



CENTRE FOR DISEASE CONTROL  
NORTHERN TERRITORY

# THE NORTHERN TERRITORY DISEASE CONTROL BULLETIN



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## Update on the *Aedes aegypti* mosquito eradication campaign in Tennant Creek, NT

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### Introduction

On the 17<sup>th</sup> February 2004, the mosquito species *Aedes aegypti*, a vector for dengue fever, was found in routine mosquito trapping in Tennant Creek. This was the first time since the 1950's that *Ae. aegypti* had been recorded in the Northern Territory (NT). The discovery of *Ae. aegypti* led to a massive survey and eradication program within the town with the aim to remove the mosquito from the NT. These actions involved Medical Entomology Branch (MEB), Environmental Health, Tennant Creek Town Council, Julalikari Council, Anyinginyi Congress, staff from various other sections of the Centre for Disease Control and volunteers.

### Eradication program

The eradication program headed by Peter Whelan and his staff from MEB consisted of several stages. The first stage in February was designed to determine the extent of the mosquito in Tennant Creek through surveying of premises for larvae and via mosquito trapping. This stage also included community education.

A free Hotline number was established for community inquiries. From February to March door to door visits were conducted informing

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residents on breeding site elimination. Insecticide spray cans were handed out to each house holder with instruction on how to apply the spray in their yard.

When it was realised that not all residents were able to efficiently recognise and eliminate breeding sites, a door to door eradication program was implemented from early March to the end of April. Teams from the Health Department and volunteers visited all residential and industrial premises and inspected for breeding sites, collected samples of mosquito larvae and treated the sites. The 2 local pest control companies in Tennant Creek were contracted to treat industrial sites. Side entry pits and storm water drains were treated in collaboration with the Tennant Creek Town Council. The Julalikari Council carried out inspection and treatment in the town camps.

## Results

By late April, 1087 premises had been treated, with the remaining 14 premises to be treated by professional pest control operators. Only 3 premises refused treatment. Larval breeding of *Ae. aegypti* was found on 88 of the premises. Adult specimens of *Ae. aegypti* were collected on 9 trapping nights from 15 locations between February and April 2004. Lethal ovitraps were used for the first time in the NT as a lure and kill method.

## Community health promotion

Within this time the Tennant Creek Town Council conducted a hard rubbish collection to help remove unwanted items such as disused baths, drip trays, empty paint tins and 44 gallon drums that could hold water and therefore be potential breeding sites. Media releases on the radio and in the local paper helped to provide the communities with advice on how to help in the eradication process.

The long Easter weekend (April 9-12), a time when many people would travel to and from Tennant Creek and transport *Ae. aegypti* out of the town to other regions of the NT, or beyond, was of great concern. Therefore, before Easter, posters were installed around the town including in local businesses explaining the importance of not transporting material and receptacles that could have held water (and therefore eggs or larvae) out of town. A large display board was

placed at the local supermarket. A mail drop to each premises, via the post office, was conducted to provide information to increase the communities' understanding of the importance of the eradication of this mosquito.

Currently road signs on entry into Tennant Creek are being organised to alert travellers and locals to the risk of transporting the eggs of the dengue mosquito in receptacles such as tyres or pet drinking bowls.

## Progress

As of the end of April, no *Ae. aegypti* had been found in adult traps. The wet season was considered over and most of the breeding sites had dried up or had been destroyed. During the dry season, monitoring on a fortnightly basis is being conducted by the local Environmental Health Officer using adult traps and several lethal ovitraps throughout the town.

The unexpected May rainfall in Tennant Creek might have caused a hatch of drought resistant eggs still present in town. Advertisements were placed into the local Tennant Creek District Times and community announcements were organised to alert residents to the potential problem of drought resistant eggs hatching due to the recent rain.

It is planned to involve school students to participate in a 'hunt for wrigglers' and 'tip out water holding receptacles' activity.

## Future plans

If no further rainfall occurs, the remainder of the dry season will be used to plan and organise intense eradication measures for the next wet season. It is planned to have established a team based in Tennant Creek in November that is trained to monitor and carry out any eradication as is needed. Renewed education of the community will begin before the next rains to avoid potential breeding sites existing in unused receptacles. It will be important to involve the community of Tennant Creek in the control and eradication of *Ae. aegypti* from the town and the wider NT. Surveys throughout the NT are planned to ensure that the dengue mosquito has not spread out of Tennant Creek or if incursions have occurred in surrounding areas that they are detected and dealt with quickly.

## First record of the mosquito species *Aedes (Aedimorphus) nocturnus* (Theobald) (Diptera: Culicidae) in Australia.

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### Introduction

*Aedes (Aedimorphus) nocturnus* (Theobald) is a mosquito species widely distributed in many islands of Indonesia, the Philippines, New Guinea, the Central Pacific and Hawaii.<sup>1</sup> Although one report of the distribution of *Ae. nocturnus* included Australia, its occurrence in this country had not been authenticated.<sup>1</sup> This paper describes the first confirmed report of *Ae. nocturnus* in Australia.

### Methods

Adult mosquitoes were collected using modified Encephalitis Vector Surveillance (EVS) carbon dioxide-baited traps<sup>2,3</sup> at up to 30 collection sites around Kununurra in northern Western Australia (WA) during the latter part of the 'wet' season (March and April)<sup>4</sup> each year from 1989 (Fig. 1). Mosquitoes were frozen and stored on dry ice until returned to the Arbovirus Surveillance and Research Laboratory at The University of Western Australia (UWA) in

Perth, where they were stored at  $-70^{\circ}\text{C}$ . *Aedes nocturnus* specimens were identified to species using keys to mosquitoes in the Australasian Region,<sup>1,5</sup> and confirmed using descriptions by Belkin.<sup>6</sup>

### Results

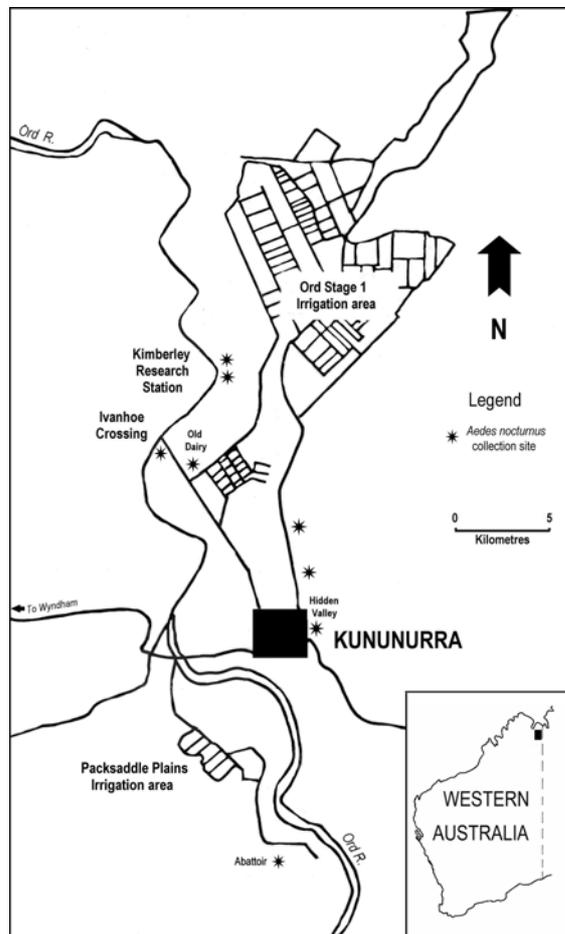
A total of 45 *Ae. nocturnus* adults were collected around Kununurra since it was initially detected in 1996 (Table 1). Low numbers (5,19,5,16) of *Ae. nocturnus* were collected in 1996, 2001, 2002 and 2003 respectively. Overall, *Ae. nocturnus* was a minor component of the mosquito populations, comprising  $<0.1\%$  of the total number of mosquitoes collected each year. Most (84%) were collected at trap sites close to or in the Ord Stage I Irrigation area (Figure 1). The remaining *Ae. nocturnus* were collected in the Packsaddle Plains Irrigation area in April 2001 (4) and in the vicinity of Kununurra townsite (3) in March 2003. In the EVS traps in which *Ae. nocturnus* was collected, the mean number per trap ranged from 3.0 to 6.5.

**Table 1. Abundance of *Aedes (Aedimorphus) nocturnus* collected by EVS<sup>a</sup> dry ice-baited traps at Kununurra, Western Australia, 1996-2003.<sup>b</sup>**

Date of collection	Ord Stage I Irrigation area					Kununurra town					Packsaddle Plains				
	No. traps	Total mosquitoes collected	No. traps with <i>Ae. nocturnus</i>	No. <i>Ae. nocturnus</i> (%) <sup>c</sup>	Mean/Trap <sup>d</sup>	No. traps	Total mosquitoes collected	No. traps with <i>Ae. nocturnus</i>	No. <i>Ae. nocturnus</i> (%)	Mean/trap	No. traps	Total mosquitoes collected	No. traps with <i>Ae. nocturnus</i>	No. <i>Ae. nocturnus</i> (%)	Mean/trap
7, 9, 10, 13 April 1996 <sup>e</sup>	13	5790	1	5 (0.1)	5.0	17	12897	0	0 (0.0)	0.0	8	3988	0	0 (0.0)	0.0
21, 23 March 1997	9	5760	0	0 (0.0)	0.0	9	7543	0	0 (0.0)	0.0	5	3308	0	0 (0.0)	0.0
21, 23 March 1998	9	4249	0	0 (0.0)	0.0	9	3845	0	0 (0.0)	0.0	6	3163	0	0 (0.0)	0.0
3, 6 April 1999	14	11735	0	0 (0.0)	0.0	10	11488	0	0 (0.0)	0.0	5	10492	0	0 (0.0)	0.0
25, 26, 27 March 2000	14	20003	0	0 (0.0)	0.0	11	11556	0	0 (0.0)	0.0	3	3374	0	0 (0.0)	0.0
2, 4, 6 April 2001	15	28181	3	15 (0.1)	5.0	13	16113	0	0 (0.0)	0.0	5	9762	1	4 (<0.1)	4.0
30 March, 1 April 2002	14	7111	2	5 (0.1)	2.5	11	5147	0	0 (0.0)	0.0	5	1730	0	0 (0.0)	0.0
17, 18, 20 March 2003	18	29870	2	13 (<0.1)	6.5	11	14160	1	3 (<0.1)	3.0	5	5468	0	0 (0.0)	0.0
Total	106	112699	8	38 (<0.1)	4.8	91	82749	1	3 (<0.1)	3.0	42	41285	1	4 (<0.1)	4.0

<sup>a</sup>Encephalitis vector surveillance traps. <sup>b</sup>In traps where  $>500$  mosquitoes were collected, a subsample of approximately 500 mosquitoes was identified to species and the species composition of the remainder of the sample was estimated by weight and extrapolation. <sup>c</sup>Percentage of total no. of mosquitoes collected in all traps. <sup>d</sup>Mean no. of *Ae. nocturnus* in traps in which it was collected. <sup>e</sup>Initially misidentified as *Ochlerotatus phaecasiatus* Marks.

**Figure 1. Locations where *Aedes nocturnus* was collected around Kununurra in northern Western Australia between 1996 and 2003.**



## Discussion

The first *Ae. nocturnus* specimens were collected in the Ord Stage I Irrigation area during the wet season of 1996, even though regular wet season collections had been undertaken since 1989 and there have been irregular collections in the area since 1972. One explanation for the new record is that the species may be a recent arrival to the area.

*Aedes nocturnus* superficially closely resembles the major pest saltmarsh species *Ochlerotatus vigilax* (Skuse) that is occasionally detected in the area, and the original specimens were misidentified as the less common *Ochlerotatus phaecasiatus* (Marks) that is also very similar to *Oc. vigilax*.<sup>5</sup> *Aedes nocturnus* was not collected again until 2001, however it has since been collected in EVS traps in the late wet season around Kununurra each year. Given that both

*Oc. vigilax* and *Ae. nocturnus* have been collected in the Kununurra environs, the possibility exists that specimens of *Ae. nocturnus* may have been confused with *Oc. vigilax* in collections prior to 1996.

In other countries, *Ae. nocturnus* larvae are predominately found breeding in shallow, temporary pools, marshes, road-side ditches and grassy pools,<sup>1</sup> so it is not surprising that the majority of adult *Ae. nocturnus* were collected in the vicinity of the irrigated areas of Kununurra where there is extensive breeding habitat suitable for *Ae. nocturnus*. Additionally, it appears that the distribution of *Ae. nocturnus* may be increasing in the locality, as evidenced by the collection of specimens from the Packsaddle Plains Irrigation area in April 2001, and from the eastern edge of the Kununurra townsite in March 2003 (Figure 1).

Large populations of adult *Ae. nocturnus* have been reported following heavy rain in Fiji and the populations are usually short-lived.<sup>1</sup> The low numbers of *Ae. nocturnus* collected in EVS traps during mosquito collection trips around Kununurra may be attributed to the fact that the annual collection trips were timed to occur during the latter part of the wet season, several weeks after the last heavy rains,<sup>4</sup> and may have been too late for *Ae. nocturnus*. It is notable that large numbers of adult *Ae. nocturnus* were collected during the 2003 dry season in Kununurra, and one pupa collected in the area at the same time was reared through to an adult specimen of *Ae. nocturnus* (A. Jardine, UWA, 2003, personal communication). This finding, coupled with the observation that *Ae. nocturnus* has been collected in EVS traps each year at Kununurra since 2001, provides circumstantial evidence that it has become established in the area.

The mechanism by which *Ae. nocturnus* was introduced into the northeast Kimberley region is unknown, but the apparent absence of *Ae. nocturnus* in collections prior to 1996 suggests that it was first introduced around this time. The introduction of *Ae. nocturnus* into Hawaii has been linked to movement of airplanes.<sup>1</sup> Similarly the introduction of *Culex gelidus* Theobald, a confirmed vector of Japanese encephalitis virus (JEV), to southeast Queensland<sup>7</sup> is thought to be aircraft related. The nearest international airport

is located at Darwin in the Northern Territory (NT), approximately 500 km northeast of Kununurra, and thus is an unlikely point of entry for *Ae. nocturnus* to northern WA. However, Kununurra is occasionally used by light aircraft arriving from Timor and other close overseas islands (G. Tucker, Australian Quarantine Inspection Service, personal communication), and it is possible that *Ae. nocturnus* may have been introduced via these aircraft. It is of interest that *Ae. nocturnus* has never been collected at Wyndham, approximately 100 km West of Kununurra, where the nearest shipping port is located. As an alternative explanation, the introduction of JEV into northern Queensland has been linked to the carriage of infected mosquitoes by cyclonic winds,<sup>8</sup> and it is also possible that *Ae. nocturnus* was introduced into the northeast Kimberley from islands of the Indonesian archipelago during similar meteorological events.

The role of the large irrigation area and associated infrastructure around Kununurra in facilitating establishment of *Ae. nocturnus* in the region is not clear. However, it is of note that *Ae. nocturnus* has not been collected during similar surveillance of mosquito fauna at numerous other towns and communities across the Kimberley, where no irrigation infrastructure exists. Similarly, an examination of mosquito reference specimens collected from many localities in the NT over many years, including the locality of Port Keats (close to the WA/NT border) has failed to find any evidence of *Ae. nocturnus* in the NT.

The encephalitogenic flavivirus JEV has been isolated from this species in Taiwan,<sup>9</sup> and *Ae. nocturnus* readily takes bloodmeals from humans.<sup>10</sup> These associations are cause for concern, given that the flaviviruses Murray Valley encephalitis virus and Kunjin virus are enzootic in the Kimberley region of WA.<sup>11</sup> Accordingly, the vector competence of *Ae. nocturnus* for these viruses needs to be investigated for public health reasons. This species is also recorded as an annoying biter and an important human pest species capable of entering houses.<sup>1</sup> If this species spreads, it would add a new dimension to the range of human pest species across northern Australia. Thus the activity and distribution of this species must continue to be monitored in both the north west of WA and in the Northern Territory.

## Acknowledgements

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## **Malaria Protocol. Guidelines For Health Professionals in the Northern Territory — 4th ed June 2004**

This document outlines some selected and unique aspects of malaria surveillance and control in the Northern Territory (NT). It describes the intensive measures that are essential if we are to prevent the re-establishment of malaria in the NT.

The malaria section in the *Therapeutic Guidelines Antibiotic. Version 12, 2003* was written from the NT and included 2 new antimalarial treatments for *P. falciparum* malaria - malarone (atovaquone/proguanil) and coartemether (artemether/lumefantrine (trade name Riamet)). After a year's experience with these treatments the order of choice of therapy in these new NT Guidelines (2004) reflects a move towards using these newer therapies as first line treatment in specific circumstances.

The malaria control program in the NT is a responsibility shared among general practitioners, hospitals, laboratories, medical entomology, community care/health centres, diseases control units, and the general community.

### **Introduction**

The NT has a comprehensive malaria surveillance and control program that includes:

- a. advice on prophylaxis for travel overseas via e.g. Health Services Australia (HSA) Travel Doctor and certain General Practitioners;
- b. early detection and hospitalisation of cases;
- c. correct treatment of cases;
- d. follow up of cases after discharge from hospital;
- e. assessment of all cases to establish appropriate entomological investigation;
- f. investigation and radical treatment/cure for high risk groups, for example migrants, refugees and co-travellers of cases who have malaria.

Malaria is caused by the blood parasite *Plasmodium*. There are 4 species: *P. falciparum*, *P. vivax*, *P. ovale*, and *P. malariae*.

The parasite is transmitted to humans by the bite of an infected mosquito. The female mosquitoes of the genus *Anopheles* are the only mosquitoes that can transmit malaria. The malarious areas across the world include:

- Africa, Middle East, Asia, China, South East Asia including Indonesia, East Timor, Papua New Guinea, the Western Pacific Islands, and Central and South America.

### **Risks of Re-Establishing Endemic Malaria in the Northern Territory**

The World Health Organization (WHO) certified the eradication of malaria from Australia in 1981, but Northern Australia still remains susceptible to the re-establishment of the disease.

The receptive area is considered to be north of the 19th parallel which is a line just north of Townsville in Queensland and just south of Broome in Western Australia. The area includes the northern third of the NT, (north of Tennant Creek) with:

- a. a history of endemic malaria until 1962;
- b. widespread breeding of the *Anopheles* mosquito;
- c. breeding of *Anopheles* mosquitoes in urban areas;
- d. regular tourist traffic from malarious countries, particularly Indonesia, East Timor and Papua New Guinea.

The number of imported cases of malaria has been increasing over the last decade as a result of increasing travel and the deterioration of malaria control in many countries.

The re-establishment of malaria in the NT, and particularly the introduction of chloroquine resistant *P. falciparum* could result in extensive morbidity and mortality in our population.

## Prevention

With increasing travel of Territorians to endemic malaria areas, including Aboriginal Australians travelling and returning to highly malaria receptive remote areas of the Top End, health professionals need to have expert and current travel medicine advice. Such expert advice on malaria prevention and prophylaxis can be gained through travel medicine clinics, the WHO (<http://www.who.int/ith/countrylist01.html>) or CDC Atlanta Guidelines (<http://www.cdc.gov/travel/>). Advice is also included in *Therapeutic Guidelines Antibiotic, Version 12, 2003*.

## Diagnosis

Malaria is diagnosed by detection of the parasite through microscopy of thick and thin blood films. As identification of malaria parasites is not a common laboratory event in Australia, the Haematology Laboratory at the Royal Darwin Hospital (RDH) and the Institute of Medical and Veterinary Science (IMVS) provide a service for confirmation of malarial parasites and species identification for all public and private laboratories servicing the NT. Malaria is a legislated notifiable disease in the NT.

Any traveller who has returned from a malarious region in the past 2 years and who has a fever or history of fever should undergo testing. The decision to have blood films taken should not be influenced by compliance with prophylaxis regimens as it is possible to be infected with malarial parasites and develop malaria even when anti-malarials have been correctly taken. The absence of parasites on a blood slide does not exclude malaria, particularly if a person has recently taken anti-malarials or antibiotics. If negative, a blood slide should be repeated 6-24 hours later and at least daily thereafter if fever persists.

## Management of Malaria

### *Principles of management*

Because of the public health ramifications of malaria and the complexity of the parasite's lifecycle, the principles of treatment are to cure the individual and prevent relapses but also include reducing and eliminating transmission.

The aims of treatment are as follows:

- a. Eradication of the malaria parasites with specific antimalarial medication.
- b. Eradication of the sexual forms (gametocytes) with a specific gametocidal drug (primaquine) to prevent transmission of the parasite to mosquitoes.
- c. Eradication of the dormant liver forms (hypnozoites) of *P. vivax* and *P. ovale* with a 2-week course of primaquine.
- d. Prevention of transmission to local mosquitoes by physically separating the parasitised patient from the mosquito environment until no longer able to transmit the parasite.

A detailed history must be obtained from every patient (see Appendix 1) including an itinerary of overseas travel and movement following their return to Australia. The history will help in assessing the risk of parasite drug resistance, inform further entomological assessment and allow for identification of co-travellers.

### *Place of treatment*

- All cases of *P. falciparum* malaria and any malaria cases where the species cannot be confirmed within 24 hours require admission to hospital.
  - This is standard practice within Australia and is considered best practice to prevent life threatening complications of *P. falciparum*.
  - It is also important to avoid any risk of transmission of the parasite to the mosquito vectors that are present in the Top End of the NT.
  - Patients are nursed in an air-conditioned ward, and must not leave the ward between 6pm and 8am.
- Confirmed *P. vivax*, *P. ovale* or *P. malariae* no longer require admission to hospital provided:
  - a. there is no evidence of co-infection with *P. falciparum* malaria.
  - b. the species diagnosed on microscopy can be confirmed by the haematology laboratory at RDH (within 24 hours) if needed.



- c. the patient agrees to remain indoors in screened or air conditioned accommodation between dusk and dawn until chloroquine therapy is completed.
- d. the patient is notified to CDC so that CDC officers can ascertain that patients treated as outpatients do not pose a public health risk. A phone message may be left with CDC after hours.
- e. the case has been discussed with an infectious diseases (ID) physician at RDH (available 24 hours per day) to check:
  - the above points a. to d.
  - clinical condition
  - follow-up arrangements
  - spleen size and offer advice about sporting restrictions
  - hypnozoite eradication treatment with primaquine

### **Initial management**

Malaria should be treated according to the algorithms in this protocol (pp 12, 13). The order of drug preference is different here in the Territory but the drug doses are the same as those stated in *Therapeutic Guidelines Antibiotic, Version 12, 2003*. Infections caused by *P. falciparum* can be fatal, particularly if the diagnosis and treatment is delayed. The World Health Organisation has a handbook on the management of severe malaria (<http://mosquito.who.int/docs/hbsm.pdf>). Intensive care units have protocols for the management of severe malaria.

All patients should have a G6PD screen to exclude G6PD deficiency before primaquine therapy. Side effects and compliance with the 14-day course is reviewed at ID outpatient clinic one week after starting treatment.

### **Discharge**

Patients with *P. falciparum* can be discharged from hospital when:

1. (i) the oral course of anti-malarial medication is being tolerated  
**OR**

(ii) the mefloquine regimen has been completed

**AND**

2. at least one blood slide has been negative;

**AND**

3. they feel well and are afebrile for 24 hours.

For cases of *P. falciparum* a stat gametocidal dose of 45 mg (adults) primaquine is given at discharge if G6PD activity is normal. There is no need for this if the patient has had treatment with artemether/lumefantrine (Riamet) and no gametocytes are seen. The discharge algorithm is on p. 13.

### **Followup**

One week after discharge from hospital, patients treated for *P. falciparum* should be reviewed, a blood slide taken for malaria parasites and radical treatment with primaquine for 14 days should be considered to eradicate any possible co-infection with *P. vivax* or *P. ovale* hypnozoites.

To prevent relapses all patients with *P. vivax* or *P. ovale* malaria, residing in the malaria receptive area of northern Australia are recommended to have the 14 day course of primaquine. If there are difficulties obtaining primaquine the infectious diseases registrar or physician at the RDH can assist with organising a supply through the hospital pharmacy.

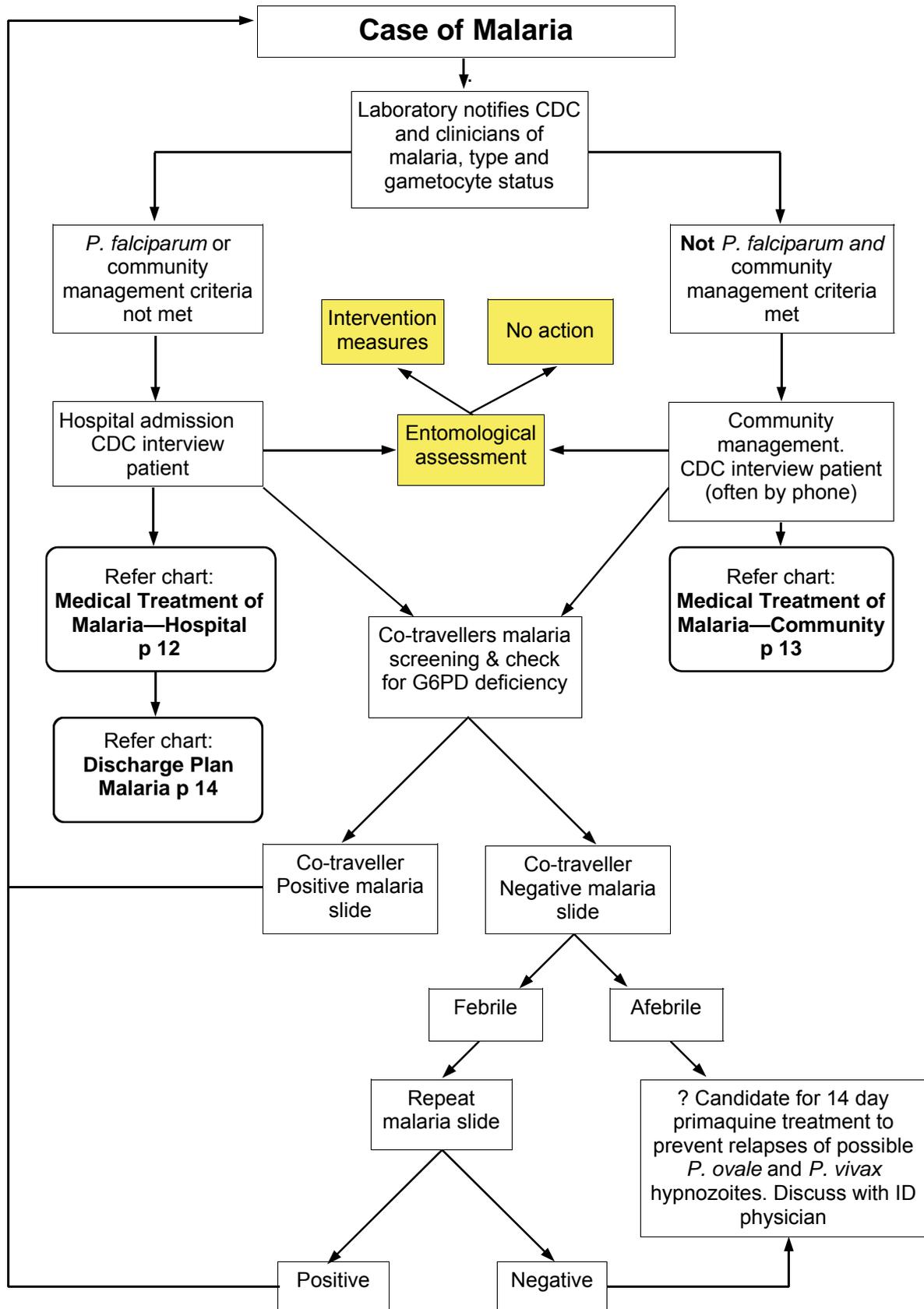
### **Relapse**

Malaria may relapse or recrudescence if the full course of treatment is not completed. All *P. falciparum* patients with recurrence of symptoms within 2 months of treatment should attend for urgent medical review.

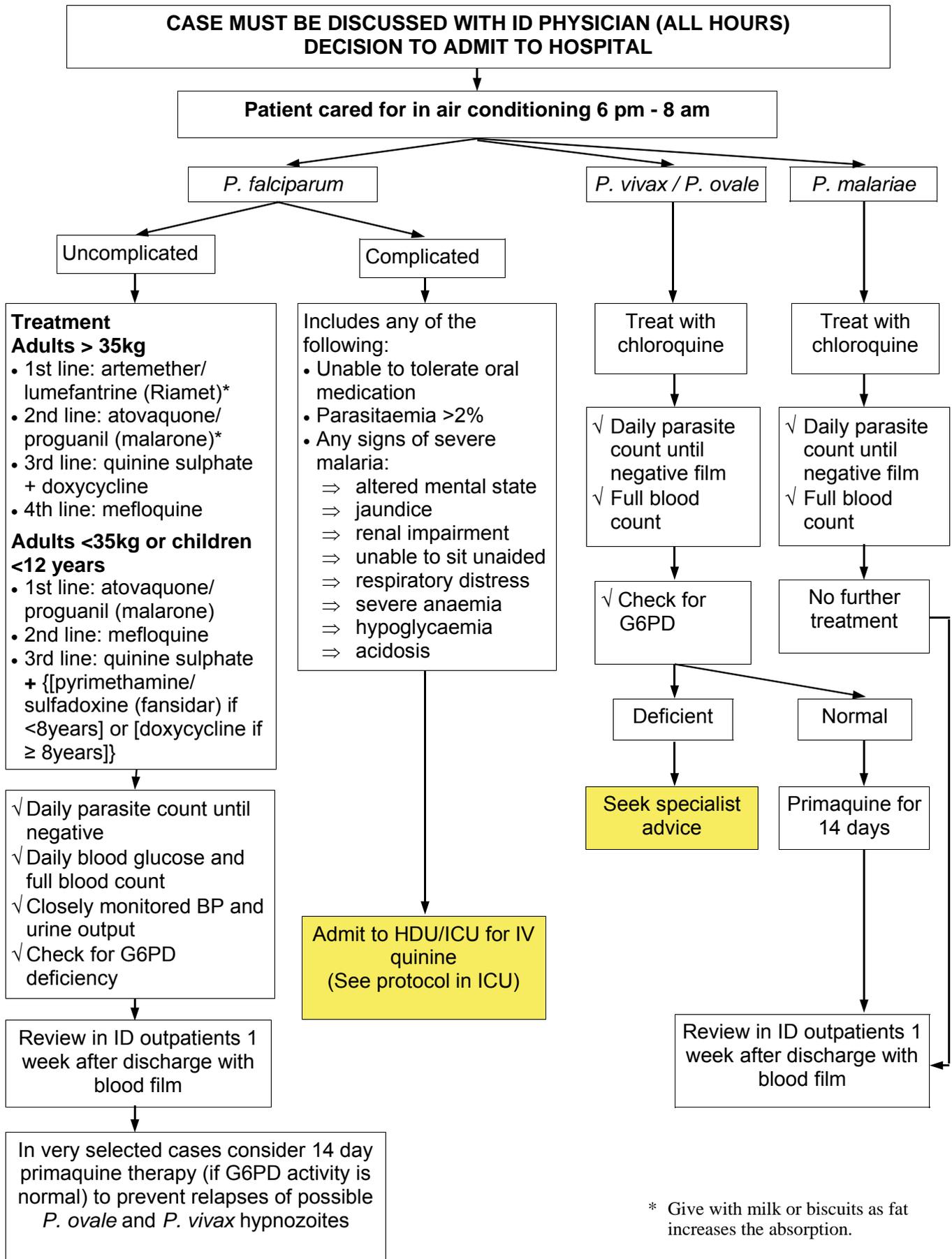
### **Screening of High Risk Groups**

Protocols have been developed for screening for malaria parasites in high risk groups on entry to the NT. Such groups include students from high-risk areas such as Papua New Guinea and the Solomon Islands, boat people and refugees. Contact Project/Research Officer NT CDC for further information 89228089.

## Management of Malaria

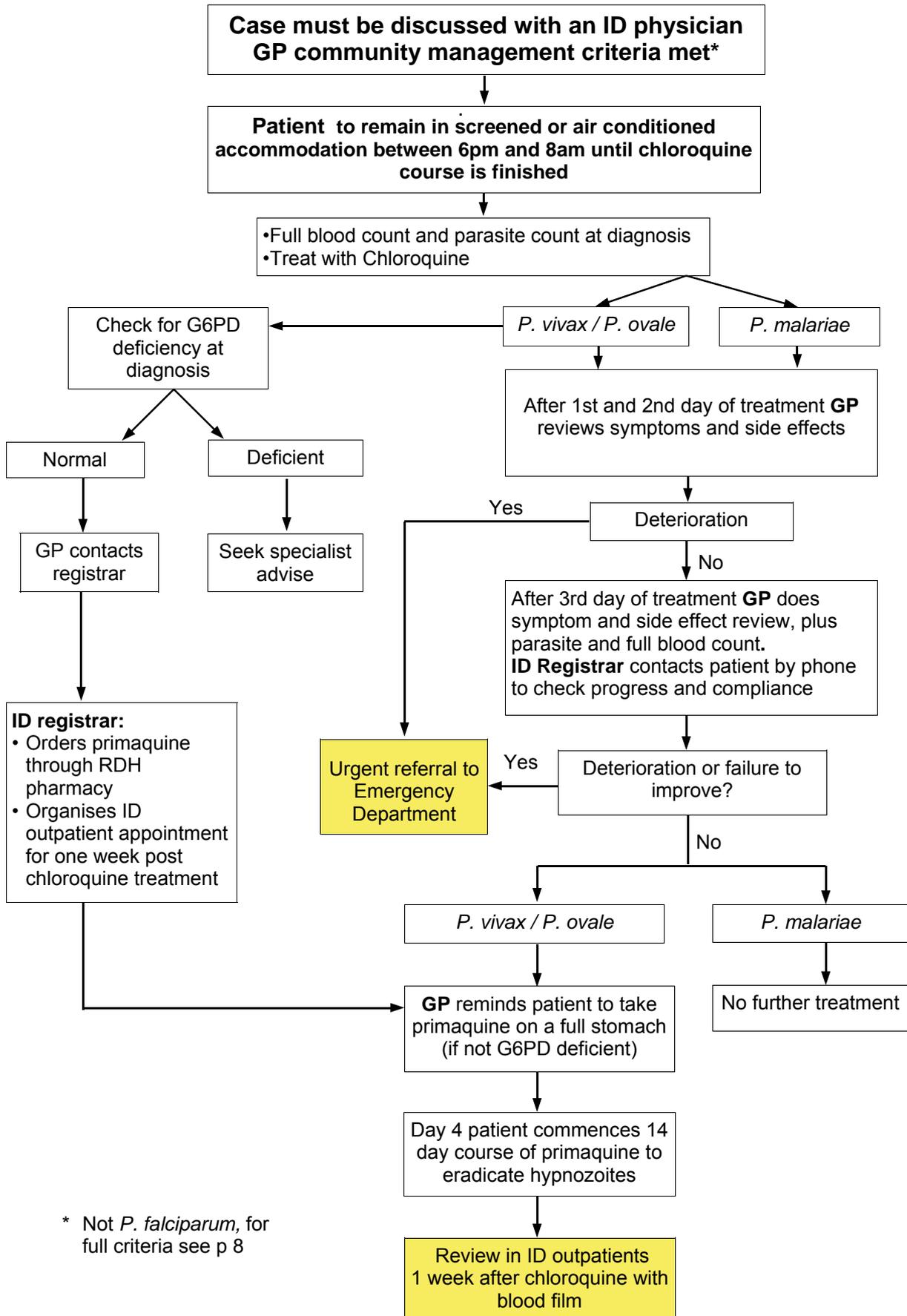


**Medical Treatment of Malaria—HOSPITAL**

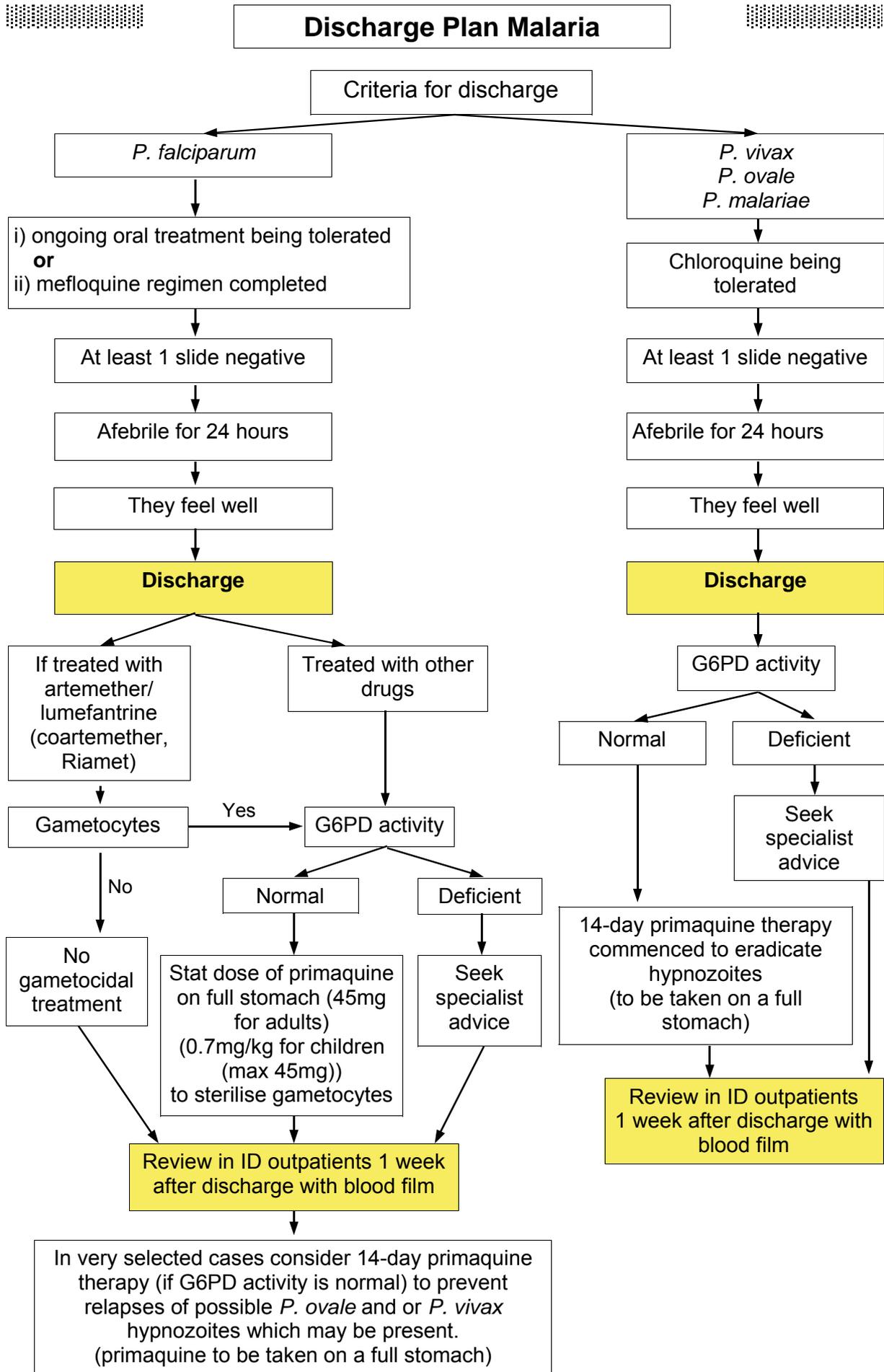


\* Give with milk or biscuits as fat increases the absorption.

**Medical treatment of Malaria—COMMUNITY**



\* Not *P. falciparum*, for full criteria see p 8



## Management of Co-Travellers

All co-travellers should be tested for malaria through the NT Centre for Disease Control (CDC). This is arranged by CDC staff when the patient is interviewed.

The pathology request form should include the name of the index case with malaria, and whether the co-traveller has any symptoms suggestive of malaria. Co-travellers with positive smears are treated accordingly, and those with negative smears may in some cases be offered treatment with chloroquine followed by 14 days of radical treatment with primaquine (see below).

## Radical Treatment/Cure for Persons at Risk

The aim of radical treatment is to eradicate the hidden liver phase of *P. vivax* or *P. ovale* which can lead to relapses of malaria after months or years.

Although radical treatment is not routinely offered to all people arriving from malarious areas it is **strongly recommended** for:

- a. migrants and refugees
- b. staff from missionary, aid organisations and expatriate workers

and **recommended** for:

- co-travellers of a case of malaria (particularly from high risk areas such as PNG and parts of Indonesia including Timor, Lombok and surrounding islands); they may include family, school, sporting and tour groups.

Radical treatment consists of:

- treatment with primaquine to eliminate parasites of *P. vivax* and *P. ovale* which may persist in the liver for several years and cause a relapse. Treatment is given for 14 days (refer to *Therapeutic Guidelines Antibiotic. Version 12, 2003*).

Blood tests to exclude parasitaemia and G6PD deficiency should be performed before starting radical treatment (1-2 mL blood in an EDTA tube). If parasitaemia is present the person must be treated accordingly. If the person has G6PD deficiency primaquine should be withheld and further management should be discussed with a specialist physician.

Treatment must be reviewed both to ensure compliance and to assess any side effects (eg haemolysis, methaemoglobinaemia, nausea, vomiting, anorexia, dizziness, epigastric distress and abdominal pains or cramps). Treatment must be taken with food to avoid gastrointestinal side effects.

Patients will be given an information sheet outlining the possible side effects from primaquine (Table 1). They will be reviewed in ID outpatients clinic one week after starting primaquine.

## Role of the Centre for Disease Control and the Medical Entomology Branch

As part of their obligations under the Notifiable Diseases Act laboratories notify CDC whenever a case of malaria is diagnosed. A staff member from CDC will interview the malaria patient as soon as possible and complete the questionnaire (Appendix 1). The Medical Entomology Branch (MEB) should then be notified and will assess the need for further action. Of particular concern are cases with gametocytes in their blood, as gametocytes are the form of malaria parasite infective for mosquitoes.

Assessment by MEB includes:

- risk of probable patient-vector contact and therefore of possible transmission to mosquitoes.

Action that may be recommended if there is a possibility of local transmission may include:

- a. fogging operations around the immediate residential area or the nearest mosquito breeding or harbouring area;
- b. limited surveillance for malaria in the malaria warning pamphlet being distributed to nearby residents;
- c. doctors and Community Care/Health Centres in the area being advised to be on alert for patients with unexplained fevers or other suggestive symptoms.

The surveillance report which has been completed by a staff member from CDC is sent to the MEB and filed at CDC.

A Territory wide register of all confirmed malaria cases is maintained at CDC, Darwin.

**Table 1. Primaquine patient information**

Primaquine is given after the chloroquine course is completed to eradicate the liver forms of *P. vivax* or *P. ovale* which can lead to relapse of malaria after months or years.

The eradication course of primaquine is given daily for 14 days and should be taken with food to prevent gastrointestinal side effects.

In case of any darkening of the urine you should stop the primaquine and contact your doctor immediately.

Common side effects	Uncommon side effects	Rare side effects
Abdominal pain	Haemolytic anaemia (in persons with G6PD deficiency)	Cardiac arrhythmias
Nausea and vomiting (when taken on an empty stomach)	Methaemoglobinaemia	Hypertension
		Anaemia
		Leucopenia
		Agranulocytosis

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## APPENDIX 1

## Northern Territory Malaria Surveillance Case Questionnaire

(All questions to be completed for each case or episode of disease)

Surname: _____	First Name: _____
Other Names: _____	DOB: ____/____/____
HRN: _____	Age: _____
Indigenous Status: _____	Sex: M / F
Address (Street/No) _____	Suburb/Location _____
District: notifying Darwin/Kath/EAR/Barkly/Alice	
Place Infected: _____	
True onset date: ____/____/____	Notification date: ____/____/____
Malaria Species: (Circle all species identified) vivax / falciparum / malariae / ovale / unknown	
Imported case: Y / N	Hospitalised: Y / N
Died: Y / N	Date of Death: ____/____/____
Doctor: _____	
Laboratory: _____	Specimen date: ____/____/____

### Enhanced Data

Nationality _____			
Arrival Date in Australia ____/____/____			
Case Code: (please circle)	Imported case / Relapsed case / Acquired in Australia (from an imported case) / Acquired in Australia (not from imported case) / Induced (ie blood tx) / Unknown		
<b>Overseas travel history*</b>			
Country of travel*	Region	Entry date	Departure date
*If Indonesia, Timor or PNG indicate region			
Case found By Screening: Y / N / Unknown	If Yes Reason for screen <sup>†</sup> _____		
<sup>†</sup> 1. Illegal immigrant, 2 Refugee, 3 Co-traveller of case, 4 Visiting student, 5 Contact tracing, 6. Other, 7. Unknown			
Military Status (Please circle)	Military / Civilian / Unknown		
If Military (please circle)	Australian Military	International Military	

**Prophylaxis**

Prophylaxis used: Y / N Type of prophylaxis: \_\_\_\_\_

Compliance: (circle below)

Good      Missed 1 or more doses      No prescribed doses taken      Nil prescribed      Unknown

Hospital admission date \_\_\_\_/\_\_\_\_/\_\_\_\_      Discharge date \_\_\_\_/\_\_\_\_/\_\_\_\_

Treatment      Date of first treatment: \_\_\_\_/\_\_\_\_/\_\_\_\_

Treatment Prescription \_\_\_\_\_

If not admitted to hospital was client contacted 14 days after commencing treatment to check treatment compliance? Y / N

Was eradication treatment (primaquine) used?: Y / N No of days given: \_\_\_\_\_ G6PD Y / N

Was there infection with more than one species of malaria during this episode? Y / N

Previous malaria diagnosed in the NT: Y / N      Date: \_\_\_\_/\_\_\_\_/\_\_\_\_

Outcome<sup>‡</sup>:      S - Survived      DM - Died of malaria      DO - Died from another cause      U - Unknown

<sup>‡</sup> Outcome at discharge from hospital, or if not admitted at the time of followup

(Please tick all species detected if a mixed infection)	vivax	falciparum	malariae	ovale	unknown
Malaria Species					
Gametocytes detected (Y/N)					

**Location history from first fever\***

Start date	End date	Visiting/ Resident	Street name and no.	Suburb	Town/Location	Mosquito bites (Y/N/UK)	No of bites (few or many)	Time of bites (day/ after dark)

\*Complete all details for each location, record all places visited after dark not only residential addresses

Has this person been made aware of the possible need for entomological access to place of residence? Y / N

Contact phone no. for property access: \_\_\_\_\_

Interviewer: \_\_\_\_\_      Date: \_\_\_\_/\_\_\_\_/\_\_\_\_

Entomology notified: \_\_\_\_/\_\_\_\_/\_\_\_\_

## Personal protection from mosquitoes & biting midges in the NT

This useful paper by Peter Whelan, Medical Entomologist, Centre for Disease Control, Department of Health and Community Services was updated in April 2004. It can be downloaded in its entirety from:

[http://www.nt.gov.au/health/cdc/fact\\_sheets/medical\\_entom\\_personal\\_protect.pdf](http://www.nt.gov.au/health/cdc/fact_sheets/medical_entom_personal_protect.pdf)

Extensive information on protection from mosquitoes and biting midges is provided covering the following areas:

- Avoidance
- Screening

- Mosquito nets
- Insect proof clothing
- Repellants
- Animal and Lighting diversion
- Adult insect control
- Insectocutors and insect traps
- Treatment of bites
- Emergency biting insect protection

The emergency protection includes climbing trees and if all else fails, as a last resort keep running! Somehow, it sounds easier to apply the repellent.

\*\*\*\*\*

## Federal Government moves to reduce dengue fever threat - 1 million for dengue mosquito crackdown

The Australian Federal Government has agreed to spend \$1 million to reduce the threat of dengue fever in the Northern Territory (NT).

This funding contribution comes in response to the establishment of dengue transmitting mosquitoes found in Tennant Creek this year (see p 1-2).

Mosquitoes that carry the dengue virus were discovered in Tennant Creek in February, prompting a major operation by the Health Department.

There were no cases of dengue fever in the town.

The NT Health Minister, Peter Toyne, announced on 25 June 2004 that the Commonwealth has agreed to putting \$1 million towards an eradication program in recognition of the consequences if dengue were to spread across northern Australia.

The second stage of the campaign against the dengue mosquito will help to eradicate the

danger in the Tennant Creek area and prevent it from spreading elsewhere.

This will involve a major elimination program in the lead-up to the rainy season which will include:

- house to house inspections of all 1100 properties for larvae,
- adult mosquito trapping and setting lethal egg traps,
- insecticide treatment and possible elimination of dengue mosquito breeding sites,
- limited fogging to control adult mosquitoes,
- treatment of rainwater tanks,
- public relations and clean-up operations,
- continued recording and evaluation using specialised trapping techniques,
- repeated survey and treatment of premises and
- mosquito activity surveillance right across the Territory (see Future plans p 2).

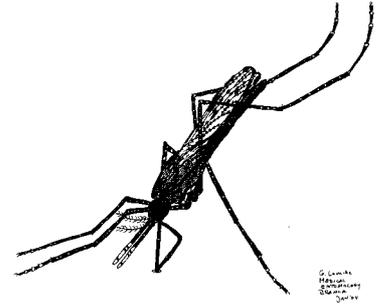
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## FACT SHEET



MEDICAL ENTOMOLOGY

# MALARIA



### What is Malaria?

Malaria is a parasitic disease transmitted by *Anopheles* mosquitoes. There are 4 types of parasites that cause malaria: *Plasmodium ovale*, *P. malariae*, *P. vivax*, and *P. falciparum*. The last 2 are the most common.

Primarily, malaria is an infection of the red blood cells, causing recurring fever of sudden onset. Malaria caused by *P. falciparum* is life threatening and can cause multiple organ damage, coma and death.

### How is it spread?

Malaria is spread by female *Anopheles* mosquitoes. The parasite enters the body in mosquito saliva when a person is bitten by an infected mosquito. The parasite first infects the liver where it begins to multiply. After some days, the resulting parasites are released into the blood stream to infect the red blood cells, where they continue to multiply, eventually bursting the red blood cells and further infecting others. If they reach high numbers they may cause severe disease or even death. Some of the parasites in the red blood cells develop into the sexual stages (gametocytes). If these stages are ingested when a mosquito bites an infected person, they develop in the gut of the mosquito for 10 –14 days, and then enter the salivary glands, ready for the next bite.

### Where is it found?

Malaria is found throughout the tropical and subtropical regions of the world. Areas of high transmission are found predominantly in rural areas in South America (e.g. Brazil), south-east Asia (e.g. Thailand, Indonesia and East Timor), Western Pacific (Papua New Guinea, Solomon Islands and Vanuatu) and throughout sub-Saharan Africa.

The last case of locally acquired malaria in the Northern Territory was in 1962 and Australia was declared free of malaria by the World Health Organisation (WHO) in 1981. However, a number of species of *Anopheles* mosquitoes exist in the NT and the malaria parasite could be re-introduced into local mosquitoes if infected travellers from overseas are bitten here. The disease could become established anywhere in the Top End, down to a latitude of 19 degrees which is just north of Tennant Creek.

### What are the symptoms?

Symptoms appear about 9-14 days after a bite from an infected mosquito, and coincide with the rupture of the red blood cells. Symptoms are often delayed in people who have lived in malarious areas and who may have developed some immunity.

Typically malaria produces fever, rigors (shakes), sweating, headache, vomiting and other flu-like symptoms. Sometimes there is a 2 or 3 day period of reduced symptoms before a recurrence on the third or fourth day. Untreated, infection can progress rapidly and become life threatening. Malaria can kill by destruction of red blood cells (anaemia) and by altering the function of vital organs such as the brain, (cerebral malaria) lungs or kidneys.

### Why does malaria relapse?

*P. vivax* and *P. ovale* exist as dormant forms that remain in the liver for months or years before producing the disease.

With *P. falciparum*, the disease can reoccur after apparent recovery, due to either inadequate treatment or infection with a drug resistant strain. *P. malariae* can rarely persist with very low levels of parasite in the peripheral blood for decades.

### How is it diagnosed?

Malaria is diagnosed by a blood test. The blood is examined under a microscope looking for malaria parasites inside the red blood cells. All travellers from malarious areas who become ill or develop a fever should be tested.

### What is the treatment?

All cases of *P. falciparum* malaria in the NT are admitted to hospital because this form of malaria can rapidly become life threatening. Cases of malaria other than *P. falciparum* can sometimes be treated at home if the house is adequately screened and if the patient agrees to stay indoors between dusk and dawn. This is to avoid any risk of transmission of the parasite to the local *Anopheles* mosquitoes.

Treatment must be given in consultation with specialist physicians.

### Before travelling overseas

Check whether the countries to which you are travelling are affected by malaria by contacting your GP, Travel Health Clinic or referring to the internet:

WHO International Travel and Health website:  
<http://www.who.int/ith/index.html>

Or the Centers for Disease Control and Prevention:  
<http://www.cdc.gov/travel/diseases.htm#malaria>

If you are travelling to an affected country you will often need preventative medication. Contact your GP or Travel Clinic to organise anti-malarial medication for your trip. Some medication must be started 1 week prior to entry to the affected area.

### How to protect yourself from mosquito bites

While in affected areas there are measures which should be taken to reduce the risk of mosquito bites.

- Avoid being outdoors between dusk and dawn to avoid mosquito bites, particularly in poorly lit areas, rural areas, or the outskirts of large towns.

- Cover your body (especially arms, legs and feet) between dusk and dawn. Loose, light coloured clothing is best.
- Apply insect repellent to exposed skin at risk times; choose one containing either DEET or picaradin.
- Avoid scents on the body, e.g. perfume, deodorants, and sweat, since these can attract mosquitoes.
- If accommodation is not well screened, sleep inside mosquito netting. Use insecticide impregnated bed nets and clothing in high risk areas.
- Use mosquito coils or insecticide vaporisers in enclosed areas.

### If you return from a malarious area and develop symptoms

If you develop symptoms of malaria within 2 years of visiting a malarious area contact your GP or hospital emergency department immediately for an urgent medical assessment. Remember to inform the medical officer of where you have travelled as this will help determine your risk of malaria and the type of treatment required.

If you have malaria, the people you have travelled with (particularly to high risk areas such as Africa, PNG, East Timor and parts of Indonesia including Flores, Lombok and surrounding islands) should also be tested.

### For more information contact your nearest CDC or Medical Entomology Branch.

Medical Entomology 89228548  
 CDC Darwin 89228044  
 CDC Katherine 89739049  
 CDC Nhulunbuy 89870359  
 CDC Tennant Creek 89624259  
 CDC Alice Springs 89517549

Further fact sheets and treatment protocols are available at: <http://www.nt.gov.au/health/cdc>

## **An update on the hepatitis C landscape in the NT**

*Maggi Richardson & Deidre Ballinger, AIDS/STD Program, CDC Darwin*

### **Introduction**

Following its identification in 1989 as the primary cause of non A and non B viral hepatitis, hepatitis C (HCV) has become the most notified disease in Australia.<sup>1</sup> An estimated 90% of new infections occur among people who inject drugs.<sup>2</sup> There is no vaccine, and exposure does not protect against reinfection from any of the known genotypes of this complex virus.<sup>3</sup> Therefore, initiatives to control the spread of the infection lie with raising awareness among those groups at most risk.

The first Australian National Hepatitis C Strategy 1999-2000 to 2003-04, was developed with the aim of reducing transmission of HCV in Australia and minimising the personal and social impacts of HCV infection. An independent review of the Strategy found that it achieved 2 important goals. It established a good foundation for action with the development of a partnership model between people affected by HCV virus and service providers, and it has contributed to an increased awareness of HCV as a serious public health problem. The Strategy and existing public health initiatives have not however managed to bring the Australian HCV epidemic under control.<sup>4,5</sup> At this critical time when HCV infections are increasing a second national strategy is being developed in broad consultation with the community, health care, research and scientific sectors and all levels of government.

The Northern Territory (NT) has monitored HCV infections since 1991, however until committed Commonwealth funding became available in 1999-2000 public health action was confined to a limited number of needle and syringe programs (NSP). The evolution of the NT AIDS Council to the NT AIDS and Hepatitis Council (NTAHC) in 2003 is an example of how community based organisations are now much better placed to address issues around HCV prevention and provide a voice for HCV positive people in the community. While access to counselling and support services has improved and links between clinical and support services forged, specialist treatment services remain in the private sector however with bulk billing access.

### **HCV Surveillance in the NT**

HCV is a laboratory notifiable disease in the NT meaning that the testing laboratory is required to forward copies of all positive serology results directly to the Centre for Disease Control (CDC) in each district. Currently there is no differentiation made between acute or chronic infection and all notifications of HCV are recorded on the Northern Territory Notifiable Diseases Surveillance System (NTNDSS) as 'unspecified'. Notification of incident infection, that which is recently acquired, requires input from the health care providers caring for the client. Prevalence, the presence of the disease in a population, is a less effective indicator of HCV transmission patterns.<sup>1</sup> Detection of incident infection is difficult because very few people experience symptoms of acute infection and even fewer seek medical advice.<sup>1</sup>

In line with recommendations from the National Hepatitis C Strategy, the AIDS/STD Program in CDC Darwin, instigated an enhanced hepatitis C surveillance project in 2001. The aim of the project was to improve the quality of epidemiological data available for HCV notifications in the NT. It relied on clinicians supplying (with client consent) information gained during pre-test counselling about any previous negative HCV tests and risk factors for HCV. The project did not extend past 12 months as many clinicians either did not gain the clinical information required to identify newly acquired infection or had concerns about potential breaches of client privacy in providing additional information to CDC.

CDC has recently reviewed how HCV cases are recorded in the NT and is working towards improving the surveillance of newly acquired cases to monitor transmission trends and identify population groups in the NT who may be at higher risk. HCV will be classified as 'newly acquired', 'chronic' and 'unspecified' on the new schedule of notifiable diseases. Clinicians will be encouraged to assess the likely duration of infection in clients who are HCV positive and inform CDC. Improving epidemiological data both locally and nationally assists in the

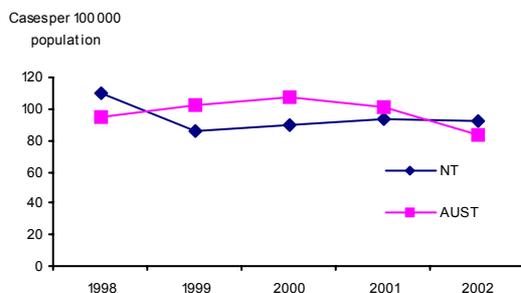
development and evaluation of targeted prevention strategies, improved service provision and attracting the necessary funding to achieve identified priorities.<sup>1</sup>

### HCV Epidemiology in the NT

Since 1991 there have been 2675 cases of HCV recorded on the NTNDSS. The NT annual rates of around 100 per 100 000 population have up until 2001, been slightly lower than the national figures (Figure. 1). Over the last decade, the peak age for notifications has fluctuated between the 35-39 and 40-44 year old groups. Nationally most cases are consistently reported in the 30-39 year old group.<sup>6</sup>

Of the total cases of HCV in the NT 1991 to 2003, the majority (68.8%) were male, 29.6% female and in 1.6% of cases gender was unknown. Cases of HCV peaked at 311 in 1994. This large number corresponds with the implementation of a register of cases set up that year<sup>7</sup> and is thought to be attributable to enhanced surveillance resulting in an increase in health care professional awareness of the condition.

**Figure 1. HCV rates in the NT and Australia by year**

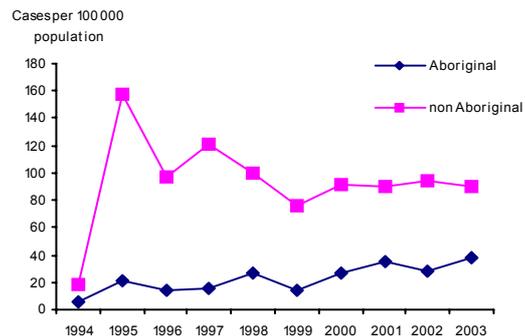


Source: National Centre in HIV Epidemiology and Clinical Research - Annual Report 2003

In the past 4 years cases in non-Aboriginal Territorians have remained stable at around 130 per year. There appears to be a slow upward trend in Aboriginal people (Figure. 2) although numbers are small. Given that injecting drug use (IDU) is a known risk factor for HCV acquisition, the few cases among Aboriginal people have been explained in the past by anecdotal evidence of low levels of IDU in that population.

Surveys of attenders at NSPs are undertaken annually at select sites in Australia to ascertain

**Figure 2. HCV rates in the NT by indigenous status and year**



demographic and behavioural information and collect finger prick samples of blood for analysis of anti-HCV antibody.<sup>1</sup> Each year around 80-90 NT NSP clients participate in these 'snapshot' surveys. In 2001 and 2002, 60% of NT participants were seropositive for HCV, a proportion which has grown steadily from 40% recorded in 1998.<sup>6</sup>

### HCV programs and prevention in the NT

Various organisations in the NT support a number of harm reduction strategies including NSPs, pharmacotherapy programs, detoxification programs and peer education programs. Harm reduction is a philosophical approach focusing on reducing the harm associated with potentially risky activities.<sup>3</sup> It does not ignore the value of helping people to become drug-free, it simply recognises that for many people who currently inject drugs, this may be a distant goal. Services to reduce risk in the interim are therefore essential if personal and public health disasters are to be avoided.<sup>8</sup>

Ongoing funding for these programs in the NT comes from the Commonwealth's Department of Health and Ageing, the Hepatitis C Education and Prevention Initiative and the Council of Australian Government's Illicit Drug Diversion Package – Supporting Measures for NSPs, is utilised to meet the broad aims of these initiatives. Namely, to reduce the transmission of blood-borne viruses (BBV), and to minimise the personal and social impacts of HCV infection and the harms associated with injecting drug use.

The initial round of funding enabled the NT to undertake a comprehensive needs analysis of HCV education and prevention programs in the NT, including the NSP and referral and

education services for people who inject drugs (PWID), to provide an evidence base for further activities.<sup>9</sup> Ongoing funding has been directed toward implementing the recommendations made, enhancing the capacity of the non-government and community sector to respond and to creating opportunities for peer education, development of locally appropriate resources and education for service providers.

One recommendation of the needs assessment was the HCV Education and Prevention Small Grant Project implemented in 2002-03. This Project made funding available to government and non-government agencies to develop innovative programs or resources relating to HCV education and prevention. Some, like the HCV Consumer and Service Provider Forums facilitated by NTAHC have informed other projects and continued well beyond the term of the Small Grant Project funding period. The Project also funded the NT Correctional Medical Service to develop a coordinated HCV and BBV Program for the NT prison system. It has been documented that transmission of HCV and other BBVs is related to the increased prevalence of the viruses, high-risk injecting and sexual behaviour in prison populations, and the limited availability of prevention methods.<sup>10</sup> In the last 10 years there have been significant increase in rates of imprisonment of PWID and thus in rates of HCV positive prisoners in the NT.<sup>11</sup> The prison developed a HCV education program aimed at prisoners and provided competency-based pharmacotherapy training for medical staff which enabled prisoners access to drug treatment. In addition, a HCV specific database was developed to collect high quality data on rates and transmission patterns of HCV infection in this defined population. Projects such as this contribute significantly to improving services and access to treatment for high-risk populations.

### **Needle and Syringe Programs**

NSPs are an effective harm reduction strategy at the forefront of public health initiatives developed in the last 50 years.<sup>12</sup> They save both lives and health dollars. Between 1991 and 2000 \$141M was expended by government (87%) and consumers (13%) on NSPs in Australia. It is estimated that 21,000 HCV infections have been prevented and 1,200 life years gained. Treatment costs avoided over the lifetime of HCV cases alone was reported to be \$783 million.<sup>13</sup>

NSPs provide an important point of contact for PWID in terms of the provision of information, education and referral to drug treatment programs. The availability of needles and syringes reduces the likelihood of sharing and thus reduces exposure to BBV infections. There is no evidence to suggest that NSPs increase injecting drug use, decrease treatment uptake or increase the amount of injecting equipment discarded in public places.<sup>14</sup>

In the NT, primary NSPs provide a broad range of services including provision of injecting equipment and disposal facilities, peer education and information on reducing drug related harm, referral to medical care and legal and other social services. NTAHC is funded by the Department of Health and Community Services (DHCS) to provide these services and outlets are currently operating in Darwin and Palmerston and will commence in Alice Springs in August 2004.

Secondary NSPs provide a more limited service focusing particularly on the distribution of injecting equipment and providing disposal facilities. These operate via Clinic 34 in each district during working hours and from hospital Emergency Departments after-hours in Nhulunbuy, Tennant Creek, Katherine and Alice Springs. Negotiations with Royal Darwin Hospital are currently underway. The Royal Flying Doctor Service provides an NSP during clinic hours at the Yulara Medical Centre and the majority of pharmacies in the NT sell injecting equipment kits (Fitkits). Future directions include plans to increase the accessibility of NSPs through pharmacies and other outlets and provide information, training and support for this to occur. For the NSP to be most effective 24-hour access to injecting equipment is required.

### **Opiate Pharmacotherapy Program**

The Alcohol and Other Drugs Program within the DHCS offers an Opiate Pharmacotherapy Program (OPP). Clients can self refer or be referred by medical services and are engaged in one-on-one counselling to work on treatment planning and the introduction of healthy alternatives to opiate use. Alongside prescribed pharmacotherapy dosing, the range of treatment services offered includes brief intervention, psychologist appointments, case management, harm reduction, referral to the Detoxification Program, group work, risk management and

referral to external specialist services. The number of people able to access treatment at any one time is dependent on availability of prescribing medical officer hours. Currently 73 people are registered with the OPP in Darwin (R. Hopkins, Manager, Clinical Services, personal communication). It is anticipated that this number will increase in the near future as a result of the recent appointment of another medical officer to the program.

### HCV Treatment

Antiviral treatment for HCV is a combination of pegylated interferon and ribavirin and is considered in patients with significant liver disease as assessed on blood testing (liver function tests), ultrasound and biopsy. Patients who require treatment are counselled with regard to self-administration of the weekly injection and also the side effect profile and monthly follow up requirements. Clients on treatment are offered support and education from the nurse employed one day a week at the Liver Clinic in Darwin and through NTAHC who offer client support services. Since 1995, 85 people have accessed treatment for HCV through the Darwin Liver Clinic (H. Hall, Clinical Nurse Consultant, Liver Clinic, personal communication).

The need for similar support services for people in Alice Springs has been identified. HCV positive people, eligible for treatment currently consult medical staff at Clinic 34 and visiting specialists from Adelaide. Funding is being sought to employ a nurse and implement a coordinated approach to HCV services in Central Australia. In addition NTAHC will provide BBV Services in Alice Springs after August, which will increase access to support and referral services.

### Future directions

It is now known that unlike HIV, HCV was highly prevalent in people who injected drugs prior to the implementation of NSPs in the 1980's. While HIV has been contained at less than 3% in the Australian IDU population,<sup>6</sup> HCV has escalated and remains an important challenge.

Further efforts to contain the transmission of HCV in the NT will be informed by improved surveillance of notified cases and enhanced by a broader health promotion approach, greater

commitment by government to NSP diversification, and collaboration with the community and non-government sector. Maintaining the relatively low prevalence in the Indigenous population is a continued priority goal to be achieved working with representative organisations to develop culturally appropriate strategies and awareness among those most at risk.

Additional projects supporting community-based organisational responses to educate PWID about harm reduction and increase referrals to treatment and counselling services, include a peer community development workers project and NSP youth outreach project.

Identifying and addressing service gaps to improve equity and access to prevention, education, treatment and support services for a range of people affected by HCV, including PWID, prisoners, people living in remote and rural settings and from culturally and linguistically diverse backgrounds, is the continued aim of the program.

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## Editorial: Hepatitis C

*Peter Markey, CDC Darwin*

Surveillance of those notifiable diseases which have a chronic course or a carrier state is notoriously problematic due to the difficulty correlating the number of new notifications with disease transmission. With such diseases, an increase in cases being notified might be due to a recent increase in transmission, or may simply be coincident with a screening program or some other event which allows chronic cases or carriers to be identified. Such is the case with hepatitis C virus (HCV), and this is one of the reasons why enhanced surveillance to ascertain "newly acquired" cases, which better reflect transmission rates, is being promoted at the national level.

As the above article has described, HCV in the NT is currently only notifiable through laboratories and without further information from the diagnosing clinician, our surveillance system cannot distinguish between those cases which have been recently acquired and those which are long-standing (or of unknown duration). All cases are therefore reported as "unspecified" and as such, the NT is one of only 2 national jurisdictions who do not report "newly acquired" cases to the Commonwealth. This

lack of detail has limited our capacity to monitor patterns of local disease transmission and the risk factors associated with it.

One of the barriers to collecting better data is the limitations of the Notifiable Disease Act, and in particular the schedules specifying the amount of information notifiers are obliged to report when notifying a case. Given the sensitive nature of some of the information which is required to classify HCV cases, doctors and laboratories have been understandably reluctant to pass on information about their clients to third parties and CDC has been equally hesitant in requesting it.

With the aims of better informing local policy, improved public health responses and nationally consistent reporting, these schedules pertaining to the Act are currently undergoing revision. The proposed changes include adding 'newly acquired' and 'chronic' HCV to the list of doctor notifiable diseases to enable the collection of higher quality data, with respect to both disease classification and information about risk factors. CDC is currently engaging consumers and health care providers in consultation to seek feedback on the proposed changes.

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## Penicillin resistant *Neisseria gonorrhoea* in the Darwin region

*Steven Skov and Peter Knibbs, CDC Darwin*

In the Northern Territory (NT), gonorrhoea is one of the most commonly notified diseases and the population rates are the highest in Australia. One of the characteristics of *N. gonorrhoea* is its propensity to become resistant to antibiotics. This has resulted in a change from oral single dose penicillin to alternative therapies including

injectable ceftriaxone in most of Australia. However, in the NT until now, oral single dose penicillin has remained the appropriate treatment for the majority of cases. The advantages of oral penicillin treatment are its acceptability to patients, ease in administration for staff and low cost.

A crucial aspect of our efforts to control gonorrhoea is the monitoring of antibiotic susceptibility of the organism. Primary care providers are encouraged to take culture specimens for gonorrhoea whenever possible and not solely rely on PCR testing which provides no antibiotic sensitivity information. Over the years, there have been limited cases of resistant gonorrhoea (Table 1), usually penicillinase producing *N. gonorrhoea* (PPNG). Because of the implication of PPNG becoming established in the local community, these cases are always followed up urgently. With very few exceptions, they have occurred in Darwin, and have been directly linked to a person with sexual contact either overseas or interstate. For this reason, treatment protocols in the NT have recommended first line treatment of gonorrhoea with penicillin, with ceftriaxone to be used if there is a history of overseas or interstate contact.

**Table 1. Cases of PPNG in the NT 2000—2004**

Year	Number of cases of PPNG	Number of cases of non-PPNG
2000	6	1,182
2001	13	1,428
2002	19	1,495
2003	9	1,383
2004 to 30 June	14	771

From January to mid April 2004, we observed 7 cases of PPNG: a significant increase on recent years. All were in Darwin and directly linked to sexual contact outside the NT. However, in late April 3 cases of locally acquired PPNG were reported, not directly linked to foreign sexual contact. Two of these cases were linked to each other, but the third was not. It was not possible to locate all the sexual partners of the infected persons and there were links with remote communities. We had to assume that PPNG could become established in the Darwin region.

Discussions were held with CDC staff in all regions in early May and a plan devised that advised practitioners in the Darwin region, both urban and rural to immediately:

- treat all possible gonorrhoea with injectable ceftriaxone,
- increase their effort to obtain culture specimens and
- increase their effort to obtain information about travel history and sexual partners.

In the rest of the NT, health care practitioners were advised of the situation and the planned response. They were also asked to increase their efforts to obtain culture specimens and information about travel history and sexual partners of cases. Penicillin was to remain the principal treatment outside the Darwin region.

Information was provided by face to face visit, phone, fax and email to all primary care agencies and providers throughout the NT. In the Darwin urban region, ceftriaxone was provided to all general practices and all other primary care agencies where it was not available in order to facilitate the change in treatment. A gazettal notice under the Poisons and Dangerous Drugs act was issued by the Chief Health Officer to permit nurses and Aboriginal Health Workers to use ceftriaxone for this purpose without a doctor's order.

Since these changes were introduced, there have been 4 further cases of penicillin resistant gonorrhoea. Three were PPNG in foreign nationals and not linked to the local outbreak. The fourth was chromosomally mediated penicillin resistance in a Darwin woman. While concerning, this last case was not related to the previous cases of locally acquired PPNG.

As the last of the 3 locally acquired cases of PPNG was found in early May, it is possible that further local transmission has been prevented. **However the possibility remains that there are other PPNG cases who have not yet presented for testing or been tested by culture.** The plan is to maintain these changes and increased surveillance until the end of July (ie a period of 3 months) and then determine whether it is necessary to extend them or revert to previous treatment protocols.

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## **Put it on so we can get it on - A sexual health campaign targeting young people aged 15-19 in Darwin**

*Jan Holt, CDC, Darwin, Liz Kasteel, Womens Health Strategy Unit*

On April the 15<sup>th</sup> Community Services Minister, Marion Scrymgour launched a new sexual health campaign at Radio Larrakia. The Campaign targets young people and raises awareness about STIs and the need for safe sex practises.

This Campaign is a joint initiative of the AIDS/STD Program and the Women's Health Strategy Unit and was developed in response to evaluation recommendations from previous sexual health campaigns, which targeted raising awareness about HIV and safe sex in young women under the age of 30. The recommendations included that condoms be more accessible and free of charge to young people; that people under the age of 18 be educated; and that future campaigns should not only be directed at women, but also at men. It was also highlighted that involvement of the target group is essential to the success of the campaign.

Taking into account the past evaluation recommendations, together with the known high rates of sexually transmitted infections (STIs) in teenage/young people, the aims of the second phase of the "put it on so we can get it on" campaign are:

- to raise awareness about the high rates of STIs in young men and women aged 15-19 in Darwin
- to inform this group of the available free and confidential health services and
- to reaffirm the need for safe sex practices to avoid STIs.

A number of focus groups were held with high school students in Darwin which allowed for discussions with approximately 80 young people. Through these discussion groups we were able to find out about young people's level of knowledge, attitudes and values around sex and their advice on how best to present sexual health information in a way that would engage young people. Students were quite clear that they were not interested in having yet another poster or pamphlet directed at them. They supported the idea that a sexual health campaign with their

direct involvement was desirable and should primarily take the form of a radio campaign. In discussions with these students it was evident that their radio station of choice was Radio Larrakia.

Some of the main points that came out of our discussion with young people included:

- unplanned pregnancies were of greater concern than STI's,
- assumptions were often made whether a person might have an STI by the way they looked,
- young men and women often have different attitudes about sex and love (e.g. young women equated sex with romance and trust, whereas young men seek out sex for their pleasure),
- women were concerned that if they had sex they could get a 'bad reputation' and
- the use of alcohol and drugs can affect a young person's decision to have safe sex.

Project staff worked closely with teachers, students and health promoting school nurses at Taminmin High School and Dripstone High School to incorporate some of the sexual health issues affecting youth into radio scripts. The students created and recorded 7 short radio messages and a safe sex rap song which are being aired on Radio Larrakia over the next 6 months. The students, school staff and project officers then had great fun recording these messages at Radio Larrakia. Students were asked to comment and evaluate how they felt about their involvement in creating the campaign material for this sexual health campaign. Comments included:

- "We enjoyed being involved with it because it was educational",
- it allowed them to be creative around important issues affecting them,
- it provided them with the opportunity to talk openly to their peers about sexual issues and
- the sharing of information was extremely valuable to them.

They found the process to be engaging and fun and it increased their confidence in talking to their peers about issues that were important but often not spoken about. Visiting Radio Larrakia, spending time in the recording studio and learning how a radio station operates also added to their enjoyment of being involved.

Two stickers were produced and included the contact details of free and confidential sexual health services in Darwin. A health promotion display with safe sex messages for youth, which will be used in schools, and for health promotion days was also developed. This display is also available for loan to other services.

An evaluation of this project will be conducted in October 2004 and the findings will be made available on the DHCS Internet.

This Campaign has been successful in terms of a close collaboration with young people, schools, government and non-government organisations and youth services.

Special thanks to the students and staff at Taminmin High School and Dripstone High School for their hard work, creativity and willingness to be involved. Thank you also to the staff and young people at SHAK (Red Cross) and Mission Australia for their involvement in holding focus groups and rap workshops.

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### **Clinic 34 new location in Mitchell St**

The new location for Clinic 34 on the ground floor, Health House, 87 Mitchell St, Darwin has opened for business.

The clinic offers a free, confidential sexual health Service including:

- investigation,
- diagnosis,
- treatment and management for blood borne virus and sexually transmitted diseases
- Sex Industry Worker's health care
- Needle and Syringe Program

For an appointment telephone (08) 89 992678

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### **About Giving Vaccines**

#### **An accredited short course for vaccine providers**

*Nan Miller, CDC Darwin*

In 1997, the Centre for Disease Control (CDC) developed a short course to provide basic skills in the management and administration of vaccines for NT providers. This was in response to The National Health and Medical Research Council of Australia recommendation that 'vaccines are administered by properly trained individuals'. The result is a competency based, short course curriculum accredited by the Northern Territory Employment and Training Authority (NTETA).

The course is offered in 2 modes: external, self-directed for nurses and doctors; and an internal, facilitated workshop for Aboriginal Health Workers (AHW). The latter usually being

within a community for ease of access with limited disruption and less travel.

Since inception of the course, the training manual has been revised regularly to include new vaccine formulation, recommendations and/or schedule changes. A comprehensive update (3<sup>rd</sup> Edition) was completed in May 2004 and is currently at the printers. We anticipate that it will be available by the end of July.

We strongly recommend that all vaccine providers: nurses, doctors and AHW do the course. Please contact workforce development in Darwin on (08) 8922 8747 for information on how to enroll.

## Tropical influenza surveillance in the Top End 1996-2003

Lesley Scott, CDC Darwin

### Introduction

The Tropical Influenza Surveillance Scheme (TISS) commenced in the Northern Territory (NT) in 1996. The scheme was initiated to:

1. Determine the seasonal pattern of influenza and assess the appropriateness of the timing of influenza vaccination in the Top End;
2. Enable early recognition of influenza outbreaks;
3. For early identification of influenza strains through cell culture for comparison to the current influenza vaccine;
4. To compare the timing of influenza outbreaks in the Top End with those in southern Australian states and
5. To determine if the NT is in a position to supply early information about influenza each season.

Initial influenza surveillance had provided evidence of 2 peaks of influenza-like illness (ILI) in the Top End of the NT. The first peak was usually in March with a later peak in August or September. A recommendation for influenza vaccination to be initiated in February each year was made.

### Description of the program

There was an initial group of 24 General Practitioners (GPs) participating in the scheme who sent in data on the number of patients meeting the case definition for ILI and the total number of clients seen by week. This was returned on a monthly basis.

The clinical case definition of influenza is fulfilled if 6 of the following symptoms are present:

- sudden onset of symptoms (within 12 hours)
- cough
- fever
- rigor or chills
- prostration and weakness
- myalgia or widespread aches and pains

- no significant respiratory physical signs other than redness of the nasal mucosa and throat
- influenza in close contacts

The Australian Sentinel Practice Research network (ASPREN) uses the same case definition while other influenza surveillance schemes have differed slightly. Both ASPREN and TISS data are reported in the *Communicable Diseases Intelligence* quarterly report and are available on the Communicable Diseases Australia website.<sup>1</sup>

Results were reported as an influenza rate per 1000 consultations and are shown in Figures 1-8. Where there was a 4-fold increase in cases of ILI, GPs were requested to notify Centre for Disease Control (CDC) and collect throat gargles. These were sent to the World Health Organising Collaborating Centre for Reference and Research on Influenza in Melbourne for culture.

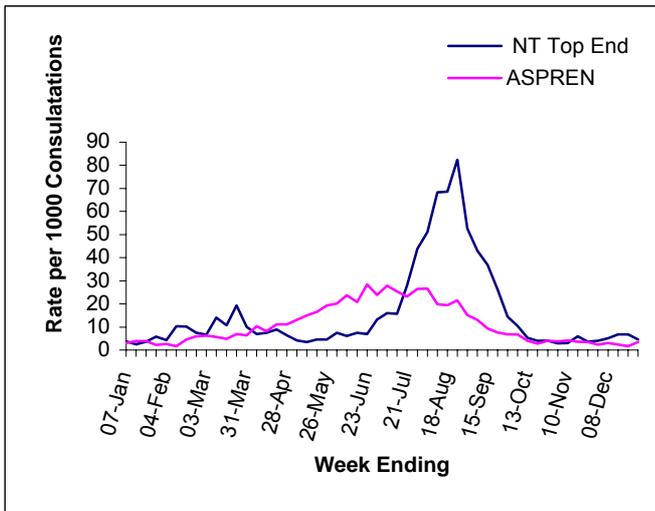
In the event of an influenza pandemic, where heightened surveillance is required, there would be an increase in frequency of reporting and extension of participants to include emergency departments and other medical service providers. This is to inform the CDC about the number of clinical cases, their distribution and circulating strains.

### TISS reporting 2003

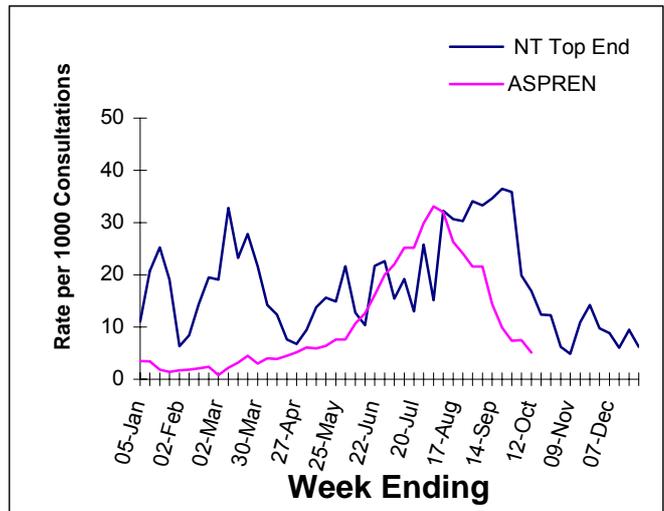
In 2003 there were 16 participating GPs as follows: Darwin (11), Palmerston (1), Humpty Doo (1), Katherine (1), Alyangula (1) and Nhulunbuy (1). There was a change from a monthly return of reports to fortnightly to improve timeliness in identifying a rise in the number of cases of ILI.

The early peak in ILI was noted in week ending 6/4/2003 (Figure 8) with the only throat culture collected that week being negative on culture. The second peak commenced in August and continued until November. During this time 18 throat gargles were collected and sent for culture. Of these, 9(50%) were culture positive

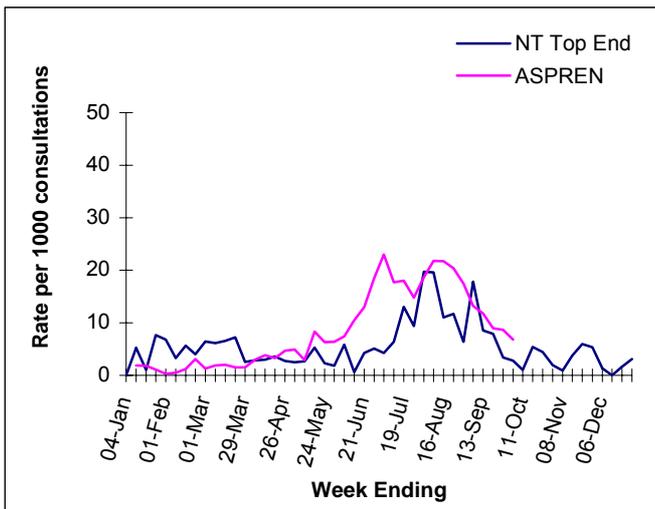
**Figure 1. Sentinel Influenza Surveillance  
Top End and ASPREN 1996**



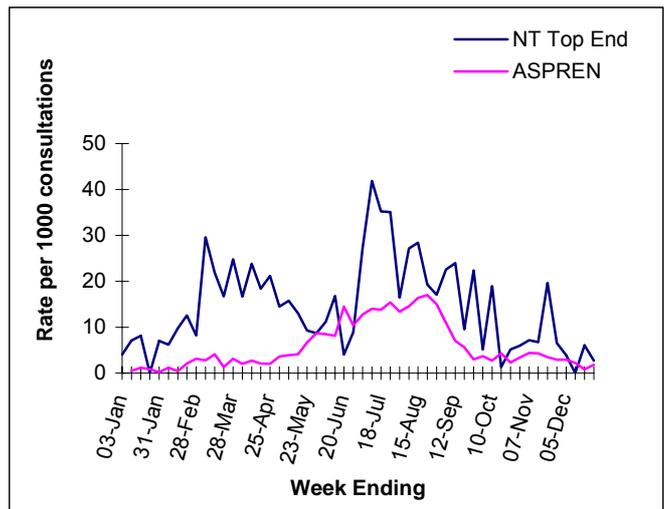
**Figure 2. Sentinel Influenza Surveillance  
NT Top End and ASPREN 1997**



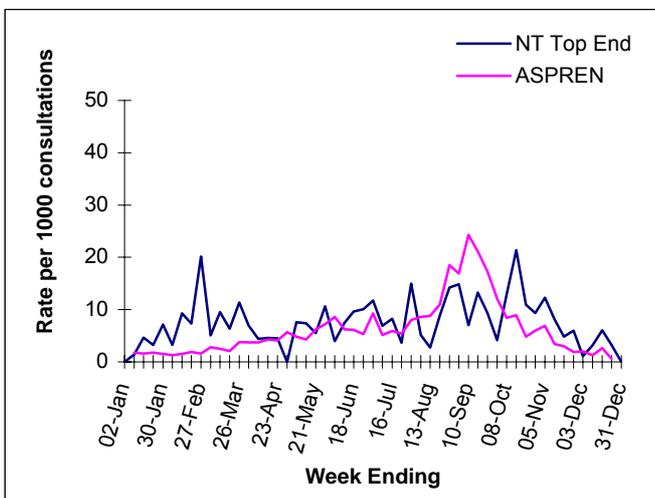
**Figure 3. Sentinel Influenza Surveillance  
NT Top End and ASPREN 1998**



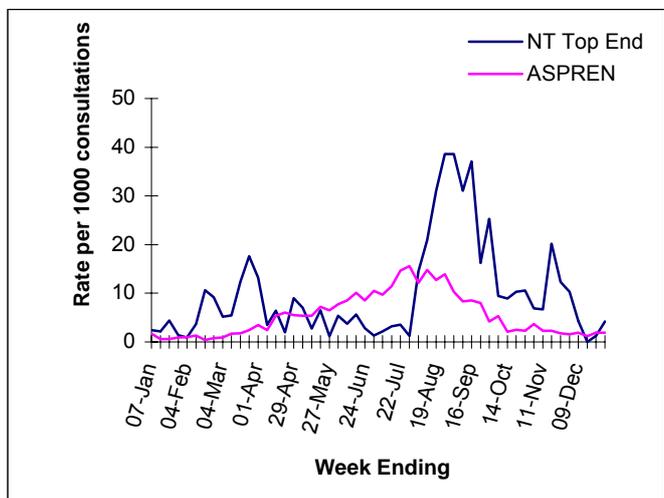
**Figure 4. Sentinel Influenza Surveillance  
NT Top End and ASPREN 1999**

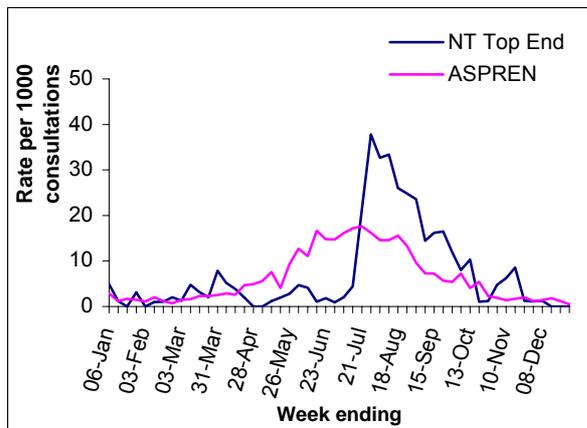
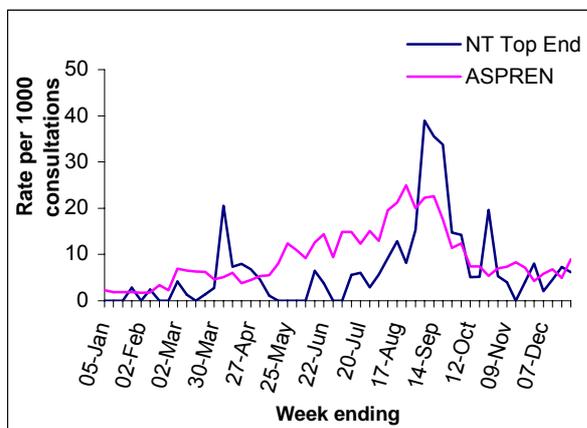


**Figure 5. Sentinel Influenza Surveillance  
NT Top End and ASPREN 2000**



**Figure 6. Sentinel Influenza Surveillance  
NT Top End and ASPREN 2001**



**Figure 7. Sentinel Influenza Surveillance  
NT Top End and ASPREN 2002****Figure 8. Sentinel Influenza Surveillance  
NT Top End and ASPREN 2003**

and typed as A/Fujian/411/2002-like. This strain was not included in the 2003 influenza vaccine but the WHO Centre for Influenza had advised that there would be some protection provided by the A/Moscow-like strain that was included in the vaccine.

### Changes to the scheme in 2004

In 2003 the National Influenza Pandemic Action Committee reviewed the surveillance case definitions for ILI in use in Australia. The objective was to have a single case definition for ILI that was most likely to predict laboratory confirmed cases of influenza. A study of sentinel general practices in Western Australia and

Victoria was conducted in 1998 and 1999. The results of the study indicated that the symptom complex of cough, fever and fatigue was most likely to predict laboratory confirmed influenza.<sup>2</sup> States and territories agreed to adopt the new definition from January 2004. This change to the case definition for ILI increases the need for laboratory confirmation especially where there is an increase in cases reported. This will confirm the sensitivity, specificity and positive predictive value of the new definition and assure us that we have moved in the right direction as well as give us the information required about circulating influenza types.

### Conclusion

Influenza surveillance in the NT is now in its 9<sup>th</sup> year with approximately 12-14 reporters sending a return each week. This has allowed the NT to inform influenza immunisation policy as well as to confirm whether the circulating influenza strains are contained in the current vaccine. With influenza cases occurring earlier in the year than southern states we are ideally placed to identify novel strains but need to be more assiduous about collecting throat gargles to ensure that this is possible.

Participation in the TISS is an approved education activity with The Royal Australian College of General Practitioners and has an allocation of 4 Continuing Professional Development points per quarter. More widespread participation of GPs will ensure that the data collected better represents the Top End. If there are any GPs interested in becoming reporters please contact Lesley Scott on 89228089 or lesley.scott@nt.gov.au.

### References

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### 4 Continuing Professional Development (CPD) points for GP participation in Tropical Influenza Surveillance Scheme.

- Minimal time involved.
- Provides crucial influenza activity information.

Call Lesley Scott on 89228089 to join up or for more information.

## Immunisation coverage for NT children, as estimated by the Australian Childhood Immunisation Register

Christine Selvey, CDC Darwin

The Australian Childhood Immunisation Register (ACIR) publishes immunisation coverage rates for 3 cohorts of children for each jurisdiction every quarter.

Rates are calculated for a 3 month cohort of children aged 12-<15 months who, to be considered fully immunised, must have received the following vaccinations before the 1<sup>st</sup> birthday:

- dose 3 of diphtheria, tetanus and pertussis vaccine (DTP),
- dose 3 of poliomyelitis vaccine,
- a primary vaccination course against *Haemophilus influenzae* type B (Hib) (either dose 2 of PRP-OMP vaccine or dose 3 of another Hib vaccine) and
- dose 2 of hepatitis B vaccine. (assumes a birth dose has been given).

These vaccinations are scheduled to be completed by 7 months of age.

Rates are calculated for a 3 month cohort of children aged 24-<27 months who, to be considered fully immunised, must have received the following vaccinations before the 2<sup>nd</sup> birthday:

- dose 3 of DTP vaccine (prior to September 2004 dose 4 of DTP vaccine was required);
- dose 3 of poliomyelitis vaccine;
- dose 1 of measles, mumps and rubella (MMR) vaccine given at or after 11 months of age;
- a primary course and one booster of Hib vaccine; and
- dose 2 of hepatitis B vaccine (assumes a birth dose has been given).

These vaccinations are scheduled to have been administered by 13 months of age.

Rates are also calculated for a 3 month cohort of children aged 72-<75 months (6 years) who, to be considered fully immunised, must have received the following vaccinations before the 6<sup>th</sup> birthday:

- dose 5 of DTP vaccine;
- dose 4 of poliomyelitis vaccine; and

- dose 2 of MMR vaccine.

These vaccinations are scheduled to have been administered by 5 years of age.

Immunisation coverage rates for each of the above cohorts are estimated by postcode of the child's address and these results sent to State and Territory immunisation coordinators. Data where a postcode contains less than 6 children in a cohort cannot be released for privacy reasons.

Postcode level data is not useful in the NT for determining community or even district level coverage. This is because there are no individual postcodes for different communities. Many communities, including those from different NT health districts, have a common postcode that is a postcode for an urban post office. Postcode 0822 is for Winnellie Post Office Bags and includes Darwin remote rural communities (except Jabiru (0886)) and many East Arnhem communities (such as Milingimbi, Ramingining, Galiwinku and Angurugu). However, other East Arnhem communities have a 088X postcode, such as Alyangula (0885), Yirrkala (0880), Nhulunbuy (0880) and Nhulunbuy PO Boxes (0881). Most remote communities in the Alice Springs have the Alice Springs PO Bag postcode (0872). Some communities in the Barkly district have the Alice Springs PO Bag postcode (eg Ali Curung), but others have the Tennant Creek PO Bag postcode (eg Elliot (0862)). However, the postcode data does provide some useful information for the NT, provided these inconsistencies are taken into account (Tables 1 to 3).

ACIR immunisation coverage for NT children and for all Australian children for the 3 birth cohorts for each quarter from June 30 2002 to June 30 2004 are shown in Graphs 1 to 3. NT coverage for the 12-<15 month cohort has fallen over the last 4 quarters, with a marked drop for the December 2003 quarter and again for the June 2004 quarter. The reason for this fall in immunisation coverage is not clear, although analysis suggests that there were a lot of children who received their 6 months immunisations only after 12 months of age, and so were therefore counted as not fully immunised.

**Table 1. 12-<15 months: Australian Childhood Immunisation Register Coverage Report. Postcode by age group (Age calculated as at 31 Mar 2004). Date of processing <= 30 June 2004.**

Area	Postcode	30 Jun 04			31 Mar 04		
		Number in postcode(s)	Fully	% Fully	Number in postcode(s)	Fully	% Fully
Katherine PO Bag	0852	51	47	92.2%	44	40	90.9%
Katherine Other	0853-0854	12	11	91.7%	14	12	85.7%
East Arnhem	0880-0885	58	51	87.9%	40	37	92.5%
Winnellie PO Bag	0822	124	107	86.3%	95	84	88.4%
Palm/Litchfield Area	0821-0847*	179	154	86.0%	179	168	93.9%
Darwin	0800-0820	252	214	84.9%	248	225	90.7%
Alice Springs Town	0870	109	92	84.4%	106	95	89.6%
Katherine Town	0850	38	32	84.2%	27	21	77.8%
Alice Springs PO Bag	0872	76	62	81.6%	52	41	78.9%
Barkly	0860-0862	27	21	77.8%	22	17	77.3%
Alice Springs PO Box	0871	19	14	73.7%	19	15	79.0%
Katherine PO Box	0851	3	2	66.7%	11	8	72.7%
<b>NT</b>		<b>945</b>	<b>805</b>	<b>85.2%</b>	<b>857</b>	<b>763</b>	<b>89.0%</b>

**Table 2. 24-<27 months: Australian Childhood Immunisation Register Coverage Report. Postcode by age group (Age calculated as at 31 Mar 2004). Date of processing <= 30 June 2004.**

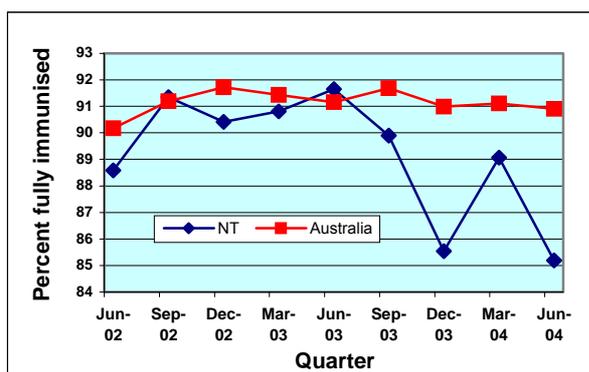
State	Postcode	30 Jun 04			31 Mar 04		
		Number in postcode(s)	Fully	% Fully	Number in postcode(s)	Fully	% Fully
Winnellie PO Bag	0822	100	98	100.0%	118	116	98.3%
Katherine PO Box	0851	10	10	100.0%	10	10	100.0%
Katherine Other	0853-0854	16	16	100.0%	11	11	100.0%
Alice Springs PO Bag	0872	75	72	98.7%	60	53	88.3%
Alice Springs Town	0870	92	88	97.8%	79	76	96.2%
Darwin	0800-0820	248	235	97.2%	231	209	90.5%
Palm/Litchfield Area	0821-0847*	193	183	96.4%	197	187	94.9%
East Arnhem	0880-0885	52	47	96.2%	39	37	94.9%
Alice Springs PO Box	0871	25	22	96.0%	18	15	83.3%
Katherine PO Bag	0852	49	46	95.9%	52	49	94.2%
Katherine Town	0850	37	34	94.6%	24	24	100.0%
Barkly	0860-0862	18	14	88.9%	15	13	86.7%
Jabiru	0886	<6			8	8	100.0%
<b>NT</b>		<b>915</b>	<b>865</b>	<b>94.5%</b>	<b>862</b>	<b>808</b>	<b>93.7%</b>

**Table 3. 72-<75 months: Australian Childhood Immunisation Register Coverage Report. Postcode by age group (Age calculated as at 31 Mar 2004). Date of processing <= 30 June 2004.**

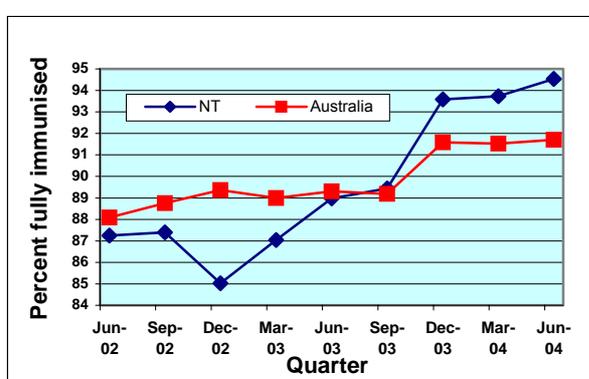
Area	Postcode	30 Jun 04			31 Mar 04		
		Number in postcode(s)	Fully	% Fully	Number in postcode(s)	Fully	% Fully
Katherine Other	0853-0854	14	14	100.0%	10	8	80.0%
East Arnhem	0880-0885	51	47	92.2%	34	29	85.3%
Winnellie PO Bag	0822	86	79	91.9%	68	61	89.7%
Katherine PO Bag	0852	48	41	85.4%	27	20	74.1%
Katherine PO Box	0851	12	10	83.3%	7	3	42.9%
Alice Springs Town	0870	115	95	82.6%	79	61	77.2%
Jabiru	0886	9	7	77.8%	9	8	88.9%
Barkly	0860-0862	22	17	77.3%	13	12	92.3%
Alice Springs PO Bag	0872	70	54	77.1%	36	24	66.7%
Katherine Town	0850	32	24	75.0%	36	28	77.8%
Darwin	0800-0820	244	182	74.6%	244	203	83.2%
Palm/Litchfield Area	0821-0847*	192	139	72.4%	197	153	77.7%
Alice Springs PO Box	0871	39	26	66.7%	35	26	74.3%
<b>NT</b>		<b>934</b>	<b>735</b>	<b>78.7%</b>	<b>795</b>	<b>636</b>	<b>80.0%</b>

\* Not 0822 Winnellie

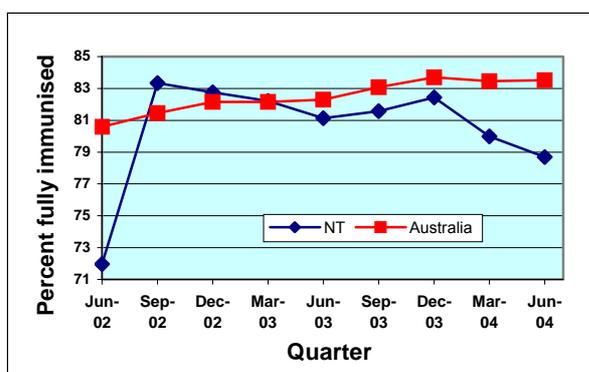
**Graph 1. Immunisation Coverage for children aged 12-<15 months**



**Graph 2. Immunisation Coverage for children aged 24-<27 months**



**Graph 3. Immunisation Coverage for children aged 72-<75 months**



Coverage for the 24-27 month cohort increased significantly in all jurisdictions in the December 2003 quarter. This is because, in September 2003, the recommendation for the 4<sup>th</sup> dose of DTPa scheduled at 18 months of age was removed from the Australian Standard Vaccination Schedule. Consequently, children assessed for the December 2003 and subsequent quarters were not required to have received 4 doses of DTPa (but only 3) in order to be counted as fully immunised for age. NT coverage for the 24-<27 cohort since the removal of the 18 month DTPa is significantly

higher than the national average, whereas before the removal of the 18 month DTPa coverage was the same or lower than the national average.

High coverage of the 24-27 month cohort without the 18 month DTPa included, means that the immunisations assessed for this cohort are all due at 12 months or earlier. That is, there is a 12 month "grace period", where the immunisations can be given up to 12 months after they first become due, and the child will still be considered fully immunised in terms of these ACIR coverage rates. The relative increase in coverage for NT children since the removal of the 18 month DTPa compared to the period where the grace period was only 6 months (18 month DTPa included), indicates that NT children are being immunised well eventually, but that the immunisations are often given between 6 and 12 months late.

National immunisation coverage for the 72-<75 month cohort is increasing slowly, but remains lower than the coverage for the younger cohorts (around 84% compared with over 90%). Four year old immunisations are just as important as those due at younger ages. Particularly with the removal of the 18 month DTPa dose, the DTPa dose due at 4 years is important for the maintenance of immunity to all 3 diseases, which will not be routinely boosted until 15 years of age. If the 15 year old immunisations are missed, then it is even more important that the 4 year old immunisation was complete. The prevention of pertussis in infants too young to have completed a primary course of DTPa vaccination is dependent on the control of this disease in older individuals to prevent transmission to young infants. The second dose of MMR vaccine is crucial for the continued elimination of measles in Australia.

Immunisation coverage for the 3 cohorts aggregated by postcode is shown in Tables 1 to 3. These indicate that the drop in immunisation coverage in 12-<15 month cohort in the June 2004 quarter occurred in all areas apart from Katherine, and was greatest in Palmerston/Rural Area, Darwin and Alice Springs town. Children in urban areas can be targeted by immunisation overdue letters if the "Usual Immunisation Clinic" field is completed on the CCIS record. Urban areas also have low coverage of the 72-<75 month cohort and reminder letters for children who are showing as overdue for these immunisations should also be considered.

## A case of leptospirosis caused by *Leptospira tarassovi* acquired in the Northern Territory

Karalyn Kalemba, CDC Darwin, Lionel Crompton, General Practitioner, Darwin

Leptospirosis is an acute infectious disease caused by over 200 different serovars of the *Leptospira* bacteria. Every year there are a few cases of leptospirosis in humans notified in the Northern Territory (NT), with 2000 being an exception with 9 notifications. The serovars identified in the NT to date have been *L. australis*, *L. hardjo*, *L. pomona* and *L. zannoni* (table 1). In June this year a case caused by *L. tarassovi* was acquired in the NT.

**Table 1. Leptospirosis Serovars notified in the NT 1992-2003.**

Year	Serovar				
	<i>L. australis</i>	<i>L. hardjo</i>	<i>L. pomona</i>	<i>L. zannoni</i>	unknown
1992	-	-	-	-	1
1993	-	-	-	-	1
1994	-	-	-	-	2
1995	-	-	-	-	-
1996	-	-	-	-	-
1997	-	-	-	-	1
1998	-	1	-	-	2
1999	-	-	-	-	1
2000	7	-	1	-	1
2001	3	-	-	-	1
2002	2	1	-	-	-
2003	3	-	-	1	-
<b>Total</b>	<b>15</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>10</b>

The case presented here, a 54 year old male stock inspector, had been herd-testing cattle for bovine tuberculosis in the 3 weeks prior to onset of illness at a cattle station in the Darwin rural region. The tuberculin skin test is placed at the base of the tail so contact with urine was part of the work. The patient was not wearing gloves and drank water from a billabong close to the cattle yard. The billabong took run off from the cattle yard and was fed by a small stream. There had been late rain at the time.

The patient presented to his general practitioner with a 3-day history of headache, fever, sweats, rigors, myalgia and visual disturbance. On examination his temperature was 37.9C, blood pressure 144/88 and heart rate 74. His respiratory, cardiovascular and abdominal

examinations were unremarkable, particularly the absence of hepatomegaly and jaundice.

He presented again to his general practitioner the next day with no improvement. Blood samples were collected and a urine dipstick was done. Liver function tests were elevated and the full blood count revealed lymphopenia. The C-reactive protein and eosinophil sedimentation rate were elevated. Urea and electrolytes were normal. Urine dipstick showed a trace of blood and protein. Serology for leptospirosis was negative. A repeat blood sample 6 days later showed improvement and this time the micro agglutination test (MAT) for *L. tarassovi* was positive with titre of 400.

6.4% of all human leptospirosis notifications in Australia are due to *L. tarassovi* but this is the first time it has been identified as the causative organism for leptospirosis in the NT.<sup>1</sup> *L. tarassovi* is known to be contracted from cattle and pigs. The case may have contracted *L. tarassovi* directly from the cattle or indirectly from drinking billabong water contaminated with cattle urine or feral pig urine.

Cattle are not routinely tested for leptospirosis in the NT and there are no vaccination programs. The reason being that leptospirosis does not appear to impact on productivity. There is very little published research on leptospirosis in cattle in the NT.<sup>2</sup> The only recent study obtained was an observational study on calf losses in the Barkly Tableland published in 2003.<sup>3</sup> This study revealed that in a cohort of 200 pregnant heifers 3% of pregnancies were aborted over the 3-month follow-up period. Calving mortality (death within 7 days of birth) was 20.8%. There was no evidence of leptospirosis being the cause for either the abortions or calf loss. Interestingly though, of the 200 cattle in the cohort, 65% had evidence of previous *L. harjo* infection and 7% had evidence of previous *L. tarassovi* infection. None had evidence of previous *L. pomona* infection. These 3 were the only serovars for which testing was done. When retested 4 months later 6% of the cattle had seroconverted for *L. harjo*, 2% for *L. tarassovi* and none for *L. pomona*.<sup>3</sup>

Though it is not clear with this case study that the infective source was cattle, it is probable. Practitioners in the NT should be aware that leptospirosis may be present in NT cattle herds, as well as in other animals, when taking a history from symptomatic patients.

Leptospirosis is also found in pigs, cattle, rats, dogs, possums, deer and foxes.

Personal protective measures include<sup>4</sup>:

- Avoid swimming or wading in water that may be contaminated. Cover all cuts or abrasions with waterproof dressings.
- Thoroughly wash hands and arms in soapy water after handling animals or carcasses, or after coming into contact with liquids that may be contaminated.
- Shower thoroughly after contact with potentially contaminated water or soil.
- Avoid hand to mouth, nose to eye contact (and especially smoking) while handling animals that may be infected.
- Gloves, eye shields, aprons and boots should be worn at all times when handling animals

or liquids contaminated with the urine of animals.

- Prevent contamination of living and recreational areas with the urine of
- infected animals eg keep working dogs out of the house yard.
- Do not feed dogs on raw feral meat because this may infect them.

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2. Personal communication. Kel Small Regional Veterinary Officer Darwin Area. Department of Business Industry and Resource Development.
3. Brown A, Towne S, Jephcott J. An Observational Study on Calf Losses on the Barkly Tableland. Technical bulletin No. 309. NT Government. Department of Business Industry and Resource Development.
4. Leptospirosis Factsheet, CDC, NT Department of Health and Community Services. [http://www.nt.gov.au/health/cdc/fact\\_sheets/leptospirosis.pdf](http://www.nt.gov.au/health/cdc/fact_sheets/leptospirosis.pdf). Accessed 30/06/2004.

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## CDC Annual Workshop

12 — 14 October

Mirambeena Resort Darwin

Presentations from each CDC program area

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## Managing tuberculosis (TB) in Kirakira, Solomon Islands

Rosalie Schultz, CDC Alice Springs

With my partner Dr Nick Tyllis, I undertook a placement in the Solomon Islands from February 2002 to February 2004, specifically in Kirakira, the provincial headquarters of Makira Province, previously Eastern Solomon Islands. Makira has around 33,000 people (projected from 1999 census) with 85% classified as 'rural'. Rural people live in villages of a mean population of 80; a definition far more stringent than what we think of as 'rural' in Australia. The only "city" with over 10,000 people is the national capital Honiara, with 49,000 (1999 census). Kirakira has around 1000 residents.<sup>1</sup> Makira Province was peaceful but many of our patients shared Australia's Foreign Affairs concerns about safety in the capital Honiara.

Therefore, the Solomon Islands is a country of people living in thousands of small villages. Few villages are accessible by road; most transport is by aluminium dinghy and outboard motor, or ship. Inland villages are accessible only on foot. Rural people are self-sufficient for survival and live largely outside the monetary economy. The difficulties in providing education and health services to such a population are immense. There is a policy goal to provide a clinic within 3 hours walk from every village in the country. Prior to recent economic deterioration there had been remarkable progress towards this ambitious goal.

### Directly Observed Treatment Short-course (DOTS) Strategy

As a country, the Solomon Islands is in principle undertaking the WHO 'DOTS framework' for TB control which has 5 components.<sup>2</sup> Below I have outlined these components with comment as to their undertaking in the Solomon Islands.

1. **Government commitment** to sustained TB control activities.

Important individuals in Solomon Islands are committed to TB, but sustained commitment by the government has not taken place, possibly as the government itself has not been stable.

2. **Case detection by sputum smear microscopy** among symptomatic patients self-reporting to health services.

Many provincial headquarters, including Kirakira have sputum microscopy services. Our service was provided by a single laboratory technician, Cecil. Cecil examined sputa and slides delivered from throughout the province on the same day. However the microscopy service did depend on the electricity supply and on consumables, neither of which were consistently available. There was a high level of community awareness of TB. This facilitated referral and a willingness to undergo trial of treatment when sputum was smear negative.

3. **Standardized treatment regimen of 6 to 8 months** for all sputum smear positive cases, with directly observed treatment (DOT) for at least the initial 2 months.

This treatment regimen is well understood, implemented and documented. In the Solomon Islands resistant mycobacteria have not emerged as a problem and therefore standardised regimens of first line drugs have high cure rates.<sup>3</sup> Patients and nurses are comfortable with the protocol of admitting patients to hospital for 2 months for the "intensive initial phase" of treatment, and this hospitalisation during the intensive phase is thought to achieve much higher rates of cure.<sup>4</sup> Mainly foreign doctors, both in Honiara and the provinces, question the basis of such extended admissions.

During patients' admissions with TB, the province's TB nurse notifies the patient's clinic nurse of the diagnosis by radio. The nurses make plans for continuation phase treatment to be given by the clinic nurse. This may be administered either at the clinic by DOT, or in packages each week for self-administration, depending on how near the patient lives to the clinic. Under the national protocol, all patients continue daily treatment regimens. When patients are discharged home after the 2-month intensive initial phase, they take the remainder of their medication supply, divided into 17 weekly packages, to their clinic nurse.

There is no routine TB follow-up arranged after hospital discharge. In Makira province both the TB nurse and myself were able to follow up patients during tours around the island. In general compliance in this continuation phase was good.

4. *A regular, uninterrupted supply of all essential anti-TB drugs.*

There was no rifampicin in the Solomon Islands for several weeks in December 2003 and January 2004, disrupting dozens of patients' treatment courses, delaying commencement of treatment for others and setting the stage for potential drug resistance that was previously unknown in Solomon Islands.<sup>3</sup> We had been warned of dwindling supplies of rifampicin for many weeks and it was difficult for me to understand why an apparently committed pharmacy service was unable to provide essential medications. The Australian-led intervention force was in Solomon Islands during this time but requests for assistance were directed back to the pharmacy service, which continued to promise that the medication would be on the plane the next day... or the next week. Plentiful supplies of rifampicin arrived in the last few weeks of our placement.

5. *A standardized recording and reporting system* that allows assessment of treatment results for each patient and of the TB control programme performance overall.

Systems had been established for standardized recording and reporting, but forms for documentation were no longer being printed. Drawing from provincial grants our health service could print our own forms for reporting. Solomon Islands has a Health Information System, but information seems to be easier to obtain from Australia than it was from Kirakira.

## Clinical

National guidelines enabled prioritisation, diagnosis and management of TB, optimising the

use of limited facilities. History, with further information from referral letters, together with repeated physical examination and 4 hourly observations provided much useful information. Sputum microscopy and chest x-ray further assisted. PPD for doing Mantoux tests was available for a brief period, but then the town's generator broke. Kerosene refrigeration was limited to vaccines only.

Solomon Islanders have different priorities from Australians, and they are aware of the difficulties the country is facing. Most community members and staff were happy for extended admissions for TB treatment, especially of underweight children, to assess weight gain and to observe 4 hourly temperatures.

Although we could request LFTs from the laboratory in Honiara, we never received a result within 3 weeks of our request, and the longest we waited for a result was 8 months. These delays meant that LFTs were never useful. During our time there we used clinical criteria and observed no side effects requiring alteration in management.

We diagnosed and managed 23 patients with TB over 2 years in Kirakira, giving an annual incidence of 38/100,000. The reported national incidence is 65/100,000.<sup>1</sup>

We had a competent, experienced and dedicated team of nurses who continued to work despite difficult circumstances including receiving no pay. Their dedication was awe-inspiring.

The importance of primary health care services to health in developing countries is well recognised, and tertiary referral centres are staffed or visited by specialists who ensure their findings are reported. However there is sparse literature on first level referral from rural primary health care setting.<sup>5</sup> The International Union against Tuberculosis and Lung Disease (IUATLD) recommends TB services, including microscopy services, be available for populations of 50,000 to 150,000 and reporting is then meant to be done for this population level. Published data on how this level of TB control actually functions however is limited.

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## Book Review

**Thomas DP. *Reading doctors' writing: Race, politics and power in indigenous health research 1870-1969.* 2004: Aboriginal Studies Press, Canberra.**

*Rosalie Schultz, CDC Alice Springs*

Our workmate David Thomas published this book expanding on his PhD thesis. Anyone involved in healthcare or research involving Aboriginal people may have their eyes opened by reading it.

The book describes the evolution of the representation of Aboriginal people in the *Medical Journal of Australia*, from the *Journal's* forerunners, through its first publication in 1914, up until 1969. Thomas discusses these representations, with the underlying research into Aboriginal health, and its motivation and technique. This leads readers to consider and question their own motivations and techniques, and how future researchers may view these.

For example, Thomas considers Anton Breinl and John Burton Cleland, who each contributed substantially to the publications on Aboriginal health. Breinl was fascinated by the diseases affecting Aboriginal people. His study of these diseases was explicitly to assist the white race to live in tropical Australia. Cleland wished to document a huge range of measurements of

Aboriginal people as part of his study of natural history (including the range of skin colourations of still-born Aboriginal infants). Only after complaints from the superintendent of the Haast's Bluff Settlement, and an accident at age 81, was his obsessive data collection halted.

Thomas is aware of the ease and purposelessness of playing "spot-the-racist or find-the-racist-remark" while examining early research. While much of the book seems to do this, the purpose is to enable us to learn from this history and understand our colleagues' work in its own context. As opinion-leaders in society, researchers have some obligation to consider their own motivations and techniques and possible outcomes of their work. The aim of the book "to promote a self-conscious dialogue about medical representations between Indigenous and non-Indigenous, and between the researched and researchers (both Indigenous and non-Indigenous)" is achieved. I recommend reading it to everyone who might find their name mentioned.

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## **Faecal & Other Body Fluid Accident Policy\*: Action to be taken following contamination**

*Environmental Health Program: January 2004*

### **In the event of faecal contamination in the pool:**

#### **Solid Stools-**

- All pool users in the immediate area should be asked to exit the pool.
- As much faecal material should be immediately removed from the pool with a fine mesh scoop. If necessary, the immediate area should be vacuumed with waste being directed to sewer or other approved waste disposal system. (Vacuum equipment should be cleaned and disinfected before reuse to prevent re-contamination).
- Spot chlorinate the affected area. This can be achieved by adding one litre of sodium hypochlorite or one cup of calcium hypochlorite to the affected vicinity.
- An arc of contamination extending from the point of the incident to the nearest wet deck, skimmer boxes or scum gutters should be roped off and closed for public use until the pool is reopened.
- If the pool is a low volume pool, such as a paddling pool, consideration should be given to closing and draining the pool. Spa pools should be closed and drained as the faecal matter will have dispersed. The low volume pool can be re-opened when it is re-filled with water and the chemical parameters are satisfactory.
- Check that pool chlorine levels overall are within regulatory chemical parameters. Where the chlorine concentration is satisfactory, allow the pool to be reopened. Where the chlorine concentration is low and the water is outside the chemical parameters the pool should be closed for one pool turnover (which is usually between 1-6 hours depending on volume of pool and capacity of filtering system). Chlorine &/or other chemicals should be added to achieve regulatory chemical parameters. Once the regulatory chemical parameters are satisfactory and confirmed through testing, the affected area may be opened to the public.

#### **Runny Stools-**

- All pool users in the immediate area should be asked to exit the pool.
- A coagulant\* should be added on and around the stool. The faecal material should be immediately removed from the pool with a fine mesh scoop. Spot chlorinate the affected area. This can be achieved by adding one litre of sodium hypochlorite or one cup of calcium hypochlorite to the affected vicinity. Where practicable, also add a coagulant to the filter media. The immediate area should be vacuumed with waste being directed to sewer or other approved waste disposal system. (Vacuum equipment should be cleaned and disinfected before reuse to prevent re-contamination).
- An arc of contamination extending from the point of the incident to the nearest wet deck, skimmer boxes or scum gutters should be roped off and closed for public use until the pool is reopened.
- If the pool is a low volume pool, such as a paddling pool, consideration should be given to closing, draining and cleaning the pool. Spa pools should be closed, drained and cleaned. The low volume pool can be re-opened when it is re-filled with water and the chemical parameters meet the standards.
- Check that pool chlorine levels overall are within regulatory chemical parameters. Where the chlorine concentration is satisfactory, allow the pool to be reopened. Where the chlorine concentration is low and the water is outside the chemical parameters the pool should be closed for one pool turnover (which is usually between 1-6 hours depending on volume of pool and capacity of filtering system). Chlorine &/or other chemicals should be added to achieve regulatory chemical parameters. Once the regulatory chemical parameters are satisfactory and confirmed through testing, the affected area may be opened to the public.
- Superchlorinate and backwash all filters that evening.

\* Coagulant = normal pool flocculant that is used to flocculate algae before backwashing

### **In the event of faecal contamination on the equipment or decking:**

- All pool users should be asked to leave the immediate area.
- As much faecal material should be immediately removed from the area and disposed into a sewer or approved waste disposal system.
- The area of contamination should be scrubbed and washed with low pressure water to the nearest floor drain. Care should be taken to avoid splashing water into the pool and to minimise the area of contamination.
- The contaminated area from the point of the incident to the floor drain should be treated with disinfectant (high strength chlorine or equivalent), roped off and closed for public use for at least 10 minutes before washing away.

### **In the event of contamination by blood, vomit and other body fluids:**

- The pool should be temporarily cleared and the contamination dispersed until there is no further trace. Tests for chlorine levels should be satisfactory before allowing people to swim.
- Blood and other body fluid spillage on the poolside should not be washed into pool side drains. It should be neutralised with a 1% chlorine solution (household bleach or a 10:1

dilution of sodium hypochlorite) for two minutes before being washed away.

- Ensure universal precautions are undertaken by all staff dealing with faecal matter, blood and other body fluids.

NOTE: All faecal and other body fluid accidents should be recorded and the action taken in the Log Book.

### **References**

1. Department of Health NSW – Public Swimming Pool and Spa Pool Guidelines, June 1996.
2. Government of Victoria, Department of Human Services, available [online] <http://www.dhs.vic.gov.au/phd/poolfacts/faecal.htm>
3. Queensland Health, Queensland Government – Code of Practice for the Control of Cryptosporidium and Giardia in Swimming Pools, Leisure Pools, Spas and Hydrotherapy Pools, 1998.

\*These are interim Guidelines and should be read in conjunction with *DHCS Water Quality and Hygiene Standard for Swimming, Diving, Water Slide and Paddling Pools, 1995*, which can be found at:

[www.nt.gov.au/health/healthdev/enviro\\_n\\_health/environmental/legislation/poolah.sml](http://www.nt.gov.au/health/healthdev/enviro_n_health/environmental/legislation/poolah.sml)

Comprehensive updated Guidelines will be developed later in 2004.

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## Letter to the editor

### Fireworks - Injuries and regulations

I have just finished reading the article "Firework related injuries -Territory Day Celebrations 2002" in *The Northern Territory Disease Control Bulletin*.

This article reads like another of those cries for banning of fireworks without any real understanding of the subject - fireworks.

Your table representing fireworks related injuries in Darwin 2002, does not detail what type of firework was involved. If you check detailed statistics from the US you will find most fireworks injuries are caused by Rockets, Firecrackers and illegal fireworks. Interestingly the humble sparkler is responsible for a lot more injuries and damage than the likes of the much enjoyed Fountain and Catherine Wheel.

Your article states:

66 grass fires which coincided with the sale of fireworks - What was the cause of the fires? Was it really fireworks or something else? Three dogs killed by cars and several animals injured during Territory Day celebrations. Fireworks really responsible? (It has been claimed in the ACT that the RSPCA has deliberately misled people with their statistics relating to stray animals during the Queens Birthday fireworks weekend.)

The article goes on to strongly recommend the Government ban private firework displays. In January of this year, the ACT revised the type of fireworks available to the public after much consultation, to the types that aren't explosive or overly noisy and that have acceptable performance characteristics. An MP made the comment "This bill is very much in line with our preferred approach, which is not to resort to bans and not to curtail unnecessarily the freedom and enjoyment of the people of Canberra, if the annoyance and harm that can be caused by fireworks can be reduced to an acceptable level".

In relation to risk, all fireworks are not the same and many provide a lot of enjoyment for families. Many innocuous items cause more injuries and damage than fireworks - skateboards, rollerblades, bicycles, household appliances, and

so on. I am sure if your author had a comprehensive knowledge of the various types of shopgood fireworks then he/she may have a different view. Do some more research and you will find that wherever fireworks are blanket banned, there is a thriving black market with no controls over the types used. (Western Australia blanket banned fireworks in 1967 and a thriving black market exists selling dangerous fireworks) Furthermore, making criminals out of mum and dad and the kids having a nice colourful show is a crime in itself.

Please don't be guilty of taking away more freedom and enjoyment of the people based on ignorance and misleading information. If you are going to write a responsible report on the subject, you need to put in a lot more effort than that I have just read.

Regards

John Stokes  
Licensed Professional Display Operator,  
Kalgoorlie,  
Western Australia

### Author and editor response

It is great to see the *Bulletin* is read so widely. The Darwin Centre for Disease Control has been conducting the annual Firework-related Injury Survey to better inform policy for the promotion of safe use of fireworks on Territory Day since 1998. These Surveys are intended to promote public safety and are not in place to support the ban of fireworks.

The 2002 Survey identified 14 firework-related injuries identified by General Practitioners or Emergency Department/Burns Clinic attendance with 5 classified as severe (4 with hospitalisation due to burns and 1 eye injury requiring day surgery) with an estimated monetary cost of these 14 injuries being \$33,421. There were also notable increases in numbers of fires, noise complaints, and injured/ killed animals around Territory Day when compared to other time frames suggesting fireworks were a factor. Also, though not mentioned in your letter, over half of the injuries in 2002 were to bystanders and there were 3.5 tonnes of debris left by fireworks for council workers to clear. These 2002 figures showed a reversal in the trend of injuries from 1998 to 2000 with an increase in number and

severity of cases. The preliminary findings from that year concluded that:

- the majority of reported injuries were due to operator error, poor parental supervision or folly,
- some cases were being investigated for impending prosecution and
- the perception was that there was an increase in the number of *display* fireworks sold illegally as a direct result of increased public demand for illegal fireworks.

Taking 2002's reversal of injury trend and other findings into account the recommendations from that year's Survey were:

- to extend the Survey to 5 major centre's across the NT,
  - for the Department of Health and Community Services (DHCS) to work with Office of Work Health and Electrical Safety (OWHES) early in 2003 to coordinate a firework safety campaign in schools,
  - for the DHCS, OWHES and Fire and Emergency Service's public affairs units to work together to develop a media safety awareness campaign,
  - to continue to support Burns Week from 24 June to 1 July to get maximum benefit in community safety awareness
- and as was pointed out,
- to strongly recommend to Government the gradual ban of private firework displays, starting with restricted hours of sale and use.

Faced with the reversal in trend and number of severe injuries (more than half to bystanders) such a recommendation, in the face of continued surveillance, was one that needed to be considered.

In 2003 the NT Government made it clear that it was not on their agenda to ban fireworks. The recommendations from the 2002 DHCS Firework-related Injury Survey were carried out for Territory Day 2003, including reducing the sale of fireworks from 3 to 2 days. The 2003

Survey revealed that there were 21 firework-related injuries in Darwin (with 32 overall reported throughout the NT), showing again an upward trend, however the number of severe injuries declined (from 5 in 2002 to 2 in 2003). Recommendations from the information collected and analysed in 2003 led to the following recommendations reported in the Sept 2003 edition of the *NT Disease Control Bulletin*:

- Continue the DHCS Firework-related Injury Survey across the NT
- Ban private fireworks at Mindil Beach and other public displays
- Coordinate a media campaign to encourage the public not to take fireworks to public displays
- DHSC to continue to work with the Fireworks Safety Group to target young adult males in future safety campaigns
- Educate community on the safety of sparklers

We fully agree that all fireworks are not the same and the sale and/or use of illegal fireworks (which ideally should be able to be eliminated) have in the past contributed to the number and severity of injuries. To better inform our safety promotion intent, the Survey will collect information to clearly identify the implicated device in the future.

Fireworks are fun, but they can be dangerous. Sadly over the past 5 years there have been 98 firework-related injuries recorded, many to children, kids under the age of 15. The CDC will continue to conduct this Survey to review the effectiveness of legislation and safety campaigns on preventing harm to Territorians during the Territory Day celebrations. The Survey Report for Territory Day 2004 will be available in the next edition of the *NT Disease Control Bulletin*.

Justine Glover, Chronic Disease and Injury Prevention Officer.

Vicki Krause, Editor, *Northern Territory Disease Control Bulletin*.

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## SARS update

### Global SARS

On May 18 the World Health Organisation (WHO) declared an end to the recent SARS outbreak in China.

- The total number of SARS cases to the end of June 2004 is 9. There are 7 confirmed cases in Beijing, and 2 confirmed cases in Anhui and 1 case is deceased.

### National SARS

#### *Reports of suspected cases in Australia*

There were 5 people investigated in Australia for SARS since the recent outbreak in China and all have been cleared of SARS (21 May 2004).

#### *Re-activation of enhanced SARS response measures*

- The Department of Health and Aging continues to monitor the world situation regarding SARS to ensure a prompt re-activation of response measures in the event of any future SARS outbreak.
- The trigger for resumption of activities will be 2 or more WHO confirmed cases in any part of the world.

#### *Current Australian SARS surveillance activities*

- The Communicable Diseases Network Australia has outlined recommendations for a

national approach to ongoing surveillance for and management of possible SARS cases in the post-outbreak period.

- Australia is currently maintaining surveillance for "alert" clusters of cases of apparent hospital acquired SARS, in staff, patients and/or visitors to the same health care facility.
- There have been no reports of clusters of SARS in healthcare facilities.
- Surveillance of laboratory requests for SARS-coronavirus testing is also being undertaken.
- Clinicians have also been advised to consider the possibility of SARS in patients with severe atypical pneumonia, including fever over 38°C and cough, without another apparent cause.
- The SARS Hotline (1800-004-599) remains in operation to provide general information on SARS. The hours of operation for the hotline are 8am to 6pm Monday to Friday. During other times, a recorded message directs callers to call during hours of operation or go to the Department's website for more information.

For further information from the Australian Government Department of Health and Aging on SARS see:

<http://www.health.gov.au/sars/index.htm>

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## Avian Influenza contact information and updates

The Australian Department of Health and Aging Hotline 1800 004 599

Australian Department of Health and Aging, Interim Protocol for public health management, advice for GPs is available at:

[http://www.health.gov.au/avian\\_influenza/protocol.htm](http://www.health.gov.au/avian_influenza/protocol.htm)

Department of Agriculture, Fisheries and Forestry. Frequently asked questions (avian influenza) at:

<http://www.affa.gov.au/content/output.cfm?ObjectID=17723CEC-2972-4F64-B340DE171A2E873A>

## Summary of selected notifiable diseases - 2003-04 wet season

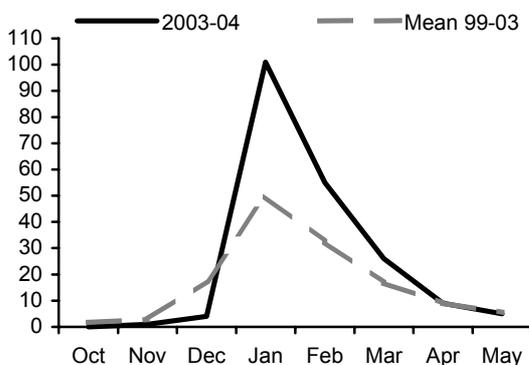
### Introduction

There are several notifiable diseases which have a seasonal peak over the Top End wet season or Central Australian summer; namely, October to May. Trends for these diseases are best presented at the end of the season rather than by calendar year, because relatively minor fluctuations in the peak months around year's start and end can have a disproportionate effect on annual data. This brief report summarises a few such diseases from the last wet season. Strictly speaking the wet season extends from October to March, but given that rainy conditions prevailed right up until the beginning of June this year, April and May have been included in these analyses. We have compared this seasons counts with the mean number of cases by month over the last 4 years; 1999-00 to 2002-03.

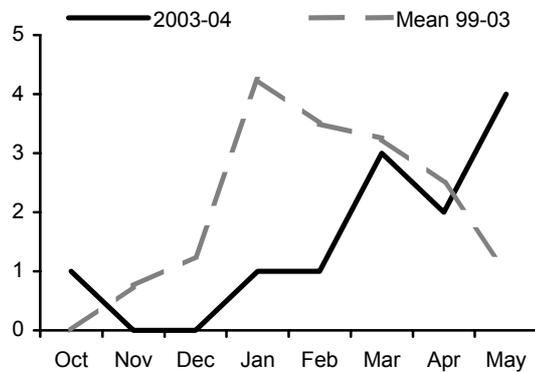
### Ross River and Barmah Forest Viruses

In January this year, 101 cases of Ross River Virus infection were notified making it one of the highest months on record. Although numbers fell during February and March there were still 48% more notifications (201) over the season compared with the mean of the previous 4 seasons (135.5; Figure 1). In contrast, cases of Barmah Forest Virus infection were down compared to the 4 year mean, although absolute numbers were small (Figure 2).

**Figure 1. Ross River Virus cases 2003-04 and 4 year mean 99-03**



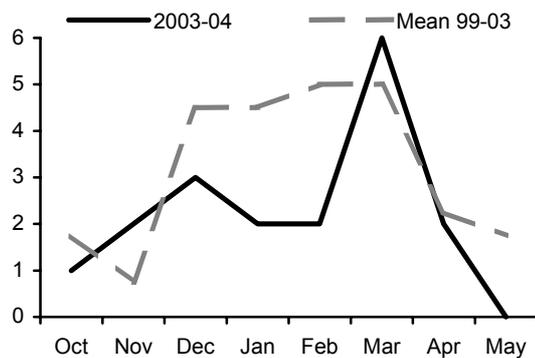
**Figure 2. Barmah Forest cases 2003-04 and 4 year mean 99-03**



### Melioidosis

Since the 2000-01 season there has been a decline in the number of cases of melioidosis and this year's number (18) was below the 4 year mean (25.5), although on a par with the previous 2 seasons (20 and 16 respectively; (Figure 3).

**Figure 3. Melioidosis cases 2003-04 and 4 year mean 99-03**

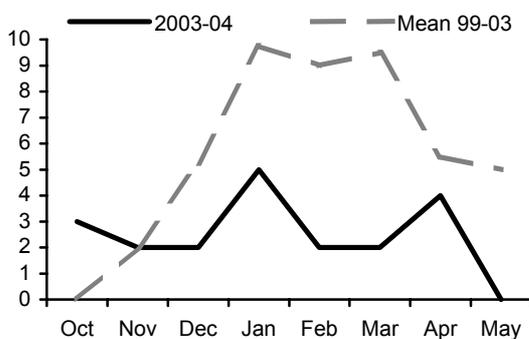


### Dengue

All dengue cases were acquired overseas, but there was still a wet season peak, with most cases being acquired in East Timor or Indonesia whose wet seasons correspond with ours. Cases this season (20) were below the mean number for the last 4 seasons (46) but if the large number

of cases (108) in 1999-00 season is taken into account (these were due to one-off events in East Timor) the last season was an average season (Figure 4).

**Figure 4. Dengue cases 2003-04 and 4 year mean 99-03**

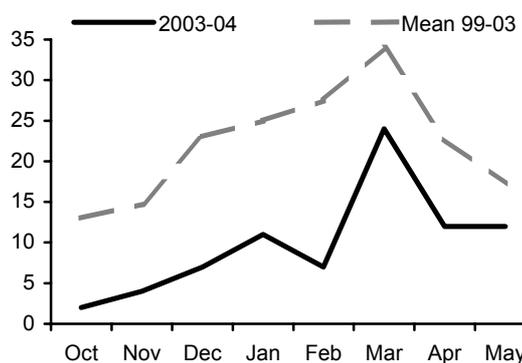


### Cryptosporidiosis

Like other enteric diseases cryptosporidiosis has a peak in the summer months and there has been

outbreaks over the wet seasons 2000-01 and 2001-02. This last season showed the similar pattern but far fewer cases, especially in Darwin where there were only 18 cases during the months in question compared with over 100 in each of the 2000-01 and 2001-02 seasons (Figure 5). There were 79 cases for the whole of the NT total compared with a mean of 177.3 over the previous 4 years.

**Figure 5. Cryptosporidiosis cases 2003-04 and 4 year mean 99-03**



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### Notified cases of vaccine preventable diseases\* in the NT By onset date 1 January to 31 March 2004 and 2003

DISEASES	TOTAL		No. cases among children aged 0-5 years	
	2004	2003	2004	2003
Congenital rubella syndrome	0	0	0	0
Diphtheria	0	0	0	0
<i>Haemophilus influenzae</i> type b	1	0	1	0
Hepatitis B	3	5	0	0
Measles	0	0	0	0
Meningococcal Group C	0	0	0	0
Mumps	0	0	0	0
Pertussis	1	4	0	0
Pneumococcal Disease*	18*	13*	3*	3*
Poliomyelitis, paralytic	0	0	0	0
Rubella	0	0	0	0
Tetanus	0	0	0	0

\* Pneumococcal disease numbers represent *all* serotypes of pneumococcal disease not just those contained in the pneumococcal conjugate (7vPCV) and polysaccharide (23vPPV) vaccines and therefore not all are vaccine preventable.

## Enteric diseases in the Northern Territory January - March 2004

*Karen Dempsey, OzFoodNet Epidemiologist, CDC Darwin*

### Outbreaks

One outbreak of foodborne disease occurred in Darwin during January 2004. Enhanced surveillance revealed a group of 3 family members, plus an additional 6 people, had eaten at a popular resort cafe on 2 January and become ill during the ensuing 36-48 hours. Seven of the cases tested positive for *Salmonella* Typhimurium PT108 or PT170, while 2 were epidemiologically linked (i.e. ill but no stool collected). Environmental inspections were inconclusive, apart from a minor breach in temperature control in a cold-food holding receptacle. Cross contamination between raw and cooked foods was not considered likely due to kitchen layout and strict adherence of staff to duties and preparation times. All foods collected for testing were negative for pathogens.

A non-foodborne disease outbreak of norovirus affecting 8 staff and 9 residents of an Aged Care facility in Darwin occurred in January. Transmission was thought to be person to person as the first case was diagnosed on 18 January and subsequent cases were diagnosed on an almost daily basis until 30 January. While there were neither major breaches of food safety and hygiene identified in the kitchen or major breaches of infection control procedures, the following measures, in accordance with Victorian Guidelines for Controlling an Outbreak of Gastroenteritis and Guidance for Institutions, were required to prevent further cases.

- Ensure that all staff members are advised of the outbreak and personal hygiene practices are reinforced.
- Ensure that ill staff members remain away from work for at least 48 hours after symptoms have ceased.
- Close the nursing home to new admissions whilst illness is ongoing.
- Thoroughly clean and disinfect all affected bedrooms, shared toilets and bathrooms, door handles, taps, flush buttons, etc using hot water and detergent followed by sanitising with a solution of 1000 ppm sodium hypochlorite.
- Steam clean soiled carpeted areas.

### Clusters

During the 1<sup>st</sup> quarter routine examination of the Northern Territory (NT) Notifiable Disease Surveillance System detected 2 clusters of *Salmonella* serovars on the database. Cluster surveillance is conducted on a weekly basis to identify groups of enteric disease cases with common characteristics such as serotype and age or location. The relevant public health staff are then contacted to identify additional links between cases and potential public health risks.

The first was a cluster of *Salmonella* Senftenberg (6 cases) notified by Alice Springs Centre for Disease Control (CDC) between 9 January and 30 March 2004. All were Indigenous residents of Alice Springs or south-western communities, with 4 aged less than 2 years of age and 2 aged over 25 years of age. There appeared to be a demographic association among cases. Investigation conducted by local health professionals failed to identify family links between cases. Food and water links were also considered unlikely.

The second was a small cluster of *Salmonella* Weltevreden (3 cases) notified by Darwin CDC between 5 and 24 February 2004. All were non-Indigenous residents of Darwin, with 2 aged between 3 and 8 months of age and 1 adult aged 40 years. No common links were identified among the 3 cases.

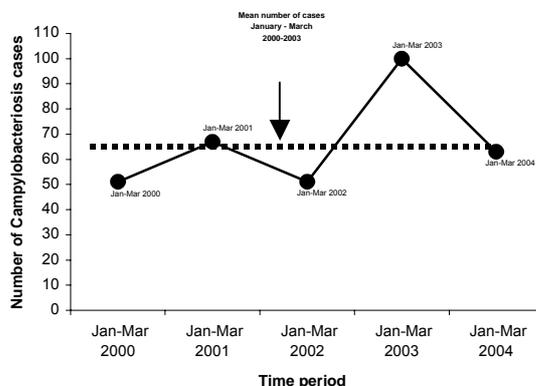
These results exemplify the difficulty in identifying causes of clustering of *Salmonella* cases.

### Enteric disease notifications

#### *Campylobacter*

From January to March 2004, a total of 63 cases of campylobacteriosis were reported throughout the NT, mostly in the Alice Springs region (41). This was a low figure compared to that reported during the same period last year, however it was comparable to the mean number of cases reported during January to March, 2000 – 2003 (Figure 1).

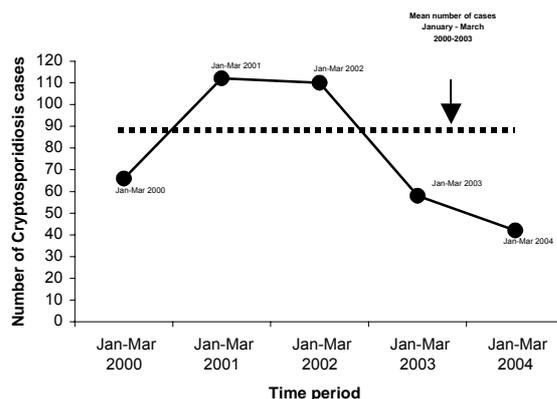
**Figure 1. Campylobacter, quarterly number of cases and average incidence, January – March 2000 - 2003**



### Cryptosporidium

There were 42 cases of cryptosporidiosis reported during the January to March quarter. Alice Springs region reported just over half (22) the cases while Darwin region reported very few (9). All were sporadic cases with none linked to swimming pools or child-care centres. The figure for this quarter was consistent with a downward trend observed last year (Figure 2).

**Figure 2. Cryptosporidium, quarterly number of cases and average incidence, January – March 2000 - 2003**



### Salmonella

The number of salmonellosis cases reported this quarter was similar to previous years (118 compared to a mean of 124). Children aged less than 5 years of age accounted for the majority (65%) of cases, however 6 cases of *Salmonella* Typhimurium PT 108/170, occurred in adults

suffering from food poisoning linked to consumption of food at a café.

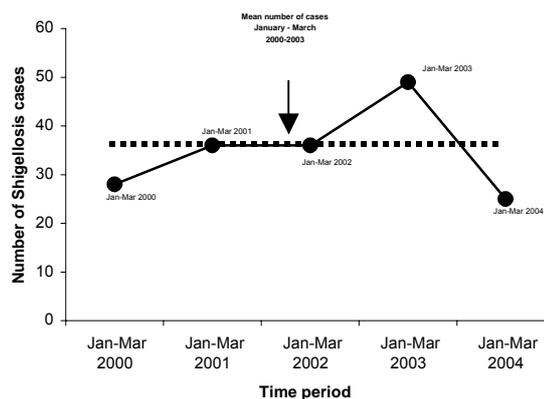
The leading serovar was *Salmonella* Typhimurium followed by *Salmonella* Saintpaul and *Salmonella* Ball. *Salmonella* Ball is usually the predominant serovar, however only 9 cases were reported this quarter, 4 less than the same period last year. Both *Salmonella* Saintpaul and *Salmonella* Ball are considered “environmental” in the NT and not generally linked to food or water.

One case of *Salmonella* Paratyphi B Var Java was reported in a 34-year-old non-Indigenous female from Darwin with no history of overseas travel but frequent contact with tropical fish prior to onset of illness. Imported tropical fish are recognised sources of this particular serovar.

### Shigella

There were 25 cases of shigellosis reported this quarter, mainly in Alice Springs region (22). This figure was considerably lower than the mean number (37) reported during the same quarter for the previous 4 years, 2000-2003 (Figure 3).

**Figure 3. Shigella, quarterly number of cases and average incidence, January – March 2000 - 2003**



### Listeria

One case of listeriosis was reported in a 30-year-old Indigenous antenatal. The diagnosis was made following admission to hospital in premature labour. Both mother and infant were delivered safely with no further complications.

### Other enteric disease notifications

Only 6 cases of hepatitis A were reported, 1 or 2 in each region with the exception of East Arnhem where no cases were reported. This was far fewer than the number (18) reported during the first quarter of last year and considerably (100%) lower than the mean number for the same period of the previous 4 years.

A total of 131 cases of rotavirus infection were reported during January to March. The wet season incidence is normally very low, however this high number reflected an unseasonable increase in cases in the Alice Springs region

during January and subsequent nosocomial transmission. Almost all cases diagnosed over a 2-week period in January were either admitted to the Alice Springs Hospital or diagnosed after admission to the hospital for other reasons. Nosocomial transmission was thought to contribute to approximately one third of cases. Following the rise in incidence in Central Australia, Katherine, Darwin and East Arnhem regions also experienced an increase in cases, although to a lesser degree.

There were no notifications of yersiniosis or haemolytic uraemic syndrome.

## Comments on Notifications 1 Jan to 31 March 2004 and 2003 (see p51)

### Congenital syphilis

For 10 of the 12 years since 1992, congenital syphilis figures in the NT have fluctuated between 1 and 8 cases annually. There was an unusually high number of congenital syphilis cases in 2001 and 2002, with 17 and 13 respectively notified. There were 8 cases in 2003, and no cases have been reported in the first quarter of 2004.

### HIV

There were 5 new notifications of HIV in the first quarter of 2004 with, 4 of these heterosexually acquired. Two of these 4 cases were diagnosed as a result of contact tracing.

### Meningococcal disease

There were 4 cases of meningococcal disease in the first quarter with 3 of these being group B

and the other unknown. This is an unusually high number for the first quarter, but it is not uncommon to have this number in other quarters of the year. The cases were widely dispersed geographically with no known association. There were no deaths.

### Rotavirus

Refer Enteric Diseases report above.

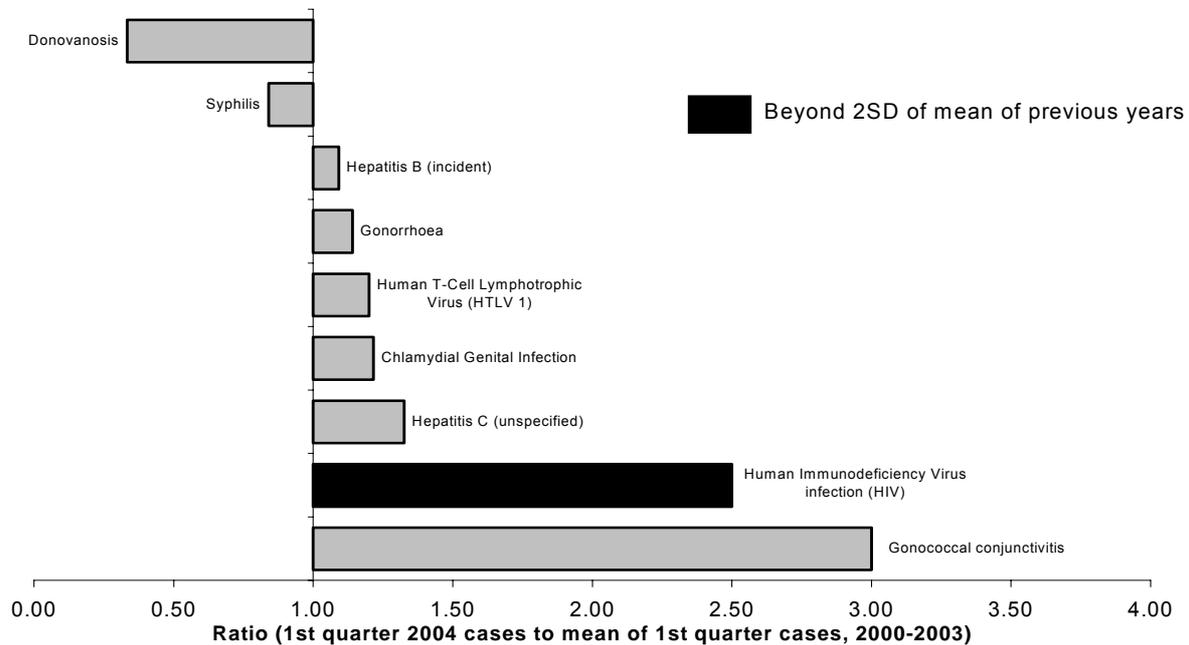
### Q Fever

There were 2 cases of Q fever in the NT in the first quarter of 2004 which was equal to the total number over the previous 10 years. However, these were sporadic cases; 1 in a foreign national working on a cattle boat and the other, not related to livestock, from Central Australia. Neither would qualify for the Q fever vaccination program.

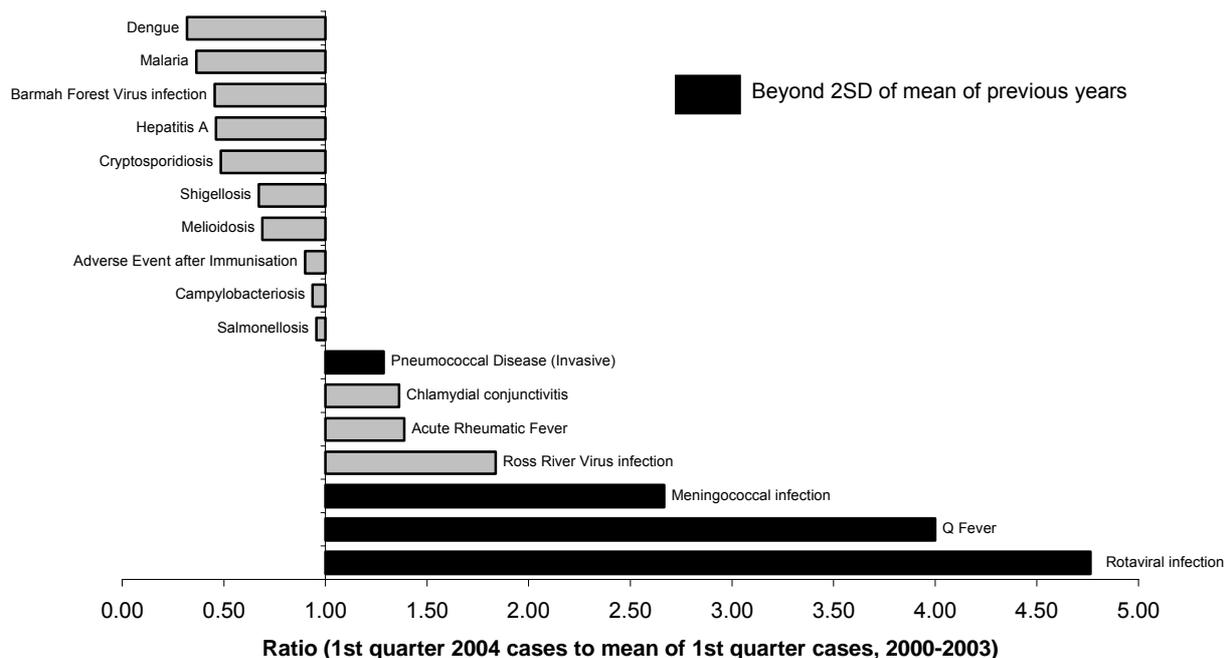
### Points to note regarding notifications (see p 51):

Anthrax, Murray Valley Encephalitis, Kunjin, Kokobera, Atypical Mycobacteria, Botulism, Brucellosis, Chancroid, Cholera, Congenital Rubella Syndrome, Diphtheria, Gastroenteritis, Gonococcal Ophthalmic Neonatal, Haemophilus influenzae not b, Hepatitis C (prevalence), Hepatitis D & E, Hydatid Disease, Leprosy, Leptospirosis, Lymphogranuloma venereum, Measles, Mumps, Orthithosis, Plague, Poliomyelitis, Rabies, Rubella, Tetanus, Typhoid, Typhus, Vibrio Food Poisoning, Viral Haemorrhagic Fever, Yellow Fever and SARS are all notifiable but had "0" notifications in this period.

**Change in 2004 1st quarter notifications compared to the mean of the 1st quarter for the previous 4 years: sexually transmitted infections and blood borne viruses (excludes congenital syphilis as there were 0 notifications).**



**Change in 2004 1st quarter notifications compared to the mean of the 1st quarter for the previous 4 years: selected diseases (those diseases with less than 5 notifications in the first quarter 2004 were excluded unless of public health importance or significant change beyond 2 standard deviations of the mean of the previous 4 years).**



## NT Notifications of diseases by onset date & districts

### 1 Jan to 31 March 2004 and 2003

Diseases	Alice Springs		Barkly		Darwin		East Arnhem		Katherine		NT	
	2004	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004	2003
Acute post-Streptococcal GN	0	0	0	0	0	0	0	0	1	0	1	0
Acute Rheumatic Fever	12	7	0	0	2	2	2	1	1	1	17	11
Adverse Event after Immunisation	2	1	0	3	5	4	0	0	2	2	9	10
Amoebiasis	0	0	0	0	0	1	0	0	0	0	0	1
Barmah Forest Virus infection	2	0	0	0	2	7	0	1	1	0	5	8
Campylobacteriosis	41	43	1	3	18	47	2	1	1	6	63	100
Chlamydial conjunctivitis	1	2	1	2	23	30	0	7	21	4	46	45
Chlamydial Genital Infection	148	193	11	3	158	157	25	38	38	35	380	426
Cryptosporidiosis	22	26	1	1	9	10	0	15	10	6	42	58
Dengue	0	0	0	0	9	6	0	0	0	0	9	6
Donovanosis	1	2	0	0	0	2	0	0	0	0	1	4
Gonococcal conjunctivitis	0	0	0	0	3	0	0	0	0	0	3	0
Gonorrhoea	195	173	17	8	78	133	29	43	59	16	378	373
Haemolytic uraemic syndrome	0	0	0	0	0	1	0	0	0	0	0	1
Haemophilus influenzae (type b)	0	0	0	0	1	0	0	0	0	0	1	0
Hepatitis A	2	4	1	0	1	10	0	0	2	4	6	18
Hepatitis B (incident)	0	1	0	1	2	2	0	0	1	1	3	5
Hepatitis C (unspecified)	4	4	2	0	51	32	1	1	1	3	59	40
Human Immunodeficiency Virus infect	0	0	0	0	3	0	2	0	0	1	5	1
Human T-Cell Lymphotropic Virus	9	3	0	0	0	1	0	0	0	0	9	4
Influenza	0	1	0	0	1	0	0	0	0	1	1	2
Legionellosis	0	0	0	1	0	1	0	0	0	0	0	2
Listeriosis	0	0	0	0	1	0	0	0	0	0	1	0
Malaria	0	2	0	0	5	11	0	1	0	0	5	14
Melioidosis	0	2	0	0	7	9	0	0	3	2	10	13
Meningococcal infection	2	0	0	0	0	1	1	0	1	0	4	1
Pertussis	0	0	0	0	1	0	0	3	0	1	1	4
Pneumococcal Disease (Invasive)	10	3	1	2	3	7	1	1	3	0	18	13
Q Fever	1	0	0	0	1	1	0	0	0	0	2	1
Ross River Virus infection	2	0	1	3	154	77	7	9	18	14	182	103
Rotaviral infection	87	2	6	0	23	8	7	1	8	1	131	12
Salmonellosis	37	25	4	5	64	50	7	4	6	29	118	113
Shigellosis	22	41	0	1	1	3	2	2	0	2	25	49
Syphilis	36	35	0	1	16	22	4	5	10	13	66	76
Syphilis - congenital	0	2	0	0	0	0	0	0	0	0	0	2
Trichomoniasis	97	60	11	3	37	48	26	35	7	16	178	162
Tuberculosis	2	2	2	0	3	1	0	1	4	2	11	6
Yersiniosis	0	0	0	0	0	0	0	1	0	0	0	1
	<b>735</b>	<b>634</b>	<b>59</b>	<b>37</b>	<b>682</b>	<b>684</b>	<b>116</b>	<b>170</b>	<b>198</b>	<b>160</b>	<b>1,790</b>	<b>1,685</b>

## NT Malaria notifications January – March 2003

*Merv Fairley, CDC Darwin*

Five notifications of malaria were received for the first quarter of 2004. The following table provides details about where the infection was thought to be acquired, the infecting agent and whether chemoprophylaxis was used.

Number of cases	Origin of infection	Reason exposed	Agent	Chemoprophylaxis
1	PNG	holiday	P vivax	yes
1	PNG	holiday	P falc	yes
1	West Timor	holiday	p falc	no
1	East Timor	working	p falc	unknown
1	East Timor	Working	P falc	no

## Disease Control staff updates

### Community Paediatrics

Tom Snelling is the community paediatric registrar replacing Alison Tigg.

### Environmental Health

Debbie Fortuin (from New Zealand) and Rachel Sheppard (from Victoria) have recently joined us as EHOs working with Environmental Health Central Australia (Alice Springs).

Gabrielle Halcrow will start as an EHO in Katherine on 29 July.

Russell Spargo and Ray Anderson have returned to the NT and taken up short term contracts as EHOs in Katherine and Darwin respectively.

Rosalyn Roche is a an EHO from NSW who is working as a Poisons Inspector with Poisons Control Section.

Mick Kinnaird (EHO) has transferred from East Arnhem to Darwin Urban and Kelly Monaghan (EHO) has transferred from Darwin Urban to Darwin Rural.

Andrew Jackson is a Darwin raised EHO currently working in Victoria who is coming back to Darwin for a 12 month contract for Rachael Gaffney who will shortly be on maternity leave.

### Immunisation

Kylie Ryan is coordinating the Meningococcal C Immunisation program with Rosemary Day and Amy Ryan employed to implement the program in Darwin primary schools.

Jill Palmer from Emergency Department, Katherine Hospital is replacing Nancy Nyberg while she is on leave from Katherine CDC.

### Medical Entomology

William Pettit has commenced with Medical Entomology Branch on a six month contract to fill in for Gisi Lamche while she is on maternity leave. For the past 13 years William has worked with CSIRO Entomology in the area of weed biological control.

### TB/Leprosy

Pam Blacker provided excellent relief in the TB program Alice Springs from mid March, until the end of June. She has moved to Bulman in Arnhem Land, working as a RAN for Sunrise.

Helen Tindall has now transferred to the TB Public Health Nurse position and Nicole McIntosh has transferred to the general CDC position from Sexual Health.