centre (DCC) in Darwin was informed of an outbreak of gastrointestinal illness at a recreational camp 120 km south of Darwin. There were approximately 100 campers, most of whom had arrived on 10 July. The following evening over 30 people became ill with diarrhoea and vomiting and were sent home and the camp was closed. DCC was invited to investigate the outbreak by camp organisers. We conducted epidemiological and environmental investigations to: describe the outbreak; identify cases; examine risk factors for illness; determine the causal agent; and advise the camp organisers of measures to prevent future outbreaks.

**Methods**

*Epidemiological methods*

Using information obtained from the camp organisers, chef and camp nurse at the initial site visit, we developed a structured questionnaire for telephone and personal interviews with camp participants. We collected: age; gender; occupation; dates of attendance; participation in food preparation; the presence, time of onset and duration of gastrointestinal symptoms; and a food intake history for 10 and 11 July. We later asked some campers about subsequent illness in household contacts. We also obtained details of accommodation arrangements and daily activities of campers from the organisers.

*Case definition*

A case was any person who attended the camp from 1 July to 14 July 1995 and subsequently developed acute gastroenteritis characterised by:

1. diarrhoea - three or more unformed stools in any 24 hour period; OR
2. vomiting - any episode of vomiting not induced by motion sickness and not due to a pre-existing complaint; OR
3. abdominal pain; OR
4. nausea or malaise of sufficient severity to affect normal activities.

We calculated attack rates (AR) for each demographic characteristic, food and beverage item and the relative risk (RR) of illness.

*Environmental health survey*

The environmental health survey consisted of an inspection of the camp location, sewerage treatment and effluent disposal systems, water supply and food storage and preparation facilities.

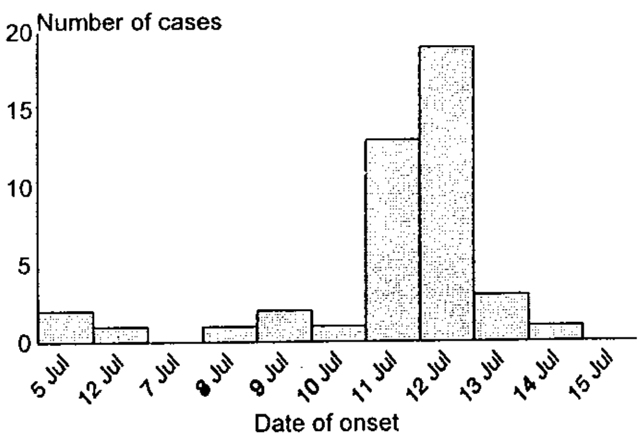
*Laboratory investigations*

We collected the following clinical, food and water samples for microscopy and culture: faecal specimens from 7 cases and the chef who remained well; one convalescent phase and 4 sets of paired sera from patients; a hand swab from the assistant cook; water samples from the bore, tank, kitchen tap, open air tap and billabong; and samples of an egg and ham breakfast dish, potatoes and cooked rice.

**Results**

100 people attended the camp and 96 completed questionnaires. One third were children with chronic illness. Most campers arrived on 10 July but 17 had arrived during the previous week. 49 campers had an illness that fulfilled the case definition for acute gastroenteritis (52%). Onset of illness by day is shown in the Figure. There was no significant difference in attack rates by age group, gender, occupation, or week of arrival at the camp. The age distribution and age-specific attack rates are shown in Table 1.

*Onset of illness by day for 43 campers*




The relative risk of illness for drinking water at any time during the camp was 2.0. Table 2 summarises the results from the only meal implicated in the outbreak. At this meal campers had a choice of either tacos with mince or steak and a variety of raw salad vegetables. Those who ate tacos or mince were approximately 3 times as likely to fall ill compared with those who did not. Because campers who ate the steak were less likely to eat tacos, steak appears to have a protective effect in in this analysis.

*Table 1*
*Age distribution and age-specific attack rates of acute gastroenteritis in campers*

| Age group | Total number | Number ill | Attack rate (%) |
|---|---|---|---|
| 0-10 | 11 | 4 | 36 |
| 11-20 | 37 | 23 | 62 |
| 21-30 | 10 | 7 | 70 |
| 31-40 | 8 | 4 | 50 |
| 41-50 | 4 | 1 | 25 |
| 51 & over | 6 | 5 | 83 |
| Total | 76* | 33 | |

* Only 76 had date of birth recorded.

*Table 2*
*Attack rates and relative risk of illness for food items eaten during the implicated meal*

| Food | AR (%) exposed | AR (%) unexposed | RR |
|---|---|---|---|
| Tacos | 59 (38/64) | 17 (3/18) | 3.6 |
| Mince | 57 (38/67) | 23 (3/16) | 3.0 |
| Cheese | 57 (35/61) | 30 (6/20) | 1.9 |
| Tomatoes | 57 (29/51) | 37 (11/30) | 1.6 |
| Sour cream | 65 (13/20) | 52 (17/33) | 1.3 |
| Carrots | 56 (15/27) | 55 (18/33) | 1.0 |
| Steak | 35 (9/26) | 57 (31/54) | 0.6 |

*Clinical details*

Patients presented with a sudden onset of mild to moderate self-limiting gastroenteritis. Acute watery diarrhoea was reported by 61% of cases, abdominal pain by 48%, nausea or malaise by 38% and fever by 14%. In 71% of cases symptoms lasted less than 48 hours (range 6 hours to one week). The incubation period was estimated to be 18-48 hours from the implicated meal (range 8-72 hours). This range was calculated from the time between the first and last common meals and the time of onset of symptoms.

There was no association between sleeping arrangements and falling ill. 17 cases were contacted two weeks after their illness; all had completely recovered and there were no secondary household cases.

*Environmental health findings*

The camp was inspected on 12 July. Prior to the camp, organisers had sought advice from Territory Health Services (THS) about precautions necessary for a camp of that size. Telephone advice had been given but the camp site was not inspected.

The campers slept in tents and there were kitchen, laundry and toilet facilities. Most of the food had been donated to the camp, and was prepared by a qualified chef, an assistant chef and the campers.

There were several deficiencies in the kitchen facilities.

1. The kitchen had no hot running water nor separate hand washing facilities.
2. One of the two freezers was over stocked with food and the internal temperature was measured at 2°C, well above the recommended minus 15°C or less.
3. The fridge had an internal temperature of 8°C, also above the recommended standard of 5°C or less.
4. The pots used for cooking were too large to guarantee even and adequate distribution of heat throughout the food.
5. The kitchen was unscreened.

The untreated water supply was at risk of contamination by ground water seepage into the shallow bore. It was known that the integrity of the water line was breached on 1 July during telephone line excavations 20m from a septic tank.

*Results of laboratory investigations*

*1. Clinical specimens*

All but two faecal specimens were negative for rotavirus antigen and bacterial pathogens including toxigenic *Escherichia coli*, shigella, salmonella, and campylobacter. Salmonella was isolated from the faeces of one child whose sibling grew adenovirus; both had illnesses fulfilling the case definition but were inconsistent with most presentations. Electron microscopy and immune electron microscopy were negative for small round structured virus (SRSV) in all cases. Serological testing for Norwalk-like agents did not proceed following failure to identify a causative agent in the faeces.

*2. Food and water specimens*

*E coli* in excess of 100 000 organisms per 100 ml (acceptable range less than 10 organisms per 100 ml) were present in a sample from one tap only. This result was not reproduced on follow-up testing. A breakfast dish grew both non-toxigenic *E coli* and *Klebsiella oxytoca*. *Bacillus cereus* in excess of $10^5$ organisms per gram grew from one sample of food that had been prepared after the onset of the outbreak. The results of testing food for *E coli* toxins were all negative.

*Public health action*

Camp site managers were told of the results of the investigation. Environmental Health Officers advised them about measures required to lessen the potential for contamination to the water supply and improve food hygiene. Camp organisers were keen to help with the investigation and act on the recommended changes.

**Discussion**

The clinical and epidemiological findings from this investigation of acute gastroenteritis in a camp are consistent with contamination of food or a beverage with a small round structured virus, possibly amplified by aerosol spread. Some campers had been unwell in the week before the camp and kitchen facilities were conducive to the survival and spread of infectious food-borne agents. The possibility of multiple organisms involving multiple pathways of transmission cannot be excluded.

It is unfortunate that the organisation attended a camp site with inadequate facilities for food storage, preparation and basic hygiene despite seeking advice from THS. Catering facilities for voluntary institutions are not subject to the same legislative controls as commercial enterprises and there had therefore been no previous inspection to the site by Environmental Health Officers. A more serious outbreak may occur if organisms such as salmonella, shigella, hepatitis A or enterohaemorrhagic *E coli* enter the same environment of poor hygiene and crowded living conditions with potentially immunocompromised children. The problems at this particular camp have been identified and addressed but the wider issue of the safety of non-commercial mass catering remains unresolved.

**Acknowledgements**
The investigation was greatly assisted by DCC staff, Sue Reid, Nan Miller, and Jo Wright who spent many hours conducting telephone interviews, and all of the campers who willingly provided us with information and specimens.

## Malaria Notifications, Northern Territory, April to June 1995

Eight notifications of malaria have been received for the second quarter of 1995. The following table provides details about where the infection was thought to have been acquired, the infecting agent and whether chemoprophylaxis was used.

| ORIGIN OF INFECTION | REASON EXPOSED | AGENT | CHEMO-PROPHY-LAXIS | COMMENTS |
|---|---|---|---|---|
| **PACIFIC** | | | | |
| PNG | Resident | P.falciparum | No | In Darwin for Arafura Games.Takes choroquine when symptomatic in PNG. |
| PNG | Working overseas | | No | Treated with chloroquine when symptomatic in PNG. |
| **ASIA/SE ASIA** | | | | |
| Indonesia | Travel/holiday | P.vivax | Yes | Third relapse since return.Previously treated with primaquine 30mg for 2 weeks then 45mg for 2 weeks. |
| Indonesia | Travel | P.falciparum | No | Initially diagnosed as a mixed P.falciparum/P.malariae infection. P.falciparum confirmed by Westmead Hospital. |
| Indonesia | Diving holiday | P.vivax | Yes | Took correct doxycycline prophylaxis. Symptoms developed 5 weeks after return. |
| Pakistan/Brunei | Pakistani resident worked in Brunei | P.vivax | No | Symptoms developed 6 months after being in Australia. |
| **AFRICA** | | | | |
| Zimbabwe/Malawi | Working overseas | P.falciparum | No | Treated symptomatically with quinine while in Africa. |
| Malawi | Escorting ill relative | P.falciparum | No | In Malawi for 30 days |

# Box-Jellyfish and the Wet Season

*Bart Currie, Royal Darwin Hospital and Menzies School of Health Research*

The "stinger" season for the Northern Territory (NT) coastal waters is 1 October until 31May. However, the most dangerous box-jellyfish, *Chironex fleckeri*, is present occasionally even in the dry season and a few stings occur each year between June and September. The last recorded fatality in Australia from *C. fleckeri* envenomation was in 1988 in a 13 year old boy from a remote NT Aboriginal community. The last nine stinger deaths in the NT have all been in children, reflecting the effect of the rapidly acting toxins on smaller body mass. The mechanisms of action of *C. fleckeri* toxins remain unclear, but clinical studies in the NT support a primary cardiotoxic role in potentially fatal stings, in addition to the severe dermatonecrotic effect so evident in even minor stings.

In fatal cases of *C. fleckeri* envenomation death may occur within a few minutes, and is usually within 20 minutes of the sting. It is therefore critical that immediate management of severe stings is optimised in the hope of preventing death. With this in mind, and given the uncertainties of the cardiotoxic mechanism, the following protocol has been developed. However, prevention is simple:

**DO NOT ENTER THE SEA AND MOST IMPORTANTLY DO NOT LET CHILDREN ENTER THE SEA DURING THE STINGER SEASON.**

**References**

1. Currie B. Clinical implications of research on the box-jellyfish *Chironex fleckeri*. *Toxicon* 1994; 32: 1305-1313.

## Summary of treatment of *Chironex fleckeri* stings

***On-the-beach treatment***

(1) Assess the conscious state and treat airway, breathing and circulation if necessary.

(2) Liberally pour vinegar over the stung area for a minimum of 30 sec to inactivate remaining stinging cells on skin and on any adherent tentacles.

(3) If unconscious or if evidence of life-threatening cardiac or respiratory decompensation, and if antivenom is available, then 3 ampoules of antivenom (each containing 20,000 units) can be given i.m. by a trained health professional.

(4) In severe envenomation use oxygen if available. Entonox (50% nitrous oxide 50% oxygen) can be administered for severe pain.

***Hospital treatment***

(1) Continue treating airway, breathing and circulation if necessary and add oxygen.

(2) If unconscious or if life-threatening cardiac or respiratory decompensation, or if a significant arrhythmia is present, administer a minimum of 1 ampoule of antivenom intravenously (each ampoule 20,000 units, diluted 1:10 with an isotonic crystalloid solution such as Hartmann's solution or isotonic saline, given over 5-10 min). In a life-threatening situation up to 3 ampoules may be given i.v. consecutively if the response remains inadequate.

(3) Cardiopulmonary resuscitation should be continued and not abandoned in the patient with ongoing cardiac arrest until after further therapy with even more antivenom (at least 6 ampoules total dose if available) and consideration of cardioactive drugs.

(4) If supplies of antivenom are exhausted and there is persisting cardiac arrest or life-threatening arrhythmia, then before abandoning resuscitation consider giving verapamil i.v. (0.1 mg/kg up to 5mg adult dose) while continuing cardiopulmonary resuscitation. Inotropes such as adrenaline should also be considered.

(5) In stings which are not life-threatening (no cardiac or respiratory decompensation) use ice-packs for initial pain relief, together with i.v. or i.m. administered analgesia if necessary (1 mg/kg of pethidine up to 50 mg adult dose initially). For pain not relieved by ice-packs and narcotic analgesia, administer 1 ampoule of antivenom i.v. as above.

(6) Further i.v. narcotic analgesia may be administered when necessary in conscious patients.

(7) Consider 1 ampoule of i.v. antivenom (administered as above) for potential cosmetic benefits in stings.

# Evacuation of an Aboriginal community precipitated by an outbreak of beetle-induced blistering dermatitis.

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## Introduction

In February 1995, 40 Aboriginal people from a small NT outstation community reported extensive painful skin lesions consistent with chemical dermatitis caused by the "whiplash rove beetle" or "acid beetle". Several earlier reports have indicated that this beetle was responsible for blistering skin lesions both in nearby regions[1], and elsewhere in Australia.[2-4] The aim of the report is to describe the outbreak and the public health measures implemented to control it.

## Method

Health staff and a medical entomologist examined the site and took specimens for identification.

## Findings

*Skin lesions*

All 40 residents reported having skin lesions. These varied in extent and stage of healing. Lesions predominantly occurred on the face, neck, upper arms and trunk. Some had a few isolated lesions while others had extensive blistering and exfoliating lesions covering over 80% of their bodies. No one had an associated conjunctivitis. Anecdotal evidence suggests that those who slept outside were affected more than others. Four people required hospitalisation for treatment.

Initial contact with the beetle was painless. In general the lesions progressed in the following way: within 24 hours a red, often linear rash developed. By day 2-4 the rash developed a surface layer of blisters. The lesion became very painful and was described as being like a battery acid burn and then became moist until about day 7 when it began to dry and become itchy. A dry scab healed and was shed by about day 10-12, leaving a dark pigmented area which persisted for 2-4 weeks. Treatment was symptomatic with care to prevent secondary infection.

## The setting

The outstation is situated 210 km south west of Darwin on a finger of land extending into the extensive Moyle River flood plain. The nearest flood plain margin was 600m from the four dwellings. The only access during the wet season is by plane. The outstation has had permanent residents for 5 years.

Approximately 20 Aboriginal men, women and children live on the outstation in 4 dwellings; one substantial and three rudimentary. Ten people reported usually sleeping outside under the lights at night. Only the substantial dwelling had intact fly screens or curtains, the latter apparently not light-proof. Residents were well informed regarding the avoidance of mosquitoes and other insects and only external light sources were used at night. Outside lighting included yellow and white fluorescent lights at night.

## The beetle

The beetles were confirmed as *Paederus australis*, a whiplash rove beetle. Initial reports of skin lesions coincided with the arrival of plague numbers of the beetles, following a record rainfall in January 1995. High numbers of whiplash rove beetles were found outside crawling around the base and walls of the dwellings, with fewer numbers found inside. They were reported to be attracted to lights at night, and able to enter dwellings through intact flyscreens and gaps in joinery.

## Public health action

All residents left the outstation for a period of 2-3 weeks. This allowed healing of existing skin lesions and time for subsidence of the beetle plague. An environmental health team sprayed the outside perimeter of all houses and inside some of the houses with a residual insecticide (deltamethrin). On the residents' return to the outstation the beetles were no longer present in plague proportions and no further lesions were reported.

## Discussion

The skin lesions are consistent with those described as Paederus dermatitis; of note were the presence of linear lesions giving the "whiplash" streaks characteristic of whiplash rove beetle, and "kissing" lesions that occurred when two skin surfaces were in contact with one another, often in the elbow crease.[5,6] Other reports have described an acute conjunctivitis with marked oedema of eyelids, known as "Nairobi eye" in Africa.[7,11] Conjunctivitis was not reported by any of the residents in this outbreak.

The Paederus beetle is elongated, ant-like, 5-10mm long and has bright coloured sections of blue/black and orange. Favoured habitats are stream banks and swamps. It is a scavenger, feeding on other insects and decaying animal and vegetable matter[4,8]. It is attracted to lights at night[7]. The beetle does not bite or sting but produces a highly toxic alkali substance, perderin, which has a severe but delayed action on the skin. The toxin is released by swatting or swiping the beetle on the skin. It is possible that the toxin may be deposited voluntarily by Paederus[7].

About 30 species of Paederus have been implicated in human skin lesions worldwide in both temperate and tropical continents.[6,7,9-11] The two Australian Paederus species implicated in skin lesions are *Paederus australis Guerin-Meneville*, and *Paederus cruenticollis Germar* (Coloptera: Staphylinidae)[7].

Community members need to be made aware of the harmful effects of contact with *Paederus australis*. Consideration should be made to place future communities at least a few km from the swamp margin, beyond the beetles flight range. Recommended control measures for times when the beetles are active: 1) a light trap should be made consisting of an external flood light to attract beetles away from buildings, with a container half filled with soapy water underneath to drown beetles; 2) houses should be fitted with good insect screens, dark curtains and have available yellow fluorescent light tubes; 3) people should avoid sleeping outside; 4) if contact with the beetle is suspected, people should wash the affected areas with soap and water[3,4] and; 5) decaying animal & vegetable matter should be cleared from around the house to a distance of 50m.[4,8]

Isolated episodes of Paederus dermatitis have previously been reported in this area[1]. While epidemics have been reported overseas this is the first recorded large outbreak of Paederus dermatitis in Australia. The severe degree of skin damage to the residents was related to the large number of *Paederus australis*. This outbreak of beetle induced blistering dermatitis precipitated a major social dislocation - the evacuation of a whole community. With more Aboriginal people moving back to reside on traditional lands, further outbreaks of beetle induced dermatitis may be seen.

**Acknowledgements**
We would like to thank the community for participating in this report and Dr David Ashbridge, Dr Bart Currie, Peter Whelan and Ross Bailee for their review of early drafts.

**References**

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4. Millard PT. Whiplash dermatitis produced by the common rove beetle. *Med J Aust* 1954;1:741-744.
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6. George AO. Paederus dermatitis - a mimic. *Contact Dermatitis* 1993;29:212.
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8. Frank JH, Kanamitsu K. Paedrus, Sebsy kati (Coleoptera: Staphylinidae): Natural History and Medical Importance. *J Med Entomol* 1987;24:2:155-191.
9. George AO, Hart PD. Outbreak of Paederus Dermatitis in Southern Nigeria: Epidemiology and Dermatology. *Int J Dermatology* 1990;29:500-501.
10. Deneys JB, Zumpt F. Rove beetle dermatitis in South West Africa. *S Afr Med J* 1963;37:1284-5.
11. Veraldi S, Suss L. Dermatitis caused by Paederus Fuscipes Curt. *Int J Dermatology* 1994;33;4:277-278.
12. George AO, Falope ZF. An epidemic of Paederus dermatitis in southern Nigeria. *Contact Dermatitis* 1989; 20:314-315.

# Hepatitis C support group

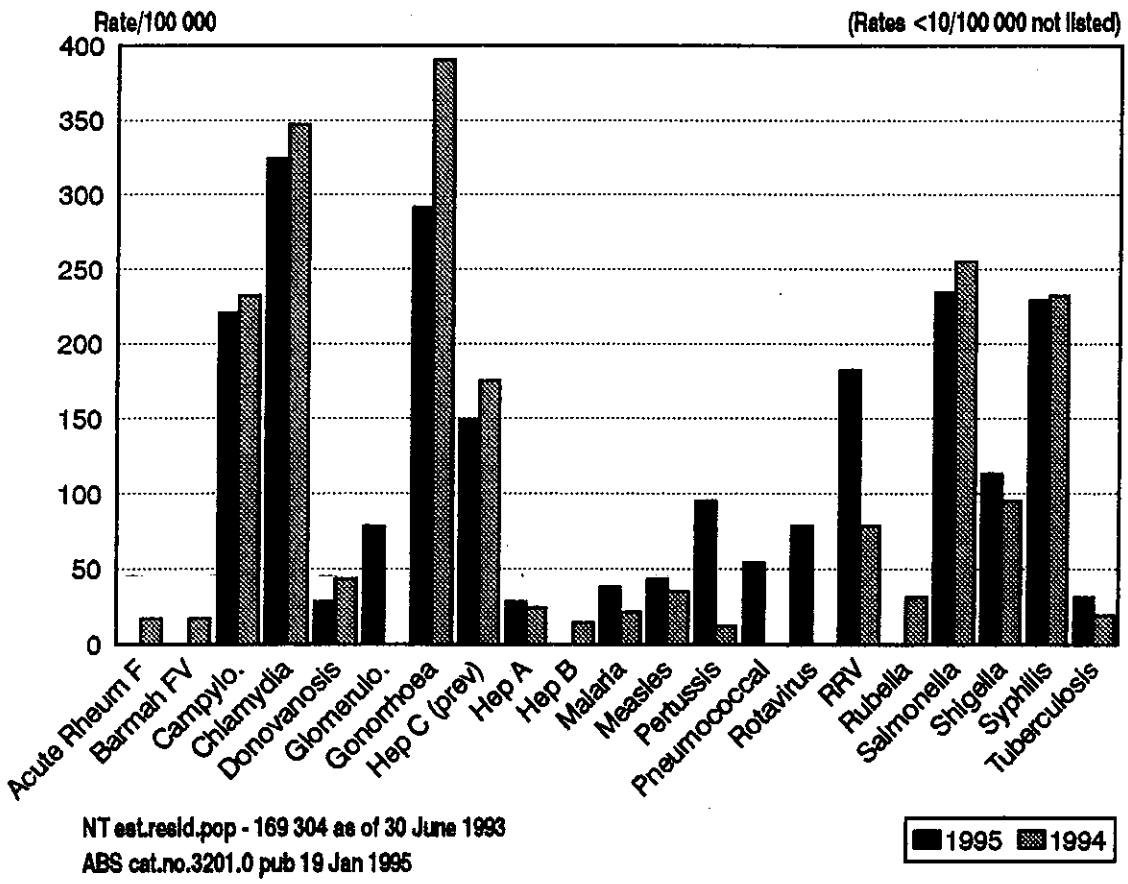
A hepatitis C support group has recently been formed in Darwin and interested people may contact the group to obtain information about hepatitis C and the activities of the support group. The group meets every second Wednesday of the month in the Family Planning meeting room at the Rapid Creek shopping centre between 6:30 and 8:30pm. The hepatitis C support telephone line provides information about the support group. Information about hepatitis C can be posted to those people who request it by leaving their details on the answering machine. The support line will be staffed by a member of the support group on Thursday afternoons if more specific information is required about the support group or hepatitis C. The telephone number for the support line is 81 3988. The group is staffed by volunteers and is a non government organisation. If anyone is interested in assisting in the running of the support group or wishes to set up a hepatitis C group in another centre please leave your details on the support line answering machine so that you can be contacted.

**Notified cases of Vaccine Preventable Diseases in the NT by Report Date 1 April to 30 June 1995 and 1994**

| DISEASES | TOTAL | | No. cases among children aged 0-5 years | |
|---|---|---|---|---|
| | '95 | '94 | '95 | '94 |
| Congenital rubella syndrome | 0 | 0 | 0 | 0 |
| Diphtheria | 0 | 0 | 0 | 0 |
| *Haemophilus influenzae* type b | 1 | 0 | 1 | 0 |
| Hepatitis B | 3 | 6 | 0 | 1 |
| Measles | 18 | 15 | 8 | 5 |
| Mumps | 1 | 0 | 1 | 0 |
| Pertussis | 40 | 5 | 12 | 0 |
| Poliomyelitis, paralytic | 0 | 0 | 0 | 0 |
| Rubella | 4 | 13 | 3 | 2 |
| Tetanus | 0 | 0 | 0 | 0 |

- Mumps is largely under-reported.

## NT wide notifiable diseases 2nd quarter 1995 and 1994




NT est.resid.pop - 169 304 as of 30 June 1993
ABS cat.no.3201.0 pub 19 Jan 1995

## NT NOTIFICATIONS OF DISEASES BY DISTRICTS
## 1 APRIL TO 30 JUNE 1995 AND 1994

| DISEASES | ALICE SPRINGS | | BARKLY | | DARWIN | | EAST ARNHEM | | KATHERINE | | TOTAL | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | '95 | '94 | '95 | '94 | '95 | '94 | '95 | '94 | '95 | '94 | '95 | '94 |
| Acute Rheumatic Fever | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 1 | 0 | 1 | 0 | 7 |
| Adverse Vaccine React. | 0 | - | 2 | - | 0 | - | 0 | - | 0 | - | 2 | - |
| Arbovirus infections | | | | | | | | | | | | |
| Barmah Forest Virus | 0 | 0 | 0 | 0 | 2 | 5 | 0 | 1 | 2 | 1 | 4 | 7 |
| Dengue | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| Ross River Virus | 24 | 1 | 2 | 0 | 32 | 25 | 11 | 3 | 8 | 4 | 77 | 33 |
| Campylobacter | 33 | 60 | 1 | 0 | 55 | 33 | 1 | 0 | 3 | 5 | 93 | 98 |
| Chlamydia | 32 | 35 | 3 | 0 | 66 | 85 | 13 | 7 | 23 | 20 | 137 | 147 |
| Cong.Syphilis | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 3 | 0 |
| Donovanosis | 5 | 14 | 0 | 0 | 3 | 2 | 0 | 1 | 4 | 1 | 12 | 18 |
| Gastroenteritis | 0 | - | 0 | - | 2 | - | 0 | - | 0 | 0 | 2 | - |
| Glomerulonephritis | 0 | 0 | 0 | 0 | 9 | 0 | 18 | 1 | 6 | 1 | 33 | 2 |
| Gonococcal Disease | 62 | 77 | 7 | 2 | 28 | 42 | 7 | 10 | 19 | 34 | 123 | 165 |
| Gononoccal Conjunct. | 0 | - | 0 | - | 0 | 0 | 0 | - | 1 | - | 1 | - |
| Haemophilus Inf type b | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 |
| Hepatitis A | 2 | 6 | 0 | 0 | 2 | 2 | 0 | 2 | 8 | 0 | 12 | 10 |
| Hepatitis B | 1 | 5 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 3 | 6 |
| Hepatitis C (prevalence) | 3 | 6 | 0 | 0 | 60 | 64 | 0 | 0 | 0 | 4 | 63 | 74 |
| HTLV-1 | 0 | - | 0 | - | 0 | - | 0 | - | 1 | - | 1 | - |
| Legionnaires Disease | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| Leptospirosis | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 2 |
| Malaria | 1 | 0 | 1 | 0 | 13 | 8 | 0 | 0 | 1 | 1 | 16 | 9 |
| Measles | 1 | 0 | 0 | 1 | 6 | 13 | 11 | 0 | 0 | 1 | 18 | 15 |
| Meningococcal Infect. | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 |
| Mumps | 0 | - | 0 | - | 1 | - | 0 | - | 0 | - | 1 | - |
| Pertussis | 3 | 5 | 0 | 0 | 20 | 0 | 9 | 0 | 8 | 0 | 40 | 5 |
| Pneumococcal Disease | 11 | - | 0 | - | 7 | - | 1 | - | 5 | - | 24 | - |
| Rotavirus | 14 | 2 | 0 | 0 | 13 | 0 | 0 | 0 | 6 | 0 | 33 | 2 |
| Rubella | 0 | 0 | 0 | 0 | 4 | 12 | 0 | 0 | 0 | 1 | 4 | 13 |
| Salmonella | 14 | 20 | 6 | 0 | 49 | 58 | 10 | 10 | 20 | 20 | 99 | 108 |
| Shigella | 19 | 18 | 3 | 0 | 13 | 10 | 12 | 5 | 1 | 7 | 48 | 40 |
| Syphilis | 59 | 47 | 0 | 1 | 7 | 12 | 8 | 18 | 23 | 20 | 97 | 98 |
| Tuberculosis | 0 | 1 | 0 | 0 | 12 | 6 | 0 | 0 | 1 | 1 | 13 | 8 |
| **Total** | **285** | **297** | **25** | **4** | **406** | **382** | **103** | **59** | **144** | **125** | **963** | **867** |

**Points to note regarding notifications:**

- Ameobiasis, Australian Encephalitis (MVE, Kunjin), Botulism, Brucellosis, Chancroid, Cholera, Congenital Rubella Syndrome, Diphtheria, Hepatitis C (incidence), Hepatitis D, Hepatitis E, HIV infections, Hydatid disease, Leprosy, Listeriosis, Lymphogranuloma Venereum,Typhoid, Yersiniosis, Viral Haemorrhagic Fever, Poliomyelitis and Typhus are all notifiable but had "0" notifications for this period.

- Dengue case was imported.

- Gastroenteritis (unspecified agent) in an institution or in two or more epidemiologically linked cases.

## Profiles and Staff Updates

**Nhulunbuy**
**Gill Campbell**
**Clinical Nurse Consultant - Level 3B**
Gill recently joined the Disease Control team in Nhulunbuy, taking up a new position as the Level 3B Clinical Nurse Consultant. Gill has spent nearly six years in the NT, mainly in the East Arnhem district working as a Community Health nurse and Health Worker educator.

**Alice Springs**
**Rose Gilby**
**AIDS/STD Aboriginal Educator**
Rose is an enrolled nurse form Griffiths, NSW. Prior to commencing the position of female AIDS/STD Aboriginal Educator on July 31st, she was working as a Health Education Officer in Bourke Community Health Centre, NSW. She has a particular interest in women's health.

**Alice Springs**
**Peter Stuart**
**AIDS/STD Aboriginal Educator**
Peter commenced as the male AIDS/STD Aboriginal Educator on July 31st. Prior to this he spent four years as a health worker at Hermannsburg community.

**Hubert Husson**
**Acting Secretary AIDS/STD Unit**
**Darwin**
Hubert is currently filling in for Jean Smith who is on long service leave until January 1996.

**Darwin**
**Jacqui Sutcliffe**
**Acting Publications Officer**
Michelle Atkinson left her position as Publications Officer in August to take up a part-time one in Occupational Therapy. Jacqui Sutcliffe from Medical Records recently joined the Unit and is currently acting in this position.

**Darwin**
**Nan Miller**
**Senior Project Officer**
Nan will be on leave from October 23rd 1995 until March 1st 1996. During her absence, Sue Reid will be overseeing the Hepatitis A and Hepatitis B programs. Please contact Sue on 228089.

**Resignations**

| | |
|---|---|
| Kirsty McNab | Program Manager<br>Alice Springs |
| John Hardwick | Public Health Nurse<br>Tennant Creek |

## Recent Publications available from NT Disease Control

| | |
|---|---|
| Protocols: | Communicable Diseases Surveillance in the Northern Territory: New Guidelines for the Reporting of Notifiable Conditions.<br>Measles Control Measures for Contacts: flow chart<br>Revised Northern Territory Adult Immunisation Schedule (in press) |
| Booklets: | Understanding childhood immunisation - Commonwealth Department of Human Services and Health. |
| Pamphlets: | Pneumococcal Disease (in press)<br>Scabies (in press) |
| Information Sheets: | School entry and immunisation records |
| Other Resources: | Revised Invasive Pneumococcal Disease: wall chart (in press) |