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How National Immunisation Program Changes will affect the NT Childhood Vaccination Schedule, November 1, 2005

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There are significant changes to the NT Childhood Vaccination Schedule that will take effect on November 1 2005. The following information regarding the changes has been sent to Northern Territory (NT) immunisation providers. All States/Territories in Australia will be implementing similar changes, but the details of which vaccines will be used and the timing of the adolescent programs varies between jurisdictions.

Changes in the NT are as follows:

- All children will receive Inactivated Polio Vaccine (IPV) containing vaccines instead of oral polio vaccine (OPV).
- All children will receive varicella (chickenpox) vaccine at 18 months.
- Indigenous children will routinely receive hepatitis A vaccine at 12 and 18 months.
- Indigenous children between 13-19 months on November 1 will be offered 2 doses of hepatitis A vaccine as part of a catch-up program.
- Indigenous children 19-60 months on November 1 will opportunistically be offered 2 doses of hepatitis A vaccine.
- Students in Year 8 will receive varicella vaccine in the first term of the school year.
- Adult dTpa vaccine (Boostrix) will be administered to students in Year 8 instead of Year 10.

Where possible, education sessions for providers will occur in October 2005.

Information handouts for parents about the new infant schedule are being prepared and will be

forwarded to providers before the program start date. Please contact Chris Nagy on 89228564 or Christine Selvey on 89228825 if you have any queries about the National Immunisation Program.

Parent information sheets are available at http://www.nt.gov.au/health/cdc/fact_sheets/fact.shtml

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How National Immunisation Program changes, 1 November 2005, will affect the NT. Information for providers

In March and June 2005, the Minister for Health and Ageing announced several changes to the National Immunisation Program from 1 November 2005. They are:

1. The introduction of funded (free to parents) varicella-zoster vaccine for 18-month-old infants and for 10-13 year old adolescents who have not had the disease or previous vaccination.
2. The withdrawal of oral polio vaccine and the introduction of funded inactivated polio vaccine combinations.
3. The introduction of funded (free to parents) Hepatitis A vaccine for Indigenous children in their second year of life and a catch-up program for those under 5 years old who live in high risk geographical areas (includes all of the NT).

1. Varicella zoster vaccine (VZV)

Infant program

- VZV is to be administered routinely as a single subcutaneous dose of 0.5ml to all infants at 18 months of age.
- Only those born on or after 1 May 2004 are eligible for funded vaccine.
- VZV is not recommended before 18 months as this may result in an increased risk of vaccine failure.
- Because non-Indigenous children are currently not required to present for vaccination at 18 months they will need to be reminded at the 12 month visit to return for VZV when their child turns 18 months.
- The Australian Government Department of Health and Ageing will be posting information to parents in this age group about the need to return for vaccination at 18 months.

Adolescent program

- From 2006, as part of a school program, VZV will be offered to all adolescents in the NT in Year 8 who do not report a history of prior vaccination or disease.
- A single dose of vaccine is required up to the age of 14 years. Any child who is 14 years or over requires 2 doses of vaccine 1-2 months apart.
- Students who are already 14 years old in Year 8 when the vaccine is delivered at schools, will be directed to a health centre or GP for dose 2.
- No pre or post testing will be required for those in Year 8, as a history of chickenpox at this age is considered to be reliable.

- If the history of prior disease is unclear, vaccination is recommended as the vaccine is well tolerated by those who are already immune.

Generic information

- Free VZV will not be available for those children who were born before 1 May 2004 until they reach 13 years of age.
- VZV can be purchased privately for those who don't want to wait for free vaccine.
- VZV is a live attenuated vaccine. Follow the guidelines for administration of live vaccines.
- VZV is contraindicated in pregnancy and in the immunosuppressed.
- Chickenpox is a more severe disease in adults than in children. Adults with chickenpox are more likely to be hospitalised or die from chickenpox than children. In children, the case fatality rate for chickenpox is 1 in 100,000 whereas it is 1 in 5000 for adults.
- Vaccinating 18 month old children will decrease circulation of wild varicella virus in the community. Uptake in the adolescent program is really important to prevent the risk of more severe disease appearing in older non-immune adults in the future.
- As vaccine uptake increases in young children, there will be less circulating virus to boost immunity in adults who have already had chickenpox. It is possible that without this natural boosting there could be a temporary increase in the incidence of shingles (herpes zoster). However no such increase has been seen in the USA where the vaccine has been routinely administered since 1995.
- Surveillance of both chickenpox and zoster is being enhanced so that any increase of these in adults will be detected early.

2. Inactivated polio vaccine (IPV) combinations

Why change from OPV?

- In about 1 in 2.4 million doses, OPV may cause paralysis known as Vaccine Associated Paralytic Poliomyelitis (VAPP) in the recipient or a close contact.
- Inactivated polio vaccine (IPV) can't cause VAPP.

Infant program

- From 1 November, OPV will no longer be used in any Australian vaccination schedule.
- In the NT the new scheduled IPV combination vaccines used from November 1 are:
 - DTPa-HepB-IPV (Infanrix[®] Penta)
 - (will replace Infanrix-HepB given at 2, 4, & 6 months)
 - DTPa-IPV (Infanrix[®]IPV)
 - (will replace Infanrix given at 4 years)
- Administer all IPV containing vaccines intramuscularly.
- In the NT, Hib vaccination will not change.
- PRP-OMP (Pedvax-HIB) should be given at 2, 4 & 12 months of age.
- Children who commence vaccination with OPV should be given IPV containing vaccines.
- If a child is overdue for a single antigen now contained in a combination vaccine, contact CDC to arrange delivery of a single vaccine dose.

Generic Information

- The IPV combination vaccines that include PRP-T Hib are not recommended for use in high risk infants (including NT Indigenous infants) because of a lower immunological response to the 1st dose of vaccine when compared to vaccination with PRP-OMP.
- Protection against Hib disease is achieved after the 2nd dose of PRP-OMP vaccine given at 4 months of age. However, 3 doses are required for protection if PRP-T is used and this will not be achieved until 6 months of age.

- PRP-T containing vaccines will be used in some states and are available for private purchase in the NT. (Infanrix-hexa & Pediacel)
- A child who receives a dose of a PRP-T Hib vaccine at 2 or 4 months of age must have another dose of Hib vaccine at 6 months as well as the 12 month booster. PRP-OMP can be used to complete the Hib course in these infants.
- PRP-OMP was recommended for all Australian children in 2000. Disease rates show that after the introduction of PRP-OMP for all children the incidence of Hib disease declined in infants aged 2-6 months.

3. Hepatitis A vaccination

Why offer Hepatitis A vaccine to Indigenous children?

- Hepatitis A is endemic in remote communities.
- There are higher rates of notification and hospitalization for hepatitis A in Indigenous children compared to non-Indigenous children.
- Following the introduction of Hepatitis A vaccine to Indigenous children in Far North Queensland in 1999, there has been a marked reduction in Hepatitis A notifications in all age groups and in both Indigenous and non-Indigenous people.

Infant program

- From November 1, children who are 12 months of age should receive dose 1 of hepatitis A vaccine as part of the routine vaccination schedule. A second dose should be given 6 months later at 18 months of age.
- Children who are 13–18 months of age on November 1 will require 2 doses of hepatitis A vaccine given 6 months apart as part of a catch-up program.
- Children who are aged between 19-60 months on November 1 should opportunistically be offered 2 doses of hepatitis A vaccine given 6 months apart.
- Only use paediatric Hepatitis A vaccine for this program (VAQTA).
- The minimum interval between dose 1 & 2 is 6 months.

Generic Information

- VAQTA, the hepatitis A vaccine to be used in this program has been approved by the Therapeutic Goods Administration (TGA) for use from 12 months of age.
- Maternal antibodies begin to wane at around 12 months, but by 18 months of age a significant proportion of children have already been infected with Hepatitis A.
- No pre or post testing for immunity is required.

2005 NT Hepatitis A vaccination

<i>Age on Nov 1 2005</i>	<i>Type Of Program</i>	<i>Vaccine doses</i>
12 Months	Scheduled vaccine	12 & 18 months
13-18 months	Catch-up	2 doses at least 6 months apart
19-60 months	Opportunistic vaccination	2 doses at least 6 months apart

NT Immunisation Schedule 1 November 2005

Birth	Hepatitis B / BCG*
2 months	DTPa-HepB-IPV, PedvaxHIB, 7vPCV ¹
4 months	DTPa-HepB-IPV, PedvaxHIB, 7vPCV ¹
6 months	DTPa-HepB-IPV 7vPCV ¹
12 months	MMR, MenCCV, PedvaxHIB, HepA*
18 months	VZV ² , 23vPPV* HepA*
4 years	DTPa-IPV, MMR
13 years	dTpa, VZV ³
15 years	23vPPV*

*denotes indigenous only
¹= Prevenar
²= Varilrix
³if not immune or previously immunised

What is changing on the 2005 November 1 Immunisation Schedule?**1. These vaccines will no longer be required:**

- DTPa (Infanrix)
- DTPa-HepB (Infanrix-HepB)
- OPV (Sabin)

2. These new vaccines will be required

- DTPa-HepB-IPV (Infanrix[®] Penta)
- DTPa-IPV (Infanrix[®] IPV)
- Varicella Zoster Vaccine (Varilrix)
- Hepatitis A (VAQTA)

3. Schedule changes

- All children receive IPV containing vaccines instead of OPV.
- All children receive Varicella vaccine at 18 months.
- Indigenous children routinely receive Hepatitis A vaccine at 12 & 18 months.

Vaccine ordering information

To minimise vaccine wastage, the following vaccines will not be routinely issued throughout October.

- DTPa (Infanrix)

- DTPa-HepB (Infanrix-HepB)
- OPV (Sabin)

If you require urgent issue of stock please contact your local pharmacy.

How much new vaccine to order?

- Order the same amount of DTPa-HepB-IPV (Infanrix[®] Penta) as you have been ordering for DTPa-HepB (Infanrix-HepB).
- Order the same amount of DTPa-IPV (Infanrix[®]IPV) as you have been ordering for DTPa (Infanrix).
- Order the same amount of varicella vaccine (Varilrix) as you have been ordering for Meningococcal C vaccine.

Hepatitis A vaccine (VAQTA)

- **In urban areas** – Order 25% of your usual Meningococcal C stock.
- **In rural areas** – Order the same amount as Meningococcal C stock.

When to order new vaccines?

- Order these vaccines with your last October vaccine order.
- These vaccines will be added to your vaccine imprest list from November.

Vaccine safety for adolescent girls

Many vaccines are contraindicated during pregnancy. This may pose a challenge for health staff vaccinating adolescent girls who may be pregnant. Pregnancy testing in minors in order to give vaccines safely, raises issues about consent for testing as well as obligatory reporting issues for under-age sex.

In order to provide safe vaccination as well as proper confidentiality and consent for testing the following steps should be followed.

1. Provide all parents/guardians (consenters) and adolescent girls with pre-vaccination checklist information to assess whether they should be vaccinated. See page 18 *The Australian Immunisation Handbook 8th Edition*.
2. Ask the girl before administration of vaccine if she could possibly be pregnant and/or she can tell you when she had her last period. Consider beforehand the appropriate person to discuss this information with the girl.
3. If the girl seems uncertain, offer to see her at the clinic at an alternative time. You may after further discussion decide on performing a pregnancy test. Pregnancy testing is not a routine part of vaccination programs. ***You must ensure that you have informed consent to carry out pregnancy testing. Consent for pregnancy testing is not covered by the Healthy School Age Kids Screening Consent Form.***
 - Once you are certain that:
 - the girl is not pregnant;
 - the girl is fully aware of the risks and benefits of vaccination;

- there are no other contraindications; and
- consent is given;

proceed with vaccination.

Adolescents are scheduled to receive the following vaccines. None of these should be given routinely in pregnancy. Information from *The Australian Immunisation Handbook 8th Edition* concerning their use in pregnancy appears below.

Adult Diphtheria Tetanus Pertussis vaccine - Boostrix (dTpa) at 13yrs

Adequate human data on use of an adult/adolescent formulation dTpa during pregnancy are not available, so it should only be given in pregnancy when the possible advantages outweigh the possible risks for the foetus.

Varicella-Zoster vaccine - Varilrix (VZV) at 10-13yrs

VZV is a live vaccine and is contraindicated in pregnancy, as the effects on foetal development are unknown. Vaccinees should be advised not to become pregnant for one month after vaccination.

Pneumococcal Vaccine – Pneumovax 23 (23vPPV) at 15yrs

Although 23vPPV has been administered in pregnancy in the context of clinical trials with no evidence of adverse effects, data are limited and deferral of vaccination is recommended unless the risk of IPD is very high. Further studies may change this recommendation in the future.

Prepared by Tina McKinnon, Child & Youth Health, Christine Selvey & Chris Nagy, Immunisation Program, CDC

Guidelines for the management of people with infectious diseases who put others at risk of infection

Steven Skov, Community Physician, CDC

Most people with infectious diseases conscientiously avoid behaviour that exposes others to the risk of infection. Unfortunately there are a very small number of individuals who by their actions pose a risk of infection to others in spite of the advice and efforts of health professionals and others to assist and support them not to. For this reason, all jurisdictions in Australia have legislation that allows public health authorities to oblige such individuals to behave in a manner that does not put others at risk. In the Northern Territory (NT) it is the *Notifiable Diseases Act 1999* the powers of which are vested in the person of the Chief Health Officer (CHO).

However, the use of coercive powers under the legislation should only be used as a last resort. Prior to taking such a step, there should be a system in place to advise, educate, support and manage people whose behaviour puts others at risk. The NT Centre for Disease Control (CDC) has developed a set of draft guidelines to provide a framework to do so. These *Guidelines* aim to strike a balance between protecting the rights of individuals and protecting the public health. The logic of the process is generally to begin with advice and education and if necessary progress to a greater degree of direct monitoring and management and only finally to coercive powers.

The draft NT Guidelines have been derived from similar guidelines in Victoria, Western Australia and New South Wales and also a consideration of the the National Public Health Partnership document "Principles to be considered when developing best practice legislation for the management of infected persons who knowingly place others at risk".

Should Department of Health & Community Services staff become aware of behaviour that places others at risk of infection, the initial step is to investigate the situation as fully as possible. Should such behaviour be confirmed and seem likely to continue in spite of the person being informed, then a Case Management Team would be formed. This team would attempt to support

the person in a broad range of matters to assist them in behaving more safely. This might involve education, counselling, medical or mental health care, support on drug or alcohol related issues, or assistance in accessing accommodation or general life skills training. The team would be multi-disciplinary nature and may include members from non-government organisations. Membership of the team must be acceptable to the person and may include a support person identified by the person concerned. At this stage, senior managers within CDC and the CHO would be advised of the situation although the person's identity would not be disclosed to them.

If the person's behaviour continues to pose a risk to others, the CHO may convene a Case Advisory Panel to provide him/her with advice to ensure that all is being done to assist the person involved not to put others at risk and at the same time ensure that the public health is protected. The Panel would usually include as a minimum:

- a medical infectious disease specialist,
- where the disease is a Blood Borne Virus (e.g. HIV), a person living with the same BBV,
- a legal advisor, and
- a person of similar ethnic background.

The Case Advisory Panel would not be informed of the person's identity. The Panel would receive regular reports from the Case Management Team, may provide direction to it and would regularly review the case to assess the person's response to interventions.

Should the person's behaviour continue to be unacceptable, a formal warning, usually in written form, would be issued to the person advising of the provisions of *Notifiable Diseases Act* and of the steps that may be taken if the CHO considers it necessary.

Finally, in the face of continued unsafe behaviour in spite of a formal warning, the CHO may issue a notice under the Act that directs the

person to take whatever measures are deemed necessary to prevent the person from spreading the disease. These measures can be very broad ranging and may include undergoing treatment, remaining in a certain place and refraining from certain behaviours. Should the person fail to comply with the directions of the notice, further actions under the Act may be taken including arrest and prosecution.

Much of the recent literature and work on this issue has focused on persons with HIV. However, the same principles apply to other infectious diseases and the draft NT Guidelines are intended for use in relation to all infectious diseases. They provide a framework that should be adapted to the individual circumstances and risk of the situation. While outlining a stepped

process, the Guidelines do not have the force of law and the CHO is empowered under the Act to pursue a different or more rapid response should the circumstances warrant it. For example, if it was known that a person with open tuberculosis wished to board an aeroplane against the advice of health staff or a person with possible SARS refused to remain in hospital then the CHO is able to invoke the Act immediately.

The draft Guidelines are available at http://www.nt.gov.au/health/cdc/glfor_mx_of_id_clients_who_keo.pdf. A consultation process is now to be undertaken to seek advice from a range of agencies to inform refinement of the guidelines. Feedback on any aspect of the guidelines is most welcome and may be directed to me on 89228513 or steven.skov@nt.gov.au.

Congenital syphilis: revised protocol for management and re-establishment of follow-up register in the Darwin region

Steven Skov, Sexual Health and Blood Borne Viruses Unit

Following a rather long process, a revised protocol for the investigation and treatment of infants at risk of congenital syphilis have now been completed. A follow-up register for such infants in the Darwin region has also been re-established.

The process of producing this version of a protocol was begun in 2001 by Dr. Ingrid Bucens, a paediatrician at Royal Darwin Hospital and myself. The process has waxed and waned and had largely waned when Dr. Jan Bullen from Katherine and the Alice Springs Sexual Health Unit and the Tri-State STI/HIV team revitalised it several years ago. This version is the result of close collaboration between specialist paediatricians and the Sexual Health and Blood Borne Viruses (SHBBV) program.

Rationale for the protocol

Syphilis is a common infection in the NT with rates of infection far in excess that of the rest of Australia. In 2003 there were 324 cases of syphilis giving a rate of 158 per 100,000 compared to the Australian rate of 8.9 per 100,000.¹ Congenital syphilis is also relatively common and clinicians need to be constantly aware of the potential for it (Table 1).

During these years, 37/49 (75.5%) of the cases of congenital syphilis were notified from the Alice Springs region. In contrast only 46.4% of all non-congenital cases occurred in that region* ($p < 0.01$). There are higher rates of syphilis in the Alice Springs region, but the local SHBBV program team's very close liaison with the hospital may also give rise to a greater degree of notification.

Table 1: Syphilis and congenital syphilis notifications in the NT

	1998	1999	2000	2001	2002	2003	2004
Cong syphilis	4	0	0	17	13	9	6
Non congenital Syphilis	335	339	280	400	425	313	289

* NT Notifiable Diseases Database

The NT Protocol is largely based on the US Centre for Disease Control (CDC) treatment guidelines² with some modification for NT conditions. The particular conditions in the NT that lead to these changes are:

- High rates of syphilis and large numbers of seropositive pregnant women mainly in remote communities.
- High mobility of patients in remote communities and difficulties in follow-up.
- Lack of immediate access to specialised tests for direct detection of *Treponema pallidum*.
- The lack of specialist paediatric care and certain laboratory facilities outside of Darwin and Alice Springs.

Central to the control of congenital syphilis is its early detection and treatment in antenatal care programs. All health services that provide such programs to high prevalence populations in the NT follow the antenatal screening program as laid out in the Congress Alukura / Nganampa Health Council Women's Business Manual.³ This involves performing syphilis serology at the first visit, early third trimester (28-32 weeks) and at delivery. For low prevalence populations, it is recommended that all women have at least 1 syphilis serology performed at some time during their pregnancy and that no child leave hospital without the result of this serology being known.

When the child is born, the point of first assessment concerning congenital syphilis is the mother's serology at delivery. If she is seropositive then her history of previous serology and treatment, if any, are taken into account along with a physical examination of the child. Depending on this assessment, syphilis serology may be performed on the child. Cord blood serology is not performed because of difficulties that arise in interpretation of results due to mixing of maternal and fetal circulations.² The child is then classified as either no risk, low risk or high risk.

No risk

Children born to mothers who have no serological evidence of ever having had syphilis are considered to be "no risk".

A child is also considered "no risk" if the mother is seropositive but there is clearly documented evidence of adequate treatment and response to

treatment before the pregnancy, the full regimen of antenatal screening and nothing to suggest there may have been a late infection.

Children in the "No risk" category have a physical examination and if that is normal no further investigation or follow up is performed. This is consistent with US CDC guidelines.

A caveat concerning this classification is that there is always the remote possibility of the mother becoming infected after the last test in those who are not tested at birth or of a late infection where a test at birth is done before seroconversion has occurred. However, this appears to be a rare event.

Low risk

This grouping contains children whose mother was treated for syphilis during pregnancy. If the mother's treatment and response to treatment are clearly documented and considered adequate and the child's examination and serology give no indication of likely infection, the child is considered to be "low risk".

These children are examined and have syphilis serology performed at birth. If neither of these indicates infection, no further investigations are performed, and the child is treated with a single injection of benzathine penicillin.

The criteria for making these judgements and recommended actions are fully consistent with the US CDC guidelines.

Children in this category are to be followed up with a clinical examination by a medical officer at 3 months of age and serology and examination at 6 months. This is organised by the hospitals informing the local NT CDC who will then ensure that follow up is performed in the community. If the treponemal serology is positive at 6 months of age, a more detailed assessment will take place.

High risk

This group contains children

- a) who have clinical or laboratory evidence of being affected, or
- b) who do not have direct clinical or laboratory evidence of infection themselves but whose mother was not treated before or during

pregnancy or whose treatment or response to treatment was inadequate.

The Protocol recommends that all these children receive a full course of 10 days intravenous penicillin therapy.

On the basis of discussions with paediatricians and SHBBV program staff throughout the NT, the approach is to provide full treatment but not routinely offer the full suite of other investigations and in particular to not routinely perform a lumbar puncture (LP). The reasons for this are:

- only in Alice Springs and Darwin is there the regular capacity to perform an LP in neonates,
- LP specimens are frequently contaminated with blood which renders them uninterpretable for this purpose,
- because of the variation in CSF protein and cell counts that occurs in neonates, results are often difficult to interpret, and
- the results would rarely affect the decision to provide full treatment to the child.

Similarly, given the decision to offer full treatment, no other investigations (eg long bone X rays) are recommended as a routine. The Protocol refers to several investigations that might be performed if clinically indicated.

The Protocol also refers to the discretion of senior specialists to perform a range of investigations (which might include LP) which, if all were completely normal, might justify treatment with a single injection of benzathine penicillin and close follow up instead of 10 days of intravenous therapy. However, the nature of the consultations were that this would be exceptional and that the usual management of high risk children would be 10 days of therapy regardless of the results of examination and investigation.

Children in the "high risk" category are to have medical officer review at 3 months but must be reviewed by a paediatrician and have serology performed at 6 months of age.

It is in relation to the investigations performed in "high risk" children that the NT Protocol diverges slightly from the US CDC guidelines. The essential point of difference is that the US guidelines advocate that children with direct evidence of being affected (clinical signs, child's RPR \geq 4 fold that of the mother or direct detection of *T. pallidum*) should have a lumbar puncture performed. In other respects the NT Protocol is virtually identical.

Follow-up registers

When the first version of this Protocol was developed in 1998, a follow up register for congenital syphilis was established in all the regional CDCs. In all regions except for Darwin, these registers have continued to operate and provide follow-up. For a multiplicity of reasons, the register ceased to operate in the Darwin region. During the process of producing this revision, a link has been re-established between Royal Darwin Hospital and the SHBBV program and a congenital syphilis follow-up register is again operating in the Darwin region.

The full version of the Protocol is available at: <http://www.nt.gov.au/health/cdc/protocols.shtm>. Information and advice concerning the management and follow up of congenital syphilis may be obtained from the CDCs in any of the NT's regional centres.

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Using Human Papillomavirus testing to monitor effectiveness of treatment of high grade intra-epithelial abnormalities of the cervix

Steven Skov, Community Physician

Women who have received treatment for abnormal pap smears will be able to be followed up in a substantially different fashion using nucleic acid testing (NAT) for Human Papilloma Virus (HPV). The change may herald the beginning of a completely new era of screening and prevention of cervical cancer. Two recent documents by national public health agencies describe the nature and rationale for the changes:

- the Ministerial Services Advisory Committee assessment report on the use of Human Papillomavirus testing to monitor effectiveness of treatment of high grade intra-epithelial abnormalities of the cervix of June 2004, and
- Screening to prevent cervical cancer: Guidelines for the management of asymptomatic women with screen detected abnormalities from the NH&MRC released in June 2005.

The Medical Services Advisory Committee (MSAC) is a high level expert body which provides advice to the Commonwealth Minister for Health and Ageing on evidence related to new and existing medical technologies and procedures and whether they should be publicly funded. Its report explores the utility of incorporating nucleic acid testing (NAT) for Human Papilloma Virus (HPV) into the follow up of women treated for High Grade Squamous Intraepithelial Lesions (HSIL). In particular, it examines reducing the amount of follow up required in those women in whom an absence of HPV can be demonstrated after treatment. The NH&MRC document covers the same issue as part of its much broader focus. Both documents arrive at very similar recommendations.

The underlying and essential rationale for the use of NAT tests in this way is that it is now widely accepted that cervical cytological abnormalities only develop into invasive carcinoma in the presence of high risk types of HPV.

Methods of the reports

The MSAC report explores the effectiveness of HPV testing as a tool for detection of a

recurrence of HSIL. It presents a detailed review of studies comparing HPV presence with pap smear cytological abnormalities after treatment for HSIL. This review examined 14 studies: 9 cross-sectional or prospective studies (the most appropriate design), one retrospective, and 4 case control studies. For a summary of the key findings of these studies see table 1. Two of the studies evaluated Hybrid Capture tests and the others Polymerase Chain Reaction (PCR) tests. The report also presents a critical appraisal of a published systematic review of literature of role of HPV DNA testing in follow up of treatment of cervical intraepithelial neoplasia (11 studies). The NH&MRC document presents a much less detailed overview of the literature, with some studies in common with the MSAC report as well as others, to arrive at the same key conclusions in terms of the implications of the literature.

Table 1: Sensitivities, Specificities and Predictive Values of HPV tests as indicators of post treatment recurrence of HSIL from MSAC literature review studies

	All studies	Cross-sectional studies
Sensitivity	29%-100%	75% - 100%
Specificity	44% - 100%	61% - 100%
Pos Predictive Value	15% - 100%	15% - 100%
Neg Predictive Value	88% - 100%	88% - 100%

As with many literature reviews, the degree of confidence one may have in the conclusions is limited. The primary studies from the MSAC document varied greatly in their inclusion and diagnostic criteria, study methods and end points, and none were randomized controlled trials examining the impact of HPV testing vs no HPV testing on ultimate health outcomes. In addition, the studies involved had relatively small numbers of subjects (mean 124 range 36 – 252) so confidence intervals are wide for the individual estimates of sensitivity, specificity and predictive values. One's confidence is enhanced however by the NH&MRC document arriving at virtually identical conclusions from the studies it examined.

The MSAC report then describes information from the Victorian Cytology Register concerning Pap smear cytological transitions over time following treatment. A Markov model is constructed to compare the likely outcomes and costs of the current recommended management protocol and a revised one incorporating HPV testing.

Changes to NH&MRC follow-up recommendations

The change to the protocol affects only those women whose follow up colposcopy or cytologies have reverted to normal by 12 months post treatment and remain that way at 24 months. The current protocol recommends that these women continue to have an annual pap smear for life.

The revised NH&MRC protocol for management of women previously treated for HSIL is:

- Colposcopy and cervical cytology at 4-6 months after treatment;
- Cervical cytology *and* HPV test at 12 months after treatment;
- Repeat cervical cytology and HPV test every 12 months until both are negative on two consecutive occasions;
- once this is observed these women revert to the usual screening interval recommended for women with no history of previous history of HSIL (ie 2 yearly); and
- for women already undergoing annual cervical cytology testing following treatment of HSIL as per the 1994 NH&MRC guidelines, to add HPV testing to the cervical cytology every 12 months until both are negative on two consecutive occasions and then revert to the usual 2 yearly screening interval.

Rationale for the change to protocol

The essential element is that HSIL does not develop in the absence of HPV. If cytology is normal and there is no HPV detected, then the assumption is that neoplasia should not develop. The safety of the revised protocol rests with the high negative predictive value of the HPV test combined with it being performed 2 years in a

row to further reduce the likelihood of false negatives.

On the basis of this, both documents imply that the proposed change could be made with no reduction of safety for the women concerned. That is no increase in the number of women developing HSIL or cancer some years after treatment. The MSAC reports provides estimates of cost savings of \$135 per woman over a period of 12 years of follow up (\$462.53 vs \$597.38).

The MSAC report concludes by recommending that HPV testing for the purpose of follow up of women treated for HSIL should be publicly funded. It notes that the Minister for Health and Ageing accepted this recommendation in June 2004.

Discussion

Both documents describe an important use for nucleic acid testing for HPV. The immediate benefits might be two fold. The principal benefit is that women who have the best outcomes after treatment would be able to revert to 2 yearly Pap smear screening instead of remaining on annual screening for life as is currently the case. The second benefit is in the potential cost savings. On the basis of approximately 14,000 women being diagnosed with HSIL in 2002 and being candidates for this form of treatment, the eventual savings would be in the order of \$1,890,000 per year.

There are some caveats on the conclusions one can draw from the reports. The cost estimates in the MSAC report are based on a cost of \$60 per HPV test. If the cost of an HPV test was \$80, the saving per woman would be reduced to \$90 over 12 years. It was noted above that there were limitations in the studies in the literature review which reduces how confident we can be in the ability of an HPV test to detect HPV or be an indicator of ongoing disease. We should also be aware that the assumptions made concerning the transitions from one health state to another were not based on directly relevant clinical data. That is, they were not based on follow up studies that measured health outcomes such as progression to or death from cancer.

However, on balance, the analysis of the evidence seems reasonable especially given the

changes to the protocol recommendations are conservative. The “gold standard” screening test (i.e. cytology) would continue to be done throughout and the change involves a return to a “normal” screening interval of 2 years instead of yearly screening only if there is a demonstrated absence of HPV with normal cytology two years in a row.

The remaining hurdles to widespread use of NAT tests for HPV for this purpose are whether the test will be publicly funded and whether an NAT for HPV will be widely available. At present the Dept of Health and Ageing has not confirmed whether there will be an item number on the Pathology Services Table for the test. Apparently it will be considered in November this year. NAT tests for HPV are commercially available (eg the Digene Hybrid Capture test and Roche AMPLICOR HPV Test 2) but not yet in widespread use in Australia.

The final point to consider is where this is heading. It now seems to be accepted that carcinoma of the cervix does not develop, or

very rarely does, in the absence of HPV, and in particular so-called “high risk” types of HPV. The studies in both documents referred to HPV tests done on endocervical specimens. However, given the experience of use of self administered vaginal swabs for gonorrhoea and chlamydia testing, will it be that this leads to a self administered swab for HPV replacing the Pap smear for cervical cancer screening?

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Northern Territory report on HIV/AIDS, Hepatitis C and Selected Sexually Transmitted Infections

Jiunn-yih Su & Kevin Sesnan, Sexual Health & Blood Borne Viruses Program; Vicki Krause, CDC Darwin

This article describes the current knowledge of the epidemiology of HIV/AIDS, Hepatitis C and selected sexually transmitted infections in the Northern Territory (NT) with an emphasis on 2004 and 2005 to date.

1.) HIV/AIDS Cumulative cases 1991 – 2005

In total there were 111 cases notified, with 93 NT residents and 18 non-residents. As of 1st September 2005 there were 10 notifications for 2004 and 3 notifications for 2005 (Table 1).

Table 1. Risk factors and Indigenous status for HIV/AIDS, 2004 and 2005

		Notifications for 2004		Notifications for 2005	
		NT resident	non-resident	NT resident	non-resident
Sex	Male	6	0	2	1
	Female	3	1	0	0
Exposure type	Heterosexual	6	1	0	1
	Male Homosexual/bisexual	3	0	0	0
	Heterosexual/IDU	0	0	0	0
	Male Homosexual	0	0	2	0
Indigenous Status	Indigenous	1	0	0	0
	Non-Indigenous	8	1	2	1
Newly acquired inf.		2	0	0	0

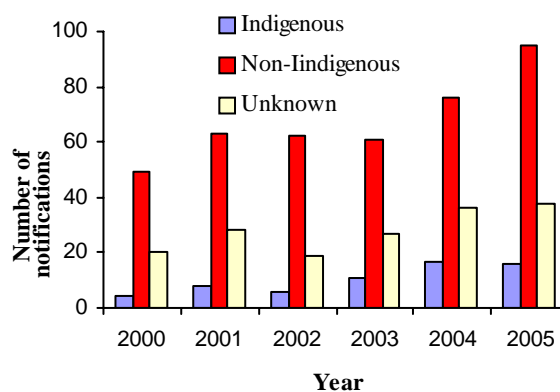
2.) Hepatitis C virus

- In 2005, 56.4 % of all notified cases were non-Indigenous, though in 25.6 % of cases the Indigenous status was unknown (Table 2).
- About 62 % were male.
- The majority of these cases were diagnosed in Darwin (about 76%).
- Mean age was 38.8 years (2004) and 38.0 years (2005, as of 1st September).
- When comparing the statistics for the first 2 quarters, there were 129 notifications in 2004 while in 2005 149 cases were notified, which represented an increase of **16 %**, and almost 100% of such increase occurred in non-Indigenous population (Figure 1).

Table 2. Hep C cases to 1st of September 2005 compared with 2004 (whole of year)

Indigenous status	Sex	2004	2005	Percentage of all
Indigenous	F	10	12	9.0%
	M	16	7	
Non-Indigenous	F	56	44	56.4%
	M	114	94	
Unknown	F	18	25	25.6%
	M	46	29	
Total		260	211	
Female total		84	81	38.4%
Male total		176	130	61.6%
M / F		2.1	1.6	

Figure 1. Number of hepatitis C notifications in the first 2 quarters of the year by Indigenous status, NT, 2000-2005



3.) Sexually Transmitted Infections

The increasing trend of gonorrhoea and chlamydia has persisted in the past few years as illustrated below (Table 3). It is worth noting that there is an increase of **20 %** in the rate of gonorrhoea in the first two quarters of 2005 over the same period of 2004. Most of the increase occurred in Alice Springs and the increase was noticed before the major annual screening started in April in Alice Springs, which suggested it being a true increase. The number and rate of syphilis continue to decline (Figure 2&3), though the actual rate is still considerably higher than the national rate.

Priority target groups remain young people aged 15-24 years. Progress has been achieved in obtaining testing data from all major laboratories servicing the NT and measures have been taken to analyse these data alongside with notification data in order to further understand the epidemiology of notifiable STIs in the NT.

Table 3. The numbers and annualised rates (per 100,000 population) of notifications of notifiable STIs for the first 2 quarters of the year, NT, 2000-2005

Year	Chlamydia		Gonorrhoea		Syphilis		Trichomoniasis	
	Number	Rate	Number	Rate	Number	Rate	Number	Rate
2000	498	509.3	602	615.7	107	109.4	585	598.3
2001	604	610.8	684	691.7	182	184.1	497	502.6
2002	677	681.5	782	787.3	195	196.3	388	390.6
2003	823	829.0	760	765.6	170	171.2	283	285.1
2004	827	827.4	826	826.4	152	152.1	292	292.1
2005	865	853.3	1,001	987.5	112	110.5	347	342.3

Figure 2. Number of STI notifications in the first 2 quarters of the year, NT, 2000-2005

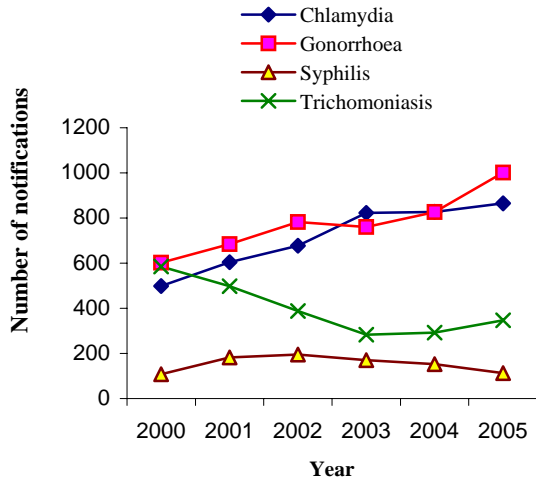
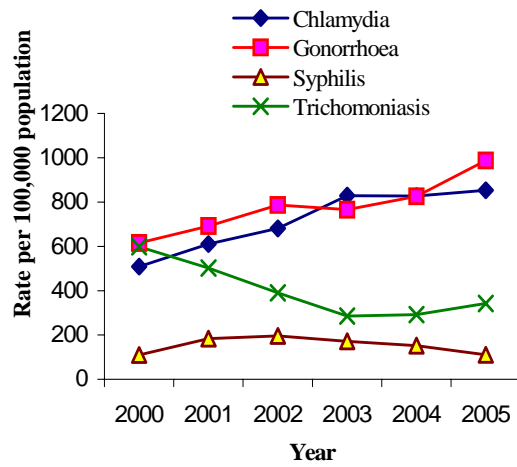


Figure 3. Annualised rates of notifiable STIs for the first 2 quarters of the year, NT, 2000-2005



The NT has well-documented, longstanding, high rates of STIs. In spite of the Sexual Health and Blood Born Virus (BBV) unit's commitment and innovative programs over the years there has been a lack of progress in reducing most STI rates in the NT. In December 2003, the NT Department of Health and Community Services (DHCS) determined to conduct a comprehensive review of STI and BBV services across all sectors of the NT. This was initiated with a view to raise awareness, redirect, if necessary,

program priorities and focus and inform the best use of increased funding to the control of STIs and BBV NT-wide. The review process has been slower than expected with the review conducted from February to April 2005 and the final report from the review still pending. The DHCS will look to outcomes of this review as well as ongoing input from experts and experienced sexual health and BBV workers throughout the NT to tackle this difficult and seemingly entrenched problem of high rates of STIs.

Reopening a hospital laboratory in Banda Aceh

Kay Withnall, Laboratory Consultant and Norbert Ryan, Senior Scientist, Victorian Infectious Diseases Reference Laboratory, Melbourne Health

Kay Withnall is a long term Territorian. She worked for 10 years as Senior Scientist at the Royal Darwin Hospital. She has more recently has worked as a consultant in laboratory assessment and training in Indonesia, East Timor and Pacific Island countries through AusAid, WHO and Secretariat of the Pacific Community (SPC) and Community Health and Tuberculosis Australia (CHATA) projects.

The 'Golf' Team – Norbert's view of his and Kay's work

Medical Team "Golf" departed Melbourne on Australia Day bound for Banda Aceh (Figure 1). This was an AusAid initiative coordinated by Emergency Management Australia. The group of 24 was the 7th Australian Government team sent to tsunami-devastated areas. The team consisted of surgeons, anaesthetists, nursing staff, paramedics, environmental and public health experts and a laboratory team. Our brief was to provide public health and medical support to communities affected by the tsunami, to coordinate with other agencies and support local health authorities.

Figure 1. Team Golf's NT members L to R: Kay Withnall, Bernard Egan and Rhonda Goldsby-Smith.



Departure came 2 working days after selection, making provision of equipment and supplies very difficult. However the team we were to replace confirmed that they had extensive provisions. We travelled with our supplies by Hercules aircraft, a slow process, landing 4 days later at the then chaotic Banda Aceh military airfield. Our instructions changed en route and

we were requested to join the Australian & New Zealand Army teams at Zainul Abidin Hospital (RSUZA), one of the larger teaching hospitals in Aceh, Indonesia. Previous groups had been operating out of a commandeered 60 bed private hospital at Fakinah, clear of any flooding.

We were subject to conditions similar to the army personnel. The men slept in stifling conditions on camp stretchers, under mosquito domes but the women members of the team were provided with an air-conditioned room. Due to disruption to water and sewerage, there was an Aussie style galvanized-iron toilet and a communal shower limited to 2 minutes per person. Our food consisted of army ration packs. For the second week we crowded into a rental house but we now had a bathroom. Curfew was still enforced as there had been shooting in this area pre-tsunami.

The hospital is a sprawling complex of single story buildings covering an area of several acres. All buildings had been flooded and many lives lost, especially in the paediatric ward. Most of the hospital equipment, communications, water supply and drainage had been damaged or destroyed. The retreating floodwaters left all buildings and surrounds covered in a 20-30 cm layer of thick, black mud. The Anzac units cleared drains, re-established an (intermittent) chlorinated water supply and re-opened 2 wards and an operating theatre.

With tens of thousands of displaced persons, epidemics of cholera, dysentery or typhoid were considered a major risk. Thus provision of a public health diagnostic service was a priority for the 2 teams who preceded us. For a short time their laboratory provided the only functioning service of this type in Banda Aceh. We considered our primary task was to maintain this capacity but to try to work in conjunction with the hospital laboratory.

While inspecting the damaged hospital labs, we met Dr Harwita, the Director of Pathology. Unfortunately she had lost 7 of a staff of 25, including the 2 who had previously provided a limited microbiology service. We offered to help her resume laboratory services for the hospital. The task was daunting, all equipment and papers had been lost in the flood. Nothing was salvaged. We assisted in preparing bi-lingual request forms and a list of tests and requirements for specimen collection. The army tradesmen helped by fitting doors, covering broken windows, replacing electrical fittings and reconnecting the water supply. In the absence of any local staff, microbiology became our responsibility.

Initially we had to advertise our service then organise specimen collection from the various sections of the hospital currently run by foreign teams. The Anzacs and German army both ran field hospitals with their own biochemistry and haematology service, Belgians and French ran the Paediatric ward, Singaporeans an Infectious Diseases ward and Chinese ran a very busy Polyclinic. There was also another equally busy outpatient department and an emergency ward with multinational and Indonesian staff, seconded from other regions.

We had expected to receive numerous faecal specimens but instead dealt largely with sputum, urine and wound swabs. Unfortunately agar supplies and reagents reflected our presumed public health role, with Microbact kits, XLD, TCBS, and selenite media clogging our fridges; supplies of blood and chocolate agars were in perilously short supply. There was no opportunity for re-supply from elsewhere in Indonesia as all flights were heavily booked. The outpatient clinics generated numerous requests for TB and each day saw 2-3 new diagnoses based solely on ZN staining. We had plenty of Gram reagents but limited stocks of strong carbol fuchsin, prompting desperate trading between the few labs that were now established. These included a newly established satellite lab of North American Medical Research Unit Jakarta, BLK (district health laboratory), a field lab at Meuloboh on the east coast and the shipboard labs on HMAS Kanimbla and USNS Mercy.

The lack of reliable water and power continued to confound operations and several of our fridges

failed. There was no air conditioning and it was exceptionally hot, dry and dusty. Tiny Drosophila-like flies descended on any moist plate and the condensation problem was immense. Despite insecticide sprays, plates left on the bench for more than a few minutes were almost invariably invaded by miniature ants, which succeeded in tracking over the whole plate. Because we were relying on candle jars, the number of sputum specimens received created storage problems within the incubator.

As noted by the previous team, there was a surprising level of antibiotic resistance encountered. Findings included MRSA, ESBL producing *Escherichia coli* and *Klebsiella pneumoniae* and isolates of *Pseudomonas aeruginosa* from sputum and wounds, that were resistant to gentamicin, timentin and ciprofloxacin. There was anecdotal evidence of widespread ciprofloxacin prescribing by local doctors. Despite the use of Ashdown's medium, there was no further isolation of *Burkholderia pseudomallei* which had been reported by the previous team. One surprising finding was the isolation of *Salmonella typhi* from dermoid cyst fluid; this isolate was fully sensitive. Approximately 10% of sputa were positive for acid-fast bacilli and there was one case of facial leprosy.

There was a disruptive stream of visitors to the lab, especially representatives from newly arrived agencies. Furthermore as the service became established, patients or their relatives started delivering specimens, in line with local habits. This included some of the TB patients, some wearing face masks.

Because our stay was only 2 weeks, we were concerned that our promise to provide continuity of service could be jeopardised. In fact we were "extracted" following 2 successive public holidays, leaving insufficient opportunities for good-byes. At short notice, the now numerous blood cultures and some potential *Shigella* isolates became the responsibility of Captain Mok of the Australian Army. Fortunately we were replaced a few days later by an AusAid funded team, which included one Australian and one Indonesian scientist. Subsequently Kay Withnall was contracted to return for a further 5 weeks and was able to run a training program for local staff. Thankfully this has helped fulfil our initial promise not to abandon this service.

Arriving at 4 weeks after the disaster, the role of the team had evolved into providing support for the re-opening of this large hospital, rather than dealing directly with tsunami victims. In the interim phase, while the surviving staff were still in the grieving period, the running of this sprawling hospital complex had been a multi-national effort. However the Australian troops should be singled out for particular praise for their efforts.

Kay's return working for a humanitarian organization, a private company providing services to Banda Aceh

In early March, following the deployment of the emergency Australian medical teams, Interplast Australia¹ and International SOS² were contracted to provide and manage an Australian-Indonesian medical team to assist the general hospital in Banda Aceh re-establish services and provide on the job training (Figure 2). The size of the team varied between 20 and 26 members over the 5 months of the contract, the majority being Indonesian, who with their experience of working in Indonesia, knowledge of the health system, language skills and cultural sensitivity, were essential to the success of the program.

Figure 2. SOS technician with Aceh microbiology laboratory staff.



I returned to Banda Aceh with this team on 3 March and took over the practical aspects of the microbiology laboratory from the excellent hands of Kate Greening from Queensland Health. This included training 3 highly motivated and competent local laboratory staff, none of whom had previous experience in

microbiology. Before the tsunami, typical of most Indonesian hospital laboratories, the only microbiology service offered was microscopy and the staff members responsible for this had died in the tsunami.

On my return the working conditions were still the same, but by then we were accustomed to working around power and water failures, occasional earth tremors, and tried not to worry about the insect trails across the agar plates, the grinding noise of the microscope stage protesting against the dust, or the refrigerators deciding that they really didn't like the tropics after all and wanted to go home. Our only reliable refrigerator was one made in Indonesia, providing a classic example for the reason why humanitarian organisations should source supplies locally.

On the night of 28 March, a severe earthquake measuring 8.6 on the Richter scale sent us all staggering from the house and although it caused no further damage in Banda Aceh, it traumatized an already traumatized population and there were many absences from work the following day. In April, it was reported that 58% of the hospital staff were suffering post-traumatic stress. The damage done by this quake in Nias has been well documented and our Interplast-SOS team immediately dispatched a medical team to Nias.

Working conditions did gradually improve and by late March we had moved into a renovated air-conditioned room with reliable water and power supplies and the hospital had reopened their food stalls and coffee shop serving the best coffee in Indonesia.

My main goal was to set up a sustainable, simple, fully documented system to cover very basic routine bacteriology, which could be carried out by technicians with minimal training. This included providing simple algorithms for choosing potentially significant isolates from amongst the exasperating mixed enteric and environmental flora culture results typically obtained in the tropics. The SOS team included an Indonesian laboratory technician, who although having no Microbiology experience proved invaluable in assisting with revising and writing laboratory methods in Bahasa, as no

¹ a humanitarian organisation staffed by volunteer Fellows of the Royal Australasian college of Surgeons and registered nurses from Australia and New Zealand

² a private company providing global medical evacuation and medical services

comprehensive Indonesian methods could be sourced.

This goal was achieved only because of the high calibre and motivation of the Acehese laboratory staff and the support of the Director of Pathology Dr Harwita. The level of sophistication however will not be sustainable once the donated laboratory supplies run out, because the hospital budget cannot support the cost of providing disposable equipment and the range of diagnostic kits considered the norm in Western laboratories. This problem was already evident in Biochemistry where pipette tips were rinsed by the cleaner and reused repeatedly. Although we were using the supplied kits, where possible simple manual tests were performed in parallel for teaching purposes and many a morning's session began with "... what to do/report when the kit/reagent runs out...".

Previously specimens for culture and sensitivity testing were referred to the provincial laboratory, but being a user pays service this was rarely undertaken. Treatment was empiric and there were no hospital prescribing policies. This was reflected in our antibiotic sensitivity results which showed an alarmingly high level of resistance. Over a 2 month period, 54% of *Pseudomonas aeruginosa*, 24% of enterobacteria and 38% of *Staphylococcus aureus* isolates were multi-resistant.

By mid March most foreign teams had departed, and the hospital was again staffed by Indonesian doctors with the consequence that the number of specimens submitted for general microbiology tailed off to only 2 or 3 a day. However with the reopening of the TB ward and the out-patients clinic and the return of the pulmonologist, the TB Programme was revived and the number of sputum specimens for ZN staining increased and became the bulk of the day's work (Figure 3). Around 25% of sputum samples received were positive for AFB in direct stains.

While the tremendous amount of high profile foreign aid provided to the general hospital is laudable, by April it was evident that low profile training institutions had been left out of the loop and were not receiving any assistance at all. At the request of the microbiology lecturer, we visited the Akademi Analisis Kesehatan, the institution which trains laboratory technicians, currently having an enrolment of 200 students

Figure 3. Aceh microbiology staff processing TB specimens



(Figure 4). The Akademi had lost most of its equipment and supplies and was valiantly attempting to carry on, but was able to conduct lectures only. Without a photocopier not even notes could be supplied to students. The province of Aceh has around 250 laboratories responsible for simple basic laboratory services³ attached to health clinics and it is essential that staffing of these laboratories is maintained. If the Akademi closes down, as has happened already with some training institutions, the results will show up in the years to come with staff shortages across the province. The materials required are basic, non-disposable, for simple manual determinations, materials possibly still to be found gathering dust in Australian laboratory store-rooms. Any laboratory text books no matter how old would be appreciated. Please contact Kay Withnall (kwithnall@octa4.net.au) if you think you can help.

Figure 4. The Microbiology class of 05 at the Akademi Analisis Kesehatan, Malcolm MacDonald and Kay Withnall in the background



³Minimally: Hb, WCC, blood glucose, urine microscopy, parasitology, malaria screens, ZN staining

***Naegleria fowleri* in the Darwin water supply**

Xavier Schobben, Environmental Health, CDC Darwin

On 11 August 2005, Power and Water Corporation (PWC) alerted Environmental Health section of Northern Territory (NT) Department of Health & Community Services (DHCS) of the detection of *Naegleria fowleri* in a sample of bio-film from the lining of a pipe supplying water to a fire-plug in Nightcliff, a northern suburb of Darwin. Bio-films are microbial populations that grow on the inside of pipes and other surfaces. A fire-plug is a source of water used for fire services and not for drinking purposes. The water sample was one of 3 samples collected in the Darwin area on 27 July 2005 as a part of a Cooperative Research Centre for Water Quality and Treatment project on bio-films in water supply distribution systems. Fire-plugs were chosen for the research as they generally contain stagnant water depleted in chlorine residual and are therefore more likely to support bio-film growth.

DHCS has responsibility for warning the public of any potential public health risks arising from water supplies and subsequently issued a media release and the fact sheet below. Upon advice, PWC subsequently increased the dosage of

chlorine at McMinns Water Treatment Plant so as to obtain a minimum of 0.5 milligrams per litre (mg/L) residual chlorine at the extremes of the pipe distribution system. A residual chlorine of 0.5mg/L is known to be an effective amount to destroy *Naegleria fowleri* in water.

PWC also sampled water (rather than bio-film) from previously sampled points in the Nightcliff area to determine if *Naegleria fowleri* was suspended freely in the drinking water distribution system. All sample results received from the interstate laboratory were negative for *Naegleria fowleri*, except for one, which contained 5 organisms per litre. PWC conducted further flushing of the system and more samples were taken as part of an ongoing surveillance program implemented for the amoeba.

Since August a small number of samples in different locations have tested positive. These locations are generally the extremities of the reticulation that experience low flows. Power Water have increased flushing at these locations and increased chlorine levels to prevent growth of the organism.

Information on *Naegleria fowleri*

What is *Naegleria fowleri*?

Naegleria fowleri is an organism that lives naturally in fresh water and breeds when water temperatures are high. It is a naturally occurring part of the Top End's environment.

It can cause a rare disease called Primary Amoebic Meningoencephalitis (a form of meningitis), but only when water containing the bug is forced up the nose.

You **cannot** get this disease by drinking water.

Even if contaminated water does go up the nose, the chance of contracting meningitis is **very low** – about one in 100 million.

Where has *Naegleria fowleri* been found?

Power and Water Corporation detected samples of *Naegleria fowleri* in the Darwin area.

What has been done?

Power and Water Corporation have flushed water through the system via fire hydrants and have scoured and resampled the water.

Chlorination is very effective in killing the organism. Chlorine in the water supply has also been increased to kill the organism, so you *may* notice a slight change in the taste of the water.

A Darwin-wide water testing program is in place and plans are being finalised to urgently test

non-chlorinated water supplies in Tennant Creek and Aboriginal communities.

What should I do?

- Keep up your usual pool maintenance, and if you are worried, clean and chlorinate your pool as soon as you can. But remember, there is no known case of anyone contracting meningitis by bathing in a maintained backyard pool
- Empty and clean small collapsible pools daily
- Children should not play with or drink directly from hoses and sprinklers (as this

reduces the chance of water being forced up their nose)

- Keep your head above water in spas, thermal pools and freshwater bodies
- If you've been away or can't smell chlorine in the water, run the tap for a few minutes

And remember, you cannot contract this rare form of meningitis by drinking water containing *Naegleria fowleri*.

For further information about *Naegleria fowleri* please contact the Environmental Health hotline free-call 1800 095 646 during business hours.

Bites and stings in the Top End and how to avoid them

Peter Whelan, Senior medical entomologist, CDC, Darwin

The Top End of Australia is home to a number of mosquitoes, biting midges, and a wide range of other insects that can leave locals and visitors alike with unwelcome pain or discomfort, as well as potentially contracting an arthropod borne disease.

Faced with a daunting array of biting arthropods (invertebrates with jointed legs; insects and spiders etc.), many people often ask, "what is the health risk of this or that insect, what is the best way to protect against the bites and stings, what repellent is the best, or even do sand flies really urinate on your skin?"

This introduction to the various culprits and the range of ways to protect yourself will hopefully help make your life in the Top End less painful and a lot safer.

What are the most dangerous insects?

The most dangerous insects in the Top End are mosquitoes. There are just over 100 species in the Northern Territory (NT). Some species prefer to bite certain animals such as marsupials, frogs, or birds, while other species will feed on any animal including humans. Over 20 species in the NT bite people often enough to be labelled

serious pests. Some are just annoying pests, such as the common brown house mosquito (*Culex quinquefasciatus*) found in septic tanks and old tyres, and the big black Anopheles mosquito (*Anopheles bancroftii*) common near paperbark swamps. However others can carry viruses that can cause human disease.

Public health enemy number one in the Top End is the common banded mosquito, *Culex annulirostris*. It is the most numerous and is present all over the Top End. This mosquito can carry the entire range of insect borne viruses that are currently known to cause human disease in Australia, which includes Murray Valley encephalitis, Kunjin, Ross River, and Barmah Forest virus disease. It is also capable of carrying Japanese encephalitis virus, which has the potential to enter the Top End from nearby Papua New Guinea, East Timor or Indonesia and cause outbreaks of a sometimes-fatal disease.

Of those viruses currently known to be in the NT, Murray Valley encephalitis virus poses the highest health risk. It has caused 29 cases of disease in the NT in the last 30 years and resulted in 6 people either dying or being left with severe brain damage. It can also carry Ross River virus, which affects up to 300 people in

the NT each year, and can result in months of debilitating lethargy and painful arthritis.

The common banded mosquito breeds in a wide range of freshwater areas including those associated with rivers or drainage lines, swamps, extensive irrigation areas, and wastewater disposal facilities. It flourishes from the early wet season to mid June, with higher numbers around the big coastal flood plains and swamps of the larger river systems. Luckily this mosquito feeds just after sunset and during the first hour of dark, so is very rarely encountered in the day except in dense shade such as rainforest patches.

One of the most annoying and painful insects is the salt marsh mosquito *Ochlerotatus vigilax*. This mosquito can carry Ross River virus and Barmah Forest virus, which can cause an arthritis like illness (Fact sheets available from http://www.nt.gov.au/health/cdc/fact_sheets/fact.shtml). While these diseases cannot kill, they put more people off work than any other insect in Australia. These mosquitoes breed prolifically in salt marshes near tidal areas and the upper edge of mangrove margins after heavy rain or the highest tides of the month. The adult females all disperse from their breeding sites looking for blood 10 days after spring tides or heavy rain in the August to January period. In the dry season they only live for around a week, but in the wet they can survive for 2 or more weeks. Their flight range is more than 10 km but the highest numbers are found within 3 km of their breeding sites. They can bite at any time, even during the day, although more often in shaded areas by day, and increase in biting intensity around dusk and for the hour after sunset. They can be unbearable in or near mangroves or forest areas during the day and their very high numbers can make the unprotected person's life unbearable.

Fortunately you can't contract dengue in the Top End, as the dengue mosquitoes (*Aedes aegypti* and *Aedes albopictus*) are not present. Although we have at least 4 local *Anopheles* mosquito species that could carry malaria you would be extremely unlikely to contract this deadly blood parasite. No malaria has been transmitted in the NT since 1962. Our protection from malaria relies on our good public health measures that rapidly detect malaria infected overseas

travellers and prevent them from infecting our local mosquitoes.

What other arthropods cause pain or health problems?

The insects and arachnids that can cause painful and annoying bites or injury include wasps, itchy caterpillars, stinging caterpillars, stinging ants, march flies, spiders, scorpions, centipedes, and a few others. Most of these rarely cause longer-term after effects or death.

One very dangerous arachnid includes the scrub typhus mite (*Leptotrombidium deliense*). The larval stage of this very small mite is encountered near rainforest patches after being accidentally picked up on legs from grass as people wander through or sit down in mite infested sites. Bites from these mites can cause scrub typhus disease. Telltale mite bites are usually on the trunk at clothing restrictions, while the signs of infection with scrub typhus are fever accompanied by a small black scab like sore. Luckily in the NT this mite only inhabits areas around Litchfield Park, so awareness and protection by repellents can reduce the hazard.

Another potentially dangerous arachnid is the red back spider (*Lactrodectus hassellti*). This distinctive black globular spider with a red (or rarely orange) stripe down the centre of the abdomen is often found in an untidy web in dry rubbish, equipment or stored items under and around the outside of buildings. Bites are usually from accidental contact. The pain is intense and characterised by sweating at the site of the bite.

There have been no deaths in Australia since at least 1956. Contact can often be avoided by awareness and inspecting under likely harbouring sites. A close relative of the red back, the brown widow spider (*Lactrodectus geometricus*), is becoming more common in the Top End. Although similar in shape and size, it lacks any red or coloured stripe on the top of the abdomen and has yellow marking on the underside of the abdomen which are diffuse markings compared with the red back and is substantially less venomous. However painful bites should still be treated as a red back bite by seeking medical care and expert identification of the spider. It can also be recognised by the spiky

appearance of the white round pea size egg sack usually present in the web with the female, compared with the smooth round egg sack produced by the red back.

Spiders with potentially painful bites include the jumping spiders (family *Salictidae*) and the mouse spider (*Missulena priunosa*). The male mouse spiders are most frequently seen and this large black aggressive spider has a distinctive light bluish-white abdomen. It is mostly active at night on the ground as it searches for the females in their burrows, so footwear and a torch are a good precaution. It is sometimes erroneously called the white tailed spider (which is not present in the NT and which has been falsely accused as the cause of a creeping skin disease). The bite of the male mouse spider causes an intense pain that can last for hours, but there are no records of serious health effects or deaths from this spider. Most other spiders in the Top End only cause localised pain, but if pain persists or other symptoms occur, seek immediate medical advice and take the spider in a jar for expert identification.

Native insects with the potential to cause much pain are the wasps and the stinging ants. Paper wasps (Family *Vespidae*) frequently nest in dense vegetation or under large leaves such as *Pandanus*. Any disturbance of their paper nests unleashes a flurry of winged warriors that home in on the face and eyes. If you disturb a nest, keep your head down and run!

The stinging ants (*Odontomachus sp*) are frequently encountered in or near monsoon forest areas, or residential areas that were formerly monsoon forest areas. These large black ants sometimes jump or click when disturbed but are usually slow moving and only found on the ground. The nests have distinctive volcano like entrances. They have large nippers but sting from behind, much like a wasp. The best protection is good shoes in areas where they frequent. Both these ants and wasps inflict a very painful sting that can last for 20 to 30 minutes. Some people suffer allergic responses to the venom of this group of insects, which includes the introduced honeybee, but does not include our native small black sugar bag bees (*Trigona sp*) that cannot sting. Allergic responses can progress to anaphylactic shock, which can be life threatening. Avoidance is the best policy, but

sensitive people should carry medication such as an antihistamine, and seek medical help if severe symptoms develop.

Frequently encountered but rarely seen painful insects include the stinging caterpillars. There is a range of these but the most common one, the cocky apple stinging caterpillar (*Thosea penthima*) is found on the cocky apple (*Planchonia careya*) and the Kakadu plum tree (*Terminalia ferdinandiana*). These light yellow, oval shaped, flattened larvae range in size from 5mm to 15mm. They look like a spike-armoured limpet, with stinging spines all around their margin and on top of their body. They are common in the early wet season and most frequently encountered by bare legs brushing against leaves when walking through low regrowth in open forests. A sharp sting, somewhat like a wasp sting, results from contact with the stinging spines, and appears as a red, slightly raised area of skin that continues to be painful for 15 to 20 minutes. The best protection is to be familiar with the food plants and avoid bare skin contact with their leaves.

The most unbearable insects in the bush are probably the hairy itchy caterpillars. There is a range of species of these caterpillars, which include the stringy bark caterpillar (*Euproctis stenomorpha*) found on the Darwin stringy bark tree (*Eucalyptus tetradonta*) and black wattles (*Acacia auriculiformis*), the freshwater mangrove caterpillar (*Euproctis lutea*) found on fresh water mangroves (*Barringtonia acutangula*) and the cocky apple (*Planchonia careya*), and the processionary caterpillar that is the larvae of the of bag shelter moth (*Ochrogaster lunifer*) (formerly *Teara contraria*) found on the cocky apple.

The stringybark caterpillar is chocolate coloured with a pale central stripe and a hairy appearance with 4 dense erect tufts of hairs on its back behind its head. It usually hides by day in the fissures of bark on the trunk and at the base of the food tree. The small pale larvae of the freshwater mangrove itchy caterpillar can hang by a silken thread, so just walking under these trees can make contact with these caterpillars. The larger larvae hide in a silken shelter on the shady side at the bottom of the tree. The bag shelter caterpillars are dark brown with dense very long hairs and spend all day in the branches

of their food trees in their communal silk and leaf bag with lots of droppings.

All of the itchy caterpillars have poisonous hairs that are frequently shed as they grow and moult. Contact with the caterpillar or the contaminated leaves or bark can transfer the hairs to your skin and result in an intense itchy skin reaction with swelling and hives. Rubbing the affected areas can transfer the hairs to other areas of skin or eyes. Even touching the adult moth can cause serious swelling and unbearable itching. The most severe swelling reactions occur around the face and neck. Avoidance of the food trees and larvae is essential to avoid problems. If affected, wash all affected areas and clothing as soon as possible and avoid hand contact near the eyes.

The little known whiplash rove beetle (*Paederus australis*) can also cause very painful reactions. It is a small thin orange and black beetle 2-3 mm long and inhabits the sub coastal flood plains during the wet season, particularly around the lower reaches of the Moyle, Daly, and Mary rivers. It is strongly attracted to light at night and is frequently encountered when sleeping under or sitting near lights. These beetles have a powerful blister agent in their blood and as a secretion from the tip of their abdomen. If you crush or disturb them, you inadvertently apply the blister agent to your skin. The blister agent cannot be felt for about 24 hours, after which a painful red raised blister and surrounding swelling occurs that progresses to a welt like appearance. The characteristic linear whiplash lesion is made by swiping the beetles off your skin and inadvertently applying the blister agent as a streak. Recognition of the beetle and avoidance of contact is the best protection. If contact is made, a quick flick with the fingernail and an immediate wash of affected skin with soap and water will prevent any blistering.

Probably the most annoying and most frequently encountered insect around the coast of the Top End is the ornate mangrove biting midge (*Culicoides ornatus*), sometimes known erroneously as a "sand fly". There are 3 species of biting midges found in high numbers in mangroves but the ornate mangrove midge is the only one that disperses out of the mangroves in large numbers. This midge breeds mainly in the mud in the upper neap tide area of mangroves, particularly in the bare creek banks in the upper part of small tidal creek tributaries just before the mangrove canopy starts to close over.

The midges have seasonal peaks from August to November and are most active for the 5 days around the full moon and new moon, with the full moon numbers being twice as high as new moon numbers. They are most active in the evening and early morning. Biting midges bite to take blood, which is necessary for the development of their eggs. They have very small biting and sucking mouthparts. They make a small pool of blood just under the skin by moving their rough mouthparts in and out. They then suck up a mixture of blood and their saliva. Luckily biting midges do not carry any human disease in Australia, but they can cause painful bites and the skin reactions can be real problems.

Why do mosquitoes or midges cause reactions?

When a mosquito or biting midge bites, fine stylets sheathed in the proboscis are inserted into the skin. Blood is sucked up through one of the channels in the stylets, while saliva is injected down an adjacent channel. This saliva can contain a number of chemicals including an anti clotting agent and histamine like substances that the human body recognises as foreign. It is this saliva that causes the burning sensation or painful reactions. So in answer to the question posed at the beginning of the article, "sandflies do not urinate on your skin!" Biting midges do not transmit diseases to humans in Australia.

Some people can become very sensitive after being bitten and suffer a local or general reaction from further bites. People bitten without any immunity to the saliva experience an initial skin reaction that usually causes a small blister. The bites may itch for days, producing restlessness, loss of sleep and nervous irritation. Scratched bites and broken skin can lead to secondary bacterial infections and result in painful sores and disfiguring scars. On the other hand, many people become tolerant to particular species after repeated bites over a long period, and some can experience no pain, red spots or after-effects.

How do you avoid mosquitoes and biting midges?

The best way to prevent bites is to avoid their breeding or surrounding sites at times or seasons when these insects are likely to be prevalent. The salt marsh mosquito is found in the upper high tide areas near poorly draining mangrove creeks

or low-lying tidal or brackish areas, particularly near large salt marsh habitats. The period of high salt marsh mosquito activity is usually during the late dry season and early wet season. Generally they are prevalent for 1-2 weeks, starting 10 days after the highest tides of the month or rain over 20 mls in 1 day. Dense vegetation within 2 km of the breeding sites should be avoided during the day over this period.

Areas of high activity of the common banded mosquito and many other mosquitoes include the large seasonally flooded areas associated with poorly defined rivers or drainage lines, coastal brackish swamps, extensive freshwater reed swamps and lagoons, extensive irrigation areas, and wastewater disposal facilities. Densely shaded areas near these habitats should be avoided during the day. Camping sites should be at least 3 km from extensive areas of these habitats. If camping near creeks, rivers or lagoons, choose localities of the water body which have steep margins or little marginal emergent vegetation, have swiftly running water with little marginal pooling or vegetation, or do not arise from or empty into a nearby swamp area. In more inland areas, locations on hills or rises at least 3 km from breeding areas should avoid the worst mosquito problems. In coastal areas choose exposed beaches or cliffs sites in open and windy situations where with the wind does not blow from the direction of the mangroves or swamps.

Biting midges are frequently found near extensive areas of mangroves. Those mangrove creeks with lots of small tributaries have more breeding sites and high midge numbers. These midges have seasonal and monthly population peaks, so plan your trips or activities around the tide table and calendar!

What are good self-protection measures against mosquitoes and midges?

The best method of avoiding attack at night is to stay inside insect-screened houses and tents or use a mosquito net. Mosquitoes accidentally admitted into tents or mosquito nets are generally easily seen and can be killed with a can of aerosol knock down synthetic pyrethroid spray.

Synthetic pyrethroid chemicals are artificial chemicals more or less similar to the natural plant product pyrethrum obtained from

pyrethrum flowers, and are very effective at low concentrations. Pyrethrum and synthetic pyrethroids are toxic in their concentrated forms but generally have a low toxicity to humans when used as directed on the label. Generally they can be recognised by the ending "thrin" in their name.

Knockdown or space sprays aerosols are suitable for spraying up in the air and can be used inside houses or tents in close proximity to people.

Residual or surface sprays usually have higher human toxicity and are labelled for application to surfaces such as floors, walls, fences and vegetation, and never for spraying up in the air or in close proximity to people. When sprayed on or around screens, and outdoor living or recreation areas, they give added protection against mosquitoes or biting midges. Care is needed to prevent inhalation or skin contact, and some insecticide formulations affect screens.

Head nets, gloves and boots can protect parts of the body that are not usually covered by clothing. The additional treatment of head nets with a repellent or insecticide will discourage insect attack. Mosquito nets are particularly effective barriers. Thick clothing or tightly woven material also offers protection against bites. Light coloured, long sleeved shirts and full-length trousers are recommended. For particular risk areas or occupations, protective clothing or mosquito nets can be impregnated with permethrin or bifenthrin to give added protection. Sleeves and collars should be kept buttoned and trousers tucked in socks during biting insect risk periods. Protective clothing is very necessary in the evenings near areas of salt marsh, mangroves, or large fresh water swamps where the various species of mosquitoes may be abundant.

Camping upwind near congregations of stock or domestic animals can divert mosquitoes or biting midges to alternative hosts, as these insects use wind borne carbon dioxide exhaled from animals to locate potential blood sources. They fly upwind following sources of carbon dioxide and certain odours, and then home in on victims from other clues such as body heat and colour. Dogs of dark colour tend to attract some species of mosquitoes or midges more than lighter colours, and can divert some pests from people who are in the close vicinity.

Many mosquito and biting midge species are attracted to light. This can cause pest problems in unscreened houses or when camping. Yellow or red are less attractive than white light. White or ultra violet lights placed at a distance from a house or camp can serve to attract insects to an alternative area. This is more effective if the light is close to the breeding site, and between the breeding site and the accommodation area. The attractive lights should not be close to accommodation or directly down wind of accommodation areas. Lightproof curtains or similar screening can be very effective in reducing the attraction of biting insects to areas that are illuminated at night.

There are a number of emergency measures that can be taken when exposed to biting insects without any protection. Sheltering downwind next to smoky fires can offer considerable protection. Burning dung or aromatic oil producing leaves from plants such as horehound (*Hyptis*), black plum (*Vitex*), turkey bush (*Calytrix*), paperbarks (*Melaleuca* species) and eucalypts (*Eucalyptus* sp) can make the smoke more effective. Leaves of a small native plant known as warnulpu (*Pterocaulon serrulatum*) that has sticky strongly aromatic leaves, are used in fires or rubbed on the skin by traditional Aborigines in the Katherine district to repel mosquitoes. Choosing locations exposed to the wind can also offer protection from some species.

Some protection can be obtained by rubbing exposed skin areas with the leaves of those plants that contain volatile oils. However these are not as efficient as commercial repellents containing the chemicals diethyl toluamide (DEET) or picaridin. Other emergency protection measures include coating the skin with mud, or burying yourself in shallow sand with some form of head protection. If nothing else is available, keep running!

What is the best repellent?

Relief from mosquitoes or biting midges is best achieved by applying repellents to the skin and clothing. Many repellents affect plastics and care is also needed when applying them near the eyes and lips.

Repellents with DEET or picaridin give the best protection. Some specific repellent products, such as normal "Aerogard", which are formulated to repel flies, are generally not as efficient as formulations containing DEET. Brands such as *Rid*, *Off*, *Bushman*, or *Tropical Strength Aerogard*, containing formulations of around 19% DEET (usually expressed on the label as 190.0g/kg) are more effective than non-DEET products, or products containing less than 10% DEET. Most products with DEET in Australia contain less than 20% DEET as a precaution against possible skin effects in sensitive people. Low irritant repellents generally contain less than 10% DEET and are not as effective as higher levels of DEET. *Repel* brand contains picaridin, which is almost as effective as DEET but is usually less irritating to the skin for sensitive people and is approved for small children. Products with greater than 20% DEET, such as *Bushman's gel* or *Muskol gel* are usually the most effective but care is needed in sensitive people and these are not approved for use on children. Alternative repellents such as Dettol in baby oil, eucalyptus oil, tee tree oil, and other plant products are not as efficient as DEET or picaridin products and should not be relied on to give effective protection.

Application of repellents over large areas of the body or on extensive areas of children is not recommended. Protection from mosquito penetration through open weave clothes can be obtained by applying a light application of aerosol repellent to the exterior of clothing. Repellents should be supplementary and not regarded as substitutes for protective clothing.

Personal repellents are available as sprays, creams or gels. Aerosol sprays are usually alcohol based and tend to evaporate quicker. The creams last longer than the aerosol formulations, while the gels last the longest. Repellents generally only prevent bites from 2 to 4 hours, depending on the repellents, the species of biting insect, or the physical activity of the wearer. Some of the oil lamps, mosquito coils and incense sticks can act as repellents but are usually only effective in sheltered situations. Electronic insect repellents that emit ultrasonic or audible sounds do not offer any protection against mosquitoes or biting midges. They are based on a false premise that specific sounds

repel female mosquitoes, when in fact the reverse is sometimes true, and have been found scientifically to have no repellent effect to mosquitoes or midges.

Plants with reported insecticidal properties such as neem trees and the citrus plant have not been shown to act as repellents merely by their presence in the vicinity of people.

What is the best way to kill mosquitoes or midges?

Mosquitoes or biting midges can be knocked down inside tents or houses with knock down aerosols or space sprays.

Devices that can be effective at killing and/or repelling biting insects include insecticide impregnated mosquito coils or incense sticks, insecticide oil lamps, automatic insecticide dispensers and electric insecticide pads. The most effective of these usually contain an insecticide such as allethrin, transfluthrin or citronella oil and rely on the smoke or vapour to carry these chemicals in the right direction or to build up in a sheltered situation. These devices are effective in relatively sheltered or closed areas such as inside buildings or tents or where there are only slight breezes. They should be backed up with other measures such as suitable protective clothing or effective repellents containing DEET or picaridin.

Large-scale control of adult biting insects can be achieved for short terms (hours) by using portable or industrial fog generators, backpack misters, or heavy-duty ultra-low-volume aerosol generators to knock down active adult insects. The insecticide of choice is bioresmethrin because it has little odour, and is very effective against active flying insects using very small amounts of the active ingredient. Control relies on good access, open vegetation, and light breezes in the direction of the breeding or harbouring sites of the targeted insects. Application should only be during the peak biting insect activity period of those insects actually causing the problem, which is usually the late evening and early night.

Application of surface spray residual insecticides such as permethrin, deltamethrin, bifenthrin and lambda cyhalothrin sprayed as a mist spray to

point of run off on building surfaces, fences, lawns or nearby hedge vegetation can give medium term (a few days to a few weeks) relief. This method is very useful as a barrier protection when large numbers of mosquitoes or biting midges are present near accommodation or outdoor use areas.

One of the residual synthetic pyrethroids, bifenthrin, when used as a barrier spray, has been reported to provide at least 6 weeks protection from mosquitoes and midges in biting insect prone areas. It has also been reported as being very effective in preventing mosquito bites inside open tents when sprayed on the outside and inside of tent surfaces. There are now do it yourself applicators of deltamethrin or bifenthrin available from supermarkets and hardware stores.

These residual insecticides should be applied according to label recommendations. For outdoor areas they should be applied with the aid of a garden pressure sprayer or machine sprayer to apply large droplets and sprays, which do not carry on the wind. Care must be taken to avoid spray drift or run off with all synthetic pyrethroids around fishponds, fish tanks, creeks, and other nearby fish habitats, as these insecticides are efficient fish poisons.

Electric insect insectocutors and other trap or killing devices that use an attracting light, heat, odour, carbon dioxide or a combination of these have been claimed to clear areas of biting insects and thus protect people. Many of these claims have not been scientifically substantiated in outdoor situations with people nearby. While trap devices can attract and trap biting insects, as well as a range of other insects, these devices cannot be relied on for effective protection from biting insect attack. When used in outdoor situations it is possible that they can increase local problems by attracting insects to the general vicinity of people. Attractive odours and carbon dioxide emitted by humans then divert the insects from the trap device to the people. These devices can however be used to trap and kill mosquitoes midges in situations where there are localised biting insect problems and there is not consistent reinvasion of new insects. In these situations an array of traps could reduce the overall population of insects and act as a barrier to provide some protection for inner areas.

What is the best way to treat bites?

Various products either applied to the skin or taken orally, can give relief from bites and prevent secondary infection. The effectiveness of various products is variable, depending on individual reaction. Skin application products include proprietary products such as Eurax, Stingose, Medcreme, Katers lotion, Dermocaine and Paraderm creme, and non-proprietary products such as tea tree oil, eucalyptus oil, aloe vera gel, methylated spirits or ice.

Ice packs applied to the general bite site will usually give immediate relief for painful and itchy bites, and swelling or blisters from mosquitoes and biting midges. The sooner the ice pack is applied after bites or reactions, the better the relief, and this can often avoid more intense reactions.

Products for more general symptoms include antihistamine products such as Phenergan Telfast and Vallergan. Check with your doctor or pharmacist for the latest product and safety information.

So when you plan your next outdoor barbeque, or a camping or fishing trip, don't forget the other bites you may get. You can protect yourself from many biting and stinging insects by being aware of where they live, what they look like, and by taking evasive or avoidance action. Do some research and background checking of the area you are going to. You can plan where you will stay in relation to potential sources of biting insects, and you can take a range of protective measures such as impregnated clothing, repellents and insecticide treated nets and tents. It is better to be forewarned and forearmed than suffer the stings and bites of outrageous insects!

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New directions for the Rheumatic Heart Disease Program

Michael Lowe, Community Physician, CDC Darwin

Rural Northern Territory (NT) has the highest recorded incidence of acute rheumatic fever (ARF) in the world. Over 95 % of patients with ARF are Aboriginal and 70% are less than 15 years old. The high rates of ARF lead to correspondingly high rates of rheumatic heart disease (RHD).

In June 2005, the Commonwealth Government allocated new funding to the CDC to administer a program for better management of RHD in the NT. This money will be used to fund full time administrative positions in the Top End and the central Australia to manage the rheumatic heart Registers and a full time nursing position in each area to coordinate the program and provide client education. TB nurses from the CDC have been trained in RHD education and will work

under the direction of the RHD nurses. In addition, we will begin to offer echocardiography in remote NT communities rather than forcing people to go to towns, and we hope to use this opportunity to provide increased education and better self management for people with RHD.

We have already completed a new version of the Rheumatic Heart Video, and hope to develop new educational resources about matters such as dental hygiene for people with RHD. We also intend to develop hand-held records for people with RHD and commenced a software upgrade for the rheumatic heart register. All in all, we hope that the coming year will be an exciting time to be involved in Rheumatic Heart activities in the NT.

The annual report of the National Influenza Surveillance Scheme 2004

The annual report of the National Influenza Surveillance Scheme 2004 appears in the *Communicable Diseases Intelligence* quarterly report. Included in this are the results of the Tropical Influenza Surveillance Scheme. Background information on the various surveillance schemes in Australia and their rationale as well as results for each state are included.

The report can be viewed on-line at :
<http://www.health.gov.au/internet/wcms/publishing.nsf/Content/cda-cdi2902a.htm>

Centre for Disease Control Conference 18-20 Oct

The annual Centre for Disease Control (CDC) Conference is being held 18-20 October at the Crown Plaza Darwin.

Day 1: Immunisation topics particularly relating to the introduction of the new vaccination schedule in November 2005. The day finishes with a talk by Dr John Hargrave, a former NT CDC medical officer, on Aboriginal health.

Day 2: Sexual health and blood born virus issues including strategies for reduction of STIs in Central Australia.

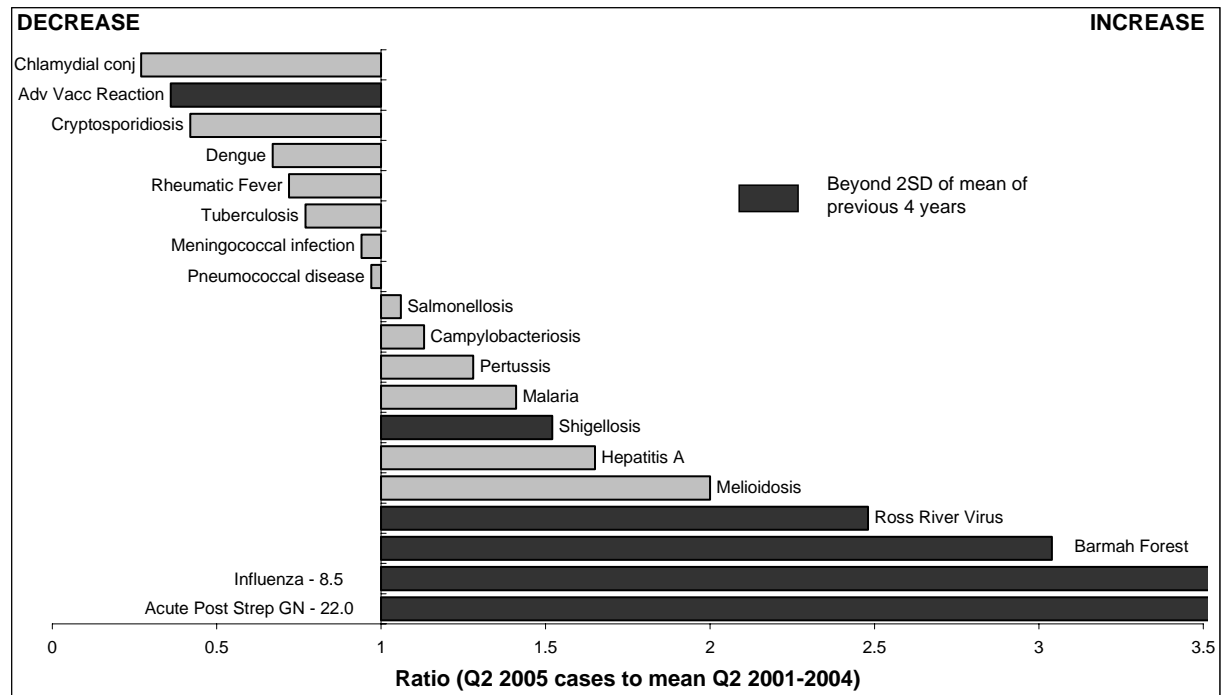
Day 3: General infectious Disease topics starting with a discussion on avian influenza.

Anyone interested in a copy of the program or attending a session please contact Lesley Scott on 89228089 or lesley.scott@nt.gov.au

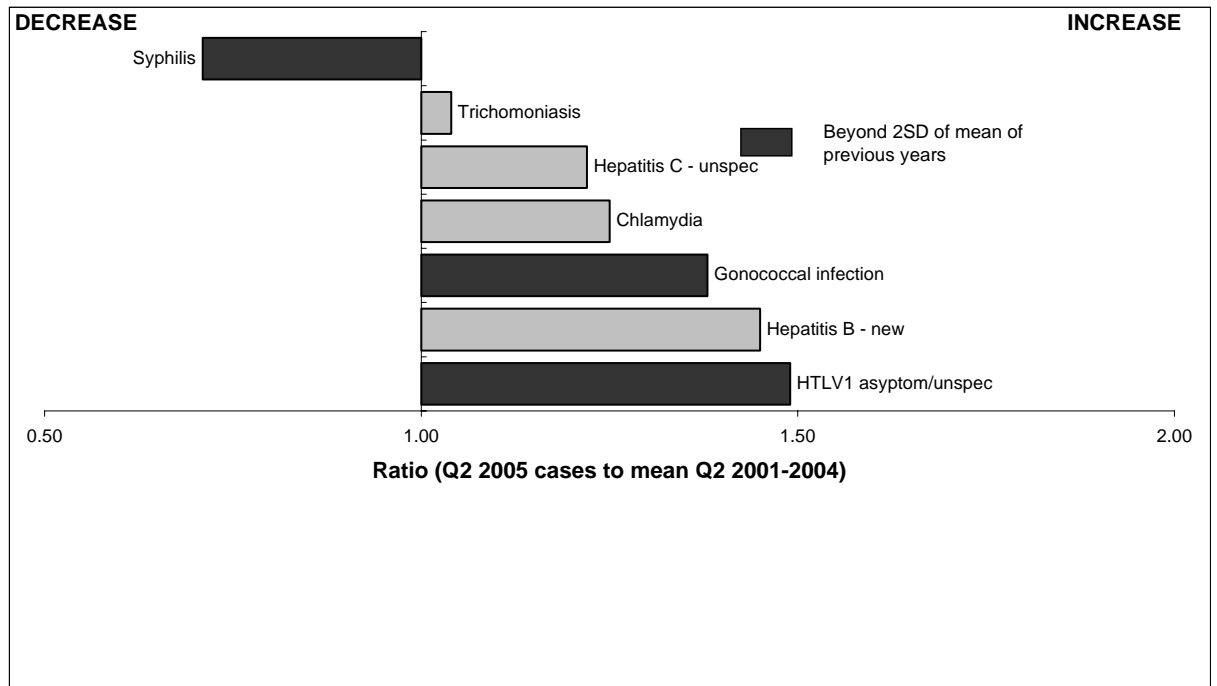
NT notifications of diseases by onset date & district
1 April to 30 June 2005 and 2004

	Alice Springs		Barkly		Darwin		East Arnhem		Katherine		Total	
	2005	2004	2005	2004	2005	2004	2005	2004	2005	2004	2005	2004
Acute Post Strep Glomerulonephritis	4	0	0	0	27	0	5	0	3	2	39	2
Adverse Vaccine Reaction	0	3	0	0	2	5	0	2	1	0	3	10
Barmah Forest	2	1	0	1	14	3	1	3	2	0	19	8
Campylobacteriosis	29	16	0	1	29	20	2	4	15	1	75	42
Chlamydia	250	225	10	16	151	142	37	27	31	38	479	448
Chlamydial conjunctivitis	5	2	1	0	2	5	1	1	2	2	11	10
Cryptosporidiosis	9	19	1	0	4	4	0	3	5	0	19	26
Dengue	0	0	0	0	5	5	0	0	0	0	5	5
Donovanosis	1	0	1	0	0	0	0	0	0	0	2	0
Gonococcal conjunctivitis	0	0	0	0	2	1	0	0	0	0	2	1
Gonococcal infection	339	266	13	15	125	91	23	30	58	50	558	452
Hepatitis A	13	2	0	0	1	1	0	0	0	0	14	3
Hepatitis B - chronic	16	0	0	0	32	0	4	0	4	0	57	0
Hepatitis B - new	2	0	0	2	2	0	0	0	0	0	4	2
Hepatitis B - unspec	20	0	1	0	19	0	6	0	4	0	51	0
Hepatitis C - unspecified	14	11	2	1	44	50	4	0	4	5	68	67
Hepatitis C - chronic	1		0		0		1		0		2	
<i>H Influenzae b</i>	0	0	0	0	0	1	0	0	0	0	0	1
<i>H Influenzae non-b</i>	5	0	0	0	1	0	0	0	1	0	7	0
HIV	0	1	0	0	0	2	0	0	0	0	0	3
HTLV1 asymptomatic/unspecified	12	8	1	0	0	2	0	0	0	1	13	11
Influenza	0	0	0	0	14	3	3	1	0	0	17	4
Legionellosis	1	2	0	0	0	0	0	0	0	0	1	2
Leptospirosis	0	0	0	0	1	1	0	0	0	0	1	1
Malaria	0	0	0	0	16	7	1	1	1	0	18	8
Melioidosis	0	0	0	0	7	4	0	0	0	1	7	5
Meningococcal infection	1	0	1	1	2	3	0	0	0	0	4	4
Mumps	1	0	0	0	1	0	0	0	0	0	2	0
MVE	0	1	0	0	0	0	0	0	0	0	0	1
Non TB Mycobacteria	2	0	0	0	0	1	0	0	0	0	2	1
Pertussis	4	0	0	0	7	0	1	1	3	0	15	1
Pneumococcal disease	14	9	0	0	4	9	3	0	0	2	21	20
Q Fever	2	1	0	0	0	0	0	0	0	0	2	1
Rheumatic Fever	6	7	0	0	4	2	1	2	2	0	13	11
Ross River Virus	0	3	0	0	27	12	3	0	6	1	36	16
Rotavirus	2	5	0	0	1	3	0	7	0	6	3	21
Salmonellosis	13	27	2	1	50	56	6	3	29	17	100	104
Shigellosis	34	18	1	0	2	11	2	4	9	5	48	38
Syphilis	38	53	3	0	8	8	2	3	17	21	68	85
Syphilis congenital	1	2	0	0	0	0	0	0	0	0	1	2
Trichomoniasis	73	63	3	7	53	24	31	20	19	1	179	115
Tuberculosis	0	2	0	0	4	2	2	0	0	1	6	5
	914	747	40	45	661	481	139	112	216	155	1,870	1,540

Ratio of the number of notifications in the 2nd quarter 2005 compared to the mean of the 2nd quarter for the previous 4 years: selected diseases



Ratio of the number of notifications in the 2nd quarter 2005 compared to the mean of the 2nd quarter for the previous 4 years: sexually transmitted infections and blood borne diseases



NT Malaria notifications April – June 2005

Merv Fairley, CDC, Darwin

Eighteen notifications of malaria were received for the second quarter of 2005. The following table provides details about where the infection was thought to be acquired, the infecting agent and whether chemoprophylaxis was used.

Number of cases	Origin of infection	Reason exposed	Agent	Chemoprophylaxis
8	Uganda	Migrant	<i>P. falciparum</i>	no
1	Indonesia	Resident	<i>P. vivax</i>	no
3	East Timor	Work	<i>P. vivax</i>	no
1	PNG	Work	<i>P. vivax</i>	no
1	PNG	Work	<i>P. vivax</i>	yes
3	PNG	Holiday	<i>P. vivax</i>	no
1	PNG	Holiday	<i>P. falciparum</i>	no

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Acute post-streptococcal glomerulonephritis

The high case numbers of APSGN reported in late 2004 and early 2005 continued into the second quarter with outbreaks re-occurring in some communities, requiring further community screening and treatment. There were 39 cases compared with the 4 year mean of 2

Ross River Virus and Barmah Forest Virus

Cases of both arboviruses were significantly higher than the long term means in the second quarter. Most cases lived in Darwin and surrounding areas. Mosquito numbers were not high at this time following a relatively dry wet season, so this persistence of arbovirus activity is difficult to explain.

HTLV1

The increased notifications of HTLV1 cases most likely reflects increased awareness and testing for the disease among physicians. There were 13 in the quarter compared with a 4 year mean of 9. Cases are primarily from Central Australia and there have been no geographical clusters.

Influenza

Cases of flu were increased in the second quarter. This reflected a return to the previous pattern of an autumnal rise in flu notifications. There was a cluster of cases in the defence forces which was associated with contact with personnel from the Northern Hemisphere.

Gonococcal infection

See article concerning this in this edition (p13).

Shigella

The high rates of shigellosis reported in the first quarter from Central Australia continued into the second quarter together with a cluster of 6 cases in an Aboriginal community in the Top End. The cluster was part of an increase of several pathogens in the community at the time and was investigated.

Syphilis

Syphilis case numbers continue to fall. This happens against the continuing increasing trend of gonorrhoea and chlamydia rates and numbers. The specific factors leading to such a decrease are not known. Sexual Health/BBV Unit is exploring the possible reasons for this trend of syphilis numbers.

Disease Control staff updates

CDC

Aikyo Miller has commenced as administration officer in Nhulunbuy replacing **Anna Durbridge** who has retired to her property in Lambells Lagoon.

Environmental Health

Richard Elder has left Tennant Creek going to the Hunter region. **Gabrielle Halcrow**, EHO from Katherine, has gone to head up World Vision Indigenous Programs in Melbourne. Judy Storer, the ever reliable Admin officer for Poisons Control retired earlier this month. Rachel Gaffney has returned to Darwin Urban Environmental Health from maternity leave and Rosalyn Roche has moved to QLD. Fiona Smith has joined the Central Australian Environmental Unit from Alice Springs Town Council, as has Edward White from NSW.

Immunisation

Sam Eccles commenced in immunisation database entry having previously worked at RDH medical outreach clinic.

Sexual Health & Blood Borne Viruses Unit

Brian Castine is employed as Aboriginal Men's Health Educator, and **Julie Hill** as Aboriginal Women's Health Educator in Alice Springs.

TB/Leprosy

Nathan Zweck has taken 12 months leave from CDC. In Nathan's absence **Natalie Gray** will be working as TB medical officer half time as well as project managing the new edition of the *Women's Business Manual*. She is doing both jobs as part of an advanced training in public health. Previously Natalie worked as a medical registrar at RDH. CDC staff wish **Pat Bonson** well on her extended leave.

Medical Entomology (MEB)

Stacey Barkworth has started in MEB as contract T1 on Tennant Creek exotic mosquito project.

Matt Shortus has been confirmed as new P2 in exotic vector, malaria and regional (East Arnhem) vector control.

Non-communicable Diseases

Justine Glover is working for 6 months part time with Palmerston Community Council, Safe Communities project while continuing part time in CDC as Safe Communities Coordinator.

Surveillance

Marianne Bookalill is continuing her AFPHM training with the Surveillance program after starting initially with Environmental Health.