



Australian Institute  
of Health



Australian Institute  
of Aboriginal Studies

# ABORIGINAL HEALTH

## information bulletin

Number 9, February 1988

The *Aboriginal Health Information Bulletin* is jointly published by the Australian Institute of Health and the Australian Institute of Aboriginal Studies and may be obtained, free of charge, by writing to:

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#### **Guidelines for contributors**

Articles which could be published in Brief Communications, Selected Reviews or Book Reviews are most welcome. Those suitable for Brief Communications or Book Reviews should not exceed 1000 to 1500 words, while those intended for Selected Reviews should not exceed 2500 words.

The editor would be grateful for any assistance in the compilation of the Bulletin, particularly with regard to Current Topics, Recently Published Research and Recent Publications, Reports and Theses.

Authors are urged to write in plain English so that their work can be easily understood. They should follow the style used in the August 1983 issue and all subsequent issues. In other cases the recommendations of Commonwealth *Style Manual* should be followed. The Harvard system of referencing should always be used.

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ISSN 0817-4814

Printed by Union Offset Co. Pty Ltd, Canberra.

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# EDITORIAL

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I would like to thank those readers who have provided feedback following the resumption of publication of the *Bulletin*. Feedback like this is very important. In these times of economic restraint, the need for the continued production of publications like the *Bulletin* has to be periodically reviewed. If continued production is justified, reader feedback helps shape the *Bulletin* into a more useful publication. So, please assist by writing to me with your comments. In many ways, the form of the *Bulletin's* continued production is in your hands.

In this issue, as in the last, I have attempted to reduce the backlog of research articles and other publications that has built up during the break in publication. Readers will notice that many of these articles are not strictly 'recent', but have been included as part of our effort to atone for that backlog. Future issues of the *Bulletin* should mainly include 'recent' articles and other publications.

At least since the early 1970s, diabetes mellitus has been recognised as a major health problem for many Aborigines. However, most of the published reports have not been comparable, both as a result of the use of different diagnostic criteria and because most have failed to take adequate account of the age structure of the surveyed population. The work of Rhys Williams, using the new World Health Organization diagnostic criteria and taking full account of the ages of the people surveyed, provides a real benchmark against which future results can be measured. In fact, it would be ideal if the results of all previous studies could be reassessed, against this benchmark.

In his article, adapted from a report appearing in the *Medical Journal of Australia*, Michael Gracey and co-workers highlight the importance of economic factors on the health of Aborigines, particularly those living in remote areas of Australia. Generally changed economic circumstances over the past 20 years exacerbate the effects of the higher costs of essential foodstuffs in remote areas.

Another disease which has been increasingly recognised as a major problem for many Aborigines is hepatitis B, apparently more for its long term sequelae than its acute effects. As shown in the review of the various published and unpublished sources, throughout many parts of Australia the prevalence of hepatitis B carrier state is high enough, according to World Health Organization criteria, to justify comprehensive hepatitis B vaccination programs for Aboriginal babies.

In response to requests from a number of readers, a brief summary of the Aboriginal Health Unit in the Australian Institute of Health has been included.

I am most grateful to Dr Patricia Merrifield, formerly of the Commonwealth Department of Health, who has been largely responsible for the production of this issue of the *Bulletin*.

Neil Thomson

# CURRENT TOPICS

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## **Inquiry into Aboriginal Deaths in Custody.**

In August 1987, the Prime Minister and the Minister for Aboriginal Affairs announced the establishment of a Joint Commonwealth-State Royal Commission into Aboriginal Deaths in Custody. The terms of reference require the Commissioner, Mr. Justice Muirhead, to inquire into the deaths since 1 January, 1980, of Aborigines whilst in police custody, in prisons or in any other place of detention. The Commissioner is also to inquire into any subsequent action taken in respect of each of those deaths, including the conduct of coronial inquiries, and any other things that were not done but ought to have been done.

Since the establishment of the inquiry, the number of deaths in custody reported to the Commission has risen markedly, and it is possible that the number to be examined (originally estimated at 44) may well exceed 100. Three additional Commissioners will now assist in the task, and the time-frame in which the Commissioner is required to report has been extended to December, 1989.

In order to prevent further deaths in custody, the Commonwealth and State Ministers responsible for police and corrective services have developed a code of practices and procedures, which are to be implemented on an interim basis, in consultation with Aboriginal people. The Royal Commission has also released for discussion draft guidelines for the treatment of Aborigines in custody.

## **National Aboriginal Health Strategy Working Party**

In December 1987, Commonwealth, State and Territory Ministers for Health and Aboriginal Affairs agreed to work together to develop a National Aboriginal Health Strategy.

To develop the Strategy, a Working Party has been established and Ms Naomi Mayers, Director of the Redfern Aboriginal Medical Service, has been appointed as Chairperson of the Working Party. The Working Party, consisting of 18 representatives from Commonwealth, State and Territory Governments and Aboriginal communities, will consult widely with all organisations, authorities and individuals with an interest or expertise in Aboriginal health issues. Submissions are also being sought from the general public.

The terms of reference to be addressed by the Working Party are as follows:

- report on Commonwealth/State and community funding arrangements, including financing of primary health care services and social health programs in Aboriginal communities;
- develop strategies to achieve improvements in the short and long term, taking into account specific health problems, health service provision, administrative and funding arrangements, Aboriginal participation, research and data collection and ongoing monitoring;
- develop strategies to maximise the involvement of Aboriginal people in their own health care;
- consider intersectoral co-ordination including Commonwealth, State, local and health service agency responsibilities;
- develop a mechanism to monitor progress towards achieving targets, taking into account performance indicators developed as part of the policy; and

- provide an interim report to the Ministerial Forum on Aboriginal Health in 1988 and a final report to the Ministerial Forum in 1989.

**House of Representatives Standing Committee on Aboriginal Affairs Inquiry into Support Services for Aboriginal and Torres Strait Island Communities.**

This inquiry is being undertaken by the House of Representatives Standing Committee on Aboriginal Affairs, following referral by the Minister for Aboriginal Affairs, Mr Gerry Hand, who has asked for a report on the effectiveness of existing support services within Aboriginal and Torres Strait Islander communities, including administrative and advisory services.

The Chairman of the Committee, Mr A Blanchard, MP, has welcomed the inquiry because of the opportunity it provides to develop proposals for greater Aboriginal involvement in, and control over, the provision of support services to their communities. Among the areas with which the Committee will be concerned are: the effectiveness of community administrative and advisory infrastructure; the role and training of community advisors and other administrative staff; the operation of community stores and other support services in the communities; and the development of management expertise in the communities to enable these services to be run more effectively.

The Committee, which held its first public hearing on 19 February 1988, will visit all States and the Northern Territory to hold public meetings, and will also visit Aboriginal communities. Because of the complexity of the issues involved, the Committee does not anticipate reporting on the reference from the Minister before early 1989.

# RECENTLY PUBLISHED RESEARCH

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## **BRITTON WJ, PARSONS C, GALLAGHER ND, COSSART Y, BURNETT L**

Risk factors associated with hepatitis B infection in antenatal patients.

*Aust NZ J Med* 1985; **15**:641-644

This paper reports on an examination of risk factors associated with hepatitis B surface antigen (HBsAg) carriers in 1821 women attending the antenatal clinic of an inner city obstetrics hospital. The major associated factors were birth in a country where the prevalence of HBsAg is high, and Aboriginal ancestry.

## **GILLESPIE WJ**

The epidemiology of acute haematogenous osteomyelitis of childhood.

*International J Epidemiology* 1985; **14**(4):600-606

This study reviewed hospital morbidity data from New Zealand, Western Australia, England and Wales and Scotland. The author found that the incidence of osteomyelitis in childhood is greater in males than females, greater in European children in Australia and New Zealand than in Great Britain, and much greater in Aboriginal and Maori children than in European children. Possible reasons for these differences are discussed, including the role of environmental factors in severe skeletal sepsis.

## **KASS RB, MEUMANN F**

Hospitalisation for childhood diarrhoea in Central Australia.

*Australian Clinical Review*, (December) 1985;178-183

The objective of this study was to reduce hospital stay by changing ward protocols with respect to infant feeding, including the encouragement of breastfeeding and the rooming-in of Aboriginal mothers. The authors found that although Aboriginal children in Central Australia have an unacceptably high morbidity rate due to diarrhoeal disease, it is difficult to justify prolonged hospital stays on the basis of anthropometric data alone. They consider that a reduction in admission rates will only occur when a number of socioeconomic variables (e.g. access to good water, better sanitation and housing, and universal education) improve. Better use of oral rehydration salts and feeding during a diarrhoeal illness can also help during the intervening period.

## **MILLER C**

Time to assess Aboriginal medical services—but how?

*Australian Dr.* (February) 1985;18-20

This is a journalistic report about the establishment and development of Aboriginal community-run health services, the need to assess their effectiveness, and, in so doing, recognise the need to develop additional and different criteria from those used for assessment of conventional health services.

## **WEBB SG, THORNE AG**

A congenital meningocele in prehistoric Australia.

*Am J Physical Anthropology* 1985; **68**:525-533.

This report is concerned with a congenital meningocele in a young adult Aboriginal female from north-western New South Wales, thought to have lived about 1788. The

authors consider that evidence of this kind may prompt a re-evaluation by prehistorians and anthropologists of the popularly held belief that such malformations were often eliminated by infanticide. The discovery of this form of pathology helps provide new information not only on past cultural attitudes towards disease, but its frequency and geographical incidence, and adds to knowledge concerning the range of pathological conditions suffered by prehistoric societies worldwide.

#### **ANDERSEN NA**

Primary care in Australia.

*International J Health Services* 1986; **16**(2):199-212

This article refers to Aborigines as one of the groups (along with migrants and the elderly) in which present significant primary health care problems are not always well met. One of the problems - accessibility to health services - has been recently addressed primarily through the establishment of community based and controlled Aboriginal health services. In these, the doctor has an expanded role, which includes supervision and training and development of health education programs in consultation with Aboriginal Health Workers on the basis of locally perceived priorities. The challenge to non-Aboriginal doctors, then, is to develop an empathic relationship with Aboriginal people, to learn to work in a different manner; to work under the control of an Aboriginal council, and to accept that the traditional healer still has an important role.

#### **BATESON EM**

Computed tomography of intracranial torulosis in the Australian Aboriginal.

*Australasian Radiology* 1986; **30**(2):92-95

This paper reports on the CT scans of three Aboriginal patients with intracranial torulosis, and discusses the significance of the radiological changes.

#### **BATESON EM**

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This paper reports on the CT scans of three Aboriginal patients with intracranial torulosis, and discusses the significance of the radiological changes.

#### **BLAKE NM, SPARGO RM**

Population genetic studies in the Kimberley of Western Australia.

*Human Heredity* 1986; **36**:286-298

This paper reports on a study of more than 800 blood samples from members of 13 tribal groups in the northwest of Australia. These were tested for 18 enzyme systems controlled by 21 loci, and for haemoglobin. Two novel alleles that are each restricted to a single tribal population suggested to the authors that these were relatively recent mutations that had not yet spread into other groups to any significant extent.

#### **BROWN T, ABBOTT AH, BURGESS VB**

Longitudinal study of dental arch relationships in Australian Aboriginals with reference to alternate intercuspation.

*Am J Phys Anthropology* 1987; **72**(1):49-57

This paper reports on a longitudinal study of the patterns of age change in dental arch breadths and depths in Aborigines (92 males and 68 females). Three types of change



in relative arch dimensions were recognised. A high frequency of subjects showed a divergent growth pattern. The authors discuss the association between divergent growth in arch breadths and the development of alternate cuspatation, which is characterised by an inability to occlude the teeth on both sides of the arch at the same time.

#### **ABORIGINAL HEALTH WORKER**

Volume 10, Number 1, March 1986

This issue covers such topics as the Newcastle medical course, the use of kava, the role of the health worker in treatment of diabetes, and stress and strain.

#### **CAMERON FJ, DEBELLE GD**

Nutrition of Aboriginal infants and children in the Murray Valley.

*Med J Aust* 1986; 144:S5-8

This cross-sectional anthropometric study of 297 Aboriginal children aged 0-11 years from 4 communities in the above area reveals significant levels of growth retardation compared with 146 local non-Aboriginal children. One of the findings was that levels of moderate malnutrition varied according to standards of housing, degree of community organisation, and the social pressures that were experienced by each community. The implications of the findings in terms of Aboriginal participation in primary health care are discussed.

#### **CAMERON WI, MOFFITT PS, WILLIAMS DRR**

Diabetes mellitus in the Australian Aborigines of Bourke, New South Wales.

*Diabetes Research and Clinical Practice* 1986; 2:307-314

This paper reports on an investigation for diabetes and impaired glucose tolerance (IGT) carried out on 294 subjects, 89% of the adult Aboriginal population of Bourke and Enngonia, New South Wales. After allowance was made for the age structures of the populations, the prevalence of 15.6% in Bourke and Enngonia was found to be higher than the recalculated prevalence of 11.2% for Davenport, South Australia (where a 1970 study had reported a crude prevalence of 19%), and higher than that found in a previous study of the Bourke population. In contrast to Davenport, a large proportion (67%) of diabetic subjects in Bourke were under the age of 50. This was partly attributable to obesity which, relative to older subjects, was common in young adults in Bourke, particularly men. Although alcohol consumption was high, it was not associated with abnormal glucose tolerance.

#### **CAWTE J**

Parameters of kava used as a challenge to alcohol.

*Aust NZ J Psychiatry* 1986; 20:70-76

This paper reports a study of kava usage at Elcho Island, Northern Territory, where there is a high level of intake, and medical effects hitherto unreported are being observed. The author considers that further study of these effects is urgently required. He also suggests that attention be directed to the question of the present traffic in kava, because while there is some local opinion that its use is preferable to that of alcohol, further study is needed before this opinion should become the basis of social practice.

#### **CRESWELL B**

The Royal Flying Doctor Service and Aboriginal health care.

*Med J Aust* 1986; 144:S2-3

This article outlines the poor health status of Aborigines, the extensive involvement of the Royal Flying Doctor Service (RFDS) in Aboriginal health care (40% of the 90,000

patients seen by the RFDS each year, and 40% of the 9,000 patients transported by air each year are Aboriginal), and the need for increased understanding by health personnel of differences in cultural, spiritual and social practices. The author suggests that increased staff would allow RFDS to be more closely involved in primary care, and would help achieve a closer rapport with Aboriginal people than currently possible. The RFDS wishes to continue to play its part in improving Aboriginal health by integrating with other agencies and increasing its involvement in health education, promotion, and maintenance.

#### **COOPER RL, COID D, CONSTABLE IJ**

Trachoma: 1985 update in Western Australia.

*Aust NZ J Ophthalmology* 1986; 14:319-323

This article describes the apparent change that has occurred in the pattern of follicular trachoma among Aboriginal preschool and schoolchildren between 1979 and 1985 in some of the communities of the Eastern Goldfields Region and the Eastern Kimberley Region of Western Australia. The prevalence reduction occurred in areas where there had been improvements in school hygiene and housing. The prevalence of cicatricial trachoma had also apparently declined. Communities at risk were identified and recommendations made for frequency of continued screening.

#### **DEBELLE G**

The health of Aboriginal children: the case for change and community control.

*Aust Paediatr J* (Editorial comment) 1986; 22:5-6

This article examines possible changes that should be brought about to improve the poor state of Aboriginal health, referring to an article by Waddell and Dibley, published in the same issue of the above Journal, that looks to some non-biological factors to explain the differences in hospitalisation rates and length-of-stay between Aboriginal and non-Aboriginal children. The 'holistic' approach to Aboriginal health care, increasing 'Aboriginalisation' of health care delivery, and control over community development are discussed as important elements in change.

#### **DOUGLAS RM, HANSMAN D, MCDONALD B, PATON J, KIRKE K**

Pneumococcal vaccine in Aboriginal children - a randomised controlled trial involving 60 children.

*Community Health Studies* 1986; 10(2):189-196

This article reports on a comparative study between a sample of Aboriginal children in central Australia and non-Aboriginal Adelaide children of a double-blind, randomised controlled trial of a 14-valent pneumococcal vaccine. The authors considered that although the numbers were small and randomisation problematic, the consistency of the clinical and bacteriological findings and the seriousness of the problem of respiratory infections in Aboriginal children justify further efforts to investigate a possible role for routine pneumococcal immunisation in Aboriginal children.

#### **GIFFORD S**

Better health for groups at risk: special needs or basic rights?

*Community Health Studies* 1986; 10(4):411-414

This article offers comment on the two chapters on Aboriginal health (by Thomson, and the National Aboriginal and Islander Health Organisation, respectively—both summarised elsewhere in this issue) in volume 3 of the final report (1986) of the Better Health

Commission. The author favours a political commitment to processes which facilitate community control over the underlying social and economic conditions that determine Aboriginal health, rather than the collection of more and better data on which to base programs and services, although she sees the need for both—given that Aboriginal people are provided with the opportunity to develop the necessary research skills.

#### **GLOVER PA**

Midwifery care in remote areas.

*Australian Nurses J* 1986; **15**(10):42-45

The author briefly outlines the topography, geography, and demography of the Northern Territory, giving a profile of Aboriginal society within it. She groups the factors which affect maternal health under the headings of personal, environmental and maternal health services available. She also gives details about the principal regional centres at the Top End, including some Aboriginal beliefs about taboo foods in pregnancy. Her conclusion is that antenatal education, of both the community and Aboriginal Health Workers, is an important aspect of reducing the perinatal morbidity and mortality statistics. In addition, care should be given to the need for adapting antenatal care to local culture and traditions, and not to following rigid patterns.

#### **GOGNA NK, SMILEY M, WALKER AC, FULLERTON P**

Low birthweight and mortality in Australian Aboriginal babies at the Royal Darwin Hospital: a 15 year study.

*Aust Paediatr J* 1986; **22**(4):281-284

This article is a retrospective analysis of all births at the Royal Darwin Hospital from 1 January 1969 to 31 December 1983. The births were divided into weight categories and racial groups (Aboriginal and non-Aboriginal). The study showed that there was a 23.2% incidence of low birthweight (LBW) babies (less than 2500g) in Aborigines compared with a 6.4% incidence in non-Aborigines. Aborigines had a better chance of surviving the neonatal period than non-Aborigines of the same birthweight, for all birthweights up to 2500g. It is suggested that this occurred because most LBW Aborigines were more mature than their birthweight suggested. The perinatal and neonatal mortality however remained high in the Aboriginal babies, and this was attributable to the very high incidence of LBW babies in this group, and perhaps to the limited use of antenatal care by the Aboriginal mothers.

#### **HANNA JN**

Lymphadenitis complicating BCG administration in Central Australian infants.

*Med J Aust (letter)* 1986; **145**(11-12):662-663

This letter draws attention to the high prevalence rate of tuberculosis in the Northern Territory, and the difficulties of providing health care to remote areas. Thus, BCG vaccination is given to all new-born Aboriginal children within the first few days of life, and on occasion to non-Aboriginal neonates who are considered to be at risk. Although BCG vaccination is generally thought to be a safe procedure, various complications, including lymphadenitis, have been reported. The author suggests that surgical excision of the affected glands is the treatment of choice for suppurative lymphadenitis after BCG vaccination in central Australian children. Because of the high prevalence of tuberculosis, however, the author also stresses the importance of continuing to administer BCG vaccination to Aboriginal infants as a priority procedure.

#### **HANSMAN D, HANNA J, MOREY F**

High prevalence of invasive *Haemophilus influenzae* disease in central Australia, 1986. *Lancet (letter)* 1986; **ii**(8512):927

This letter describes the high incidence of severe infections caused by *Haemophilus influenzae* among Aboriginal children in central Australia in 1985 and 1986. The numbers of cases among Aborigines in the twelve months from June 1985 represented an exceptionally high attack rate—equivalent to 1100 cases per 100,000 children under five years of age. The rate at that time in central Australia, higher than that among the children of Navajo Indians and Southern Alaskans, was considered unlikely to be the result of a localised epidemic, as the cases occurred over a vast and sparsely populated area. In trying to explain the high rate of *H influenzae* disease in places with such different climates as Alaska and central Australia, the authors suggest that overcrowding and other adverse socioeconomic factors may be the common factors leading to ready transfer of potentially pathogenic bacteria in respiratory secretions between young children.

#### **HARRIS L, KNIGHT J**

Morbidity patterns in a general paediatric unit in rural Western Australia. *Med J Aust* 1986; **145**(9):441-443

This paper reports on a review of the 536 admissions to the Medical Paediatric Unit at Derby Regional Hospital in 1984. Aboriginal children represented 90% of admissions and 59% of these were under two years of age. The major problems encountered were respiratory, gastrointestinal and renal disease, failure to thrive and anaemia. The authors consider that improvement in domestic environmental conditions and other social factors would significantly decrease these morbidity levels.

#### **HENDERSON R**

Condylomata lata in Aboriginal children. *Med J Aust (letter)* 1986; **145**(6):302

This letter draws attention to possible misdiagnosis in Aboriginal children of condylomata lata (which are broad-based papules appearing on warm, moist sites of the skin in secondary syphilis) as Donovanosis (or granuloma inguinale—a chronic, progressively destructive bacterial infection of the skin and mucous membranes of the genitals). Differences in the picture of Donovanosis and condylomata are described, and it is pointed out that the treatment prescribed for Donovanosis may be inadequate if the case is in fact syphilis.

#### **HOLLOWS F**

Some aspects of Aboriginal health. *Aust Fam Physician* 1986; **15**(7):884-887

This paper gives an overview of some infections which have a high prevalence in many Aboriginal communities (e.g. trachoma, otitis media, respiratory infection, skin infections, leprosy, sexually transmitted disease), as well as some statistics (e.g. stillbirth, infant mortality, and adult mortality, rates), all of which demonstrate the large differential between Aboriginal and non-Aboriginal health. The author considers that the most urgent need in Aboriginal health is to work together with Aboriginal people to change living conditions so that infections do not occur so frequently, and to modify lifestyle so that adult mortality is reduced.

### **HUDSON HM**

Evaluation of trends in middle ear disease among Australian Aborigines.  
*Biometrics* 1986; **42**(1):159-169

This study applies the Gompertz hazard model of age incidence of disease to estimate disease trends in a community. The trend estimate is based on proportions of individuals with disease experience in different age groups at one point of time, and may be used as an indicator of the changing health of a community. The method has been applied to ear health data collected among Aboriginal children by the National Trachoma and Eye Health Program of the Royal Australian College of Ophthalmologists. With this data, and in other areas of public health, the analysis is seen by the author as a useful screening device that can lead to follow-up studies and concentration of resources in particular communities.

### **ABORIGINAL HEALTH WORKER**

Volume 10, Number 2, June 1986

This issue consists of reprints of articles from previous editions, relating to such topics as: psychological disorders, dialects, grief and depression, anger and aggression, serious mental illness, and petrol sniffing.

### **McGILCHRIST CA, HILLS LJ**

Estimation of cumulative illness using cross-sectional data.  
*J Chronic Dis* 1986; **39**(11):929-931

This article demonstrates a general method using cross-sectional data for assessing cumulative illness due to a particular disease. An application is given in relation to otitis media in Aborigines, and a contrast made with the non-Aboriginal population.

### **MOBBS R**

But I do care! Communication difficulties affecting the quality of care delivered to Aborigines.

*Med J Aust* 1986; **144**:S3-5

This article focusses on consultations between Aboriginal patients and resident medical officers at a rural urban hospital serving a large Aboriginal population in north-west Queensland. It was found that the large majority of resident medical officers interviewed had experienced communication difficulties with their Aboriginal patients. This had caused considerable distress, and highlighted the need for more education and training in cultural studies in medical courses.

### **NAUGHTON JM, O'DEA K, SINCLAIR AJ**

Animal foods in traditional Australian Aboriginal diets: polyunsaturated and low in fat.  
*Lipids* 1986; **21**(11):684-690

This article refers to the propensity for Australian Aborigines to develop high frequencies of diabetes and cardiovascular diseases when they make a transition to an urban lifestyle, and points out that the composition of the traditional diet, particularly its lipid components, is an important aspect of the hunter-gatherer lifestyle which may bear on the risk of these diseases. The authors examined the fat content and fatty acid composition of a wide variety of animal foods eaten traditionally by Aborigines from different regions of Australia. The results of the analyses suggested that even when the traditional diet contained a high proportion of animal foods, it would have been low

in fat with a high proportion of polyunsaturated fatty acids (PUFA), and thereby could have protected Aborigines against cardiovascular diseases and related conditions through a combination of factors: low energy density, low saturated fat and relatively high PUFA content.

#### **PINCOMBE J**

Integrating Aboriginal students into the general nursing course.

*Australian Nurses J* 1986; 15(7):47-49

This article describes how the three-year nursing course at the Western Australian School of Nursing was modified, in consultation with Aboriginal educational and nursing personnel, to help overcome the difficulties experienced by Aboriginal students with the theoretical component. The changes included a four-week orientation course, and twelve months of supervised learning. A brief outline of some of the problems, as well as the successes, is included.

#### **PROCIV P, MOORHOUSE DE, WAH MJ**

Toxocariasis—an unlikely cause of Palm Island mystery disease.

*Med J Aust* 1986; 145:14-15

This article reports on work that was undertaken to elucidate the life-cycle and pathogenicity of the flying fox parasite *Toxocara pteropodis*, following a suggestion that Palm Island mystery disease might have been due to an epidemic of visceral larva migrans caused by the parasite. It concludes that, while humans are susceptible to larval infections with this nematode, clinical manifestations are unlikely to develop.

#### **RUTISHAUSER I, McKAY H**

Anthropometric status and body composition in Aboriginal women of the Kimberley region.

*Med J Aust* 1986; 144:88-10

This article describes a detailed cross-sectional anthropometric study of 114 adult women in the Kimberley region of Western Australia. Uncertainties were found about the accuracy of applying prediction equations based on skinfold measurements in non-Aboriginal women to assess total body fat in Aboriginal women. The authors state that these uncertainties highlight the need for further studies, as well as caution in using limited anthropometric data to assess nutritional status in a population of different racial origin.

#### **SEKIKAWA M, AKAI J, KANAZAWA E, OZAKI T**

Three-dimensional measurement of the occlusal surfaces of lower first molars of Australian Aborigines.

*Am J Physical Anthropology* 1986; 71(1):25-32

This article reports on the measuring in three dimensions by means of Moire contourography of the occlusal surfaces of lower first molars of Australian Aborigines. Molar cuspal heights in this population were higher than in Japanese but lower than in Dutch populations, and intercuspal distances were considerably larger than those in the two other populations. Populational differences in occlusal features may influence both craniofacial structures and jaw movements in the three populations. Low correlations between the cuspal heights and the intercuspal distances in the other two populations were also found in this population, indicating that human molar cuspal height is independent of the transverse size of the crown. The authors consider that the further

improvement of recently developed accurate techniques for measuring the occlusal features of dentition in three dimensions and application to various populations will offer a means of understanding the complex relationships between form and function in the masticatory system.

**STANLEY FJ, MAUGER S**

Birth-weight patterns in Aboriginal and non-Aboriginal singleton adolescent births in Western Australia.

*Aust NZ J Obstet Gynaec* 1986; **26**:49-54

This paper provides what the authors consider as preliminary data (due to the difficulties in estimating gestational age and in categorising intrauterine growth retardation) in describing patterns of preterm birth and intrauterine growth retardation from the West Australian Midwives Notification system for 1979-1983. Aboriginal teenage fertility was much higher than that for non-Aborigines, and seemed to be rising. Many more young teenagers giving birth were Aboriginal than Caucasian. The majority of the low birth-weight births in both racial groups were due to preterm birth and not to intrauterine growth retardation.

**TOWNSEND G, YAMADA H, SMITH P**

The metaconule in Australian Aboriginals: an accessory tubercle on maxillary molar teeth.

*Human Biology* 1986; **58**(6):851-862

This study reports a high frequency of occurrence of the metaconule in maxillary molars of an Australian Aboriginal population. The authors suggest that the metaconule may provide additional enamel bulk on the distal occlusal surface of maxillary molars, an area which is subjected to early attrition by opposing teeth during mastication in Aborigines.

**WADDELL C, DIBLEY M**

The medicalization of Aboriginal children: a comparison of the lengths of hospital-stay of Aboriginal and non-Aboriginal children in Western Australia and the Northern Territory.

*Aust Paediatr J* 1986; **22**:27-30

This paper compares the lengths of hospital-stay of Aboriginal and non-Aboriginal children in Western Australia and the Northern Territory during the previous few years. The comparison yields two trends: (1) Aboriginal children stay longer in hospital than do non-Aboriginal children; and (2) within each racial group, children stay longer in hospital in the Northern Territory than in Western Australia. The authors examine the possible reasons for these trends, which include non-biological factors such as the latent logic of public hospitals as service institutions, and the medicalisation of impoverished children.

**WALKER ARP**

Aboriginal health.

*South African Medical Journal* 1986; **70**:249-250

This article comments on a recent supplement on Aboriginal health published in the Medical Journal of Australia, commending the Australian commentators on their 'admirable honesty' in portraying the current picture on Aboriginal health status, and suggesting that South Africa might follow this model in collecting and disseminating

information on the health status and future health goals for its four major population groups.

#### **WATSON DS**

Biparietal diameter in the Australian Aboriginal foetus.

*Br J Obstet Gynaec* 1986; **93**:339-342

This study, carried out between 1982 and 1984 in the East Arnhem Region of the Northern Territory, showed that the biparietal diameter fell below that of a US population at 32 weeks, and the deficit became progressively more obvious towards term. Lower birthweights were found for Arnhem Land Aborigines than for their North Queensland counterparts, which may reflect differences in lifestyle.

#### **WATSON DS**

Petrol abuse at Elcho Island: an attempted intervention.

*Aust Paediatr J* 1986; **22**:277-279

This article describes an attempt to contain juvenile petrol abuse at Elcho Island, Northern Territory. Ethyl mercaptan (skunk juice) was introduced as an additive to the petrol to discourage sniffing. The reasons for the failure of the program are discussed.

#### **WATSON DS, WATSON RM, SISKIND V**

Respiratory function in Aboriginal children.

*Med J Aust* 1986; **144**:S11-13

This article reports on lung function tests which were carried out on 151 Aboriginal school children and 246 non-Aboriginal children, all aged 11-15 years. The results supported the findings of others who have demonstrated a racial difference in ventilatory lung function, with non-Aboriginal children scoring higher than Aboriginal children. The results are discussed in the context of smoking habits. The authors state that the lung function program provided an opportunity to reinforce teaching about tobacco and its effect on the body.

#### **ABORIGINAL HEALTH WORKER**

Volume 10, Number 3, September 1986

The emphasis in this issue is on health education, the material having been provided by Aboriginal Health Workers from different parts of the country. The subjects covered range from Aboriginal child care in hospital to dental care and general health promotion.

#### **WATSON DS, TOZER RA**

Anaemia in Yirrkala.

*Med J Aust* 1986; **144**:S13-15

This article reports on the prevalence and causes of anaemia in residents over the age of 5 years at the Yirrkala Aboriginal community. Eleven per cent were found to be anaemic (haemoglobin less than 110g/l). Most of these were iron-deficient, attributed in part to hookworm infestation; fifteen per cent were folate-deficient; and none was vitamin B12-deficient. The authors suggest that these results indicate the need for promotion of awareness in that community, and in others with similar problems, by Aboriginal Health Workers of the symptoms, treatment, causes and prevention of anaemia, particularly in regard to giardial and hookworm infestations.



**WELCH JS, DOBSON C, CHOPRA S**

Immunodiagnosis of *Entamoeba histolytica* and *Ascaris lumbricoides* infections in Caucasian and Aboriginal Australians.

*Transactions of the Royal Society of Tropical Medicine and Hygiene* 1986; **80**(2):240-247

This paper examines the results of a study under survey conditions of the immunodiagnostic efficiency of an indirect immunofluorescence test (IFAT) and in vitro lymphocyte proliferative responsiveness (cell mediated immunity test, CMIT) used to measure the immunological responses of individuals with known natural *Entamoeba histolytica* and *Ascaris lumbricoides* infections. *E.histolytica* was found to be common among Aborigines from Cherbourg, Kowanyama and central Australia, but was not found in Brisbane non-Aborigines. This was seen to be a reflection of the disparity between their experience of parasitic infections in the different situations rather than any racially or gender-based genetic differences.

**WILLIAMS DRR, FISHER JS**

The management of diabetes in Aboriginal patients.

*Med J Aust (letter)* 1986; **144**:386

This letter refers to an epidemiological survey carried out in the Aboriginal communities of Purfleet and Forster, New South Wales, the poor glycaemic control of patients who had been diagnosed as diabetic before the commencement of the survey, the decision to use insulin, and the occurrence of complications of diabetes (e.g. retinopathy, ischaemic heart disease). The authors request feedback from other practitioners regarding the development of complications and the use of insulin treatment in avoidance of these.

**ABORIGINAL HEALTH WORKER**

Volume 10, Number 4, December 1986

This issue focusses on all aspects of AIDS, including: its effects on the immune system; ways of transmission; infection through needle-sharing; counselling problems in various affected groups; treatment; methods of prevention; and education of Aboriginal Health Workers.

**BATESON EM**

Pneumothorax in the Aboriginal.

*Australasian Radiology* 1987; **31**:260-266

This article reports on a study comparing the frequency and radiological manifestations of pneumothorax in adult and neonatal Aboriginal and non-Aboriginal patients in the Royal Darwin Hospital during the period 1976-1985. Some striking differences were revealed in both adults and neonates. For example, in the adults, primary spontaneous pneumothorax was common in the non-Aboriginal patients, but there was only one case in an Aboriginal patient, and this could have been due to recent trauma. Secondary spontaneous pneumothorax was significantly more common in the Aboriginal patients, and four were the result of active pulmonary tuberculosis. Spontaneous pneumothorax was rare in the neonatal Aboriginal patients.

**ABORIGINAL HEALTH WORKER**

Volume 11, Number 1, March 1987

This is a South Australian edition, with acknowledgment being given to the excellent cooperation that exists between the Aboriginal Health Organisation and the Aboriginal

Medical Service. The subjects include: mental health, health statistics, petrol sniffing, Huntington's Disease, Coober Pedy, health worker education.

#### **CAWTE J**

Aboriginal mental health.

*Australian Aboriginal Studies* 1987; 1:100-109

This article is primarily a personal memoir of the author, who looks back over thirty five years' association with Aboriginal health, both in remote communities and in the Prince Henry Hospital, Sydney. He outlines how he became committed to Aboriginal health, his involvement in the paramedical journal *The Aboriginal Health Worker*, and provides a summarised bibliography from 1972 onwards.

#### **CAWTE J, FLORENCE M**

Environmental source of manganese on Groote Eylandt, Northern Australia.

*Lancet* (letter) 1987; i:1484

This letter reports that the remarkably high concentrations of manganese in surface soils and vegetables grown in the village of Angurugu suggest that the source of manganese at Groote Eylandt is more likely to be provided by local soil, dust, and plants than by the nearby mining operations.

#### **COOPER MH, SCHAMSCHULA RG, CRAIG GG**

Caries experience of Aboriginal children in the Orana Region of New South Wales.

*Aust Dental J* 1987; 32(4):292-294

This paper reports on an assessment of indices of cumulative caries experience (DMFT, DMFS, SR) for 682 Aboriginal children aged 5-14 years living in the predominantly non-fluoridated Orana and Far West Health Region of New South Wales. Results indicated substantially decreased caries experience compared with findings in a 1978 survey. This is attributed to a preventive program based on fluoride therapy, and to improved national emphasis on child health programs. The authors also point out that this is part of a general global trend in most industrialised countries.

#### **ABORIGINAL HEALTH WORKER**

Volume 11, Number 2, June 1987. Women's Health—Pt 1

This issue begins with an overview of women's health, and includes articles on housing, female alcoholism, Chlamydia, pap smears and cancer of the cervix, and breastfeeding.

#### **ELLIS DH**

*Cryptococcus neoformans* var. *gattii* in Australia.

*J Clinical Microbiology* 1987 (February); 430-431

This article reports on the examination of 45 clinical isolates of *Cryptococcus neoformans*, in which an unusually high incidence of *C neoformans* var. *gattii* was revealed. Assessment of all the available data from Australian isolates of this organism indicated the likelihood of there being an endemic focus for the incidence of *C neoformans* var. *gattii* in the rural Aboriginal population of the Northern Territory.

### **FARAGO C**

Urolithiasis in the Aboriginal and non-Aboriginal children and adults of Central Australia. *Australasian Radiology* 1987; **31**:300-303

This article reports on a study that was undertaken to determine the incidence of urolithiasis in patients referred to the Radiology Department of the Alice Springs Hospital. From the routine imaging procedures that were used, the following pattern of urinary calculous disease emerged: urolithiasis appeared common in Aboriginal children and in the non-Aboriginal adult patients, but uncommon in Aboriginal adults. The author points out that the observations were from a highly selected group of patients, but that this may not exclude the hypothesis that there is a self-correcting factor developing in the later years which prevents stone formation in the adult Aboriginal population. This unknown factor appears unaffected in the Aboriginal population by a western-style diet, and is presumed to account for the racial variation in the pattern of urolithiasis.

### **FARAGO C**

Overinvestigation of Aboriginal children with urinary tract infection?  
*Med J Aust (letter)* 1987; **147**(10):521

The author outlines the differences in referrals between Aboriginal and non-Aboriginal children for urinary tract investigation, and points out the limited diagnostic value of micturating cystourethrograms, and the increased diagnostic yield brought about by the routine use of ultrasonography. The latter has helped in the recognition of nephrolithiasis as a major correctable disease of the urinary tract in the Aboriginal children admitted to Alice Springs Hospital.

### **GRACEY M**

Malnutrition and infections: interactions and wider implications.

In: *Proceedings of the Menzies Symposium Nutrition and Health in the Tropics 26-27 August 1987*. Subsection F of the 57th ANZAAS Congress Science and Life in the Tropics: 31-41

This paper refers to the widespread malnutrition and high incidence of infections among children who live in Aboriginal communities in northern Australia, and relates the infections to unhygienic living conditions and high levels of environmental contamination. Low birth weight is seen as having an adverse effect on later growth and nutritional status, and is probably related to maternal factors, including nutrition. The author sees a wide range of social and economic factors, including high unemployment, changes in diet and lifestyle, alcohol abuse, etc. as combining to contribute to unsatisfactory health in Aboriginal communities.

### **GRACEY M, SPARGO RM**

The state of health of Aborigines in the Kimberley region.  
*Med J Aust* 1987; **146**(4):200-204

This article is a shortened version of one that was written to provide background information about Aboriginal health in the Kimberley region in anticipation of the rapid sociological changes which are likely to occur there as a result of the development of mining and tourism. The topics covered are gastroenteritis, childhood deaths and malnutrition, admissions to hospital, maternal health and malnutrition, zinc deficiency, urbanisation and lifestyle disease, enteric disease surveillance, chronic ear infections, leprosy, sexually transmitted diseases, and deaths from external causes.

#### **GRAY A**

Family planning in Aboriginal communities.

*Community Health Studies* 1987; **11**(3):165-175

This article reports on a series of surveys carried out between 1981 and 1983 in five Aboriginal communities to examine the mechanisms that may have contributed to the decline in Aboriginal fertility in the 1970s. A variety of family planning methods was found to be in use. The author considered that extreme reticence on the part of Aboriginal people about the reproductive aspects of women's lives was likely to pose problems for the delivery of adequate health services. While individuals working in health service delivery were attuned to Aboriginal sensitivities in this area, they were not always aware of the reasons for them, nor of their precise nature.

#### **HANNA JN**

Poor response to hepatitis B vaccine administered to Aboriginal infants in Central Australia.

*Med J Aust (letter)* 1987; **146**(9):504-505

This letter reports on low seroconversion rates following immunisation of Aboriginal infants born to hepatitis B surface antigen (HBsAg) seropositive mothers in the Alice Springs Hospital during 1985. (From 1 January 1985, all infants born in Alice Springs Hospital to such mothers were required to be immunised against hepatitis B). It is not known whether the low seroconversion rates reflect inadequate handling of the vaccine in central Australia, or whether they are caused by other undetermined factors. It is suggested that low temperature monitors be used in conjunction with the transport and storage of the vaccine to obviate the possibility that the reduction in potency of the vaccine may have been due to freezing.

#### **HITCHCOCK NE, GRACEY M, MALLER RA, SPARGO RM**

Physical size of 1887 Aboriginal schoolchildren in the Kimberley region.

*Med J Aust* 1987; **146**(8):415-419

This study documents the weights and heights of 1887 Aboriginal schoolchildren from communities throughout the Kimberley region of Western Australia. The data showed that Aboriginal children who live in the more remote communities of the Kimberley were smaller in weight and height than those who lived in the towns, and Aboriginal children in the Kimberley region were lighter and smaller than non-Aboriginal children living in Western Australia as a whole.

#### **KILBURN CJ**

Manganese, malformations and motor disorders: findings in a manganese-exposed population.

*NeuroToxicology* 1987; **8**(3):421-430

This study aimed to further delineate aspects of the Groote Eylandt Syndrome, and by examining birth records and children, to explore the possible effects of manganese during foetal and neonatal development. The author concluded that the available evidence could only implicate manganese by association, and further information would be needed before the true role of manganese could be defined with any clarity. This should include the results of extensive blood sampling, electrophysiological studies, and postmortem studies.

**MILLS CA, KIMBER LM, WALLINGTON JA**

Fitting of bone conduction hearing-aids to Aboriginal children.

*Med J Aust (letter)* 1987; **146**(2):116-117

This letter describes recent programs in the Northern Territory and Western Australia which have been developed to overcome past failures in hearing-aid fitting programs for children living in remote Aboriginal communities. The authors found that when intensive support is given to both teachers and students, hearing-impaired Aboriginal children enthusiastically accept and benefit from FM/Walkman radio hearing-amplification systems.

**ABORIGINAL HEALTH WORKER**

Volume 11, Number 3, September 1987. Women's Health—Pt 2

This issue includes such topics as : 'Women's Business'; midwifery and the Aboriginal Health Worker; sexually transmissible disease; pregnancy; the Congress Alukura; and breast self-examination.

**MOHR VS, BARLOW JW, TOPLISS DJ, O'DEA K, STOCKIGT JR**

Evaluation of T4 and T3 binding kinetics in the thyroxine binding globulin abnormality of Australian Aborigines.

*Clinical Endocrinology* 1987; **26**:531-540

This study involved the comparison of 12 euthyroid Aborigines with low T4 and Aborigines with normal T4 using measurements of free T4 and T3 by equilibrium dialysis. It was found that a substantial minority of Australian Aborigines have a TBG (thyroxine-binding globulin) variant characterised by both reduced capacity and affinity of T4 and T3, and this suggested that TBG may be both qualitatively and quantitatively abnormal in these subjects. The authors consider that, from a practical point of view, primary hypothyroidism should not be diagnosed in Aborigines on the basis of reduced T4 and free T4 index without demonstrating TSH (thyroid-stimulating hormone) excess.

**MOORE DJ , BUCENS MR, HOLMAN CDJ, OTT AK, WELLS JI**

Prenatal screening for markers of hepatitis B in Aboriginal mothers resident in non-metropolitan Western Australia.

*Med J Aust* 1987; **147**:557-558

The authors report on a study of 1947 Aboriginal women who resided in non-metropolitan regions of Western Australia and gave birth during January 1983 to February 1985. 42% of these women were screened prenatally for the presence of hepatitis B surface antigen (HBsAg). The proportions of Aboriginal women screened varied from 17% in the southern divisions to 72% in the Kimberley region. The screening program identified 29 Aboriginal women with a positive result of the test. On this basis, the prevalence of HBsAg was estimated as 3.6%, which is consistent with the World Health Organization's intermediate-risk category and the need to provide hepatitis B vaccination to all Aboriginal infants.

**NEWMAN B**

Education of Australian Aboriginals as community health care workers.

*J Royal Society of Health* 1987; **107**(5):178-180

This paper outlines briefly some aspects of the education of Aboriginal people as health care workers, including background, governmental intervention and support, selection of students, length of program, curriculum, role of teachers, and assessment of students

and evaluation of the course. The author points out that success of such a program will depend largely on the society's acceptance and support.

**O'CONNELL PJ, IBELS LS, THOMAS MA, HARRIS M, ECKSTEIN RP**

Familial IgA nephropathy: a study of renal disease in an Australian Aboriginal family.  
*Aust NZ J Med* 1987; **17**(1):27-33

This article reports on a study of an Australian Aboriginal family, extending through four generations, with a high incidence of renal disease. Overall, the findings suggested a genetic mechanism in the pathogenesis of IgA nephropathy in some patients and, as there was evidence of renal disease in 25% of those tested, may indicate an underlying high incidence of renal disease in the Aboriginal community.

**OZAKI T, KANAZAWA E, SEKIKAWA M, AKAI J**

Three-dimensional measurements of the occlusal surfaces of the upper molars in Australian Aborigines.  
*Aust Dent J* 1987; **32**(4):263-269

This article reports on the measuring in three dimensions with the aid of moire contourography of the occlusal features of the upper first molars in Aborigines. These were compared with those in the Japanese and Dutch populations, in both of which the intercusp distances were considerably greater. The authors discuss the observed racial differences in occlusal surface features in relation to general craniofacial morphology, dental occlusion and the mechanics of jaw movements during mastication.

**PATTERSON C**

Problems in the assessment and the overcoming of nutritional deficiencies in Australian Aborigines.  
*Med J Aust* 1987; **147**:319-320

This is an editorial commenting on the poor health status of Aboriginal people, the role that nutrition plays in this, and the article by Sullivan et al (referred to below) in the same journal issue. The author stresses the need to take into account the various social and cultural factors which may influence 'good nutrition', including the deep-seated social inequalities experienced by Aborigines (eg access to sources of nutritious food, the cost of such foods and the regularity of their availability), and the need to understand, and try to solve, the problems which lead to a high consumption of alcohol. The latter is seen by the author as probably the most complex of all the nutritionally-related problems of Aborigines.

**PATTERSON F, DENT O, HALL J, SMITH C**

Hepatitis A and B in Australian Aborigines living in an urban community.  
*J Gastroenterology & Hepatology* 1987; **2**:563-568

This study investigated HAV and HBV infection in urban Aborigines from Condobolin, New South Wales. Results indicated that hepatitis acquired early in life is evident in this Aboriginal urban community. Transmission may be vertical or horizontal or both. Immunoprophylaxis with immune globulin and hepatitis B vaccine was recommended for neonates and seronegative individuals. The high prevalence of anti-HAV in those Aborigines aged 10-19 years was described by the authors as being comparable to that of the developing world.

**RANFORD P, HAY J, SERJEANTSON SW, DUNCKLEY H**

A high frequency of inherited deficiency of complement component C4 in Darwin Aborigines.

*Aust NZ J Med* 1987; 17:420-423

This research involved the examination of inherited deficiencies of serum complement components C4A, C4B, and C2 in two Australian Aboriginal populations from Darwin and Alice Springs and comparison with the prevalence of complement deficiencies in non-Aboriginal blood donors. The frequency of C4A deficiency alleles was 29% in Darwin Aborigines compared with 12% in Alice Springs and 17% in Canberra blood donors. Partial C4B deficiency was also higher in Darwin Aborigines than in the other populations. Inherited deficiency of serum complement component C2 was not observed. The authors consider that a high frequency of serum complement component C4A deficiency may explain the higher prevalence and greater severity of systemic lupus erythematosus reported in Aborigines, and further research should define more clearly the clinical significance of such deficiencies.

**RATNAIKE RN, COLLINGS M, DORWARD SK, BROGAN RM**

Diarrhoeal disease in an Aboriginal community.

*European J Epidemiology* 1987; 3(3):312-315

This study was undertaken in an Aboriginal community with the aim of obtaining information on the incidence and prevalence of diarrhoea in the community, as distinct from hospital admissions, and the extent to which the community regarded diarrhoea as a problem in isolation and in relation to other diseases. A review of clinic records showed a minimum of 1.24 episodes/year in children below five years, and a survey in the community school identified 51% who had experienced diarrhoea in the previous two weeks, none of whom had presented to the clinic. The authors found that the community perceived diarrhoea as a major problem, and conventional preventive measures would not by themselves improve the situation. It was proposed therefore that active involvement of the community in designing, implementing, and evaluating future interventions would be necessary.

**RAWLINSON WD, BASTEN A, HARGRAVE JC**

Clinical significance of changes in serum proteins, immunoglobulins, and autoantibodies in leprosy.

*International J Leprosy & other Mycobacterial Diseases* 1987; 55(2):277-285

This article reports on the clinical significance of an investigation of the levels of acute phase reactants such as C-reactive protein (CRP), serum globulins and autoantibodies in leprosy, by comparing populations of Aborigines with stable treated leprosy and relevant contact groups, including: a) non-infected European sporadic contacts; and b) healthy Aboriginal relatives of patients with confirmed leprosy. The authors consider that the raised levels of CRP and immunoglobulins and the higher frequency of autoantibodies seen in leprosy patients compared with sporadic contacts are probably related to the differences in the incidence of non-leprosy infection rather than to leprosy *per se*. Comparable results were found in the leprosy patients and their family contacts. The data highlighted the need to use antigen-specific assays for determining the significance of changes in acute phase reactants and for distinguishing between the primary and secondary effects of *Mycobacterium leprae* infection.

**RISCHBIETH RH, THOMPSON GN, HAMILTON-BRUCE A, PURDIE GH, PETERS JH**

Acute encephalopathy following petrol sniffing in two Aboriginal patients.

*Clinical and Experimental Neurology* 1987; 23:191-194

This article describes two instances of petrol sniffing encephalopathy in Aborigines. The authors state that although the psychological and neurological complications of petrol sniffing have been documented among Aborigines, there has not previously been reported the most devastating toxic effect—acute encephalopathy. The latter is an infrequent but serious consequence, and generally affects chronic petrol sniffers, reflecting a widespread abuse of this substance in the community. Of the two cases described, one showed incomplete recovery six weeks after cessation of exposure.

**SMALLWOOD G**

The Aboriginal and Islander community.

*Australian Disability Review* 1987; 1(1):8-10

This paper outlines the problems of Aboriginal health and disability from an Aboriginal health professional viewpoint. It describes the large gap in health status between Aborigines and non-Aborigines, the lack of black involvement in surveys that have been carried out on blacks, and the small use of general hospitals and private practitioners by blacks. The importance of understanding cultural values is stressed as one way of helping overcome the problems of Aborigines and Islanders in white-controlled health services. The author also stresses that the only way that Aboriginal health will be bettered is by Aborigines being able to control their own lives.

**SPENCER J**

The right to drink.

*Lancet (Point of View)* 1987; i(8543):1195-1196

This brief article outlines the background of the Kimberley region of Western Australia, the harshness of the climate and terrain, and the numerous Aboriginal communities scattered over thousands of square miles. In referring to the poor health status of Aboriginal people there, the author states that the principal disorders among the adult population are related directly to excessive alcohol consumption. Although governments have allocated funds for rehabilitation services, there is no clear evidence that they have made any difference. These problems began to worsen about the time that Aboriginal people were granted equal rights and opportunities, and in the present situation these people are the losers, while landlords, hoteliers and brewers grow wealthy from the thriving trade.

**STAUBER JL, FLORENCE TM, WEBSTER WS**

The use of scalp hair to monitor manganese in Aborigines from Groote Eylandt.

*NeuroToxicology* 1987; 8(3):431-436

This research focussed on the monitoring of manganese in scalp hair in more than 100 Groote Eylandters in an attempt to determine if the Aboriginal population of Angurugu has a significantly higher manganese intake than other populations. (This interest had arisen out of the suggestion that the high incidence of neurological disturbances endemic on Groote Eylandt—known as the Groote Eylandt Syndrome—may be due to high levels of manganese). The authors considered that, while scalp hair may be useful in determining a population's overall exposure to manganese, interpretation of the data is difficult without careful study to separate endogenous and exogenous sources of manganese. Blood and tissue manganese levels may be more useful to determine body



burden of manganese and to indicate individuals affected with Groote Eylandt Syndromes—at least until further research clarifies the relationship.

#### **SULLIVAN H, GRACEY M, HEVRON V**

Food costs and nutrition for Aborigines in remote areas of Northern Australia.  
*Med J Aust* 1987; **147**:334-337

This article reports on a prospective study of the nutrition and growth of infants who were born in the isolated communities in the Kimberley region of Western Australia. (See also on this topic the review 'Economic factors affecting Aboriginal health and health care' by Gracey, Sullivan and Spargo, elsewhere in this issue). The high rates of undernutrition, growth failure, and morbidity that were found during the project pointed to the possibility that financial factors affecting the availability and distribution of foods may have been exercising considerable impact on maternal and child health in the region. While the authors consider that there should be significant benefits from the introduction of a system of nutritional supplementation for Aboriginal mothers and other disadvantaged sections of the community, they recognise that this would be unlikely to receive community or political support at present.

#### **TAYLOR HR**

Strategies for the control of trachoma.  
*Aust NZ J Ophthalmology* 1987; **15**:139-143

This article points out that trachoma is still a major cause of blindness in many developing areas, and that it can be viewed as a community-based disease. Thus, treatment or intervening strategies must be aimed at the community level. The more conventional approaches of treatment (topical or systemic antibiotics) do not seem to offer an appropriate cost-benefit ratio for widespread use, and new methods and techniques should be used for studying trachoma. Carefully designed epidemiological field studies can evaluate the role of many different community, family and personal practices and behaviours that could be associated with trachoma. For example, two recent studies have shown a clear association between trachoma and infrequent face-washing in children. Further studies are in progress to identify ways to alter this behaviour and assess the impact of such intervention on trachoma.

#### **THOMPSON JE**

Morbidity patterns in Western Australia.  
*Med J Aust (letter)* 1987; **146**(5):280-281

This letter refers to: an article by Harris et al (1986); the use of the term 'part-Aboriginal'; the numbers of Aboriginal children under five years admitted to hospital for asthma; and the rarity, or indeed complete absence, of this disease in those of totally Aboriginal descent.

#### **WATSON DS**

Apathy or antagonism? Tribal Aborigines in the health care system.  
*Aust Fam Physician* 1987; **16**(5):664-668, 671

This article discusses the cultural factors in Aboriginal society which make implementation of western style medicine difficult. These include: the presence of traditional medicine men and women, food taboos during pregnancy, the influence of sorcery, and the social, educational and economic factors that affect the attitudes of Aboriginal people to health care. The author suggests that strategies to overcome these

difficulties will rely heavily on Aboriginal health workers who act as a bridge between the two cultures and styles of medicine.

**WILLIAMS DR, MOFFITT PS, FISHER JS, BASHIR HV**

Diabetes and glucose tolerance in New South Wales coastal Aborigines: possible effects of non-Aboriginal genetic admixture.

*Diabetologia* 1987; **30**(2):72-77

This article reports on a study of diabetes in a group of coastal Aborigines in New South Wales. It documents diabetes prevalence and describes glucose tolerance (including insulin response to oral glucose) in relation to genetic admixture from non-Aboriginal sources as assessed by HLA antigen status. The study was carried out as a first stage in a program directed towards the detection of diabetes and diabetic complications, improved diabetic control, and the prevention of diabetes and obesity in this population. The results indicate that in a group of coastal Aboriginal people who have been subject to considerable genetic admixture, the prevalence of diabetes is less than would be expected on the basis of epidemiological data from a similar study of Aboriginal people from central New South Wales.

**ABORIGINAL HEALTH WORKER**

Volume 11, Number 4, December 1987

This issue focusses on the Kimberley region of Western Australia - its topography, industries, people, and problems, including suicide, prisons, and the use and abuse of kava.

# BRIEF COMMUNICATIONS

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## A review of hepatitis B infection among Aborigines

Neil Thomson and Morteza Honari  
Australian Institute of Health, Canberra

Hepatitis B virus (HBV) infection has long been known to be more prevalent in some Aboriginal communities than in the general population (Barrett 1972, Barrett 1976, Kelly et al 1975). In fact, the first recognition of hepatitis B surface antigen (HBsAg) occurred in the serum from an Aborigine, hence its early name of Australia antigen (Blumberg et al 1965). However, it has only been with the development of more sensitive screening tests that the full extent of the problem has been recognised.

HBV infection is implicated, to varying degrees in four main clinical entities: acute hepatitis, chronic active hepatitis, cirrhosis and primary liver cancer, particularly hepatocellular carcinoma. Interestingly, acute infection with HBV does not appear in itself to be a major problem for Aborigines. For example, in his analysis of serological markers for HBV at Yuendumu, Northern Territory for the years 1967-77, Hardy reported no clinical evidence of infection, despite the presence of markers suggesting that 90 per cent of the population had been infected (Hardy 1982).

Whereas most people develop immunity to the virus after the initial exposure (shown in their serum by the presence of hepatitis B surface antibody (anti-HBs)), some become chronic carriers and are susceptible to the long term sequelae. These carriers are identifiable by the presence in their serum of hepatitis B surface antigen (HBsAg). While there is no clear evidence that chronic active hepatitis is a problem, as summarised later the higher rates of cirrhosis and primary liver cancer among Aborigines than among the general Australian population are well documented. However, the actual contribution of HBV is not known. Dietary factors and alcohol are likely to play a significant role, certainly for cirrhosis.

Table 1, summarising the results from a number of surveys in Aboriginal groups around Australia, reveals a wide range of prevalence of chronic carriers, evidenced by the presence of HBsAg. Even the lowest levels, around 3-4 per cent, at Woorabinda and Mornington Island in Queensland and in rural Western Australia are well above the level of 0.07 per cent documented for Sydney blood donors (Britton et al 1985).

The details of the most intensive survey, a stratified random sample of Aborigines aged 12 years or more in Western Australia (Health Department of WA 1987), are shown in Table 2. The highest level (22 per cent) for an individual community was found in Warburton, in the Eastern Goldfields region. This level is similar to those documented for other communities in central Australia (including the southern areas of the Northern Territory, the north west regions of South Australia, and the Warburton Ranges area of Western Australia), and substantially higher than the carrier rate in most other parts of Australia.

**Table 1 PREVALENCE OF HEPATITIS B SEROLOGICAL MARKERS**

Population	Number surveyed	HBsAg	Prevalence Anti-HBs	Any marker	Source
Meekatharra, WA, 1970-73	143	0.13	0.11	-	1
Cundeelee, WA, 1970-73	138	0.24	0.12	-	1
Mornington Is, Qld, nd	316	0.04	0.39	0.51	2
North West, SA, nd	327	0.26	0.66	-	3
Yarrabah, Qld, nd	219	0.11	-	-	4
Yirrkala, NT, nd	595	0.10	0.78	-	4
Brisbane, Qld, nd	219	0.08	0.23	0.39	4
Woorabinda, Qld, nd	393	0.03	0.24	0.32	4
Queensland, nd	665	0.08	0.22	0.38	4
Queensland, nd	751	0.07	-	-	5
Rural WA, 1983-85	816	0.04	-	-	6
WA, 1986	1150	0.08	0.45	0.52	4
North West, SA, 1984-5	339	0.26	0.56	-	7
Sydney, NSW, 1983-4	67	0.09	0.45	-	8
Yuendumu, NT, nd	806	0.24	-	0.90	9
Brewarrina, NSW, 1985	375	0.19	-	0.72	10

*Sources:* 1: Kelly et al 1975; 2: Wands et al 1982; 3: Burrell et al 1983; 4: Health Department of WA 1987; 5: Scott et al 1987; 6: Moore et al 1987; 7: Nganampa Health Council 1987; 8: Britton et al 1985; 9: Hardy 1982; 10: Campbell 1988

**Table 2 PREVALENCE OF HEPATITIS B SEROLOGICAL MARKERS, WESTERN AUSTRALIA, 1986, BY REGION**

Region	Number surveyed	HBsAg	Prevalence Anti-HBs	Any marker
Perth	88	0.05	-	0.25
South West	145	0.03	-	0.23
Eastern Goldfields	242	0.12	-	0.66
Central	264	0.07	-	0.56
Pilbara	140	0.09	-	0.59
Kimberley	271	0.08	-	0.58

*Source:* Health Department of WA 1987

As shown in Table 1, most surveys have found a prevalence of HBsAg above, or around the borderline of, the high risk level of 8 per cent according to World Health Organization (WHO) criteria (Deinhardt and Zuckerman 1985). Even those surveys in which a lower carrier rate was documented reported a high prevalence of hepatitis B markers.

In a thorough analysis of mortality from cirrhosis in the Northern Territory in the period 1979-83, Plant (1987) found that, for males, the number of deaths (unstated) was 13.7 (95 per cent confidence 10.4-17.6) times the number expected, if total Australians rates applied. For females, the number of deaths was 4.8 (95 per cent confidence 2.1-9.5) times the number expected. While acknowledging that it is impossible to determine the relative contributions of HBV and alcohol, it is likely that HBV played a significant role.

Available evidence suggests that, in some areas, primary liver cancer (PLC) is between 6 and 7 times more common among Aborigines than among the general Australian population. In the central and northern regions of Western Australia in 1971-76, there were 6 cases (5 male, 1 female) of PLC, compared with an expected 0.86, a relative risk of 6.9 (95 per cent confidence 2.7-16.7) (Armstrong and Joske 1979).

Of the 100 cases of PLC identified in a detailed search of Western Australian death registration data, Cancer Registry records and pathology reports for 1976-83, 7 cases (5 male, 2 female) occurred in Aborigines (Frazer, Hocking and Hansen 1984). For males, the Aboriginal: non-Aboriginal relative risk was 5.5 (95 per cent confidence 1.0-12.8). For females, the relative risk was 8.0 (95 per cent confidence 1.0-29.0). For both sexes combined, the relative risk was 6.0 (95 per cent confidence 2.4-12.4).

For the period 1982 to 1985, data from the Western Australian Cancer Registry revealed that for Aboriginal males the incidence of the predominant type of PLC, hepatocellular carcinoma, was 12.6 per 100,000 person years, compared with 1.7 for non-Aboriginal males (Hatton and Clarke-Hundley 1986, Health Department of WA 1987). For females, the incidence of hepatocellular carcinoma was 6.4 per 100,000 person years for Aborigines, compared with 0.4 for non-Aborigines.

For the Northern Territory in 1979-83, there were 6 deaths certified as due to PLC among 1651 deaths identified as Aboriginal (Plant 1987). All 6 deaths were of males, giving a relative risk of 7.1 (95 per cent confidence 2.6-15.4) compared with the 0.85 deaths expected if the rates for the total Australian male population applied. The two-sex relative risk (not provided) was likely to be around 6.

Some work raises doubts about the presence of significant long term sequelae of HBV among Aborigines in Queensland (Scott et al 1987). However, it is noteworthy that the population of Queensland's Northern Region, with a high proportion of Aborigines, experienced much higher mortality rates for 'cancer of the liver, gall bladder and bile ducts' in 1970-82 than did Queensland overall (Heyde, Williams and Ring 1985). For males, the rate was 1.53 times the overall Queensland state rate, and for females it was 1.36 times higher.

While there is little that can be done to prevent current carriers proceeding to their possible long term sequelae, the availability in Australia since 1982 of an effective vaccine provides the means for interrupting transmission and reducing the reservoir of carriers (Burrell 1984).

Based on the WHO recommendation that all populations with an intermediate or high prevalence of hepatitis B markers should adopt a policy of pre-exposure vaccination of all infants together with post-exposure vaccination and immunoglobulin administered to infants born to HBsAg positive mothers (Deinhardt and Zuckerman 1985), it is clear that most Aboriginal communities in Australia should be considered for neonatal vaccination. Since 1986, the Commonwealth Government has provided financial support for such vaccination, the programs to be coordinated at State/Territory level.

However, the reluctance of some authorities to embrace a new vaccine, together with doubts about its effectiveness and the actual carrier status of some communities, has meant that programs have not been fully implemented.

The initial experience with the vaccine in central Australia raised some doubts about its effectiveness in evoking a satisfactory immune response, as measured by seroconversion. Following the WHO protocol, since January 1985 all infants born to HBsAg seropositive mothers at the Alice Springs Hospital received hepatitis B immunoglobulin and hepatitis B vaccine at birth, followed by further doses of vaccine at 2 and 6 months (Hanna 1987). Of the 26 infants who were fully vaccinated, only 14 (54 per cent) were anti-HBs seropositive at follow up, much lower than the expected seroconversion rate of around 95 per cent (Burrell 1984).

In contrast, preliminary results from the Queensland program, which began in 1986, found that 71 of 81 infants (88 per cent) had seroconverted (Sheridan 1987). The differing results have highlighted potential problems with handling the vaccine, as it is not only vulnerable to raised temperatures, but also to freezing. It now appears likely that the handling of the vaccine, at least in central Australia, will include low temperature monitors in addition to the usual cold-chain monitoring (Hanna 1987).

Thus, while there is a real chance to interrupt transmission and reduce the reservoir of carriers, the long term sequelae of hepatitis B infection among present carriers will be experienced by Aboriginal communities for many years to come.

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# Australian Institute of Health—its role in Aboriginal health

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The Australian Institute of Health (AIH) was established in August 1984, as a part of the Department of Health, and was created as a statutory authority under the *Australian Institute of Health Act 1987*. It is an independent health statistics and research agency within the Federal Community Services and Health portfolio, and also provides research and statistical support to the States and Territories through the Australian Health Ministers' Advisory Council.

From its inception, the AIH was given Commonwealth responsibility for Aboriginal health statistics. In mid-1985, this primary function in Aboriginal health was expanded to include the collection and dissemination of information on the health status of Aborigines—an activity that had previously been conducted by the Australian Institute of Aboriginal Studies (AIAS), through its provision of an Aboriginal Health Research Fellowship.

The expansion of AIH functions resulted in the creation of an Aboriginal Health Unit, the main statistical responsibility of which was the development of a national system of Aboriginal health statistics. The priority areas for the latter were set by the 1984 National Task Force on Aboriginal Health Statistics: births, deaths, hospitalisation and perinatal statistics. Other proposed statistical functions included assisting in the planning for a national leprosy register, and, in conjunction with the National Trachoma and Eye Health Committee, the creation of a national trachoma data base. Unfortunately, limited resources so far have prevented the fulfilment of some of these functions.

The information functions of the AIAS Research Fellowship have been continued in the Unit. Hence, the recent recommencement of publication of the Aboriginal Health Information Bulletin, and the pending publication of a hard copy of the bibliography of Aboriginal health. As noted in an earlier edition of the Bulletin, the bibliography was prepared in a joint venture involving the AIAS, the Commonwealth Department of Health and the National Library of Australia, with financial assistance from the National Health and Medical Research Council. It has been computerised, and is accessible through the National Library of Australia's Australasian Medical Index system.



# SELECTED REVIEWS

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## New information on diabetes and impaired glucose tolerance: results of the Bourke and Purfleet studies

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### Background

Diabetes has long been known to be an important health problem in Aboriginal communities. Wise and his colleagues (Wise et al 1970 and 1976), working in South Australia, found that around 10% of Aboriginal adults had diabetes according to the definition then in current use. Bastian (1979) found a higher prevalence (12.2%) in West Kimberley and Finlay-Jones and McComish (1972) an even higher figure, though they were studying individuals who, because they were also receiving treatment for leprosy, must be regarded as a highly unusual group. Max Kamien (Kamien 1976), in his studies of the Bourke community, reported that diabetes was present in 8.3% of subjects over 30 years of age, and in 12.6% of those over 40. These figures should be compared with a prevalence of around 2-3% of diabetes in non-Aboriginal adults (of all ages) surveyed by similar methods (Welbourn et al 1966, and Glatthaar et al 1985).

Though diabetes is most often detected (and defined) in terms of hyperglycaemia, there is a much more sinister side to the disease than the relatively simple problem of a high blood glucose. The effects of diabetes on the small blood vessels of the eye, the kidney and the nervous system make diabetic retinopathy, nephropathy and neuropathy important causes of morbidity and, particularly in the case of diabetic nephropathy, of mortality. Either as a result of elevated blood glucose or blood fat or both, individuals with diabetes are also at high risk of other disorders, particularly ischaemic heart disease (IHD) and impaired circulation to the lower limbs. Though diabetes in Aboriginal communities seemed, for some time, not to lead to these long-term complications, there is now clear evidence that it does (see for example, Stanton et al, 1985). Diabetes must, therefore, be vigorously detected and controlled and, if possible, prevented in Aboriginal communities.

As in other populations in which diabetes is common, the type of diabetes which occurs most often in Aboriginal communities is Non-Insulin Dependent Diabetes (NIDDM). True Insulin Dependent Diabetes Mellitus (IDDM) seems to be extremely rare. Even more interesting is the likelihood that, before the advent of urbanisation, both NIDDM and IDDM were probably unknown in Aboriginal society. As in several Pacific populations (King et al 1984) and some North American Indian groups, the sudden change from traditional ways of life to a settled existence has been accompanied by a dramatic rise in the prevalence of overweight and obesity.

### Definitions

The definition of diabetes has changed, for good reason, since the years when the early population surveys were carried out in the 50s and 60s. When an individual patient presents with the classic symptoms of the disease, there is usually no doubt that the

levels of blood glucose found are above normal. In these early surveys, however, there was considerable doubt as to which levels of hyperglycaemia signified that diabetes was present in individuals without symptoms. These were people in whom, despite their lack of symptoms, were likely to develop the complications of the disease as time went on. Determination of these levels could only be made with adequate follow-up of subjects involved in the early population surveys. The latest of a series of revisions of diabetes definitions is given by the World Health Organisation study group in a report published recently (WHO 1985). The biochemical levels suggested are given in Table 1.

Also included in this Table is the definition of Impaired Glucose Tolerance (IGT). This is a relatively new concept introduced around 8 years ago by the National Diabetes Data Group (in the USA) and the WHO Expert Committee on Diabetes (WHO 1980). Very little is known at present about the epidemiology and the pathological significance of IGT, but it does seem that it is different from diabetes in that subjects with IGT do not develop diabetic retinopathy or any of the recognised small vessel complications of diabetes but seem, at least in some populations, to be at increased risk of dying from heart disease.

One of the problems of interpreting the previously published population data of diabetes in Aboriginal groups (Wise et al 1970; Finlay-Jones and McComish 1972; Wise et al 1976; Kamien 1976; and Bastian 1979) is that different definitions of diabetes have been used and that these all differ in some respect or other from the current definition. Also, all of these studies were carried out before IGT was recognised, so that we know nothing of the epidemiology of this potentially important disease entity in Aboriginals.

The information presented here is of diabetes and IGT in two New South Wales Aboriginal groups - those examined in the Bourke study (Cameron, Moffitt and Williams 1986) and those involved in the Purfleet and Forster study (Williams, Moffitt, Fisher and Bashir 1987). In the second of these, diabetes and IGT are defined according to the definitions shown in Table 1. In the Bourke study, an earlier version of these WHO definitions was used (WHO 1980) but this fact does not make a great deal of difference to the interpretation of the results. In both cases, diabetes was detected using the 75g modified oral glucose tolerance test which has now become standard practice in diabetes epidemiology.

Another condition which must be carefully defined is obesity since its occurrence is so very closely related to the epidemiology of NIDDM. The definition of obesity is based on the level of body fatness which, in most people, will lead to illness and early death. In practice, this is done by examining Life Assurance statistics (mostly from the USA) and seeing which level of body weight for height confers this significant risk of premature mortality. The Body Mass Index (BMI) is usually used as a measure of obesity in this context: values of BMI which can be taken as the upper limits of normal are 27 in men and 25 in women (Bennett 1979). Values in excess of these correspond to obesity. These are the definitions of obesity used here.

### **Survey methods**

Both the Bourke and Purfleet surveys required knowledge of the numbers of people in the population so that prevalence figures for diabetes and IGT could be calculated. In the former this base was taken as adult Aboriginal people (those aged 20 and over) known to be resident in Bourke and the neighbouring settlement of Enngonia when the survey was undertaken (October 1982-January 1983). In the latter, a house-to-house census had to be carried out of those living in Purfleet and the Aboriginal settlement at Forster. The numbers of adults resident in these places at that time were, in Bourke and Enngonia—332, Purfleet—240 and Forster—152.

Those with previously diagnosed diabetes (which matched the WHO criteria) were identified and all others were asked to undergo the 75g oral glucose tolerance test. This involved having an early morning blood sample taken, drinking 75g of glucose in a

carbonated drink and then having a second blood sample taken 2 hours later. All subjects who took part, including those with previously diagnosed diabetes, were asked a series of questions on diet, smoking and other aspects of lifestyle. They also had their weight and height measured and, in Purfleet and Forster, had blood taken for genetic studies.

## Results

In Bourke and Enngonia, an impressive 89% of the adult population took part in the survey. In Purfleet and Forster, the participation rate was not as high but was still a creditable 66%. The most likely reason for the higher participation at Bourke was the fact that Ian Cameron, who carried out the fieldwork there, was himself a local resident. Also, because of the genetic studies, more was required of each individual involved in the Purfleet study and this may have deterred some people from participating.

The most important results of the two studies are shown in Table 2. The age and sex distribution of the base populations were slightly different in the two places and, since the occurrence of diabetes is related both to age and sex, this difference had to be taken into account before valid comparisons of diabetes prevalence in the two groups could be made. There are several methods for doing this, direct age-sex standardisation is a technique widely employed in epidemiology as is the one used here. When the data on total diabetes prevalence are age and sex standardised, using the 1981 New South Wales Aboriginal census population (Australian Bureau of Statistics, 1983) as standard, the rates are, for the Bourke study, 15.6% and for the Purfleet study, 7.8% (see Table 2).

As expected, most of those with previously diagnosed diabetes in both studies were being treated either with oral hypoglycaemic drugs or with dietary control alone. Even so, 12 (27%) of this group of 44 subjects were being prescribed insulin. On further investigation, however, it seemed clear that a number of these 12 individuals were being prescribed insulin largely in an attempt to improve control and could not, therefore, be described as having IDDM. Though no attempt was made in these surveys to divide subjects into IDDM and NIDDM sub-groups, it is likely that the overwhelming majority of those previously known to have the disease and those newly discovered to have diabetes had NIDDM.

## Discussion

The results of the Bourke study (and several other population surveys of this type) suggested to us that the number of new cases of diabetes that would be discovered in Purfleet and Forster might be almost as great as the number already known. In fact, many fewer than that were found and a considerable (and statistically significant) difference emerged between the age-sex adjusted prevalence of diabetes in the two studies (15.6% compared with 7.8%).

As the results of the genetic studies at Purfleet became available, however, a possible explanation for this difference became apparent. Information on important genetic markers, particularly blood groups and HLA antigens (the molecules on the surfaces of cells which are responsible for, among other things, distinguishing the body's own tissues from 'foreign' material such as bacteria and viruses) showed that about 61% of the genetic ancestry of the Purfleet and Forster subjects was of non-Aboriginal origin (mainly Caucasian but also some Chinese). There is, as yet, no direct information on these markers in the Bourke and Enngonia subjects but, if, as seems likely, this non-Aboriginal genetic influence is less in the Bourke population then this may be part of the explanation of the lower prevalence of diabetes in Bourke compared to Purfleet. If this is true then it agrees with similar evidence from Pacific island populations (King et al 1984).

Another possible explanation—that the higher prevalence of diabetes in Bourke was the result of more obesity in that population—can be ruled out since there was no

significant difference between the two studies, either in men or in women, in the prevalence of obesity. Other explanations are possible, however, including dietary difference between the two groups and there is, again, insufficient information available at present to make further observations on this possibility.

Detailed study of the differences in the occurrence of diabetes in different groups throughout the world can result in an increased understanding of the causes of the disease and, therefore, an increased likelihood that diabetes can be prevented. Work among the inhabitants of Pacific islands, already mentioned, has shown that genetic influences on the occurrence of NIDDM are powerful but that environmental influences, particularly changes in diet and physical exercise, are necessary for this genetic predisposition to become manifest as diabetes.

Experimental studies, such as those of O'Dea and her colleagues (eg O'Dea 1984) have shown that, when Aboriginal people with diabetes go back to their traditional lifestyle even for a short period, their diabetes becomes better controlled and may even disappear. This occurs in individuals who are, quite clearly, genetically predisposed to the condition. These studies have already suggested ways in which the metabolism of people that are susceptible to NIDDM differ from those of people that are not. With further work of this type, the goal of preventing NIDDM may, one day, be achieved.

Whether the long-term effects of IGT, particularly ischaemic heart disease, can be reduced with treatment or whether IGT itself can be prevented are both largely unknown at present. Over the next two decades, research may well increase our understanding of this newly defined condition and suggest ways in which its effects can be lessened. Both for IGT and for diabetes, comparisons between Aboriginal and non-Aboriginal populations and comparisons between Aboriginal communities living in different parts of Australia are likely to contribute towards a greater understanding of exactly how these conditions arise.

#### **Detection, Control and Prevention**

The three basic aims of the efficient detection of existing diabetes, the adequate control of blood glucose (and the other manifestations of the disease) and the prevention of further cases have been embraced by diabetes programmes in many countries throughout the world, including Australia. The detection, control and prevention of diabetes in Aboriginal people should be made a high priority in areas where the disease is common and several specific measures can be suggested.

The first of these must be an awareness of the disease, its symptoms, the fact that it may sometimes exist for some considerable time without symptoms, and the fact that it, and impaired glucose tolerance, can cause disability and premature mortality through heart disease, eye disease and other causes.

Control of diabetes requires more than medical treatment with insulin or oral hypoglycaemic medication. It needs some commitment by the patient to make some changes in his or her behaviour, particularly in the area of diet. There is, of course, a need to see a physician regularly but an increasingly important part of the diabetes health care team is the nurse specialist who can advise on therapy, foot care, work and exercise and other important aspects of the disease. A personal involvement in the management of the condition is, however, necessary for every patient.

Finally, in the field of primary prevention, enough is already known to suggest some positive action. Avoidance of obesity and overweight is probably the most important single element in the prevention of NIDDM. Though this is considerably easier said than done, the link between the development of obesity and the consumption of a diet high in energy (most often derived from fatty foods and alcohol) and the influence of reduced physical activity are sufficiently clear to give guidance to community diabetes prevention programmes. These measures are particularly vital in communities, such as Aboriginal groups, where the likelihood of developing diabetes is high.

## Acknowledgements

The Bourke study was planned and carried out before I visited Australia on sabbatical leave in 1985. I am grateful to my colleagues, Ian Cameron and Paul Moffitt (who carried out the study), for involving me in the final stages of the analysis and publication. Many people, not least the inhabitants of Purfleet and Forster, assisted in the study there. They are fully acknowledged in the main account of the work which is listed below. My co-authors, Paul Moffitt, John Fisher and Helen Bashir deserve particular mention for their assistance in the planning, execution and analysis of that study.

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**Table 1 DIAGNOSTIC VALUES FOR DIABETES AND IMPAIRED GLUCOSE TOLERANCE.**  
(Time interval is that after a 75g oral glucose load taken after an overnight fast—WHO, 1985).

	Glucose concentration, mmol/litre(mg/dl)			
	Whole blood		Plasma	
	Venous	Capillary	Venous	Capillary
<b>Diabetes</b>				
Fasting value	▶ 6.7 (▶ 120)	▶ 6.7 (▶ 120)	▶ 7.8 (▶ 140)	▶ 7.8 (▶ 140)
2 Hrs after load	▶ 10.0 (▶ 180)	▶ 11.1 (▶ 200)	▶ 11.1 (▶ 200)	▶ 12.2 (▶ 200)
<b>Impaired glucose tolerance</b>				
Fasting value	◀6.7 (◀120)	◀6.7 (◀120)	◀7.8 (◀140)	◀7.8 (◀140)
2 hrs after load	6.7-10.0 (120-180)	7.8-11.1 (140-200)	7.8-11.1 (140-200)	8.9-12.2 (160-220)

**Table 2 SUMMARY OF THE MAIN RESULT OF THE BOURKE AND PURFLEET STUDIES.**

	Bourke and Enngonia	Purfleet and Forster
Known to have diabetes before the survey	28	16
Prevalence of known diabetes in Aboriginal adults	9.5%	6.7%*
New cases of diabetes detected	18	3
Cases of IGT identified	7	6
Total (crude) prevalence of diabetes (known and new cases)	15.6%	8.1%*
Crude prevalence of IGT	2.4%	2.8%*
Age-sex adjusted prevalence of diabetes**	15.6%	7.8%*
Prevalence of diabetes in men	16.7%	6.8%*
Prevalence of diabetes in women	14.6%	9.7%

\* Adjusted for the fact that not all individuals studied in Purfleet and Forster were Aboriginal.

\*\* See text for explanation.

# Economic factors affecting Aboriginal health and health care

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## SUMMARY

The rapid change from traditional lifestyle to dependence on the wider cash economy has brought difficulties in adjustment for remote Aborigines. Factors which unfavourably influence health for many of these Aborigines include limited education about health and nutrition, restricted food choices, unsatisfactory living conditions and facilities for food storage and preparation. High rates of unemployment and heavy dependence on social welfare payments are complicated by traditional or customary behaviour patterns, gambling and high rates of alcohol abuse. Because of remoteness, the differential costs for sustenance, living needs and employment tend to aggravate the problems, as do the widespread sedentary lifestyle and unhealthy dietary habits and food choices.

## Introduction

Before the 1967 Referendum, which ended constitutional discrimination against Aborigines, many Aborigines in the Kimberley region lived in small groups or clans on pastoral stations, and were regularly distributed basic rations (e.g. meat, flour, tea, sugar) by station managers.

The new rights of Aborigines conferred by the Referendum, the Federal Pastoral Award and the embargo placed on Australian lean beef by the United States administration, all contributed to the additional financial pressures being placed on the cattle industry in northern Australia. Following the introduction of equal pay and other entitlements, provisions that had been previously supplied by the pastoralists were withdrawn, and Aborigines moved off the stations and into town areas or fringe settlements. Sometimes they would find themselves having to try to integrate with groups that would previously not have congregated together. In these new situations, living conditions were inadequate, opportunities for employment were very limited, and newly acquired unrestricted access to alcohol led to frequent problems.

Social security payments to unemployed or otherwise eligible Aborigines entailed enormous difficulties in distribution, especially in remote areas. In addition, the rapid changes ushered in after the Referendum ultimately brought a new set of obligatory costs (e.g. rent, rates, electricity, water, gas charges) to Aboriginal people. Many of these costs, together with housing and other basic needs, are much more expensive and difficult to arrange in remote Australia than they are in less remote parts of the country. In addition, forced integration into a rapidly 'urbanising' environment, even in very remote localities, led to increasing dependence on food supplies that had to be flown or trucked in from distant southern centres, and an increased vulnerability to market forces.

The subject of economics and health has considerable relevance for Aboriginal well-being, although it is difficult to generalise because wide regional variations exist. The issues which are to be addressed will be illustrated by reference to an ongoing research project involving Aboriginal communities in a relatively remote part of northern Australia. This should help to demonstrate how the rapid social and economic changes which have occurred since the late 1960s have important implications for the present and future health of Aborigines in rapidly-changing 'outback' Australia.

### **The West Kimberley Region**

The West Kimberley Region of Western Australia covers an area of more than 420,000 square kilometres, and has a population of 15,220, of whom 9,145 are Aborigines (Australian Bureau of Statistics, 1986). The region, which has only six towns (all except one of which were established last century) is sparsely inhabited. The late 1970s and 1980s have brought great changes to the region, e.g. vastly improved physical and electronic communications, an increase in tourism, exploration and mining, and a substantial increase in the non-Aboriginal population. In addition, the Royal Australian Air Force is establishing a major defence facility on the outskirts of Derby on the north-west coast.

### **The Kimberley Mothers' and Babies' Project**

Previous studies have shown the high levels of ill-health and undernutrition in Kimberley infants and young children (Gracey et al 1983; McNeilly et al 1983), the poor standards of nutrition in Kimberley women of childbearing age (Gracey et al 1984), and the reduced level of the antibacterial protein, lactoferrin, in the breastmilk of Kimberley Aboriginal mothers (Houghton et al 1985).

In order to examine some of the factors that influence health in Aboriginal mothers and their infants in this region, the research team commenced a prospective study of 49 infants born between mid-1984 and mid-1985 in several Aboriginal communities between Derby and Fitzroy Crossing. In the process of assessing environmental and sociological factors likely to have health implications within these communities, it soon became clear that financial factors influencing food availability and distribution were of major importance. This has been assessed using a 'market basket' survey method. (Sullivan et al 1987. Editor's note: A summary of this article appears elsewhere in this issue).

### **The Kimberley 'Market Basket'**

Many of the items used to estimate the Consumer Price Index are not relevant for Aboriginal people who live in the Kimberley. The research team therefore devised a local 'market basket' based on the most popular food items from the relatively restricted range of goods which are available to Kimberley Aboriginal people through community stores or other commercial food outlets. The main items are shown in Table 1.

The costs of the 'market basket' comparing a representative count of food items plus some standard non-food items (excluding alcoholic beverages) were estimated on the basis of the needs of a family of five. These, compared with a representative sample of similar items bought from supermarkets in Perth at the same time, are shown in Table 2.

Many Aboriginal community stores in remote areas have experienced serious financial difficulties due to such factors as inefficient management, wastage of perishable items and 'booking down' items to customers who do not have ready cash at the time of purchase. These help to account for high price differentials (often very substantial) which are used in some stores in an attempt to recoup their losses, and should be taken into account when determining the costs incurred by Aborigines in remote areas in meeting their daily subsistence needs.

### **Other factors which influence the Aboriginal economy and health**

There are many other factors which influence the distribution of income and food among Aboriginal families and communities in the Kimberley, and which are likely to have adverse effects on the health of young mothers and children. These include: the traditional behaviour pattern of immediate consumption; sharing amongst relatives and



clan members; the relative immobility of Aborigines within the social structure; gambling; alcohol abuse; poor prospects for employment; inadequate facilities for food storage (for example, only 49% of households in the study have refrigerators); electricity and rate payments; etc.

### **Conclusion**

Preventive health programs have helped significantly to improve hospitalisation rates, and health standards, in Kimberley Aborigines over recent years (McNeilly et al 1983). Maintenance of these gains and further improvements in health for remote Aborigines will depend on planning for adequate and appropriate community-based services and support facilities, whether from Government agencies or Aboriginal Medical Services, which are assuming an increasingly important role in the region. The differential costs for such services must be an integral part of the financial commitment for the foreseeable future. A more realistic system of indexation of living costs is needed to help overcome the financial disadvantage which seems inherent in choosing to live in the underdeveloped and remote northern parts of Australia.

### **Acknowledgements**

This work was supported by grants from the Australian Institute of Aboriginal Studies and the Research and Development Grants Advisory Committee of the Australian Department of Health. We thank the Commissioner of Health for permission to publish this report.

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**TABLE 1 MAIN FOOD ITEMS IN THE KIMBERLEY 'MARKET BASKET' SUPPLY**

Flour (1kg-25kg)	Noodles
Sugar	Rice
Tea	Bread
Breakfast cereals	Jam
Powdered milk	Biscuits
Baking powder	Meat
Tinned savouries	Vegetables
Tinned meats	Fruit
Baby cereals	Pies
Oil, margarine	Cold drinks, juices

**TABLE 2 FORTNIGHTLY 'MARKET BASKET' COSTS COMPARING PERTH PRICES TO KIMBERLEY PRICES**

Location and shop	Total Cost (\$)	No. of Items unavailable
<b>PERTH</b>		
Charlie Carters	195.30	1
Cheapway	188.80	1
Coles New World	192.07	1
Foodland	194.77	3
Woolworths	190.67	2
Average	192.32	(100%)
<b>DERBY</b>		
Barula Cooperative	226.44	1
Rusty's	218.54	3
Woolworths	194.68	1
Average	213.22	(111%)
<b>FITZROY CROSSING</b>		
Roadhouse	265.27	4
Supermarket	243.30	2
United Aboriginal Mission	246.19	4
Average	251.59	(131%)
<b>FITZROY CROSSING ABORIGINAL COMMUNITIES</b>		
Bayulu	313.28	8
Junjuwa	288.60	18
Looma	277.92	2
Noonkanbah	308.86	7
Wangkatjunka	404.51	6
Average	318.63	(166%)

# RECENT PUBLICATIONS, REPORTS AND THESES

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## **BRADY M, PALMER K**

*Alcohol in the outback. Two studies of drinking.*

Australian National University North Australia Research Unit Monograph, Darwin 1984

This monograph is a study of alcohol consumption in an Aboriginal community. It describes how Aborigines organise their drinking business, which is seen as a social action, the complexity of which has been long overlooked by non-Aboriginal Australians. While the sociological and physiological costs are generally negative, drinking is seen as the means whereby Aborigines attempt to remedy their powerlessness. However, the authors indicate that the desired ends can also be obtained through alternative forms of ritual and myth, which can make drinking redundant. They conclude that the feelings of powerlessness can only be overcome by the effective restoration of an economic base to Aboriginal society.

## **HALL R**

*Mortality and Morbidity of Central Australian Aboriginal Children Under Five Years of Age.*

Treatise submitted in partial requirement for the degree of Master of Public Health, School of Public Health and Tropical Medicine, University of Sydney 1985

This treatise reports on a study which investigated the mortality and morbidity experiences up to September 1983 of Aboriginal children born in the Alice Springs and Barkly Regions of the Northern Territory in the period 1978-1982, and the utilisation of health services by these children. It also compared their mortality and morbidity experiences with those of other Aboriginal children, based on published reports. Despite an improvement in mortality in the previous decade, the degree of reported morbidity was found to have risen. These children frequently suffered from multiple pathology, and appeared especially vulnerable after the introduction of weaning foods, from about six months of age. The author points out the complex interaction between nutrition and infection, and considers that the health of these children could only be improved by focussing on improvement of both health care services and environmental health measures.

## **MENZIES SCHOOL OF HEALTH RESEARCH**

*First Darwin Conference—Trachoma and Chlamydial Disease 17-20 July 1985*

This is a report of the first major academic activity of the Menzies School of Health Research. The sessions covered such topics as: clinical and public health issues in eye disease, genital tract disease, and otitis and childhood infections; microbiology; background for new strategies for prevention of chlamydial disease, including rationale for vaccine development.

**ABORIGINAL HEALTH ORGANISATION (South Australia)**  
*Renal Survey Report. (Undated)*

This is the report of a survey carried out in 1983 as a joint project of the Aboriginal Health Organisation (AHO) and the Renal Unit, Queen Elizabeth Hospital. The aims of the survey were to: determine the prevalence of diabetes, renal disease, hypertension, and obesity in a representative sample of 3,000 Aboriginal persons from tribal, rural, and urban areas in South Australia; gather data about the numbers and age structures of Aboriginal communities, and their body build and fatness; and to assist in health care and health promotion initiatives by the AHO. About 25% of the State's Aboriginal population participated in the survey, which indicated extremely poor health status. The AHO considered that this situation reflected the disadvantages long experienced by Aboriginal communities, and that the high level of acceptance of the particular survey process used implied that it should be used as a model in the exploration of ways to improve Aboriginal health. This process included the involvement of skilled advisers and dedicated resource persons working in close association with community leaders and community health workers to develop programs which are understood, accepted and controlled by the community itself.

**AUSTRALIA. DEPARTMENT OF THE PRIME MINISTER AND CABINET. OFFICE OF THE STATUS OF WOMEN**

*Women's Business. Report of the Aboriginal Women's Task Force by Phyllis Daylight and Mary Johnstone.*

Australian Government Publishing Service, Canberra 1986

This is the report of a team of thirteen women who consulted over a period of twelve months with Aboriginal women across Australia on a variety of issues, which included housing, education, health, care of children, employment, self-determination, legal aid, and culture. The authors indicate that this is the first report of its kind for Government and that it marks what could only be the beginning of a heightened awareness of the way in which Aboriginal women live, provide and care for families, and perceive the world. Although the authors found it almost impossible to separate out the issues one from another, the main health concerns included: the need for more women health workers; the need for more appropriate accommodation for women from remote areas requiring medical care in urban centres (e.g. accommodation for families in the weeks before a birth); the need for sex education programs to help diminish the numbers of very young Aboriginal women having babies; difficulties in caring for old people; the social, as well as the physical, implications of alcohol and other drug abuse, particularly petrol sniffing.

**AUSTRALIAN INSTITUTE OF HEALTH**

*Aboriginal Health Statistics.*

Proceedings of a Workshop, Darwin, April 1986 (ed N Thomson)

This is a report on Aboriginal health statistics, including an overview, recent developments, associated Community Employment Projects, availability, hospitalisation data, and future prospects.

**NATIONAL ABORIGINAL AND ISLANDER HEALTH ORGANISATION**

*Aboriginal health: beyond statistics.*

(Paper prepared for the Better Health Commission). In: *Better Health Commission: Looking Forward to Better Health* (Vol 3, Chapter 2):16-21. The workshops and consultations: reports to the Better Health Commission. Australian Government Publishing Service, Canberra 1986

This paper gives a general outline of the historical, political, and health situation of the Aboriginal people. It emphasises the importance of a holistic definition of health, and points out that the establishment and growth of a network of Aboriginal community controlled health initiatives is an expression of Aboriginal identity and assertion of rights. It also stresses that there is a need for urgent action towards a reorientation of Government and wider Australian society in their perception of and approach to Aboriginal health, particularly, and Aboriginal affairs, generally.

#### **NORTHERN TERRITORY DEPARTMENT OF HEALTH**

*Health Indicators in the Northern Territory.*

Published November 1986

This report comprises analyses of the mortality, hospitalisation, and communicable disease notification data that are routinely collected by the Northern Territory Department of Health (NTDH). The data are primarily presented in tabular or graphic form, with minimal commentary. Included is an analysis of the cause-specific death rates of Aborigines and non-Aborigines in the Northern Territory between 1979 and 1983, and the cause-specific hospitalisation rates of the same populations between 1977 and 1982, taking into account differences in age-structure between these two groups. Aborigines had higher mortality and hospitalisation rates than non-Aborigines. Infectious and parasitic diseases accounted for a high proportion of the Aboriginal hospitalisation and causes of death. Establishment of a Communicable Diseases Centre, increasing emphasis on preventive medicine, and continuing development of services to meet the special needs of Aboriginal people are all parts of the strategy being implemented by the NTDH to help overcome some of the problems highlighted in this report.

#### **THOMSON N**

*Current status and priorities in Aboriginal health.*

(Paper prepared for the Better Health Commission). In: *Better Health Commission: Looking Forward to Better Health.* (Volume 3, Chapter 1):13-15. The workshops and consultations: reports to the Better Health Commission. Australian Government Publishing Service, Canberra 1986

This is a comprehensive presentation of available data on Aboriginal health, including population estimates, demography, mortality, morbidity (hospitalisation and specific conditions), priority areas and strategies. The author considers that the current substantial data deficiencies, and the incomplete understanding of the relationship between social, cultural, and economic factors and health status, are the main impediments to the development of appropriate medical and health programs for overcoming the existing health and social inequalities experienced by many Aborigines. He asks questions that are presently unanswerable, and concludes that Aboriginal health should be a 'number 1' priority for the Australian community. As a first step, therefore, there should be a detailed analysis of Aboriginal health status and socioeconomic circumstances in the light of health (not only medical) expertise, and with major Aboriginal involvement.

#### **AUSTRALIA. DEPARTMENT OF ABORIGINAL AFFAIRS**

*Aboriginal Statistics 1986.*

Australian Government Publishing Service, Canberra 1987

This report is the second issue of the annual publication Aboriginal Statistics produced by the Statistics Unit of the Department of Aboriginal Affairs. The statistics have been compiled from a wide range of sources, and the topics include land, housing, health,

education. The publication aims to provide the latest available time-series data relating to Aboriginal people, as at December each year. It is planned that the topics will remain constant, as far as possible, so that there will be continuity of data for inter-temporal analysis.

#### **AUSTRALIA. HOUSE OF REPRESENTATIVES STANDING COMMITTEE ON ABORIGINAL AFFAIRS**

*Return to Country. The Aboriginal Homelands Movement in Australia.*  
Australian Government Publishing Service, Canberra 1987

This document is the report of an inquiry into Aboriginal Homeland Centres, which was referred to the House of Representatives Standing Committee on Aboriginal Affairs by the Minister for Aboriginal Affairs, Mr. Holding, in June, 1985. The Committee was asked to inquire into and report on the social and economic circumstances of Aboriginal people living in homeland centres or outstations, and the development of policies and programs to meet their future needs. The Committee identified 588 homeland centre communities throughout Australia with a total population of about 9500. In relation to health services to these centres, the report made several recommendations, including: the urgent need to improve environmental health conditions; the need for expansion of training programs for Aboriginal health workers resident in homeland centres, so that a basic health care service can be provided in all communities; and the development of improved health data collection systems, including data on the health status of homeland dwellers.

#### **CARTER E**

*Aboriginal Women Speak Out...about rape and child sexual abuse.*  
Adelaide Rape Crisis Centre Inc. 1987

This report is the result of analysis of a questionnaire survey carried out by the Adelaide Rape Crisis Centre through the National Employment Scheme for Aboriginals, in May, 1985, and covering the urban Aboriginal community in Adelaide and suburbs. Responses were given to one hundred and twenty questionnaires, which described fifty nine cases of rape and sixty one cases of child abuse. The author indicated that these subjects had been shrouded in silence in the Aboriginal community. A high proportion of survivors did not formally report rape because of fear. The effects of the stress of these experiences can manifest themselves throughout life, in such ways as drinking and pill-taking. The author suggested that the time has come to address these issues, so that programs and services are developed which respond to the needs of Aboriginal people.

#### **NORTHERN TERRITORY DEPARTMENT OF HEALTH**

*A Profile of Aboriginal Health Workers in the Northern Territory of Australia, December 1986.*

Revised July 1987 (Prepared by H.M. Boulden)

This is described as a 'snap-shot' profile of Aboriginal Health Workers as significant providers of primary health care in the Northern Territory, and includes statistics on such aspects as numbers, age-groups, employers, attainment of basic skills certificate, registration etc.

## **NORTHERN TERRITORY DEPARTMENT OF HEALTH**

*Northern Territory Trachoma Control and Eye Health Committee's Randomised Controlled Trial of the Effect of Eye Drops and Eye Washing on Follicular Trachoma among Aboriginal Children. (Undated)*

This report describes the above study involving school children in 36 Aboriginal communities, randomly allocated to either one of three treatment programs (vis. oily tetracycline drops, daily eyewashing, or a combination of the two), or non-treatment. It was found that an eyewashing program may be combined with, but cannot be a substitute for, an eye drops' program in controlling follicular trachoma in Aboriginal children.

## **ADDITIONAL REPORTS WHICH REFER TO ABORIGINES**

### **AUSTRALIA**

Report of the Royal Commission into British Nuclear Tests in Australia. Australian Government Publishing Service, Canberra 1985

### **AUSTRALIA**

Better Health Commission. Looking Forward to Better Health (3 Volumes). Australian Government Publishing Service, Canberra 1986

### **HONARI M, SAINT-YVES IFM**

The Northern Territory Cancer Report 1981-1985. An Analysis of Ethnic, Age & Sex Specific Rates. Published February 1987

### **LEE S, SMITH L, d'ESPAIGNET E, THOMSON N**

Health Differentials for Working Age Australians. Australian Institute of Health, Canberra 1987

## **NORTHERN TERRITORY DEPARTMENT OF HEALTH**

Statistics on Drug and Alcohol Use in the Northern Territory. First Edition September 1986

### **WESTERN AUSTRALIA**

Perinatal Statistics in Western Australia. Second Annual Report of the Western Australian Midwives' Notification System for 1984

### **WESTERN AUSTRALIA**

Third Annual Report of the Western Australian Midwives' Notification System 1985 (DJ Moore, JAY Straton)

### **WESTERN AUSTRALIA**

The 1985 Western Australian Birth Cohort. Perinatal and Infant Mortality Identified by Maternal Race. (C Hill, J Winch), August 1987

### **WESTERN AUSTRALIA**

The Seventh Annual Report of the Perinatal and Infant Mortality Committee of Western Australia and the Annual Report of the Maternal Mortality Committee for the year 1986, September 1987

### **WESTERN AUSTRALIA**

Report of the Congenital Malformations Register of Western Australia 1980-1986. (C Bower, F Stanley, R Forbes, E Rudy), September 1987

### **MENZIES SCHOOL OF HEALTH RESEARCH**

Proceedings of the Menzies Symposium, Nutrition and Health in the Tropics 26-27 August 1987. Subsection F of the 57th ANZAAS Congress Townsville 1987