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Sex in the city. 'Put it on so we can get it on'. Young Women's HIV Awareness Campaign. A joint project between the Women's Health Strategy Unit and the AIDS/STD Program in Darwin

Jan Holt, Educator, AIDS/STD Program Darwin.

In Australia young heterosexual women have not been the traditional target for HIV awareness Campaigns as HIV has predominantly affected homosexually active men.

However, here in the Northern Territory (NT) our situation is different to the rest of Australia with 38% of all cases of HIV heterosexually acquired compared to the national figure of 16%. Since the end of 1999 the epidemiology of HIV in the NT has changed and cases are being diagnosed in young heterosexual women.

Given this situation the AIDS/STD Program and the Women's Health Strategy Unit identified the need to respond by raising awareness about HIV among young women, particularly as women often do not see themselves at risk of HIV.

The AIDS/STD Program and Women's Health Strategy Unit joined forces to design and implement a six-month HIV Awareness Campaign targeting Darwin urban women aged 18-30. The aim was to get women to personalise the risk of HIV. A consultative committee comprising relevant stakeholders and a smaller working committee were established and met regularly to advise and work on the Campaign.

27 young women in Darwin were recruited by advertisements in newspapers and nightclubs to participate in focus groups. These women were

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extremely frank about their knowledge, attitudes and behaviour towards sexual health. Good insights into the Darwin nightclub 'scene' were obtained, along with creative suggestions as to the tone, form and content that would best capture the attention of young women aged 18-30.

Most women were well informed about HIV, but did not really see themselves at risk and often were more concerned about unplanned pregnancies than HIV or sexually transmissable infections. Condom usage was inconsistent and sometimes influenced by the ability to negotiate condoms with a casual partner, their risk assessment of their partner, or alcohol and drugs.

Focus group members wanted this Campaign to depict women as being in control. They didn't want a campaign that preached or used scare tactics. The look of the Campaign needed to be sexy, funky and represent 'real people'. As a result of the focus groups the Campaign products included 2 posters which have been placed on the back of women's toilet doors at all major pubs and clubs around Darwin. Additionally, two radio advertisements were broadcast on HOT 100 FM radio and a fantastic dance music track using the Campaign slogan, a condom wallet and a pass out stamp at three nightclubs using the slogan were also developed.

In the lead up to AIDS Awareness Week, on the weekend of 22 and 23 November 2002, the Campaign was launched in conjunction with Discovery Nightclub at an event called Safe and Sexy. The posters were in place in the toilets and safe sex messages were written in lipstick on the mirrors in the toilets. Over 3,000 condoms were given away during the weekend. Raunchy dancers, and a Miss and Mr Safe and Sexy modelling competition took place and the safe sex dance music song was played over the weekend with the D.J. providing safe messages in between songs.

This Campaign has had extensive coverage through the press and the radio, and a wider distribution of the posters to other NT towns and agencies is occurring.

An evaluation of this Campaign will occur at three months and then at six months.

This Campaign has already been successful in terms of close collaboration across many sections of the Department of Health and Community Services, the early input of our consumers and the guidance of our stakeholders. The project officers are very appreciative of everyone's input, guidance and assistance in bringing this very important Health Promotion Campaign together.

If anyone would like copies of the posters for display or further information about the Campaign please contact:

Project Officers: Jan Holt 89228819 or Liz Kasteel on 89992715

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AIDS awareness week - 24 November – 1 December 2002
'HIV doesn't discriminate, people do'

Jan Holt, Educator, AIDS /STD Program

This year the theme of AIDS Awareness Week focused on the stigma and discrimination that many people who are living with HIV/AIDS experience. A substantial proportion of people with HIV/AIDS in Australia report that as a result of their illness they have faced discrimination, particularly when accessing health care services, insurance and accommodation.

This year's Campaign aimed to prevent Australians from discriminating against those who are living with the virus. It is through education and information that discrimination can be prevented. All people regardless of their HIV status should be treated with respect and equality.

Globally, many countries are experiencing a serious HIV epidemic. Some of these countries are in the Asia Pacific Region on our doorstep. UNAIDS reported that AIDS has become the most devastating disease humankind has ever faced. Last year there were more than 5 million

new infections and over 40 million people worldwide are currently living with HIV/AIDS.

In Australia the epidemic has primarily affected gay and bisexual men and was contained through early intervention and ground breaking (often bold) education and prevention programs. However there is an urgent need for continued vigilance. After 20 years of the epidemic, there is evidence to suggest that people are becoming complacent and less receptive to the messages about safe sex. In Australia, currently there are approximately 700 new infections each year.

Here in the Northern Territory (NT), the HIV situation is quite different to the rest of Australia. The rates of sexually transmissable infections (STIs) in the NT are much higher than the rest of Australia. A person with an STI has a much greater risk of being infected with HIV.

Heterosexual transmission of HIV in the NT accounts for nearly 40% of all cases, compared with a figure of 16% for the rest of Australia. The proportion of young heterosexual females diagnosed with HIV in Darwin is increasing. This year all the cases of HIV diagnosed in females in the NT have been among heterosexual women between 18-30 years old.

The Department of Health and Community Services has launched a HIV Awareness Campaign targeting young women following recent diagnoses in 4 heterosexual women. Two of these heterosexually acquired cases were in itinerant women. The aim of this campaign is to urge young women to realise that HIV can and does affect women in the NT and that safe behaviours can prevent the further spread of HIV.

There is concern about the potential for HIV to spread across the NT. Education about HIV/STIs and safe sex practices, targeted service delivery and improving the availability and use of condoms are some of the responses to this.

HIV is preventable. It is the responsibility and right of individuals and the community to prevent its transmission.

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Box jellyfish in tropical Australia – new findings and the treatment and prevention of *Chironex fleckeri* stings

Bart Currie, Menzies School of Health Research, Northern Territory Clinical School and Royal Darwin Hospital

The official "stinger" season for the Northern Territory (NT) is from 1 October until 1 June. This is longer than elsewhere in tropical Australia. However, the major box-jellyfish, *Chironex fleckeri* is also responsible for a few stings during the "safer" season (June until end of September) in the NT and historically deaths from *C. fleckeri* have been recorded in all months of the year except one. Around 40 jellyfish stings present to Top End hospitals or health clinics each stinger season. The majority of these are confirmed by "sticky tape" test (see below) to be *C. fleckeri.* There are also 3-10 cases of classical Irukandji syndrome, usually associated with the box-jellyfish, *Carukia barnesi,* in the Top End each year. Irukandji syndrome is commoner in Far North Queensland, while *C. fleckeri* stings are more common in the NT. There are also a small number of stings in Darwin harbour each season from a four-tentacled (carybdeid) box-jellyfish which is bigger than the carybdeid, *Carukia barnesi*, associated with the Irukandji syndrome, as noted above. The "Darwin carybdeid" causes local sting marks and pain, which are less severe than with *C. fleckeri.* Whether the "Darwin carybdeid" can cause classical Irukandji syndrome remains unclear.

It has recently been reported that a multi-tentacled box-jellyfish (chirodropid) different from *C. fleckeri* has been netted in large numbers throughout the mid-year dry season at Town Beach, Nhulunbuy on the Gove Peninsula. This dry season "Gove chirodropid" was first noted in June 1991. It is similar to another non-Chironex chirodropid present in North Queensland, called *Chiropsalmus sp.* These chirodropids are smaller than *C. fleckeri*, with fewer tentacles and they have to date not been

associated with life-threatening envenoming. However the presence of large numbers of box-jellyfish in the mid-year outside the "stinger season" has implications for prevention messages (see below).

In January 2002 and April 2002 there were 2 reported deaths in North Queensland attributed to Irukandji syndrome. Both died from intracranial hemorrhage, presumably secondary to the severe hypertension that can occur with Irukandji syndrome. These are the first documented deaths from this syndrome. Recent work in North Queensland suggests there are other species of carybdeids apart from *C. barnesi* that may cause Irukandji syndrome and the jellyfish responsible for the 2 fatalities remain unidentified. The extensive experience of managing Irukandji syndrome at Cairns Base Hospital has enabled treatment algorithms for Irukandji syndrome to be developed (see reference, Little et al *MJA* 1998) and these are recommended for the NT.

Clinical Issues for *Chironex fleckeri* stings:

The last recorded *C. fleckeri* death in Australia was in January 2000 when a 6-year-old boy from Yarrabah in Far North Queensland died soon after presumed *C. fleckeri* envenoming. The last recorded death in the NT was from February 1996 in a 3-year-old girl from a remote NT Aboriginal community with confirmed *C. fleckeri* envenoming. The last 10 stinger deaths in the NT have all been children, showing the greater risk of a smaller body mass exposed to the millions of stinging cells (nematocysts) on jellyfish tentacles injecting their venom threads into the dermis.

The rapidity of severe envenoming from *C. fleckeri* (and possibly also from related jellyfish elsewhere in the world) is unique in clinical toxinology. Death may be within a few minutes, and if it occurs is usually within 20 minutes of the sting.

Although the lethal toxins from *C. fleckeri* and their exact mechanisms of action remain poorly characterised, the prospective NT study of over 200 *C. fleckeri* stings, together with some recent publications elsewhere has clarified some important clinical features. The ongoing support of Royal Darwin Hospital's Accident and Emergency staff, staff in coastal communities and District Medical Officers in providing skin sticky tape samples for identification of jellyfish species by nematocyst microscopy together with collected information from stinger report forms, has been invaluable in improving our understanding and clinical management.

Summary of clinical and prevention issues

1. Arrhythmias are seen with severe *C. fleckeri* stings, supporting a primary cardiotoxic role in potentially fatal stings. **A baseline ECG is useful for all but minor stings.**

2. Despite the dramatic nature of severe envenoming, by far the majority of *C. fleckeri* stings are mild to moderate, with the **initial severe pain well controlled with ice-packs** and, for moderate stings, **a single injection of narcotic analgesia if ice-packs are insufficient.**

3. The efficacy of *C. fleckeri* antivenom remains to be proven, with conflicting results from laboratory studies. There has yet to be a definitive report of *C. fleckeri* antivenom saving a life and there have now been 3 documented deaths despite *C. fleckeri* antivenom. While a number of severe envenomings have been given antivenom and survived, there are similar case reports where antivenom was not given. The suggestion from some animal studies is that the antivenom is less effective than predicted initially and therefore possibly much more antivenom is needed. This has led to the NT and other's recommendation that **in life-threatening envenoming as much antivenom as available (eg up to 6 ampoules) be given if there is no initial response.** Because death, if it occurs, is usually rapid the scenario for definitively showing benefit of antivenom will be a major sting with cardiorespiratory arrest near a health centre or hospital where immediate resuscitation and rapid use of intravenous (IV) antivenom is possible.

4. Recent experimental work from Queensland supports the long-standing NT protocol of **not using pressure bandages and immobilisation (PI)** in jellyfish stings because of potential harm and theoretical

reasons which make it unlikely to work. The Australian Resuscitation Council has now acknowledged the validity of the concerns and retracted its recommendation for PI with jellyfish envenoming.

5. **Delayed reactions** are common with *C. fleckeri* stings and consist of an itchy **"papular urticaria"** appearing at the original sting sites around 7-14 days after the original sting. This is considered to be a delayed hypersensitivity reaction, possibly to jellyfish nematocyst products retained in the dermis. The reaction **responds to topical steroid cream and oral antihistamines if required.**

6. Recognition of stings outside the official "stinger season" together with an emphasis on preventing stings in children has led to the recommendation to parents of children swimming in tropical waters outside the stinger season to consider protective clothing for their children. Most important in preventing fatal stings, is decreasing the exposed area. Full length stinger suits can be very hot, so t-shirts and shorts or sun suits which cover the trunk and upper arms and legs are better than no extra covering. These also assist with sunburn protection.

Bibliography

Williamson JA, Fenner PJ, Burnett JW, Rifkin JF, editors. Venomous & Poisonous Marine Animals. A Medical & Biological Handbook. UNSW Press 1996.

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

Little M, Mulcahy RF. A year's experience of Irukandji envenomation in far north Queensland. *Med J Aust* 1998; 169: 638-641.

Tibballs J, Williams D, Sutherland SK. The effects of antivenom and verapamil on the haemodynamic actions of *Chironex fleckeri* (box jellyfish) venom. *Anaesth Intens Care* 1998; 26: 40-45.

Currie BJ. Clinical Toxicology: A tropical Australian perspective. *Ther Drug Monit* 2000; 22: 73-78.

Pereira PL et al. Pressure immobilisation bandages in first-aid treatment of jellyfish envenomation: current recommendations reconsidered. *Med J Aust* 2000; 173: 650-652.

O'Reilly GM, Isbister GK, Lawrie PM, Treston GT, Currie BJ. Prospective study of jellyfish stings from tropical Australia, including the major box jellyfish *Chironex fleckeri*. *Med J Aust* 2001; 175: 652-655.

Little M, Mulcahy RF, Wenck DJ. Life-threatening cardiac failure in a healthy young female with Irukandji syndrome. *Anaesth Intens Care* 2001; 29: 178-180.

Little M. Is there a role for the use of pressure bandages in the treatment of jellyfish envenomation in Australia? *Emerg Med* 2002; 14: 171-174.

Fenner PJ,Haddock JC. Fatal envenomation by jellyfish causing Irukandji syndrome. *Med J Aust* 2002; 177: 362-363.

Seymour J, Carette T, Cullen P, Little M, Mulcahy R, Periera P. The use of pressure immobilisation bandages in the first aid management of cubozoan envenomings. *Toxicon* 2002; 40: 1503-1505.

Currie BJ, McKinnon M, Whelan B, Alderslade P. The Gove chirodropod: a box jellyfish appearing in the "safe season". *Med J Aust* 2002; 177: 649.

The main message remains:

DO NOT ENTER THE SEA AND MOST IMPORTANTLY DO NOT LET CHILDREN ENTER THE SEA DURING THE STINGER SEASON - OCTOBER TO MAY

Summary of treatment of *Chironex fleckeri* stings

On-the-beach treatment:

1. Assess the conscious state and treat airway, breathing and circulation if necessary.
2. Liberally pour vinegar over the stung area for a minimum of 30 seconds to inactivate remaining stinging cells on skin and on any adherent tentacles.
3. If unconscious or if evidence of life-threatening cardiac or respiratory decompensation, and if antivenom is available, then 3 ampoules of antivenom (each containing 20,000 units) can be given IM by a trained health professional. However IV antivenom (see below) is preferable wherever possible.
4. In severe envenomation use oxygen if available. Entonox (50% nitrous oxide 50% oxygen) can be administered for severe pain.

Hospital treatment:

1. Continue treating airway, breathing and circulation if necessary and add oxygen. Apply vinegar as above.
2. If unconscious or if life-threatening cardiac or respiratory decompensation, or if a significant arrhythmia is present, administer a minimum of 1 ampoule of antivenom IV (each ampoule 20,000 units, diluted 1:10 with an isotonic crystalloid solution such as Hartmann's solution or isotonic saline, given over 5-10 minutes). In a life-threatening situation up to 3 ampoules may be given IV consecutively if the response remains inadequate.
3. Cardiopulmonary resuscitation should be continued and not abandoned in the patient with ongoing cardiac arrest until after further therapy with even more antivenom (at least 6 ampoules total dose if available) and consideration of cardioactive drugs.
4. In stings which are not life-threatening (no cardiac or respiratory decompensation) use ice-packs for initial pain relief, together with IV or IM administered analgesia if necessary (0.1 mg/kg of morphine up to 5 mg adult dose initially). For pain not relieved by ice-packs and narcotic analgesia, administer 1 ampoule of antivenom IV as above.
5. Further IV narcotic analgesia may be administered when necessary in conscious patients.
6. The sting should subsequently be treated as for a burn (eg if blistering occurs), to avoid secondary infection. Steroid cream is contra-indicated in the acute sting, but can be used for delayed hypersensitivity reactions which occur at 7-14 days.

Sticky tape method for identifying nematocysts:

Ordinary transparent sticky tape, 4-8 cm long, is applied to the sting site, firmly stroked several times, then removed and stuck onto a glass slide. The slide is sent for microscopy, which is currently being done at the Menzies School of Health Research.

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Melioidosis – another wet season, so be vigilant

Bart Currie, Josh Davis, Dale Fisher, Nick Anstey, Sarah Huffam, Ric Price, Gary Lum, Dianne Stephens, Alex Brown, Allen Cheng and Susan Jacups
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The 2002/2003 wet season has commenced, with 2 early wet season cases of melioidosis despite the limited rainfall in November and early December. The Darwin prospective melioidosis study has now documented 346 cases of culture confirmed melioidosis in the Northern Territory with 61 deaths from melioidosis (18%) since October 1989. The 2001/2002 wet season was drier than average and there were only 25 cases of melioidosis (4 melioidosis deaths) in 2001/2002 (November 1st 2001-October 31st 2002). This is fewer cases than has been reported for many years. The highest number of cases was 48 in 1997/1998, which included the devastating Katherine flood on Australia Day (26/1/98) with 11 cases directly attributed to exposure to flood waters. In 1998/1999 there were 47 cases, including 7 cases directly attributed to category 5 Cyclone Thelma which stuck the Tiwi Islands in December 1998.

Information about melioidosis

1. The bacterium, *Burkholderia pseudomallei*, is an environmental organism found in soils and water across the Top End. Most infection is thought to be acquired through percutaneous inoculation, although inhalation/aspiration and ingestion are also possible. Recent analysis of cases suggests that inhalation/aspiration may be important during heavy monsoonal rains.
2. Until new therapies recently became available it was the commonest cause of

fatal community-acquired bacteremic pneumonia at Royal Darwin Hospital (and possibly also Katherine and Gove Hospitals).

3. While cases are commonest in the Top End, occasional cases have occurred in Central Australia over recent years following especially heavy rainfall. Melioidosis is also important in the Kimberley region of Western Australia and in north Queensland, including the Torres Strait Islands.

4. The incubation period has been ascertained from the Top End study to be 1-21 days, with a mean incubation period of 9 days.

5. Pneumonia is the commonest presentation of melioidosis. As well as severe septicaemic pneumonia with mortality often over 50%, many patients present with milder forms of pneumonia, which respond well to appropriate antibiotics. Other presentations of melioidosis include skin abscesses or ulcers, abscesses in the internal organs such as the prostate, spleen, kidney and liver, fulminant septicemia with multi-organ abscesses and unusual neurological illnesses such as brainstem encephalitis and acute flaccid paraplegia.

6. Diabetes is the most important risk factor for melioidosis, with around 40% of cases being diabetic. In addition, excessive alcohol consumption, chronic renal disease, chronic lung disease and excessive kava drinking are risk factors for melioidosis. While the majority of patients with melioidosis have one or more of these risk factors, melioidosis can also occur in children and healthy adults. However severe disease and death are extremely rare in people without identified risk factors.

7. Melioidosis has recently been diagnosed in several people with cystic fibrosis living in or travelling to melioidosis endemic regions. Colonisation of airways with *B. pseudomallei* may also be occurring, suggesting that the bacteria may behave in a similar way to *B. cepacia*.

8. Persons without symptoms or a known history of disease can also be found to be positive on serological testing, indicating asymptomatic infection. A small proportion of these people can "re-activate" from latent infection many years later in life, analogous to tuberculosis. However re-activation represents probably less than 5% of Top End cases, with the vast majority of presentations following infection during the current wet season.

9. The likelihood of diagnosis is increased by using selective culture media (modified Ashdown's broth), frequent sampling (sputum, throat, rectal and ulcer swabs) and collection of blood cultures. Clinicians should liaise with laboratory staff to ensure selective media are available including for remote communities.

10. Early diagnosis and appropriate antibiotic therapy decrease mortality.

11. Follow-up of cases and adherence to eradication therapy (usually at least 3 months of antibiotics after discharge) are critical to prevent relapse, which can be fatal.

12. Each monsoon cases of melioidosis occur in travellers returning from tropical Australia to southern states or overseas countries.

13. Public education remains very important. Wherever possible people should be directed to avoid contact with wet season soils or muddy water. Wearing footwear and the use of gloves while gardening or working outdoors are very important measures to avoid possible exposure. These preventive measures are especially important to emphasise for all diabetics.

The Top End empirical protocol for adult community-acquired pneumonia is devised to cover melioidosis in patients with risk factors, as well as other important pathogens (see NT Disease Control Bulletin December 2000 Vol 7 no. 4, p 5-6).

Durations of intensive and eradication therapy may need to be prolonged in more extensive pneumonia, deep-seated infections, bone, joint and CNS infections.

In patients in ICU with melioidosis septic shock, a G-CSF protocol has been associated with decreased mortality.

Once melioidosis is confirmed the treatment is as below.

The Northern Territory Melioidosis Treatment Protocol

Initial intensive therapy – minimum of 14 days

ceftazidime (50mg/kg up to 2g) 6-hourly IV **or** meropenem (25mg/kg up to 1g) 8-hourly IV

PLUS

trimethoprim/sulfamethoxazole (8/40mg/kg up to 320/1600mg) 12-hourly orally or IV

Followed by

Eradication therapy - minimum of 3 months

trimethoprim/sulfamethoxazole (8/40mg/kg up to 320/1600mg) 12-hourly orally*

*Folic acid 5mg/d is added to the trimethoprim/sulfamethoxazole.

Recent References from the NT study

1. Currie BJ, Fisher DA, Howard DM, Burrow JN, Selvanayagam S, Snelling PL, et al. The epidemiology of melioidosis in Australia and Papua New Guinea. *Acta Trop* 2000; 74: 121-127.
2. Currie BJ, Fisher DA, Howard DM, Burrow JN. Neurological melioidosis. *Acta Trop* 2000; 74: 145-151.
3. Low Choy J, Mayo M, Janmaat A, Currie BJ. Animal melioidosis in Australia. *Acta Tropica* 2000; 74: 153-158.
4. Currie BJ, Fisher DA, Anstey NM, Jacups SP. Melioidosis: acute and chronic disease, relapse and re-activation. *Trans R Soc Trop Med Hyg* 2000; 94: 301-304.
5. Currie BJ, Fisher DA, Howard DM, Burrow JN, Lo D, Selva-Nayagam S, et al. Endemic melioidosis in tropical northern Australia: a 10-year prospective study and review of the literature. *Clin Infect Dis* 2000; 31: 981-986.
6. Jenney AW, Lum G, Fisher DA, Currie BJ. Antibiotic susceptibility of Burkholderia pseudomallei from tropical northern Australia and implications for therapy of melioidosis. *Int J Antimicrob Agents* 2001; 17: 109-113.
7. Currie BJ, Mayo M, Anstey NM, Donohoe P, Haase A, Kemp DJ. A cluster of melioidosis cases from an endemic region is clonal and is linked to the water supply using molecular typing of Burkholderia pseudomallei isolates. *Am J Trop Med Hyg* 2001; 65: 177-179.
8. Munckhof WJ, Mayo MJ, Scott I, Currie BJ. Fatal human melioidosis acquired in a subtropical Australian city. *Am J Trop Med Hyg* 2001; 65: 325-328.
9. Ulett GC, Currie BJ, Clair TW, Mayo M, Ketheesan N, Labrooy J, et al. Burkholderia pseudomallei virulence: definition, stability and association with clonality. *Microbes Infect* 2001; 3: 621-631.
10. Stephens DP, Fisher DA, Currie BJ. An audit of the use of granulocyte colony-stimulating factor in septic shock. *Intern Med J* 2002; 32: 143-148.
11. Holland DJ, Wesley A, Drinkovic D, Currie BJ. Cystic fibrosis and *Burkholderia pseudomallei*: An emerging problem? *Clin Infect Dis* 2002; 35: e138-140.

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A single dose treatment for suppurating ear disease in Aboriginal children

Stephen Bryce, Gapuwiyak Community Medical Officer, Ross Diplock, Consultant Paediatrician, John Dewing, Final Year Medical Student, University of Perth

For remote health practitioners in the Northern Territory, the problem of managing discharging ears in Aboriginal children tends to be associated with feelings of frustration and pessimism. It is well known that this is an endemic problem. Causes have been well described elsewhere and in terms of management, a recent Cochrane review concluded that properly administered treatment with "aural toilet and topical antibiotics is effective in resolving otorrhoea and eradicating bacteria from the middle ear" (at least in the short term).[1] However, material specific to Australian Aboriginal health suggests that a major reason for treatment failures is a *lack of adherence* to prescribed treatment.[2,3] While the ongoing injection of new housing and the introduction of the pneumococcal vaccine should help to address the problem on a community level, there remain significant problems with current *clinical treatment* of a patient with tympanic membrane perforation and ear discharge.

Both community and hospital based health staff will be familiar with the scenario of a carer being dispensed a bottle of sofradex, kenacomb or acetic acid and then asked to administer the drops after aural toilet 4 times daily. Generally, most clinics have such limited resources that it is not possible to thoroughly follow all of these children up. In fact, some health staff argue that treatment seems so ineffective, follow up is a waste of time. When the child *is* seen again, usually the discharge persists. The carer may or may not report that they have administered few of the drops.

Reasons for poor adherence with ear drops

We have identified a number of reasons why this treatment may be adhered to poorly. Firstly, Yolngu patients live in close knit clan groups and are regularly discussing the various treatments dispensed by the clinic. From our discussions with patients, there appears to be the general feeling that the ear drops simply do not work. Perhaps there is a "vicious cycle" operating here - the drops do not work because they are not administered regularly and they are not administered regularly because they are thought not to work. Carers will not waste their time on a treatment they have little faith in. In contrast, since we have been using Celestone VG in Gapuwiyak, patients have often specifically asked for it instead of ear drops.

Secondly, it is worth noting that Yolngu women tend to start having children at a relatively young age. In community, motherhood is seen more as an "apprenticeship" than an independent role. The responsibility for important issues like administering medication often falls to a more senior carer like a grandmother, an older aunt or a more senior wife. Senior carers are usually responsible for several children within a clan household. The amount of time and energy they have to dry mop and administer drops 4 times per day is therefore limited. Also, the child in question may be one of several in the household who has discharging ears. These problems become compounded when a household is affected by alcohol or other substance abuse, domestic violence, problem gambling or financial hardship (all common).

Dry mopping, done properly, can be uncomfortable for many children. Having to administer this treatment to a reluctant, protesting child makes it even less attractive. Anecdotally, we very rarely see a full week of dry mopping plus drops completed.

Celestone VG

The key advantage of this technique is that it is administered *once only* in the clinic. It can be used for a range of pathology from moist tympanic membrane perforations up to suppurating otitis media. Celestone VG is a long acting ointment that contains the antibiotic gentamicin and the steroid betamethasone. It should be noted that it does not have any antifungal activity – however if used properly, this is rarely a problem in practice. The antibiotic kills middle ear bacteria and the steroid

addresses the "vicious cycle" of inflammation that is involved in delaying the healing of perforations.

The technique we have developed at Gapuwiyak is as follows:

- Firstly, obtain a disposable 2ml syringe. The plunger is removed and the syringe filled with (0.5 - 1 ml for a child or 1 - 1.5 ml for an adult) Celestone VG through the "back end" and the plunger is replaced. For an "inserting nozzle" we have used a 16G or 14G plastic I.V. cannula – with the metal introducer removed and cut to half-length. Alternatively, we have used the blunt, plastic cannulas used to inject through rubber I.V. bungs.
- The ear is dry mopped with a tissue or toilet paper "spear" until the external auditory canal is free of pus and debris. Then the pinna is gently pulled upwards and backwards to straighten the external canal. The Celestone VG is inserted until it is visible at the canal entrance.

The ointment tends to remain for about one week. We have found that if further Celestone VG is inserted within 2 weeks, there is a risk of fungal overgrowth. We therefore wait 3 to 4 weeks before deciding whether to insert any further ointment. Anecdotally, we have seen many discharging ears clear up after 1 or 2 applications. As far as Gapuwiyak Yolngu are concerned, this is a strongly preferred treatment, and as mentioned tends to be the specifically requested treatment.

The history of Celestone VG in Gapuwiyak.

In 1998, we became frustrated at the poor results in treating ear discharge and so started using the technique at the suggestion of visiting paediatrician, Dr Ross Diplock. Pharmacists from Royal Darwin Hospital raised legitimate concerns about inserting an ototoxic substance (gentamicin) directly into an ear with a perforated eardrum. At the time, we consulted with Darwin E.N.T. Surgeon, Dr Michael Zacharia. His opinion was that Celestone VG had a number of other indications within ENT practice and the true risk of ototoxicity from this product is extremely low. He also commented that theoretically the product should be useful for the group of patients in question.

Evidence for effectiveness of Celestone VG

While we have not had the resources to do a controlled trial, we present here the available evidence supporting its use.

Wilde, England and Jones[4] compared the single installation of an antibiotic/steroid ointment, with regular aural toilet and installation of medicated dressings. They randomised 70 patients with otitis externa, infected mastoid cavities or chronic suppurative otitis media to either of the above treatment groups. The aural toilets for the second group were regularly done in a supervised outpatient setting. At the 3 week endpoint, both treatments were found to be *equivalent* in terms of effectiveness. This was a small study and it is not possible to extrapolate too much from its findings. However, the results are encouraging and consistent with our clinical experience at Gapuwiyak.

Preliminary results of research by the Menzies School of Health Research in the NT shows a rate of tympanic membrane perforation of 25% in children aged 6 – 30 months.[5,6]

In January 2002, a retrospective chart audit in Gapuwiyak aimed to compare perforation rates with the Menzies data. In January 2002, a final year medical student (John Dewing) reviewed the files of all Gapuwiyak children in the age range used by Menzies. Children who had not had their ears examined in the past 3 months were excluded from the audit. Records were reviewed for the 3 months prior to the audit date and any form of tympanic membrane perforation over that period was recorded. After using Celestone VG on the vast majority of patients since mid-1998, we found that 14% of Gapuwiyak children had one or more tympanic membrane perforations. A similar audit was performed in June 2002 – again giving a figure of 14%. While this compares favourably with the Menzies figure of 25%, it is a very "raw" figure potentially subject to significant bias. It needs to be confirmed with a prospective controlled study.

Summary

Suppurative ear disease and perforated tympanic membranes are remarkably common in NT indigenous communities. Health staff frequently become frustrated by poor responses to established treatments of regular dry mopping and ear drops. Celestone VG is a long acting ointment that contains both an antibiotic and steroid component. It can be administered to patients as a single treatment. There is currently limited evidence to support its effectiveness, but its superior acceptability to carers and staff begs further investigation of its use.

References

1. Acuin J, Smith A, Mackenzie I. Interventions for chronic suppurative otitis media. The Cochrane Library, 2001, Issue 3.
2. Morris P.S. Improving the Medical Management of Otitis Media and Other Bacterial Respiratory Disease In Rural and Remote Australian Aboriginal Children: A Systemic Approach. Menzies School of Health Research, December 1998.
3. Morris et al. Recommendations for Clinical Care Guidelines on the Management of Otitis Media in Aboriginal and Torres Strait Islander Populations. For the Office for Aboriginal and Torres Strait Islander Health, Commonwealth Dept of Health and Aged Care. March 2001.
4. Wilde AD, England J, Jones AS. An alternative to regular dressings for otitis externa and chronic suppurative otitis media. *The Journal of Laryngology and Otology*, 1995; 109: 101-103.
5. Personal Communication Dr Peter Morris, Menzies School of Health Research 20/11/2001.
6. Morris P. Preliminary Report – Prevention of Otitis Media Perforations with Prevenar and Training. Menzies School of Health Research, 22/11/2001.

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Community initiatives to reduce rates of chronic suppurative otitis media

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The extent of the problem

Chronic suppurative otitis media (CSOM) is one of the most important health problems facing Aboriginal children living in rural and remote communities.[1,2] Suppurative ear infections are now rare in developed countries. This has led the World Health Organisation to advise that populations with rates of CSOM in excess of 4% have a massive public health problem.[3] In most Aboriginal communities, rates are considerably higher than this.

Nearly all children will experience some ear infections (otitis media) early in their life. In a relatively large proportion of Aboriginal children, these infections are severe enough to result in perforation of the tympanic membrane. Episodes of acute otitis media with perforation (AOM/wiP) that do not receive appropriate antibiotic treatment are likely to progress to CSOM. Once established, CSOM is an extremely difficult condition to manage. Medical treatment generally needs to be continued for many weeks. Even when the perforation is dry, children are at risk of further episodes of discharge until the tympanic membrane has healed.

The hearing loss associated with CSOM is nearly always significant. For most children, this means that voices at a conversational level sound like whispers. In the more severely affected children, voices at a conversational level will not be heard at all. The hearing loss associated with CSOM tends to be more severe than that associated with other types of otitis media. Therefore, young children with this condition will nearly always need additional audiological and educational support.

Preventing the onset of CSOM

The bacteria that most commonly cause AOM (*Streptococcus pneumoniae*, *Haemophilus influenzae*) are very effectively spread by children with chronic nasal discharge. Reducing exposure and susceptibility to these pathogens will ultimately lead to dramatic reductions in the rates of CSOM. Therefore, preventive strategies

should include: 1) efficient immunization programs (including the new 7-valent conjugant pneumococcal vaccine), 2) early identification and appropriate antibiotic treatment of acute otitis media without perforation (AOM/woP) and acute otitis media with perforation (AOM/wiP), and 3) education and support for additional hygiene interventions.

Acute otitis media without perforation (AOM/ woP) most commonly occurs in the first 2 years of life. It is best identified by the presence of a bulging tympanic membrane. The more severe infections are associated with the development of a pinhole perforation. In the early stages, this perforation heals and re-perforates. This is the time when the benefits of aggressive antibiotic treatment are greatest. Often higher doses and more prolonged courses of treatment are required. It is appropriate to continue amoxycillin until signs of bulging of the tympanic membrane or recent discharge have resolved. Topical antibiotics such as gramicidin-framcetin- dexamethasone (Sofradex) are also recommended if the perforation persists. A diagnosis of CSOM should be reserved for those children who have discharging for at least 6 weeks plus a perforation that covers at least 2% of the tympanic membrane. Children with smaller perforations, or with new discharge from a previously dry perforation, should be considered to have AOM/wiP. Again, antibiotic treatment should continue until signs of bulging of the tympanic membrane or recent discharge have resolved.

Effective management of CSOM

The assessment of children with discharging ears can be difficult. In young children, visualisation of the perforation (or recently healed perforation) requires removal of all discharge from the ear canal. This can be done by dry mopping or syringing. Clinicians should resist the temptation of making a diagnosis of CSOM without identifying the site and size of the perforation.

CSOM is a bacterial infection that often involves several different pathogenic and opportunistic organisms. The most important of these is *Pseudomonas aeruginosa* which is relatively resistant to antibiotic treatment. In addition, the extensive tissue damage in the middle ear mucosa and mastoid bone are likely to contribute to the need for prolonged or intensive treatment regimes. The principles of treatment are the same for all chronic suppurative diseases: remove the pus and deliver appropriate antibiotics to the site of infection. For topical antibiotics, this means ensuring the medication passes through the perforation into the middle ear space.

The largest community-based intervention study involving children was conducted in Africa.[4] In this region, around 1% of the population are affected by CSOM. Children were randomly assigned to treatment with either dry mopping followed by Sofradex drops or dry mopping alone. While dry mopping alone did not appear to be an effective treatment, even the benefits of regular treatment with Sofradex drops were not evident until children had received at least 12-16 weeks treatment. More intensive hospital-based studies of daily debridement by an ENT surgeon plus intravenous antibiotics have documented that 2-3 weeks of therapy are required to treat this infection.[5] Clearly the need for such intensive or prolonged treatment represents a major barrier to good outcomes in Aboriginal children. Furthermore, those who achieve dry ears after their initial treatment will be at risk of further episodes of discharge until their tympanic membrane perforation heals.

The staff at the Gapuwiyak health clinic should be congratulated for their efforts in trying to address this important issue. While their overall perforation rate of 14% is relatively low by Northern Territory standards, it is still considerably higher than that seen in other populations (including developing countries) and well above the WHO rate of 4% signalling a massive public health problem. Their experience with the use of Celestone ointment is encouraging and justifies further research. Ideally children should be randomly allocated to receive the new treatment or standard therapy and all children randomised have their final ear state assessed by an independent (blinded) observer. This will ensure that other factors that might influence outcomes are the same for the 2 groups of children. For example, additional education for families about the importance of this condition and close follow up by health clinic staff are likely to have a positive impact on outcome. Without the use of the randomised

study design, it is difficult to distinguish the beneficial effects of these aspects of care from the potential for greater antibiotic delivery associated with Celestone ointment.

Finally, it is extremely encouraging to hear of families becoming actively involved in the choice of their medical treatment. All families should be informed of the likely benefits and harms of all medical interventions. This information is most reliable when it comes from well-designed research studies. However, families should then be encouraged to combine this information with their own personal preferences for health care. This is only feasible in clinics (like the Gapuwiyak Health Centre) that support effective communication and a patient-centred approach to chronic disease management.

References

1 Coates HL, Morris PS, Leach AJ, Couzos S. Otitis media in Aboriginal children: tackling a major health problem. Med J Aust 2002; 177:177-178.

2 Morris P, Ballinger D, Leach A, Koops H, Hayhurst B, Stubbs L et al. Recommendations for Clinical Care Guidelines on the Management of Otitis Media in Aboriginal and Torres Strait Islander Populations. Canberra: Office of Aboriginal and Torres Strait Islander Health, 2001.

3 Report of a WHO/CIBA Foundation Workshop. Prevention of Hearing Impairment from Chronic Otitis Media. Geneva: World Health Organisation, 1996.

4 Smith AW, Hatcher J, Mackenzie IJ, Thompson S, Bal I, Macharia I et al. Randomised controlled trial of treatment of chronic suppurative otitis media in Kenyan schoolchildren [see comments]. Lancet 1996; 348(9035):1128-1133.

5 Fliss DM, Dagan R, Houri Z, Leiberman A. Medical management of chronic suppurative otitis media without cholesteatoma in children [see comments]. J Pediatr 1990; 116(6):991-996.

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Kava liver toxicity and kava 'fits'

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Liver toxicity from herbal remedies containing kava

Kava's beneficial effects as a natural therapy with few side effects have become internationally contentious.[1] Reports of potentially fatal liver toxicity observed in patients who used kava-based products, or extracts of kava,[2,3] led to the withdrawal of kava-based therapies from sale in Germany, France, Switzerland and the United Kingdom in late 2001[1] and now Canada in 2002.[4] Medical alerts have been issued in the United States.[5] In Australia, kava products are the subject of a voluntary recall alert.[6] This was in response to a recent report of a Melbourne woman aged 56 who died despite a liver transplant for fulminant hepatic failure. She had been otherwise well prior to this. For 3-4 months before the onset of liver failure she had been taking five herbal remedies, one of which contained kava.

While these controversies were evolving, Aboriginal people in Arnhem Land have continued to drink kava supplied through a persistent illegal trade.[7] Since 1998, legislation has allowed for the development of a system of regulations for the legal supply of kava in those communities who wish to use it.[8] Legal kava is now being used by people in 3 communities in Arnhem Land. The aims of regulation have been to eliminate the illegal trade and to minimise the harms from kava abuse.[8] For some time it has been known that the quantities of kava consumed by Aboriginal people in Arnhem Land, where kava has been used for almost 20 years, are equivalent to doses of kava lactones many times greater (ca. 10 to 50 times greater) than the recommended therapeutic doses of herbal remedies on the market.[9]

There is good evidence for changes in liver function in Aboriginal kava users in Arnhem Land who use kava powder imported from

Pacific island countries mixed with water.[10,11] There is, however, no evidence that liver failure has occurred in association with this style of kava use in this population. In populations in Pacific island regions where kava has been used for many years in similar ways no evidence exists for liver failure in association with kava use. Elevated levels of alkaline phosphatase (ALP) and gamma-glutamy transferase (GGT) in Aboriginal kava users return to within a normal reference range upon ceasing kava use or moderating consumption. Elevated GGT and ALP and the absence of an elevated alanine transaminase (ALT) in kava drinkers suggest the possibility of an obstructive rather than an inflammatory pattern of response.[10] Why fulminant hepatitis may occur in association with the use of manufactured herbal remedies containing kava but does not appear to occur with the use of the natural forms of kava has not been investigated. Although it has not yet been shown to exist in association with kava use in its traditional form, there is the potential that long-term liver damage from alcohol abuse may be exacerbated by an interaction between kava and alcohol. Therefore advice for moderating kava use is especially appropriate if people are also consuming alcohol. In addition to this, there is no data available that can address the question of whether kava can augment liver damage that occurs with hepatitis-B infection which is endemic in eastern Arnhem Land.

Figure 1 shows the occurrence of abnormal GGT with increased kava use in one community in eastern Arnhem Land. Comparisons with an earlier study by Mathews et al are also provided (figure 2) to demonstrate the kinds of ranges that have been observed in Aboriginal kava drinkers in 2 cross-sectional studies.[10,11] Clinicians may need to consider different approaches when treating Aboriginal people who drink kava.

Possible *grand mal* seizures associated with kava toxicity and withdrawal

In Arnhem Land in the late 1990s, a heavy kava user was admitted to hospital with choreiform (extrapyramidal) movements.[12] The 27-year-old Aboriginal man who had no history of other substance abuse had presented 3 times with generalised choreoathetosis secondary to kava bingeing. He had abnormally elevated ALP and GGT. He was treated with intravenous diazepam

Figure 1. Frequency of occurrence of abnormal values of gamma-glutamyl transferase by category of kava use (Chi2=8.15, P=0.004)[16]

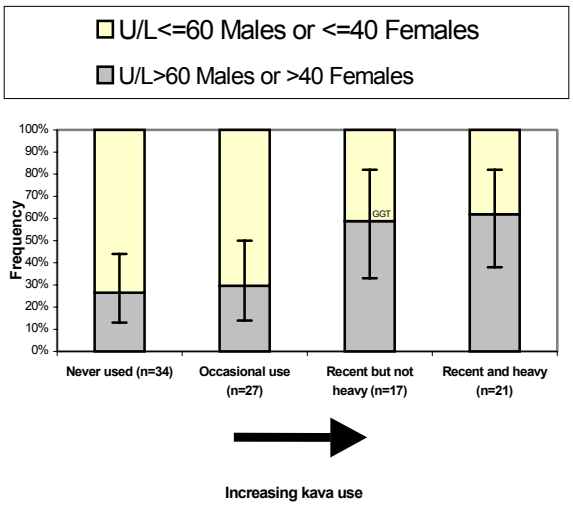
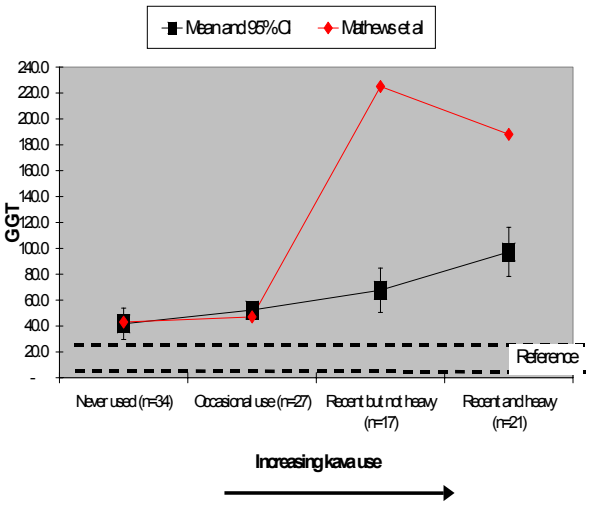


Figure 2. Differences in gamma-glutamyl transferase by categories of kava use (F=7.37, P<0.001)



and within 12 hours he no longer had these symptoms.[12] At about the same time during the 1990s, there were other reports from the region's community clinics of the occurrence of 'fits' or 'seizures' in kava drinkers. Reports of similar adverse reactions to kava are rare in the literature.[13,14]

From the 1980s up to 1999 in a sample of the eastern Arnhem Land Aboriginal population, 21 kava users experienced 32 "seizure" episodes for which the date of occurrence and other data was recorded in notes in community health clinics.[15]

Kava toxicity effects were suspected in 15 and withdrawal effects in 6 of 32 "seizure" episodes. In 7 episodes impaired consciousness and abnormal movements were adequately documented to suggest *grand mal* seizures. The maximum number of "seizures" experienced was 3 with 3 individuals experiencing this number of seizures between 1990 and 1999. During 1994-1997 when kava supply may have reached its peak, 16 individuals experienced 19 "seizures". Of the 21 individuals experiencing "seizures", 15 were heavy users described locally as people who occasionally drink kava in '24 hour' sessions. The clinical data and the coincidence of peak supply with records of "seizures" suggest kava toxicity and withdrawal seizures may both occur with heavy kava use.[15] It is possible that these "seizures" only occur in individuals predisposed to seizure activity, but this requires further study. Kava drinkers admitted with a history of possible seizures should be considered for referral for EEG, CT brain scan and neurological assessment.

References:

1. Blumenthal M. (2002). Kava safety questioned due to case reports of liver toxicity: expert analyses of case reports say insufficient evidence to make causal connection. American Botanical Council. Available: http://www.herbalgram.org/browse.php/kavaupdate/ [Accessed 21 June 2002].
2. Escher M, Desmeules J, Giostra E, Mentha G. Hepatitis associated with Kava, a herbal remedy for anxiety. *BMJ* 2001;322:139.
3. Russmann S, Lauterburg BH, Helbling A. Kava hepatotoxicity. *Ann Int Med* 2001;135:68-9.
4. Health Canada. Health Canada issues a stop-sale order for all products containing kava. Available: http://www.hc-sc.gc.ca/english/protection/warnings/2002/2002_56e.htm#top [Accessed 28 October 2002].
5. Lewis Taylor C. (2001, Dec 19). Dear health care professional colleague [letter]. Rockville (MD): US Food and Drug Administration. Available: http://www.fda.gov/medwatch/safety/2001/kava.htm [Accessed, 9 July 2002].
6. Commonwealth Department of Health and Ageing. (2002). Consumer warning on kava-containing medicines. Trish Worth, Parliamentary Secretary for the Minister of Health and Ageing.

   Available: http://www.health.gov.au/mediarel/yr2002/tw/tw02005.htm [Accessed 8 March,2002].
7. Clough AR. Enough! or too much. What is 'excessive' kava use in Arnhem Land? *Drug Alcohol Rev* 2002. IN PRESS.
8. Northern Territory of Australia. Kava licensing matters. : Department of Industries and Business, Racing, Gaming and Licensing Division; 2001. Available at http://www.nt.gov.au/dib/licensing/html/kava.shtml [Accessed 3 Nov 2001].
9. Clough AR, Burns CB, Mununggurr N. Kava in Arnhem Land: a review of consumption and its social correlates. *Drug Alcohol Rev* 2000;19 (3):319-28.
10. Clough AR, Jacups SP, Wang Z, Burns CB, Bailie RS, McDonald SP, et al. Health effects of kava use in an eastern Arnhem Land community *Intern Med J* .
11. Mathews J, Riley M, Fejo L, Munoz E, Milns N, Gardner I, et al. Effects of the heavy usage of kava on physical health: summary of a pilot survey in an Aboriginal community. *Med J Aust* 1988;148:548-55. IN PRESS.
12. Spillane P, Fisher D, Currie B. Neurological manifestations of kava intoxication [letter]. *Med J Aust* 1997;167:172-3.
13. Schelosky L, Raffauf C, Jendroska K, Poewe W. Kava and dopamine antagonism. *J Neurol, Neurosurg and Psychiatr* 1995;58:639-40.
14. Almeida JC, Grimsley EW. Coma from the health food store: interaction between kava and alprazolam. *Ann Intern Medicine* 1996;125 (11):940-1.
15. Clough AR, Cairney S, Maruff P, Currie B. Possible toxicity and withdrawal seizures in Aboriginal kava drinkers in Arnhem Land South Pacific. *J Psychology* ;13(1):26-33.

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Rectification and control practices in a major salt marsh mosquito breeding site, Darwin, NT

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Abstract

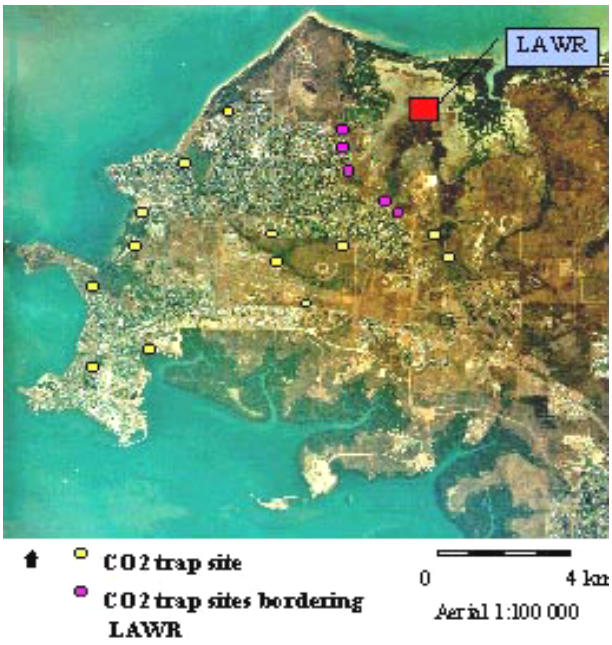
The salt marsh mosquito *Ochlerotatus vigilax* occurs seasonally in high pest numbers adjacent to the Darwin urban area. They breed primarily in the upper tidal zone in the nearby Leanyer swamp after inundation by extreme tides and rain. The historic Leanyer Air Weapons Range (LAWR) created a 90ha area of bomb craters, which were very productive breeding sites for *Oc. vigilax*. The Medical Entomology Branch (MEB) with support from the Mosquito Control Advisory Committee, has long urged the rectification by filling and levelling of the bomb craters. The Department of Defence commissioned the rectification of the LAWR in June 1998 at a projected cost of $1.7 million. The major engineering works were carried out between May and June 2000. The area in the vicinity of the LAWR requiring insecticide control reduced from an average of 82.7ha before to 8ha after rectification. The reduction in *Oc. vigilax* breeding is presented spatially and temporally through a Geographic Information System. The rectification of the LAWR is a success story for the Department of Health and Community Services, the Mosquito Control Advisory Committee and the Department of Defence, with significant benefits to the people of Darwin.

Introduction

Engineering and insecticide control practices are used in the Darwin area as part of an integrated mosquito control program.[1] This report describes the rectification of the Leanyer Air Weapons Range (LAWR) and the mosquito monitoring of the site. The LAWR is situated between Buffalo Creek and Micket Creek, east of Darwin (Fig.1). The RAAF used the area as an aerial bombing range during and after World War II and the resulting habitat is a prolific *Ochlerotatus vigilax* (salt marsh mosquito) breeding site.

The MEB and the Mosquito Control Advisory Committee (MCAC) have advocated the rectification of the LAWR in an effort to:

Figure 1. LAWR Location, Darwin.



1. Reduce the mosquito breeding area and associated personnel and operational costs to survey and control Leanyer Swamp.
2. Reduce salt marsh mosquito numbers affecting nearby residents.
3. Reduce mosquito borne disease in Darwin urban areas adjoining Leanyer Swamp.

The area previously comprised over 500 craters with a closed grassland and sedgeland community, fringing salt flats.[2] The prime rectification area consisted of around 90 hectares of high-density craters, each of which had an average depth of 1.2m and a breadth of 15m (Fig. 2). The area is subject to periodic inundation after extreme high tides and heavy rainfall events. The LAWR craters and associated impeded drainage areas provided a suitable breeding site for *Oc. vigilax,* which is a major pest species in northern Australia and is a major vector of Ross River virus.[3]

This paper presents the process undertaken by the MEB and the MCAC to have the LAWR rectified. It also presents an evaluation of the results of the rectification works.

Figure 2. LAWR before rectification looking S)

Figure 3. LAWR after rectification (looking NW)

Leanyer Air Weapons Range Rectification

The LAWR rectification works negotiations took place over a period of 10 years. The LAWR is situated on Commonwealth land and is the property of the Department of Defence. The Northern Territory Department of Health and Community Services (DHCS) first formally identified the area as being a significant salt marsh mosquito breeding site in 1989.[1] The DHCS identified the area as needing rehabilitation to reduce the need for ongoing and costly mosquito control operations. A time line lists the important steps in getting the works approved and the area rectified (Appendix 1).

An Unexploded Ordinance (UXO) survey and removal operation was carried out to eliminate any exploded or unexploded ordinance from the bomb crater site before engineering works commenced. An average of 8.5 items of sub-surface contamination was detected per hectare.[4] The physical rectification of LAWR took place from May 2000 to June 2001 at a cost of almost $1.7 million. The earth works were begun in May 2000 and were largely completed by June 2000. The bomb craters were rectified through vegetation removal, and then filling and levelling of the craters by graders and tip trucks. The drainage of the area was also modified and the area levelled. After the completion of earthworks, the area was left to stabilise for 12 months to allow for compaction of fill. In June 2001 the LAWR area was reinspected and final works were undertaken by filling some remnant depressions and undertaking minor drainage works associated with the access road to LAWR.

Leanyer Air Weapons Range Mosquito Management Techniques

The LAWR had proved difficult to control with insecticides, as the craters were spread over a wide area and were of varying depth. The entire crater area needed to be controlled at high insecticide application rates to ensure effective mosquito control. On average, the cost of aerial mosquito control in the Leanyer swamp area was around $140 per hectare (includes only helicopter time and insecticide costs). One control operation could cost around $13,000. In a single wet season, the area can fill and dry out a number of times, and breeding requiring control operations can occur after each drying and flooding episode.

The eggs of *Oc. vigilax* are layed on moist mud or on the bases of salt marsh plants. During the late dry season to the middle of the wet season, the bomb craters can be repeatedly flooded and *Oc. vigilax* can hatch in high numbers. The MEB surveys the LAWR area after significant rainfall events (over 25ml) or after extreme tides (over 7.5m). Surveys are conducted using a Jet-Ranger helicopter and numerous survey points are checked for breeding using a 300ml ladle to determine the extent of the breeding. The area to be controlled is evaluated using the helicopter

survey results and are outlined on aerial photos. The MEB uses the bacterial insecticide *Bacillus thuringiensis* subspecies *israelensis* ('Cybate'® or 'Vectobac' ®) for the majority of the helicopter insecticide applications.

In 1999 the MEB introduced a Geographic Information System (GIS) to evaluate the spatial and temporal characteristics of the mosquito breeding in Leanyer Swamp. The GIS has been used to map the helicopter control areas, tidal inundation, survey points and species larval distribution. The GIS is able to present spatial data overlayed with attribute data. This ability has enabled the LAWR area to be evaluated on the mosquito breeding potential before and after the rectification works.

The filled (dark) areas (Fig. 4-5) represent the helicopter spray areas that were recorded on the aerial photographs after the spray operations. The figures below demonstrate the dramatic reduction in the *Oc. vigilax* breeding area after the rectification works and the subsequent reduction in insecticide application to the LAWR. Nil to very low larvae density have been found in the rectified area after each rain or tide event over the last two wet seasons. The total area that required insecticide application reduced from an average of 82.7ha for the 3 years before rectification, to 8ha for the 2 years after rectification. This has substantially reducing the amount of insecticide and helicopter time required for control in the LAWR area. (Table 1).

Mosquito Monitoring

The Medical Entomology Branch sets weekly carbon dioxide baited encephalitis virus surveillance (EVS) traps[5] at 18 sites around Darwin. Of these sites, 5 border the Leanyer swamp area, which includes the LAWR, and can be used to assess *Oc. vigilax* numbers emerging from the general Leanyer swamp area and dispersing towards Darwin's northern suburbs (Fig. 1). Annual *Oc. vigilax* numbers were calculated from a total of weekly trapping results of 5 sites for the financial year 98/99 to 01/02. The collection figures show a trend of reduced numbers after the rectification works were completed (Table 1). The mean annual numbers of *Oc. vigilax* in the 3 years before rectification were 16,603, while the mean for the 2 years after rectification was 4,862.

Table 1. *Ochlerotatus vigilax* and the Leanyer Air Weapons Range

Financial Year	Total *Oc. vigilax** (5 sites bordering LAWR)	LAWR - hectares controlled
1997/98	10526	112
1998/99)	32838	117
1999/00 (before)	6446	19
2000/01 (after)	4131	14
2001/02	5594	2

**Ochlerotatus vigilax* - total collected from 5 sites set weekly for the financial year.

Figure 4. Insecticide control area 98/99 (before)

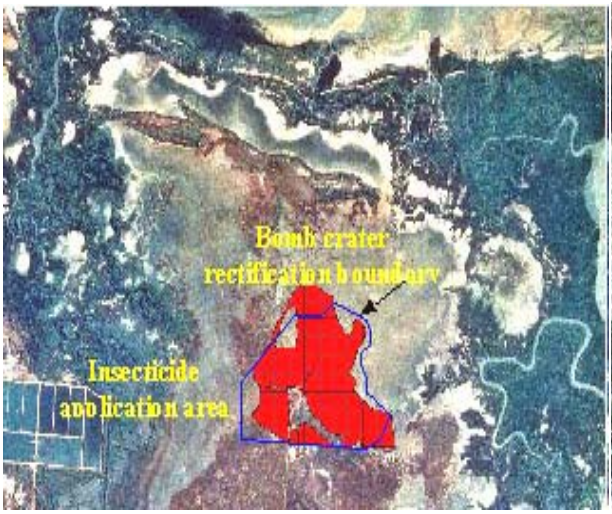


Figure 5. Insecticide control area 01/02 (after)

Conclusions drawn from *Oc. vigilax* trapping numbers should be viewed with caution. There is considerable variability in numbers each year due to productivity of the breeding sites in both Leanyer swamp and more distant swamps from which salt marsh mosquitoes can disperse. Exceptional years of high rainfall in October or November during the wet season can dramatically increase *Oc. vigilax* numbers by causing extensive flooding of all the potential breeding sites and result in mass dispersal of *Oc. vigilax* over wide areas from well outside the helicopter applied control areas. Such an event occurred in 1993/94 and 1998/99 (Fig. 6) when there was above average November rain. High rainfall onset in December, followed by regular rainfall that results in the swamp being rapidly and continually flooded, can dramatically reduce subsequent wet season numbers of Oc. vigilax. Continuously flooded breeding sites are not suitable for egg laying and are not suitable for larval habitats due to fish predation.

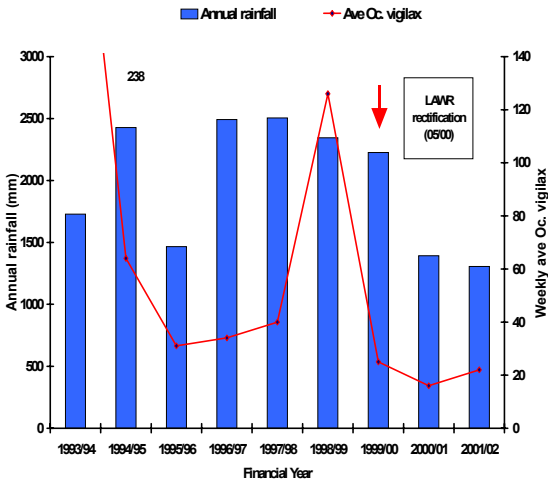
There are also other *Oc. vigilax* breeding sites in the Leanyer swamp area other than LAWR that contribute to the totals for the 5 trap sites. Wind direction and rainfall are additional variables that must be considered for mosquito production and dispersal to mosquito traps. Another possible variable factor is the success of the MEB insecticide control operations in and around Leanyer swamp but these are relatively consistent each year with good and timely control of the breeding sites within the Leanyer area. However during most years, LAWR has been a significant contributor to total *Oc. vigilax* numbers and to the area of insecticide control operations.

Annual rainfall figures and for Darwin and average weekly numbers of *Oc. vigilax* per trap set from the five sites over a year are presented graphically in Figure 6. Prior to the LAWR rectification works, the average weekly number of *Oc. vigilax* was higher each year when compared with the following two years, despite years of variable rainfall (Fig. 6).

Conclusion

The $1.7 million rectification works has reduced the area of *Oc. vigilax* breeding in the LAWR. The time and effort used to control *Oc. vigilax* in LAWR has been significantly reduced. The

Figure 6. Annual Darwin rainfall & average weekly numbers of Oc. vigilax per. trap at 5 sites bordering LAWR, financial year July 93 to June 02



MEB has already saved a considerable amount of money in the control of mosquitoes within the LAWR, and this is likely to continue for many years. The use of GIS technology has graphically demonstrated the decrease in insecticide controlled areas, from an average of 82.7 ha before rectification to an average of 8 ha after rectification. There is an indication of reduced salt marsh mosquito numbers in the adjacent residential areas, with an average of 16,603 saltmarsh mosquitoes per year in weekly mosquito traps before rectification, to an average of 4,862 per year after rectification. The DHCS has now been able to focus its mosquito control efforts on other salt marsh mosquito breeding sites. The MCAC, DHCS and the Department of Defence rectification of a productive and long-term mosquito breeding site will reduce the pest problems and amount of mosquito borne disease in the Darwin area.

Acknowledgments

Gwenda Hayes of the MEB established the GIS program to display mosquito control operations in the Leanyer Swamp and her groundwork is gratefully acknowledged. Group Captain Brian Lane Acting Director General, Facilities Air Force advanced the LAWR project to finalisation within Defence and his contribution is gratefully acknowledged. Different ministers of Health and the NT government, together with the executive of DHCS and Chief Health

Officers, particularly Shirley Hendy, supported these matters diligently over the years. The final outcome could not have been possible without this support. The Mosquito Control Advisory Committee was a vital part of pursuing the objectives of rectification and their support is gratefully acknowledged.

Appendix

Time Line of events for Leanyer Air Weapons Range (LAWR) Rectification works

Date	Correspondence/ Action
Late 1989	The Department of Health and Community Services (DHCS) fills 11 Bomb Craters (lha). Cost $25,000. Shows that rectification is practical and effective.
15/05/90	Task Force Review by DHCS and Darwin City Council (DCC) of the mosquito situation in Darwin formally identifies the LAWR as a significant problem.
19/07/90	DHCS Minister writes letter to Minister of Defence requesting funding of $200k per annum for 5 years for LAWR remedial works.
12/02/91	Minister of Defence "not prepared to authorise the expenditure of Defence department funds for this purpose".
29/10/92	Medical Entomology Branch DHCS has talks with local Dept. of Defence on the need to minimise any further crater development.
19/10/94	DHCS and local Defence talks about health projects include need for a rectification project LAWR.
12/04/95	NT Mosquito Control Advisory Committee (MCAC) agrees for an approach to Defence to seek rectification.
23/06/95	DHCS again approaches Defence and request the rectification of LAWR, including engaging engineering consultant, methods, and cost.
31/08/95	Defence minister states that he is prepared to consider works and wants Defence to study safety and Environmental Impacts before further supporting.
10/10/95	Northern Territory Government, through DHCS, advises Defence of commitment of $200k for initial `seed' works to demonstrate the importance of LAWR rectification and to pursue initial investigations.
28/8/96	DHCS minister writes to Defence requesting assistance in rectification of bomb craters.
23/10/96	Commitment by Defence to program funds for requested works if meeting of local shareholders chaired by local DHCS medical entomologist reach agreement on remedial measures.
24/4/97	Consultants commissioned by DHCS and DCC present a scoping study report to address environmental and engineering measures to rectify LAWR.[6]
26/05/97	Department of Defence commissions an initial Unexploded Ordinance (UXO) survey and report on LAWR.
10/4/98	The Department of Defence approves detailed survey for clearance of UXO.
11/06/98	The Department of Defence approves $700k for survey and removal of UXO.
06/07/99	Tenders close for LAWR rectification earthworks of filling and draining works, approx $1M.
01/05/00	Earthworks begin by sourcing fill, and use of scrapers, tip trucks, graders.
30/06/00	Earthworks complete and site is left to `settle' for 12 months.
26/06/01	MEB, Defence, consultant engineers meet for follow up field inspection and remedial works program.
26/11/01	Minor works completion with remainder of the $1.7 million dollar works allocation.

References

1. Whelan, P.I (1989). Integrated Mosquito Control in Darwin. In *Proceedings of 5th Arbovirus Symposium* 28 August - 1 September 1989, Brisbane.
2. Metcalfe, K (1998). Environmental Report on Mosquito control in the former Leanyer Air Weapons Range. Unpublished report for Sinclair Knight Merz.
3. Whelan, P. Merianos, A. Hayes, G & Krause, V (1997). Ross River virus transmission in Darwin, Northern Territory, Australia. *Arbovirus Research In Australia.* 7: 337-345.
4. Young, D (1997). UXO Contamination, Leanyer Air Weapons Range, Darwin. Consultants Report, Sinclair Knight Merz, report for Department of Defence.
5. Rohe DL & Fall RP (1979). A miniature battery powered C02 baited light trap for mosquito borne encephalitis surveillance. *Bull. Soc. Vector Ecol*. 4: 24-27.
6. Sinclair Knight Merz (1997). Mosquito Control in the former Air Weapons Range, Leanyer. Preliminary Scoping Study (unpublished). Sinclair Knight Merz, report for Department of Defence.

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Cryptosporidiosis: will it happen this wet season?

Peter Markey, CDC Darwin

Introduction

In the wet seasons of 2000-01 and 2001-02, Darwin and other Top End urban centres experienced outbreaks of cryptosporidiosis, with confirmed cases being predominantly non-Aboriginal children under 5 years of age. The epidemic of 2000-2001 has been described previously[1]; the aim of this article is to briefly summarise the pattern of cases in the outbreak during the 2001-02 wet season and to outline the strategies which have been taken recently to avert a further outbreak in the coming months.

The 2001-02 wet season outbreak in Darwin

In the months December 2001 to May 2002 there were 75 cases of cryptosporidiosis notified to CDC from the Darwin urban area (including Palmerston and Litchfield Shire); the weekly figures are shown in Figure 1. Figure 2 compares the fortnightly figures with those of the previous wet season. In 2001-02 there were only 4 cases in December and 12 in January, reflecting a later onset than the previous year. The outbreak of 2000-01 had a biphasic pattern, with a steep earlier rise in the number of cases, a period during which there were few cases, followed by a further flatter rise two months later.

Of the 75 cases in 2001-02, 36 (45%) were male, 53 (71%) were under 3 years of age and 12 (16%) were under 12 months. The age

Figure 1. The number of cryptosporidiosis cases per week, August 2001-June 2002

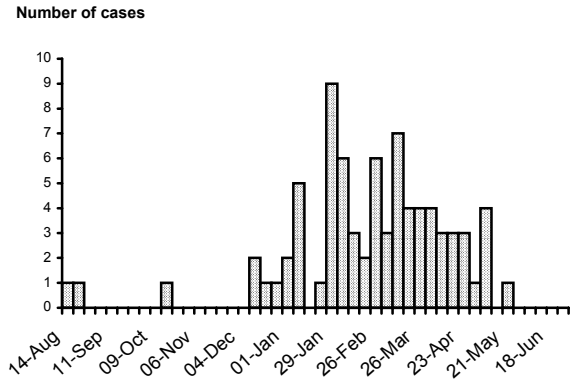
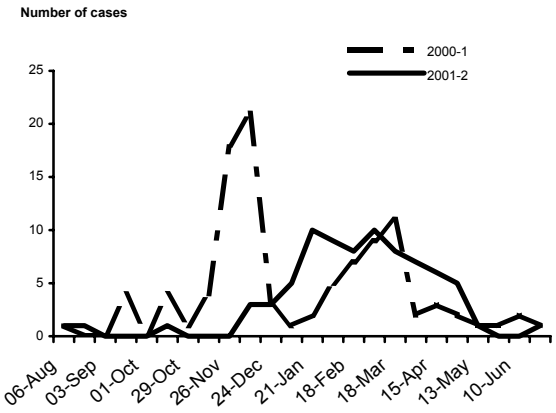
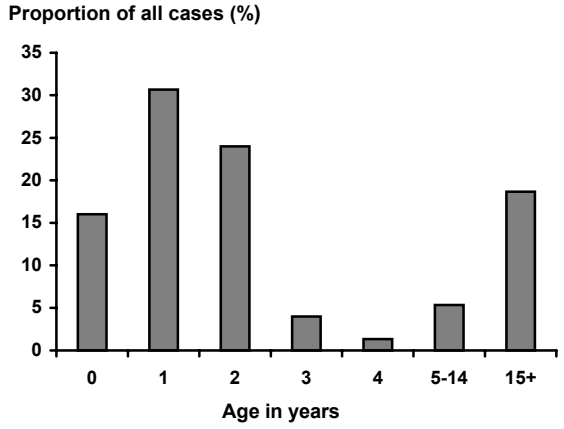


Figure 2. The number of cases of cryptosporidiosis per fortnight, 2000-01 and 2001-02



distribution is illustrated in Figure 3. Only 4 (5%) were Aboriginal although a further 13 (17%) were of unknown ethnicity. The age, sex and ethnicity distribution was similar to that of the previous season.

Figure 3. Age distribution of cryptosporidiosis cases, 2001-02.



On-call staff at CDC investigated 65 cases using a standardised questionnaire. Questions were asked about use of swimming pools and child care centres, illness in other family members and the possibility of a point source of infection. In 8 cases information was not obtainable. Of the remaining 57 cases, 36 (or 63% of those contacted) reported attending child care centres and 18 (32%) reported swimming in a swimming pool (public or private) in the week prior to the illness. Child care centres were named for 16 cases and 8 of these were attended by more than one case. There were 2 child care centres attended by 4 cases and one which was attended by 7 cases. In 4 cases swimming was done only in private swimming pools while 8 swam in community swimming pools and 6 swam in other public swimming pools (such as hotel or hospital pools). Only 2 swimming pools were named as being attended by more than one case, with one of these 2 pools being named by 7 cases. This particular pool was also associated with an outbreak of diarrhoeal disease in 19 of a group of 36 triathletes who trained at the pool. Unfortunately, none of these were confirmed by testing.

Interventions

In the 2 weeks after the detection of the outbreak it was apparent that there was one particular swimming pool and one child care centre which were associated with cases. The child care centre was visited by an Environmental Health Officer for further inspection and advice but had already initiated additional hygiene measures together with informing parents and putting up signage. The swimming pool was also inspected and following further discussion was closed to the public for 4 days while undergoing repairs and hyperchlorination. According to the local media water tested from the pool proved negative[2] although the negative predictive value of such testing in this setting is likely to be low.

Letters were sent to all child care centres and all community public swimming pools in Darwin, explaining the nature of the disease, the mode of transmission and recommended preventative measures. Child care centres and pools attended by more than one case were contacted and sent further advice and the Environmental Health Officer was notified.

The media were moderately active in reporting the outbreak but mainly dwelt on the pool closure and the 'mystery' surrounding the negative testing.[2-4]

Anticipating 2002-03

The first cases of cryptosporidiosis during the last 2 wet seasons both in Darwin and other Top End districts occurred in the last week of November or first week of December. Therefore CDC staff (including those in other districts) thought it appropriate to pre-empt this year's outbreak by issuing warnings early. The following strategies have been implemented;

- Public pools in the NT have been asked to display a sign at the entrance to the pool stating "The Department of Health and Community Services recommends that anyone with diarrhoea should not swim, wade or paddle in public pools. Exclusion from the pool should continue for at least 2 weeks after the diarrhoea has ceased, especially in cases of cryptosporidiosis".
- CDC has issued a media release warning the public of the possibility of another outbreak and advising the public about ways to prevent illness. The NT News published the story but unfortunately omitted the preventative measures.

- A letter and a fact sheet were sent to all child care centres in Greater Darwin warning about diarrhoeal illness and recommending avoidance of water play involving filling of wading or paddling pools.
- Community public swimming pools were sent a note and fact sheets with similar information.

CDC staff in other Top End districts have also been active in implementing these strategies. It is hoped that this information will help avert or minimise an outbreak of cryptosporidiosis in the wet season of 2002-03. There were 12 cases notified in the last 2 weeks of November 2002 (compared with a usual "sporadic" rate of about 2 per week); 4 were from Katherine township, 5 from Darwin Rural, and 1 each from East Arnhem, Alice Springs and Darwin Urban. In the first week of December at the time of writing there were only 3 cases notified, 1 being from an isolated community in East Arnhem district and the other 2 from Katherine.

References.

1. Peacock D. Darwin cryptosporidiosis outbreak December 2000-January 2001. *The NT Disease Control Bulletin*. 2001;8(1):10-12.
2. Anon. No clue to pool bug source. *NT News.* 20/2/2002.
3. Bevin E. Home pools bug alert. *Sunday Territorian*.17/2/2002;1-2
4. Hinde S. 22 sick as bug shuts pool. *NT News*. 16/2/2002.

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Review of the NT adult pneumococcal vaccine database.

Danielle Stewart, GP trainee, CDC Darwin and Peter Markey, CDC Darwin

Introduction

The Northern Territory (NT) of Australia has, by world standards, extremely high rates of invasive pneumococcal disease (IPD). Incidence rates of IPD in Aboriginal children under two years of age in Central Australia have been documented among the highest in the world (between 1534 and 2053 per 100,000),[1] but rates in the Aboriginal adult population have also been high, 10-15 times the non-Aboriginal rate.[2]

The 23 valent polysaccharide pneumococcal vaccine (Pneumovax®) has been recommended for high risk groups for many years; however it was not until 1995 when a pneumococcal awareness and vaccination campaign in the NT highlighted the under-utilisation of the vaccine in the Aboriginal population, that it was actively promoted in this population.[3,4] The recommendations at that stage were for all Aboriginal people 50 and over, all non-Aboriginal people 65 and over and all those with chronic heart, lung or renal disease or diabetes to be recommended the vaccine and boosted every 5 years.

Since then, recommendations have changed as more details about the epidemiology of the disease have come to light and from May 2000 Pneumovax® vaccine was recommended for all Aboriginal children in Central Australia between 2 and 5 years and for all Aboriginal adults 15 years and over. Recommendations for those over 2 years outside of these groups with chronic disease remained the same and boosters were recommended every 5 years for all groups. In June 2001, the 7 valent conjugated pneumococcal vaccine (Prevenar®) was introduced for use in infants under 18 months. In the new schedule Pneumovax® was recommended as an 18 month booster for those Aboriginal infants who received a primary course of the 7 valent vaccine.

The NT has maintained databases attempting to record all adult pneumococcal vaccinations since 1995. Initially, each health district kept its own database but in 1999 these were merged and the resulting centralised register kept in Darwin Centre for Disease Control (CDC), as the NT pneumococcal vaccine register. Individual service providers now report to their district which in turn reports to the Darwin-based register. Coverage is not complete, but all government community health centres report to the register together with most community controlled Aboriginal health organisation centres.

This study aimed to use the pneumococcal vaccine database and population statistics to assess Pneumovax® coverage in the eligible NT adult population by district, gender and ethnicity. It also aimed to estimate the proportion of administered vaccines which are reported to the database, using pharmacy distribution data. Finally it aimed to make recommendations regarding both the vaccination program and reporting to the database.

Methods

The relevant table from the Pneumovax® database was exported and analysed in EpiInfo 6.04, and results tabulated in Excel. The data were cleaned and entries recording influenza vaccination alone were deleted.

Vaccination coverage at a certain date was defined as the proportion of those eligible for Pneumovax® who were 'up to date' on that date, that is, had received a vaccination within the previous 5 years. A further calculation was made for those who were considered partly immune, which was defined as having had a Pneumovax® between 5 and 10 years previously. Rates were calculated for the end of 2001, but also for the end of 1999, 4 months before the policy changed. This date was chosen, rather than the date of the policy change, because many community health centres pre-empted the change and administered Pneumovax® together with the annual influenza vaccination campaign in February and March of 2000.

ABS estimated resident population data for 2001 and 1999 were used for denominators. Analysis was done by ethnicity, age-group and health district (with Darwin district split into rural and urban). Data concerning recipients living interstate were not included in the analysis (n=301).

Results

The database consisted of records of 19,644 vaccine recipients, 15,223 of whom had received a pneumococcal vaccine. After excluding those who lived interstate there were 14,922 included in the analysis. The majority of vaccine recipients were Aboriginal (91.0%) and the male female distribution was almost equal (49.0% male). Ascertainment of ethnicity was excellent with only 1.4% of the records having ethnicity not recorded. At the end of 2001, there were 9,270 Aboriginal people 15 years and over on the register who had received a Pneumovax® vaccine in the last 5 years. This represented 25.7% of the NT Aboriginal population in that age group. There were a further 7.0% who had received a vaccine between 5 and 10 years previously and were defined as partly immune. In the non-Aboriginal population 10.2% were immune and a further 0.5% partly immune. These figures are documented in Table 1.

According to the ABS estimated resident population for 2001, there were 36,049 Aboriginal people who were eligible for Pneumovax®, more than 6 times the number of eligible non-Aboriginal people as defined by age.

Table 1. Coverage rates for Pneumovax® at the end of 2001, by ethnicity.

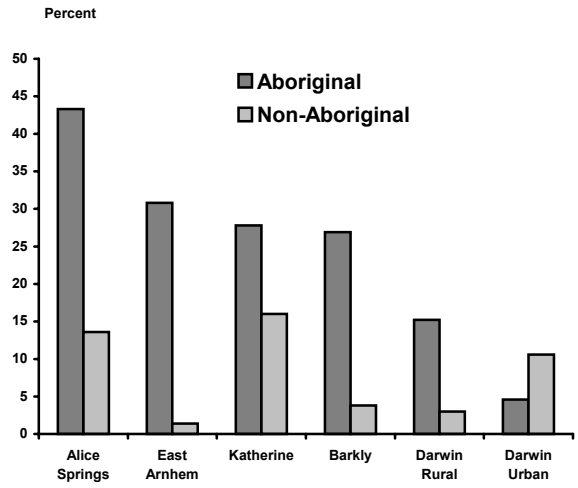
	Eligible group	Population 2001-NT	No of individuals		Coverage % (partly immune)
			Immune	Partly immune	
Aboriginal	>14 years	36049	9270	2524	**25.7 (7.0)**
Non-Aboriginal	> 64 years	5440	553	28	**10.2 (0.5)**
Total		41489	9823	2552	**23.7 (6.2)**

Table 2. Coverage rates at the end of 2001, by district and ethnicity.

		Alice Springs	Barkly	Darwin Rural	Darwin Urban	East Arnhem	Katherine	Total %
Aboriginal	**15+**	43.3	26.9	15.2	4.6	30.8	27.8	**25.7**
Non-Aboriginal	**65+**	13.6	3.8	3.0	10.6	1.4	16.0	**10.2**

In the Aboriginal population, Alice Springs district had the highest coverage rate (43.3%) and Darwin Urban the lowest (4.6%). Darwin Urban was the only district in which the rate was higher in the non-Aboriginal population (10.6%). Coverage rates in the non-Aboriginal population were lower in all other districts. (Table 2 and Fig. 1).

Figure 1. Pneumovax coverage rates at the end of 2001, by ethnicity and district.



The coverage rates at the end of 1999 are compared with those of the end of 2001 in Table 3. From this it can be seen that the increased coverage in the 15-49 year old Aboriginal population did not occur in Darwin urban and rural districts. Also, the proportion of Aboriginal people 50 years of age and over who were fully immunised fell overall from 59.1% to 50.4% between the end of 1999 and then end of 2001. This fall was most noticeable in Darwin Rural district where coverage rates in that age-group almost halved in 2 years. In this district, according to the register, over 700 vaccines were administered in 2000 and 2001 but over 800 clients who were due for their 5 yearly booster did not receive it, so they became defined as non-immune. Rates in the 50 and over age-group also decreased in Alice Springs and Katherine districts.

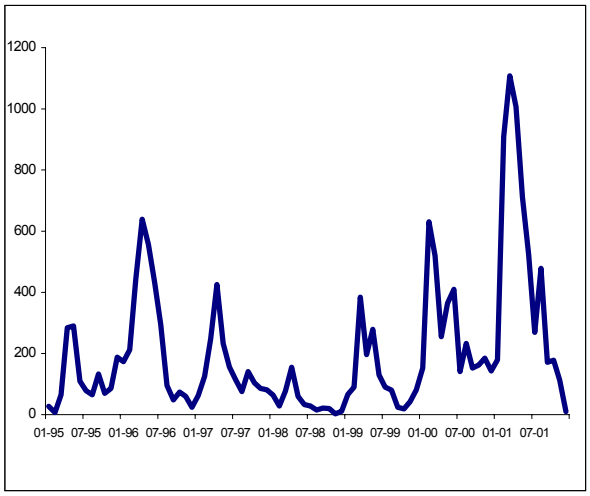
The number of vaccines given per month is illustrated in Fig. 2. The annual spike illustrates the practice of giving Pneumovax® at the same time as the yearly influenza vaccine, mainly in late February through April prior to the oncoming flu season. The increase in area under the curve (indicating number of vaccines given)

Table 3. Coverage rates for Pneumovax® vaccine 1999 and 2001, by district and age-group.

		Alice Springs	Barkly	Darwin Rural	Darwin Urban	East Arnhem	Katherine	Total %
Aboriginal 15-49 yrs	1999	18.4	12.3	12.7	2.4	7.0	13.7	**11.4**
	2001	35.7	21.6	12.1	3.2	27.2	23.8	**21.3**
Aboriginal 50+ yrs	1999	86.6	52.8	64.7	14.7	50.8	62.4	**59.1**
	2001	79.5	53.2	34.4	12.8	54.1	49.4	**50.4**
Non-Aboriginal 65+ yrs	1999	7.1	1.0	3.2	3.7	0.0	5.7	**4.3**
	2001	13.6	3.8	3.0	10.6	1.4	16.0	**10.2**

from 2000 onward reflects the change in policy from early 2000 (made 'official' in May 2000).

Figure 2. Pneumovax vaccines per month, Jan 1995-Dec 2001



Pharmacy data revealed that 17,254 pneumococcal vaccines had been distributed during 2000-2001. The number of vaccines reported to the database in those 2 years was 8,689, or only 50.4% of those distributed. This figure does not include possible wastage.

Discussion

This analysis of the Pneumovax® database allowed both assessment of vaccination coverage in the high risk elderly population, for which there have been long-standing recommendations, together with the monitoring of vaccine uptake in a new segment of the population ie Aboriginal people 15-49 years old following new recommendations.

Any conclusions or recommendations from this data need to take into account that only 50.4% of distributed vaccine was reported to the register. Certainly, it is likely that reporting was lower in the urban GP setting than in the setting of the departmental Aboriginal community health centres, so our recommendations are likely to be limited to this section of the community. Some organisations report to the register only de-identified data and while this is adequate for the purposes of the recent vaccination episode, it does not allow for the recording of re-vaccination and leads to the possibility of duplication. Moreover, it also does not allow the register to feedback information to service providers or to generate lists to assist in identifying those requiring immunisation.

The overall coverage for the targeted Aboriginal population (those 50 years or over) at the end of 1999 was 59.1% and 2 years later after expanding the target group to those 15 years and over the coverage was 25.7%. Coverage rates varied greatly between districts; this may have been due to difference in access to health care among the Aboriginal population, the priority given to pneumococcal vaccination or it may have reflected variation in reporting.

The best coverage rates were achieved in the Aboriginal 50 and over age group, where rates varied from 34.4% to 86.6% (excluding Darwin Urban district). Interestingly, coverage overall in the Aboriginal population 50 years and over fell in the 2 years to the end of 2001. This was because there was a large group of Aboriginal clients who were vaccinated in the mid 1990s and not re-vaccinated as their 5 yearly booster became due, thereby becoming non-immune. This may have been due to primary health care resources being diverted to implementing the new policy of vaccinating the 15-49 year old age group. This does not explain the fall in the coverage rate in those 50 years and over in Darwin Rural and Urban districts where the 15 to 49 year old coverage changed very little. Alternatively it may reflect problems with recall systems or a low priority or emphasis given to re-vaccination. It is possible that the immunity conferred by Pneumovax® lasts longer than 5 years in a large portion of the population. The proposed revised vaccine schedule for 2003 tends to support this possibility. If this is the case, then it was strategically sensible to concentrate resources on vaccinating the 15-49 year old cohort, rather than re-vaccinating the elderly. Nevertheless, it is also important to recognise that this boosting, certainly in some groups, may be necessary. It is worth remembering that, with 5 yearly boosters, one fifth of the eligible population, or 8,300 people, have to be immunised every year.

Non-Aboriginal coverage rates still remain very low even though they increased twofold between 1999 and 2001. It is likely this reflects low reporting rates by health care providers as the majority of elderly non-Aboriginal people

receive vaccines from GPs in large urban centres. The improvement in rates is still encouraging and may reflect an increased awareness of the benefits of pneumococcal vaccine in the non-Aboriginal community.

Recommendations

Reporting

- Interpretation of the data would be enhanced if pharmacy data were analysed in more detail to better estimate reporting and 'leakage' rates across districts and health care providers. These estimates could help direct strategies to further improve reporting rates in all sectors of the vaccine providing community.
- Reporting to the register needs to be promoted. Service providers should be encouraged to provide identified data. If there are further concerns about privacy these need to be discussed and solutions found to allow for best use of the registers.

Coverage

- Future programs promoting polysaccharide pneumococcal vaccine should target the Darwin Rural and Urban Aboriginal 15-49 year old age group, together with reminders to boost the over 50 year olds who may be overdue (subject to forthcoming NH&MRC recommendations).
- Further monitoring of vaccination rates be carried out on a regular basis to monitor the need for further resources and strategies to achieve high coverage rates.
- Given the uncertainty in the coverage estimates in the non-Aboriginal population, due to the suspected poor reporting, a further assessment of the coverage of Pneumovax® in the eligible non-Aboriginal population by another mechanism (eg audit or survey) is warranted.

References

1. Krause VL, Reid SJC, Merianos A. Invasive pneumococcal disease in the Northern Territory of Australia, 1994-1998. *Med J Aust* 2000; 173 Suppl: S27-S31.
2. Gilbert GL. Retreat of the pneumococcus? *Med J Aust* 2000; 173 Suppl: S20-S21.
3. Connors C. Aboriginal Pneumococcal Awareness and Vaccination campaign. *NT Communicable Diseases Bulletin.* 1995; 2(8):17.
4. Connors C. Pneumococcal vaccine – Who needs it? *NT Communicable Diseases Bulletin.* 1994; 2 (2):1-2.

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Medical Yolngu in 6 Lessons

Terrence Ritharrmiwuy Guyula, Senior Aboriginal Health Worker – Gapuwiyak Community, Arnhem Land, N.T., Dr Stephen Bryce, Gapuwiyak Community Medical Officer

We wish to make your readers aware of the availability of a new CD-ROM, "Medical Yolngu in 6 Lessons". The Yolngu family of languages remain an important pre-European Aboriginal language group in Australia's Top End. Several thousand Top End Aborigines still use a Yolngu dialect as their first language which includes a significant Yolngu Community in Darwin. Among this group, it has been estimated that only 12 to 15% have any degree of English fluency. As a result, mis-communication with health practitioners remains an important contributor to the many poor health outcomes seen in the region.

In view of this, we have attempted to produce a useful resource for busy clinical staff – developing the above CD-ROM in close partnership with Yolngu leaders over the past 2 years. It is hoped that the material can provide the practitioner with a useful working knowledge of the Yolngu language as well as a core vocabulary of useful clinically-relevant Yolngu words. We also cover key structural differences between English and the Yolngu language, a series of sample consultations and information on cross cultural issues such as how to befriend traditional Aboriginal people - as well as how you may inadvertently offend them. Finally, useful contacts and resources are listed for those who wish to do more advanced study into Yolngu language and culture.

The course has been fleshed out with many photographs of East Arnhem Landscapes and Yolngu portraits. We have also had original background music especially composed. It is the result of an over-the-internet collaboration between Gapuwiyak Yidaki (didgeridoo) player, Terrence Guyula and Brisbane composer, Andrew Bryce.

Every effort has been made to keep the CD-ROM succinct, user-friendly and good humoured. The material contained should be able to be covered in a few hours. "Medical Yolngu in 6 Lessons" is presently available for Windows machines only. It requires 128MB RAM (64 minimum) and a Pentium 2 processor or later. However a compressed version is currently being put together (available in a couple of months) that will run on older, less powerful P.C.s as well as Macintosh computers. The CD-ROM can be freely duplicated and distributed. Miwatj Aboriginal Health Inc. fully funded the project. Copies are available for loan from:

- Royal Darwin Hospital Library
  Ph (08) 8922 8961 Fax (08) 8922 8208
  Email: libraryrdh.ths@nt.gov.au

- Gove District Hospital Library
  Att. Sue Ibbs
  Ph (08) 8987 0262
  Email: Sue.Ibbs@nt.gov.au

- Alternatively, copies can be obtained *free of charge* from:
  Dr Stephen Bryce
  Email: STEPHENBRYCE@bigpond.com.au

- Miwatj Aboriginal Health Inc. (Funding body)
  Ph (08) 8987 1102 Fax (08) 8987 1670

- Northern Territory Remote Health Workforce Agency
- Att. Nicole Lamb
  Ph (08) 8982 1053 Fax (08) 8941 5579
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NT Malaria notifications

Merv Fairley, CDC, Darwin

April-September 2002*

Nine notifications of malaria were received for the second and third quarters of 2002. The following table provides details about where the infection was thought to be acquired, the infecting agent and whether chemoprophylaxis was used.

Origin of infection	Reason exposed	Agent	Chemoprophylaxis
Indonesia / Thursday Island	holiday	P.vivax	no
Indonesia	holiday	P.vivax	no
PNG	national	P.vivax	yes
Philippines / East Timor	holiday	P.vivax	yes
Indonesia	holiday	P.vivax	no
East Timor	holiday	P.falciparum	yes
East Timor	holiday	P vivax	no
PNG	holiday	P.vivax	yes
South East Asia	holiday	P.vivax	no

*Note these figures are for 2 quarters rather than the 1 quarter usually reported.

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Points to note regarding notifications page 30:

- Anthrax, Kunjin, Kokobera, Atypical Mycobacteria, Botulism, Brucellosis, Chancroid, Cholera, Congenital Rubella Syndrome, Diphtheria, Gastroenteritis, Gonococcal Opthalmic Neonatal, Haemolytic Uraemic Syndrome, Hepatitis C (incidence), Hepatitis D & E, Hydatid Disease, Leprosy, Leptospirosis, Listeriosis, Lymphogranuloma venereum, Measles, Plague, Poliomyelitis, Q Fever, Rabies, Rubella, Tetanus, Typhoid, Vibrio Food Poisoning, Viral Haemorrhagic Fever, and Yellow Fever are all notifiable but had "0" notifications in this period.
- The top 4 notifiable diseases continue to be in the category of sexually transmissible infections.
- Arboviral infections were down for this 2002 quarter possibly reflecting a drier wet season.
- This 2002 quarter of pertussis figures show the epidemic of 2001 has ended.
- The rise in chlamydial conjunctivitis notifications for this 2002 quarter reflects the increased reporting of trachoma initially picked up by school screening.

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NT NOTIFICATIONS OF DISEASES BY ONSET DATE & DISTRICTS
1 JULY TO 30 SEPTEMBER 2002 AND 2001

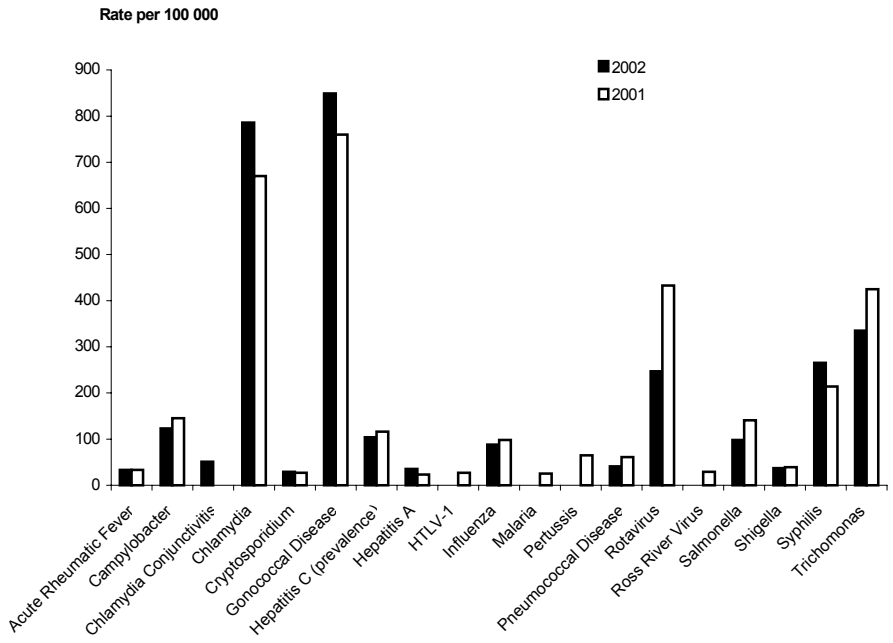
DISEASES	ALICE SPRINGS		BARKLY		DARWIN		EAST ARNHEM		KATHERINE		TOTAL	
	2002	2001	2002	2001	2002	2001	2002	2001	2002	2001	2002	2001
Acute Rheumatic Fever	8	5	0	2	2	4	2	1	4	4	16	16
Adverse Vaccine Reaction	0	1	1	0	1	2	0	1	0	1	2	5
Amoebiases	0	0	0	0	2	0	0	0	0	0	2	0
Arbovirus infections												
Murray Valley Enceph	0	0	0	0	0	1	0	0	0	0	0	1
Barmah Forest Virus	1	0	0	0	2	8	0	0	1	0	4	8
Dengue	0	0	0	0	4	8	0	1	0	0	4	9
Ross River Virus	0	0	0	2	1	11	0	1	0	0	1	14
Campylobacter	21	29	1	1	26	31	5	3	7	7	60	71
Chlamydia	130	172	4	5	175	106	41	22	35	23	385	328
Chlamydia Conjunctivitis	1	0	0	0	21	4	2	0	1	0	25	4
Congenital Syphilis	2	2	0	0	0	2	0	1	0	0	2	5
Cryptosporidiosis	6	2	1	0	4	5	1	2	2	4	14	13
Donovanosis	0	4	0	0	0	2	0	0	1	1	1	7
Glomerulonephritis	0	0	0	0	0	4	0	0	0	2	0	6
Gonococcal Disease	187	232	5	14	112	69	47	23	65	34	416	372
Gonococcal Conjunctivitis	1	0	0	0	0	0	1	0	0	0	2	0
Haemophilus Inf type b	0	0	0	0	0	1	0	0	0	0	0	1
Haemophilus Inf not b	1	0	0	0	2	0	0	0	0	1	3	1
Hepatitis A	2	1	5	1	6	6	0	1	4	2	17	11
Hepatitis B	2	0	0	1	1	0	0	0	0	0	3	1
Hepatitis C (prevalence)	3	11	1	1	41	41	1	2	5	2	51	57
HIV infections	2	0	0	0	2	1	0	1	0	0	4	2
HTLV-1	1	6	0	0	0	5	0	0	0	2	1	13
Influenza	14	30	0	0	23	13	4	5	2	0	43	48
Legionnaires Disease	0	0	0	0	1	0	0	0	0	0	1	0
Malaria	0	0	0	0	3	11	0	1	2	0	5	12
Melioidosis	0	0	0	0	3	1	0	0	0	0	3	1
Meningococcal Infection	0	1	0	0	1	2	0	0	1	0	2	3
Mumps	0	0	0	0	0	1	0	0	0	0	0	1
Ornithosis	0	0	0	0	2	1	0	0	0	0	2	1
Pertussis	0	19	0	2	1	8	1	0	0	3	2	32
Pneumococcal Disease	7	18	0	1	7	10	0	1	6	0	20	30
Rotavirus	11	6	2	0	64	145	36	41	8	20	121	212
Salmonella	4	14	1	3	31	39	3	3	9	10	48	69
Shigella	6	6	2	1	7	3	1	1	2	8	18	19
Syphilis	57	64	1	5	36	15	5	5	31	16	130	105
Trichomonas	58	55	2	7	51	64	27	39	26	43	164	208
Tuberculosis	0	1	0	0	4	2	0	0	0	3	4	6
Typhus	0	0	0	0	0	1	0	0	0	0	0	1
Yersiniosis	0	0	0	0	0	1	0	0	0	0	0	1
Total	**525**	**679**	**26**	**46**	**636**	**628**	**177**	**155**	**212**	**186**	**1576**	**1694**

NOTIFIED CASES OF VACCINE PREVENTABLE DISEASES IN THE NT BY ONSET DATE 1 JULY TO 30 SEPTEMBER 2002 AND 2001

DISEASES	TOTAL		No. cases among children aged 0-5 years	
	2002	2001	2002	2001
Congenital rubella syndrome	0	0	0	0
Diphtheria	0	0	0	0
Haemophilus influenzae type b	0	1	0	1
Hepatitis B	3	1	0	0
Measles	0	0	0	0
Mumps*	0	1	0	0
Pertussis	2	32	1	14
Poliomyelitis, paralytic	0	0	0	0
Rubella	0	0	0	0
Tetanus	0	0	0	0

* Mumps is largely under-reported.

NT WIDE NOTIFIABLE DISEASES 1 JULY TO 30 SEPTEMBER 2002



Rates <10/100,000 not listed
NT est resid.Pop.—195,905 supplied by Epidemiology & Statistics Branch, DHCS

2002 National Immunisation Awards

Lifetime Achievement Awards

Hartley Dentith:

Hartley Dentith, manager of the East Arnhem Centre for Disease Control in the Northern Territory was one of four recipients of the National Lifetime Achievement Awards for his decades of individual dedication to the coordination and delivery of vaccination programs.

Hartley has worked in disease control in the East Arnhem District of the Northern Territory for the past 16 years. During that time he has been responsible for implementation of both childhood and adult immunisation programs in East Arnhem. East Arnhem District has the highest immunisation coverage in the NT, which is a direct result of Hartley's work in promoting and facilitating immunisation services. His work during the past 16 years includes education to all East Arnhem service providers; facilitating the vaccine provider course "About Giving Vaccines" and directing clinical assessment of course participants; setting up systems and processes for use in remote health centres to ensure high immunisation coverage; reporting and follow-up of all adverse events following immunisation occurring in East Arnhem; promotion of accurate and timely reporting of immunisation data and direct support of the NT Childhood Immunisation Database; and assistance with the administration of immunisations particularly during catch-up campaigns.

Without MrDentith's work, it is unlikely that East Arnhem would have achieved the current high immunisation coverage rate that it is renowned

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Recognition of efforts to target hard-to-reach groups - public immunisation provider in the Northern Territory

Justine Miller

Justine Miller is the infant and child health nurse at Wadeye in the Top End of the NT. Wadeye (Port Keats) is an Aboriginal Community of approximately 1500 people situated about 500 kilometres south east of Darwin. It is accessible by road during the dry season only (7 hour journey) and by light aircraft throughout the year (50 minutes).

Justine has achieved high conjugate pneumococcal immunisation coverage in the infants and children of Wadeye. Wadeye has the highest number of children vaccinated with conjugate pneumococcal vaccine of all remote Aboriginal communities in the NT. Justine has been responsible for ensuring this vaccine is administered to both new infants born after the Childhood Pneumococcal Program was introduced, and to children born after 01/09/1999 who require conjugate pneumococcal catch-up vaccination. Achieving high coverage "in the bush" setting requires attention to detail, the use or recall/reminder lists, setting up of systematic processes within the Health Centre, multiple approaches to accessing the children who require vaccination, and diligence in immunisation reporting. Most importantly, the trust of the community is essential. Justine excels in these tasks and her achievements are shown by the high coverage of conjugate pneumococcal vaccine in this community.

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Disease Control Staff Updates

Darwin

Farewell and best wishes to **Justine Glover** who has commenced maternity leave from her position with the Chronic Diseases team.

Meredith Hansen-Knarhoi and **Helen Kennon** have joined the TB/Leprosy Unit as Clinical Nurse Consultants. Meredith has worked recently in the Congo and East Timor, while Helen is returning to the TB Unit after working in a General Practice setting.

The Public Health Nurse position with the AIDS/STD unit has been filled by **Autumn Goodall.** This position has been vacant for a while and was previously filled by Sue Dubow. Autumn has spent the last few years coordinating chronic disease programs, for the DHCS in Port Keats and previous to that on the Tiwi Islands.

Catrina Arnold-Knott joins us as the Coordinator of the STI/ HIV Strategy to the Darwin Remote Region. Catrina has spent the last 2 1/2 years as a medical officer at Katherine Hospital. Prior to this she was working in a public health position in Vanuatu.

Nan Miller, Senior Project Officer , on leave from CDC, has extended her time working in PNG until February 2004.

Katherine

Maria Chandler has transferred for 6 months, as manager, to Patient Services and **Margaret Richards** is working part time as the administration officer.

Alice Springs

Alex Brown, Public Health Medical Officer, has taken up a senior research fellow position at Menzies, based in Alice Springs as of January 2003 however he will continue to have some part time commitment to CDC.

Darren Armitage, Team leader Disease Control, has moved on to Cairns.

Jeanette Berthelsen has moved from Accident and Emergency to take the Public Health Nurse TB/Leprosy position vacated by Belinda Farmer (who is now in Darwin working in TB/Leprosy).

Beth Rowan has commenced in the Mobile Vaccination nurse position.

Helen McLean is working with database support.

Tennant Creek

John Turahui has transferred to from A&E/ Aerial Medical to the Communicable Disease Officer position. John had previously worked as a RN3B at Ali Curung and Canteen Creek.

Nhulunbuy

CDC Nhulunbuy welcomes **Julie Sankey** as women's AIDS/STD educator, relieving for Kim Machin's maternity leave. Julie has been working in the top end since 1999 and has recently spent 12 months working at GDH.

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