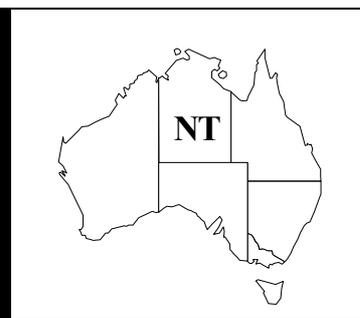




THE NORTHERN TERRITORY DISEASE CONTROL BULLETIN



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The NT Disease Control Bulletin

The *NT Communicable Diseases Bulletin* has a new name this edition. The change reflects the NT Disease Control Program's involvement in the epidemiology, prevention and management of chronic diseases linked to applied research under the direction of the Community Physician, Dr Tarun Weeramanthri. Previous articles about chronic disease have included:

1. *Any improvement in blood sugar control, however small, may help prevent the complications of diabetes.*
2. *Treat lipids aggressively in patients with known cardiovascular disease.*
3. *Cholesterol reduction: base your primary prevention strategy on overall cardiovascular risk and emphasise non-drug options first.*
4. *Hypertension control - choose your drug carefully, and monitor its effects.*

This edition covers the use of aspirin in persons with stable cardiovascular disease, or persons at risk of developing cardiovascular disease.

Other articles in the past have highlighted the NT Chronic Diseases Network, established in 1997 to 'promote improved communication, coordination, collaboration and collective memory in the area of the common chronic diseases', the Rheumatic Heart Disease Control Program and the Chronic Obstructive Airways Disease Project.

The Chronic Diseases Network Project Officer, Steve Morton, is also based in Disease Control and is contactable on 8922 8280. He edits a monthly

newsletter, *The Chronicle*, distributed to Network members. Anyone with an interest in chronic diseases is invited to join the Network and receive the newsletter.

The Editors of *The NT Disease Control Bulletin* welcome any contributions with a chronic disease focus from our readers.

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1998/99 Federal Budget: Initiatives in adult immunisation and the diagnosis of sexually transmitted diseases

The Commonwealth Government announced that as part of new health initiatives in the 1998/99 Budget, influenza vaccine would be made free of charge to all Australians over age 65 years. The program will start in the 1999 influenza season. Free vaccine is seen as one way of improving vaccine uptake among elderly Australians, one of the recognised groups at risk of the complications of infection with influenza.

Of greater significance to the NT is the Federal Government's proposed funding for primary health care initiatives for Aboriginal and Torres Strait Islander people. New funding that will impact on communicable disease control include the National Indigenous Pneumococcal and Influenza Immunisation Program and a Health Program Grant to provide Polymerase Chain Reaction (PCR) technology to ATSI people for the detection of sexually transmitted disease (STD).

The National Indigenous Pneumococcal and Influenza Immunisation Program aims to increase pneumococcal and influenza immunisation coverage by making both vaccines free of charge at the point of service through community controlled Aboriginal Medical Services, State Health Authorities and general practitioners. Influenza vaccinations will be

administered to individuals on an annual basis, with pneumococcal vaccination every five years.

Influenza and pneumococcal disease are major causes of acute respiratory disease within the indigenous population. Respiratory disease is the third largest contributor to indigenous death. The cohort population, as recommended by the NHMRC, will extend to 80% of 15-50 year olds and all indigenous peoples over 50 years of age.

A second important initiative is the Health Program Grant to be established from 1 July 1998 to provide PCR technology for STD diagnosis. PCR will be funded as a screening tool, thereby increasing access to improved diagnostic technology. This will impact on management of STDs to reduce prevalence rates of STDs and the transmission of HIV. PCR technology has a greater sensitivity than conventional testing techniques, is less invasive and unaffected by delayed transport time or extremes of temperature.

The grant will provide PCR technology for the diagnosis of gonorrhoea, chlamydia and trichomoniasis in hyperendemic areas, including the NT. Details of the funding allocation are still being negotiated.

Non-Communicable Diseases Update: No.5.

Message: Offer aspirin to anyone with known cardiovascular disease, unless contra-indicated

*Tarun Weeramanthri, Community Physician, CDC, Darwin and
Di Howard, Specialist Physician, Royal Darwin Hospital*

This summary was written for the Guidelines, Standards and Audit Team within the Coordinated Care Trials. It deals with the use of aspirin in persons with stable cardiovascular disease, or persons at risk of developing cardiovascular disease. It does not deal with the use of aspirin in the specific situations of unstable angina, acute ischaemic stroke, atrial fibrillation, the period immediately following angioplasty or coronary artery bypass surgery, or in the prevention of venous thrombosis.

Background

Aspirin, through its effect on prostaglandins, decreases the aggregation of platelets, which are crucial to thrombotic cardiovascular disease. Aspirin, therefore, has the potential to reduce the risk of such events.

Effect in secondary prevention

- An overview of 133 trials of antiplatelet therapy, including a total of 53,000 patients with known

- cardiovascular disease, concluded that aspirin reduces the risk of cardiovascular events by about 25%.¹ Non-fatal myocardial infarction and stroke are reduced by 30% and fatal myocardial infarction and stroke by about 15%. About 40 serious vascular events are avoided for every 1,000 high risk patients treated for a few years with aspirin.
- Most of the trial data has been gathered from male subjects, but the benefits seem to extend to women.²
- In the acute phase of evolving myocardial infarction, aspirin has the best benefit-to-risk ratio of any proven therapy.³

Effect in primary prevention

There have been two randomised controlled trials. The US Physicians' Health Study with over 22,000 male participants showed a statistically significant 44% reduction in risk of first myocardial infarction, but with a possible increase in haemorrhagic strokes in the aspirin group.⁴ A far smaller British trial, also limited to male physicians, showed no significant effects of aspirin.⁵ An overview of both trials showed a highly significant 32% reduction in risk of non-fatal myocardial infarction.⁶ Additional data will become available from the current Women's Health Study which has 40,000 US female healthcare professionals enrolled in a trial of low-dose aspirin.²

Side effects

- Overall, aspirin may increase the risk of gastrointestinal bleeding up to three fold. The effect is dose-dependent. The risk of gastro-intestinal bleeding is reduced at dosages less than 300 mg per day, and may be reduced further as the dose approaches 75 mg.⁷
- The value of enteric coated aspirin, in terms of a possible decrease in gastrointestinal bleeding, is still being debated.⁸
- Aspirin doubles the risk of cerebral haemorrhage,⁹ an effect which is not clearly dose-dependent.
- Aspirin has no effect on the progression of diabetic retinopathy, and can be used safely in those with diabetic retinopathy.¹⁰
- The following are *contraindications* to the use of aspirin: aspirin allergy, bleeding tendency, anticoagulant therapy, recent gastrointestinal bleeding, clinically active hepatic disease, previous haemorrhagic stroke.¹⁰

Recommendations

Secondary prevention

- Ensure that anyone with known cardiovascular disease (ie a past history of myocardial infarction, angina, transient ischaemic attack, thrombo-embolic cerebrovascular accident, or peripheral vascular disease) is on aspirin, unless contraindicated.
- Aspirin should be continued indefinitely unless contraindications arise.²

Primary prevention

- The *routine* use of aspirin in primary prevention of cardiovascular disease *cannot be recommended in people at low risk* of adverse cardiovascular events, since the potential haemorrhagic complications outweigh the possible benefits.
- It is recommended that people with diabetes¹⁰ should be offered aspirin if they have one or more of the following risk factors:
 - i. hypertension
 - ii. hyperlipidaemia
 - iii. obesity (BMI >30)
 - iv. smoker
 - v. micro- or macro-albuminuria
 - vi. family history of premature coronary disease
- However, it should also be considered in those without diabetes but at *high risk* of a cardiovascular event because of the presence of multiple risk factors. It is a matter of balancing the patient's individual risk factor profile with the demonstrated benefits of aspirin in reducing risk of a first myocardial infarction in males and the possibility of haemorrhagic side effects (gastrointestinal and cerebral). The risk:benefit ratio is likely to be favourable if the person's overall cardiovascular mortality risk exceeds 40-50 per 1,000 person years.⁹



Dosage considerations

- The most effective dose of aspirin is yet to be determined, but dosages between 75-325 mg daily are as effective as higher dosages. A dose of 150 mg. This is the cheapest way to give aspirin.
- Daily dosages above 75mg have the desired physiological effects within a few days and special low dose formulations containing 100 mg of drug are widely available.⁷
- In emergencies, such as an acute myocardial infarction, a dose of 150-300 mg ensures a rapid onset of action. Ideally, the tablet should be chewed or crushed, so that absorption occurs through the buccal mucosa; this is particularly important if the preparation is enteric-coated.³
- In a person with diabetes, because of complex haemostatic changes, a dose of at least 300 mg is recommended.⁹
- When used to delay the progression of proven carotid stenosis, it is the practice, particularly in North America, to use at least 650 mg of aspirin.¹¹

Other agents

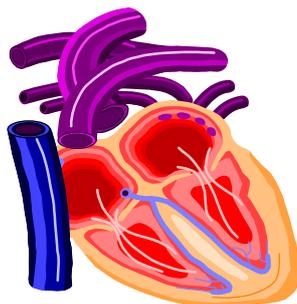
- There is no evidence that combining aspirin with another antiplatelet agent is more effective than aspirin alone.¹
- Alternatives to aspirin include the following antiplatelet agents: the older agents - sulfinpyrazone and dipyridamole; and the newer agents - abciximab, ticlopidine (risk of neutropenia is 1%), and clopidogrel.¹²⁻¹⁴ Consult a specialist physician for advice on these agents.

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Moreover, dosages less than 160 mg daily seem as effective as dosages greater than 160 mg.⁷

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Tampon testing - improving access to STD screening for women

Maree Dunn - Former Project Officer, AIDS/STD Unit, Darwin

Rates of sexually transmitted diseases (STDs) in the Northern Territory (NT) are considerably higher than the rest of Australia, especially in the Aboriginal population, although the non-Aboriginal population also has higher rates. Fairley et al suggest that the main determinant of the high rates of infection amongst Aborigines is the lack of access to services rather than any difference in the rate of partner change between Aboriginal and non-Aboriginal people.¹

Barriers to reducing the prevalence of STDs in remote communities include difficulty accessing appropriate sexual health services and reluctance of the "at-risk" population to present for check-ups due to the invasive nature of investigations. The asymptomatic nature of most STDs creates the dilemma that there will be no significant decrease in transmission rates if public health strategies are aimed simply at treating people who present with symptoms of disease.

Conventional diagnostic means of testing for common bacterial STDs, eg. gonorrhoea and trichomonas, rely upon the culture of organisms which may not survive the journey from patient to laboratory. With all these factors in mind, the AIDS/STD Unit Darwin, in collaboration with Menzies School of Health Research and Royal Women's Hospital Melbourne, undertook the "Tampon Study" to determine the acceptability and accuracy of self-inserted tampons as a method of specimen collection to detect STDs in women.

Methods

Indigenous and non-indigenous women attending community health centres, family planning clinics and sexual health clinics in the Top End of the NT were invited to participate in the study. Usual presentations were for well women's checks, Pap smears, routine antenatal care, STD screening or with symptoms of disease. Tampons collected from these women in both urban and remote centres were sent to Melbourne for testing by PCR for *Chlamydia trachomatis* (CT), *Neisseria gonorrhoeae* (NG), and *Trichomonas vaginalis* (TV).² Swabs were processed by the health centre's usual laboratory service.

Table 1 Tampon use

During phase 1 of the study women were asked about their familiarity with tampons and to nominate their preference for tampons or swabs as a technique for STD screening. They were then asked to have both the tampon test and routine swabs for the purpose of the study. PCR results from tampons were compared with results from conventional methods (Gene Probe for CT, microscopy and culture for NG, and for TV either Pap smear, microscopy or culture on trichomonas medium).³ In the second phase of the study, tampon and urine specimens were collected from each woman and tested by PCR for CT, NG and TV. McNemar's test was used to determine whether there was a statistically significant difference in the sensitivity of urine PCR and tampon PCR for detecting these infections in women.⁴

At the end of January 1998 we examined results from tampons tested at Royal Women's Hospital as well as notifications of chlamydia and gonorrhoea from CDC in Darwin for two distinct time periods; July-November 1996 and November 1997-January 1998. These two time periods were chosen to reflect times when health centre activities in respect of STD screening were quite different. Results from the first six month period deal with testing done as part of routine health centre activities. During a second three month period, tampon testing was performed as part of coordinated programs aimed at offering STD screening to as many Aboriginal women as possible. We wanted to determine the benefit of the self administered tampons as a tool to improve access to STD screening for Aboriginal women, and to determine if there were any obvious trends in STD prevalence in communities across the Top End.

Results

The tampon test (T-test) was highly acceptable to all women. In phase 1, of 509 women asked to participate in the study, 480 (94%) agreed, and 84% of these said they preferred the tampon test to conventional swabs. An important finding was that many Aboriginal women were familiar with using tampons (Table 1), and of the women who had never used tampons, more than 75% were willing to use them for the study.

Phase 1 (n = 480)

Indigenous status	Always use (%)	Sometimes use (%)	Never use (%)
Ab	42	34	24
Non-Ab	63	28	9

Table 2 shows that detection of *C. trachomatis*, *N. gonorrhoeae* and *T. vaginalis* was significantly greater by PCR from tampon specimens than by conventional methods.

Table 2 Comparison of conventional swabs vs tampon PCR for detecting STDs Phase 1 (n = 480)

	Conventional tests	T-test
Gonorrhoea	4 (1%)	52 (11%)
Chlamydia	14 (3%)	26 (5%)
Trichomonas	45 (9%)	75 (16%)

During phase 2, when urine PCR was compared to tampon PCR, we found that urine was as sensitive as tampons for the diagnosis of chlamydia, but the tampon was significantly more sensitive for gonorrhoea and trichomonas (Table 3).

Table 3 Comparison of urine PCR vs tampon PCR for detecting STDs Phase 2 (n = 452)

	Urine PCR	Tampon PCR	Sig-nificance
Gonorrhoea	10%	21%	p < 0.01
Chlamydia	6%	7%	NS
Trichomonas	18%	22%	p < 0.01

Following completion of the formal part of the study, there were 830 T-tests processed in the 6 month period from July-December 1996; most of them done as part of routine health centre activities when women presented with symptoms of disease, were named as "contacts", or were tested as part of antenatal screening. During the 3 month period November 97-January 98, there was increased activity promoting "well women's" health programs in Aboriginal communities with staff from the AIDS/STD unit assisting communities to run screening programs. 1,372 women were tested during this 3 month period. There was a statistically significant decrease in the proportion of both trichomoniasis (p < 0.004) and gonorrhoea (p < 0.001) infections detected in women who were screened in the latter period (Table 4).

Table 4 Comparison of Tampon test results for two distinct time periods

Time period	CT positive	TV positive	NG positive	Number tested
Jul 96- Dec 96	6%	24%	20%	830
Nov 97-Jan 98	4%	18%	10%	1372

Table 5 details the number of notifications of gonorrhoea and chlamydia for the three regions across the Top End for the two distinct time periods previously described. Not only was there a marked increase in the detection, and subsequent treatment of infection in the 3 month period but also an increase in the proportion of infections detected by tampons (for example 170 out of 202 cases of gonorrhoea diagnosed by T-test in the first period compared to 126 out of 129 gonorrhoea cases diagnosed by T-test in the second time period).

Table 5

	Gonorrhoea		Chlamydia	
	Male	Female	Male	Female
July 96 - Dec 96				
Darwin	39	119	33	105
Katherine	27	46	15	30
East Arnhem	3	37	4	16
TOTAL	69	202 (170 by T-test)	52	151 (50 by T-test)
Nov 97 - Jan 98				
Darwin	33	65	34	53
Katherine	15	30	8	20
East Arnhem	5	34	3	24
TOTAL	53	129 (126 by T-test)	43	97 (56 by T-test)

The majority of infections were detected in women between the ages of 20-24 years (20% of positive tests). However infections were detected in women as young as 11 years and as old as 64 years. Thirty three women who had been tested in the first period (Jul-Dec 96) were tested again in the latter time period. Of these, 6 tested positive for infection in both time periods (despite adequate treatment), and 3 women who tested negative in the earlier time period, tested positive for infection later.

Discussion

The "tampon study" revealed that a self-administered tampon was an acceptable tool for screening women for STDs. PCR testing of tampon

specimens was significantly more sensitive than either conventional swabs or urine PCR for CT, NG and TV, and has been accepted as the standard diagnostic tool for detecting these infections in women in the Top End of the NT.

Health staff and female clients have become accustomed to the convenience of the self-administered T-test for screening and contact tracing and are now reluctant to apply invasive diagnostic procedures to screen asymptomatic women. This was borne out when tampon testing was suspended for five months due to lack of funds. From discussions with remote area staff we know that minimal screening of women was undertaken between June 1997 until interim funding to resume T-testing for indigenous women was provided by the Office of Aboriginal & Torres Strait Islander Health (OATSIHS) in November 1997.

Results from testing done during the two different time periods discussed earlier demonstrate the benefits of concerted screening activity in detecting disease in asymptomatic women. Active promotion of well-women's programs in Aboriginal communities has led to greater exposure to convenient, acceptable tampon testing of many more women. The increased testing in the second 3 months period over the first reflects this. There is a marked increase in the cases of chlamydia and gonorrhoea notified when screening programs are pursued. (It is reasonable to project that the number of infections detected in the 3 month period would be roughly doubled in a six month period - Table 5). This means more infections detected, more people being treated for infections, therefore a greater opportunity for preventing the morbidity which can result from untreated STDs eg pelvic inflammatory disease, infertility.

It must be pointed out however that tampon testing for screening does not eliminate the need for Pap smears or internal examination of women with symptomatic disease.

Notifications for STDs in males most likely reflect men who presented symptomatically or who were tested because they were named as "contacts". It is possible that contact tracing of women with infections could have led to the increase in notifications of men with disease (Table 5). Attempts were made to have men's screening programs closely aligned with the promotion of women's screening, but this has not been as easy to

pursue. Strategies to address the needs of men are urgently required.

We are optimistic that the "Top End STD project" due to commence in the next few months will lead to coordinated education, screening and treatment of both men and women. This CRC project is a joint effort of the AIDS/STD unit, Menzies School of Health Research and the Department of Epidemiology and Preventive Medicine, Monash University. It aims to determine the most effective and efficient way to reduce the prevalence of endemic STDs in Aboriginal communities in the NT by using the more convenient screening tools of tampon PCR for chlamydia, gonorrhoea and trichomonas in women, and urine PCR for chlamydia and gonorrhoea in men.

Conclusion

Effective public health programs to control STDs must detect asymptomatic infections. We suggest that programs aimed at coordinated screening and treatment of STDs will make a difference to the endemicity of STDs in Top End communities, given that we now have such acceptable and sensitive diagnostic techniques. Staff not qualified (or not permitted in the case of male staff) to do a full gynaecological examination can request a tampon test at any time. We believe that the self-administered tampon technique represents a major advance in the diagnosis of STDs for women and provides us with a tool for greatly improved management and hence control of STDs in our population.

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Enhanced influenza surveillance in the Top End

Sue Reid, CDC, Darwin

Background

In May 1997, influenza A (H5N1) virus was isolated from a three year-old boy who died in Hong Kong. This was the first-ever reported case of an avian influenza virus directly infecting a human. Prior to this, the H5 subtype had been known to infect only various species of birds, including chickens and ducks. Between May and December 1997, a total of 18 human cases of the Hong Kong 'bird flu' were confirmed with 6 deaths. The onset date of the last reported case was on 28 December 1997. Epidemiological studies suggest that the main source of infection was by contact with infected poultry with little if any person to person transmission.

Since past global epidemics (pandemics) of influenza are thought to have arisen through genetic reassortment between circulating human and avian influenza subtypes, the emergence of the new H5 subtype acted as the catalyst for the establishment of an 'Australian Influenza Pandemic Planning Committee' in December 1997. One of the first tasks in the strategic approach to the Hong Kong 'bird flu' was to enhance influenza surveillance Australia wide and particularly in the Top End since new strains of influenza are often identified here before they become established in other parts of the country.

Although concerns over the much publicised Hong Kong 'bird flu' seem to have proven unfounded so far, there is still a chance that the H5 subtype could mutate into a more transmissible form of influenza in humans. Given that the last three influenza pandemics this century were all thought to have originated in South East Asia and since a future pandemic is highly likely to affect Australia before countries of the northern hemisphere, we cannot afford to become complacent. Timely recognition of new variants of type A influenza viruses is the cornerstone of pandemic preparedness.¹

Enhanced influenza surveillance in the Top End - the process

A three month period of enhanced influenza surveillance commenced in the Top End on 1 February 1998. Surveillance activities involved the participation of sentinel general practitioners (GPs),

health care providers in rural and remote communities, medical, nursing and administrative staff at Royal Darwin Hospital (RDH), Education Department (Top End high school nurses), RDH laboratory, Western Diagnostic Pathology, Queensland Medical Laboratory and the WHO Collaborating Centre for Influenza Reference and Research.

Three types of surveillance data were collected during the period of enhanced surveillance. These included laboratory diagnoses, sentinel GP consultation data and absenteeism among nursing staff at RDH and Top End high school students.

Throat washings collected from individuals who strictly met the clinical case definition of influenza were forwarded to the WHO Collaborating Centre for Influenza Reference and Research in Melbourne from the sentinel GPs, rural and remote communities, RDH outpatients and RDH inpatients with respiratory illnesses. Approximately thirty sentinel GPs reported on a weekly basis the number of clinical cases of influenza seen according to the Australian Sentinel Practice Research Network (ASPREN) case definition of influenza which requires the presence of six of the following features: sudden onset of most symptoms (within 12 hours); cough; fever; rigors or chills; prostration and weakness; myalgia or widespread aches and pains; no significant respiratory physical signs other than redness of nasal mucosa and throat; or influenza in close contacts. Weekly absenteeism data were collected on RDH nursing staff and Top End high school students as a non-specific, indirect measure of influenza activity.

Results

Laboratory surveillance

Only one of seventy-seven throat washes forwarded to the WHO Collaborating Centre for Influenza Reference and Research between 1 February and 30 April 1998, proved culture positive to influenza A H₃N₂ (Sydney-like strain). Serological testing on RDH inpatients also confirmed a case of influenza B and parainfluenza type 3 in February and March respectively.

**Figure 1 Sentinel Influenza Surveillance NT Top End and ASPREN
Jan - April 1998**

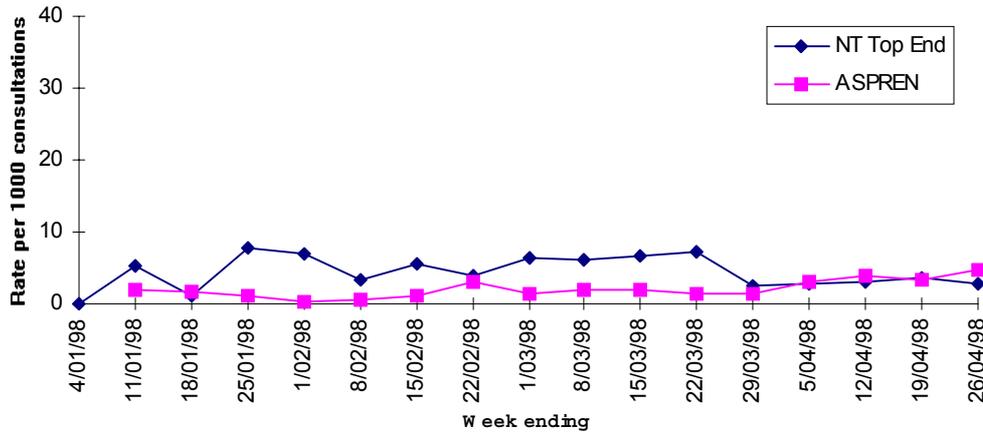
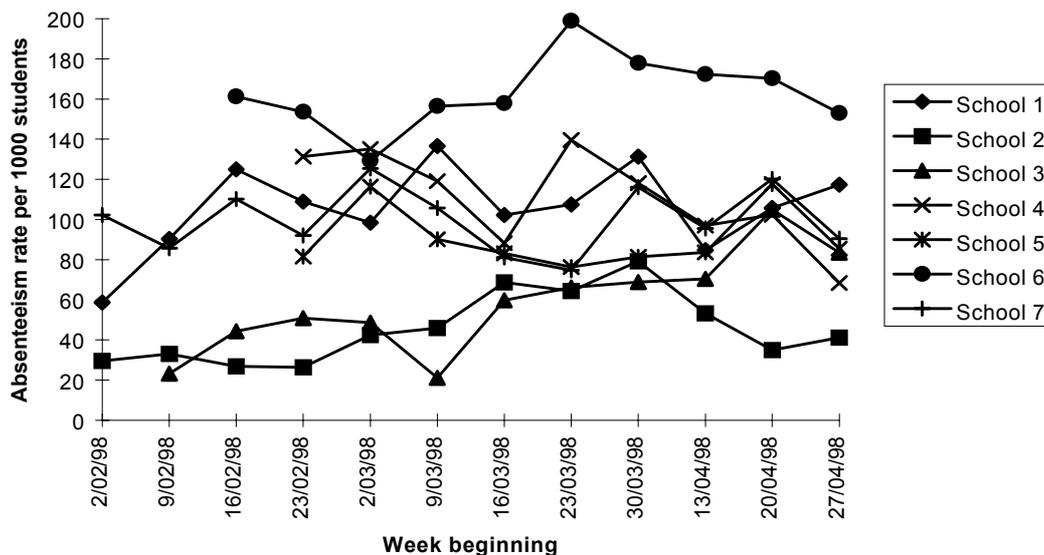


Figure 2 Top End High School Absenteeism



Top End sentinel general practitioner surveillance

Weekly consultation rates for influenza-like illness recorded through the Top End sentinel influenza surveillance scheme from January to April 1998 illustrates a constant low level of activity, with baseline consulting rates ranging from 0-7.7 per 1000 consultations (Figure 1). In the NT, epidemic activity is defined if the rate exceeds 30 per 1,000 for at least 2 consecutive weeks. A large epidemic may peak at 100 cases per 1000 consultations. Although the rates exceed those recorded by the ASPREN for the first three months, this can probably be attributed to the larger number of Top End GPs recording consultation data in the sentinel

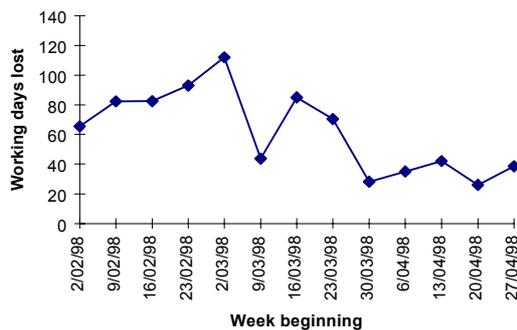
surveillance scheme relative to the number of GPs recording for the whole of Australia.

Absenteeism surveillance

Figure 2 shows absenteeism rates per 1,000 students in seven Top End high schools. The week beginning 6 April coincided with the Easter school holidays and therefore data were not collected for that week. Discussion with school nurses throughout the enhanced surveillance period confirmed that the somewhat erratic rates of absenteeism observed was a relatively common pattern. There were no apparent trends or clustering that could be attributed to increased influenza activity.

Figure 3 shows sick leave absenteeism data amongst RDH nursing staff, reported as the number of working days lost by staff providing a medical certificate. Although there were occasional anecdotal reports of staff being 'off sick with the flu', the lack of positive influenza results during the enhanced surveillance suggested that other common respiratory pathogens were circulating in the community at the time. The variation in nursing staff absenteeism rates could not be explained, but were not attributed to influenza activity.

Figure 3 RDH nursing staff absenteeism with medical certificate



Discussion

The three month period of enhanced influenza surveillance appears to have coincided with the lowest levels of clinical influenza activity in the Top End since surveillance began in 1996. Despite the lack of laboratory confirmed cases and constant low consultation rates recorded by the Top End general practitioner surveillance scheme, the program was well received by all those who contributed data. Our observations have been confirmed by very low levels of influenza activity currently reported in all other States.

The throat washes supplied and analysed by the WHO Collaborating Centre for Influenza Reference and Research in Melbourne proved a simple and acceptable, non-invasive means of testing patients for influenza virus. The WHO laboratory is able to report on subtypes and antigenic analysis of influenza viruses isolated, thus providing information on the degree to which circulating viruses are related to current vaccine strains and strains circulating elsewhere in the world. It was through the WHO laboratory last year that the A/Sydney strain was isolated in a number of Top End Aboriginal communities experiencing influenza outbreaks in October/November. One limiting factor in the use of throat gargles as the main diagnostic test during the surveillance period was that respiratory viruses other than influenza could

not be identified. In the early stages of an outbreak of influenza-like illness, in order to quickly identify the causative organism, it may be useful to collect a throat swab for culture for other respiratory viruses, in addition to the throat wash specimen which is only cultured for influenza virus.

Absenteeism surveillance, whilst lacking the specificity of laboratory data, can provide an indirect measure of influenza activity, particularly during epidemics. In August 1996, high rates of nursing staff absenteeism at RDH during an outbreak of influenza A resulted in the cancellation of elective theatre lists and the closure of a ward. Also, one of the military bases in Darwin reported that high rates of 'flu' had resulted in the cancellation of some planned exercises.² Given that we did not experience an outbreak of influenza during the three month surveillance period, it is not surprising that the absenteeism data collected from RDH nursing staff and Top End high school students showed no apparent trends or clustering.

Although not inundated with reports of clinical influenza and diagnostic specimens, the three month period of enhanced surveillance proved a very useful exercise indeed. A network of communication was established and there was a big collaborative effort on all fronts. While there is no real need to continue the enhanced surveillance at present, should there be a notable increase in influenza-like illness in the Top End over the next few weeks or months, the program can be reactivated quickly and efficiently. In the meantime, Top End sentinel GPs continue to record consultation data as part of the Tropical Influenza Surveillance Scheme. Also, influenza continues as part of the diagnostic workup of inpatients with sudden severe respiratory disease.

Acknowledgments

The Centre for Disease Control would like to extend their thanks and appreciation to all those who participated in the enhanced influenza surveillance program.

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A case presenting diagnostic difficulties: making sense of flavivirus serology in the Top End of the Northern Territory

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Abstract

In early April 1998 the Centre for Disease Control (CDC) in Darwin was notified of a case with positive dengue serology. The illness appeared to have been acquired in the Northern Territory (NT). Because dengue is not endemic to the NT, locally acquired infection has significant public health implications, particularly for vector identification and control to limit the spread of infection. Dengue IgM serology was positive on two occasions but the illness was eventually presumptively identified as Kokobera infection. This case illustrates some important points about serology. The interpretation of flavivirus serology is complex and can be misleading, despite recent improvements. The best method of determining the cause of infection is still attempting to reconcile clinical illness details with incubation times and vector presence, as well as laboratory results. This approach ultimately justified the initial period of waiting for confirmatory results in this case, before the institution of public health measures necessary for a true case of dengue.

Introduction

Dengue fever is a flavivirus infection transmitted by the mosquito *Aedes aegypti*. After an incubation period of 7-10 days it causes a flu-like illness with high fevers, chills, myalgia and headaches. Distinctive features include retro-orbital headache and bone pain (it is also known as "breakbone fever"). It can be a severe, occasionally fatal illness, causing haemorrhage and shock. The last documented cases of dengue fever in Darwin occurred in 1955. Surveys since 1974 have found no *Ae. aegypti* mosquitoes in the NT.¹ Proven locally acquired dengue in 1998 would necessitate an expensive program of enhanced human and entomological surveillance, NT quarantine, and control measures.

Case study

On 2 April 1998, CDC in Darwin received a laboratory notification from a local doctor of a suspected case of dengue in a Darwin resident recently returned from a four week holiday in before 1989. There was no four fold titre rise in total antibody to support an acute infection, and it was

Queensland. A 20 year old university student had presented to his general practitioner on 17 March 1998 complaining of a two day history of fevers, chills, myalgia, pharyngitis and headache. The illness was short lived: he defervesced after three days but had persistent myalgia and remained tired for a week. He made a complete recovery.

He denied any travel further north up the Eastern seaboard than suburban Brisbane. He had not been overseas since 1989 and had not been north of Rockhampton since 1993. Extensive questioning failed to reveal alternative sources of exposure to the dengue vector. On return he had been well for 22 days.

Progress

Dengue serology was ordered by his doctor because of his travel history, but the illness was most likely locally acquired in the NT on epidemiologic grounds. The clinical illness was not consistent with classic dengue, there being no bone pain nor retro-orbital headache. Dengue serology was repeated to ascertain whether there was a fourfold rise in total antibody titre.

Ae. aegypti is not readily caught in the usual CO₂ baited traps. This necessitates expensive and time consuming house to house searches of water containers with larvae and adult biting catches. Three CO₂ traps around the patient's house were set in mid April on two occasions and the results of ongoing exotic *Aedes* ova trap surveillance were reviewed while the serology was pending. No *Ae. aegypti* or *Ae. albopictus* (another recognised vector of dengue) were captured and the overall numbers of adult mosquitoes caught at the residence were low.

On both 17 March and 2 April 1998 the patient's screening flavivirus serology showed a titre of 1:160 with a positive dengue IgM (Table 1). However, given the highly variable nature of persistence of flavivirus IgM² it was felt that this could have been evidence of old infection, either from 1993 in Queensland or as a less likely possibility from India

unlikely that at presentation to his doctor on day 2 of the illness an IgM test would be already positive.

Table 1 Results of flavivirus tests performed at the PathCentre laboratory in Perth

	17/3/98	2/4/98	20/4/98
Haemagglutination inhibition			
Flavivirus screen	1:160	1:160	1:160
Murray Valley encephalitis	1:160	1:160	1:160
Kunjin	>1:640	1:320	1:320
Enzyme Immunoassay			
Ross River IgM	NR		
Barmah Forest IgM	NR		
Fluorescent Antibody			
Murray Valley encephalitis IgM	NR	NR	n/a
Dengue IgM	Reactive	Reactive	n/a
Kunjin IgM	NR	Weak reaction	n/a

NR - Not reactive

A more likely possibility was that his test results were due to another flavivirus infection giving a false positive dengue result, which has been documented previously.³ Unfortunately there was no serum left from the first bleed to check initial titre, or for further specialised tests such as virus polymerase chain reaction (PCR) or culture. In order to exclude other flaviviruses, the remaining second bleed serum and a further specimen were sent to Queensland Health Scientific Services for further testing. The results are shown in Table 2.

On the basis of these results Queensland Health Scientific Services staff were confident that this constituted a presumptive Kokobera infection. This flavivirus is known to cause occasional human infection.⁴ Although the Kokobera total antibody showed a nondiagnostic one titre rise, the IgM test showed a clear positive result. There was also a two fold rise in total antibody to Stratford, but the IgM was negative.

More importantly, the laboratory tests did confirm that the infection was not dengue, in this case justifying the wait for serology results before further public health action was taken.

Table 2 Results of flavivirus tests performed at Queensland Scientific Services laboratory

Enzyme Immunoassay	2/4/98	20/4/98
Flavivirus IgG	Reactive	Reactive

not routinely requested. If our patient had had a travel history consistent with vector contact in

Dengue IgM	NR	NR
Encephalitic flavivirus group IgM ¹	NR	NR
Non-encephalitic Australian group Flavivirus IgM ²	Reactive	Reactive
Ross River IgG and IgM		NR
Barmah Forest IgG and IgM		NR
Haemagglutination inhibition(HAI)		
Murray Valley encephalitis	40	20
Dengue 1	80	80
Dengue 2	40	20
Dengue 3	20	20
Dengue 4	20	20
Alfuy	160	80
Kunjin	40	80
Kokobera	80	160
Stratford	80	160
Japanese encephalitis	80	80
Ultracentrifugation and HAI		
Kokobera		Reactive
Stratford		NR

¹ Group includes antigens from Japanese encephalitis, Murray Valley encephalitis, Kunjin

² Group includes antigens from Kokobera and Stratford

Conclusions

Laboratory Testing

Specific flavivirus serology results, particularly IgM results, are unreliable; they may be elevated for a period of some years, or falsely elevated because of related but distinctly different flavivirus or other arbovirus infections with very different public health implications. If significant public health action rides on a flavivirus result, it is safer to rely on a two titre (four fold) rise in antibody level over the acute phase of illness, with sera tested in parallel to ensure a consistent reading under identical conditions, than an isolated positive IgM result. It is therefore very important to obtain repeat blood samples so that sera can be retested in parallel. In the NT setting with no established vector populations this approach is sensible. However in other parts of Australia such as northern Queensland where *Ae. aegypti* is present a faster diagnosis is necessary. This may involve a greater reliance on the clinical picture and an attempt to demonstrate the virus in acute serum, either by virus culture or PCR.

Because of the high rate of cross reactions in flavivirus serology, a positive screening test should be approached with an open mind. Specific tests for other flavivirus infections including Kokobera are

Queensland he would have been notified as a case of dengue, and yet if he had not travelled to

Queensland he would not have had dengue serology requested in the first place. It is a timely reminder that one may need to spread a diagnostic net more widely when considering the cause of an arboviral infection.

Public Health Action

This case also reinforces the importance of ensuring that all factors - laboratory tests, clinical and epidemiologic data are consistent before making a diagnosis that has considerable public health implications. Our case of "dengue" was suspect from the start because the clinical illness was inconsistent and there was no entomological evidence that the vectors were present in Darwin. The assumption that this was not dengue was borne out by reference laboratory testing and justified the wait for results before vector identification and

control strategies, as well as human health service alerts, were implemented.

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Hepatitis B vaccination and health care providers: Are you putting yourself or your patients at risk of hepatitis B infection?

Nan Miller, Senior Project Officer, CDC, Darwin

The blood-borne virus most commonly transmitted in the health care settings, hepatitis B (HB), is also the one that is most easily prevented. Vaccination against HB is safe, effective and readily available to all health care providers. Unfortunately, many do not take up the offer or do not complete the three doses required for a good immune response. This not only puts the provider at risk of HB infection but also the patients in his/her care.

An article in the *New England Medical Journal of Medicine* reported an incident in which one surgeon infected at least 19 patients with hepatitis B without evidence of inadequate infection control. Here is the story.

In July 1992, a 47 year old woman without identified risk factors became ill with acute HB four months after undergoing a thymectomy in which a thoracic surgery resident participated. This surgeon was found to be susceptible to hepatitis B virus (HBV) on testing in December 1989 before completing a general surgery residency. He began the thoracic surgery residency program in July 1991. He was offered the HB vaccine but never received it. In January 1992, he became fatigued and in February he had jaundice with detectable HB

THS Recommendations

surface antigen (HBsAg) and IgM antibody to HB core antigen (HBcIgM). He withdrew from surgical duty until March 1992, when his symptoms resolved. He returned to practising surgery without any additional tests for HBsAg or HBe antigen (HBeAg). He was still positive for HBsAg and HBeAg in July 1992, when the index patient was identified, and was relieved of surgical duties pending an investigation. During the same period at least 18 other patients were infected with HBV following surgery in which this surgeon participated.

The investigation found that the HBsAg subtype and the partial HBV DNA sequences from the surgeon were identical to those from the infected patients. The surgeon had HBeAg and a high serum HBV DNA concentration.¹

This outbreak had tragic consequences for the case patients, their families and the surgeon who left surgical practice indefinitely. The entire episode could have been prevented if the surgeon had received HB vaccination when it was offered.

If you are a health care provider with direct patient contact and are not fully vaccinated against HBV (3

doses of HB vaccine), DO NOT DELAY - start or complete your HB vaccination course now.

If you are a health care provider and have direct patient contact you should:

- be fully vaccinated against HBV (3 doses);
- have your immune status checked post vaccination (ideally within three months); and
- have a single booster every five years.

Refer to the revised *NT Hepatitis B Vaccination Policy* (May 1998) for details of THS program.

You owe it to yourself and to the patients in your care.

Reference

1. Harpaz R, Von Seidlein L, Averhoff FM, Tormey MP, Sinha SD, et al. Transmission of hepatitis B virus to multiple patients from a surgeon without evidence of inadequate infection control. *N Engl J Med* 1996; 335: 549-554.

Hepatitis B Revised Public Health Management Guidelines

Definitions

HBsAg = hepatitis B surface antigen indicates acute infection or chronic carriage with hepatitis B virus (HBV).

HBcIgM = IgM antibody to hepatitis B core antigen indicates acute HBV infection.

HBeAg = hepatitis B e-antigen indicates acute infection or continued (chronic) highly infectious state.

HBsAb = hepatitis B surface antibody indicates immunity to HBV due to past infection, by vaccination or after passively acquired antibody (short term eg 3-6 months) from hepatitis B immunoglobulin (HBIG).

HBcAb = hepatitis B core antibody indicates current or past infection with HBV.

Notification criteria

A case of acute HBV must be notified if clinical findings and laboratory tests (liver enzymes etc) confirm an acute HBV infection. The investigation form (Appendix 1) will assist in determining if the patient has acute or chronic HBV infection.

Communication

The Centre for Disease Control should consult with the patient's medical practitioner to offer assistance with counselling and in identifying and managing contacts.

Management of case

Try to identify the source and mode of the infection, and the possibilities for further spread.

Provide advice on the nature of the infection, mode of transmission and importance of identifying sexual, household and other close contacts.

Advice given to case:

- adopt safer sexual practices;
- do not donate blood during acute infection and as long as test remains surface antigen positive;
- do not share injecting equipment;
- do not share razors or toothbrushes and keep them out of the reach of children;
- wipe up blood spills with tepid soapy water and/or solution of household bleach and water;
- cover cuts and wounds with waterproof adhesive dressing; and
- dispose of blood-stained tissues etc safely.

Management of contacts

Transmission from index case may have occurred through:

- perinatal exposure;
- sexual exposure;
- sharing injecting equipment;
- biohazard injuries; or
- close contacts or household members by undefined mechanisms.

Pre-vaccination testing for HBsAg, HBcAb and HBsAb is recommended for sexual and household contacts of acute or chronic HB individuals.

If:

- ⇒ HBsAg negative, HBcAb negative and HBsAb less than 10 IU/ml, offer primary HB vaccination course as per 'NT Hepatitis B Vaccination Policy' or a single booster (if previously vaccinated).
- ⇒ HBsAg negative, HBcAb negative and HBsAb greater than or equal to 10 IU/ml, no further action is required, recommend booster every 5 to 10 years.
- ⇒ HBsAg positive and HBcAb positive, do not vaccinate, refer to medical practitioner for clinical assessment. Identify contacts and initiate management of contacts.
- ⇒ HBsAg negative, HBcAb positive and HBsAb negative, this most often represents remote resolved infection with selective loss of HBsAb. May also represent the 'window' period of acute infection, chronic infection with HBsAg below the limits of detection, or a false positive result. Refer to an infectious diseases physician or liver clinic.
- ⇒ HBsAg negative, HBcAb positive and HBsAb positive. Person is immune, record in notes, no further follow-up.

If HBsAg and HBsAb are negative, post-exposure prophylaxis may be indicated for the contacts:

Type of exposure	Hepatitis B immunoglobulin		Vaccine	
	Dose	Recommended timing	Dose	Recommended timing**
Perinatal	100 IU IM	within 12 hours of birth	0.5ml IM	within 7 days repeat at 1 & 6 months
Percutaneous#	400 IU IM	within 24 hours (up to 72 hours)	1.0ml IM*	within 7 days repeat at 1 & 6 months

** The first dose can be given at the same time as the hepatitis B immunoglobulin but at a separate site.

* 0.5 ml for persons under 10 years of age.

For more details, refer to district hospital Biohazard Injury Protocol.

Sexual exposure

- ⇒ Sexual contact of a newly diagnosed acute HBV infection with or without a clinically compatible illness (ie HBsAg +ve and HBcIgM +ve):
 - Offer HBIG and HB vaccination (refer below for dosage and recommended timing).
- ⇒ Sexual contact of a newly diagnosed prevalent HBV infection (ie HBsAg +ve, HBcAb +ve, HBeAg +/-ve):
 - If new sexual partner - consider HBIG and HB vaccination (refer below for dosage and recommended timing).
 - If long-term sexual partner - offer HB vaccination as per schedule (HBIG probably not indicated in this situation).

HBIG: 400 IU IM within 14 days of sexual contact.

HB vaccine: 1.0 ml IM* within 7 days, repeat at 1 and 6 months (the first dose can be given at the same time as the hepatitis B immunoglobulin but at a separate site).

Post-vaccination testing for HBsAb +/- HBsAg 3 months after the third dose of vaccine is recommended for sexual and household contacts of acute or chronic HB individuals.

If:

- ⇒ HBsAb greater than or equal to 10 IU/ml - booster every 5 to 10 years.
- ⇒ HBsAb less than 10 IU/ml - booster now and every 5 to 10 years.

Refer to the revised 'NT Hepatitis B Vaccination Policy' (May 1998) for details on pre, post-testing and vaccination of perinatal contacts and to district hospital Biohazard Injury Protocols for percutaneous and permucousal exposures.

Feedback

Report the result of case/contact investigations to the doctor who notified the case.

The following appendices are included in the guidelines:

- Appendix 1 Hepatitis B Investigation Form
- Appendix 2 Public Health Management Flowchart

For a full copy of the revised guidelines, contact Nan Miller on 8922 8564 or fax 8922 8310.

Hepatitis A

Revised Public Health Management Guidelines

Definitions

IgM antibody to hepatitis A virus indicates acute or convalescent phase of hepatitis A infection.

IgG antibody to hepatitis A virus indicates the recovery phase or past infection and immunity against hepatitis A virus infection.

Notification criteria

A case of acute hepatitis A virus (HAV) infection must be notified if clinical and laboratory tests (markedly elevated liver enzyme levels and IgM anti-HAV positive) confirm an acute HAV infection.

Communication

The Centre for Disease Control should consult with the medical practitioner of the patient with acute HAV infection to offer assistance in counselling the patient, source investigation, identifying and managing contacts.

Management of case

Try to identify the source of infection and possibilities for further spread. The Enteric Investigation Form should be used to guide this process.

Provide counselling on the nature of the infection, mode of transmission and importance of identifying contacts. The pamphlet 'HEPATITIS A - WHAT YOU NEED TO KNOW' will assist with this process.

Exclude case from school/work if food handler, pre-school child or child care worker until one week after the onset of jaundice or other symptoms.

Advice given to case:

- wash hands thoroughly with soap and running water after going to the toilet;
- wash hands thoroughly with soap and running water before eating or preparing food;
- do not donate blood during acute infection;
- do not prepare or handle food for others; and
- do not have oral-anal sex.

Management of contacts

Definition: A contact is defined as a person who had close contact with a confirmed case during the

two weeks preceding and one week after the onset of jaundice including:

- staff and children at a child care facility, particularly if there are children in nappies or being toilet trained at the facilities;
- household and sexual contacts;
- if case is a foodhandler, then all other foodhandlers in the same establishment; and
- residents and staff at an institution giving custodial care.

Prophylaxis for contacts:

Consider the need for normal human immunoglobulin (NHIG, 0.02 ml/kg).

NHIG should be given as soon as possible or within 7 to 10 days after exposure.

Note: In areas/countries where hepatitis A is endemic ie remote, rural Aboriginal communities, current NT practice is that NHIG should not be given to children under 5 years of age because hepatitis A is a mild disease in childhood and natural infection confers long lasting immunity.

⇒ Maintain surveillance of contacts for a six week period.

⇒ Investigate possibility of food or water-borne source.

⇒ Staff and residents of institutions and child care facilities should be reminded of general hygiene practices, in particular hand washing before eating or preparing food and after going to the toilet.

⇒ NHIG should be considered for all staff and attendees of child care centres that have children in nappies if:

- cases are recognised in household contacts of two or more of the enrolled children.

NHIG may be indicated for common source exposure, eg. food borne or water borne, if exposure is recognised early. NHIG is not recommended for persons with a common source exposure after cases have begun to occur.

Feedback

Report results of case/contact investigation to the doctor who notified the case.

For a full copy including appendices, contact Nan Miller on 8922 8564 or fax 8922 8310.

Revised Guidelines for the Control of Diphtheria in the NT

Background

Corynebacterium diphtheriae is endemic in the Northern Territory (NT), and is regularly cultured from wound and nasopharyngeal swabs, particularly in Aboriginal people. Universal vaccination with diphtheria toxoid and maintenance of adult boosters with adult diphtheria tetanus (ADT) vaccine at least once every 10 years is the only effective control measure. Although vaccination against diphtheria does not prevent or reduce carriage of *C. diphtheriae*, it helps boost antibody levels against the diphtheria toxin and hence protects against development of the toxigenic disease. The presence of *C. diphtheriae* does not necessarily mean that the person has *systemic* disease.

Strains of *C. diphtheriae* can be divided into those that produce toxin ('toxigenic strains') and those that do not ('non-toxigenic strains'). The usual cause of life-threatening disease is toxin production from toxigenic strains, but cases of invasive endocarditis and septicaemia by non-toxigenic strains have also been reported. From 1993 to 1997, there were no cases of systemic diphtheria or toxigenic strains reported in the NT.

Clinical features

Infection with *C. diphtheriae* can cause a spectrum of illness ranging from subclinical to severe life-threatening disease. Inapparent infections outnumber clinical cases. Two types of disease can occur:

1. A superficial and usually mild infection of the nose, ear, throat, skin, wound, or eye, often with a purulent discharge. Twenty percent of patients with cutaneous diphtheria also have infections in the nasopharynx with the same biotype.
2. Disease from the toxin of *C. diphtheriae* ('toxigenic disease'), is very serious with a mortality in excess of 20%. The most important manifestation is the production of a membrane across the back of the throat causing respiratory obstruction. Other manifestations of the toxin are myocarditis and blood disorders. Late neurological effects of the toxin include cranial and peripheral motor and nerve sensory palsies that may appear 2-6 weeks after the absorption of the toxin. Ten to fifteen percent of pharyngeal diphtheria cases may result in cardiac toxicity, with neurotoxicity in up to 75%. Toxigenic

disease can result from infection by toxigenic strains of *C. diphtheriae* anywhere on the body.

Collection of specimens from suspected case

- Nasopharyngeal cultures should be obtained with a flexible alginate (wire) swab that reaches deep into the back of the nose.
- Throat cultures should be taken with a cotton swab that is firmly applied to any area with a membrane or inflammation.
- Any chronic crusting lesion should also be swabbed. Before cultures of wounds are taken, lesions should be cleansed with sterile normal saline and crusted material removed. A cotton-tipped applicator should then be firmly applied to the base of the wound.
- Transport in ordinary semi-solid transport medium, such as Amies or Stuarts.

Public health action

Public health action of some degree is required for any isolation of *C. diphtheriae* from any infected site. Refer to sections on management of cases and contacts.

Case definition for notification

Systemic disease caused by both toxigenic and non-toxigenic strains of *C. diphtheriae*, as well as *any* toxigenic strains are notifiable. CDC Darwin should be alerted of such cases by telephone, fax or email. Non-toxigenic cutaneous diphtheria is not notifiable in the NT.

Mode of transmission

Droplet spread usually by person-to-person contact, but occasionally through food or articles soiled with discharges from infected lesions (eg clothes, bed linen or table surfaces). Raw milk has also served as a vehicle.

Incubation period

Usually 2 to 5 days, but may be much longer.

Period of communicability

Variable, until virulent bacilli have disappeared from discharges and lesions (usually more than 2 weeks; seldom more than 4 weeks). Rarely chronic carriage.

Susceptibility and resistance

Infants born of immune mothers are relatively immune; protection is passive and usually lost by 6

months. Clinical disease does not always lead to lasting immunity: conversely, immunity is often acquired through inapparent infection.

Method of diagnosis

Culture of *C. diphtheriae* from the infected site. Direct microscopy is of no value.

Management of cases

- **Clinical systemic diphtheria/results of toxigenicity pending**

⇒ Confirm with the local laboratory that the specimen has been sent to IMVS for urgent PCR toxigenicity testing. A result should be available in 24-48 hours.

Since clinical systemic diphtheria is usually caused by a toxigenic strain it is a **medical emergency**. Management involves seeking advice from an experienced physician, and includes the administration of antibiotics (refer to relevant section on page 5) and equine diphtheria antitoxin on the basis of clinical diagnosis alone. Administration of antitoxin is the most important aspect of treatment in this situation and must not be delayed until bacteriological/toxigenicity confirmation. Life support measures, including endotracheal intubation or emergency tracheotomy may be necessary to overcome respiratory obstruction.

Cases should remain in strict respiratory isolation until two cultures from both the nose and throat taken not less than 24 hours apart, and not less than 24 hours after ceasing antibiotic therapy, are negative for diphtheria bacilli. If culture is impractical, isolation may be ended after 14 days of appropriate antibiotic treatment. Active surveillance for further cases should commence. Notify the local doctor or health centre.

CDC should also be notified on suspicion of diphtheria by phone, fax or email for advice on contact tracing. Refer to section on management of contacts.

- **Toxigenic infection**

The management of toxigenic infections in the absence of systemic disease involves seeking advice from an experienced physician, as it may involve the administration of equine diphtheria antitoxin.

Vigorous cleansing of wounds, if present, and the administration of antibiotics is recommended.

The same isolation criteria apply as for systemic disease above. There should also be heightened surveillance and follow-up of contacts. Refer to section on management of contacts.

- **Non-toxigenic infection**

Treatment of non-toxigenic infection will depend on the local manifestations of the infection, and a decision on whether to treat will need to be made on individual circumstances. Cases and contacts should be immunised with a diphtheria toxoid containing vaccine if not up to date. Children should receive 5 doses of diphtheria-tetanus-acellular pertussis vaccine (DTPa) up to 8 years of age with 10 yearly boosters in the form of ADT thereafter. Refer to section on management of contacts.

Active surveillance

Active surveillance includes follow-up of contacts, as detailed below. In addition, community members with symptoms compatible with diphtheria up to two weeks after diagnosis of the index case should be investigated. This includes anyone presenting with a sore throat or runny nose, particularly if the nasal discharge is blood stained or only apparent on one side.

Definition of a contact

1. All household members and other persons with history of habitual, close contact with the index case.
2. Anyone who has had significant contact with nasopharyngeal secretions of the index case during the previous week (ie. mouth kissing or mouth to mouth resuscitation).
3. Anyone who has spent 4 hours or more a day for 5 consecutive days, or more than 24 hours with the index case in the week preceding the onset of illness (eg contacts in child care centres, schools etc).

Management of contacts

Management of contacts is based on the clinical condition of the index case and the toxigenicity of the infection, if known.

A **If the index case has:**

- i. Clinical systemic diphtheria, toxigenic or non-toxigenic strain, or
- ii. A confirmed toxigenic strain with or without systemic disease.

The following should be initiated for asymptomatic contacts:

- Take nasopharyngeal swabs (or nose and throat swabs) for culture and place in ordinary semi-solid transport medium.
- Previously fully immunised close contacts should be given a booster dose of a diphtheria toxoid containing vaccine if their last dose was > 5 years ago. Previously unimmunised or incompletely immunised (ie less than 3 injections with the initial series of diphtheria toxoid containing vaccine) contacts should start the full course of primary immunisation. Child contacts \leq 8 years of age should be age appropriately immunised with DTPa.
- Antibiotic prophylaxis (see next section).
- Observe closely for 7 days.
- Exclude adults who handle food/milk products or work with children, and children who attend school or day care until swabs prove them not to be carriers.

B If the index case has:

- No evidence of systemic disease with a confirmed non-toxigenic organism, or
- No evidence of systemic disease with toxigenicity pending*.

Action to be taken for contacts should involve:

- Taking the opportunity to offer opportunistic immunisation to asymptomatic, previously fully immunised close contacts who require a booster dose of a diphtheria toxoid containing vaccine, ie if their last dose was >10 years ago. Previously unimmunised or incompletely immunised (ie less than 3 injections with the initial series of diphtheria toxoid containing vaccine) contacts should start the full course of primary immunisation.

* If the laboratory result comes back as a toxigenic strain, refer to 'A' on previous page.

Antibiotic prophylaxis for contacts of systemic diphtheria and/or toxigenic infection

Antibiotic prophylaxis should be given regardless of the immunisation status of the contact.

Weight < 30 kg: Benzathine penicillin (Bicillin LA), 600,000 units (450mg/1ml) as a single intramuscular dose.

Weight \geq 30 kg: Benzathine penicillin 1,200,000 units (900mg/2ml) as a single intramuscular dose.

If compliance assured or penicillin allergy present:

⇒ Erythromycin orally, 40-50mg/kg/day, maximum 2 grams per day, for 14 days.

For a full copy of the revised guidelines, contact Sue Reid on 8922 8089 or fax 8922 8310.

Second Chronic Diseases Network get together

Steve Morton, CDC Darwin

At a recent successful Darwin workshop seventy enthusiastic network members examined "Client, cultural and carers' perspective's of chronic diseases".

After several diverse but interesting short talks and a productive information/networking session, participants debated the issues and resolved that their priorities for the network were:

- developing a specific project on ways to build **collective memory**;

- advocating for **interpretation and cultural mediation** for non-English speaking Aboriginal clients
- **maintaining communication to ensure progress** on workshop outcomes;
- organising to meet **the needs of carers**.

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NT vaccination coverage statistics, ACIR third quarter assessment to 30 September 1997

Angela Merianos, CDC Darwin

Vaccination coverage rates across Australia are being assessed by the Health Insurance Commission (HIC) on a quarterly basis using data recorded on the Australian Childhood Immunisation Register (ACIR). The ACIR estimates for the cohort of children born 1 January to 31 December 1996 only look at DTP (diphtheria-tetanus-pertussis vaccine), OPV (oral polio vaccine) and Hib (*Haemophilus influenzae* type b) vaccines given within the first year of life.

Methods

Coverage rates for each district and urban versus rural areas were calculated using data entered on the NT Childhood Immunisation Databases for children currently aged 12-14 months inclusive who were immunised between 1 January 1996 and 30 September 1997 and received their vaccinations before 12 months of age. This is the algorithm used by the HIC and indicates both coverage and timeliness of administration and allows a lag time of 7 months for the third dose immunisation schedule to be completed before being excluded from consideration in coverage statistics; a very wide margin for timeliness.

Data on this age cohort was downloaded from each dataset and coverage rates calculated after duplicate data had been removed and discordant vaccination records updated.

A child in this age cohort was defined as age appropriately immunised (fully vaccinated) by the ACIR if s/he had received three doses each of DTP and OPV vaccines and either two doses of PedvaxHIB[®] or three doses of a different Hib preparation within the time parameters above. DTP3, OPV3 and the third dose of an appropriate Hib vaccine such as HibTITER[®] are scheduled for 6 months of age while the second dose of PedvaxHIB[®] is due at 4 months of age.

Hepatitis B (HB) vaccination statistics are included here for local information but are not included in the estimates of age appropriate vaccination.

Results

Table 1 presents the total number of children included in the analysis by district and residence in an urban or rural area and Table 2 presents the corresponding coverage rates (n=941).

Table 1 Population denominators and doses given by vaccine group for NT children aged 12-14 months inclusive on 30 April 1998 vaccinated by 30 September 1997

District	Total Children	Children vaccinated with			
		DTP3 ¹	OPV3 ²	HB3 ³	HIB2 ⁴
Ops North					
Darwin Urban	507	393	393	348	423
Darwin Rural	71	61	59	59	62
Darwin Total	578	454	452	407	485
EAR Urban	18	17	17	10	18
EAR Rural	66	59	59	61	64
East Arnhem Total	84	76	76	71	82
Katherine Urban	56	42	41	36	43
Katherine Rural	34	32	32	30	31
Katherine Total	90	74	73	66	74
Ops Central Australia					
Alice Springs Urban	114	90	94	84	101
Alice Springs Rural	44	40	35	36	40
Alice Springs Total	158	130	129	120	141
Tennant Creek Urban	20	15	14	12	18
Tennant Creek Rural	11	8	8	8	9
Tennant Creek Total	31	23	22	20	27
NT Total	941	757	752	684	809

Table 2 Corresponding coverage rates (%)

District	DTP3	OPV3	HB3	HIB2
Ops North				
Darwin Urban	78	78	69	83
Darwin Rural	86	83	83	87
Darwin Total	79	78	70	84
EAR Urban	94	94	56	100
EAR Rural	89	89	92	97
East Arnhem	90	90	85	98
Katherine Urban	75	73	64	77
Katherine Rural	94	94	88	91
Katherine Total	82	81	73	82
Ops Central Australia				
Alice Springs Urban	79	82	74	89
Alice Springs Rural	91	80	82	91
Alice Springs Total	82	82	76	89
Tennant Creek Urban	75	70	60	90
Tennant Creek Rural	73	73	73	82
Tennant Creek Total	74	71	65	87
NT Total	80	80	73	86

¹ Diphtheria-tetanus-pertussis vaccine dose 3.

² Oral polio vaccine dose 3.

³ Hepatitis B vaccine dose 3.

⁴ PedvaxHIB[®] vaccine dose 2 or dose 3 of another Hib vaccine.

DTP3 uptake ranged from 73-94%, OPV3 from 71-94%, Hib from 77-100% and HB3 from 56-92%. NT wide, 80% of children had received three doses of DTP and OPV in a timely fashion, 86% had received two or more doses of a Hib vaccine and 73% had received three doses of hepatitis B vaccine. Age appropriate coverage was consistent between Operations North and Operations Central Australia at 77% and 76% respectively. Factors influencing coverage include geographical location, population size and the type of vaccine.

Overall coverage was higher in rural than urban areas, with the notable exception of the East Arnhem district where the Nhulunbuy Infant Health Clinic has achieved the highest coverage rates overall for DTP, OPV and Hib vaccines.

Small population size was associated with higher coverage as expected, except in Tennant Creek. It is noteworthy that Darwin Urban, with the largest population of 507 eligible children achieved coverage rates comparable with urban Katherine (n=56) and Alice Springs (n=114), and better than those recorded for Tennant Creek (n=20).

In most areas, coverage for Hib vaccines exceeded that for DTP3 and OPV3. This can be explained by the fact that most NT infants are age appropriately immunised against Hib by 4 months of age using PedvaxHIB[®] while DTP3 and OPV3 are administered at 6 months of age. Vaccine uptake is known to fall with increasing age. The third dose of hepatitis B vaccine had the lowest uptake in all districts but was higher in rural than urban areas. This may reflect the greater priority appropriately given to the timely completion of the NHMRC recommended vaccine schedule, especially when vaccination is opportunistic.

Discussion

This is the second local estimate of NT vaccination coverage rates based on birth cohorts defined by the ACIR¹ and follows on from estimates of crude coverage produced in 1997 for the NT and the various districts.^{2,3} Estimates have been reasonably consistent over time, but still probably reflect the minimum coverage achieved in the NT. Reasons behind this assumption include the fact that an unknown proportion of children represented in the analysis have actually left the NT (the ACIR denominator for this cohort of children is 886 compared to 941 derived from the NT databases), not all providers report to the regional database in a timely and consistent manner and some vaccination

encounters are not being reported to the regional database at all.

A recent Commonwealth initiative to improve vaccination uptake by linking vaccination status with the Maternity Allowance, Child Care Allowance and Child Care Rebate means that parents may have these allowances temporarily withheld until proof of vaccination is received by the HIC. It is the responsibility of all NT vaccine providers and data entry officers to ensure that this information is accurately recorded at each step of the information chain *on all children receiving any vaccination in the NT* whether resident or not and ultimately sent to the ACIR in a timely fashion. THS has been looking into improving its data flow, but needs the assistance of all vaccine providers to ensure that data reaching the ACIR are accurate and complete.

Over the next few months, CDC will be attempting to ensure that vaccine providers record new vaccination encounters in a consistent way across the NT. All relevant details should be completed so that the HIC can incorporate NT data into the ACIR without generating queries. At present for a number of reasons, the most important of which is our failure to consistently record Medicare numbers (with subnumerate) as a unique child identifier, only 50% of NT data can be appended to the ACIR without manual scrutiny (HIC, personal communication). This slows the process of data uplift considerably and also means that only a proportion of NT data are incorporated into the ACIR within assessment dates (vaccine administration cutoff dates) used for the quarterly vaccination coverage reports produced by the HIC. These problems ultimately result in the NT appearing to have a vaccination uptake well below the national average; the ACIR generated coverage rates for this cohort of children are 59% for DTP3 and OPV3, 67% for Hib and only 55% fully immunised.

I seek the cooperation of all vaccine providers to help facilitate this process and improve the NT's ability to adequately document the good work that is being done in immunisation locally.

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Immunisation status of children 0-6 years in Alice Springs:

a general practice audit

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Introduction

An audit of the immunisation status of children 0 to 6 years old attending three private general practices in Alice Springs was undertaken over four weeks in late 1997. Most (95%) of the children were non-Aboriginal. Immunisation for these children had been primarily delivered by the public sector through the Community Care Centre. Australian Childhood Immunisation Register (ACIR) data for the divisional area claims 37.1% coverage, and 53.9% coverage for the biggest of the group practices in the audit.

Objectives

- To document the rate of up to date immunisation in 0-6 year olds attending general practitioners (GPs) in Alice Springs, allowing some comparison to ACIR figures.
- To determine the role for GP involvement in childhood immunisation.
- To establish the proportion of children seen in general practice who do not appear on the local Childhood Immunisation Database.
- To establish the extent of missing data from the Childhood Immunisation Database, and understand why it is missing with a view to improving data quality.

Definition

“Up to date” was defined to mean that the child was not due or overdue for any vaccinations. Thus, for any child who was not up to date, there was the opportunity for the general practitioner to offer vaccination during the consultation. A child could be up to date and yet not have received all scheduled vaccines, for example where Hib vaccination had been delayed and fewer doses required, or DTP4 missed at 18 months of age but a dose appropriately given at 4-5 years of age.

Methods

A data collection sheet was prepared, and pre-piloted with a small number of children at one of the surgeries.

The audit ran from 24 November to 21 December 1997. Parents were asked to bring the child's parent-

held record of immunisation to the consultation when appointments were made for children during this time. At the consultation the parent was asked about their child's immunisation status, the parent-held record was photocopied, permission to pass these details to the Centre for Disease Control (CDC) was obtained and details were recorded about the place of immunisation.

Data sheets were checked against the Childhood Immunisation Database. Where a child's immunisation status was not evidently up to date, further follow-up was undertaken to ensure the accuracy of the immunisation record on the database. This involved checking Community Health Centre records, parents were phoned for details from the parent-held record if it had not been available during the consultation, and where necessary, the ACIR or interstate providers were contacted.

The 95% CI around the estimate of coverage was calculated using the formula $p \pm (1.96 \times SE)$ to $p + (1.96 \times SE)$ where p = the proportion of children fully immunised in sample size n , and the standard error of p is $SE = \sqrt{[p(100-p)/n]}$.

Results

No parent was known to have refused to participate in the audit. Details were recorded for 146 children, attending 11 doctors. 96.6% were residents (living in Alice Springs permanently or visiting for more than a month), 85% were vaccinated in Alice Springs, and 3% were also vaccinated elsewhere, mostly interstate. One child attended twice during the period at two different practices, making a total of 147 eligible child encounters. Since this child was assessed differently by two different doctors and their vaccination was brought up to date at the second encounter, data on immunisation status are reported for 147 encounters. All of those asked (98.6%) gave permission to contact CDC. Three children were vaccinated at the visit during the audit (2%). One doctor did report having failed to record some children's vaccinations on the data collection form and there were nine parent-held record photocopies for children not recorded on the data collection form, so it is likely that failure to record by other doctors also occurred. There were ten sibling pairs included among the 146 children.

The parent-held record was available for 82 children at the time of the GP consultation. The parents of 62 children reported that the record had been left at home; only two parents reported the parent-held record was lost.

A match on the Childhood Immunisation Database was made for 129 (88.4%) of the children. The majority of those who were not on the database had moved from interstate and had not been vaccinated locally.

Based upon the Childhood Immunisation Database and the copy of the parent-held record where available, only 89 (60.5%) of children in the audit were up to date with a further eight (5.4%) of children for whom no information was available. Over one third of children were not up to date based upon database records.

Follow-up of other sources of information on immunisation status, increased the percentage of children up to date on the NT schedule to 79.6% (117 children). A further 10.9% were up to date excluding hepatitis B vaccination. Therefore, 90.5% were up to date on the NHMRC schedule (95% CI 85.7-95.3%). Of those not up to date, the vaccines most commonly missed were MMR/Hib and DTP4, that is, those due at 12 months or later.

The level of inaccuracy of the local Childhood Immunisation Database was disconcerting, since only 88 (59.9%) of children had their vaccination status accurately recorded, 42 (28.6%) of children had inaccurate records and the remaining 17 (11.5%) were not on the database. Of those recorded on the database, its accuracy was better for younger than older children. For 0-1 year olds, 80% of vaccination details were correctly recorded on the database, compared to 65% of 2-3 year olds and 45% of 4-6 year olds ($\chi^2=11.2$, $p<0.01$).

Conclusions

The immunisation coverage, at over 90% fully vaccinated according to the NHMRC schedule, is high by Australian standards, although this study did not address the issue of timeliness but rather coverage at a point in time. The ACIR data on coverage in the region of 37% was the rate for children up to 21 months and the estimate reflects timeliness of vaccination, so it would be expected that vaccination coverage rates would be slightly lower. The difference based upon timeliness should be only small, and it is difficult to see how the coverage could be so different for that age group. The discrepancies between ACIR data and the local

database are likely to reflect technical problems with the local Childhood Immunisation Database, failure of vaccine providers to report all vaccinations given to the data entry officers, delays in reporting to the ACIR by the NT, and the ACIR failing to accept some of the data reported to it.

The accuracy of the local Childhood Immunisation Database needs to be improved. Data that appeared on the database did reflect vaccinations which had been given but there were gaps where vaccinations given were not recorded.

We believe that the extent of missing data is much greater than can be attributed to problems with reporting to the database. The database has, over a number of years, been reported to crash with an unknown amount of data lost on each occasion. Most providers report regularly to the local database and a reported vaccination for which details of previous vaccinations are missing always triggers a request for details of the earlier vaccination encounter. The higher accuracy of the database for younger age groups is likely to reflect the prospective nature of the ACIR data collection, the attention given to gathering missing information triggered by the intensity of immunisation activity in the first six months of life and the attention now placed on immunisation reporting. At older age groups, vaccination activity is infrequent and so a search to find missing vaccination details rarely occurs.

Given the high mobility in and out of Central Australia, the finding that a number of children did not appear on the Childhood Immunisation Database is not surprising. A means of dealing with movement of children in and out of the Region is, however, important for accurately calculating immunisation coverage.

There is a role for GPs in ensuring that immunisation is up to date and in opportunistic vaccination. The more assiduously they do this, the greater role they will play in influencing that vaccination is timely. A particular gap identified in this study is lack of hepatitis B vaccination in those children who have moved to the NT from other states. The local GPs should now develop a high level of awareness that children born outside the NT may need hepatitis B vaccination. Despite the availability of the parent-held record at consultations, GPs had sometimes mistakenly reported children as being up to date. This error occurred more frequently with respect to the NT rather than the NHMRC schedule, but errors occurred in assessing both schedules. It is important

that GPs are aware of the current NT schedule and review parent-held records with care.

Most parents had retained their parent-held record in which the child's vaccination status was recorded, and for the vast majority of children this was an accurate record. Since this record serves as an up to date record of a child's vaccination status, it is a useful means of facilitating the role of primary health care providers in immunisation - provided it is brought to all consultations and that providers

diligently check the record and offer vaccination when appropriate. Carers should be asked to bring the parent-held record to all appointments so that the doctor can check that the child is up to date.

This audit has provided useful and reassuring information regarding the vaccination status of children attending general practice in Alice Springs, but highlights the need for a more robust and reliable Childhood Immunisation Database.

Editorial

The article by Ewald et al brings up a number of issues about the flow of information between vaccine providers and the existing system of Childhood Immunisation Databases in the NT, the importance of information integrity, and the importance of quality assurance at each stage of an immunisation program.

A secondary objective of the review was to determine the role of general practitioners in childhood immunisation. At the present time in the NT, 99.3% of immunisation encounters registered with the ACIR are delivered in the public sector by THS Community Health Centres or Aboriginal Medical Services and 0.7% in general practice (ACIR Quarterly Report, June 1998). These statistics are likely to change as GPs take on a greater role in immunisation. Although this study may not be representative of immunisation coverage rates in urban Alice Springs, Ewald et al have demonstrated that high rates of vaccination uptake have been achieved through existing services among the children in their review. GPs, however, can and should play an important role in parent education, including encouraging parents to present for medical appointments with their children's immunisation records, opportunistic vaccination especially of children older than 12 months of age, and in ensuring that parents new to the NT are aware of our universal hepatitis B vaccination policy.

CDC has received a large number of inquiries from vaccine providers who receive reports of coverage from the ACIR that bear no relationship to what they know local vaccine uptake to be. The Health Insurance Commission (HIC) uses a complex algorithm based on the date of birth, age at assessment in months and an assessment cutoff date to calculate coverage rates from ACIR data. The HIC accepts the most recent dose of any vaccine as evidence that earlier doses have been given.

However, a child is not considered up to date if a dose is missed eg. the fourth dose of DTP due at 18 months of age being given at 4-5 years that Ewald et al classify as fully vaccinated. It is also important to note that the ACIR at present only contains data collected prospectively on children who were aged 0-6 years inclusive on 1 January 1996 ie. historical data are missing.

Vaccinations given to a child after the assessment cutoff date for that dose are not included in the coverage statistics for that age group (age cohort). So far, the HIC has calculated coverage rates for the primary course of vaccines only ie. the third doses of DTP and OPV and the second dose of PedvaxHIB® (or third dose of an alternative Hib vaccine). For example, in the most recent ACIR calculations of 30 April 1998, only vaccinations given by 30 September 1997 were included in the analysis for the cohort of children born 1 July to 30 September 1996 (aged 12-14 months inclusive on the assessment date). In addition, only vaccinations given before 12 months of age were considered. These calculations take into account a variable lag time between the due date for a particular vaccine dose and the date of assessment. The lag time was 7 months for the last set of coverage statistics.

This algorithm therefore provides information about both gross coverage and the timeliness of vaccination. The NT's coverage rates using the HIC algorithm are presented in *NT vaccination coverage statistics, ACIR third quarter assessment to 30 September 1997* on pages 20-21.

In 1998, the Commonwealth Government linked vaccination coverage rates to the Maternity Allowance, Childcare Allowance and Child Rebate. Ensuring timely transmission of data to the ACIR is the only way to ensure that parents will not be asked to duplicate information already provided about

their children's vaccination status and that payments are not suspended.

Any immunisation program is an integrated system involving parents, providers, and in the NT, a Territory wide information system with CDC as the Childhood Immunisation System owner. Vaccine providers are responsible for ensuring that their clients are up to date with their vaccinations, have a duty of care to accurately record vaccinations provided and forward those data to the HIC either directly or via the local database. Vaccine providers, including doctors, should be aware of both the current NT and NHMRC Childhood Vaccination Schedules. A number of changes have occurred recently to the Schedule and the introduction of multivalent vaccines is imminent. All vaccine providers are strongly encouraged to undertake the short course "*About Giving Vaccines*" to ensure that their knowledge about immunisation standards, contraindications to vaccination, the vaccine cold chain and reporting requirements is current. CDC is negotiating CME and practice assessment points with the Divisions of General Practice for doctors who take the course.

In the NT, Territory Health Services has taken on the responsibility of transmitting vaccination records to the HIC for health services that have authorised that transfer. Problems with the existing immunisation software are acknowledged and have led to delays in the transfer of information to the HIC; these problems are being addressed across the NT and require a high level of ongoing technical support from IT services. The good news for urban centres and some rural locations is the development of a Community Care Information System that will include an immunisation module (care plan) that will supersede the existing immunisation software. This new system is due to be rolled out in the second half of 1999. In the meantime, some immediate improvements will be made to the existing database to facilitate better recording of information by producing user friendly recall/reminder lists and clearer parent held immunisation reports.

We should all encourage parents to maintain their own records of childhood vaccination. Health services should routinely advise parents to attend with documentation, ideally when appointments are booked or during the consultation as a health promotion exercise. This change in culture should be extended to Aboriginal parents in both urban and rural settings; many examples of the importance parents give to the immunisation record can be

found internationally among communities with low rates of literacy and non-Western world views, achieved through continuing education. Our current system of health services holding the parent held record for Aboriginal families may prevent its loss but stops parents from taking responsibility for their children's health. Changing this culture requires a sustained effort by all health service providers.

Our system will continue to fail parents if any link in the immunisation chain is weak. Not only must THS ensure efficient and accurate data entry and database integrity, but all vaccine providers must show a commitment to the rapid and regular turnaround of data collected within their practice environment. Some providers fail to report regularly, immunisation histories are sometimes incomplete and writing is often illegible, necessitating requests for clarification by the immunisation data entry officers or public health nurses.

One of the most important deficiencies in the way we currently record vaccination histories is our failure to document Medicare numbers. Health services should encourage parents to register infants with Medicare as soon as possible after birth. Children under 7 years of age are registered with the ACIR as soon as they acquire a Medicare number and that is used as the primary unique identifier for matching the child's demographic details with reports of vaccination. The Medicare number should be recorded with the subnumerate character that identifies each individual on a family card. The NT currently uses the HRN as the unique identifier and NT children first appear on a secondary ACIR database until they are matched with a Medicare number and their details are transferred onto the main database. This process introduces additional delays, and problems with matching children have resulted in inaccurate data that impact on coverage rates. All vaccine providers are asked to record the Medicare number whenever possible to facilitate rapid incorporation of NT children onto the main ACIR database. The Medicare number, or a space to record it, will soon appear on recall/reminder lists.

Each level of inefficiency discussed above delays the receipt of high quality data by the HIC to the detriment of NT families. The purpose of this Editorial is to engender better understanding among vaccine providers about the importance of the childhood immunisation program and immunisation information system, and their crucial role in ensuring the integrity of both.

Enhanced measles control campaign

Nan Miller, CDC Darwin

Smallpox was eradicated from the world in the 1980s and the global eradication of poliomyelitis is expected by the year 2000. Recent successes in interrupting the local ("indigenous") transmission of measles virus in the Americas and the United Kingdom prompted a meeting of international health authorities in 1996 to consider the feasibility of global measles eradication. The conclusion was that measles eradication is feasible. As a result, the Commonwealth has initiated a National Measles Control Campaign for Australia. The Campaign forms the first stage of the longer term strategy for elimination of measles from Australia and is in line with the World Health Organization's plan for future global eradication.

The Campaign has four components:

- amend the National Health and Medical Research Council (NHMRC) recommended immunisation schedule by bringing forward the second dose of measles-mumps-rubella (MMR) vaccine to 4-5 years of age (concurrently with the DTPa and OPV) rather than at the currently recommended age of 10-16 years;
- ensure that all primary school children (5 - 11 years of age inclusive) are provided with a second dose of MMR vaccine through a school based program ("mop up");
- follow up all 2-5 year olds to ensure that they have received their first dose of MMR vaccine, in collaboration with general practitioners and

other vaccination providers ("catch up"); and

- recommend that all secondary students who have not received a second dose of MMR vaccine should be vaccinated.

The date for the change in the recommended schedule for the second dose of MMR is 1 August 1998. THS will amend the NT Childhood Vaccination Schedule in line with the NHMRC recommendation. The NT school based Year Six Program will cease concurrent with the schedule change.

The "mop up" campaign will be short and sharp from 3 August to 6 November in all schools in Australia.

The aim of Territory Health Services is to increase measles vaccination coverage levels in children 1-11 years of age in order that measles transmission will not be sustained in the event of a measles outbreak.

We are hoping to achieve coverage rates of:

- ◆ greater than, or equal to, 95% for one dose of MMR in children 1-4 years of age ("catch up"); and
- ◆ greater than, or equal to, 95% for two doses of MMR in children 5-11 years of age ("mop up").

Brad Palmer RN has been appointed to coordinate the Campaign for THS in the NT. Brad will be based at CDC, Darwin.

School Age Hepatitis B Program, Operations North

Chris Nagy, Coordinator Hepatitis B Program, Ops North

In 1997 the NHMRC recommended the universal immunisation of all children and adolescents between the ages of 10 - 16 years for Hepatitis B.

Aboriginal Medical Services commenced a School Age Hepatitis B Program in February 1998 which aims to immunise all school children aged 6 - 16 years inclusive. This is a once only program that will be completed by 1 April 1999. The NT is in a unique position in Australia because universal

Territory Health Services (THS) in conjunction with the NT Education Department, the Association of Independent Schools, Catholic Education and

hepatitis B immunisation has been offered to all infants since August 1990. Successful implementation of the School Age Program combined with the infant program means that transmission of hepatitis B can essentially be stopped in this age group.

Eligible students will be offered a primary course of three doses of paediatric Hepatitis B vaccine at their local school, THS community Care/Health Centre, Aboriginal Medical Service or general practitioner. No booster doses, nor pre and post testing, are included in this program.

The Program has been well supported by the school population and is proving a popular immunisation.

To date, most high schools and some primary schools in the greater Darwin area have completed dose one and are commencing dose two. Katherine District primary schools will begin the Program in the next semester. The Program has been highly successful in both Nhulunbuy Primary and High Schools.

For information concerning this Program please contact Chris Nagy on 8922 8510.

Mosquito borne virus warning Nhulunbuy and the Top End, June 1998

Brian Montgomery, Medical Entomology Branch, Darwin

The Territory Health Services advise that a potentially dangerous mosquito borne virus which can cause Australian encephalitis has been detected in sentinel chicken flocks in Nhulunbuy for the first time this year. A similar media release was issued for the Katherine area in March this year. This serves as a reminder that the top half of the NT remains in the seasonal risk period for Australian encephalitis disease.

Australian encephalitis can be caused by either Kunjin virus or Murray Valley encephalitis virus. Murray Valley encephalitis virus causes a potentially fatal illness, while Kunjin causes a generally more mild disease with fever and severe headache. Only Kunjin virus has been detected in the most recent tests.

These two viruses are seasonally present in the north west of WA and the top end of the NT during most years. Both are only transmitted by the bite of certain species of mosquitoes which have become infected with the virus. The most common mosquito in the NT, the common banded mosquito, is regarded as the main carrier of the virus in the NT after the wet season. These viruses are thought to normally infect and multiply in birds but flaviviruses in general and the two viruses mentioned above in particular. While the chickens do not become ill, the test indicates whether a virus infected mosquito has bitten the chicken. This program acts as an early warning system to show the presence of the virus in a general region before the spread to people.

occasionally humans and other mammals become infected.

Murray Valley encephalitis virus is the more dangerous virus and has not been detected in the most recent tests. While only about one in 500 to 1000 people who are bitten by an infected mosquito develop the disease, it can cause a serious illness, particularly in children, and has a death rate of about 20% while another 25% are left with serious nervous system disease symptoms. The normal symptoms of Australian encephalitis caused by Murray Valley encephalitis virus are severe headache, stiff neck, high fever, and in some cases delirium and coma.

There have been 21 confirmed cases of Australian encephalitis in the NT since 1974. Three of these cases were caused by infection with Kunjin virus in 1997.

Sentinel chicken programs are run in WA and the NT to detect the presence of the Australian encephalitis viruses. Blood samples are regularly taken from flocks of 10 chickens placed at different towns and localities in both regions and sent to Perth to test for the presence of antibodies to the sentinel chicken surveillance program in the NT is conducted as a joint program between the Territory Health Services (THS), the Department of Primary Industries and Fisheries (DPI&F) and the University of WA. These flocks are maintained by DPI&F officers or volunteers. There are 7 sentinel flocks of chickens positioned from Darwin to Alice Springs.

Testing of the sentinel chickens bled in May was completed on the 12 June 1998 and has shown the presence of Kunjin virus in two of the chickens in the Nhulunbuy flock. There were no new indications of virus activity for flocks in Alice Springs, Tennant Creek, Katherine, Fogg Dam, Leanyer (Darwin urban) or Howard Springs (Darwin rural).

Brian Montgomery, medical entomologist with THS, said that there were relatively low numbers of vector mosquitoes in Nhulunbuy in May and June to date. However, the risk of Australian encephalitis remains because it is the older mosquitoes that usually carry the virus.

The numbers of the common banded mosquito throughout the remainder of the Top End of the NT are high in most areas, especially near seasonally

flooded wetlands such as the major river floodplains, eg the Kakadu area and Jabiru, and other areas around the north coast. Mosquito numbers are still relatively high in the rural areas of Darwin but relatively low in urban areas of Darwin, with the exception of those areas adjacent to Leanyer Swamp.

THS advise that there is no vaccine for Australian encephalitis and that the only protection is to avoid being bitten by mosquitoes.

THS recommend that people in the Top End of the NT take extra precautions against mosquito bites, at least until the end of July. People are advised to:

- avoid outdoor exposure around dusk and at night near wetlands and areas of high mosquito activity.
- reduce outdoor activity in the evening and at night in all areas if mosquitoes are present.
- use mosquito proof accommodation and camping facilities at night in all areas.
- wear protective clothing including light coloured clothing with long sleeves and long trousers and ankle protection with socks between dusk and dawn in areas where mosquito bites are likely.
- use a protective repellent containing DEET as a supplement to protective clothing when outdoors at night in areas of mosquito activity.
- ensure children are adequately protected against mosquito bites.

For more information contact Territory Health Services, Medical Entomology Branch on 8922 8502.

World Health Organization update 1 June 1998 Yellow fever infected countries

The World Health Organization have advised of the occurrence of yellow fever in French Guiana.

The following list of declared yellow fever infected countries is provided for your information.

In AFRICA: Angola, Benin, Cameroon, Gabon, Gambia, Ghana, Guinea, Liberia, Nigeria, Sierra Leone, Sudan, Zaire. In SOUTH AMERICA: Bolivia, Brazil, Colombia, Ecuador, French Guiana [WER 73: (21), 22 May 1998], Peru.

Travellers over the age of 12 months who enter Australia within six days of having been overnight or longer in a yellow fever infected country, as listed in the World Health Organization publication, *Weekly Epidemiological Record*, must have a valid yellow fever vaccination certificate.

A valid certificate is not required to enter Australia from Rio de Janeiro, Iguacu or Sao Paulo in Brazil.

**NT NOTIFICATIONS OF DISEASES BY DISTRICTS
1 JANUARY TO 31 MARCH 1998 AND 1997**

DISEASES	ALICE SPRINGS		BARKLY		DARWIN		EAST ARNHEM		KATHERINE		TOTAL	
	'98	'97	'98	'97	'98	'97	'98	'97	'98	'97	'98	'97
Acute Rheumatic Fever	1	2	1	0	1	2	0	0	3	0	6	4
Adverse Vaccine React.	0	2	0	0	0	3	1	0	0	0	1	5
Arbovirus infections												
Barmah Forest Virus	1	0	0	1	1	7	1	4	1	2	4	14
Dengue Fever	0	0	0	0	1	4	0	2	0	0	1	6
Ross River Virus	1	15	1	13	43	48	12	3	15	19	72	98
Campylobacter	16	23	0	0	23	30	7	2	8	10	54	65
Chlamydia	70	42	6	9	79	51	25	14	24	9	204	125
Congenital Syphilis	2	0	0	0	0	2	0	0	0	0	2	2
Donovanosis	11	1	0	0	1	3	0	0	0	0	12	4
Glomerulonephritis	7	0	0	0	1	1	0	0	0	0	8	1
Gonococcal Disease	73	68	15	8	85	90	52	14	39	30	264	210
Gonococcal Conjunct.	0	3	0	0	0	0	0	0	12	0	12	3
Haemophilus Inf type b	0	1	0	0	0	0	0	0	0	0	0	1
Hepatitis A	0	7	0	1	7	5	2	0	3	6	12	19
Hepatitis B (acute)	0	0	1	0	0	3	0	1	3	0	4	4
Hepatitis C (prevalence)	8	10	0	1	70	78	1	2	3	0	82	91
HIV infections	0	1	0	0	0	3	0	0	0	1	0	5
HTLV-1	14	1	0	0	0	1	0	0	0	0	14	2
Legionnaires Disease	0	0	0	0	1	0	0	1	0	0	1	1
Leptospirosis	0	0	0	0	1	0	0	0	1	0	2	0
Malaria	1	0	0	0	7	8	0	1	0	1	8	10
Measles	0	2	0	0	1	3	0	0	0	3	1	8
Melioidosis	0	0	0	0	8	0	0	0	3	0	11	0
Meningococcal Infect.	1	1	0	0	0	0	0	0	0	0	1	1
Mumps	1	2	0	0	0	1	0	0	0	0	1	3
Pertussis	1	0	0	0	1	6	0	1	3	1	5	8
Pneumococcal Disease	8	3	0	0	4	8	0	1	0	1	12	13
Rotavirus	27	4	7	0	6	4	0	0	2	1	42	9
Rubella	0	1	0	1	1	1	0	0	1	0	2	3
Salmonella	30	22	5	2	56	59	18	4	24	6	133	93
Shigella	4	35	4	0	8	20	12	3	2	5	30	63
Syphilis	44	23	16	3	7	14	5	10	2	7	74	57
Tuberculosis	2	0	0	0	5	2	0	0	2	0	9	2
Typhoid	0	0	0	0	2	1	0	0	0	0	2	1
Typhus	0	0	0	0	0	1	0	0	0	0	0	1
Yersiniosis	1	0	0	0	1	0	0	0	0	0	2	0
Total	324	269	56	39	421	459	136	63	151	102	1088	932

- Australian Encephalitis (MVE, Kunjin), Amoebiasis, Botulism, Brucellosis, Chancroid, Cholera, Congenital Rubella Syndrome, Diphtheria, Gastroenteritis in an institution or food handler, Hepatitis C (incidence), Hepatitis D and E, Hydatid Disease, Leprosy, Listeriosis, Lymphogranuloma venereum, Poliomyelitis, and Viral Haemorrhagic Fever are all notifiable but had "0" notifications in this period.

EPIDEMIOLOGICAL COMMENT

Melioidosis (incomplete reporting interval)

This is newly included on the Notifiable Diseases list reflecting its importance in the Top End. There was a total of 43 cases reported in the 1997/98 wet season. This is a record since special surveillance began in the 1990/91 wet season (Dr Bart Currie, personal communication).

Salmonella

At least two clusters of *Salmonella paratyphi* BBV Java RDNC were reported during this quarter involving 7 cases in Darwin and 4 cases in Katherine districts. No direct linkage between cases was found.

- Out of a total of 111 cases of salmonellosis with known serovars, the most commonly seen were *S.paratyphi* BBV Java RDNC (11 cases), *S.typhimurium* group (8 cases), *S.ball*, *S.infantis* and *S.muenchen* (7 cases each), *S.saintpaul* (6 cases) and *S.give* (5 cases).
- Only 2 cases of *S.oranienburg*, implicated in an outbreak of food poisoning associated with Alba brand gelati in SA, have been notified in the NT that also received those products.

Chlamydia

More chlamydia has been diagnosed across all regions except the Barkly. This may reflect increased screening and a greater success rate of screening because of the high acceptability of tampon testing (including in Alice Springs where a trial is underway). An alternative explanation is that more disease is actually occurring due to failure of prevention.

Gonococcal disease

The rates of gonococcal disease in East Arnhem are greater for 1998 than 1997, reflecting the greater coordinated screening activity amongst women and the acceptability of the tampon test in that district.

Donovanosis

Notifications in Alice Springs have increased and reflect the presence of a dedicated worker and the Donovanosis Register.

Syphilis

The increase in syphilis notifications in Alice Springs and the Barkly may reflect the effect of increased, planned screening programs in those districts.

NT MALARIA NOTIFICATIONS

January to March 1998

Compiled by Merv Fairley, CDC, Darwin

Eight notifications of malaria were received for the first quarter of 1998. The following table provides details about where the infection was thought to have been acquired, the infecting agent and whether chemoprophylaxis was used.

ORIGIN OF INFECTION	REASON EXPOSED	AGENT	CHEMO-PROPHY-LAXIS	COMMENTS
AFRICA	Work	<i>P.vivax</i>	No	Diagnosed RDH. Recrudescence.
INDONESIA	Holiday	<i>P.vivax</i>	No	Diagnosed RDH.
PNG	Holiday	<i>P.vivax</i>	Yes	Diagnosed RDH. Recrudescence.
INDONESIA	Holiday	<i>P.vivax</i>	Yes	Diagnosed RDH.
INDONESIA	Holiday	<i>P.vivax</i>	No	Diagnosed RDH.
PNG	Study	<i>P.vivax</i>	Yes	Diagnosed ASH. Recrudescence.
INDONESIA	Expatriate	<i>P.vivax</i>	No	Diagnosed RDH.
INDONESIA	Holiday	<i>P.vivax</i>	Yes	Diagnosed RDH. Took traditional medicine when he felt sick?

NOTIFIED CASES OF VACCINE PREVENTABLE DISEASES IN THE NT

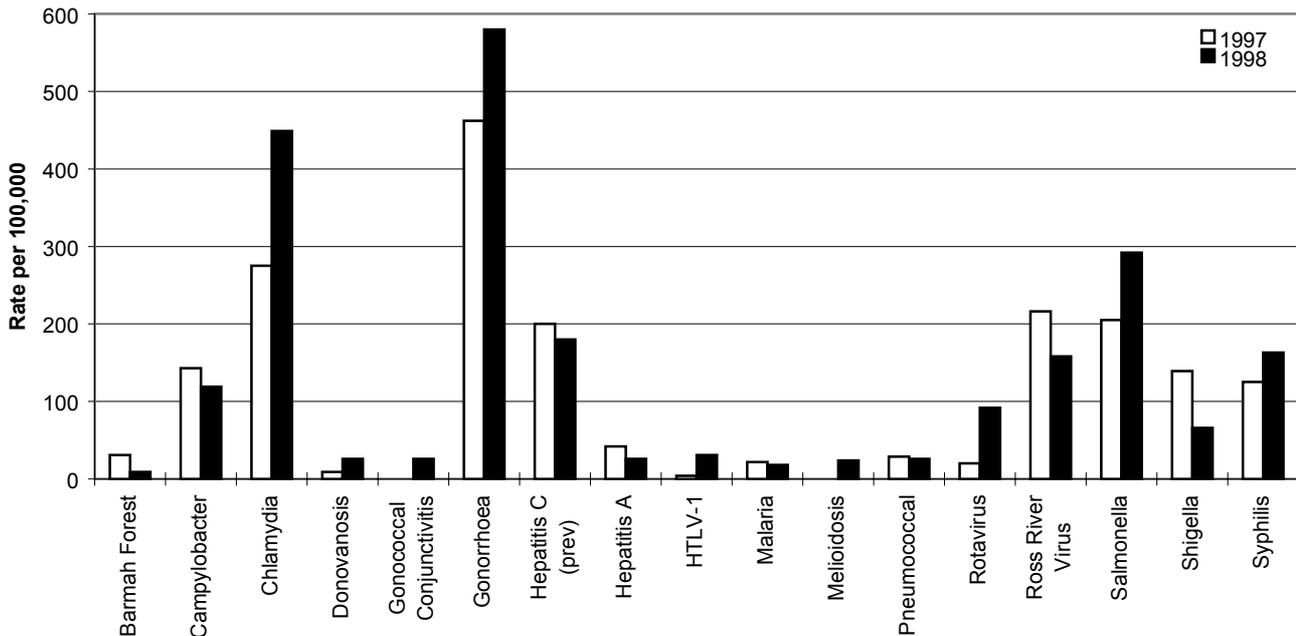
BY REPORT DATE 1 JANUARY TO 31 MARCH 1998 AND 1997

DISEASES	TOTAL		No. cases among children aged 0-5 years	
	'98	'97	'98	'97
Congenital rubella syndrome	0	0	0	0
Diphtheria	0	0	0	0
<i>Haemophilus influenzae</i> type b	0	0	0	0
Hepatitis B (acute)	4	4	0	1
Measles	1	8	0	4
Mumps	0	3	1	1
Pertussis	5	8	0	2
Poliomyelitis, paralytic	0	0	0	0
Rubella	2	3	0	0
Tetanus	0	0	0	0

NT WIDE

**NOTIFIABLE DISEASES
1 JANUARY TO 31 MARCH 1998 AND 1997**

Incidence Rate per 100,000



Rates < 10/100,000 not listed
NT 1996 mid year est. resid. pop - 181,923 as supplied by ABS

TO THE EDITOR

Enquires have been made regarding the possibility of having supplies of Ashdown's medium available at the community clinics for the collection of specimens for the investigation of infection due to *Burkholderia pseudomallei*.

As I see it, this will not be a problem provided the staff collecting the specimens are made aware of the correct collection procedures and that appropriate specimens are collected. My only concern is that when collecting specimens for the investigation of infection including melioidosis, it may be assumed that *Burkholderia pseudomallei* is the only potential pathogen so that specimens are only collected into

Ashdown's broth, thus making them unsuitable for the isolation of other organisms such as *Staphylococcus aureus*, *Streptococcus pyogenes*, *Streptococcus pneumoniae*, *Haemophilus influenzae*, *Actinobacter baumannii* and *Chromobacterium violaceum* to mention but a few. These organisms will not be recovered from an Ashdown's broth.

Supply of the Ashdown's broths can be sent to each community for which we provide pathology services. Please ask the staff at the clinics to re-order the broth along with their normal stores order.

I suggest the following to be collected if melioidosis is a differential diagnosis:

Wound or ulcer	Swab in transport medium (Stuart's or Aimes)	Room Temp (RT)
	Swab in Ashdown's broth	RT
Chest infection	Sputum in sterile specimen container	4°C
	Blood culture set(s)	RT
Systemic infection	Blood culture set(s)	RT
	Throat swab in Ashdown's broth	RT
	Rectal swab in Ashdown's broth	RT
	Urine specimen in sterile container	4°C
	and, if applicable any of the following:-	
	Swabs from any wounds in transport medium	RT
	Swabs from any wounds in Ashdown's broth	RT
	Synovial fluid in sterile specimen container	4°C
	Pleural fluid in sterile specimen container	4°C
	Cerebrospinal fluid into 3x sterile containers	RT

Wayne Pederick
Laboratory Manager
QML

HIV/AIDS Guide for Kimberley health professionals

Dr Donna Mak, Kimberly Public Health Unit

Talking about HIV/AIDS in the Kimberley - a health education and counselling guide for use by health professionals working with Kimberley Aboriginal people, is a resource for doctors, nurses, Aboriginal health workers and others who need to discuss HIV/AIDS and other related topics with Kimberley people. This guide is specifically designed to assist in communication between English-speaking health professionals and Kimberley Aboriginal people whose first language is not English.

The author, Pat Lowe, is a clinical psychologist and writer with extensive experience in counselling and working in the Kimberley cross-cultural environment. The illustrations and layout by Kimberley graphic artist Carol Tang Wei

compliment the text and make the guide attractive and user-friendly.

Cost:

- \$50.00 if you enclose a self-addressed, pre-paid air-bag large enough to contain an A4-sized ring binder (32cm X 27cm X 4cm), or
- \$60.00 inclusive of postage and packing.

Orders can be directed to Ms Ros Cain, Kimberley Public Health Unit, PMB 912, Derby, Western Australia, 6728 and make cheque/money order payable to Kimberley Public Health Unit. Payment must accompany orders.

Addendum

The article **To BAD or not to BAD** by Jacki Mein and Gary Lum, published in the March 1998 edition of the *Bulletin* had an incomplete referencing section.

A fourth reference should have been included which was :

4. Yang Y, Leng Z, Shen X, Lu D, Jiang Z, Rao J, et al. Acute bacterial meningitis in children in Hefei, China 1990-1992. *Chin Med J Engl* May 1996; 109(5):385-8.

~~STAFF UPDATES~~

ALICE SPRINGS

Josie Probin, (RN from Alice Springs Hospital) recently commenced as the coordinator for the School Age Hepatitis B Program, based in Alice Springs. Josie has worked throughout the NT in both remote and urban positions.

DARWIN

Chris Nagy (RN from Casuarina Community Care Centre and former coordinator of the Immunise Australia Program) has been appointed as the coordinator of the School Age Hepatitis B Program for Operations North.

Brad Palmer (CNC from Darwin Community Care Centre) has recently been appointed to coordinate the enhanced measles control campaign for THS in

the NT. Brad will be based at CDC, Darwin. A team leader will soon be appointed in Alice Springs.

Dr Christine Selvey has been appointed Acting Head, Immunisation, for a period of 5 months. Christine has returned to the Territory after a 15 year absence. Most recently she has been in Canberra where she worked for Family Planning ACT. Prior to this she lived in Cape Town, South Africa where she completed a MSc in sports medicine. Christine spent her childhood in Darwin but left the NT in 1977 to attend Adelaide University