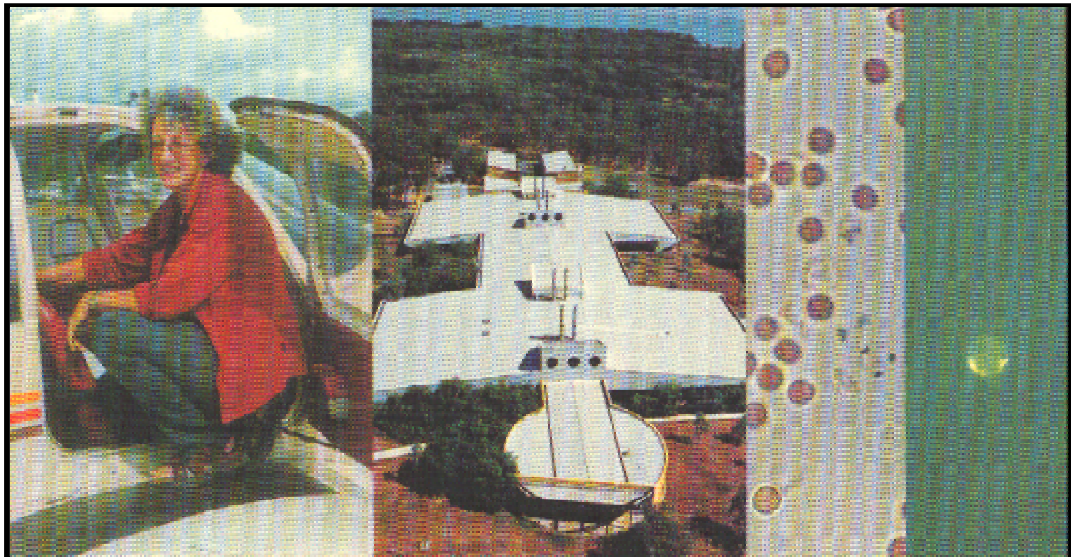




Menzies School of Health Research
Northern Territory Australia



1998-1999
Annual Report

The Logo

The logo is an abstraction,
in Northern Territory colours,
of the double helix of the DNA molecule;
it might also be called the "*ladder of life*".
This molecule provides the chemical code
for all living things, including infectious agents
which are important causes of disease.

The logo symbolises the commitment of the School
to apply the best available scientific methods
for the prevention of disease and
the promotion of public health.

Cover :

1. *In the Field* : Kathryn Flynn is a research assistant with the Public Health & Epidemiology Unit - she is also the team pilot on occasions.
2. *At Home* : Menzies School of Health Research, Darwin.
3. *In the Laboratory* : Malaria infected red blood cells surrounded by uninfected cells.
4. The same infected blood cell under fluorescence showing the surface location of potential vaccine molecule *Clag9*.



MENZIES SCHOOL OF HEALTH RESEARCH
Northern Territory Australia

1998-1999 Annual Report

Mission Statement :

To help improve the health of the people of northern and central Australia and regions to the near north through multidisciplinary research and education.

www.menzies.edu.au



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Official Patron

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Administrator of the Northern Territory

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Queensland :

Mr Ron Archer AM

South Australia :

The Hon John Dawkins
Dr Lowitja O'Donoghue CBE AM
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Tasmania :

Dr John Hargrave AO MBE

Victoria :

Sir Gustav Nossal AC CBE
Mr Charles Goode

Western Australia :

The Hon James Muirhead AC QC
(until July 1999)

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Dr Ella Stack CBE

Dr Brian Devlin

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Mr Fred Finch

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Dr Ian Gardner

Mr Steve Gelding

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Mr John Grootjans

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Dr Jeff Hanna

Mr Tom Harris

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Mr Steve Hatton

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Armstrong AM

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His Worship, The Mayor		
Andy McNeill APM JP		

MSHR Medallion Recipients*

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Miss Margaret Brewster	Dr John Hargrave AO MBE
Father Frank Flynn MSC AC	Mr Ray Norman AM
Mr Harry Giese AM MBE	

*Medallion Recipients are also Members of the School



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Foreword



Richard V Ryan AO

The Menzies School of Health Research has again enjoyed a very successful year.

It is with regret that the Board accepted the resignation of Professor John Mathews from 01 July 1999. We thank John for his invaluable contributions as the Foundation Director of the Menzies School of Health Research, and wish him every success in his new role as Head of the National Centre for Disease Control in Canberra.

The position of Director has been advertised internationally to attract the highest quality field of applicants. Professor David Kemp FAA will act as Director until the selection process is finalised by the Board. I would like to thank Professor John Young AO, for the great help and assistance that he and the University of Sydney are providing us in filling this position.

Dr Eric Wigglesworth retired as Executive Director of The Menzies Foundation in August 1998. I would like to thank Dr Wigglesworth for his significant role in the development of the School. The Menzies Foundation funded the two workshops which led to the inception of the School in 1984, and has since provided an annual grant towards its operations. I welcome Professor John Coghlan AO as Dr Wigglesworth's successor.

The third Quinquennial Review was successfully conducted in October 1998, under the guidance of Professor Jim Pittard, Professor of Microbiology at the University of Melbourne. The Review Committee's report was subsequently accepted by the Board and appears in later pages.

In October 1998 the School signed an historic Legal Agreement with the Tiwi Health Board. The Agreement, the first of its kind in Australia, honours the right of the Tiwi people, and, by extension, all Aboriginal people, to exercise control over research being conducted in their communities.

After several years of negotiation, the Menzies School of Health Research entered into its first Enterprise Bargaining Agreement with the National Tertiary Education Industry Union in December 1998. The Agreement will remain in force for a period of two years from the date of certification.

I would like to thank Dr Lindy Warrell, Executive Officer to the School from July 1998 until May 1999 for her invaluable contributions to the signing of both the above Agreements. I would also like to welcome Dr Ken Sawers to the position of Business and Policy Manager, vacated by Ms Katherine Henderson in November 1998.

A number of factors have contributed to a constrained financial position this financial year. These include marginally funded grants, a recent wage movement and the School's increasing success in attracting research grants. Policies adopted to protect the long-term interest of the School include a positive cash budget for the 1999-2000 financial year and the replacement of staff only in areas that benefit the School as a whole.

In closing, I would like to thank fellow Members of the Governing Board, the Finance Committee, the members of staff and the many supporters of the School – all of whom contribute in no small way to its many successes.

Richard V Ryan AO
Chair
Board of Governors
Menzies School of Health Research



In Memory of James Muirhead AC QC

James Henry Muirhead was born in Adelaide on 24 August 1925. He attended St Peter's College and then served in the AIF from 1943 to 1946, during which time he saw active service in the front line in New Guinea. He then studied law at the University of Adelaide, graduating LLB in 1949. He practised as a barrister and solicitor in South Australia and became a QC in 1967. From 1970 onwards he served as a judge in the District Court of South Australia, in the Supreme Court of Papua New Guinea, the Supreme Court of the Northern Territory and the Federal Court of Australia. In these offices he was greatly respected for his competence and all-round ability, and greatly loved for his courtesy and compassion.

In 1973-74 he took time off from his judicial duties to set up the Australian Institute of Criminology, at the request of the then Attorney-General Lionel Murphy. In 1987 he was appointed the Royal Commissioner to inquire into Aboriginal Deaths in Custody, an immense task because it entailed a detailed examination of the circumstances of every case, and ultimately required the services of several other commissioners to deal with the vast body of evidence. Before completion of the inquiry, but after he had set the guidelines, he was appointed Administrator of the Northern Territory, and, in this capacity he served with great distinction from 1989 to 1992. He retired to Perth but made frequent visits to the Territory

because two of his four children and their families had remained here, but also because of his great affection for the Territory and for Territorians, who returned the affection in full measure.

It was on one of these visits that Justice Muirhead died in Darwin on the 20 July 1999. No-one deserved better the State Funeral then properly accorded to him and the huge company of mourners who attended.

This brief summary does not and cannot do justice to the memory of a splendid man.

Jim's association with the Menzies School of Health Research commenced with its inception, and deepened when, as Administrator, he became its Official Patron. After his retirement, he became the West Australian Patron. The School had a particular interest for him because of its emphasis on Aboriginal health, which paralleled his concern for their welfare. The School has lost an active, vocal and well-informed supporter.

To his wife, Margaret, who shared all Jim's thoughts and loyalties, and to his family, the School extends its deepest sympathy, and its thanks for his friendship and for his memory.

Austin Asche AC QC
MSHR Patron for the NT



Members of the Governing Board

Chair/Treasurer

Richard Ryan AO BSc FCA FAIM (Nominee of the Governing Board)

Mr Ryan is a Fellow of the Institute of Chartered Accountants in Australia and a Companion of the Institution of Engineers, Australia. He is Chief Executive Officer of Henry Walker Eltin Group, Deputy Chancellor of the Northern Territory University, a Director of the Aboriginal and Torres Strait Islander Commercial Development Corporation and President of the National Heart Foundation.

Members

L Valerie Asche MSc PhD FASM MAIBiol CBiol (Nominee of the Governing Board)

As a microbiologist Dr Asche has been a university academic, an industrial consultant and head of a diagnostic unit. In the Northern Territory she was Head of the Microbiology Unit at the Menzies School of Health Research (1986-1994); a consultant for the NT Department of Health and Community Services and is at present editor of *Recent Advances in Microbiology*.

Dayalan Devanesen AM MBBS DPH MPH FRACMA FAFPHM FCHSE GDip Public Sector Executive Management (Nominee of the Minister for Health, Family & Children's Services)

Dr Devanesen is the Director of the Primary Health and Coordinated Care Branch of Territory Health Services. He commenced work in Alice Springs as a District Medical Officer in 1974 and has been involved with the development of services to Aboriginal communities. In 1985 he moved to Darwin as the Director for Community Health Services for the Northern Territory. He is the Vice President of the Royal Australian College of Medical Administrators and Chair of the NT Branch.

Stephen Leeder BSc(Med) MBBS PhD FRACP FFPHM FAFPPHM (Ex officio)

Professor Leeder is Dean of the Faculty of Medicine, Professor of Public Health and Community Medicine at the University of Sydney and a Fellow of the University Senate (the governing body of the University).

At a national level Professor Leeder is a member of the National Health and Medical Research Council; he chairs one of its principal committees, the Health Advisory Committee. He is also the immediate past president of the Public Health Association of Australia.

Professor Leeder is a member of the Western Sydney Area Health Board and chairs its Human Research Ethics Committee and Health Outcomes Council.

Simon Maddocks BAgSc(Hons) PhD CPAg (Nominee of the Menzies Foundation)

Dr Maddocks is Director of the University of Adelaide Roseworthy Campus and a Senior Lecturer in the Department of Animal Science. His research interests are in reproductive immunology and cell biology. He is the immediate past president of the Sir Robert Menzies Memorial Scholars Alumni Association and a Director of the Board of the Sir Robert Menzies Memorial Foundation.

John Mathews AM BSc MBBS MD PhD FRACP FRCPA (Ex officio)

Professor Mathews was appointed Foundation Director of the Menzies School of Health Research in 1984. His previous research was in New Guinea and at the Walter and Eliza Hall Institute, with postdoctoral work in Oxford and ten years as a NHMRC Fellow in the Department of Medicine at the University of Melbourne. He has served on numerous NHMRC Committees, and as an adviser to government on agent orange, ionising radiation, AIDS, Aboriginal health and tropical research issues.

Ron McKay BSc PhD GDipComp GDipBus FAIM (Nominee of the Minister for Education)

Professor McKay is Vice Chancellor of the Northern Territory University. He was appointed in 1996, following a six-year term as Deputy Vice Chancellor. Until recently, Professor McKay was also Chair and Chief Executive Officer of the Strehlow Research Centre. He is currently Chair of the Northern Territory Research and Development Advisory Council (NTRDAC).

Margaret McLean JP Clinical Nurse Consultant RN RM DipAppSci BNurs (Nominee of the Governing Board)

Mrs McLean has worked as a clinical nurse consultant in the Elliott community and north Barkly region for the past eleven years. She is currently on secondment to the Community Care Information Systems Project of Territory Health Services where, as the Rural Information Systems Manager, she is overseeing the development and implementation of an Information System in remote communities.

She is an active member of various community organisations and a past member of the Women's Advisory Council (1990-1992). Currently she is a representative on numerous steering committees and working parties, with particular relevance to health issues in remote areas.

John Paterson BSocSci (Nominee of the Administrator)

Mr Paterson is a born and bred Territorian who has worked in the field of indigenous affairs since 1979. He is currently on secondment to the Minister for Aboriginal Development, and Parks & Wildlife.

Mr Paterson was previously ATSIC Commissioner for the NT North Zone, holding various portfolio responsibilities including Indigenous Health. He continues to serve as a Regional Councillor of the Yilli Rreung Regional Council. Mr Paterson is also Chair of the NT Area Consultative Committee, which is a peak advisory committee to the Federal Minister for Employment, Education, Training & Youth Affairs.

Mr Paterson has foreshadowed his resignation from the MSHR Board of Governors from 02 July 1999. He will be leaving Darwin to accept the position of Regional Manager, Geraldton Regional Office, Aboriginal Affairs Department in Western Australia. We thank John for his invaluable contributions as a Member of the Board and wish him all the best.

Peter Plummer BSc GDipMgt Corp Directors Dip (Nominee of the Minister for Health, Family & Children's Services)

Currently Chief Executive Officer of Territory Health Services, Mr Plummer was previously CEO of Mines and Energy and, prior to that, held senior positions in two other economic development departments in the Northern Territory. Before coming to the Northern Territory Mr Plummer lived in Papua New Guinea for 16 years, working in the secondary and tertiary education sectors.

Dorothy Sing RN (Nominee of the Governing Board)

Ms Sing is a certified general, midwifery and intensive care nurse, a family planning nurse practitioner and an AIDS educator. She has lived and worked in the Territory for 30 years and is currently Clinical Nurse Consultant for the Disease Control Unit in Katherine.

Her particular interests being STDs and women's health, Ms Sing has been involved in the STDs in Women "T-test" pilot project.

John Young AO DSc MD FAA FRACP (Nominee of the Vice Chancellor, University of Sydney)

Professor Young is Pro-Vice Chancellor (Health Sciences) and Professor of Physiology at the University of Sydney. He is an eminent physiologist who has played an important role in international and national physiology societies.

Professor Young was Dean of the Faculty of Medicine and Chair of the MSHR Board of Governors until his appointment as Pro-Vice Chancellor in April 1997.

Staff Representative

Ms Bev Hayhurst MPHc BEd DipTeach AppDipTeach (Multiple-Handicapped Deaf)

Secretary to the Board

Ms Katherine Henderson BA DipEd (until November 1998)

Dr Ken Sawers BAgEc(Hons) DipEconStats MEc PhD (from December 1998)



Director's Overview : Health Research to Benefit the Community



John D Mathews AM

This Overview has three objectives:

- To thank all those who have supported the Menzies School of Health Research and contributed to its successes and achievements (see Box 1);
- To explain the paradigm of cooperative research at the Menzies School of Health Research, and to illustrate its community benefits;
- To comment on the investment challenges for public health research in future years.

The Cooperative Research Paradigm at the Menzies School of Health Research

The Menzies School of Health Research has addressed problems in Aboriginal and tropical health through research that requires cooperation between disciplines as well as improved communication and trust between researchers, other health professionals, Aboriginal people and the wider community. Similar strategies will help to address other public health problems in the modern world and ensure that research results are translated more reliably into community benefit.

What has been achieved ?

The Menzies School of Health Research in the Northern Territory has been a surprisingly successful research investment. The dividends since 1985 include increased understanding of Aboriginal and tropical health problems, the transfer of knowledge and skills into training and improved health services, and up to 100 research publications each year.

How did the investment in MSHR begin ?

The Menzies School of Health Research commemorates the name of our longest serving Prime Minister, Sir Robert Menzies. The School is a brave and cooperative venture of the Northern Territory Government, the Menzies Foundation, and the University of Sydney. I was appointed as Foundation Director in June 1984, and we moved to Darwin in January 1985, in quixotic mood, and not knowing what to expect. Coralie had found a Thomas

Keneally quote : *the north is littered with the detritus of great hopes, and Darwin is still an outpost... but with a sense of destiny that would have done Athens credit.* We dreamed of Athens in the north.

My research background was in medicine and epidemiology, with experience from New Guinea, the Walter and Eliza Hall Institute, Oxford University, and the University of Melbourne. The dream for MSHR was to establish it as a centre of research excellence and to somehow make a difference in Aboriginal health. An early challenge was to understand the complex politics of Aboriginal health. Indeed, balancing the science and politics of public health has been a continuing theme throughout the life of the School.

1 The Menzies School of Health Research is a Cooperative Achievement — Thanks to All Those Responsible for its Success

The success of the Menzies School of Health Research is due to the contributions of many individuals and organisations over more than 15 years. We gratefully acknowledge those associated with the Menzies Foundation, the University of Sydney, and the Northern Territory Government who realised their vision for the Menzies School in the early days. There has been strong and continuing support from the Northern Territory Government through successive Chief Ministers, Ministers for Education and Ministers for Health, and through the many contributions of government officials. We thank all of those who have worked for the School as members of the Governing Board, as members of School Committees, or in other capacities, and those who have provided wise advice or counsel to the School in so many different ways.

The School is particularly grateful to its Vice-Regal Patrons for their continuing support, and to those other Patrons who have allowed their names and goodwill to be associated with the School.

The Menzies School of Health Research could not continue to exist without the financial support for core activities through the generous infrastructure grant from the Northern Territory Government, now appropriated through Territory Health Services. The Menzies Foundation has always committed funds to support the position of Director, and is now providing additional support for the School from its limited resources. The new building, completed in 1996, was funded jointly by the Northern Territory and Commonwealth Governments. Recently the School has learnt of new government funding that will allow for the co-location of MSHR in Alice Springs with the Centre for Remote Health. The School is particularly grateful to the Ministers and officials who played a key role in securing all those funds.

Research funds for the School have been won through competitive grants from NHMRC, the National Heart Foundation, the AMP Research Foundation, the Clive & Vera Ramaciotti Foundations, the Australian Kidney Foundation, Channel 7 Children's Research Foundation of SA, Colonial Foundation Limited, Community Health and Anti-Tuberculosis Association, Australian Pharmaceutical Manufacturers Association Inc, the Centre for Kidney Research at New Children's Hospital Sydney, the National Institutes of Health (USA), The Wellcome Trust (UK), World Health Organization, Dept of Education, Training and Youth Affairs, Australian Rotary Health Research Fund, Howard Hughes Medical Institute (USA), and Territory Health Services. (See page 167 for grants awarded

continued ...

this year.) These funds have allowed the School to develop its impressive profile of research to address important areas of health need in northern and central Australia. The success of the School in winning such funds has also provided public evidence of the quality of its work.

The work of the School has also been supported through the generosity of individual and corporate donors (see p. 166 for recent list), several of whom have preferred to remain anonymous. Such welcome donations, whether tied or untied to specific projects, have added greatly to our research capacity.

In recent years, the School has strengthened its program of public health teaching through financial support from the Commonwealth, through the PHERP program, and through support from the Northern Territory University. The School is particularly grateful for the interest and support from the University and the Vice Chancellor, culminating in the partnership agreement signed in June (p. 59).

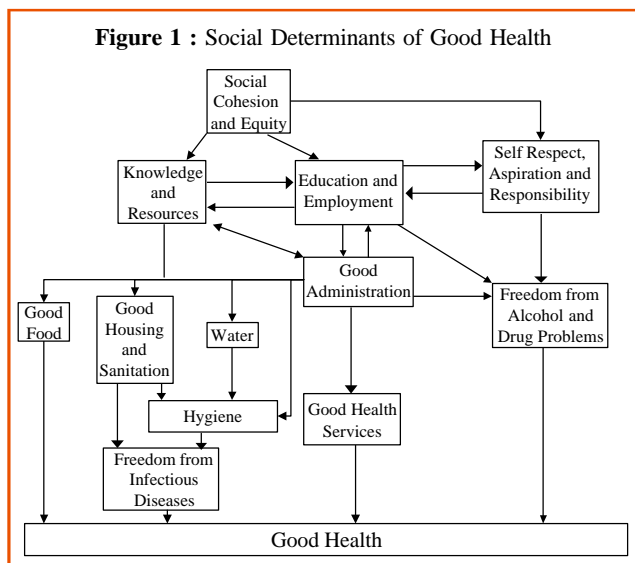
Much of the work of the School would have been impossible without the goodwill of health staff, community administrators, public officials, Territory Health Services and non-government organisations such as the National Heart Foundation. It is a particular pleasure to acknowledge the continuing help and friendship of Aboriginal people from many communities who have participated in research and health development projects, often at some inconvenience to themselves. The School is also deeply indebted to those Indigenous Australians who have helped the School through the Aboriginal Ethics Sub-Committee (p. 68), the Board of the Cooperative Research Centre (p. 55), and through the Legal Agreement signed with the Tiwi Health Board (p. 59).

Above all, the School could not exist without its staff and students. Without their talent and commitment, whether as researchers, administrators, educators or liaison or support staff, the Menzies School of Health Research would not have earned its reputation as one of the leading public health research institutions in Australia. It is particularly gratifying that the School has been able to train many young Territorians in research. A number of our students have achieved success in the Young Territorian of the Year Awards, or been recognised in other ways. In this, my last Overview for an Annual Report, it is a pleasure to congratulate all those who achieved such success at MSHR, and to express my sincere personal thanks to all past and present members of the MSHR team. As individuals, and collectively, they have done all that they possibly could to promote our ethos of excellence and relevance in public health research and education. I am particularly indebted to Mr Richard Ryan AO, Chairman of the Board, and Professor David Kemp, FAA, Deputy Director, and to the many others who have done so much to support me as Director over the last 15 years.

The politics of Aboriginal health

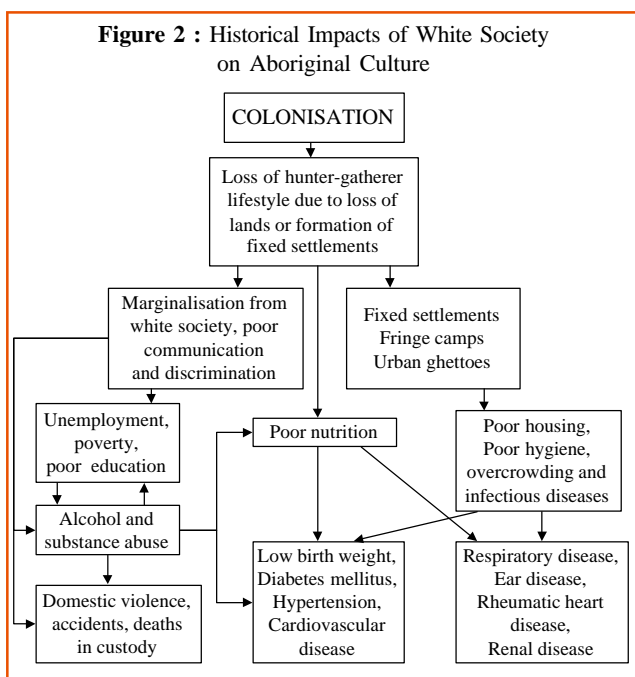
Countries with less education and income have poorer health, and within any one country, educational and socio-economic disadvantage predict poor health. Figure 1 shows how education, employment and good administration underpin health in any society; Figure 2 shows how the social dislocation suffered by Aboriginal Australians over the past 211 years has caused and perpetuated their poor health.

Thus the poor health of Aboriginal Australians is not due to any absolute lack of knowledge about the causes of their ill-health (see Box 2), but to the fact that they have had limited access to health resources and knowledge because of poverty and educational disadvantage. In the past there has also been limited understanding of Aboriginal health issues by funding



agencies, compounded by inadequate knowledge and training of health advisers and providers. Unfortunately, the poor state of Aboriginal health has also been perpetuated by disagreements about what should be done and how, who should do it, and who should pay for it. This lack of consensus, amounting to a modern Babel (Box 3), is only now beginning to be resolved.

The Menzies School of Health Research has contributed to the debate on Aboriginal health by helping to fill important gaps in understanding, communication and implementation. It has attracted expert staff to the Northern Territory, driven a research agenda to identify important areas of unmet health need, tested innovative health interventions, and been an evaluator, critic and advocate on Aboriginal health policy. Its research has also had considerable success in understanding how the effects of social disadvantage are translated into the (biological) causes of disease (Figure 2), and how this understanding can be used to improve health practice.



MSHR as a successful experiment in interdisciplinary and cross-cultural collaboration

The success of MSHR has been driven by the quality of our staff and students, and by the added value that comes from collaboration between disciplines that include social science and anthropology, epidemiology and public health, clinical medicine, infectious diseases, microbiology and molecular genetics. Above all, the Menzies team would have been incomplete without the expertise and commitment of Aboriginal staff and colleagues. Major contributors have been Lorna Fejo, Jessica Bujevich, the late Sally Ross, Louisa Collins,

2

Lessons About Aboriginal Health and Research

Aboriginal health is limited more by the failure to apply existing knowledge than by the lack of knowledge *per se*. Aboriginal people have always understood this, and they have been naturally suspicious of research that seems merely to serve the interests of researchers. The most relevant research questions are:

- How to ensure that existing knowledge is taken up and acted upon by public sector decision-makers and managers and health professionals?
- How to improve Aboriginal access to the knowledge and resources to improve their own health?
- How can specific research projects make a difference through:
 - ⇒ better ways of working across cultural boundaries
 - ⇒ improved access to knowledge, resources and health services for Aboriginal people
 - ⇒ improved social or biomedical understanding to promote health or prevent or treat disease?

3

The Modern Babel

The biblical Tower of Babel (Genesis, xi) is the traditional metaphor explaining the schisms in language, beliefs and culture in the modern world. It reminds us that without a common language and shared concepts, we are unable to understand each other.

There have been many different voices speaking about Aboriginal health. Some voices have blamed the victims, and seen the emergence of Aboriginal control as a threat. There have been issues between different levels of government. Some officials have lacked public health understanding and been unused to problem solving. Some health professionals were escaping from academia, or had a post-modern scepticism about science and medicine. Romantics have seen Western education as a threat to traditional Aboriginal culture. Urbanised Aboriginal people voiced their hurt from discrimination or family experiences as stolen children. Aboriginal Health Workers have strong cultural skills, but only limited health training. With their culture and values being eroded by the outside world, traditional Aboriginal people could draw on insufficient support.

In such a Babel there could be little consensus about how to improve Aboriginal health. Without consensus, political action was difficult. As a result the poor state of Aboriginal health has continued to burn into the conscience of Australia. It could be long remembered as the worst ever failure of our nation.

Daisy Yarmirr, Josie Crawshaw, Annie Bonson, Mai Katona and many others. They have communicated the health priorities and values of Aboriginal people to non-Aboriginal researchers, facilitated research projects in a culturally appropriate manner, and worked with other Aboriginal people to show how knowledge and research findings can be fed back to communities and applied to achieve practical health benefits. Recently, the Tiwi Health Board has played a key role in identifying the many sensitive issues that arise in a cross-cultural research environment, and in codifying the conditions for future work in the Legal Agreement signed with the School in October 1998 (p. 59).

4

The Science and Politics of Public Health

In its 15 year history, the Menzies School of Health Research has been committed to the advancement of health knowledge, and to the use of that knowledge to improve health. Thus Menzies has balanced the science of finding new knowledge (the art of the soluble) against the politics of transferring that knowledge into practice (the art of the possible).

- Science and politics are also of importance for public health on the global scale: not only have they driven social changes leading to poor health, but they are also tools to improve it.
- Scientific proof of the benefit of public health interventions can be elusive, if only because there can be long time delays before health benefits are realised.
- Moreover, with limited resources, economic analyses must help decide whether health outcomes that are scientifically possible are also affordable.
- Even if a health outcome is scientifically feasible and affordable, it will not be politically achievable without mutual understanding, shared values and cooperation between relevant interest groups.
- Greater cooperation between researchers, politicians, bureaucrats and health consumers can facilitate mutual understanding, identify shared values and help to ensure that agreed health targets are not only scientifically feasible, but also politically achievable.

These principles have informed the work of the Menzies School and the recently established Cooperative Research Centre for Aboriginal and Tropical Health.

Community Benefits from Research and Development Initiatives

Research at the Menzies School of Health Research has benefited greatly from its partnerships with colleagues in Territory Health Services and other organisations in Australia and overseas, and from the support of Aboriginal leaders and communities. A detailed account of projects in the last year is provided in the Unit Reports (from p. 71). Table 1 (next page) highlights community benefits from MSHR research over recent years, while the following section summarises several medically important case-studies.

Interdisciplinary case-studies of medically important research

Understanding streptococcal infection and rheumatic fever

Up to 60% of Aboriginal children in bush schools have skin sores, infected with group A streptococci (GAS), with occasional epidemics of acute post-streptococcal nephritis (kidney disease). These same communities suffer from the highest rates of rheumatic fever (heart and joint inflammation due to GAS) in the world. KS Sriprakash, our molecular geneticist, has classified these GAS bacteria by molecular fingerprinting (*Vir* typing and *emm* sequence typing). His team has detected as many as 13 distinct types of GAS at the same time in a single community, with some 100 different types circulating through Aboriginal communities in northern Australia. Work is in progress to identify any strains that contribute specifically to kidney disease, possibly because they carry the SIC molecule. This molecular work enhances parallel studies of GAS

Table 1 : Community Benefits from MSHR Research Over Recent Years

Theme	Important Results	Community Benefits
Aboriginal Understandings of Illness and Death (Tarun Weeramanthri, Ada Parry, Norma Benger, Clifford Plummer and others)	Improved appreciation of cultural differences in knowledge, understanding and meaning about illness and death affecting Aboriginal families.	Improved guidelines for medical and coronial procedures involving Aboriginal families; improved strategies for communicating about illness and death.
Health and Education (Terry Nienhuys, Judith Boswell, Al and Leslie Yonovitz and colleagues)	Otitis media and hearing disability lead to poor educational and employment outcomes.	Increased funding for hearing rehabilitation and special education in Aboriginal schools.
Education and Health (Komla Tsey, Bob Boughton and colleagues)	Review of literature showing how poor education contributes to poor health.	Increased awareness of the need for improvements in education; CRC program commenced.
Aboriginal Training & Employment (Mai Katona, Terry Dunbar and colleagues)	Limited training and employment opportunities for Aboriginal people.	Traineeship programs in health and research through MSHR and the CRC.
Reducing Substance Abuse - Alcohol & Kava (Peter d'Abbs) - Petrol Sniffing (Chris Burns, Bart Currie and Alan Clough)	Improved understanding of the value of community-based interventions and of changes in government policy.	Community and government actions are more likely to be based on evidence of effectiveness.
Smoking Control (Rowena Ivers, Chris Burns, Ross Bailie, Tiwi Health Board and Territory Health Services)	Limited understanding by communities of the heavy financial and health impacts of smoking.	More culturally appropriate education and intervention programs will be pilot-tested and evaluated.
Improving Nutrition (Mandy Lee, Daisy Yarmirr, Annie Bonson, Dorothy Mackerras and Territory Health Services)	Pilot study at Minjilang showed sustainable improvements in nutrition and health through community action.	Improved nutrition policy and support for community programs.
Improving Birth Weight and Subsequent Health (Cheryl Rae, Lorna Fejo, Sue Sayers, Wendy Hoy and Dorothy Mackerras)	Recognition that high rates of low birth weight are linked to disease in later life in Aboriginal communities.	Strong Women, Strong Baby, Strong Culture program launched and evaluated.
Improved Diagnosis and Treatment of Otitis Media (Peter Morris, Harold Koops, Al Yonovitz, Amanda Leach and Hearing Committee)	Video images of eardrum used to validate diagnosis, to train health staff, and to evaluate effectiveness of new treatments.	Improved awareness of mothers, health staff and policy-makers of the need for early and effective treatment of otitis media.
Improved Treatment of Trachoma (Andrew Laming, Amanda Leach, Bart Currie and colleagues)	Children of pre-school and school age screened for trachoma and treated with single-dose azithromycin.	Increased awareness of the value of azithromycin treatment.

Continued ...

Theme	Important Results	Community Benefits
Improved Prevention and Treatment of Skin Sores (Jonathan Carapetis, Daisy Yarmirr, Bart Currie and THS)	Community program to reduce scabies and streptococcal skin infection shown to be effective at Minjilang	Increased awareness of the value of diagnosis and treatment as well as hygiene and environmental measures.
Improved Diagnosis and Treatment of Renal Disease (David Pugsley, Paul van Buynder, Wendy Hoy, Tiwi Health Board, THS and colleagues)	High rates of proteinuria progressing to renal failure requiring dialysis. Risk related to low birth weight, skin sores and obesity. Treatment with ACE inhibitors shown to delay progression.	Improved funding for dialysis services. Increased awareness of need for improved maternal and child health, infection control and weight control, and for early treatment to slow progression.
Improved Surveillance and Prevention of Rheumatic Fever (Jonathan Carapetis, Bart Currie and THS)	High rates of rheumatic fever due to ubiquitous streptococcal infections; inadequate penicillin prophylaxis to prevent second attacks.	Rheumatic heart disease registry established to facilitate follow-up, prophylaxis and treatment using standard protocols. Improved community education.
Improved Education About Rheumatic Fever (Geoffrey Angeles, Norma Bengert, THS and colleagues)	Booklets, songs and videos developed to increase awareness of the need for surveillance, prophylaxis and treatment.	Special funding obtained by THS to implement registry and education program for patients, health staff and families.
Improved Diagnosis and Treatment of Donovanosis and STD (Frank Bowden, Jenny Carter, Dave Kemp, KS Sriprakash and colleagues)	New molecular techniques introduced for rapid diagnosis of donovanosis, allowing more rapid treatment with azithromycin.	More effective diagnosis and treatment should lead to the rapid disappearance of disfiguring genital disease.
Best Practice Protocols and Evidence-Based Medicine (Bart Currie, Barbara Patterson (THS), David Scrimgeour, Peter Morris and colleagues)	Contributions to standard treatment protocols to promote best practice under local conditions.	Increased awareness by health staff of the importance of best practice; increased awareness by policy-makers of the resources needed to promote adherence.
Health Services Evaluation (David Scrimgeour, John Wakerman, Chris Burns, Ilan Warchivker and colleagues)	Resources available to Aboriginal communities insufficient to provide services needed to deal with high rates of illness.	Recommendations made to governments for increased funding.
Coordinated Care Trials Evaluation (Peter d'Abbs, Ross Bailie and colleagues)	Evaluation results in process.	Pooling of funds, with cash-out of average Medicare and PBS entitlements, has provided funds for more adequate levels of service delivery.
Cost-Benefit and Cost-Effectiveness Analyses (Jiqiong You, Wendy Hoy, Philip Baker, Carol Beaver, THS and colleagues)	Expense of renal dialysis and of service delivery generally has prompted a number of projects in this area.	Necessary services need to be provided on ethical grounds. Nevertheless, economic studies may help policy-makers to confront the inadequacy of current resources (see below).

epidemiology and treatment, as well as research towards vaccine development at the CRC for Vaccine Technology in Brisbane.

Understanding respiratory (ear and chest) infections

Interdisciplinary research has also enhanced our understanding of respiratory infections in Aboriginal communities. For example, persistent otitis media (OM) causes ear discharge, hearing loss and educational disadvantage for Aboriginal children. OM develops within a few weeks of birth following early infection with *S. pneumoniae* and *H. influenzae* bacteria. Although each infection is eventually cleared by the host, there are at least 80 different types of bacteria which queue up to infect every child. The persistence of infection and respiratory disease is associated with serial infection by multiple bacterial strains into adult life. Bacterial cross-infection is driven by overcrowding, by poor hygiene and by the large numbers of bacterial strains. Nasal discharge in children is not only a marker of chronic otitis media, but also a major source of cross-infection. Persistent infection in the lower respiratory tract leading to chronic bronchitis, and/or bronchiectasis, is being addressed in a major new study.

Understanding antibiotic resistance

In an antibiotic treatment trial, an antibiotic resistant clone of a 6B pneumococcal serotype was preferentially carried and transmitted to infants. Fortunately, there were no untoward complications, and the resistant 6B clone disappeared when treatment stopped. In another community, azithromycin used for trachoma treatment increased the prevalence of resistant pneumococcal strains. This was reversed after treatment stopped, probably because in the absence of antibiotic selection, resistant strains are pushed out by competing sensitive strains. The study of antibiotic resistance is complicated by simultaneous carriage of multiple strains in the same individual. Antibiotic resistant strains can 'hide' behind sensitive strains, and be rapidly revealed by antibiotic treatment of a carrier.

Understanding scabies in dogs and people

Skin infections associated with scabies infestation are frequent in Aboriginal children. Dogs in Aboriginal communities are also frequently infected. Because dog scabies was thought to be a source of infection for people, scabies control programs have previously treated dogs rather than people. Now molecular genotyping has shown that scabies mites from dogs in Australia and America are different from the human scabies in those same areas. This shows that scabies from dogs cannot infect people, and that human scabies cannot be prevented by treating dogs. Community-based treatment of children with pyrethrin can reduce both scabies and streptococcal impetigo.

Research highlights in tropical and international health

After a 10 year search, begun at the Walter and Eliza Hall Institute, David Kemp and his team have found the gene in *P. falciparum* (CLAG) that explains the stickiness of red

blood cells in cerebral malaria. The team has also identified other malarial genes, similar to CLAG, opening up new possibilities for treatment or prevention of cerebral malaria. This work complements other malaria projects in Indonesia, funded by a grant from the Northern Territory Government to mark the 50th anniversary of Indonesian independence, and by an NIH grant to Nick Anstey, carried out in cooperation with Emiliana Tjitra and the Indonesian authorities. Other international projects and contacts involving School staff are in place with West Africa, Vietnam, Thailand, New Guinea, Kenya, Germany, India, South Africa, USA and UK.

Cooperation is the secret to success

MSHR has become a leader in tropical and Aboriginal health research through its capacity to encourage cooperation between disciplines, and to build and sustain cooperative partnerships with Aboriginal stakeholders, health services and governments in northern and central Australia, most recently through the new Cooperative Research Centre (CRC). This cooperative research paradigm, linking the laboratory with the clinic and the community, has delivered important understandings and also contributed to more effective strategies for training of health staff, and to improved health promotion, prevention and treatment strategies. Despite its short-term opportunity costs, cooperation in health research pays off in the longer term by helping to translate modern scientific knowledge into direct community benefit. A fundamental law for interacting systems, whether biological or social, is that they achieve long-term stability through cooperative processes which provide pay-offs to balance otherwise competitive forces (Box 5). Indeed, through natural selection, competitive interactions can lead to cooperation to achieve a balance between short term returns ('efficiency'), and longer term strategic outcomes.

5

Competition and Cooperation in Research Both Model and Metaphor

- Competition maximises short-term gains, but can lead to destructive instability or monopoly in the longer term.
- Complex systems with greater stability and diversity, whether they are social, economic or biological, have evolved cooperative (complementary) strategies to accept short-term losses in exchange for longer-term gains.
- Scientific research epitomises the long-term benefits of a tension between competition (*be the first*) and cooperation (*we all benefit from publication*).
- Threats to science and public health from economic rationalism, post-modernism and diverse community interests should be addressed by improved education and communication and by cooperation with potential critics.
- Such an extended model of competition and cooperation will provide greater community benefit, and more than justify the opportunity costs incurred.

Public Health as an Investment in the Future

What do we mean by public health?

It is an almost impossible task to define public health to the satisfaction of all! We can start with the scientific context. The irascible philosopher, Sir Karl Popper (1902-1994), firmly believed in the criterion of falsifiability to distinguish science from non-science. He claimed that propositions had to be (potentially) falsifiable or refutable to be accepted as scientific. Sir Peter Medawar, the eminent British immunologist and essayist (1915-1987), was more pragmatic. He captured the essential role of science as a tool for understanding the world. Medawar's aphorism "science as the art of the soluble" contrasts with the earlier dictum of "politics as the art of the possible" from Otto von Bismarck, the first German Chancellor (1815-1898).

This counterpoint between science (How do we understand the world?), and politics (How do we change it?) provides a key to help understand our dilemmas in public health. When we wear our hats as scientists we look for evidence of the highest quality, ideally from a randomised controlled trial (RCT). (Indeed, we know that Popperian refutation provides the logical rationale for every RCT, and for its statistical interpretation.) Yet in the practical world of public health, it is often impossible or too expensive to carry out an RCT to evaluate an intervention if the outcomes will not be realised for years or even decades. With such realities we will often have to take decisions and introduce public health interventions when even the best available evidence (or the best solution in terms of Medawar's phrase), is circumstantial and scientifically incomplete. Again, as scientists, even when we do have strong evidence supporting an effective intervention strategy, our capacity to implement it will often be constrained by ethical and funding considerations or by the other political realities of our democratic society.

A Working Definition of Public Health Practice

The application of scientific principles, within a political framework, to improve population health. More simply, we balance the "art of the soluble" against the "art of the possible".

However, in striking this balance, it is important not to discredit our discipline by claiming that the scientific evidence is more conclusive than it really is. We should clearly and publicly acknowledge the areas of our scientific doubt, before taking pragmatic decisions based on political considerations and the balance of the scientific probabilities.

Public health lessons from the past are still relevant today

The origins of public health are lost in the mists and myths of pre-history, yet the causes of 'dis-ease' of mankind were well understood by the ancients. The Book of Revelation recognised, in the Four Horsemen of the Apocalypse, two scourges of war and civil disorder,

and one each of pestilence and famine. These lessons from the past resonate in the modern world through events in Biafra, Rwanda, Eritrea, Angola, Iraq and the Balkans, and through emergent diseases such as HIV/AIDS, and re-emergent diseases such as tuberculosis.

The history of public health is simply that of our struggle to maintain a civil society, to feed, house and clothe our citizens, and to protect them from infectious diseases and an unsafe environment (Figure 1). We know that in cities of the industrial revolution in the 19th Century, there was social dislocation, poverty and overcrowding in insanitary and squalid living conditions leading to high rates of malnutrition and infectious disease. Health also suffered because of unsafe working conditions in the mines and the 'dark satanic mills', the escape into alcohol and substance abuse, and high rates of crime and imprisonment. The response to these Dickensian conditions in the middle of the 19th Century was led by the public health movement, driven by enlightened self-interest of the well-to-do and by humanitarian sentiments.

Remember that the public health movement in Britain was born within living memory of the reign of terror that followed the French Revolution at the end of the 18th Century. Remember also that the Red Queen in Alice in Wonderland was wont to say "Off with his head!" Although Lewis Carroll was writing two or three generations later, it is likely that the Red Queen was a not very coded political reference back to the Reign of Terror in France. There is another public health reference in Alice, namely the Mad Hatter's Tea Party. But have you ever wondered why Carroll chose the hatter to be mad? The answer is that in Carroll's day, hatters were still using mercury, a highly toxic substance, to cross-link the sulphhydryl groups in the wool felt, and to thus stiffen the brims of the hats that they made. Unfortunately, the mercury also stiffened the brains of the hatters. Hence the Mad Hatter's tea party.

There are many other literary connections to the public health movement of the 19th Century. For example, Rev Charles Kingsley of "Water babies" fame was writing to influence public opinion about the inhumanity of forcing young children to work long hours in filthy conditions in the mines and the mills.

So it was an opportunistic consortium of public health reformers who influenced the body politic to invest in public education, housing, sanitation, clean water supplies, and improved nutrition; these reforms delivered a major health transition in the western world in the century to 1950. Indeed, in the view of McKeown and other commentators, medical science can claim but little credit for the health transition prior to World War 2. Other commentators, such as Ivan Illich (*Medical Nemesis*, 1974), have gone even further, and claimed that medical advances are potentially harmful, particularly for developing countries.

Although many would question the views of McKeown and Illich, it does seem clear that *the post-industrial health transition in the western world was not driven by hard scientific evidence of the effectiveness of the social and environmental interventions being implemented. Rather, it depended upon scientific evidence that was often circumstantial, and on the hope,*

good intentions and political effectiveness of the public health movement. Perhaps we should remember that as another important lesson from the past!

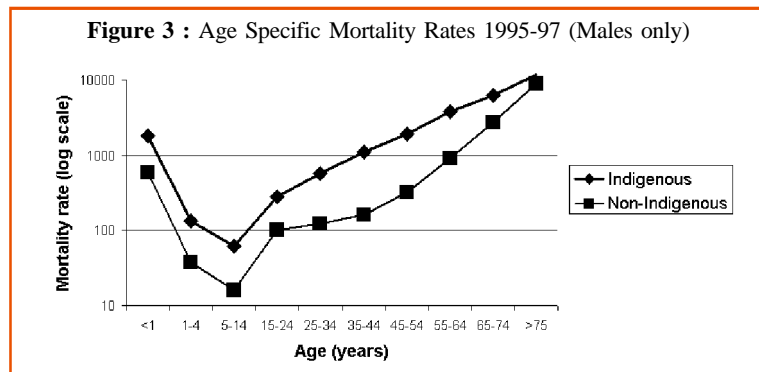
Public health transitions today

The work of Jack Caldwell at ANU has identified per capita national income and level of maternal education as two key variables determining health transitions in developing countries today. This corresponds to the common sense notion that there is a need to invest in health infrastructure (the hardware for health) and also to invest in education to provide the knowledge (software) to ensure that the infrastructure is effectively used.

Lessons from Aboriginal health

The facts about Aboriginal health outcomes in Australia are well known. The recent report from ABS/AIHW presented age-specific mortality rates in NT, WA and SA for 1995-97, summarised in Figure 3, and contrasted with the rates for non-Indigenous Australians.

At virtually every age, Indigenous mortality rates are from two to eight times greater than those for other Australians. The mortality ratio peaks in



middle age (35-44), when indigenous rates are seven to eight-fold greater, corresponding to mortality rates only encountered by non-Indigenous people who are more than twenty years older. If an Indigenous person happens to survive to 75, then the mortality ratio is only 1.3, possibly reflecting a survival of the fittest!

6

Social Inequalities and Poor Health

Social inequalities lead to poor health through a variety of causal pathways (Figure 2). Research with Aboriginal people clearly shows the importance of social disadvantage in driving the downstream causes such as bacterial infection, malnutrition and substance abuse. These causes can be propagated from generation to generation because of the particular vulnerability of the foetus and the infant to such adverse environmental influences. Disadvantaged children grow up to become disadvantaged mothers with a higher risk of having disadvantaged children in the next generation.

Michael Marmot and others have also provided evidence that the link between lower social position and poor health persists even in the British Civil Service, where no employees would be regarded as physically disadvantaged. The precise causal pathways, possibly depending on lack of social control, may be elucidated by longitudinal studies of children followed from birth.

At the simplest level, the poor state of Aboriginal health can be explained by past failures to invest in education and employment and health services for Indigenous Australians. Indeed, the social dislocation of Indigenous Australians today, and their lack of infrastructure and capacity to deal with the consequential health problems, is reminiscent of the social and health problems during the Industrial Revolution. Now, as then, the solutions must lie in a societal commitment to long-term investment in employment, education, health infrastructure and health services.

Why do public health investments need to be long-term ?

This should be obvious. However, in this era of instant gratification, there is a need to remind ourselves, the public, departments of finance, and politicians of *the need for current investment in public health to realise benefits that may be deferred* for a long time into the future. How long might we have to wait? There is empirical evidence that the health transition in the developed world developed over some 100 years. This would include the time needed to complete the antecedent social, educational and environmental changes, as well as extra time (unlikely to be more than a lifespan) for the consequential health improvements to be expressed in individuals in the population.

There is also empiric evidence of time delays in relation to specific causes of disease. For example, the smoking-related epidemic in developed countries grew over two generations. There is an incubation period for smoking-related cancer of 30-50 years, so that a similar period of time must elapse before the *full* impact of smoking control measures on cancer is realised. Of course the community will reap partial benefit from smoking control measures over shorter periods of time. In particular, the vascular complications of smoking are *partially* reduced within a few months of smoking cessation.

Another example of a long incubation period is provided by the effect of low birth weight (measuring maternal malnutrition, infection and other adverse events in pregnancy) in increasing the risk of chronic disease in adult life. The so-called *Barker hypothesis* has conceptualised what our grandfathers' generation took for granted, namely that the seeds of good health in middle age are sown much earlier in life (*ie. in utero*, as well as in infancy and childhood). *Thus we need to invest now in improving maternal and child health in order to reap the full dividend in 40 or more years time.* Figure 4 models some of the relationships from MSHR research with Tiwi people. Not only has this shown that low birth weight predicts type II diabetes, but it also predicts proteinuria, renal and cardiovascular disease. Furthermore, there is strong circumstantial evidence that 'school sores' (childhood skin infections with Group A Streptococci) also predict renal disease. Thus the complex of malnutrition and infection in pregnancy and infancy and childhood, still endemic in many Aboriginal communities, is a powerful predictor of diabetes, renal disease, and vascular disease in middle age.

To invest now for future benefit, the obvious things are to improve maternal nutrition, to control infections in pregnancy and childhood, and to try and control the onset of obesity in

early adult life. *Sometimes it is absolutely necessary to do the obvious, even though we cannot prove all links in the causal chain with scientific rigour!* Because of their high rates of infection, low birth weight, and chronic disease in later life, there is great potential for long-term benefit from maternal and child health programs in Aboriginal communities. In contrast, there are low rates in affluent communities, where the health transition is already more or less 'complete' as a result of past improvements in nutrition, infectious disease control, and maternal care.

How Do We Identify the Best Buys in Public Health ?

Investments in health infrastructure

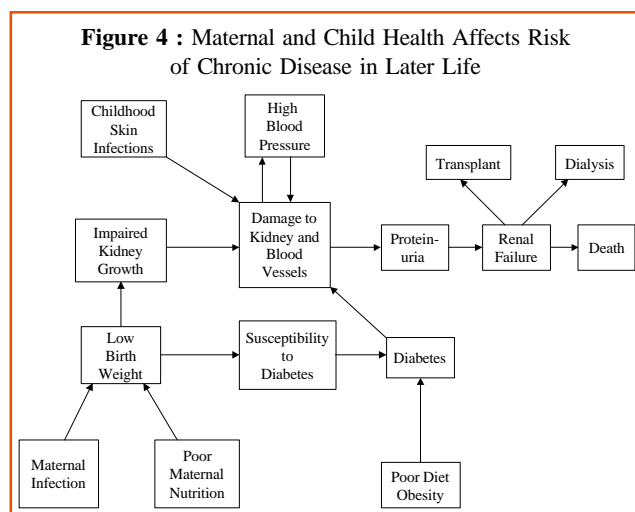
Even today, health outcomes for Aboriginal Australians continue to suffer because of the lack of historical investment in their health infrastructure. Until that historical shortfall in investment is made up, Aboriginal people will bear the heavy burden of accrued social and health deficits. Australia will continue to pay the accumulated costs of 'patching up' the people who have been damaged by cultural disruption, unemployment, substance abuse, and by diseases arising from malnutrition, infection and discrimination (see Figures 1 and 2). Investment in Aboriginal education is of particular importance, because without it, successive generations will be deprived of the knowledge and skills that they need to lead healthy and fulfilled lives and to contribute as productive citizens in a multicultural Australia. Thus there are sound economic arguments, as well as equity arguments, for Australia to sustain and increase the level of its investment in health infrastructure for Aboriginal communities.

Public health provides a tool-kit of skills to better invest in prevention

In many respects, Australian health expenditures are not optimised to deliver the 'best-buys'.

a) There is over-consumption of services by the 'worried well' in many sectors of society. In contrast there is under-consumption of (often inaccessible or inappropriate) services by Aboriginal citizens and by others with the heaviest burdens of preventable or treatable disease.

b) The effectiveness of many treatment and preventive



strategies is unknown. Strategies are often chosen arbitrarily rather than on the basis of evidence, and even those that are known to be efficacious under ideal circumstances may prove to be ineffective in practice because of inadequate resources, poor compliance or for other reasons.

c) Yet the allocation of financial resources to maximise cost-effectiveness of health services is complex. For example :

- It is natural to invest in care of symptomatic conditions where there is an immediate benefit to an identifiable person asking for help;
- It is difficult to measure effectiveness, particularly for preventive interventions (*eg.* improved nutrition) where the benefits might be delayed for many years after the investment;
- The future benefits of preventive interventions may not accrue equally to all, and individual motivation for behavioural change towards an uncertain future benefit will often be low;
- Although ‘prevention is said to be cheaper than cure’, this is not always true after taking account of the opportunity cost of investing now for a future benefit. The practice of ‘discounting’ on preventive health investments has been introduced to allow for the interest that would have been earned on the money in the meantime, and because it seems unreasonable to ask this generation to invest ‘too much’ in the health of subsequent generations;
- There is not yet a general consensus about how the benefits of prevention and treatment can be quantified from one condition to another or from one population to another in cost-effectiveness analyses. One approach is to use disability adjusted life years (DALYS) to measure the burden of disease and to provide a scale to measure the potential benefits of intervention;
- Human Services, Victoria and the Australian Institute of Health and Welfare (AIHW) have used DALYS to show that the burden of disease is much greater for Aboriginal than for other Australians;
- Such results illustrate the correspondingly greater opportunity for selected interventions to be more cost-effective in Aboriginal and other disadvantaged populations.

d) Thus a particular challenge for public health today is to link expertise in **evidence-based medicine and public health** with expertise in **cost-benefit analysis** and to develop case-studies to persuade governments that greater investment in Aboriginal health is one of the ‘best buys’ that can possibly be made.

Renal Disease in Aboriginal People : A Candidate Case Study to Compare the Cost-Effectiveness of Preventive and Treatment Strategies

The incidence of end-stage renal disease (ESRD) is many times greater for Aboriginal people than for other Australians. Without long-term dialysis at a cost of \$40,000 to 80,000 per year, or without the (rare) opportunity to transplant a new kidney, large numbers of Aboriginal people will die in their 30s, 40s or 50s. Dialysis increases life expectancy by a few years, but it has a lesser benefit in Aboriginal than in other patients.

What are the alternatives to dialysis or transplantation?

- The pharmacological treatment of high blood pressure (often associated with the early stages of renal disease) has been shown to delay the progression to renal failure and dialysis in Aboriginal patients. The costs of such treatment are an order of magnitude less than those of dialysis, and the quality of life for the patient is much better. Likewise, treatment of diabetes mellitus can also delay the onset of renal failure, leading to cost savings and improved quality of life, at least for some years;
- The longer-term strategy, to prevent the onset of renal disease, cardiovascular disease and other related conditions, requires some knowledge of their environmental causes. From previous research through the Menzies School of Health Research, the predictors of renal disease in Aboriginal populations include : low weight at birth, streptococcal skin infections in childhood, and obesity developing in early adult life. Thus it is likely that rates of renal disease, 20 or so years into the future, would be greatly reduced by interventions which :
 - ⇒ improve maternal health and nutrition in pregnancy, and thus lead to improvements in birth weights of Aboriginal infants;
 - ⇒ improve control of streptococcal and other infections, particularly in childhood;
 - ⇒ improve the quality of nutrition in children and young adults, with exercise programs to minimise obesity.
- Despite the limited and circumstantial nature of current evidence, it is neither feasible nor ethical to consider a controlled trial that would have to run for many years to provide a rigorous answer about the efficacy of such preventive interventions. As with many other public health problems, it is necessary to *take action now on the basis of evidence which is still imperfect.*
- It seems blindingly obvious that we ought to allocate substantial funds to preventive programs. Such decisions can be justified by all currently available evidence, including:

- ⇒ the rationale to improve maternal and child health and infection control for reasons *other than* renal disease and diabetes;
- ⇒ the efficacy of interventions as measured by short-term outcomes (improved birth weight, reduced infection, and reduced obesity);
- ⇒ the best knowledge of the biology and epidemiology of renal disease in local and overseas populations;
- ⇒ best estimates of the cost-benefit trade-off between the treatment and prevention of ESRD and related conditions, using DALYS as a measure of benefit (eg. see Box 7).

7 Possible Costs and Benefits for Early Treatment and Prevention of Renal Disease (ESRD) and Other Chronic Diseases

Trade-off of early treatment against dialysis

Assume that treatment of chronic renal disease at a cost of \$2,000 per year commences 3 years before dialysis would otherwise be required (at a cost of \$40,000 per year). If treatment postpones the need for dialysis by 5 years, it will be cost-effective if we value a life year at \$7,000 or more in current values. If treatment were to postpone the need for dialysis by as much as 10 years, then it would be cost-effective down to a life year value of \$1,800 after discounting.

Trade-off for programs in early life to prevent renal failure

As much as 2% of the adult Tiwi population is currently on dialysis. With a mean survival time on dialysis of some 4 years, it is plausible to assume that at least 5-10% of the age-cohort could require dialysis. (This is probably conservative, as about 50% of adults have proteinuria indicating progressive renal disease.) Assume that 10% would otherwise require dialysis at a mean age of 45 years for a total of 4 years. This is an average deferred per capita cost of \$16,000 (10% x 4 x 40,000), leading to discounted per capita cost of \$4,144 over 45 years. This would justify the expenditure of \$4,144 per pregnancy to prevent future renal failure and save on dialysis costs, without even taking account of the life years saved, and without taking account of the extra benefits from the parallel prevention of diabetes and cardiovascular disease!

How much can we justify spending to increase the life expectancy of Aboriginal people?

Life expectancies for Aboriginal people in remote communities are 20-25 years less than for other Australians, and their quality of life is poor because of chronic illness. Assume that there is an average deficit of 25 DALYS. If we value a DALY at \$15,000 in current value and assume that there will be an average of 30 years between increased expenditure and the consequential health benefit, then the costs of 25 x 15,000 = \$375,000 will be discounted to \$152,000 over 30 years. This suggests that we could justify an increased per capita expenditure of \$5,000 per year if we were convinced that such expenditure would substantially increase the life expectancy of Aboriginal people over the 30 year period. *Such models need to be further developed and rigorously tested.*

What Are the Future Challenges for Public Health?

Public health professionals need to be pro-active about meeting the many challenges of modern society (Box 8). For example, if we neglect to engage with the biotechnology revolution, then its impact on Australian health will be driven completely by commercial interests, without the leavening influence of the public sector.

8

Public Health Challenges in a Changing Society

- The sexual revolution and advertising.
- Changes in family structure and dynamics.
- Globalisation of the economy.
- Changes in work and community values.
- Environmental degradation.
- The information revolution.
- The biotechnology revolution.
- Re-emergence of communicable diseases.

We must also remember our continuing vulnerability to the rapidly changing social and biological forces that surround us. In particular, after the health transition and the introduction of antibiotics in the years after World War 2, we were confidently told in the 1970s that infectious diseases would be a thing of the past in the developed countries. AIDS and HIV proved how wrong those predictions were. Now the world is facing great uncertainty, not only with HIV, but with the emergence of antibiotic resistant bacteria, drug-resistant TB, worries about pandemic influenza, and the new viruses such as lyssavirus, hendravirus, and nipavirus. A common feature of the agents causing these infectious diseases is that they originated from or are currently transmitted by animal species other than man. Their emergence or re-emergence reminds us that we cannot escape either our biological heritage, or the way that as social animals, we live and interact with each other and the world about us.

We need to build that broad understanding of the biological and social domains into all aspects of our future public health practice. This new synthesis should re-create the 'old public health' of the past, merge it with the 'new public health' of the 1980s, and build a new discipline to face the social, the biological and the technological challenges of the new millennium. The Menzies School of Health Research has already developed a dynamic and interdisciplinary interface and a vision for the future. With its talented staff and students it is well placed to carry its leadership role into the 21st Century.

Strategies to Meet Future Challenges

- To promote more public health thinking in government and the wider community.
- To promote interdisciplinary knowledge and skills and cooperation.
- To more effectively promote behavioural change amongst health professionals and the wider community.



Report of the 1998 Quinquennial Review Committee

October 1998

Professor Jim Pittard (Chair)
Professor Graham Brown
Assoc Professor Judy Simpson
Dr Ian Anderson

The structure of the report reflects the major points in the Committee's Terms of Reference.

1. Receipt of Detailed Documentation about Past and Proposed Activities of the Menzies School

Before visiting the School in the first week of October, the committee received extensive documentation about past, present and future activities of the School. During a visit to Alice Springs prior to the visit to Darwin, two members of the committee had an opportunity to read many of the reports produced by the Alice Springs Branch.

2. Commissioning of Independent Assessments

No such assessments were considered necessary.

3. Consider Any Confidential Submissions from Relevant Stakeholders and from Staff at the School

4. To Make a Site-Visit to Meet with Stakeholders and School Staff

Two members of the committee (Professor Pittard and Assoc Professor Simpson) visited Alice Springs where they had discussions with various members of the Menzies staff. They also visited the Institute for Aboriginal Development to talk with the Deputy Director, Debra Maidment and with Rodney Higgins, The Tangentyere Council to talk with Mike Bowden, the Territory Health Services Regional Directorate to talk with Ms Sue Korner and the Central Australian Aboriginal Congress to talk with Lynore Geia. During the Darwin visit, the entire committee met with Mr Chris Makepeace, Deputy Secretary, School's Policy & Operations North, NT Department of Education, Ms Trish Angus, Dr Gary Lum, Dr Shirley Hendy and Ms Merryn Hare of the Territory Health Services, Assoc Professor Charles Webb and Professor Greg Hill of the Northern Territory University, Mr Bill Barclay and Ms Alberta

Puruntatameri of the Tiwi Health Board, Dr Chris Burns of the National Heart Foundation, NT Division, Ms Kate Ross and Ms Liz Stubbs, Chair and Secretary respectively of the Joint Institutional Ethics Committee - Royal Darwin Hospital & Menzies School of Health Research, Ms Mai Katona, leader of the Aboriginal Health Policy and Research Unit, Dr David Brewster of the Royal Darwin Hospital, Mr Richard Ryan, Chairman of Menzies School of Health Research Board, Postgraduate Research Students, Postdoctoral Fellows, and the Director and Deputy Director, Professors John Mathews and David Kemp. Unfortunately, while the committee was in Darwin, it was not possible to arrange a meeting with the Minister for Health, Family and Children's Services, the Hon Denis Burke MLA, but the Chairman received a letter from the Minister after returning to Melbourne.

In addition to these meetings, the committee received written submissions from Professor Michael Good, Queensland Institute for Medical Research, Mr Bill Barclay, Chief Executive Tiwi Health Board, Dr Chris Burns, Director National Heart Foundation NT Division, Sir Daryl Dawson, Chairman The Menzies Foundation, Professor SR Leeder, University of Sydney, Assoc Professor Charles Webb, Northern Territory University and John Eldridge, General Manager of the Aboriginal and Torres Strait Islander Commission (this submission did not arrive until after the committee had left Darwin).

Although a variety of issues were discussed during these meetings and in the submissions, the overwhelming responses

to the various activities of Menzies School were very favourable.

5. Receive Additional Presentations, During the Site Visit, that are Relevant to the Past and Proposed Work of the School

During the Tuesday and Wednesday of the visit, the committee listened to oral presentations covering all of the activities of the School. Comments on individual programs are included elsewhere. However it would be appropriate to indicate at this point that the committee was very impressed with the quality and professionalism of all of the presentations.

6.1 The Performance of the School as a Whole

(1) Outputs

The academic output of the School remains at a high level commensurate with its standing as a major biomedical research institute within Australia. (Specific comments on some of the programs will be made later in the report.) Through its production of a number of excellent reports the School is making a very positive contribution to establishing a sound foundation for the development of Public Health policies by Government. Some mechanisms or influences, however, may need to be established to ensure that all such reports receive careful consideration by Government and wherever possible can also be disseminated in a communicable form to the Aboriginal people who are

frequently the object of the study. Recent progress by Menzies School in the area of Diagnosis and Treatment have made major contributions to the successful treatment and containment of Donovanosis, Scabies and Chlamydial infections while other studies provide a greatly increased understanding of different and complex infectious diseases.

(2) Relevance to community needs

Practically all the work at Menzies is directed specifically to community needs. The lead times between research and clearly discernible positive outcomes varies greatly depending on the projects. Various lifestyle studies including such matters as nutrition and substance abuse have the possibility of fairly immediate implementation, other studies such as reports on community self-determination and new proposals for reorganisation of Remote Area Health Service Delivery have a more indeterminate period between production and implementation. Laboratory-based studies have a much longer lead time and it is encouraging to see the very real value of PCR diagnostics in providing critical new information about the epidemiology of Scabies, which, linked with Clinical Studies can provide a major advance in the control of this disease. In a similar manner, the development of a non-invasive PCR-based diagnosis for Donovanosis linked with new and effective chemotherapy is also providing immediate benefit to the Community. Studies on Renal Disease have very significantly advanced the understanding of the various contributing causes and at the same time provided

diagnostic tests and medical intervention which offers a very significant improvement in the quality of life and life expectancy and may also reduce the severe financial burden of ever increasing numbers of haemodialysis units. The work of the multidisciplinary team continues to provide new and very important information and treatment. The problem is extremely complex and the multifaceted approach is essential to provide both real improvement now and eventually sufficient understanding to allow eradication of this particular problem.

(3) Interaction with stakeholders

Menzies School serves a variety of stakeholders with disparate needs and priorities. As far as the committee can gauge, the School has handled the multitude of interactions effectively and conscientiously. It is well regarded by the Board of The Menzies Foundation, by Northern Territory Health Services, by the National Health and Medical Research Council, by the Cooperative Research Centre Board, by the Universities of Sydney, Flinders and Northern Territory and by a number of Institutions with whom we met in Alice Springs and Darwin. Its interaction with the Aboriginal community which is of central importance to its core functions has recently been strengthened by the signing of a Memorandum with the Health Board of the Tiwi people. This is a seminal important interaction which may serve as a model for arrangements elsewhere with other communities. A discussion of the complex issues associated with well intentioned research involving Aboriginal communities is discussed more

fully elsewhere in this report. The committee was impressed with Mai Katona's very clear explanation of the different perceptions of researchers and those being researched and the psychological and physical load which is often borne by the research subjects. We believe that Menzies has indicated a willingness to understand, to listen and to establish a sustainable and mutually beneficial partnership with the stakeholders in the Aboriginal community.

(4) Productivity in relation to available resources

The productivity of the School, whether in the form of publication in scholarly journals, Consultancy Reports or Books and Videos to convey information back to the people is very satisfactory.

(5) Ethical and other issues

Major ethical issues relate to the interactions between researchers and the subjects of their research, the significance of the results of the research for improved well-being and the unambiguous agreements between the researchers and all the people who are involved in the research. The School has been steadily evolving acceptable procedures and objectives some of which may have suffered from the influx of new researchers and as previously noted the recent agreement with the Tiwi people's Health Board is seen as an extremely important step. In this development, Menzies is leading the way and although considerations of these various interactions will have to remain high on the School's priority list, it is currently making significant progress.

The Review Team met with the Chair and Secretary of the Joint Institutional Ethics Committee and the system for project appraisal was described. Undoubtedly this committee plays an extremely important role, and the Chair informed the team that all requirements of NHMRC are being met. It was noted that requirements for projects funded by the National Institutes of Health (USA) may be slightly different and these need to be assessed when NIH grant success is achieved.

The Committee would be able to fulfil its role better with increased resources to enable inclusion of members from distant locations.

The Board should examine liability insurance arrangements for MSHR, non-MSHR, and lay members.

The Director had informed the Chairman of the Review Committee, in advance of the Review, that a confidential ethical matter had been referred to an external independent committee of enquiry. As the deliberations of this committee had not yet been completed at the time of the Review, as due process had been observed and as the matter was not raised with the Review Committee during any of its extensive discussions nor in any written submissions, the committee did not involve itself in consideration of this matter.

(6) Other Matters

(a) Alice Springs

The Alice Springs node of the Menzies School has grown considerably since 1993. The increase in numbers

(largely funded by external bodies) and the new quarters, provide both an identity and a presence. Notwithstanding the loss of David Scrimgeour, the Unit appears to comprise a dynamic and dedicated group very actively involved in investigating important issues affecting Public Health and Aboriginal communities. Although some of the members of the Unit make frequent trips to Darwin, the committee believes that some form of annual retreat involving all the researchers and staff from both ends of the Territory would be beneficial in establishing and maintaining a mutual understanding and appreciation of the exciting and interesting challenges exercising the minds and the activities in each of these locations.

(b) The last five years

During the last five years the Menzies School of Health Research has made major strides in confirming its position as a unique and important Research Institute within Australia. Of particular note is the move to the splendid new facilities, the expansion of the Alice Springs operation, the successful bid for a CRC in conjunction with a number of other partners, the expanding links with the Northern Territory University, the production of a number of seminal reports dealing with Public Health policy, important discoveries in the area of Molecular Diagnostics which have immediate relevance to improved health care, important discoveries in the molecular studies of Malaria and Group A

Streptococci, major advances in the understanding and treatment of renal disease and the signing of a very important agreement between the Tiwi Health Board and the Menzies School of Health Research. All in all, the school is to be congratulated on an excellent performance.

(c) Revisiting the report of the last review

In the previous review a number of recommendations were made which may bear revisiting. The Review Team had been very impressed with the activities of indigenous people in establishing and running an alcohol rehabilitation centre (CAAAPU) and a Birthing Centre (Alukura), both in Alice Springs. The committee had recommended that Menzies School try to provide skilled assistance to facilitate the acquisition of funds to support both their activities and to guide the analysis of the work that they had already carried out. Unfortunately CAAAPU's funding was cut shortly after the Review and before any support had been forthcoming from Menzies. This year's committee was pleased to hear that funding by both Federal and Northern Territory Governments had recently been restored and that Komla Tsey of the Alice Springs Office had been instrumental in helping CAAAPU to frame their submission. We also note that Alukura is a member of the new CRC which may well provide the avenue through which Menzies could provide the assistance to help in the analysis of data that they have collected

over eleven years. We understand from discussions, that they would appreciate such help.

The previous review also recommended that Aboriginal representation on the Board of Menzies School be increased from one to three. We note that it is still only one and repeat the advice of the previous review that steps be taken to increase their representation. In view of the clearly stated aims of the School, the local demographics and the School's increasing involvement with Aboriginal people in Research and Teaching, we believe that their current representation is unsatisfactory. The previous review had also raised the possibility of Menzies extending its links to other Institutions in the North. In part, this has been achieved with the new CRC, the links with the Northern Territory University and the ongoing collaborations with QIMR and Flinders University Northern Territory Clinical School.

(d) Relationship between the Menzies School of Health Research and the Northern Territory University

The committee notes the increased association between the University and Menzies, and believes that there are opportunities to develop these relationships further in a mutually beneficial way. We understand that there is a process of ongoing negotiations between the two bodies in areas of common interest. One possibility, however, that the committee

very strongly advises against is any move in which Menzies becomes a "controlled entity" of the Northern Territory University and loses its autonomy. We believe that the continued autonomy of Menzies School is absolutely critical to its prosperity and further development. As we have mentioned elsewhere, we believe that Menzies is pioneering major new and important relationships in public health research and needs maximum flexibility in order to succeed in these endeavours. On the other hand, closer association in the form of an adjunct Faculty of Public Health may well be beneficial to both parties. Although we support an increasing involvement of Menzies in education and would greatly encourage the establishment of some new joint appointments, such involvement will need to be controlled carefully to ensure that the staff of Menzies are not too deflected from their central and core activities in their research programs.

6.2 The Performance of the Director and Senior Staff

(1) The Director

The committee has uniformly high praise for the performance of the Director. He leads an exciting and very productive Institute where the enthusiasm, dedication and general morale is high. He continues, with a great deal of sensitivity, to guide the School along a path which will establish a sustainable partnership between the research ethos of the School, the researchers and the Aboriginal community for whom and with whom the School wishes to work.

He has played a significant role in establishing the CRC, which in itself is a major acquisition for the Northern Territory and which should establish important new collaborations to the benefit and improvement of the health status of the Aboriginal people. He has also continued with his own scholarly work and with the many duties which require the Director to interface efficiently with Government and the many other relevant organisations with which the Menzies School interacts.

(2) The Deputy Director

Mention should also be made of the very important and first class role played by the Deputy Director, Professor David Kemp. He continues to offer the Director very important support in the administration and management of the School's affairs. His academic leadership in research can be seen to be having a major impact on a number of the School's research programs. His recent election as a Fellow of the Australian Academy of Science and his selection as Rubbo Orator is a clear indication of the very high regard in which Professor Kemp and his scientific achievements are held. In the committee's view the Menzies School is very fortunate in having a Director and Deputy Director of the calibre of Professor Mathews and Professor Kemp.

(3) Unit Leaders

The Unit Leaders are also without exception impressive individuals whose leadership and dedication is critically important for the continued development of the School and its objectives. We note and endorse the School's policy of regular reviews of staff performance.

6.3 Detailed Comments on Individual Programs

(1) Health Social Sciences Unit

From the presentations made to the Review Committee, it was evident that the role of social science-based research in the Menzies research program has continued to develop over the last five years. One such example was the input from the social sciences in interventions relating to the abuse of alcohol and other misused substances. The Central Australian Unit has also developed an impressive body of work developing and evaluating programs and drawing on a broad framework of social sciences. The committee also noted, for example, the critically important work planned in evaluating the sustainability of initiatives to reduce alcohol-related harm. Further, the planned development of culturally appropriate models for policy and program evaluation will provide a crucial base for the broader development of the research-to-practice interface in the Menzies Program.

The committee would support the further integration of social science research into various core research activities conducted by the Menzies School and sees a need and an opportunity for an additional input relating to Health Financing and Health Economics. One principal measure of the ultimate success of the research being carried out at the Menzies School will be its translation into sustainable and appropriate health care. Given the well-established links between disease and social conditions, there is a critical opportunity for the research at the

Menzies School to make a major contribution to illuminating and helping to remedy these unacceptable situations.

With the development of the Co-operative Research Centre in Aboriginal and Tropical Health, there is an opportunity to build a critical mass of researchers in the social sciences, particularly, in relation to the CRC health services research program. The Review Committee agrees that significant contributions could be made by social scientists and behavioural scientists. One important area for study would be smoking prevention and the committee would support submissions from Dr Burns or others to organisations such as the Anti Cancer Council or the National Heart Foundation to fund a social scientist to investigate these issues.

(2) Aboriginal Policy and Health Education Unit

The Aboriginal Policy and Health Education Unit impressed the committee with the quality of their presentations. There was clear evidence of leadership being shown by the Unit, which had a well articulated strategic program which can be integrated with much of the research of the Menzies School.

The Review Team is of the view that continuing support for this program is essential. Relationships with Aboriginal communities are fundamentally important to the viability of research at the School. As the Menzies program continues to grow in scope, more interfaces will be created with Aboriginal communities and community organisations. Further, there will be a continuing need to recruit research

staff and some of these may not have sufficient experience in cross-cultural or Aboriginal health research and will need training in these areas. In addition, there is a growing sophistication within Aboriginal communities in the management of research activities and a growing expectation of active participation in the development of research priorities and research action.

The Menzies School has responded to this changing environment, and the legal agreement with the Tiwi Health Board is evidence of this. This landmark agreement will provide a model for the development of similar arrangements in other communities and other Aboriginal health research contexts.

In developing a strategic approach to building effective relationships with Aboriginal communities and health agencies it is important to include:

1. activities that develop the capacity of researchers to effectively work in a cross cultural context;
2. activities that increase the capacity of Aboriginal people and communities to collaborate in research action;
3. the development of a systematic approach to project liaison and brokerage.

The Aboriginal Policy and Health Education Unit Report demonstrates that the Menzies approach is consistent with the above. For instance the committee noted the planned development of cultural awareness activities, the development of a career strategy for Aboriginal people (based on the experience of the homework centre

program and the trainees program); and the planned approach to research support. It will be important to support the further development of this work by ensuring both an adequate resource base, and the integration of the work of this Unit with all of the research program units. Such an arrangement needs to be reflected in both organisational structure and process, and should be underscored by sound communication.

In further developing this component of the Menzies program it will be important to identify strategic opportunities for involvement of Menzies staff in activities that improve the opportunity for Aboriginal people and communities to engage in research activities. Furthermore, it is recommended that the School builds on existing mechanisms through which Aboriginal and Torres Strait Islander people can have an input into the development of the Menzies research agenda. As the research program at Menzies continues to grow it will be important to build a co-ordinated program linking research to practice, and including sound strategies for the dissemination of research findings.

(3) Lifestyle and metabolic disease

Presentations were made to the Review Committee about research being conducted at the Menzies School into Aboriginal lifestyle and metabolic diseases. The Renal Unit and the Tropical Health Unit are managing this research. The Aboriginal Birth Cohort Study has produced a valuable database, that promises to assist in further developing our understanding of the relationship between Aboriginal birth

antecedents, birth outcomes and subsequent morbidity and mortality.

The Renal Unit has produced an impressive body of research work since its inception in 1992. This rigorous program has consistently produced work of a high standard. Considerable progress has been made in characterising the epidemiology of Aboriginal renal disease and its pathophysiology. The findings of the treatment program have provided promising evidence for the efficacy of the treatment regime that has been trialed. The further development of the intervention oriented component of this program is a priority given the documented burden of End Stage Renal Disease in the study communities. The economic evaluation of the screening and treatment of Aboriginal renal disease promises to be an important contribution to Aboriginal health policy. The legal agreement with the Tiwi regarding research is a watershed - and will be critical in the further development of this program.

There have been recent international developments in the understanding of the relationship between social process and the production of some lifestyle diseases. It may be possible to develop local investigations, that draw on perspective's and methodologies of the Social Sciences and that further develop our understanding of the relationships between these two.

(4) Clinical research and international health

The committee was impressed that the work of the past five years has made a substantial contribution to reaching the goals of the School in addressing issues of

clinical importance in the Territory. An integrated approach has been taken to addressing major health problems in which excellence in clinical research provided by Dr Currie and colleagues has been linked to laboratory research, often providing information of immediate relevance and already applicable to service delivery. Research presentations to the committee were of uniformly high standard, consistent with the fact that much of the work has already been published in high-ranking international peer-reviewed journals and has attracted continued funding from highly competitive sources. Success in developing typing methods for *B. pseudomallei* will certainly provide excellent tools for improving understanding of relationships between animal, human, and environmental isolates, and the assessment of “outbreak” or “pathogenic” isolates. The collaboration with the molecular genetics and parasitology groups has added enormous value to the clinical studies.

Streptococcal infection is clearly identified as a major determinant of health and health expenditure in the Territory because of its acute manifestations (respiratory and ear infections) and chronic life-threatening sequelae of rheumatic heart disease and renal failure. Appropriately, the School devotes considerable effort to improving understanding of genetics of the organism, particularly its diversity and the acute and chronic complications of infection. Excellent progress has been made in developing methods to type the organism, to identify potentially pathogenic products (SIC) or components of the cell surface, to produce protocols for the effective management of acute infection

that should minimise possibility of long-term sequelae or development of resistance, and to improve management of chronic renal failure (See Renal Unit).

Several approaches to the control of streptococcal disease were outlined and excellent progress has been made from a basic study of organisms (Typing) to the development of an excellent educational package about rheumatic fever. Evaluation of the package is planned and the Review Committee emphasises the importance of attempting to include a health outcome as well as process outcomes in this and similar evaluations.

The committee also recognises the value that could be added with additional input to immunological assessments of correlates with long term sequelae of disease (also in collaboration with the Renal Unit) and supports the view that recruitment of an appropriately qualified immunologist would be of great value to the School. Vaccine related research should be encouraged, recognising that unless specific correlates of disease with a subset of organisms can be found the tremendous diversity will make vaccine development extremely difficult.

The committee welcomed the inclusion of an International Health Program at the Menzies School and commends the Northern Territory Government on its initiative in funding the project. In a short period, Dr Anstey and colleagues have initiated studies of clinical epidemiology of malaria and investigated a new diagnostic test to *P. vivax* malaria. Not only does his work provide opportunities for the international collaborations (that could be

increased with further external funding), but is amplified by the complementary studies with the Molecular Parasitology Unit. The Committee supports the view that opportunities for regional collaboration should be seen as an important aspect of the work of the School.

(5) Molecular Parasitology Unit

The work of the Unit is clearly of high international standard and reflects extremely well on Professor Kemp and his staff. Not only has the group made important findings in malaria and scabies but has had major input into studies of *Haemophilus*, Donovanosis and Melioidosis. It is particularly pleasing to note the integration of the work with collaborative projects in the School. It is unusual to be able to translate research efforts to clinical practice so rapidly and so effectively.

(6) Ear Health and Education Unit

The Unit is tackling a problem of major health significance in a multidisciplinary approach recognising medical, microbiological, and audiological aspects of disease and the challenges of cross-cultural health care. The randomised, placebo-controlled trial for prevention of chronic otitis media will provide important evidence as to whether early intervention with antibiotics can prevent serious complications of infections acquired early in life. The researchers recognise the importance of evaluating the emergence of antibiotic resistance during such programs so that overall impact of the program can be assessed to decide on its potential for

widespread application. The committee was impressed by the comprehensive program presented and the quality of the work being performed by the team and was pleased to know that discussions were taking place with the Territory Health Service to ensure sustainability of service to the community at the end of the research phase and application of results to communities at risk. The committee recognised the importance of linkages to social science research into factors associated with compliance and the need for continuing epidemiological surveillance for the reservoirs of infection.

(7) Diagnostic tests and accreditation

The Menzies School has been extremely successful in developing a molecular diagnostic test for donovanosis. It is important that funding be identified by the Commonwealth to fund a scientist at the Royal Darwin Hospital to transfer the test from a research environment to a diagnostic laboratory. The Menzies School is in a difficult situation if information obtained in the research setting is used as a diagnostic test that is used for clinical decision-making.

Similar situations will arise with future diagnostic tests.

(8) Public health and epidemiology

Improving Public Health continues to be the ultimate objective of all the work of the Menzies School. Collaboration between the Public Health and Epidemiology Unit and many other Units

ensures that research is based on a thorough understanding of the epidemiology of a disease increasing the probability that the results can then be translated into effective public health interventions. Dorothy Mackerras' work on the nutritional status of children has highlighted the importance of both underweight and overweight in the 7-15 year age group. Methods of communicating this relatively complex message back to the communities so that child growth can be appropriately monitored are being explored through collaborative work with the Territory Health Service. Mary Dorling's doctoral research on aspects of the sex industry in Indonesia illustrates the breadth of the research of this Unit and the contribution that qualitative methods can make to public health. John Mathews' work on the mathematical modelling of epidemics is an important new development which is contributing to the understanding of the spread of bacterial infections involving *Pneumococcus*, *Haemophilus* and Group A Streptococci. The Unit carries out useful consultancy work not only for the Territory Health Service but also through winning tenders such as that for the nutritional impact of the diesel leak on Groote Eylandt. Menzies School should ensure that it maintains its expertise in epidemiology and biostatistics, as there is undoubtedly a potential for increasing its research and consultancy work in quantitative analysis and evaluation, both in Darwin and Alice Springs, eg. an analysis of the 11 years of data from Alukura. There is a risk that, by grouping biostatistics with computing it will be seen as having purely a service role rather than being an academic discipline, which could make it difficult to attract and

maintain good biostatisticians, particularly if they are not given due recognition for their contribution to publications.

(9) Education and training

An important new development at the Menzies School in the last quinquennium has been the establishment of a coursework program in public health. While this was initially based on the Master of Public Health course at the University of Sydney and students were enrolled through the Faculty of Medicine there, since 1996 students enrolling in the Master of Public Health have done so in the Faculty of Science at Northern Territory University. This move not only attracted extra income, as Northern Territory University passes on 90% of HECS funding to Menzies School, whereas the University of Sydney regarded Menzies' students as being above their quota, but it is also appreciated by Northern Territory Government bodies, such as Territory Health Service, as an important contribution to the development of higher education in the Northern Territory.

Postgraduate research students have also begun to enrol through Northern Territory University when appropriate, while those with a medical background enrol through the Faculty of Medicine at either the University of Sydney or Flinders University. Thus, in the past five years, Menzies has developed new and increasing links with universities in its region, and its relationships with all three universities will undoubtedly continue to evolve in the next five years with the recent opening of the Northern Territory Clinical School of Flinders University.

The introduction of a local Master of Public Health is recognised as a significant step in improving the public health education in the Northern Territory. In common with most Master of Public Health courses in Australia, coursework units are taught by academics from a variety of universities, by hospital-based clinicians, and by those involved in health service delivery (Territory Health Service staff). While this diversity is a strength of the degree, it also has the potential to lead to lack of uniformity in the quality of the teaching. Academics at Menzies School should give whatever assistance is possible to those recruited from elsewhere in order to ensure that the courses delivered are of a uniformly high standard. Current plans to increase the flexibility of the coursework program should help to meet the needs of the students, and are in line with developments in other Master of Public Health courses around Australia. Some consideration should be given as to whether the number of students who have completed the coursework but not the treatise for the Master of Public Health is an indication that the research component is not an appropriate requirement for some students, or is simply a reflection of the difficulties under which part-time postgraduate students work in the NT.

(10) The Molecular Genetics Unit

The Unit has continued with its excellent work on Group A Streptococci. The development of a PCR-based method for typing different strains has revealed the very significant diversity and variability of Group A streptococcal strains circulating in the Northern Territory. Extensive

sequencing studies will contribute important information on the basis of this variability and will also contribute to important collaborative work with Professor Michael Good of QIMR aimed at developing a novel and effective peptide vaccine. The construction of a new shuttle vector that can be used to integrate novel genes into one of the six ribosomal RNA genes of the streptococcal genome provides an excellent system for introducing putative virulence genes into strains which can then be studied in tissue culture and in animal experiments (at the moment these will have to be carried out outside the Menzies campus). A number of potential virulence and invasion specific genes have been identified for use in these studies. Work on the organism *Calymmatobacterium granulomatis*, the causative organism of Donovanosis has established its extremely close phylogenetic relationship with *Klebsiella* and has also led to the establishment of two PCR based diagnostic tests that can be readily used to identify this organism. The finding that material from swabs is sufficient for this very sensitive test makes much more intrusive sampling such as biopsies unnecessary and greatly simplifies and improves the efficiency of screening for this organism. As outlined elsewhere, this advance coupled with chemotherapy makes the eradication of this disease a possibility. The development of a PCR-based test for *Chlamydia pneumoniae* is making possible a longitudinal study of over 5,000 samples collected by the School over a six year period.

The overall productivity of the Unit has been excellent, both in terms of publications

in major journals and in real contributions to important developments which are offering the possibility of significant improvements to the quality of life for many people.

6.4 Areas of Strengths and Weaknesses within the School

(1) Strengths

1. The excellent new Building and Facilities.
2. The calibre and dedication of the staff.
3. The number of diverse, challenging, highly significant and in some cases unique research programs being investigated at Menzies.
4. The working partnership and collaborations that the Menzies School is forging with indigenous people.
5. The ability of the School to link fundamental laboratory research to the solution of major public health concerns amongst indigenous and other members of the community.
6. The opportunity to demonstrate the value of research in significantly improving the quality of life for many under privileged Australians.
7. Involvement with the new CRC and the new linkages that have been established.
8. The opportunity to make important contributions to Public Health Education.

(2) Weaknesses

1. Relatively low population base of the Territory with the consequent difficulties in raising extra funds (The committee notes however the continuing and essential support from the NT Government).
2. Relatively small number of tenured staff which up until recently had limited the pool of researchers actively seeking research funds.
3. The remoteness which makes it more difficult to attract students and staff. (The facilities provided by the new building and the many research programs would certainly be able to accommodate more researchers). The committee would support efforts by the Director or Deputy Director to approach NHMRC or other funding bodies to determine whether current Fellowships could be modified or new ones created to allow joint appointments with other institutions (either sequentially or concurrently) in order to increase the (currently small) number of postdoctoral scientists in the School.
4. The fact that many of the evaluative reports are the results of consultancies with service providers rather than being independent initiatives may require the School to develop a more coordinated and strategic approach to facilitating effective transfer of research into practice. Such an approach needs to consider the multiple ways in which the School interacts with Aboriginal communities, health practitioners, service providers and policy makers but also needs to ensure that there are

effective strategies for disseminating to Aboriginal communities the findings of research and evaluation. Such feedback is essential to maintain the credibility of researchers within these communities. (The formation of a CRC may offer opportunities to overcome this problem).

5. Relatively inflexible rules of Granting Agencies may prevent the factoring in of the many constraints and special conditions associated with carrying out many of the research programs so central to the Menzies School.

6. The distance between Alice Springs and Darwin makes it difficult for the activities of the two sections of the School to be adequately integrated and fully informed.

6.5 The Proposals Made for the Next Quinquennium

The proposals for the next quinquennium are to be found in part, in the School's strategic plan, in the Overview report of the Director and in the many highly successful existing programs whose very existence makes a convincing claim for further study. The committee finds little to disagree with in any of these documents. However, it will take this opportunity to make some general comments about the future.

(1) New linkages

Development of further links with the Northern Territory University is to be

encouraged as long as the autonomy of the Menzies School is maintained. Even with that proviso there seems to be many opportunities for future developments that would benefit both the School and the University.

Participation in the Cooperative Research Centre for Aboriginal and Tropical Health offers many new and potentially important partnerships for Menzies School. The greatest problem will be for the various partners in the CRC, while making the most of new opportunities, to accept that the CRC cannot be a panacea to solve all of the pressing problems that exist in Aboriginal and Tropical Health.

(2) Increased growth

As mentioned elsewhere in the report, the new building and the many exciting and challenging research programs can accommodate more scientists (staff and students) than are currently at Menzies. The committee has already commented positively on the need for new positions in the Social Sciences and in Immunology. New joint positions with the Northern Territory University and other organisations will be required if the teaching commitment of Menzies is to be increased as outlined in the strategic plan and as discussed elsewhere in this document. The initiative of the School in trying to raise external funds is to be commended and the possibility of more short term staff visits or exchanges should be kept in mind. One other possibility discussed by the committee was to enquire of NHMRC as to whether it would be possible to spend the 'overseas' portion of

a CJ Martin Scholarship at the Menzies School, in recognition of the many unique public health problems that were being investigated here.

(3) Interaction with Aboriginal people

In the committee's view, Menzies School has pioneered major new initiatives in its interactions with the Tiwi people. It has a very articulate and strong leader of its Aboriginal Policy and Health Education Unit and clearly stated Aims for extending and improving its existing arrangements with Aboriginal people, assisting in their undergraduate and pre-university training, developing career paths and facilitating cross-cultural awareness. A sustained and mutually supportive relationship between the Menzies School of Health Research and Aboriginal people is seen by the committee to be absolutely critical and the committee believes that all these tasks must remain high on the School's agenda.

(4) Management structures

Organisational development is an ongoing process. The Review Team was provided with evidence that the management of the School had responded strategically to the ongoing development of the management and operation of the School. It is anticipated that over the next five years the internal and external operating environment of the School will continue to grow and transform. For instance, it might reasonably be expected that there will be:

(a) Continued growth of Menzies research program activities, and a

commensurate expansion of staff and other resources allocated to the School.

(b) Growing expectations in Aboriginal communities and health organisations for meaningful participation in the development of research priorities and collaboration in research projects.

(c) Growing opportunities to develop research projects in South-East Asia.

(d) The on-going development of the Cooperative Research Centre in Aboriginal and Tropical Health.

(e) A shift in the national funding of Aboriginal health research to support strategic research action, and the development of a more effective research to practice transfer.

(f) On-going opportunities to engage in applied research activities.

These changing dynamics will place new demands on the organisational structure and management of the Menzies School. It would be appropriate during the next five years for Menzies School to under-take a systematic examination of their organisational structure and management processes and their capacities to respond to these various changes.

(5) The Menzies Board and the translation of research into practice

The committee was very impressed with many of the research findings of the last five years. In many cases, they offer tantalising possibilities of having major beneficial influences on the quality of life of many people. In some cases, the realisation of these possibilities may require

collaboration and support from other bodies such as the Northern Territory Government or the Northern Territory Health Services and in all cases will require effective communication back to the Aboriginal people. The committee would urge the Board where possible to use its influence to help achieve these ends. We have commented elsewhere on what we perceive to be an under-representation of Aboriginal people on the Board and believe that further appointments would be beneficial.

(6) High quality laboratory research

The committee was very impressed with the quality of this research being carried

out at Menzies School and as it is our experience that the value of such research is not always appreciated in the midst of so many pressing problems in Public Health, we would make the following observations. Such research is central to attracting funding from bodies such as NHMRC and NIH and is an essential component of the excellent international reputation of the School. Its presence also ensures that the School can attract and retain some of Australia's best scientific minds. The various examples that have been discussed in the report of major benefits already flowing from this work should in itself, justify the continuance of its strong presence in the School.



Education & Training

The Menzies School of Health Research is committed to increasing the opportunities available for postgraduate training for health professionals and for health education and training for Aboriginal people and the wider Northern Territory community.

The research and education programs of the School are particularly concerned with Aboriginal health problems, health in rural and remote areas and in tropical or developing countries. The School's education programs are funded from both external sources (*eg.* PHERP) and from MSHR core funds.

Postgraduate Study

The academic standing of the Menzies School of Health Research is derived from its status as an extramural department of the Faculty of Medicine of the University of Sydney and postgraduate research students at the School may enrol for higher degrees of the University of Sydney. The School has also finalised an agreement with the Northern Territory University and in 1996 the first postgraduate research students enrolled with the Northern Territory University. Through an affiliation with the Clinical School at the Royal Darwin Hospital, the School has strengthened its links with Flinders University of South Australia offering additional opportunities for postgraduate study at MSHR. Postgraduate coursework degrees in public health accredited by both the University of Sydney and the Northern Territory University are available through the School.

Postgraduate Research Degrees

Postgraduate research students are supervised by senior staff of the School who hold University of Sydney academic titles. These include Professors John Mathews and David Kemp, Senior Lecturers Dr Peter d'Abbs and Dr KS Sriprakash, Lecturers Dr Joan Cunningham and Dr Komla Tsey and Clinical Associate Professor Dr Bart Currie. Dr Ross Bailie holds an academic appointment with Flinders University of South Australia as Senior Lecturer in Public Health, and it is anticipated that Public Health teaching staff will also hold Northern Territory University appointments in the future.

In 1998-99, one Master of Science student, two Master of Science in Medicine students and four PhD students joined the School, bringing the total enrolled in higher degrees by research to 31.

Students enrolled during 1998-99 are listed in Box 1 (p. 45), along with their area of research.

Current funding support includes:

Menzies Scholars	4 students
NHMRC	3 students
Australian Kidney Foundation	2 students
Cooperative Research Centre for Aboriginal & Tropical Health	3 students
New Children's Hospital	1 student

New 1998 Menzies Scholar

Dr Craig Boutlis, previously employed as an Infectious Diseases Registrar with the Monash Medical Centre in Melbourne, has been granted a Menzies Scholarship to undertake a Master of Science with the NTU. Entitled *Investigation of relationship between nitric oxide and pathogenesis of malaria with respect to (i) antiparasitic effects and (ii) antidisease effects*, Craig's research aims to study the role of nitric oxide in the immunopathogenesis of malaria.

Visiting Students

Elective term students

The School recognises the value of undergraduate medical experience in the Northern Territory and each year provides places for Australian and overseas medical students to undertake elective terms. Students are given the opportunity to carry out a small research project as well as assisting medical staff with general clinical duties.

Bernie CHANGSIRI	Sydney University	05.12.98 - 20.01.99
John NIROSHINI	University of Melbourne	06.12.98 - 01.01.99

1

Thesis Topics of Research Students 1998-99Doctor of Philosophy (PhD)

Philip BAKER	Cost-effectiveness of screening and treatment of renal disease
Jillian BARCLAY	Royal Flying Doctor Service – The nurses' story
Alan CLOUGH	Health effects of heavy use of kava and alcohol in eastern Arnhem land
John CONDON	Health services and other factors which effect cancer survival in Aboriginal people in the Northern Territory
Pearly HARUMAL	The molecular biology of scabies
Deborah HOLT	The identification of the clag gene family of <i>P. falciparum</i> by positional genetics
Rowena IVERS	Quit smoking health promotion materials for Aboriginal people
Katherine KEMP	Cross-cultural communication in the health care setting: In particular intensive care
Tai Pong (Daniel) LAM	A study of the effects of land migration on the health of the water people in Hong Kong and implications for clinical practice
Stephen McDONALD	Correlation of vascular and renal disease with their risk factors in an Aboriginal community
Gurmeet SINGH	The impact of intrauterine and infant nutrition on the development of the kidneys in Aboriginal children
David THOMAS	A history of Aboriginal health research
Emiliana TJITRA	Clinical features and predictors of malaria: Comparison between areas of different endemicity in East Indonesia
Andrew WHITE	Antecedents of renal and cardiovascular disease in Aboriginal children

Theses under examination

Mary DORLING	“‘All the Prostitutes Come from Java’: Structure, Organisation and Diversity in the Sex Industry in Kupang, Nusa Tenggara Timur and Risk for HIV and Other Sexually Transmitted Diseases”
Peter MORRIS	“Improving Medical Services for Otitis Media and Other Chronic Bacterial Respiratory Diseases in Rural and Remote Australian Aboriginal Children : The Systematic Approach”
Susan SAYERS	“Birth Antecedents and Outcomes for Aboriginal Babies Born at the Royal Darwin Hospital 1987-1990”
Heidi SMITH-VAUGHAN	“Carriage Dynamics and Genetic Diversity of <i>Haemophilus influenzae</i> in Infants with Otitis Media at a Remote Aboriginal Community in Northern Australia”

Continued ...

Richard WEIR "A Longitudinal Study of Arboviruses and Their Association with Medical and Veterinary Disease in the Northern Territory, Australia"

Theses awarded

Jonathan CARAPETIS "Ending the Heartache : The Epidemiology and Control of Acute Rheumatic Fever and Rheumatic Heart Disease in the Top End of the Northern Territory"

Garry MYERS "Analysis of a Chlamydial Gene Cluster Encoding Novel Membrane Proteins"

Shelley WALTON "*Sarcoptes scabiei* : A Molecular Approach to Immunological and Epidemiological Aspects"

Master of Public Health (Research)

Sreedevi AITHAL Otitis media and speech perception in cross-language context

Venkatesh AITHAL Behavioural and electrophysiological studies in binaural hearing with Aboriginal children

Ofra FRIED Cross-cultural issues affecting the medical management of terminally ill Aborigines in Central Australia

Nandor JAROSS Diabetic retinopathy in the Top End of Australia in the light of ophthalmic services in the Top End: An analysis of current and future need in relation to current and predictive prevalence and pattern of eye disease

Master of Science in Medicine (MScMed)

Alan CASS Renal morphology in Aboriginal Australians

Graeme MAGUIRE Chronic lung disease in Aboriginal Australians

Master of Science

Craig BOUTLIS Investigation of relationship between nitric oxide and pathogenesis of malaria with respect to (i) antiparasitic effects and (ii) antidisease effects

Jodie LOW CHOY Veterinary aspects of melioidosis

Danielle SMITH Child growth promotion

Jiqiong YOU Component cost analysis of maintaining renal dialysis for Aboriginal patients in the Northern Territory

Bachelor of Medical Science

Thesis under examination

Megan HIBBLE "Molecular and Immunological Properties of Group A Streptococci in an Endemic Region"

Public Health Teaching

Aim of the program

The aim of the public health coursework program was endorsed at a planning workshop in early 1998:

“To provide and support public health training throughout central and northern Australia (and neighbouring regions) in a form that is appropriate to the specific needs of this area.”

To this end the program pays particular attention to Indigenous health, to populations living in tropical environments, and to populations living in remote environments.

Background to the development of the coursework program

In line with the mission of MSHR a coursework program in public health was established by the School in 1993. The program was based on the Graduate Diploma and Master of Public Health courses at the University of Sydney, students were enrolled through the Faculty of Medicine at the University of Sydney, and the program was taught with some assistance from the Department of Public Health. The intention of having the program more firmly based in the Territory was realised when the program was accredited by the Faculty of Science at the Northern Territory University in 1995, and students were enrolled with this Faculty from 1996. MSHR, however, has retained full responsibility for the planning and operation of the program, and the Sydney course has been substantially adapted to suit the particular needs of people working in central and northern Australia.

Recent developments

A number of significant developments evolved from the 1998 planning workshop, including:

- a revision of the unit structure to make the program more consistent with that used by NTU and other universities;
- the re-accreditation of the Masters and Graduate Diploma awards (as required on a regular basis by NTU). This has included major revisions to a number of existing units and the development of a number of new units to keep up with evolving demands;
- the introduction of two new awards: the Graduate Certificate and Professional Doctorate in Public Health. The introduction of these awards increases the range of entry and exit points to the coursework program, and should increase the accessibility of the program to students;
- the introduction of a coursework only option for the Master of Public Health award. This option may be more suitable for students intending to work in a service rather than research environment;

-
- the signing of a new Memorandum of Understanding between MSHR and NTU which establishes MSHR as an Adjunct Faculty of Public Health. The MOU will allow MSHR and NTU to work more effectively in partnership for the development of public health teaching and research for the benefit of the Northern Territory and the region.

Mode of delivery and structure of the program

The program will continue to be taught predominantly in external mode, with a residential requirement of one week in each semester. This is believed to be the most suitable mode of delivery for potential students in the region, but we shall continue to examine ways of facilitating access to the program. This will include increasing the number of units available through short courses and in entirely external mode. The four awards within the program represent a progression from relatively basic postgraduate training to advanced training. Students can upgrade from one award to a higher award with full credit for work completed. Depending on the award, completion may be within a minimum of one year and a maximum of ten years.

Slightly more than half of the coursework is made up of core and compulsory units, and includes units on:

- History and Philosophy of Public Health;
- Research Methods (including epidemiology and biostatistics);
- Demography;
- Health Sociology;
- Organisation and Management of Health Services;
- Health Promotion & Communication;
- Health Economics;
- Approaches to Problems in Public Health.

Students choose from a wide range of elective units to make up the balance of the coursework. Elective units currently include:

- Aboriginal Traditions of Health, Healing & Nurturing;
- Aboriginal Society, Culture & Health;
- Public Order & Public Health among Aboriginal People;
- The Political Economy of Aborigines in Central & Northern Australia;
- International Health & Development;
- Child Health;
- Nutrition Issues in the Developing World (emphasising Aboriginal issues) ;
- Nutritional Epidemiology;
- Introduction to Alcohol & Other Drug Issues;
- Alcohol & Other Drug Issues among Indigenous Australians;
- Epidemiology of Non-Communicable Disease;
- Epidemiology of Communicable Disease;
- STD including HIV;
- Mycobacterial Infections;
- Vector Borne Infections;
- Models of Health Service Delivery;
- Ethics of Medical Research & Service in Aboriginal Settings;
- Health Surveillance Systems & Records;
- Evaluation of Health Programs.

The following new elective units have been introduced this year:

- Environmental Health in Central & Northern Australia;
- Gender and Health;
- Vaccination;
- Epidemiological Modelling;
- Special Project / Reading Unit;
- Demography & Health Planning in the NT / "Extended" Demography.

Students are also able to access approved units from other institutions in Australia, and are able to credit approved short courses towards their degree. Links with Flinders University include cooperative organisation and teaching of some units and short courses.

The following short courses have been (or will be) run this year. These are available to a wider audience than enrolled coursework students, and present an opportunity for further study for people who do not wish to undertake a full course of study and are interested in specific topics.

- "Evidence Based Health" – in conjunction with the Australasian Cochrane Centre;
- "Leadership in Public Health" – by Professor D'Arcy Holman (University of Western Australia);
- "Environmental Health in Central and Northern Australia" – to be run in Alice Springs in October 1999, in conjunction with several other academic and service organisations.

There are also plans to develop the unit on "Introduction to Health Information & Health Research" for delivery as a short course specifically to meet the needs of local health service organisations. Other topic suggestions for inclusion in short courses have included:

- Evaluation of Health Programs;
- Economic Evaluation of Health Programs;
- Priority Setting in Health;
- Integrated Health Service Delivery to Provide Comprehensive Services;
- Information Systems;
- Public Health & Chronic Disease

In line with three important reviews undertaken within the past year (the PHERP Specialty Program Review, the Menzies Quinquennial Review, and the review of the overall National PHERP Program) we shall be developing the program to facilitate access to a broader range of people involved in public health, and specifically seeking ways to facilitate access to Indigenous students. We shall also be identifying areas in which we can make a special contribution to the national network for public health education, and seeking collaborative links with institutions that can make useful contributions to our program.

Staff and program management

The program is coordinated by Ross Bailie. Liz Stubbs, who has done an excellent job in providing academic administrative support to the program for a number of years has taken up a research opportunity within the School, and we are in the process of recruiting a new academic administrator. Audrey Langlands continues to provide excellent general

administrative support. Accountability for the coursework programs is currently to the University of Sydney Faculty of Medicine for students enrolled prior to 1996, and to the Northern Territory University Faculty of Science for students enrolled since 1996. All of the students enrolled through Sydney University have now completed the coursework components of their studies, with only a few yet to complete their treatises.

The MSHR Coursework Management Committee has immediate responsibility for coursework management, and reports to the MSHR Postgraduate Studies Committee. Membership of the Coursework Management Committee includes unit coordinators, administrative support and student representatives as follows:

Dr Ross Bailie (Program Coordination)	
Ms Liz Stubbs (Academic Administration)	
Mrs Audrey Langlands (General Administration)	
Dr Joan Cunningham	
Ms Jenny Powers	[until 12.98]
Dr Peter d'Abbs	
Dr Komla Tsey	
Dr John Wakerman	[until 12.98]
Dr Dorothy Mackerras	
Professor John Mathews	
Ms Janice Money (Student Rep)	[until 12.98]
Ms Pam Gollow (Student Rep)	
Ms Letitia Del Fabro (Student Rep)	[from 02.99]

Through the establishment of MSHR as an Adjunct Faculty of Public Health of NTU we are committed to adopting a structure consistent with the NTU faculty structures, and a process to achieve this will result in a revised structure by late 1999. This will include the establishment of a Faculty Board and Course Advisory Committees.

Teaching staff

More than thirty people have contributed to the teaching program over the past year, and these include full and part-time MSHR staff, and staff who contribute to the program on a 'casual' or contract basis, but who are principally employed by other organisations (or are self-employed). Part-time and casual staff have been employed, at least in part, by THS, Flinders University, ABS, NTU, University of Sydney, University of Newcastle and Royal Darwin Hospital (RDH).

People who have contributed to teaching for the program in the past year, their main institutional affiliation (at the time of teaching – some of these have changed recently) and their teaching responsibilities are listed on the following page.

Mrs Ann Alderslade	Chief Librarian, THS Central Library : <i>Literature Searching.</i>
Dr David Ashbridge	Deputy Regional Director, Operations North, THS : <i>History and Philosophy of Public Health.</i>
Mr Anthony Barnes	National Director, NCATSIS, Australian Bureau of Statistics : part of <i>Demography.</i>
Dr Ross Bailie	Course Coordinator, MSHR : <i>Approaches to Problems in Public Health and Case Studies in Public Health.</i>
Ms Carol Beaver	THS : <i>Health Economics.</i>
Professor David Brewster	Clinical Dean, Flinders University Northern Territory Clinical School : <i>Child Health.</i>
Dr John Condon	Director, Epidemiology Branch, THS : part of <i>Demography; Introduction to Health Information and Health Research.</i>
Dr Christine Connors & Ms Robin Williams	respectively Darwin Remote Services, THS, and Faculty of Aboriginal and Torres Strait Islander Studies, NTU : <i>Gender and Health.</i>
Dr Joan Cunningham	Director of Research, NCATSIS, ABS : <i>Research Methods (Epidemiology); Introduction to Health Information and Health Research.</i>
Assoc Professor Bart Currie	Head, Tropical Medicine & International Health Unit, MSHR; Staff Specialist RDH : <i>Vector Borne Infections.</i>
Dr Peter d'Abbs	Social Scientist, MSHR : <i>Introduction to Sociology and Health; Introduction to Alcohol and Other Drugs; Alcohol and Other Drugs in Indigenous Australians.</i>
Dr Anthea Duquemin	THS : <i>Evaluation of Health Programs.</i>
Dr Gill Hall & Dr Sandy Thomson	Population Health Unit, Alice Springs, THS : <i>Vaccination.</i>
Ms Beverley Hayhurst	Project Manager, Renal Unit, MSHR : <i>Health Promotion and Communication Skills.</i>
Dr Sam Heard	Director, GP Education and Research Unit, Flinders University NT Clinical School : <i>Health Surveillance Systems and Records; Models of Health Service Delivery.</i>
Dr Paul Kelly	DMO, Darwin Remote Services, THS : <i>International Health and Development.</i>
Dr Vicki Krause	Program Director, Centre for Disease Control, THS : <i>Mycobacterial Infections.</i>
Ms Alison Laycock	Aboriginal Health Strategy Unit, THS : assisted with the development of <i>Health Promotion.</i>
Mr Colin MacDougall	Department of Public Health, Flinders University : <i>Principles of Management and Planning.</i>
Dr Dorothy Mackerras	Epidemiologist, MSHR : <i>Nutritional Epidemiology; Nutrition Issues in the Developing World; Treatise Development.</i>
Professor John Mathews	Director, MSHR : <i>Approaches to Problems in Public Health and Case Studies in Public Health.</i>

Dr Angela Merianos	Head, Immunisation and Surveillance, Centre for Disease Control, THS : <i>Epidemiology of Communicable Disease.</i>
Professor Gavin Mooney & Mr Alan Shiel	respectively Associate Professor and Senior Lecturer in Health Economics, Department of Public Health, University of Sydney : <i>Introduction to Health Economics.</i>
Ms Jenny Powers	Biostatistician, University of Newcastle : <i>Biostatistics.</i>
Ms Cheryl Rae	Manager Public Health, THS : <i>Nutrition Issues in the Developing World.</i>
Dr Gary Robinson	Lecturer, Department of Sociology, NTU : <i>Introduction to Sociology and Health.</i>
Dr David Scrimgeour	Medical Officer, Traveller's Vaccination Centre (previously Senior Research Officer, MSHR Alice Springs Unit) : <i>Epidemiology of Non-Communicable Disease.</i>
Dr Christine Selvey & Ms Nan Miller	Centre for Disease Control, THS : <i>Vaccination.</i>
Dr Komla Tsey	Head, MSHR Alice Springs Unit : <i>Research Issues in North and Central Australia; Aboriginal Traditions of Health, Healing and Nurturing; Aboriginal Society, Culture and Health; Public Order and Public Health Among Aboriginal People; Political Economy of Aborigines in Central and Northern Australia.</i>
Professor Ram Vemuri	Faculty of Business, NTU : <i>Health Economics and International Health and Development.</i>
Dr John Wakerman	Senior Research Fellow, MSHR Alice Springs Unit : <i>Health Services in Northern Australia and Beyond; Principles of Management and Planning.</i>
Dr Tarun Weeramanthri	Community Physician, THS : <i>Epidemiology of Non-Communicable Disease; Ethics of Medical Research and Service in Aboriginal Settings.</i>
Mr Peter Whelan	Senior Medical Entomologist, Medical Entomology Branch, THS : <i>Vector Borne Disease.</i>

A number of other people have contributed in a visiting or guest lecturer capacity.

Student and graduate profile

Graduates and currently enrolled students are predominantly based in the Territory, with others spread across Australia and overseas. To date nine students have graduated from the NT program, five with a Master of Public Health and four with a Graduate Diploma. The background of students is very variable. As of July 1999, enrolments stand at forty-six, with an additional six students auditing units in the program and another twelve students from other institutions cross-enrolled to do one or more of our units. Box 2 on page 54 shows the MPH coursework treatises submitted during the year.

Funding for the program

DETYA funding

Menzies does not have a DETYA profile, and cannot claim HECS fees directly. Students enrolled through the University of Sydney bring no funding to MSHR, as they are regarded by the University of Sydney as being 'above quota'. In accordance with the Memorandum of Understanding signed between MSHR and the Northern Territory University, the University passes on 90% of HECS funding to MSHR up to a maximum of five EFTSUs (this is based on an average annual enrolment of 15 students taking an average of three years to complete the coursework).

PHERP funding

Two Specialty Program Grants were awarded to MSHR in 1995 for three years and extended for one year to include 1998. The grants were to support research and education in STD/HIV and communicable disease, and Aboriginal health, and have been used in part to fund the coursework teaching program. Additional Commonwealth funding has been secured for 1999 to bridge the gap until the new funding cycle for the national PHERP program in 2000.

Other funding

Other MSHR staff with a major commitment to the program are supported out of core or Fellowship funding.

Titles of MPH Treatises Submitted During the Year

Student	Status	Supervisor	Title
Rowena IVERS	Graduated	Tarun Weeramanthri (THS)	“‘Healthy Adult Checks’ – An Evaluation of Preventative Health Activities for Adults in Two Remote Aboriginal Communities”
Tania SHELBY-JAMES	Graduated	Amanda Leach (MSHR), Dorothy Mackerras (MSHR)	“Molecular Epidemiology of <i>Streptococcus pyogenes</i> (Group A Strep) in the Upper Respiratory Tract and Skin of Aboriginal Schoolchildren Receiving a Single Dose of Azithromycin for Trachoma”
Yvonne WOOD	Graduated	Peter d’Abbs (MSHR), Alan Ruben (THS)	“The Opinions and Attitudes of Darwin Pool Owners Towards Risk, Responsibility and Swimming Pool Fencing”
Bruce McLAREN	Under examination	Julia Shelley (LaTrobe)	“How do Victorian General Practitioners Manage Bleeding in Early Pregnancy? Care Provided by Victorian General Practitioners of Women Experiencing First Trimester Miscarriage”
Patricia FIELD	Under examination	John Wakerman (MSHR)	“A Review of Territory Health Services Planning Processes for Primary Health Care Services in Central Australia”
Deborah SINGH	Under examination	Peter d’Abbs (MSHR)	“Factors that Enhance the Role of Women in Baha’i Community Health Work Programs”
Jeffrey STANDEN	Under examination	Peter d’Abbs (MSHR)	“A Study of an Aboriginal Environmental Health Worker Program in the Top End of the Northern Territory”



Cooperative Research Centre for Aboriginal & Tropical Health



CRC Management Team :
Ms Terry Dunbar (Business Manager), Professor Tony Barnes
(Director), and Ms Sally Matthews (Deputy Director)

The Cooperative Research Centre for Aboriginal and Tropical Health (CRCATH) was created as a joint venture between six core partners in 1997. In addition to MSHR, the core partners are Central Australian Aboriginal Congress, Danila Dilba Aboriginal Medical Services, Territory Health Services, Flinders University of South Australia and the Northern Territory University. The CRC receives funding from the Commonwealth Government on the basis of one dollar for two 'in-kind' dollars contributed from partner organisations. MSHR is the major 'in-kind' contributor. The CRC has its own Annual Report to which readers are referred for further information than the summary provided below.

The poor health of Aboriginal Australians has been extensively described in numerous research papers and administrative reports over many years. Despite the wealth of descriptive and analytical knowledge, there has been no commensurate improvement in the health outcomes. In the past years, this state of affairs contributed to a significant disillusion with the research process amongst Aboriginal and health service stakeholders.

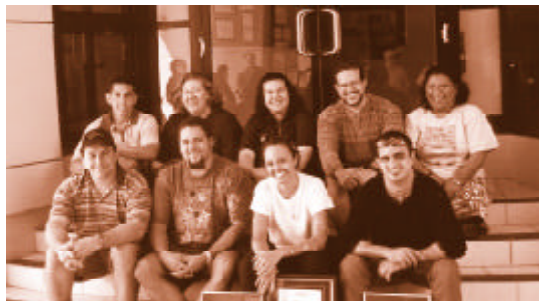
In responding to this challenge, this CRC has created itself as an important new partnership between academic researchers, health service providers, and Indigenous stakeholders. The partners are now working together to discover, explain and disseminate knowledge about:

- the social, educational and biological causes of the poor health of Aboriginal Australians;
- the social, educational, administrative and health service actions necessary to bring about sustainable improvements in health;

- the most effective means of implementing and evaluating necessary social changes, policies and practices;
- the importance of Aboriginal ownership of the planning and implementation of research and the development of initiatives through the CRCATH;
- the importance of transferring knowledge and skills in research, evaluation and health development to Aboriginal people to bring about sustainable improvements in health.

Research as a Guide to the Understanding of Poor Aboriginal Health

Biomedical and public health research programs have been important in defining the disease burdens for Aboriginal Australians, and in identifying the environmental causes such as infection, poor nutrition, substance abuse and accidents. Social research has highlighted cultural disruption, poverty, unemployment, poor education, poor administration and poor housing at higher levels in the causal chain.



CRC Trainees :

Back (L-R) : Karl Gundersen, Sarah Walton, Leah AhMat, Mark Mayo and Loyla Leysley
 Front (L-R) : Peter Thomsen, Joseph Fitz, Melita McKinnon and Masun Nasir

The understanding that comes from such research provides a theoretical rationale for the social, educational, medical and public health interventions that are needed to improve Aboriginal health, but it does not explain how the necessary changes might be most effectively implemented.

Understanding Cooperative Partnerships and Action Health

Although the academic approach can help identify what changes might be needed to improve Aboriginal health, it cannot solve the practical problem of how such changes might be achieved. Change in the health care system, including the necessary behavioural changes amongst policy-makers, administrators, health-care professionals and Aboriginal clients, will only become possible if Aboriginal people are themselves directly involved in the planning and problem-solving process.

Through the CRCATH Board, Aboriginal stakeholders are now setting research priorities. In a number of programs, Aboriginal researchers and community leaders are already working in cooperative partnership with researchers and health service providers to identify the most effective strategies for change. This requires a process of iterative consultation, integral to action research, to build mutual trust and understanding between the partners. The trust helps to ensure that knowledge and understanding of cultural differences can be shared to inform each step in the action research agenda. The ultimate goal is to help all the partners to

understand how best to change the health system, and how best to apply knowledge and skills from both the Aboriginal and Western traditions of public health and medicine.

Sustainable innovations in Aboriginal health policy and practice will flow from the cooperative ethos of the CRCATH, from existing knowledge delivered by all the CRCATH partners, and from new knowledge acquired through its research and development programs. However, in the modern world, health services must make the best use of available financial resources. Thus, our CRC has both the opportunity and an implicit responsibility to explore the costs and benefits of different Aboriginal health strategies, to identify new financial resources, and to help provide leadership in setting expenditure priorities.

Investing for Disease Prevention and Treatment

In several respects, health expenditures are not optimised to deliver the 'best buys' for Aboriginal Australians. There is over-consumption of services by the 'worried well' in many sectors of society. In contrast, there is under-consumption of services by Aboriginal citizens with the greatest burdens of preventable or treatable disease.

The effectiveness of many treatment and prevention strategies is unknown. Strategies are often chosen arbitrarily rather than on the basis of evidence, and even those that are known to be efficacious under ideal circumstances may prove to be ineffective in practice because of inadequate resources, poor compliance or

for other reasons.

The allocation of financial resources to maximise cost-effectiveness of health services is complex. A particular challenge for this CRC is to link expertise in evidence-based medicine and public health with expertise in cost-benefit analysis and to develop case studies to persuade governments that greater investment in Aboriginal health is one of the 'best buys' that can possibly be made.

The Year In Review

One of the most important issues addressed in the past year was that of strategic planning. In the early life of the CRCATH, our research agenda was greatly influenced by the prior interests and capabilities of research partners, and by their obligations to deliver in-kind projects from existing resources. The CRCATH Board brought a breadth of expertise, and a commitment to ensure that strategic priorities would be set in accordance with the wishes of Aboriginal people. It became clear that Board priorities would not be met if research priorities were conceived on a project-by-project basis and if proposals were fully developed before seen by the Board. Subsequently, a two-stage process was adopted whereby researchers were asked to prepare detailed proposals only for those research ideas approved by the Board on the basis of a short synopsis. This increased the work load for the Board, the Executive Committee and Program Leaders. Despite much goodwill, there were practical difficulties of communication between so many busy people from different backgrounds.

However, there has now developed a new perspective: a mutual recognition of previous differences and a greater commitment to shared strategic objectives. CRCATH values 'action research' and research and training initiatives that enhance both the skills of participating Aboriginal people and the effectiveness of health services for Aboriginal people.

The management of the CRCATH was put under great strain during its establishment: the Director and Deputy Director were both part-time positions and there were a number of staff changes among the Program Leaders. With the expected appointment of Professor Tony Barnes in early August 1999 as full-time Director and Ms Sally Matthews who commenced as full-time Deputy Director in March 1999, the executive capacity of the CRCATH will be ensured. Ms Terry Dunbar has been most effective as Business Manager since the inception of the CRCATH, ably supported by Administrator Mrs Liz Williams.

The CRCATH has emerged from an important development phase during which it worked through a range of issues. It has made substantial progress towards establishing a new paradigm for

cooperative research, problem solving and training that will develop and support the knowledge, and skills of Aboriginal people and communities, and will strengthen the links between health research, policy, practice and health consumers.

Aboriginal people will, thus, have the capability to plan and implement solutions to their own health problems. Through their working relationships with government health services, and with the evidence gained through the CRCATH, Aboriginal communities and organisations will have the influence and information necessary to justify the increased resources needed to put their plans into action.

Thanks and Acknowledgements

It is a pleasure to thank all participants in the CRCATH: the partner organisations, the Chairperson and Members of the Board, the Members of the Executive Committee and the Secretariat, and the researchers, health service providers, policy-makers, administrators and Aboriginal community members who have done so much to make the work on the CRCATH so challenging, interesting and so potentially valuable.

Centre Management

Professor Tony Barnes	Director	ph : 08.8922 8473 email : tonyb@menzies.edu.au
Ms Sally Matthews	Deputy Director	ph : 08.8922 8854 email : sallym@menzies.edu.au
Ms Terry Dunbar	Business Manager	ph : 08.8922 7862 email : terryd@menzies.edu.au
Mrs Liz Williams	Administration Officer	ph : 08.8922 7861 email : liz@menzies.edu.au

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Collaborative Initiatives

Tiwi Legal Agreement

In October 1998, the Menzies School of Health Research and the Tiwi Health Board signed an historic Legal Agreement providing for an ongoing research partnership with the Tiwi people.

The Agreement provides the Tiwi with the right to exercise control over research being conducted in their community. It respects cultural beliefs and gives legal force to the protection of Tiwi people as research participants, providing greater ethical protection than can currently be guaranteed under NHMRC guidelines alone.

The Agreement also regulates the use of research samples, both by the School and by third parties to any research projects. It allows projects to be completed in accordance with protocols approved by the Tiwi Health Board and provides procedures incorporating the wishes of next of kin for dealing sensitively with samples from, or relating to, deceased persons.

A copy of the Agreement is available on the MSHR website at : www.menzies.edu.au.



Alberta Puruntatameri (THB) and Val Asche (MSHR Board) signing the Legal Agreement

Memorandum of Understanding Signed with Northern Territory University

In June 1999 the Menzies School of Health Research and Northern Territory University signed a Memorandum of Understanding providing a partnership agreement for the provision of public health education and training relevant to the Northern Territory.

Under the three year MOU, the Menzies School of Health Research will become an "Adjunct Faculty of Public Health of the



L-R : Richard Ryan, Nan Giese, John Mathews and Ron McKay signing the MOU

Photo courtesy : Baz Ledwidge, NTU

Northern Territory University”, while recognising that MSHR retains its status as an independent statutory authority.

Public health students enrolled through MSHR will have access to additional courses and scholarships on the same basis as students at NTU and will be encouraged to take part in the academic and social life of the University.

Further information on the public health education programs can be found in the *Education & Training* section of this Annual Report.

Letter of Agreement with NIHRD, Jakarta

In July 1998, the School signed a Letter of Agreement with the National Institute of Health Research and Development, in Jakarta. This formalised arrangements for the Malaria-Tuberculosis Research Collaboration with the Indonesian Ministry of Health in Eastern Indonesia, and will provide a framework for future collaborative research activities. In September, the School was fortunate to host a visit by the Director of the NIHRD, Professor Umar Fahmi Achmadi, and the Head of the NIHRD’s Communicable Diseases Research Centre, Dr Sumarjati. This provided a valuable opportunity to establish cooperative research priorities and to explore potential future training and research opportunities provided by the Agreement.



Back (L-R) : Dr Nick Anstey and Professor John Mathews
Front (L-R) : Professor Umar Fahmi Achmadi, Dr Sumarjati and Dr Emiliana Tjitra

Tuberculosis Control Program in Indonesia

In February 1999, the Menzies School of Health Research commenced work on an *AusAID*-funded World Health Organization tuberculosis project. In collaboration with the Indonesian Ministry of Health, the project aims to improve TB diagnosis and treatment in Indonesia. Specific objectives include capacity building, human resource development and a drug resistance survey.

Dr Paul Kelly, a public health and TB specialist, and Ms Kay Withnall, a laboratory scientist, have been employed by MSHR to work on this project in collaboration with WHO, Indonesian Ministry of Health and Territory Health Service employees.

Wellcome-Funded Snakebite Studies in Collaboration with Oxford University and the Liverpool School of Tropical Medicine

Clinical Associate Professor Bart Currie received a Wellcome Short-term Travelling Fellowship in 1998. The following is his report.

In 1998 I was fortunate to get a Wellcome Short-term Travelling Fellowship. This enabled us to spend five months in Oxford. Three months of this was my sabbatical from MSHR/THS – the first time in over 10 years that I had no clinical responsibilities – no beeper and no excuse for being late to meetings, or for departing early! I spent most of my time on one of my favourite topics – snakebite and venoms.

My sponsor and mentor for this was David Warrell, Professor at the Centre for Tropical Medicine, Nuffield Department of Clinical Medicine, University of Oxford. The specific work the Wellcome Trust supported was a study of venom levels in patients bitten by various Australian snakes. Why Oxford? Because at present there is nowhere in Australia that can do this work. This is an extension of work initiated in Papua New Guinea by Professor Warrell in collaboration with Professor David Theakston in the Venom Research Unit at the Liverpool School of Tropical Medicine.

The concept is simple – Sandwich ELISA assays are developed to measure the amount of venom circulating in the blood at various time points. Each snake group needs its own assay, *eg.* brown snakes, mulga (“king brown”, but really a “black” snake), taipan and death adder. We can use these assays to determine : a) which snake bit the person; b) whether a given dose of antivenom has been enough to neutralise all circulating venom (venom level drops to zero); and c) whether any first aid applied to the patient has been effective in stopping venom absorption (venom level rises after release of first aid).

Alison Richards in Professor Theakston’s lab has been working on developing these assays with collaborators around the world. Bringing this science to the ‘art’ of snakebite treatment has shown that in some countries the antivenoms used are either ineffective or used in too low a dose, while in others the antivenom doses given are often larger than necessary. Various first aid methods have been shown to retard venom absorption more effectively than others.

So what about Australia’s situation? The preliminary results : a) confirm the clinical suspicions that brown snake antivenom is ‘under-dosed’; b) suggest that mulga (black), death adder and taipan antivenoms are effective at neutralising circulating venom, usually in doses of one to two ampoules; and c) support concerns that crepe bandages are often ineffective in preventing venom absorption. There is now growing enthusiasm amongst medical colleagues around Australia to use quantitative venom assays to answer these important clinical questions about antivenom dosing and best practice first aid in snakebite. This will require bringing the venom assays for Australian snakes back to Australia from the UK and making them available for all interested clinicians; a project for the new millennium well suited to Darwin and MSHR, being surrounded by the wonderfully exciting fauna of tropical Australia.



Kidney Disease : Lessons from Aboriginal Australia



Dr Wendy Hoy MB BS BScMed FRACP

The kidney program at MSHR had its beginnings in 1989. It was a response in part to a request of the Tiwi Land Council, its earliest supporter, “*to find out the cause of kidney failure in our people and do something about it*”. Professor John Mathews, Dr Paul van Buynder and Dr David Pugsley led the charge in the early years, and the team and its activities have continued to expand during this decade.

Nephrology, the medical science of kidney disease, is a young discipline. The main impetus to its coalescence into a specialty in the mid-1960s, was the potential for widespread application of dialysis and transplantation to sustain life for people with irreversible kidney failure. For 30 years, the main focus of the discipline and main source of practice income has been refinement of these technologies, and the biology and care of the patients they support, while the origins, natural history and modification of the



John Mathews and David Pugsley
meet with the Tiwi men
Photo courtesy : NT News, 1991

processes leading to kidney failure have been relatively neglected. Now, however, an explosion of kidney failure in most Indigenous and transitional people in the developing world is directing attention to these issues, to which our program is dedicated.

The study of serious disease in high risk populations is justified, not only to arrive at strategies for prevention and containment, but also to illuminate disease associations, risk factors and mechanisms that might also apply in the broader population, but are often obscured by lower disease rates and a less risk-ridden environment. We have been privileged, in partnership with the Tiwi people, to make progress in both areas.

Through an epidemiologic and community-based approach, rather than an exclusive focus on individuals with disease, we have found that the expression and progression of kidney disease is influenced by many factors, which often operate simultaneously, the ‘multideterminant model’. We have also found that traditional interpretations of microscopic

features of kidney biopsies are of limited use in illuminating 'cause'. Finally, we have shown that kidney disease is intimately related to cardiovascular disease and other chronic 'lifestyle' diseases, through shared risk factors as well as clinical markers. These findings challenge 'single cause' models of kidney disease, and current morphologic classifications. They also highlight the very serious limits of, and impediments posed by, 'organ-specific' medical training, specialisation and research streams. They might ultimately help to prompt re-evaluation of disease perspectives and categorisations, modification of academic curricula, more community-based medical training, and better interspecialty dialogue and collaboration.

Aboriginal people are experiencing a sudden and great excess of kidney disease, not because they are fundamentally different, but because there is an extraordinary abundance of serious risk factors in their current circumstances: low birth weight, infant malnutrition, repeated infections, poor diet, lack of exercise, pervasive smoking, heavy drinking and the like. These are features of poverty, disadvantage and rapid transition, rather than of Aboriginality *per se*. Disease rates will continue to change with the flux, confluence, weightings and waning of risk factors. Health services influence disease profiles in many ways. Risk is reduced by increasing birth weights and fewer infections, while progression is slowed by antihypertensive and specific renal-protective treatment, but opportunities for

disease expression and progression are enhanced by other achievements. Better hospital management of sick babies has resulted in a progressive and dramatic fall in infant mortality since the 1960s; thus large cohorts of low birth weight babies and malnourished infants have now survived to adult life at high risk for adult disease (the Barker hypothesis and its extensions). In addition, delay of adult deaths through better, though still imperfect, management of infections, diabetes, high blood pressure and



Eric Tipiloura talking about food.

Community education is one important ingredient of a successful program

the like, kidney disease more often has the opportunity to run the full length of its leisurely course to kidney failure. We must emphasise the positive elements of these scenarios, promote whole-of-life health perspectives, demand a standard of community-based health care surpassing that of hospital practice, and press towards a standard of health and a life expectancy approaching that of non-Aboriginal people. Experience elsewhere, in American Indians, for example, tells us this is can be achieved over a few decades or a couple of generations.

We do not expect to find Aboriginal-specific genetic markers that explain most of their excess of kidney disease (or cardiovascular or other chronic disease). Indeed, the same disease profile among most populations world-wide, in similar socio-economic and health transition, weighs against such a possibility. However, the high rates of disease in Aboriginal people enhance the chance of identifying the multitude of genetic traits that interact with environmental factors to influence disease expression and progression in us all.

We have not delineated the full menu of risk factors for kidney disease in Aboriginal people, for this is necessarily limited by the hypotheses posed and the tools to detect them. We do, however, know enough to prepare strategies that will prevent much of the excess. We also know how to modify the course of disease, with treatments that are effective regardless of the primary ‘cause’. Disease modification and prevention go hand in hand, so that adults already affected can survive beyond early adult life, to anchor and sustain families and community and cultural values, while we work towards healthier generations to follow. Such prevention and disease modification strategies will benefit the entire community health profile, through the intimate relationships and shared risk factors of all the common chronic disease entities.

Due to deficiencies of expertise and community-based services, we have had to model the efficacy of treatment to reduce kidney failure and cardiovascular disease that is already accepted practice in the broader population. This awkward situation has created ambiguity and tension at many levels, inside and outside MSHR, but not with the community and participating individuals. There have, however, been huge bonuses. We have learned some ingredients of a successful program: Maximum involvement of local workers; a community- rather than clinic-based focus; a collaborative, non-authoritarian approach; involving participants in their own testing; personalising health goals; and giving information, not directives. Blood pressures are much improved, kidney disease is slowed down dramatically, hospitalisations have fallen, and adult deaths and kidney failure have fallen an estimated 60%. Partly on this evidence base, Outreach programs have been funded to share the principles of risk factor identification, diagnosis and early intervention with other Aboriginal communities.



Eric Tipiloura taking health care into the community

In the close relationship developed through conduct of this program, we have inevitably been drawn into more general issues of concern to the Tiwi people. We have participated in development of the Tiwi Health Board, establishment of the Tiwi Dialysis Unit, and advocacy for improved housing and capital works. We have participated in clinical guideline formulations for Aboriginal health services, and developed the Outreach program. Against some resistance, we propose that any clinical/epidemiological research program in an area of high need is inevitably connected to service, and seek to legitimise and promote that perspective. We also argue that ongoing surveillance and evaluation (arguably forms of research) and accountability for outcomes must be an integral part of all service delivery,

especially for populations with such disastrous health profiles. Only thus can we define changing needs and develop and modify strategies as those needs and experience dictate.

The main role of the MSHR Kidney Team in this research has been protocol development, conduct of the fieldwork and analyses of clinical and epidemiologic data. Many of our findings have come through collaborations with other agencies. These include Territory Health Services, (resource and costing data and economic evaluation), Servier Australia (the treatment program), the ANZDATA registry (kidney failure nationwide), nephrologists in Central Australia, Western Australian and Queensland (disease patterns and rates), the University of Western Australia (cutting edge serologic analyses), the Austin Hospital and the University of New South Wales (genetic markers), Monash University Public Health Department (nutritional analyses), Flinders University and University of Melbourne Departments of Pathology (assessments of biopsies); and Monash University Department of Anatomy (size and number of filters in kidneys). Vital collaborations in the Outreach program are with the National Heart Foundation, Diabetes Australia and the Australian Kidney Foundation and federally, with OATSIHS. Our program has thus acted as a fulcrum for much broader cross-disciplinary findings, maximising and multiplying productivity. It is, we hope, compatible with the 'theme-centred' model of program support proposed for the future by the NHMRC.



1998 Annual General Meeting

The 1998 Annual General Meeting of the Menzies School of Health Research was held on Friday, 20 November.

The Chair of the Board of Governors, Mr Richard Ryan AO, welcomed everyone to the thirteenth Annual General Meeting of the School, and the list of apologies was noted. Minutes of the 1997 AGM were circulated and confirmed, with no matters arising.

The Director, Professor John Mathews AM, presented the 1997-98 Annual Report, indicating that the report incorporated Volumes I & II of the Quinquennial Review Report, and therefore covered the School's achievements over the past five years. Professor Mathews noted that the culture of health research and education developed at the School has helped to deliver improved understanding and awareness of the problems of Aboriginal and tropical health in northern Australia. As an example, he pointed to the discovery by School researchers that dog and human scabies are distinct populations, strongly suggesting that people are not commonly infected with scabies from their dogs. He also noted the importance of postgraduate coursework in public health and advised that a Faculty of Public Health is being explored in partnership with the Northern Territory University.

Professor Mathews attributed these achievements to the commitment and talent of staff members, students and colleagues, and the financial support provided by the Northern Territory Government, the Menzies Foundation, competitive grants and donations.

The Treasurer, Mr Richard Ryan AO, outlined the financial statements, noting the unqualified report from the Auditor-General and congratulating the staff on the financial management of the School.



1998 Oration

The Menzies School of Health Research 1998 Oration was held at the MGM Grand Casino on Friday, 20 November.

Mr Bob Collins, former Senator for the Northern Territory, delivered a provocative and enthralling Oration, entitled *Statehood, Reconciliation and Good Health*, to an audience of 140 people.

Mr Collins canvassed reasons why Territorians voted “no” to Statehood, contemplated the national debate on Aboriginal reconciliation in the context of the Stolen Generation, and made a case for an effective command of the English language as a means of addressing structural elements of inequality in relation to good health among Indigenous Australians.

In supporting the need for reconciliation with Aboriginal Australians, he quoted the Governor-General, Sir William Deane:

It should, I think, be apparent to all well-meaning people that true reconciliation between the Australian nation and its indigenous people is not achievable in the absence of acknowledgement by the nation of the wrongfulness of the past dispossession, oppression and degradation of the Aboriginal peoples. That is not to say that individual Australians who had no part in what was done in the past should feel or acknowledge personal guilt. It is simply to assert our identity as a nation and the basic fact that national shame, as well as national pride, can and should exist in relation to past acts and omissions, at least when done or made in the name of the community or with the authority of government ...



Membership of School Committees

Audit Committee

Mrs Sue Bradley (Chair)
Mr Harry Giese AM MBE
Ms Jennifer Prince
Mr Richard Ryan AO
Ms Joanne Schilling
Ms Bev Hayhurst (Staff Rep)
Mrs Yolanda Jackson
Professor David Kemp FAA
Professor John Mathews AM [until 06.99]
Dr Ken Sawers

Coursework Management Committee

Dr Ross Bailie (Chair)
Dr Joan Cunningham
Dr Peter d'Abbs
Ms Letitia Del Fabbro (Student Rep)
[from 01.99]
Ms Pam Gollow (Student Rep)
Ms Audrey Langlands (Secretary)
Dr Dorothy Mackerras
Professor John Mathews AM [until 06.99]
Dr Janice Money (Student Rep) [until 12.98]
Ms Jenny Powers [until 12.98]
Ms Elizabeth Stubbs [until 06.99]
Dr Komla Tsey
Dr John Wakerman [until 03.99]

Finance Committee

Mrs Jane Large (Chair)
Mrs Sue Bradley
Mr Harry Giese AM MBE
Mr Richard Ryan AO
Ms Joanne Schilling

Dr Ross Bailie [from 06.99]
Ms Bev Hayhurst (Staff Rep)
Mrs Yolanda Jackson
Professor David Kemp FAA
Professor John Mathews AM [until 06.99]
Dr Ken Sawers

Institutional Biosafety Committee

Professor David Kemp FAA (Chair)
Dr Val Asche
Dr Karen Gibb
Mr Lodi Hoeben
Dr Gary Lum
Dr Lorna Melville
Dr KS Sriprakash
Ms Elizabeth Stubbs (Secretary)
Mrs Sue Hutton

Joint Institutional Ethics Committee of RDH and MSHR

Dr John Condon (Chair) [from 02.99]
Ms Kate Ross (Chair) [until 02.99]
Dr Nick Anstey
Dr David Ashbridge [until 05.99]
Dr Chrissie Berryman [until 11.98]
Dr David Brewster
Ms Peggy Cheong
Mr Ian Hillock
Mr Jack McTaggart
Ms Clare Martin MLA [until 02.99]
Professor John Mathews AM [until 06.99]
Dr Peter Morris
Ms Sandi Smiles [until 11.98]
Ms Elizabeth Stubbs (Secretary)
Reverend Jim Taylor

Mr Peter Thomsen [from 11.98]
Dr Katharine Trenholme
Professor Jenny Watson
Mr Trevor Woodhead [until 08.98]

New Members in 1998-99

Ms Elizabeth Jacob [from 11.98]
Ms Helen Murray [from 08.98]

Aboriginal Ethics Sub-Committee

Mr Peter Thomsen (Chair) [from 11.98]
Mr Trevor Woodhead (Chair) [until 08.98]

Ms Terry Dunbar
Ms Katrina Hodgson
Ms Mai Katona
Ms Merle Kennedy
Ms Sandra Kitching
Mr Desi McKenzie
Mrs Liz Williams

New Members in 1998-99

Dr Ngiare Brown [from 05.99]

Mr Joe Cardona [from 11.98]
Ms Elaine Dixon [from 05.99]
Dr Marlene Kong [from 02.99]
Mr Travis Peris [from 05.99]

Scientific Adviser

Dr Peter Morris

Postgraduate Studies Committee

Professor David Kemp FAA (Chair)

Mr Philip Baker (Student Rep) [until 11.98]
Dr Ross Bailie [from 01.98]

Dr Joan Cunningham

Assoc Professor Bart Currie

Dr Peter d'Abbs

Dr Dorothy Mackerras

Dr Graeme Maguire (Student Rep) [from 01.99]

Professor John Mathews AM [until 06.99]

Dr KS Sriprakash

Ms Elizabeth Stubbs (Secretary)

Dr Komla Tsey

Assoc Professor Charles Webb

Unit Reports & Scientific Publications 1998-1999

Reference Numbers within Unit Reports correspond with the numbering of the Scientific Papers & Publications section, page 141.



Aboriginal Policy & Health Education Unit



Rear : Ruth Cahill

Middle (L-R) : Karl Gundersen, Sarah Walton, Leah AhMat, Mark Mayo, Loyla Leysley and Terry Dunbar

Front (L-R) : Mai Katona, Peter Thomsen, Joe Fitz, Melita McKinnon, Masun Nasir and Geoffrey Angeles

The Aboriginal Policy and Health Education Unit is being redefined to cope with the changes which are slowly occurring. These proposed changes involve greater input and recognition of the staff of the Unit in various projects, ideas, negotiations and general input. It is also envisaged that there will be more input from stakeholders and development of partnerships between MSHR and Aboriginal communities in urban and rural areas.

Highlights

- Staff representation on the Joint Institutional Ethics Committee and Aboriginal Ethics Sub-Committee.
- Staff involvement in the Enterprise Bargaining Agreement – specific to Aboriginal training and career paths.
- NT Public Sector Plain English Award to Norma Benger and Geoffrey Angeles for development of the Rheumatic Heart Disease Information Package.
- Research information gathering by CRC Trainees in New Zealand, June-July 1999.
- Networking with other Indigenous Researchers.
- Louise Martin accepted into Medical Studies at Flinders University, Adelaide.
- Mark Mayo recipient of DETYA Cadetship to undertake Bachelor of Science degree at NTU.

The conduct of research will come under more scrutiny through partnership arrangements, in the context of development, data collection, priorities of research, understanding the perspective of those studied and their process for decision making.

The Aboriginal Unit will continue to highlight issues of participation, ownership, accountability and definition of research as more Aboriginal people are given the opportunity to be trained as researchers. This Unit is also clearly in a position to challenge standards for European ethical frameworks and research methodologies, and that challenge is becoming entirely expected.

There has also been a focus on intellectual and cultural property rights in other domains, such as cultural artefacts but not on research issues. Today Aboriginal researchers and communities are becoming more aware of Aboriginal values and processes which reflect Aboriginal world view in this area. Therefore our role within the Unit is to assist researchers to recognise the different processes involved in conducting research which promotes cultural relevance. It seems that there is a need for an Aboriginal framework to be developed for assessing, monitoring and promoting conducive research activities, which will emerge from the Aboriginal theory of knowledge, to work parallel with Western knowledge in these areas.

Broad Objectives

The Aboriginal Unit will :

- Work collaboratively with researchers, Aboriginal communities and organisations in the conduct of appropriate research.
- Encourage and assist Aboriginal communities to provide feedback to the various service providers of the recommendations of various projects undertaken in their communities.
- Conduct bi-cultural workshops for Aboriginal communities.
- Support Aboriginal communities to prioritise their own research.
- Provide relevant knowledge about research to the Aboriginal communities and organisations.
- Analyse boundaries determining co-authorship in terms of Aboriginal involvement in research.
- Continue to provide access to Aboriginal Language Classes.

Specific Objectives

- Gain discrete funding.
- Establish exchange programs between Aboriginal and other Indigenous researchers.
- Establish an Education Centre.
- Provide links between MSHR and other Indigenous Institutions involved in research.
- Ensure that training of Aboriginal people is appropriate and relevant.

Employment and Career Strategy

There is no doubt that preparation for a more efficient work force is a prerequisite for success for any institution and individual worker. This involves what skills and competencies are required for the future. The purpose of these two strategies (currently in draft stage) is to provide avenues for Aboriginal people to use this unique location to develop expertise, strengthen rapport with Aboriginal communities and organisations, and become a centre of excellence for education and training of Aboriginal people in health research.

Without establishing career paths for Aboriginal employees there would be little incentive for employees to acquire new skills and afford MSHR effective researchers. Such a vision of career development extends well beyond the narrow perceptions of skills audit and therefore requires detailed analysis and task inventories so that training can be defined efficiently and an appropriate training mix can be devised.

Enterprise Bargaining

While this topic will be referred to in another section of the Annual Report, it is important to discuss its impact on the

Aboriginal Unit. In order to effect the EBA, discussions are in place with MSHR management to recognise the Aboriginal knowledge required as part of the position descriptors and the values placed on them by this institution. At present the concepts are being developed to recognise Aboriginal knowledge skills levels. As employees progress, the salary component also increases. This Agreement is being designed to provide employees higher job satisfaction and productivity.

There is also a need to establish a mechanism to monitor the rate of acquisition of skills by Aboriginal staff to fulfil the individual and institutional skills requirement.

Research Projects

The Unit is seeking changes to the way in which projects are developed.

Many researchers are still submitting their proposals before seeking assistance from the Aboriginal Unit. We are currently working towards greater understanding of the issue among researchers and they will no doubt seek our suggestions in the future.

Unit staff have been involved in many research projects throughout the year, and these are mentioned within the relevant Unit reports.

Ms Mai Katona BA DipEd	Unit Head	
Mr Peter Thomsen CertHlthProm	Aboriginal Education Officer	
Mr Geoffrey Angeles BAppSc	Research Assistant	
Ms Norma Benger CertHlthProm	Research Assistant	
Mr Joseph Fitz Cert Project Officer	CRC Trainee	[until 19.03.99]
	Project Officer	[from 22.03.99]
Mr Harold Koops AHW	Research Assistant	
Mrs Loyla Leysley AHW	Trainee Research Assistant	
Ms Louise Martin BSc	BSc(Hons) Student	[until 29.01.99]
Mr Mark Mayo AssocDipAppSc	Laboratory Assistant	[until 03.03.99]
	DETYA BSc Cadet	[from 04.03.99]
Ms Melita McKinnon	CRC Trainee	[until 17.03.99]
	Technical Assistant	[from 18.03.99]
Ms Leah AhMat	CRC Trainee	
Mr Karl Gundersen	CRC Trainee	[from 06.04.99]
Mr Masun Nasir AssocDipEd	CRC Trainee	[until 04.05.99]
Ms Kylie Romelo	CRC Trainee	[from 12.04.99]
Ms Sarah Walton	CRC Trainee	[from 22.03.99]
Ms Jayne Whelan	CRC Trainee	[until 26.02.99]



Central Australian Unit

This Unit aims to undertake relevant research and development to improve the health of people in Central Australia and beyond. More specifically, we aim to research and disseminate health and other information that will assist the capacity of communities, service providers and policy-makers to address the unacceptable health inequalities between the region's Indigenous and non-Indigenous populations.

Highlights

- Three communities have received more resources and better access to health services following the Review of Northern Territory Government Remote Health Services in Central Australia.
- Evaluation of the Family Well Being Personal Development and Counselling Course.
- A consumer focused evaluation of services required by people experiencing mental health problems undertaken for the first time in a remote region.
- Central Australian Remote Health Training Unit (CARHTU) Evaluation.
- Preliminary results from the development of a preventive approach to nutrition problems in a Central Australian community show a decline in the number of children who suffer weight loss in the first year of life.
- Recommendations for a costed range of proposed health services accepted for action by Ngangganawilli Aboriginal Community Controlled Health & Medical Service Aboriginal Corporation (NACCHMSAC).

The focus of our work continues to be health program evaluation, broadly defined to include needs analysis, program planning and monitoring, policy analysis, service reviews and economic analysis as well as outcome and impact assessments. The research, consultancies and other activities are characterised by being applied research which has arisen directly from needs identified by service providers. More recently, through our involvement in the CRC for Aboriginal and Tropical Health, we are beginning to diversify our research and development efforts into the area of Indigenous education. This is largely the result of a growing recognition of the close correlation between formal education and health status as documented in the international literature, and the need to explore the nature of the relationships within the context of Indigenous Australia. Staff of the Unit continue to make significant contributions to the School's Master of Public Health coursework teaching and postgraduate research student supervision (see *Education & Training*). At an informal level, we continue to provide important research-related advice and support to organisations and communities throughout the region.

Our research and development activities during the year have been overshadowed by the current financial crisis of the School and its consequent concerns for the future of the Unit. In the first half of 1999 three key members of staff resigned and are yet to be replaced. John Wakerman, Senior Research Fellow, left the School in January 1999 to become the inaugural Director of the Centre for Remote Health. Jackie Parkinson, Office Manager, resigned in

March 1999 to relocate interstate with her family. This was followed by the resignation of the Head of Unit, Komla Tsey. Komla has accepted an appointment with James Cook University from August 1999. The School has approached the Northern Territory and Commonwealth Governments for financial assistance to relocate the Unit with the Centre for Remote Health as a way of maximising resource use.

Evaluation of Family Well Being (FWB) Personal Development and Counselling Course

Between March 1998 and April 1999, Tangentyere Council, an Alice Springs based Aboriginal housing and community development agency, implemented a Family Well Being (FWB) course. FWB is a personal development and counselling course, with particular emphasis being placed on quality parenting and relationship skills. Developed by a group of Adelaide-based Aboriginal people, FWB specifically aims to address the effects of settler colonisation on the emotional health and general well being of Indigenous Australians at the level of the individual and their family. Komla Tsey and Anne Every received a grant under the National Youth Suicide Prevention Strategy to evaluate the FWB course.

At each stage of the four-stage course over 80% of the participants were Aboriginal and nearly 90% were women. The age of the participants ranged from the late 20s to early 50s. Over 70% of participants were employed throughout the course, mainly in the human service area.

A participant-observer approach, involving enrolment and participation in the course by Komla Tsey, was combined with personal narratives, or story telling, through which participants reflected upon the specific contexts in which they have used the FWB skills. This was used to evaluate the program. Overall, the findings of the evaluation show convincingly that participants have used the FWB principles and skills to bring about modest, but significant, changes in their emotional and social health.

An underlying concern among participants was the need to make the program more widely known and available to identifiable groups and families in the community – both in remote and urban settings.

FWB is a very bold initiative in so far as it attempts to explicitly address the emotional effects of colonisation among Indigenous Australians. The course developers need to be warmly commended for daring to tackle an issue that is too frequently talked about as the underlying cause of Aboriginal health, but with very few specific public health strategies being put forward to deal with the problem.

There will be a follow-up study to determine whether the capacity building process demonstrated in this evaluation ultimately translates into measurable health outcomes.

Evaluation of Mental Health Services in Central Australia

Ann O’Kane, Komla Tsey and Eva Briscoe were requested to undertake an

evaluation of mental health services with funding from the NHMRC *via* the National Mental Health Strategy. An evaluability assessment was undertaken to start the project (Tsey *et al*, 1998). From this, two key questions concerning mental health programs emerged as the priorities for the substantive evaluation. The first question was to investigate benchmarks for basic levels of resource allocation for specialist mental health programs for the population residing in Central Australia. Using published data for a population-based needs assessment, it was found that the specialist programs were severely under-resourced, particularly for:

- children and young people;
- people in the most remote areas (Apatula region);
- non-clinical services, such as supported accommodation and rehabilitation.

The second question was to explore what mix of services needed to be available for people experiencing mental illness. The methodology used for this question involved direct mental health consumer participation and employment within the evaluation. The project developed a broad view to this service mix question and incorporated access to resources considered to be basic human rights in Australia. A survey was developed to assess whether residents with mental illness were accessing key community resources required to assist recovery and get on with their lives. The results indicate that access to the range of resources is very limited. The specialist mental health service needs to develop partnerships with key community services

to work toward a zero level of discrimination in the central Australian region.

This project was one of the first attempts to answer these questions for residents living in remote regions and experiencing the consequences of mental illness.

Central Australian Remote Health Training Unit (CARHTU) Evaluation

MSHR and the Centre for Remote Health (Jayne Schofield, Komla Tsey and Ilan Warchivker) successfully bid for a contract in January 1999 to evaluate the training activities of Central Australian Remote Health Training Unit (CARHTU). The following is the thrust of a preliminary report covering the first six months.

CARHTU took 18 months to finalise its training plan using a collaborative process, each stakeholder with their own distinct interests and agendas. With only 18 months until its three year funding expires, there appears to be a special urgency for CARHTU to demonstrate to stakeholders its reason for being. This appears to be the case, particularly in a policy environment where training providers are expected to justify themselves in terms of measurable training outcomes. While tangible training outcomes are important, we believe a formative assessment at this stage is appropriate.

A range of challenges face new providers of education and training for Aboriginal Health Workers (AHWs) in Central Australia, such as the special demographic features of the region, the subordinated position of AHWs within the health care team and the resulting powerlessness, the low levels of literacy and numeracy among AHWs, the difficulty of providing training services across different organisations – each with its own unique needs and agendas and the difficulties of working in a politically changing environment. Critical to these will be the extent to which the action learning sets, CARHTU's ongoing interaction and consultation with stakeholders, and this evaluation process are used to address the range of challenges.

Overall, the establishment of CARHTU as an organisation funded to provide ongoing training and support to AHWs from various health services, is an achievement in itself. The trainer support program, the quality of the workshops being delivered, the delivery of training to AHWs on a one-to-one basis in the workplace, and the fact that the training program is clearly in line with the competency-based structure of delivery and assessment, are all significant achievements.

There is more work to be done in the area of health services work-based training. The CARHTU and health services should work in greater collaboration with regards to work-based training and the development of strategies to incorporate literacy and numeracy into AHW training.

Developing a Preventative Approach to Nutrition Problems in a Remote Community

Ilan Warchivker and John Wakerman have been funded by RHSET to develop a preventive approach to nutrition problems in a remote community.

The study evolved following a community initiative to address nutrition problems identified in a previous study conducted by Menzies School of Health Research. Several meetings about operational aspects of the project took place between March and June 1998, with training of potential nutrition workers beginning in June 1998.

The project has three major components: intervention, education and evaluation. An additional component includes the development of a store policy for the community.

Intervention includes provision of meals to children under three years old whose mothers contribute an agreed payment for food each fortnight. At present the women's centre provides breakfast served at the women's centre from 9 am and lunch provided as meals-on-wheels at home. Participation in the program varies from 10 to 24 children per fortnight, with a number of older children being enrolled in the program.

The educational component includes meetings at the women's centre and one-to-one sessions with mothers. Main tasks include introducing mothers to the concept of growth charts and the need for solid food from the age of four to five months. The

education team also provides a menu for children which includes type and quantities of appropriate food for each age group. Finally we talked about the cycle of poor nutrition → repeated diarrhoea → other infection → hospitalisation which many children experience. We have also introduced the concept of 'kids at risk' and identified these children to mothers and nutrition workers to ensure their participation. Individual growth charts are given to each mother quarterly and, when appropriate, together we identify the reasons for low or inadequate growth.

Preliminary results show a decline in the number of children requiring urgent attention and an improvement in the weight of all children under 12 months. Nutritional improvement of children between 12 and 36 months has been less apparent, with discussions about follow-up and development of individual action plans taking place with parents and carers.

These results were presented to the women and the health staff in a recent workshop.

Review of Ngangganawilli Aboriginal Community Controlled Health and Medical Service Aboriginal Corporation (NACCHMSAC) ^[102]

NACCHMSAC is an Aboriginal Community Controlled Health Service which provides health services to a significant proportion of non-Aboriginal clients. Due to persistent financial difficulties NACCHMSAC requested MSHR conduct a review.

Project objectives included developing benchmarks for health service resourcing, comparison of current resources with industry standards, analysis of the ability of current services to address community needs and recommending funding responsibilities for the indicated acceptable level of service provision.

The review team (John Wakerman, Ilan Warchivker, John Tregenza and Katherine Henderson) used a combined qualitative and quantitative approach. Documents and relevant correspondence related to health services in the region were reviewed and consultation with community people, management and health staff identified the urgent health concerns and structural issues related to delivery of health services to the region. A detailed analysis of population size and mobility characteristics identified a service population estimate and a detailed expenditure analysis was conducted and compared with similar health services. Finally we costed a range of recommended health services, and outlined them at a community meeting. A short implementation plan was also proposed following acceptance of the recommendations for action.

This review was funded by the Office of Aboriginal Health, Health Department of Western Australia (OAH HDWA).

Provision of Primary Health Care Services Evaluation in the Balgo Region of the South East Kimberley ^[103]

This project was a collaboration between the newly established Centre for

Remote Health (CRH) and Menzies School of Health Research in Alice Springs. The Kutjungka (Balgo) region applied for funding to establish a community controlled health service in 1995. The communities incorporated Palyalatju Maparnpa Aboriginal Corporation Health Committee (PMACHC) to achieve this goal, however negotiations with government agencies had not achieved this goal. The review has aimed to assist the communities to establish an adequately funded service responsive to community needs.

A description of current health services, in conjunction with community consultation and a detailed health expenditure analysis, provided an outline of the main health service issues in the region. This was then used to develop a health service model.

The final report will be presented to PMACHC in October. The committee will then decide on the implementation of the proposed model and how best to achieve their goal of community control.

Funding for this evaluation was provided by the OAH HDWA.

Systematic Review of CRC Education & Health Program

Overview

This project is part of the Health and Education and Health Research Program of the Cooperative Research Centre for Aboriginal and Tropical Health, of which MSHR is a core partner. Dr Komla Tsey, MSHR Central Australian Unit Head,

developed this project, and Dr Bob Boughton was appointed as the Central Australian-based Research Fellow in November 1997. Dr Anne Lowell also worked as a Research Fellow on the project from the Darwin MSHR office until August 1998. In August 1998, the Board of the CRC extended Dr Boughton's funding for a further year, and the project is now due for completion in November 1999.

Findings and achievements

Major findings from the review of published research into the nature of the connection between education and health, and of the small pilot study undertaken, include:

- a) There is overwhelming evidence internationally that improved education levels are a major determinant of better population health and, in particular, that rising education levels of women are associated with better health outcomes in their children.
- b) Evidence has been found in data collected in both quantitative and qualitative research across most of the developed and undeveloped world, including historical studies going back to the turn of the century.
- c) International research is not nearly so clear in terms of the pathways by which this effect occurs, and studies have focused on an enormous range of 'intervening' variables.
- d) Despite Australia being a major centre for this research, through the Health Transitions Centre at the Australian National University, almost

no work of a similar nature has been conducted in Indigenous communities.

e) Dr Alan Gray's analysis of the NATSIS data collected by ABS in 1994 suggests that there may be some association between education levels and the reported health-seeking behaviour of Indigenous parents in relation to their children. It also shows that this is not a simple monotonic relationship as would have been predicted from the international work.

f) Major ethical, theoretical and practical problems occur which will need to be taken into consideration if any more detailed examination of the education-health link in Indigenous communities is to produce worthwhile outcomes.

g) These issues combine most clearly in a consideration of what the CRC has begun to refer to as the 'control factor' in health.

Space precludes summarising the findings from the examination of research and policy development in Aboriginal education, and the current data on education participation and outcomes, which can be found in the publications section. Findings in the two areas have now been presented to a large number of forums of both Indigenous and non-Indigenous people involved in the education and health sectors, generating a great deal of interest and debate. Submissions based on this work have also been sought by several government inquiries into Indigenous education, including the Human Rights and Equal Opportunities Commission (HREOC) Inquiry into Rural and Remote

Schooling, the Senate Inquiry into Aboriginal Education and the Collins Review of Aboriginal Education in the NT.

There are now three research reports undergoing peer review prior to decision about publication and Dr Anne Lowell has submitted several papers based on her work in this project.

Conclusion

This project has opened up a new and exciting field of research which is relevant to Indigenous health, and it has also begun to tap into a very strong current of interest among Aboriginal communities, health and education service providers and government. Things have therefore moved on considerably since the immediate past program leader, Dr Komla Tsey, first raised this issue, along with some other speakers, at the 1995 Aboriginal Health Transitions conference in Darwin. The biggest threat to this new development remains the continued perception among both health and education decision makers that the two fields only come together practically in the concept of 'health education' and, in doing so, confines itself to research in this already established area.

Postgraduate research

Ofra Fried

Ofra Fried has been completing her MPH thesis on developing an understanding of cross-cultural issues for terminal care in Central Australia. This has resulted in several work-related benefits including the design and production of a

poster, a book and other educational materials for the Central Australian Palliative Care Service. This project, entitled *Many Ways of Caring: The Central Australian Aboriginal Paintings Project* has attracted considerable interest. The research and work were discussed at the recent CARPA Conference on Palliative Care (08-09 May 1999), which Ofra helped to organise and spoke at. A conference report was published in the Palliative Care Association's Newsletter and another will be published in the *Journal of Rural Health*, and a paper will be published in the July 1999 issue of *Progress in Palliative Care*. Ofra will also present a paper and a poster at the forthcoming Australian Palliative Care Conference in Brisbane in October 1999.

Jillian Barclay

Jillian Barclay is in the final year of her PhD study entitled *The Royal Flying Doctor Service – the Nurses' Story*. Many nurses have worked for and with RFDS over time, but records of their employment/secondment do not appear to exist. It has not been the intention of this study to provide a chronological listing of nurses, but rather to explore the story of pioneer nurses, largely women, in outback Australia forging a new frontier in nursing practice at altitude. The context within which this ground breaking work took place is examined and some flight nurse stories told. The NSW section of the RFDS was the first section nationally to employ a flight nurse and so this section has been used as a case study. The flight nurse's appointment was at Broken Hill in 1945. NSW, SA and Victorian sections jointly funded the

position as an experiment so it has been viewed as important to document the appointments of the first flying nurses at these bases also.

For the purpose of this study, WA and QLD sections of the RFDS have not been dealt with in detail, as it would appear that they later followed the patterns of flight nurse employment as originated by the former sections.

The notion of nurses flying around outback Australia has conjured up many professional and romantic images of what would appear to be a very prestigious and glamorous job. Therefore it has been

mandatory that this study explore and disclose myths, perceptions and deceptions relating to issues such as female stereotypes, assumed roles of women, subservience and romanticisms in an environment of male medical and management dominance.

Due to the inadequacy of data relating to the RFDS flight nurses in primary and secondary sources, oral history methodology has been used to disclose flight nurse stories.

Presentations have been made at several conferences in the USA, UK and Australia, and there have been three publications.

Dr Komla Tsey BA(Hons) PhD	Senior Lecturer/ Unit Head	
Dr John Wakerman MBBS MTH FAFPHM	Senior Research Fellow	[until 01.03.99]
Dr Robert Boughton BA(Hons) DipEd PhD	CRC Research Fellow	
Mr Ilan Warchivker BA BEc(Hons)	Senior Research Officer	
Ms Sally Matthews BA GradDipPublicSectorExecLeadership	Senior Research Officer	[04.08.98-26.02.99]
Ms Ann O'Kane BSW MSW	Senior Research Officer	
Ms Jayne Schofield	Research Officer	[from 18.03.99]
Ms Sharyn Winders SpeechPathol	Project Officer/Speech Pathologist	[until 31.12.98]
Mrs Jackie Parkinson	Office Manager	[until 30.04.99]
Ms Cathy Hampton	Admin/Research Assistant	
Ms Linda Tate	Research Assistant	
Ms Colleen Hennessy	Director, ARHRI	[until 07.09.98]
Ms Eva Briscoe	Casual Research Assistant	
Ms Anne Every	Casual Research Assistant	
Mr Matthew Fowler	Casual Research Assistant	



Computing & Biostatistics Unit



Rear (L-R) : Tony House and Robyn Liddle
Front (L-R) : James McBroom and David Arthur

The Computing and Biostatistics Unit aims to provide high quality computer and statistical support to staff and students of the School.

The Unit is intimately involved in every project of the School, and provides assistance and advice in all areas of these projects, from preliminaries such as experimental design and data measurement to data collation, storage, retrieval, and archiving, and finally data analysis and dissemination of results.

Highlights

- Oracle upgrade.
- SunOS upgrade.
- RAID array and new processors in place.
- Year 2000 upgrades on all desktop computers.
- Internal network performance increase (from 10MB/sec to 100MB/sec).
- Microwave link (64KB/sec to 2MB/sec link to outside world).
- Domain name change from `menzies.su.edu.au` to **`menzies.edu.au`**.

The year has presented numerous challenges to the Unit, due primarily to the increased load on the system. Through the dedication and skill of Unit staff, these challenges have been met, and the stability and performance of the system improved for all users.

Staff Changes

It was with regret that we farewelled the Unit Manager, Abron Lukitsch. Abron was with the School for seven years, spending the past four as Unit Manager.

The School also accepted the resignation of Jeni Wie, the Visual Aids Coordinator, this year. Jeni was a well-liked and respected member of the School for ten years and her skills will be greatly missed.

We wish both Jeni and Abe every success in the future.

In June 1999 the Unit welcomed Mandy Noble. Mandy is employed on a consulting basis as helpdesk support and software training, specifically Netscape mail, Microsoft Word, Excel, and Power Point.

Computing

The central system

During the year the Sun computers have been upgraded to improve their performance and to introduce a level of fault tolerance. The upgrade included increased memory for each machine, the replacement of the single CPUs to a pair of faster CPUs per machine and preparation for the installation of a RAID disc system.

Both Sun computers have had their operating system upgraded to Solaris 7. This makes the machines Year 2000 compliant, and has allowed the software packages running on them to be upgraded to Year 2000 compliant versions.

An Intel based Windows NT server was added to further increase system availability.

The network

The network was enhanced on two fronts. The link from Menzies to the internet was greatly improved by the introduction of a microwave link to the NTU. The internal network was enhanced by the addition of a new Cisco router and switching device that is capable of providing a network frequency of 100Mhz to the desktop, up from 10Mhz.

The desktop

The performance price of machines continued to fall during this financial year. As a result the configuration of the 'Menzies standard' new desktop computer was upgraded significantly.

The demise of the older versions of 486 computer and the application of the latest patches to the software, mostly from Microsoft, has also made the desktop and laptop computers Year 2000 compliant.

Oracle

The past year has seen the Oracle database upgraded from version six through version seven and on to (the current) version eight. All databases on the system have been successfully migrated across

both upgrades and development work is continuing on them. With initial problems solved, we now have the ability to provide a windowing environment to the databases and are currently working to this end. This version of Oracle also provides better control of access security to the databases, an important feature in light of the recent Tiwi Legal Agreement.

Domain name change

Menzies School of Health Research has changed its domain name from *menzies.su.edu.au* to *menzies.edu.au*. The old domain name will remain as long as Sydney University maintains the “su.edu.au” domain, however we suggest that all references to the old domain be replaced as soon as possible.

Helpdesk

As part of the Unit’s continuing dedication to timely, appropriate, and friendly support, the helpdesk has carried out the following (by no means complete) list of projects during the year:

- acquisition of a CD burner, a new scanner, and two zip drives;
- installation of several Linux and Windows/Linux dual-boot PCs;
- acquisition of numerous IPXs from the Dept of Mines and Energy as an asset exchange. These machines will be used to provide access to the Unix servers in much the same way as the old terminals, but with a graphical user interface;
- Year 2000 upgrades and installation of Microsoft patches on all desktop

PCs, and a concurrent collation of a full asset list of these PCs.

Biostatistics

The Biostatistics sub-unit continued to provide staff and students of the School with accurate up-to-date and innovative advice and support during the year.

Some statistical highlights include:

- upgrading of statistical software. In particular, we have upgraded SPlus to version 5.3 for Linux, providing the School with some of the most sophisticated statistical modelling, visualisation and analysis software available;
- modelling of longitudinal binary data in case-control studies;
- collaborating on the HIPP project, modelling infant growth using non-linear mixed effect models;
- mathematical modelling of multi-strain organisms ^[57];
- Bayesian analysis of complex systems, including fixed and random effects meta-analysis, hierarchical models, and Bayesian model averaging.

Significant Collaborations

The Unit has collaborated on many projects throughout the year, including:

- development of the Cooperative Research Centre website;

- installation of network links in Alice Springs with the Centre for Remote Health and Flinders University NT Clinical School;
- planning for installation of the new CRC server;
- installation of a microwave link with Flinders University NT Clinical School;
- installation of a Cisco switch and router with Flinders University NT Clinical School;
- provision of modelling assistance to the HIPP program review;
- provision of assistance to various laboratory-based projects including *Haemophilus* and scabies projects ^[57, 59, 60, 86].

Mr Abron Lukitsch BSc(Comp)	Information Systems Manager
Mr Tony House BMath(Comp)	Systems Administrator
Ms Paulette Lieby BSc(Math Comp)	Mathematician [until 01.02.99]
Mr James McBroom BEcHons(Stats)	Research Assistant – Statistics/IT
Ms Jeni Wie BAppSc(Animal Biol)	Computer Media Support Officer [until 07.05.99]
Ms Robyn Liddle BSc(Biol) GradDipCompSc	Database Administrator
Mr David Arthur	Information Technology Officer
Mr James McArthur	Casual Information Technology Officer
Ms Mandy Noble	Information Technology Consultant



Ear Health & Education Unit



Above Rear : Harold Koops
Front (L-R) : Liz Stubbs, Angela Melder,
Una Pilakui and Peter Morris

Below (L-R) : Melita McKinnon,
Heidi Smith-Vaughan and Amanda Leach



Otitis media (middle ear disease) with conductive hearing loss is a frequent illness affecting young children, particularly Aboriginal children. In some communities more than 50% of young children still experience a perforation of one or both tympanic membranes, a public health emergency by WHO standards.

The aim of this Unit is to conduct and disseminate research that is most likely to contribute to improvements in medical and audiological practice guidelines for high risk populations.

Highlights

- Harold Koops to work with Tiwi Health Board on promotional materials regarding the Tiwi Legal Agreement.
- Amanda Leach to act as consultant to WHO on carriage studies of respiratory bacteria.
- Louise Martin achieved BSc(Hons I) and successfully applied to study medicine at Flinders University.
- Melita McKinnon (CRC Trainee) appointed to staff.
- Angela Melder completed MPH coursework.
- Peter Morris completed PhD thesis and appointed Head of the Ear Health & Education Unit.
- Una Pilakui recognised for her work on the Tiwi Islands and included as a Chief Investigator on an NHMRC grant application.
- Heidi Smith-Vaughan completed PhD thesis.
- Al Yonovitz appointed District Manager of Australian Hearing Services in the NT.

- Otitis media (OM) remains unacceptably common and severe in Aboriginal children.
- Meta-analyses of randomised controlled trials (RCTs) in developed countries (low risk populations) show modest benefits of antibiotic therapy for acute otitis media (AOM). This is because spontaneous resolution occurs in the majority of those who do not receive antibiotic treatment.
- Lack of standardised diagnostic criteria mean that it is not currently possible to identify patients most likely to benefit from antibiotic treatment.
- AOM is rarely identified in Aboriginal children due to a lack of clinical symptoms and poor diagnostic skills in remote area health clinics.
- Untreated AOM in Aboriginal children does not resolve spontaneously.
- Antibiotic resistance is increasing at alarming rates and judicious antibiotic use is one strategy recommended to limit further increases. At the same time, high dose amoxycillin is recommended for empiric treatment of AOM in areas of high resistance.

The Contribution of Professor John Mathews

...medical practitioners... have been reluctant to try and implement 'best

practice' guidelines for treatment on the grounds that medical solutions cannot substitute for social solutions. As a result, many Aboriginal people still remain untreated for conditions that would be treated automatically if they occurred elsewhere.

*John D Mathews
Recent Adv Microbiol, 1997.*

John Mathews has probably contributed more than any other individual to the recent improvements in medical research addressing Aboriginal health. His emphasis on 'a better understanding of the biology' lead to the crucial longitudinal study of ear disease in Aboriginal babies. John continues to use the data from these studies to construct mathematical models of bacterial infection. John and Coralie Mathews were also responsible for extending our research activities into the Darwin child care centres.

The Importance of Compliance

Despite the enormous amount of research addressing medical interventions, very little attention is paid to the influences of compliance. Why do some patients 'just say "no"'? While compliance is believed to be extremely poor in rural and remote Aboriginal communities, there is little empirical evidence available. Angela Melder has monitored compliance levels with clinical trial treatments (active or placebo). Preliminary quantitative data have shown the following:

- 8/47 (17%) families had an estimated compliance level of 41-50%;

-
- 15/47 (32%) families had an estimated compliance level of 51-60%;
 - 9/47 (19%) families had an estimated compliance level of 61-70%.

Although poor, these compliance levels are clinically significant, since 50% compliance should provide sufficient antibiotic to reduce new episodes of AOM. Initiatives introduced to improve compliance include personal diaries, reminder notices (written in English and Tiwi), neighbour network support groups employing Tiwi people, incentive awards, and finally, a supervised dosing program employing Tiwi people.

This final, labour intensive approach achieved consistently higher levels of compliance, however it still had limited effectiveness.

Angela's principal aim is to explore the researchers' and the research participants' perspectives about the meaning of compliance through semi-structured interviews. Preliminary findings have been included in feedback to the community and used to guide subsequent data collection. These studies will have important implications for the management of respiratory infections in Aboriginal communities.

Systematic Reviews

Systematic reviews use an explicit approach defining the types of studies eligible for consideration and the methods used to identify them. More comprehensive search strategies are less likely to miss relevant studies and selection bias is

avoided. A commissioned systematic review on the medical management of otitis media conducted by the Kimberley Aboriginal Medical Service will now direct future NHMRC and OATSIH funded research initiatives. Systematic reviews on otitis media, other bacterial respiratory infections, and randomised controlled trials in Aboriginal health have been completed by Peter Morris as part of his PhD thesis. Al Yonovitz and Sreedevi Aithal, along with Jacky Yarrow (Australian Hearing), and Amarjit Arand and Jeanette Scott (Territory Health Services), have been commissioned by Office of Aboriginal and Torres Strait Islander Health (OATSIH) to conduct a systematic review of audiological research relevant to Aboriginal children.

Progress in Chronic Otitis Media Intervention Trials (COMIT)

COMIT 1 : OME preliminary nasopharyngeal carriage and clinical results

Amanda Leach is responsible for the design, data collection and analysis of the NHMRC funded 'COMIT 1'. Infants are reviewed from birth and, at first diagnosis of otitis media with effusion (OME), are randomised to receive either placebo or amoxicillin (50 mg/kg/day bid). This continues for a maximum of six months. To date 50 infants have completed the study (phase 1) and another 17 are currently on 'Menzies Medicine' (phase 2). While we have not documented any infants with persistently aerated ears (normal) during the study period, there have been important

changes in rates of AOM and perforation (see Table 1). After a statistically significant reduction in suppurative disease, the rates are very high again in 1999. Improvements may have been a consequence of prolonged active surveillance and treatment that occurs as part of the study.

Microbiological findings support the view that severity of disease, both in the middle ear and the nose, is correlated with multiple species colonisation of the nasopharynx (Figures 1 and 2).

The earlier onset of OME and suppurative OM compared to onset of clinically detectable nasal discharge (Figure 2) may be a consequence of the anatomy of the middle ear space, with a smaller amount of pus production being required to result in clinically appreciable disease.

In our studies, infants with acute otitis media (AOM) receive seven to 14 days amoxicillin (50 mg/kg/day bid), cefaclor or cotrimoxazole (at an equivalent dose). We have observed a number treatment failures and are concerned that the current regimens are inadequate, possibly due to antibiotic resistance (particularly pneumococcal resistance), poor compliance or inadequate dosage in this high risk population.

COMIT 2 : CSOM

In 1997 we were funded by Merck Sharpe and Dohme to conduct a randomised controlled trial of treatment for chronic suppurative otitis media, (CSOM– active discharge from a perforation of more than 6 weeks duration). Among approximately 200 school aged children examined, 50 met eligibility criteria and agreed to take part in the study. All children received sofradex drops and were randomised to also receive either amoxicillin or placebo. The impact of education and timer alarms in improving compliance with medication was also evaluated. The amoxicillin group experienced a reduction in the density of nasopharyngeal infection (see microbiology section, below) and this was associated with improvement in clinical signs of rhinosinusitis during periods of high compliance. Improvements in CSOM were minimal.

Sustainability, transferability and community participation

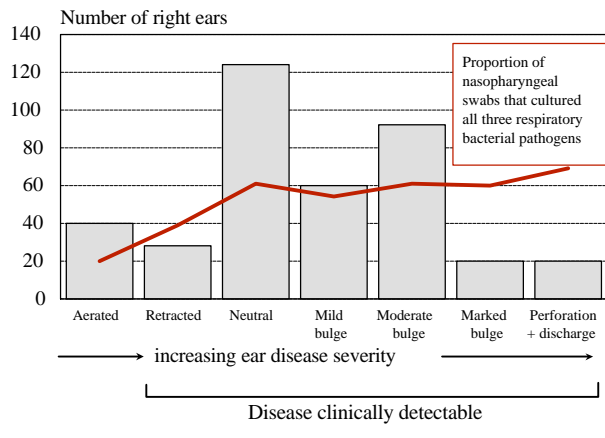
Harold Koops, an Aboriginal Health Worker, has become an essential link between the research offices in Darwin and our field work on the Tiwi Islands. Harold's frequent visits, good nature and increasing knowledge of the Tiwi language have been a great support for his Tiwi colleagues. Una

Table 1: Changes in the prevalence of severe ear disease over time

Birth Year	Exclusions	Inclusions	AOM	Perforation	CSOM
1995	4	15	11/15	4/15	2/15
1996	2	21	16/21	8/21	3/21
1997	1	14	4/14	0/14	0/14
1998-99	2	20	17/20	6/20	0/20

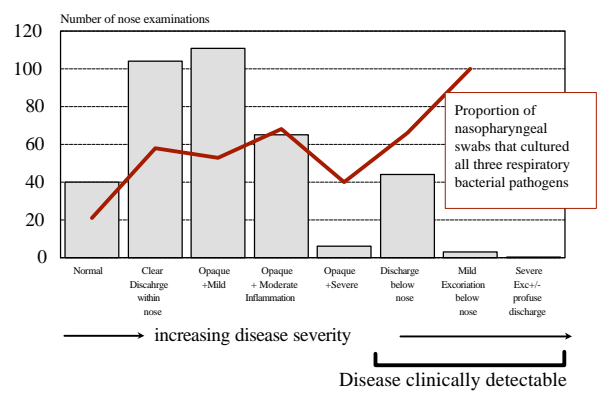
AOM = acute otitis media; CSOM = chronic suppurative otitis media

Figure 1 : “Ear Score” (right ear) from 399 examinations in 50 infants enrolled in placebo-controlled antibiotic trial.



Pilakui, Ainsley Kerinauia, Carla Kerinauia, Gerard Munkara and Marlees Mungatopi have continued to get the ‘Menzies Medicine’ out to families participating in the clinical trials despite difficult circumstances. Most importantly, they have ensured that around 83% of clinical assessments are successful: a fantastic achievement. Una Pilakui (an ear health worker since leaving school) is now in her fourth year with the Ear Team. Harold Koops has also become the most active promoter of the School, preparing exhibitions for open days at Barunga, Daly River, Oenpelli and the Royal Darwin Show.

Figure 2 : “Nose Score” from 399 examinations in 50 infants enrolled in placebo-controlled antibiotic trial.

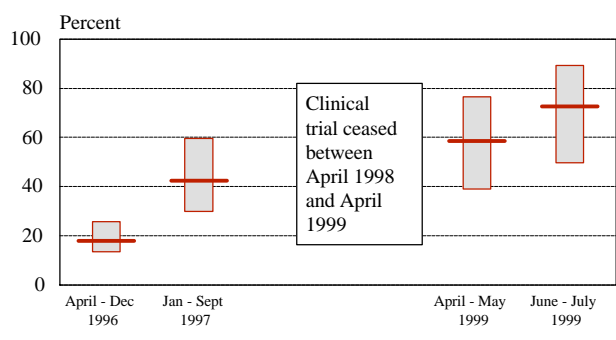


Future studies

Applications have been submitted to the NHMRC and the Harry Windsor Foundation to conduct a further four randomised controlled trials, which are extensions of previous work:

- i) ciprofloxacin *versus* standard therapy for chronic suppurative otitis media;
- ii) improved hygiene measures *versus* standard practice in Darwin child care centres;
- iii) amoxycillin *versus* placebo for persistent nasal discharge;
- iv) high dose amoxycillin *versus* standard dose therapy for acute otitis media.

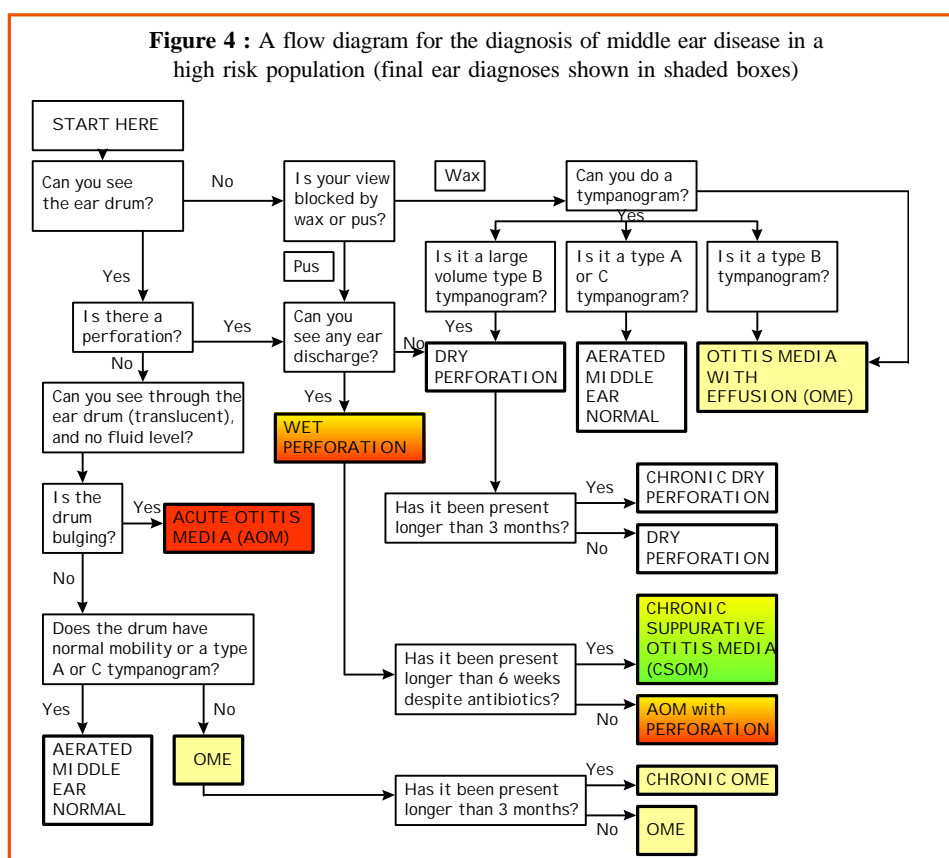
Figure 3 : Proportion of swabs with penicillin resistant pneumococci during placebo-controlled RCT (mean, 95% CI)



The Diagnosis of Otitis Media : To Treat or Not to Treat

There is an urgent need to improve the accuracy of diagnosis of AOM and to identify patients most likely to benefit from antibiotic treatment in this era of increasing antibiotic resistance. Studies of populations with high rates of CSOM may help identify those children most likely to benefit from antibiotic therapy. Video recordings and parent interviews collected as part of COMIT 1 suggest that AOM is not associated with the abrupt onset of symptoms. The use of bulging or recent perforation of the tympanic membrane as the sole criteria for AOM (see Figure 4) has the potential to substantially reduce the frequency of antibiotic prescription in developed countries.

Video images of pneumatic otoscopy have been used to assess the level of agreement between experienced clinical observers. Rob Berkowitz, Albert Foreman, Gus Hunter, Geoffrey Vercoe, John Vorrath, and Michael Zaccharia acted as independent observers. Aaron Leach and Patrick Scott (under the supervision of Al Yonovitz) edited and randomly assorted 89 ear drum video recordings into 25-second presentations. While the intra-observer agreement for the local clinical observer was very good (kappa 0.92), agreement between the original diagnosis and the six external observers was less impressive (kappa 0.4-0.6). It is clear that further work is required to reduce levels of disagreement in diagnosis.

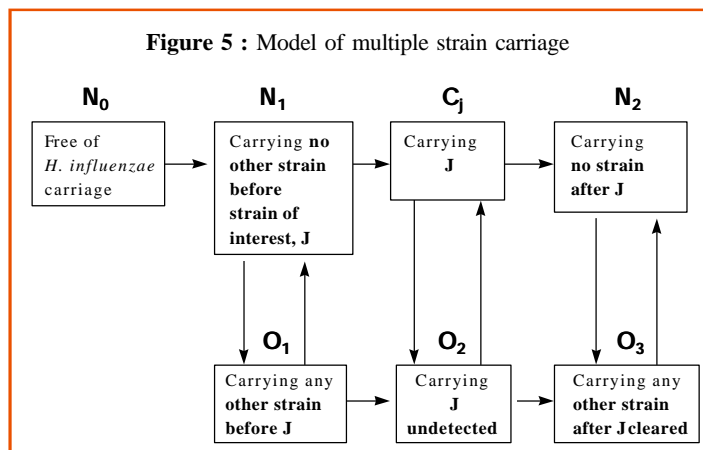


More Microbiology: 'Understanding the Biology'

Under the guidance of Amanda Leach, Grace Perez, Melita McKinnon and Liz Stubbs have continued their intensive microbiological investigation of nasopharyngeal swabs. Training in pneumococcal serotyping was provided by Mike Gratten. Heidi Smith-Vaughan has made important contributions to understanding the relationship between the host and *H. influenzae*. Her longitudinal molecular data from the Tiwi Island infants has now been fitted to a series of mathematical models developed by John Mathews and James McBroom using the software package EPIMOD (see Figure 5). This model predicted that the first acquisition occurred within days of birth and each *H. influenzae* strain was carried for an average of 137 days (although it was only detected on 37% of occasions). Estimates based on detection alone were far shorter (34 days). Furthermore, the mean number of strains carried at any one time was predicted to be 4 compared with rates of 1.5 based on actual detection. The applicability of the model to Australian child care centres is particularly interesting. Heidi is seeking NHMRC funding to extend the microbiological culturing from swabs obtained during the Darwin child care study (Skull *et al*, 1999) to include *H. influenzae* and *M. catarrhalis* (consistent with the Tiwi studies).

Extremely high penicillin resistance (MIC = 16 µg/mL) in pneumococci : a case study

The relationship between antibiotic use, the proliferation and spread of antibiotic resistant pneumococci and the rate of *de novo* emergence of resistance is poorly understood. The benefits of restricted use and the potential risks associated with untreated bacterial infection are uncertain. Between 17 and 193 days of age one research participant made 27 clinic presentations, was admitted to hospital four times with lower respiratory tract infections, and was prescribed 88 days of β -lactam antibiotics. Nasopharyngeal cultures at age 163 days revealed serotype 14 with penicillin MIC of 4 µg/mL. At ages 193 days and 219 days serotype 14 isolates with penicillin MIC of 16 µg/mL were detected. Molecular typing showed that all serotype 14 isolates with MICs 4 or 16 µg/mL were identical, but unique among the 5 molecular type 14s recovered from this population over recent years. Mutations of penicillin binding protein gene(s) (*pbp*) may have occurred *in vivo*, in the originally acquired serotype 14 strain. The *pbp2x* genes will be sequenced.



Nasopharyngeal carriage in children with CSOM

The CSOM study (COMIT 2) microbiology was commenced by Tania Shelby-James and completed by Grace Perez and Melita McKinnon. With assistance from James McBroom, Grace conducted a longitudinal logistic analysis of the nasopharyngeal carriage data. Children with CSOM who received sofradex drops plus oral placebo for a six week period had significantly higher carriage rates for *S. pneumoniae* (OR = 2.4, 95% CI 1.03 - 5.50), *H. influenzae* (OR = 2.38, 95% CI 1.17 - 7.77) and *Moraxella catarrhalis* (OR = 4.96, 95% CI 1.67 - 14.67) when compared to children with CSOM receiving sofradex drops plus oral amoxicillin. Irrespective of treatment group, *H. influenzae* carriage declined significantly during the study period (OR = 0.73, 95% CI 0.57 - 0.94). At the 11 week follow-up visit there was no longer any significant difference in carriage between the two groups. Preliminary analyses show that clinical findings (excessive nasal discharge) were consistent with the microbiology results.

The “micro” ear team thank Sue Hutton, Jann King and Karl Gundersen for their invaluable technical support in the laboratory.

Links between Ear Health and Education

Al Yonovitz (as District Manager – Northern Territory) and Leslie Yonovitz (as Senior Researcher) have joined the staff of Australian Hearing Services. Fortunately both Al and Leslie are able continue their

research activities at the School on a part-time basis (20% and 50% respectively).

While much of the research conducted explores medical solutions, it is acknowledged that the most important consequences of ear disease are hearing disabilities and social disadvantage. Normative data for Tonal Masking Level Differences (MLD) in children have been developed for children from the Essington School by Venkatesh Aithal and Al Yonovitz as part of Venkatesh’s MPH thesis. Venkatesh also documented impaired MLDs in Aboriginal children. Venkatesh and Al, along with Leslie Yonovitz, Sreedevi Aithal and Rebecca McCulloch also collected normative data for school children for revised NAL AB words with speech spectrum and white noise at various signal-to-noise ratios.

In 1998, the Department of Education, Training and Youth Affairs (DETYA) offered funding for ‘strategic initiatives’ to improve literacy among Indigenous students. MSHR, in collaboration with the Independent Schools of the NT, were funded for their project entitled *Advancing Indigenous Literacy Through Intervention for Hearing Disabilities*. Al Yonovitz coordinated the project, Rebecca McCulloch was the project educational audiologist, while Leslie Yonovitz and Sharyn Winders, both speech pathologists, provided hearing support to the six schools. A total of 1050 students in 39 classrooms were included in the program. FM sound field amplification systems were installed and otoscopy and tympanometry were integrated into each school or community health care system. Families were consulted and audiological assessment

provided. The Waddington Diagnostic Reading and Spelling Tests were administered along with the PA-EFL (a test designed by Leslie specifically for Indigenous students learning English as a foreign language).

Project results

1. ENT referrals: 40% had active ear disease and/or need reconstructive middle ear surgery. Note: Only 15% of the participants in this project were primary school-aged (at greater risk of active ear disease).

2. Australian Hearing referrals: 16% had hearing loss great enough in both ears to meet current criteria for individual FM classroom hearing aids. An additional 24% had conductive hearing loss that may also be educationally significant if they are Indigenous students learning English as a foreign language.

3. Central Auditory Processing Disorder (CAP-D): 38% had signs of poor speech discrimination and intolerance of background noise. This group of students is *in addition* to those identified as having peripheral hearing losses. Such students may hear different words to those actually spoken (mis-perceive), miss out on parts of what is said, fail to keep pace with rapid speech and shifts in topics, fatigue and ‘tune out’, *etc.*

4. Performance objectives: it was specified that students should attend at least 75% of school days to be able to benefit from hearing support services.

Sadly, none of the primary-aged students, and only 212 secondary-aged students met these criteria (total 20%). Their results were:

- progress in Spelling Age Scores: 0.95 years;
- progress in Reading Age Scores: 0.99 years;
- progress in Phonological Awareness Scores: 17% (18 months).

High-attending Indigenous students were those who had less ear disease and hearing loss, stayed in school until they were older, and achieved above Intensive English (T-year 3). There is an urgent need to establish standards for classroom acoustics for students with hearing disabilities and for *all* Indigenous students learning EFL. During the course of this project, Patrick Scott and Al Yonovitz developed a computer-assisted analysis system for assessment and modification of classroom acoustics. This should be trialed and evaluated as an instrument to develop standards for classroom acoustics.

Acknowledgements

The Ear Team thank the participating Tiwi families, the Tiwi Health Board, the Julanimawu Health Centre and Xavier Education Centre for their ongoing support. Funding has been provided by the NHMRC, DETYA and the Territory Government. Additional in-kind contributions have been provided by the Cooperative Research Centre for Aboriginal and Tropical Health.

Dr Peter Morris MBBS	NHMRC Public Health Fellow/Unit Head [from 27.05.99]	
	NHMRC Aboriginal Health Training Scholar	[until 24.12.98]
Dr Al Yonovitz PhD	Hearing Scientist	
	Unit Head	[until 07.05.99]
Dr Leslie Yonovitz PhD	Research Fellow	
Dr Amanda Leach PhD	Senior Research Officer	
Ms Rebecca McCulloch BSc	Senior Research Officer/Audiologist	[until 31.12.98]
Ms Sharyn Winders BSc	Project Officer/Speech Pathologist	[until 31.12.98]
Ms Heidi Smith-Vaughan BSc	Graduate Research Assistant	
Mr Venkatesh Aithal MSc	Research Assistant	[until 26.02.99]
Ms Sreedevi Aithal MSc	Research Assistant	[until 26.02.99]
Mr Harold Koops AHW	Research Assistant	
Ms Angela Melder BAppSc	Research Assistant	
Ms Grace Perez	Technical Officer	[until 04.06.99]
Ms Liz Stubbs MPH	Technical Officer	[from 01.07.99]
Ms Melita McKinnon	Technical Assistant	[from 18.03.99]
Mr Sylvester Black	Casual Project Assistant	
Mr Ainsley Kerinauia	Casual Project Assistant	
Ms Carla Kerinauia	Casual Project Assistant	
Mr Aaron Leach	Casual Project Assistant	
Ms Marlees Mungatopi	Casual Project Assistant	
Mr Gerard Munkara	Casual Project Assistant	
Ms Una Pilakui	Casual Project Assistant	
Mr Patrick Scott	Casual Project Assistant	



Una Pilakui conducting a community-based ear examination

Liz Stubbs and Peter Morris taking samples for the randomised control trial





Health Social Sciences Unit



(L-R) : Nonie Wales, Joe Fitz, Peter d'Abbs and Sam Togni

The Unit's activities in the past year have focused on two major projects, but have also included other initiatives associated with the Master of Public Health (MPH) program and the Cooperative Research Centre for Aboriginal and Tropical Health (CRC).

Highlights

- Evaluation of the Katherine West Coordinated Care Trial.
- NHMRC grant to examine the long-term effects of community-based alcohol restrictions in regional and remote Australia.
- Review of petrol sniffing interventions.
- Development of a new MPH elective, "Evaluation of Health Programs".

Evaluation of Katherine West Coordinated Care Trial

In July 1998 a MSHR team under the direction of Peter d'Abbs, with Samantha Togni as Project Manager, was awarded a contract to evaluate the Katherine West Coordinated Care Trial, one of four such trials involving Aboriginal health services in Australia between 1998 and 2000. Other trial sites are located in the Tiwi Islands (NT), Wilcannia (NSW) and Perth-Bunbury (WA).

The Coordinated Care Trials (CCTs) derive their name from a broader program of national health care reform, under which a number of initiatives aimed at providing more effective and efficient care to persons suffering from chronic conditions are being trialled in non-Aboriginal settings.

The Aboriginal trials, however, have several features not to be found in the so-called 'mainstream' trials. The two NT trials have three defining characteristics. Firstly, responsibility for allocating health resources within the respective regions has been shifted from the traditional provider – Territory Health Services (THS) – to regional 'Health Boards' composed of Aboriginal people from communities in the region. The Katherine West Health Board covers an area of 162,000 sq km, with a population of around 3,000. As well as the major Aboriginal communities of Lajamanu, Kalkaringi, Daguragu, and Yarralin, it includes a number of smaller communities, the town of Timber Creek and several cattle stations – all of which are included within the scope of the trial.

The Health Board is a 'fund holder': that is, funds that would otherwise have been

spent on provision of health services by THS have been 'pooled' and given to the Health Board which may, subject to agreed conditions, choose to allocate those funds in the same manner as THS has done in the past – or instead, reprioritise expenditure among programs.

A second characteristic of these trials is that the Health Boards receive additional funds from the Health Insurance Commission in the form of 'MBS/PBS cash-outs'. Residents of remote Aboriginal communities rarely receive rebates through either the MBS or PBS, because there are very few doctors or pharmacists in the bush to generate such rebates. For the purposes of the trials, the Commonwealth is providing a *per capita* addition to their normal funding allocation, based on the estimated average MBS/PBS rebate paid to Australian citizens. This amounts to a little over \$536 per person per year.

A third feature of the Aboriginal Trials is that they are designed on a 'whole of population' basis, rather than on serving the health needs of an identified subset of the community, as the non-Aboriginal Trials do. This means that they are likely to lead to greater emphasis on preventative, population-based measures than has been possible in the past.

The trials also have a fourth characteristic, which they share with the mainstream trials: the principle of 'care coordination' of persons with chronic conditions. To facilitate this process, THS, prior to commencement of the trials, prepared a number of 'best practice' protocols for management of chronic diseases, and developed a new computer-based client record system.

For evaluation purposes, the trial has been conceptualised in terms of four components:

- inputs;
- change mechanisms;
- intermediate outcomes;
- longer-term outcomes.

The inputs have already been described. These, in combination, are designed to bring about changes in the structures and processes through which health services in the Katherine West region are delivered. These changes, conceptualised in the evaluation as ‘change mechanisms’, are

- Aboriginal control over purchasing and providing health services;
- increased resources for health services;
- improved care coordination (at the patient level);
- service coordination (at the program level).

An important initial task of the evaluation is to determine to what extent the trial inputs lead to the creation of the postulated change mechanisms. This involves testing four hypotheses, namely, that:

1. establishment of the KWRHB + transfer of fund-holding authority to KWRHB will lead to *Aboriginal control over purchasing and providing health services by the KWRHB* in the KW region;
2. pooling of THS funds + cashing-out of MBS/PBS benefits will lead to:

a) an increase in resources for health services in the KW Remote region;

b) changes in levels of expenditure on existing services in the region including the possibility of cessation of services and also including expenditure on management, infrastructure, *etc*);

c) introduction of new programs and/or services;

3. development of Standard Care Plans + development of the IT system + recruitment, training and provision of on going support for selected individuals to carry out functions of care coordination will lead to *improved care coordination* of persons with chronic illness and/or acute, multiple service needs;

4. pooling of THS funds + cashing-out of MBS/PBS benefits + transfer of purchasing power to KWRHB will lead to:

a) improved administration, co-ordination and deployment of health services;

b) increased intersectoral collaboration.

To test these hypotheses, both qualitative and quantitative methods are being used.

Under the ‘program logic’ underpinning the trial, these change mechanisms are in turn expected to lead to clinical outcomes, such as improved management of chronic conditions which, while not necessarily bringing about enhanced health status in the short-term, can be expected to do so in the longer-term. Another task of the evaluation

is to gauge the extent to which these clinical outcomes occur.

This latter task is being pursued by means of clinical audits, using random samples of trial participants, and ascertaining the extent to which:

- a) services scheduled for provision under the relevant Standard Care Plans appear, on available evidence, to have been provided;
- b) services provided are recorded in the new computerised IT system.

Three such audits are planned for the evaluation: a baseline audit (already completed), a mid-term audit (data collection completed) and a final audit.

To date, several interim reports have been prepared for the trial sponsors (the KW Health Board and THS) and the Commonwealth Government. However, at this point in the trial, these reports are not available to the public.

Determinants of Sustainability in Community-Based Action to Reduce Alcohol Problems

Peter d'Abbs and Samantha Togni have commenced a two-year examination of longer-term effects of community-based alcohol restrictions in regional and remote settings in Australia.

In recent years a number of community groups involving Aboriginal and non-Aboriginal people in regional and remote settings have mobilised to bring about formal restrictions to the sale of alcohol as part of a strategy to reduce alcohol-related

harm. These initiatives have been informed by elements of 'community development', 'health promotion' and 'new public health' models, in which emphasis is placed on increasing the local community's control over health-related issues. Common to all of these approaches is a principle of targeting interventions at the whole community rather than at individual 'problem drinkers'.

Examples are Halls Creek and Derby, both in the Kimberley region of Western Australia, and Tennant Creek and Curtin Springs in the Northern Territory. Initial evaluations of these initiatives indicated that, at least in the short-term, they had a significant impact on levels of alcohol-related harm, as indicated by measures such as alcohol-related hospital presentations, incidents of assaults and interpersonal violence, and apparent alcohol consumption. As a consequence, the initiatives have been hailed as representing a viable option for community groups aiming to reduce alcohol-related harm.

However, virtually nothing is known about the *sustainability* of these outcomes or about the determinants that help or hinder sustainability. This uncertainty is common in many areas of health promotion and it has only recently begun to be addressed.

This project addresses the issue by revisiting the settings mentioned in order to gauge the longer-term impact of restrictions still in place, and to identify the determinants of sustainability.

The research plan comprises two main components:

1. follow-up evaluation to gauge (a) the longer-term impact of the restrictions

on alcohol sales, and (b) the extent of continuing community support for the restrictions;

2. a sociological analysis aimed at identifying the determinants of sustainability, leading to formulation of a 'middle range theory' of sustainability in community-based alcohol interventions.

This project is being funded by a NHMRC research grant.

Review of Interventions into Petrol Sniffing

One of the perennial problems besetting some (but far from all) Aboriginal communities is petrol sniffing by young people. Over the years, a large number of interventions have been undertaken to try to prevent and/or contain petrol sniffing and its effects. Few of these interventions have been adequately documented, much less evaluated, with a result that today's would-be problem solvers rarely build on yesterday's successes and failures. Some years ago, in an attempt to address this situation, a comprehensive review of interventions into petrol sniffing was prepared for the Drug and Alcohol Bureau (as it was then called) of THS by Peter d'Abbs.

The review, though well received, was never widely circulated, and has since become dated. During 1998 a decision was taken to update and publish the report under the auspices of the Cooperative Research Centre for Aboriginal and Tropical Health (CRC). The CRC is providing funds to cover expenses associated with updating

the review, while two CRC Core Partners, THS and the MSHR, have contributed the time of Sarah MacLean and Peter d'Abbs respectively as 'in-kind' contributions towards the CRC Program.

The project is now nearing completion.

Contributions to MPH and Associated Programs

This year has seen continuing and growing involvement in the MPH teaching program. Peter d'Abbs continued to coordinate a core unit, *Sociology and Health*, as well as two electives in alcohol and other drug issues. In addition, he worked with Ms Janice Jessen from Northern Territory University in adapting one of these units, *Alcohol and Other Drug Issues Among Indigenous Australians*, for undergraduate level teaching.

In Semester 2, 1998, a new elective was introduced into the MPH program entitled *Evaluation of Health Programs*. The unit was compiled jointly by Peter d'Abbs, Peter Morris, Anthea Duquemin and Ann Garrow.

Also during the year, three MPH students supervised within the Unit completed their dissertations, namely: Yvonne Wood, Debra Singh and Jeff Standen.

Other postgraduate activities

Three PhD students attached to the Unit continued to make progress on their research during the year. Daniel Lam completed data collection for his research

on the effects of land migration among water people in Hong Kong.

David Thomas continued work on his PhD investigating the history of Aboriginal health research. He has largely completed work describing Aboriginal health research before 1914 in the early Australian medical journals and medical congresses. He is now looking at research published in the *Medical Journal of Australia* from when it was first published in 1914 until 1970. David spent February 1999 as a Visiting Fellow at the Koori Health Research and Community Development Unit of the University of Melbourne and has also continued regular part-time public health work at the Danila Dilba Aboriginal Medical Service in Darwin.

Kath Kemp is now analysing data collected for her PhD study of cross-cultural issues associated with intensive care nursing involving Aboriginal patients and their families. The intensive care experience is constructed within a framework of complex and differing realities that may affect interaction between the nurse and the family. The aim of Kath's project is to describe this experience from the viewpoints of both nursing staff and

Aboriginal families, and to derive from the study strategies to reduce miscommunication in future. Nurses and patients from two Northern Territory hospitals and one receiving hospital in South Australia have been interviewed.

Personnel

Peter d'Abbs and Samantha Togni continued their involvement in the Health Social Sciences Unit throughout the year. Towards the end of 1998 Suzie Adsett joined the Unit for six months to assist with the clinical audits being conducted as part of the CCT evaluation. In January 1999, Nonie Wales joined the Unit as a Research Assistant to work on both the CCT evaluation and the NHMRC project. In April 1999 Joe Fitz joined the Unit as a Project Officer, also to work on both of these projects. Prior to this, Joe completed a traineeship for Aboriginal students with the Cooperative Research Centre.

Ross Bailie (MSHR) is a member of the CCT evaluation team, supervising the clinical audits and John Deeble (NCEPH) is a consultant advising on evaluation of economic aspects of the trial.

Dr Peter d'Abbs BA(Hons) MA PhD	Senior Lecturer/ Unit Head
Ms Samantha Togni BA(Hons) MA	Project Manager/ Research Officer
Ms Suzie Adsett RN BAppSc(Nurs)	Clinical Research Officer [from 07.12.98]
Ms Nonie Wales BA(Hons) BSocSc	Research Assistant [from 08.02.99]
Mr Joseph Fitz Cert Project Officer	Project Officer [from 22.03.99]
Mrs Kath Kemp RN BAppSc(Nurs)	Menzies PhD Scholar
Dr Daniel Lam	PhD Scholar
Dr David Thomas MBBS DTM&H MMedSc FAFPHM	NHMRC PhD Scholar



Molecular Genetics Unit



Back (L-R) : Megan Hibble, Mark Mayo, Armando Del Vecchio, Michael Binks,
Karl Gundersen and Jon Hartas
Front (L-R) : Robyn Marsh, KS Sriprakash, Paula Lawrie and Heidi Smith-Vaughan

This Unit engages in studies that: a) unravel the mechanisms of antigenic diversity in disease-causing bacteria; b) increase understanding of host-pathogen interactions; c) develop molecular methods to diagnose bacterial infection and to type otherwise non-typable strains; d) contribute to molecular epidemiology, and e) identify and characterise bacterial antigens that may be important as vaccine candidates.

Highlights

- The protein called SIC may be responsible for kidney disease amongst Aboriginal people.
- Distribution of the genes for proteins involved in adherence to the host cell could be different within a *vir* type. Hence, *vir* types do not always represent strains, indicating that movement of virulence genes from one bacterium to another is a common feature in group A streptococcus.
- Preliminary results show that the presence of a gene for a fibronectin binding protein may be important in invasive disease.
- Expression of two novel chlamydial membrane-associated proteins was detected in natural infection.

Streptococcus pyogenes

Streptococcus pyogenes (group A streptococcus, GAS) can cause self-limiting infection or, if ineffectively treated, can lead to serious sequelae such as acute rheumatic fever (ARF) and acute glomerulonephritis (AGN). *S. pyogenes* also causes life-threatening invasive diseases like streptococcal toxic shock-like syndrome and necrotising fasciitis. Penicillin still remains a very effective antibiotic against *S. pyogenes* infection. However, in severe systemic disease, antibiotic treatment often may not resolve pathology and the causative organisms are usually not recovered from ARF or AGN patients. Therefore, vaccines are being actively sought for protection against recurrent infections, toxic shock-like syndrome and other possible post-infection sequelae.

Streptococcal Inhibitor of Complement function (SIC)

In 1996, a Swedish group described a streptococcal extracellular protein which inhibits complement function. This protein, SIC, binds to clusterin and other blood proteins and also the membrane attack complex (MAC), the final complex of the complement cascade. Our research revealed that there are two classes of SIC – CRS and DRS, for closely and distantly related to the prototype SIC respectively (Figure 1). CRS and DRS are found in all isolates which contain *emm1*, *emm12*, *emm55* and *emm57*, the genes for M types 1, 12, 55 and 57 respectively [14]. Epidemiological evidence suggests that strains of

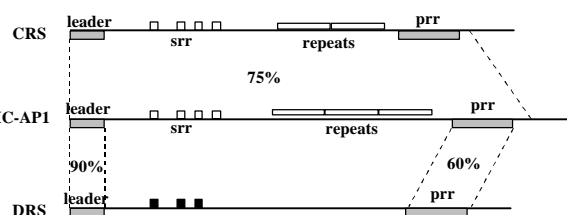
these M types could be AGN-associated. We estimate that strains containing these four *emm* sequences account for more than 6% of the Northern Territory's isolates, which is a substantial representation.

CRS and DRS have been cloned in pQE30 for expression. The recombinant proteins are being purified for detailed biochemical studies. Moreover, if SIC is a nephritis strain-associated protein, we expect strong seroreaction to this protein among AGN patients. This hypothesis will be tested.

GAS strain structure in the Top End of the Northern Territory

We now have a large collection of GAS isolates and most have been typed by *vir* typing, a molecular typing method previously described by us. In all, more than 100 *vir* types are circulating in the Top End. Our previous studies revealed that GAS strains and other potential pathogens of this genus (for example group G streptococcus) may occur in panmixia. Exchange of genetic materials (particularly of those recognised to code for virulence factors) among different *vir* types may provide further variation in strain structure relevant

Figure 1: Comparison of CRS and DRS to the prototype SIC (SIC-API). The sequences corresponding to short repeat regions (srr) are different for CRS and DRS. The leader sequence and the proline rich region (prp) are conserved in CRS and DRS. The percent identity of residues is shown.



to virulence and pathogenesis. Some virulence genes are present in almost all isolates, hence variations could arise only by allelic differences of the gene. In contrast the others, for example the genes for fibronectin binding proteins, are present in 30-70% of the isolates. Furthermore, there are multiple genes which code for fibronectin binding proteins. Thus allelic differences, as well as permutations of these genes, may contribute to changes in virulence characteristics. In order to test whether *vir* types represent strains for the purpose of virulence characteristics, we investigated distribution of genes for three fibronectin binding proteins among several isolates belonging to the same *vir* type. Our preliminary results suggest that *vir* types may not always represent strains in regard to these virulence characteristics. Knowledge of the combination of some of the virulence genes present in a *vir* type is important to associate severity of infections. For example our preliminary results show that strains with gene one of the fibronectin binding protein are more likely to be associated with invasive disease. Further work to confirm this finding is in progress.

The work on *S. pyogenes* is carried out in collaboration with the Tropical Medicine and Renal Units at the School, Mark Walker at the University of Wollongong, Singh Chhatwal, Braunschweig, Germany, and Dr Debra Bessen, Yale University.

Funding for the *Streptococcus pyogenes* projects is provided by the NHMRC.

Chlamydia

Chlamydia trachomatis, an intracellular bacterial parasite, causes conjunctivitis, trachoma, non-gonococcal urethritis, pelvic inflammatory disease, lymphogranuloma venereum, and neonatal respiratory infections in humans. The prevalence and incidence of many of these diseases are high in the Northern Territory population. Our aim is to identify novel surface proteins that could be potential vaccine antigens. Our search revealed two chlamydial membrane associated proteins (CMAP1, CMAP2). Studies using sera from a Chlamydia-endemic region clearly showed that both these proteins are expressed during natural infection (Figures 2 and 3). A correlation between the degree of exposure to chlamydial infection and the degree of anti-CMAP1 reactivity was also found. However, rabbit antibodies to the two CMAPs did not neutralise chlamydial infection of cell cultures.

Funding for the Chlamydia project is provided by the NHMRC.

Figure 2: Comparison reactivity to GM1.1 (a peptide corresponding to CMAP1) with original MIF titres (microimmunofluorescence). Sera (1:400 dilution) were selected from low (0-16), medium (32-256) and high (512-1024) responding groups. χ^2 trend analysis confirms a positive linear association between reactivity to GM1.1 and MIF titre ($P < 0.0001$).

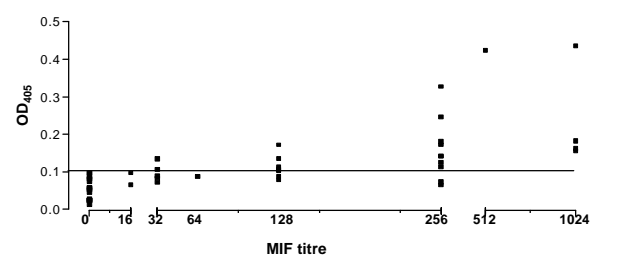
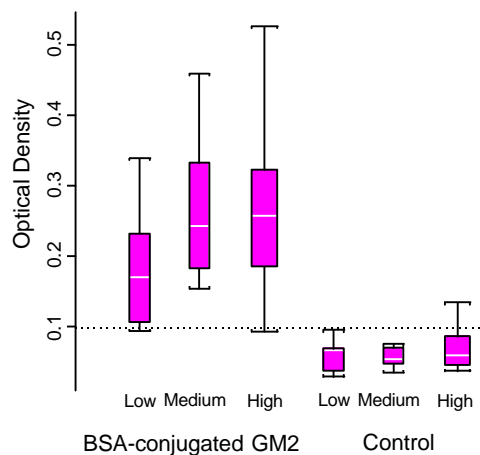


Figure 3: Boxplot showing seroreactivity to GM2, a peptide corresponding to CMAP2. BSA-conjugated GM2 or mock-conjugated BSA were used to coat wells of microtitre plates. Box plots labelled as low, medium and high represent sera from low, medium and high MIF titres respectively (see Figure 2). The height of the box represents the inter-quartile range. The lower end of the box is the 25th percentile (1st quartile) The upper end of the box is the 75th percentile (3rd quartile). The line within the box is the median. The width of the box is proportional to the square root of the sample size. The “whiskers” extend to the maximum and minimum data values.



Donovanosis

Donovanosis is a genito-ulcerative sexually transmitted disease that occurs across northern Australia and in many regions throughout the world. Although it is entirely curable, if undiagnosed or treated late, the condition can lead to serious consequences which include scarring, mutilation and infertility. The condition is associated with an increased risk of HIV transmission, providing compelling reasons to improve its diagnosis and treatment. A polymerase chain reaction-based diagnostic method was developed in this laboratory (Carter *et al*, 1998) and further work to improve this method is now in progress. This work is carried out in collaboration with the Molecular Parasitology Unit at the School and Territory Health Services, Darwin.

This project is supported by the NHMRC.

Burkholderia pseudomallei

The tropical disease, melioidosis, results from infection with the bacterium *Burkholderia pseudomallei*, common in the tropical north of Australia and endemic in South-East Asia. It is fatal in up to 50% of diagnosed cases and is widely underdiagnosed because of its multifaceted presentations involving many different organs and yet it can remain dormant in humans for many years. It is the most common cause of fatal community-acquired bacteraemic pneumonia in the Top End of the Northern Territory.

Recent work suggest that there are two biotypes representing virulent and avirulent phenotypes.

We have an extensive collection of clinical and environmental *B. pseudomallei* isolates and have prepared chromosomal DNA from a large number of them. Presently we are standardising AFLP, a powerful DNA fingerprinting method, to categorise the isolates on the basis of genotypic differences. The purpose of this is to conduct detailed epidemiological studies of the disease and to isolate genes that may be important in virulence. This is a joint project between this Unit, and the Molecular Parasitology and Tropical Medicine Units at this School.

Funding is provided by an NHMRC project grant.

A Rapid Diagnostic test for Group B Streptococcus

Group B streptococcus is a leading cause of serious neonatal infection. Prophylactic antibiotic treatment during labour can prevent the neonatal infection. Prenatal carriage of group B streptococcus is not a good indicator for infection intrapartum. Therefore, empirical adoption of guidelines suggesting use of prophylactic antibiotic treatment for women with

prenatal colonisation of the organism might lead to unnecessary use of antibiotics. This could be avoided if there were a simple and fast test to detect group B streptococcus during labour. Our approach is based on an assay for C5a peptidase, a highly specific endopeptidase present on the surface of these organisms.

We have just commenced this work, which is supported by the CRC for Aboriginal and Tropical Health.

Dr KS Sriprakash BPharm MPharm PhD	Principal Research Fellow/Unit Head	
Dr Alison Goodfellow BSc PhD	Postdoctoral Fellow	[until 29.01.99]
Dr Garry Myers BSc(Hons) PhD	Informatics Officer	[until 21.10.98]
Ms Heidi Smith-Vaughan BSc	Graduate Research Assistant	
Mr Jon Hartas BAppSc	Research Assistant	
Mr Michael Binks BSc	Technical Officer	
Mr Armando Del Vecchio BSc(Hons)	Technical Officer	[from 04.01.99]
Mr Richard Grinvalds BSc MSc MPhil MAIMS	Technical Officer	
Ms Sally Rosen BSc	Technical Officer	
Mr Mark Mayo AssocDip AppSc	DETYA Cadetship	[from 04.03.99]
	Laboratory Assistant	[until 03.03.99]
Ms Megan Hibble BSc	Project Assistant/Technical Officer	
	NHMRC BMedSc Scholar	
Ms Robyn Marsh BSc	CRC MSc Scholar	[from 01.04.99]
Mr Karl Gundersen	CRC Trainee	[from 06.04.99]
Mr Tony Valle BSc	Casual Technical Officer	



Molecular Parasitology Unit



Clag : Sometimes research can get rather sticky ...

Rear (L-R) : Katharine Trenholme, Estelle Gray, Don Gardiner and David Kemp
Front (L-R) : Shelley Walton, Pearly Harumal, Paula Hawthorne and Joanne Manski-Nankervis

In the Molecular Parasitology Unit we aim to use modern molecular methods to answer questions that are important to the health problems of our region but cannot be answered by older approaches. We collaborate with several other Units as well as with colleagues from Territory Health Services and work in cooperation with communities, providing them with feedback on programs such as scabies in order to achieve this.

Highlights

- Evidence that *clag*, a gene that we have identified with a cellular adhesion function important in severe malaria, produces a product which is located on the surface of the infected red blood cell.
- Evidence that other genes closely related to *clag* are expressed in red blood cell stages of the parasite.
- Generation of hundreds of thousands of *E. coli* clones which should express scabies sequences.
- Demonstration of antigenic changes in *Haemophilus influenzae* during persistence in an infected child.
- Feedback of epidemiological information showing that dog and human scabies mites are different populations.

Malaria

Severe malaria occurs when parasitised red blood cells adhere to the endothelial lining of capillaries in organs such as the brain. Our program has been aimed at understanding this process of 'cytoadherence', in particular the roles of the parasite genes responsible.

Katharine Trenholme, Don Gardiner, Deby Holt and Liz Thomas have been examining mechanisms of cytoadherence. During the past year Liz has been replaced by Mandy Edwards, Joanne Manski-Nankervis has commenced an Honours year and more recently Deby has been replaced by Paula Hawthorne.

A region of chromosome 9 ^[5] is often deleted in parasites cultured in the laboratory leading to parasite lines that have lost the ability to cytoadhere. Last year we reported the identification of a gene in this region which we named the Cytoadherence-linked Asexual Gene (*clag*, now called *clag 9* because it has paralogues on other chromosomes) with properties suggesting that it may be the gene responsible for cytoadherence ^[51]. We demonstrated that disruption of this gene in the parasite, using the transfection procedures recently developed in Alan Cowman's laboratory in Melbourne, resulted in parasites which had lost the ability to cytoadhere to melanoma cells or to the purified receptor CD36.

This year we have studied *clag 9* in further detail ^[51]. We have prepared antibodies to synthetic peptides derived from the *clag 9* sequence. When these were reacted with live parasites and then labelled by fluorescence the parasitised red cells

reacted strongly (cover photograph). This is potentially a very important result as it indicates that the *clag 9* protein is exposed on the surface of the infected red cell and available to antibodies. Hence it appears that *clag 9* may be a potential vaccine candidate. Much more work over a number of years will be required to examine this possibility.

It is clear from the emerging stream of data from the Malaria Genome Sequencing Projects that *clag 9* has a number of counterparts on other chromosomes. Three additional complete sequences are now available and we have shown that two of these (*clag 2* and *clag 3.2*) are expressed in red blood cell stages. This suggests that they may also be implicated in cytoadherence, perhaps specific for receptors other than CD36.

The sequences of *clag 9* from other isolates are highly conserved, with variation seen at only four sites in the region examined so far. These are all located on the same side of a transmembrane segment. The high degree of conservation may have significant implications with regard to the vaccine potential of this molecule.

This work is supported by the NHMRC and by a generous donation from Mark Nicholson and Alice Hill.



Defining the Protective Immune Responses to Scabies

Scabies is a disease unusual in urban Australia but endemic in remote northern and central Australian Aboriginal communities, in which up to 50% of children may be infested with the scabies

mite. These infestations often lead to bacterial skin infections, and serious complications, including blood poisoning and kidney damage. A particularly dreadful form of scabies, known as crusted scabies can develop, in which mites multiply in their millions and the affected person develops severe crusting of the skin. This results in death within 5 years for up to 50% of people with this form of scabies. Unfortunately these communities have arguably the highest known incidence of crusted scabies world-wide. Crusted scabies is therefore a serious public health issue, not only for the individual concerned but also for their communities, where sufferers may be 'core transmitters' of the disease.

In collaboration with the Tropical Medicine Unit we have investigated the efficacy of current acaricides [68].

Development of immunotherapy or vaccines, in particular to prevent the crusted form of scabies, would have tremendous impact on the quality of life for sufferers in these remote Aboriginal communities. However there have been very few published studies on the nature of the immune response in either crusted or uncomplicated scabies, and there is no *in vitro* model for human scabies. The MSHR is in a unique situation having modern well equipped laboratories and access to large quantities of mites for molecular and immunological studies. No other groups internationally are working on characterising the immune deficit in crusted scabies.

We have already established essential basic procedures which are necessary steps in vaccine development. These include

dissecting mites from shed skin; preparing DNA from individual mites; establishing a set of mite genetic markers [59-61, 86]; studying the epidemiology of scabies [104,105]; generating both genomic and expression libraries from scabies DNA, and presently we are screening the latter for mite antigens using serum from scabies patients.

We are now in an excellent position to extend and consolidate our current studies with the introduction of methods to characterise the immune response of patients with crusted and uncomplicated scabies. In particular, it is important to look for the differential production of cytokines, key regulators of the immune response.

Shelley Walton has recently returned from six months training in cellular immunology with Anne Kelso in the Leukocyte Biology Unit at Queensland Institute of Medical Research. With the long-term goal of developing immunotherapy or a vaccine to prevent this disease, we aim to: (1) test whether the type of *in vivo* immune response differs between crusted and uncomplicated scabies; (2) determine if the *in vitro* response to a panel of candidate antigens differs; in particular, we will test whether crusted scabies is associated with a Th2 response and uncomplicated scabies a Th1 response.

These studies should provide a clearer outline of the nature of the immune response in scabies and provide a solid base for future research. Differences between the responses in the two forms of the disease may both explain the nature of the deficit that results in the extreme form and identify those responses that are important in normal scabies.

Pearly Harumal has constructed a library of several hundred thousand expression clones containing scabies cDNA sequences in the vector pGEX 2T in *E. coli* [119]. This was particularly difficult because of the small amount of material available from hand-dissected mites. She has developed protocols which allow amplification by PCR and cloning of minute amounts of cDNA. She is currently attempting to overcome background problems in screening these with serum from persons exposed to scabies. We hope that the isolation of clones expressing scabies antigens will lead to better understanding of the immunology of scabies and, perhaps eventually, a vaccine. That this is a realistic possibility is suggested by the success of the vaccine against the cattle tick, *Boophilus microplus*.

This work is funded by the NHMRC and by the Channel 7 Children's Research Foundation of South Australia

Molecular Epidemiology of *Haemophilus influenzae* in the Respiratory Tract of Aboriginal Infants

Aboriginal infants in the Top End of the Northern Territory suffer continuous episodes of otitis media (OM) from within weeks of birth and throughout childhood. Our previous work demonstrated that the extended carriage of NCHi is at least partly due to colonisation with a successive onslaught of different strains, coupled with queuing of multiple strains in each infant^[101]. NCHi strains were further characterised by sequencing regions of the P2 major outer

membrane protein (MOMP) implicated in protective immunity. Extensive diversity was observed between strains with the extended carriage of a particular PCR-ribotype potentially explained by P2 variation. In addition, horizontal transmission of the P2 gene between different strains was evident.

The P2 sequence information has been used to develop PCR and colony hybridisation assays that will detect low numbers of defined strains among large numbers of other bacteria to more precisely define the number of strains carried simultaneously, and the duration of carriage of subsidiary strains queued behind a dominant strain.

Lipopolysaccharide (LPS) is a major virulence determinant of *H. influenzae*. NCHi are able to display different LPS structures by the spontaneous loss or gain of multiple epitopes in various combinations. Expression of at least three LPS epitopes is encoded by the *lic1* locus. Loss or gain of a variable number of CAAT repeats located within this gene, called phase variation, alters the expression of the epitopes it encodes. Louise Martin has detected phase variation of the *lic1* locus in longitudinal isolates collected from an infant colonised long-term with a single strain of NCHi; this is the first time that this has been demonstrated *in vivo*.

Implications

This project characterised *H. influenzae* which colonised Aboriginal infants at rates of virtually 100%, subsequently causing ear disease and associated effects, the most direct effect being hearing loss.

This work demonstrated an enormous diversity among the *H. influenzae* colonising these infants, thus allowing persistent colonisation or infection. Many different types of *H. influenzae* are circulating in the community and the infants are colonised by a continual succession of these strains.

NHMRC provides funding for this project.

Professor David J Kemp FAA BSc PhD	Deputy Director/ Unit Head	
Dr Donald Gardiner PhD	Senior Research Officer	
Dr Katharine Trenholme PhD	Senior Research Officer	
Dr Shelley Walton PhD	Research Officer	[from 27.07.98]
Ms Deby Holt BAppSc(Biotechnol)	Research Assistant	
Ms Mandy Edwards BAppSc(Biotechnol)	Technical Officer	[from 18.02.99]
Ms Paula Hawthorne BSc(Hons IIA)	Technical Officer	[from 07.06.99]
Ms Elizabeth Thomas BSc	Technical Officer	[until 23.11.98]
Mr Mark Mayo AssocDipAppSc	Laboratory Assistant	[until 03.03.99]
Ms Pearly Harumal BSc	APA DETYA PhD Scholar	
Miss Louise Martin	BSc(Hons) Student	[until 29.01.99]
Ms Joanne Manski-Nankervis	BSc(Hons) Student	[from 01.02.99]



Public Health & Epidemiology



(L-R) : Kathryn Flynn, John Condon, Dorothy Mackerras and Ross Bailie

The Public Health and Epidemiology Unit focuses on social and cultural aspects of disease and mortality, as well as on the epidemiology of infectious and non-infectious disease. It also comments on policy and collaborates widely with other Units.

Highlights

- Colonial Foundation funding for Aboriginal Birth Cohort follow-up.
- United Nations Development Program consultancy undertaken by Dorothy Mackerras to advise on feasibility and design of a national nutrition survey in Samoa.
- Review of THS Environmental Health Program and THS contribution to the Health Infrastructure Priorities Project/National Environmental Health Strategy.
- Involvement in evaluation of Tiwi and Katherine West Coordinated Care Trials.

Staff Changes

The most significant event for the Unit and the School was the departure of John Mathews at the end of the financial year.

Aboriginal Birth Cohort Study

The Aboriginal Birth Cohort Study has commenced a new phase. The aims are to investigate the influences of birth weight on Aboriginal childhood nutrition, growth and morbidity and to examine the modifying influences of living conditions on these influences and identify markers in childhood of chronic adult diseases. Seventeen percent of this birth cohort were low birth weight and 27% were small for gestational age.

For the last few years Kathryn Flynn has been maintaining the cohort. With funding from the Colonial Foundation, the prospective follow-up of the 10-12 year-olds was commenced in January 1999.

The project team members are Ingrid Bucens, Paediatrician at Royal Darwin Hospital and, from Menzies, Kathryn Flynn, Mai Katona, Dorothy Mackerras, Gurmeet Singh and Sue Sayers. Team members focus on specific aspects of the



Celebrating Colonial Funding for the Birth Cohort Study : Wendy Hoy, Kathryn Flynn and Sue Sayers

follow-up. Measures of height, weight, head circumference, skin folds, total body fat percentage and blood pressure are collected by Dorothy and Kath; Gurmeet is concentrating on the ultrasound measurement of kidney and liver size; Ingrid on lung function; and Sue on community, household and family social factors. A number of biomedical measures are being recorded on fasting blood samples and urine samples.

Preliminary analysis of 110 children including 36 from Darwin (mean age 10.6 years \pm 1.7) and 27 from a remote community (mean age 10.9 years \pm 1.4) has been undertaken. The analysis of possible cardiovascular risk factors show urban children were heavier ($p < 0.001$) and had higher mean systolic ($p < 0.05$) and diastolic ($p < 0.05$) blood pressures than community children. For community children mean HDL-cholesterol and red cell folate values were significantly lower than those for urban children ($p < 0.05$ and $p < 0.005$, respectively). There were no significant differences for cholesterol, triglycerides or LDL-cholesterol values.

By early August 1999, 205 children had been seen. Continuing collection and analysis will determine if these findings are consistent with other Top End Aboriginal communities and are related to the birth weight outcomes.

Feasibility of a National Nutrition Survey in Samoa

During the year, Dorothy Mackerras went to Samoa as a consultant for the United Nations Development Program to

advise on the feasibility and design of a national nutrition survey. One of the main purposes was to determine exactly the extent of alleged malnutrition in children. She identified that the survey could take place in combination with a WHO survey of the effectiveness of filariasis prophylaxis and would usefully include an assessment of anaemia. The survey is currently underway and she is continuing her association with it *via* a consultancy with the World Health Organization.

Tiwi and Katherine West Coordinated Care Trial Evaluations

These trials are joint initiatives of Territory Health Services and the Commonwealth Government, and involve the transfer of control of, and purchasing authority for, health services to local or regional health boards, together with the implementation of care planning protocols and an electronic information system. Ross Bailie's primary role in this trial is an evaluation of the impact of the care protocols and information system on clinical practice. Dorothy Mackerras has also been briefly involved in some of the preliminary aspects of the health promotion program in the Tiwi Trial.

ACT Coordinated Care Trial

Since leaving Canberra in early 1998 Ross Bailie has continued as a member of the evaluation team for a trial of care coordination by general practitioners in the ACT. The trial is being jointly sponsored by ACT Health and Community Care and

the ACT Division of General Practice. This project is a complex and multicomponent evaluation of a managed care-type initiative. The evaluation involves health consumers in a randomised controlled trial, with additional important components of the evaluation focussing on the experience and perceptions of general practitioners and community service providers, and on the impact of the initiative on the general health and community services system. One specific aspect of the trial that Ross is currently working on is exploring alternative measures of co-morbidity and the association of co-morbidity with severity of illness and predicted resource utilisation.

Review of the Environmental Health Program of Territory Health Services and the THS Contribution to the Health Infrastructure Priorities Project/National Environmental Health Strategy

MSHR was contracted in 1998 to conduct the above two reviews, with Katherine Henderson as project leader and Ross Bailie as collaborator. The Environmental Health Program has responsibility for conducting statutory environmental health functions in the Territory, supporting the Aboriginal Environmental Health Worker Program and surveillance of health infrastructure in remote communities, medical entomology services and surveillance of poisons and pharmacy. A copy of the review report is now available in the THS Library. The Health Infrastructure Priorities Project/

National Environmental Health Strategy is a national initiative to upgrade health infrastructure in remote communities. The initiative has included a number of projects in the NT, and these are overseen by ATSIC. The review focussed on THS' contribution to the projects, and a final report is awaiting approval by THS.

Trial of a Brief Intervention for Hazardous Alcohol Use Among People Attending an Aboriginal Medical Service

This project was conducted by NCEPH at ANU in collaboration with the National Drug and Alcohol Research Centre (Sydney) and Nunkuwarrin Yunti Aboriginal Medical Service (Adelaide). Ross Bailie continued his involvement in the project after coming to MSHR early last year. The aim of the project was to assess the acceptability and effectiveness of brief interventions in the setting of an urban Aboriginal Medical Service. The project ceased in late 1998 due to poor recruitment, which prevented an assessment of effectiveness. However, important information regarding the implementation and acceptability of the intervention was gained.

Investigation of a Cluster of Gynaecological Cancers in the Northern Territory

There have been several reports of an apparent excess of gynaecological cancers in parts of the Top End over the past decade. A Masters student from NCEPH at ANU is conducting an investigation of this apparent cluster in collaboration with a number of

other academics and medical practitioners. This preliminary investigation is being undertaken with co-supervision from Ross Bailie and should be complete by the end of 1999, possibly forming the basis of a more intensive study.

Evaluation of the Implementation of the NT Food and Nutrition Policy

Dorothy Mackerras received a grant from Territory Health Services to evaluate the first 3.5 years of implementation of the NT Food and Nutrition Policy. This Policy was developed in 1995, partly with funding under the National Food and Nutrition Policy. The implementation phase of the NT Policy received special funding in the NT budget. Interviews were held with a variety of players in Darwin, Katherine and Alice Springs and others were contacted by letter, email and phone. The draft report has been submitted to the Steering Committee.

CRC

All members of the Unit are involved in the CRC for Aboriginal and Tropical Health. John Mathews was the Director, Dorothy Mackerras is the Coordinator for Education and Training and Ross Bailie became the Deputy Program Leader of the Public Health Program in 1999.

PhD Students

Several students are also attached to the Unit. Ross Bailie is supervising Rowena Ivers and Alan Clough, and Gurmeet Singh is working on the Aboriginal Cohort Study.

Dr Dorothy Mackerras BSc MPH PhD	Senior Lecturer/Unit Head	
Professor John Mathews AM BSc MBBS MD PhD FRACP FRCPA	Director/Epidemiologist	[until 30.06.99]
Dr Ross Bailie MBChB MRNZCGP MPhil(MCH) FCCH MD FAFPHM	Senior Lecturer	
Dr Sue Sayers MBBS DCh AmBd Pediatr FRACP AmBd Neonatol Perinatol PhD	Honorary Senior Research Officer	
Mrs Kathryn Flynn RN	Casual Project Assistant	[until 26.05.99]
	Project Assistant	[from 27.05.99]
Ms Fehmin Shafi	Casual Research Assistant	[08.09 - 25.11.98]
Mr Alan Clough DipEd BSc(Hons) MSc	PhD Scholar	
Dr Rowena Ivers MBBS FRACGP DipObs MPH	Menzies PhD Scholar	
Dr Gurmeet Singh MB BS FRACP (India)	Australian Kidney Foundation PhD Scholar	

Renal Unit



Rear (L-R) : Kiernan McKendry, Alan Cass, Andrew White, Eric Tipiloura and Zhiqiang Wang
Front (L-R) : Judy You, Julie Mastin, Wendy Hoy, Angela Kelly and Gurmeet Singh

The Renal Unit aims to define rates, distribution and trends of renal disease in Australian Aborigines, its causes, associations and morphology, and to model and support strategies for its prevention, early diagnosis and amelioration.

Highlights

- The explosion of definitive 'products' of our program due to the recruitment and productivity of our epidemiologist/statistician, Dr Zhiqiang Wang.
- Addition of 5 more graduate students, broadening and invigorating the Unit.
- Eleven manuscripts, 16 presentations at national and international meetings, submission of another 10 abstracts for the first 3 months of the new fiscal year, and 10 teaching presentations to health care providers and clinics.
- Seminal manuscripts describing rates and causes of renal disease in Aboriginal people, its natural history, and recommendations for screening and treatment.
- Dramatic improvement in clinical profiles and 60% reduction in natural deaths and kidney failure in the first 3 years of the Tiwi treatment program.
- Plans for the Tiwi Health Board to assume control of this program.
- Development and funding of a consultancy program to offer similar services to Aboriginal communities nationwide.
- International recognition, with requests to consult in Indonesia, Africa, and South America.
- Monetary or equipment grants from Bayer, Janssen Cilag, Australian Kidney Foundation, Centre for Kidney Research - New Children's Hospital Sydney, Australian Pharmaceutical Manufacturers' Association, Rio Tinto, and NHMRC.

This has been a productive year, bearing the fruits of many long-term projects. A longitudinal study started by Dr Paul van Buynder and Professor John Mathews in 1990 has been completed, our treatment program has yielded dramatic results and been translated into regional and national policy, and we have gained momentum from the interests and activities of our postgraduate students. The program stands centre stage in epidemiologic/health services research and demonstration arenas in chronic disease and indigenous health in Australia.

Dr Wang, an epidemiologist/statistician, came from Calgary in Canada to join the Unit in October 1997. His expertise and dedication allowed us to work in a truly professional way through the enormous cross-sectional and longitudinal data sets we have accumulated in this program, and lent additional important perspectives which he is developing personally. His support and advice to our graduate students is substantial and indispensable.

Angela Kelly and Kiernan McKendry, Coordinators of the Tiwi treatment program have achieved enormous successes, and been vital in increasing awareness of chronic disease risk factors in the community at large. Eric and Elizabeth Tipiloura and Nellie Punguatji now run most of the day-to-day matters of the treatment program on the ground, and are responsible in large part for the good level of participation and excellent results. They too have presented their experiences nationwide to help other communities tackle the same issues, and were featured in a documentary of the program exhibited internationally by Rio Tinto.

Julie Mastin continues to provide us with office and administrative support. Susan Jacups has moved to a challenging job with Flinders University NT Clinical School, although she continues with the treatment program in a part-time capacity. We farewell Bev Hayhurst, seconded for a year as Manager of Health Promotion in Territory Health Services, who is the longest standing member of the Unit after Wendy, and thank her for her dedicated work on both the community disease profiles, and more recently in the challenging and complex family studies. The Renal Unit and the Tiwi community will miss you, Bev. John Mathews, whose interest and energy got the renal program started, will stay involved and interested, although at some geographical distance in his new position as Director of Disease Control in Canberra.

The projects of our graduate students have gained great momentum, and several have fostered important links with other disciplines. All of our students have made presentations at national or international meetings; they were prominently featured in the annual meeting of the Australian and New Zealand Society of Nephrology Meetings in Brisbane during March 1999, and contributed to the increasing consciousness of the Society the need to further develop its epidemiological and health services perspectives. Jiqiong (Judy) You is completing her Masters of Science Degree in Health Economics in a joint project with the Health Economics sector of Territory Health Services. She has defined for the first time annual costs of dialysis treatment and related hospital costs for people with kidney failure in the Top

End, and evaluated the similarities and differences between Aboriginals and non-Aboriginals. Philip Baker is completing an evaluation of the cost-effectiveness of the Tiwi renal and cardiovascular screening and treatment program, for a PhD degree. His project has further developed Cochrane perspectives, has fostered alternate methods for program evaluation where parallel control groups are not available, and developed links with the Health Economics disciplines in the Social and Preventive Medicine Department at the University of Queensland, where he is situated for his final year. Alan Cass is exploring open the demography of renal failure within Australia, with an emphasis on regional variation by Aboriginality and socio-economic status, and its association with general mortality profiles. He is also promoting nationwide collaborative studies on relationships between birth weight and renal disease, evaluating the relevance of our observations to the non-Aboriginal population. Stephen McDonald is evaluating the prevalence and links of cardiovascular and renal disease in Angurugu on Groote Eylandt, and working alongside the local doctor, Wendy Williams, to strengthen the clinical and service interfaces to deal with the huge burden of morbidity unfolding. Gurmeet Singh is continuing and expanding the work begun by Janine Spencer, in evaluating the links between early nutrition and growth and renal development, in two complementary settings; a study of persons of all ages with birth records (age 1 to 40 years) on the Tiwi Islands, and study of a group of children from 800 children of very homogeneous age (8 to 11) who represent a cohort of Aboriginal children followed

by Sue Sayers before or since their birth. Andrew White is undertaking a clinical, epidemiological and serological study to evaluate in much greater detail the contribution of poststreptococcal glomerulonephritis to the huge burden of renal disease on the Tiwi Islands. He and Gurmeet together have already described the community-wide ultrasound findings in the Tiwi population and, in defining its limited yield and utility as a routine test in the evaluation of persons with suspected renal disease, have made an important contribution to modification of health services practices and containment of diagnostic costs. Together, Alan Cass and Wendy Hoy are also continuing a study to describe whether tendency to kidney disease can be attributed in part to being born with fewer numbers of nephrons.

Collaborations have included the 'strep' team at Menzies, the Departments of Anatomy at Monash University, and Pathology at the University in Jackson, Mississippi (John Bertram and Michael Hughson, glomerular counting and sizing), Alex Disney and the ANZDATA Registry, the Australian Kidney Foundation (Outreach), the Austin Hospital (Sianna Panagiotopoulos, ACE genotype analysis), the Looma project (Donna Mak, renal protection), and Katie Coles (UWA, Perth, markers of infection), the Public Health Unit at Monash University (Kerin O'Dea, nutritional perspectives), and Territory Health Services (contribution to personnel support for treatment program). The Australian Kidney Foundation and Servier continue to provide us with wonderful moral and financial support.

Ongoing projects to be completed within the next two years include:

1. definition of the basis of the family clustering, which includes analysis of family trees, physical and genetic markers;
2. illumination of the relationship of kidney disease to infections, including those not traditionally suspected to have such a role, like gum, ear, lung and intestinal infections, and with non-streptococcal skin disease;
3. broad definition of the influence of early growth and development on future

health: to include infant, childhood and adult mortality, body size and shape, clinical features like blood pressure and metabolic profile, and tendency to infections, diabetes, renal and cardiovascular disease;

4. glomerular sizing and counting;
5. ongoing analysis of mortality and renal failure rates in the NT, to document trends and evaluate potential uptake or effects of altered service delivery.

Dr Wendy Hoy MB BS BScMed FRACP	Principal Research Fellow/Unit Head
Dr Zhiqiang Wang PhD	Senior Research Officer, Statistics
Ms Susan Jacups RN BNurs	Community Program Coordinator
Ms Angela Kelly BSN RN BHlthSci	Community Program Coordinator
Mr Kiernan McKendry RN BNurs	CommunityProgram Coordinator
Ms Bev Hayhurst MPHc BEd DipTeach AppDipTeach	Research Assistant
Ms Kim O'Sullivan RN	Casual Community Coordinator
Ms Nellie Punguatji	Casual Community Project Assistant
Ms Elizabeth Tipiloura	Casual Community Project Assistant
Mr Eric Tipiloura	Casual Community Project Assistant
Ms Julie Mastin	Casual Administrative Assistant
Mr Philip Baker BSc(Hons)	NHMRC PhD Scholar [until 04.01.99]
Dr Alan Cass MB BS FRACP	New Children's Hospital PhD Scholar
Dr Stephen McDonald MB BS FRACP	NHMRC PhD Scholar
Dr Gurmeet Singh MB BS FRACP (India)	Australian Kidney Foundation PhD Scholar
Dr Andrew White MB BS	Australian Kidney Foundation PhD Scholar
Ms Jiqiong You MB MBA	Menzies MSc Scholar



Tropical Medicine & International Health Unit



Rear (L-R) : Alan Clough, Heidi Smith-Vaughan, Loyla Leysley and Nick Anstey
Front (L-R) : Bart Currie, Shelley Walton, Geoffrey Angeles and Mark Mayo

The emphasis for the Tropical Medicine & International Health Unit is on collaboration with both local health professionals and experts outside the NT to address health issues important for the region. Studies are targeted at improving prevention and treatment of specific illnesses, usually through a better understanding of the underlying disease processes. Epidemiology, clinical observations and basic laboratory work are all involved.

This Unit Report has been separated into two sections – Tropical Medicine, and International Health.

Tropical Medicine Highlights

- Implementation of Top End Rheumatic Heart Disease Control Program.
- Improved outcomes for melioidosis.
- Commencement of Chronic Lung Disease Program by Graeme Maguire.
- Loyla Leysley completes Certificate III in Health Studies (Aboriginal Community Health) and Aboriginal Health Worker registration.
- Jonathan Carapetis' PhD thesis *Ending the Heartache : The Epidemiology and Control of Acute Rheumatic Fever and Rheumatic Heart Disease in the Top End of the Northern Territory* passed.
- Wellcome Travelling Fellowship to Oxford for Bart Currie.

TROPICAL MEDICINE

Infectious Diseases

Antibiotic guidelines and treatment protocols

The national Antibiotic Guidelines are revised and published every two years. There continues to be a major input from work done in the Territory. In the 1998-99 edition the remote areas section, written at MSHR, was incorporated into the main chapters, with consequent strengthening of the national applicability of protocols developed in the NT for skin sepsis, scabies, rheumatic fever prophylaxis, trachoma, melioidosis, STDs and malaria. The revision of the CARPA Manual from Central Australia is also informing national and Territory-wide protocols.

Melioidosis and pneumonia

Since late 1989 there has been a continuing prospective study of over 250 cases of melioidosis coordinated by the Unit, by far the largest study in Australia. Melioidosis is the commonest cause of fatal bacteraemic community-acquired pneumonia in the Top End and at Royal Darwin Hospital. In collaboration with hospital laboratory staff (directed by Gary Lum), clinical staff and the NT Centre for Disease Control we have devised improved diagnosis and treatment protocols and education packages for health staff and the public [1, 25, 50, 84, 88, 89, 90]. Through NHMRC funding for the Royal Darwin Hospital Clinical School and support from the Dean, David Brewster, Susan Jacups is assisting with analysis of the epidemiological

features of melioidosis in the Top End [49, 81]. The importance of diabetes, alcohol and kava as risk factors for disease and mortality is being quantified.

Although melioidosis remains a devastating infection in certain circumstances, the mortality of those infected has been significantly reduced in the Top End. Our clinical study has enabled various collaborative projects on epidemiology and pathogenesis within Menzies and externally. The 1998-99 wet season had a record number of Top End melioidosis cases, with 47 confirmed cases and six deaths. The strong association with rainfall was again prominent, with cyclone Thelma making December a particularly bad month.

With Anton Jarmaat and other veterinary colleagues at NT Dept of Primary Industry and Fisheries, we are looking at the relationship of soil contamination with the melioidosis bacteria, *Burkholderia pseudomallei*, to



Susan Jacups. Menzies-Flinders (Darwin Clinical School) collaboration

animal and human melioidosis disease. Jodie Low Choy, a Darwin veterinarian, completed her Roy and Marjory Edwards Fellowship looking at the epidemiology and clinical features of melioidosis in animals in the Top End ^[55]. Melioidosis has a major impact, especially on goats, in the tropics and the public health implications of this included the concern of disease transmission to humans ingesting unpasteurised goats milk.

Mark Mayo, Heidi Smith-Vaughan and Paula Lawrie, with support from David Kemp and Sri Sriprakash are using our new NHMRC melioidosis grant to expand on our molecular typing techniques, with Mark's Pulsed-Field Gel Electrophoresis method proving very useful in answering our questions on relationships between environmental and human isolates (confirming two tropical Australian 'outbreaks' to be clonal and related to isolates from the local environment and, in one case, suggesting contamination of the unchlorinated community water supply) ^[73, 114].

Scabies

Protocols of scabies programs for community and hospital use are being refined. The role of oral ivermectin therapy in refractory crusted (Norwegian) scabies is being studied ^[60, 86, 119]. Failure of ivermectin to give sustained benefit in some cases, despite repeated doses, emphasises the need for a community approach to treat contacts who are potential sources of reinfestation and to support hygiene measures and household environmental cleaning ^[59, 86, 104, 105].

See also the section in Group A Streptococcal Diseases below and the Molecular Parasitology Unit report on scabies mites.

Group A Streptococcal Diseases

Acute rheumatic fever and rheumatic heart disease

MSHR remains one of few institutions undertaking the combination of field epidemiology and molecular biological research to answer the outstanding questions regarding ARF pathogenesis and control ^[7, 8, 11, 43, 44, 71, 113]. Following Jonathan Carapetis' PhD thesis, the database of all known or suspected cases of ARF and RHD has been incorporated into the Commonwealth-funded Top End RHD Control Program, which is coordinated by THS Disease Control and receives strong support from Chris Burns, current Director of the National Heart Foundation's NT Division. This program, based around the establishment of a computerised register of all ARF/RHD patients and a series of educational packages (see below), began in early 1998 and now represents the ideal of moving from applied research to improved service delivery. A NHF grant enabled some of the important field work, looking for immune markers predictive of protection from streptococcal infection. This may help lead to a streptococcal vaccine. Liz Stubbs, Bev Hayhurst and Paula Lawrie have continued to work on this project.

Our field and laboratory work has also led to new approaches to primary

prevention [6, 9, 80, 116]. Traditional strategies for primary prevention of ARF are based on epidemiological studies of GAS from the 1940s through the 1970s, largely in the USA. The pioneering studies of the Molecular Genetics Unit in developing rapid, cheap methods for molecular typing of field isolates is helping to show how GAS epidemiology in the Top End is very different from that in industrialised countries. It is clear that the load of infection with numerous distinct strains is enormous. Moreover, the traditional distinction between ‘skin’ and ‘throat’ isolates appears to be blurred. We are challenging the dogma that skin sores have no role in ARF pathogenesis, and are promoting strategies for reducing rates of streptococcal pyoderma as a form of primary ARF prevention (see below). Primary prophylaxis for streptococcal sore throat remains extremely important and further work is needed to understand the epidemiology of sore throat and GAS pharyngitis in this region.

Rheumatic fever information packages and education

Geoffrey Angeles and Norma Benger have published two educational booklets about rheumatic fever – *The Rheumatic Fever Story* and a book for adults, *Rheumatic Fever: Questions and Answers*. Subsequently, with Liz Stubbs and clinical staff, they produced a rheumatic fever video in early 1998.

The books are in circulation in a number of communities and are being used by people with rheumatic fever and clinical and hospital staff. We have had reports

from some communities that the books and the associated penicillin needle charts have helped to improve the rates of adherence to preventive medication.

The AMP Foundation and the Australian Rotary Health Research Fund provided valuable support for these projects.

Loyla Leysley is funded by the CRC to work with hospital staff and health staff in communities to improve understanding of ARF and RHD. She has successfully completed her Certificate III in Health Studies at Batchelor College and gained Registration in the NT as an Aboriginal Health Worker. Loyla has also made important connections with colleagues in remote communities in Queensland, enabling dissemination of work done at the School.

Geoffrey Angeles has also been successful in acquiring a RHSET grant to formally evaluate the package in three communities, using a workshop strategy to provide Aboriginal Health Workers with information about rheumatic fever, so that they may use the package to educate their own people in their own way.

Towards a group A streptococcal vaccine

Our ongoing collaboration continues with Michael Good’s team at the Queensland Institute of Medical Research. They are narrowing down a small area of the surface M protein of GAS, which is a potential vaccine candidate. We are undertaking field studies in collaboration with Linda Selvey from Queensland Health

and Evelyn Brandt from QIMR to look at the immunological responses to this peptide in children and adults in Aboriginal communities [4, 70]. This will help ascertain whether naturally acquired antibodies to the peptide are indeed predictive of protection from GAS colonisation and/or disease sequelae. More recently we have begun collaborating with Mark Walker from the University of Wollongong and Sri Sriprakash on an NHMRC grant looking at streptococcal fibronectin binding proteins as potential vaccine candidates (see Molecular Genetics Unit report) [64].

Other infectious diseases

Collaborative projects continue with the NT Centre for Disease Control (Vicki Krause), colleagues from Royal Darwin Hospital, NT Medical Entomology (Peter Whelan), rural communities, NT Dept of Primary Industry and Fisheries and various interstate colleagues. Areas include malaria [37, 85, 138], arboviruses [5], leprosy, hospital infections [23], zoonoses and environmental pathogens [34, 36, 48, 65, 77, 92, 115] and sexually transmitted diseases [75].

Toxinology

The prospective studies on snakebites and jellyfish continue. Venom level studies in collaboration with David Warrell at Oxford and David Theakston at Liverpool are helping define clinical correlates with circulating snake venom and responses to antivenom doses and first aid initiatives [78, 82, 83, 91, 117]. Paula Lawrie is developing expertise in microscopic identification of

jellyfish nematocysts in stickytape samples from people stung by jellyfish.

Harold Koops has very successfully developed public displays on snakebite, which have attracted lots of interest at various venues, including remote community open days and the Royal Darwin Show.

Sarah Walton has been funded by the CRC to develop educational materials of CRC and MSHR research activities for feedback to the public. She is working on jellyfish posters in conjunction with Bev Hayhurst and THS Health Promotion staff.

Chronic Lung Disease Program

Graeme Maguire commenced his PhD studies into chronic non-specific lung disease (CNSLD) in June 1998. This condition, a significant cause of morbidity and mortality for all Australians, is a major contributor to increased hospitalisation and early death in Australian Aboriginal people. With the support of the Community Health and Antituberculosis Association, APMA-AMA Aboriginal Health Initiative, GEMCO, Territory Health Services and community representatives, he has commenced a cross-sectional study investigating the nature, burden and risk factors for CNSLD in a rural Northern Territory community.

Two factors in the aetiology and progression of CNSLD have now been identified for further study, namely the role of early experience, particularly birth weight and respiratory infections in the first year of life and a retrospective cohort study

will determine the influence of these factors on subsequent adult lung function.

Finally, it is planned to explore the role of bacterial infection and prophylactic antibiotics in CNSLD, with the ultimate aim being to offer improved treatment to all Northern Territory people who suffer from CNSLD.

Kava in Arnhem Land : Comment on Consumption and Social Correlates

Pharmacological research on kava (*Piper methysticum* Forst. f.) has documented physiological and neuro-cognitive effects. Earlier work in Arnhem Land suggested an association between heavy kava consumption and indicators of ill-health. Changing use patterns in Arnhem Land populations, possible health effects, pharmacological understandings and public commentary have informed Northern Territory policy-makers' responses to concerns about Aboriginal people using kava. The NT Parliament enacted legislation (June 1998) for the second time in eight years to control kava marketing and use.

In the scant literature and published commentary on kava in Australia it is often declared that Aboriginal people in Arnhem Land have consumed it at extremely high levels, far greater than in Pacific Island societies and that consumption takes place outside of a context of social controls. An inconclusive debate about kava's ill health effects in Arnhem Land Aboriginal populations turns around a lack of published findings of similar morbidity in

Pacific region kava-using populations and whether observed ill-health effects may instead be due to a special situation that reflects Aboriginal people's substandard socioeconomic position within their own country. How *do* Aboriginal people in Arnhem Land drink kava, how much, and can we make comparisons with other studies?

Dosage levels

We reviewed published data about kava consumption, evaluating it with respect to information collected from participant observation in one Aboriginal community in Arnhem Land, where it was found that people were drinking kava at a steady tempo; 37 g of kava powder containing around 3800 mg of kava lactones in 670 mls of water in an hour. Contrary to anecdote, weekly consumption of kava in Arnhem Land appears similar to consumption levels in Pacific Island populations. The highest levels of consumption in Arnhem Land may be up to 900 g/week of kava powder with heavy consumers drinking at least 610 g/week; levels comparable to estimates for Pacific Island societies. A steady tempo of drinking suggests that an individual's weekly kava consumption relates to the



Alan Clough and Bob Nimbahly.
A spot of bother on a field trip in East Arnhem

amount of time spent drinking which, in turn, is correlated with categories of social setting of drinking ($p < 0.0002$). Surrogates of consumption levels may be found in local socio-economic circumstances.

Case-control study

An NHMRC study has been commenced by Alan Clough, Chris Burns and Ngarrawu Mununggurr, with epidemiological support from Ross Bailie. Case-control methodology is being used to look at the central criterion of admissions

of Aboriginal people over the age of 15 years to the regional hospital (Gove) with ischaemic heart disease and serious infectious disease, particularly pneumonia. Contextual factors we are looking at include alcohol use, tobacco use and nutritional status. The study is also examining sudden cardiac deaths over the last ten years. A cross-sectional study of one community will document the relationships between levels of kava and other substance use and neuro-cognitive and physiological assessments controlling for confounding factors.

INTERNATIONAL HEALTH

Background

The MSHR-Indonesian Ministry of Health malaria-tuberculosis research collaboration was established in early 1996 during a Heads of Government meeting between the Chief Minister of the Northern Territory and the President of the Republic of Indonesia. To mark the 50th anniversary



Back (L-R) : Craig Boutlis, Kay Withnall and Nick Anstey
Front (L-R) : Ruth Boveington, Emiliana Tjitra, Jocelyn Saunders and Paul Kelly



of Indonesian independence, and with the support of the Indonesian Ministry of Health, the Northern Territory Government provided funding for two Fellowships, for research in cooperation with Indonesian health authorities towards the better understanding, prevention and treatment of malaria and tuberculosis in the Eastern Provinces of Indonesia [79].

Over the last three years a number of collaborative studies in malaria and tuberculosis have been undertaken.

International Health Highlights

- Commencement of a major tuberculosis project in East and West Timor, and Flores.
- Important studies by Emiliana Tjitra to improve the diagnosis and treatment of malaria in primary health centres in Eastern Indonesia.
- NIH-funded studies of the Immunology of Severe Malaria commence in Irian Jaya.
- Establishment of MSHR/MoH Malaria Research Field Station in Genyem, Irian Jaya.
- Links established with Mimika Hospital in Timika, Irian Jaya.
- MOU signed with National Institute of Health Research and Development in Jakarta.
- First field evaluation of the new AMRAD-ICT Australian designed and manufactured combined dipstick test for malaria.
- Menzies scholarship to Craig Boutlis.

Malaria

Improving the diagnosis and treatment of malaria in Eastern Indonesia

Dr Emiliana Tjitra, the Eastern province-based research fellow, has been evaluating the utility of current Ministry of Health case definitions for clinical malaria for individual case diagnosis/management and for disease surveillance in regions with different intensities of malaria transmission. She is also examining whether alternative clinical case definitions may prove to be more useful in areas of both high and low malaria transmission. This is important in a country like Indonesia, with malaria transmission ranging from zero through to hyperendemicity. Her initial clinical studies were undertaken in Radamata Primary Health Care Centre in West Sumba (an area of hypoendemicity) in 1997-98. She has now extended her studies to Genyem

Primary Health Care Centre in Irian Jaya, an area of intense malaria transmission^[79].

One of the aims of these studies is to improve the accuracy of malaria diagnosis. In collaboration with the Indonesian Ministry of Health, she has coordinated refresher and retraining sessions for local health centre, hospital and district microscopists. Problems with access to prompt and reliable microscopy have limited the usefulness of microscopy in malaria-endemic countries. Previous studies in Indonesia and elsewhere have shown the utility of rapid antigen detection methods for diagnosis of *falciparum* malaria, but these have been limited by the inability to also diagnose *vivax* malaria. In a successful linkage with Australian industry, Dr Tjitra and Dr Nick Anstey have therefore evaluated the diagnostic usefulness in the field of the new AMRAD-ICT rapid combined *Plasmodium falciparum*/ *P. vivax* immunochromatographic antigen detection test (AMRAD ICT Malaria Pf/Pv) for malaria. Although

sensitivity for *P. falciparum* malaria was excellent, sensitivity for *vivax* malaria was below the desirable level [37, 138]. Gametocytes of *P. falciparum* appear to cause persistent antigen positivity after treatment which may limit the test's utility in predicting treatment failure [85].

Dr Tjitra is also using recent WHO protocols to evaluate *in vivo* drug resistance patterns for both major species of malaria in each of the study areas. These have confirmed widespread *P. falciparum* resistance to chloroquine in both West Sumba and Genyem (64% and 83% treatment failure respectively), with failure of haematological recovery of particular concern. Addition of sulphadoxine/pyrimethamine to chloroquine did not improve treatment success. However a follow-up open pilot study of artesunate in combination with sulphadoxine/pyrimethamine showed excellent efficacy. WHO has declared evaluations of such artesunate-containing drug combinations an urgent priority to slow progression of global multidrug resistance. Later in 1999, Dr Tjitra will thus be performing a randomised controlled trial of artesunate-sulphadoxine/pyrimethamine *versus* sulphadoxine/pyrimethamine alone.

The establishment of the MSHR-NIHRD Genyem Malaria Field Station (pictured) was made possible by generous support from Mr Mark Nicholson and Ms Alice Hill. Funding from the Northern Territory Government Malaria-Tuberculosis Research Fellowships, Mark Nicholson and Alice Hill, and AMRAD-ICT have supported the Irian Jaya field studies.

Nitric oxide (NO) in severe and uncomplicated adult malaria

This National Institutes of Health-funded study in Irian Jaya is extending previous work into the role of nitric oxide (NO) in the immune response to *Plasmodium* infection and in the pathophysiology of severe malaria [41, 42, 87, 110]. In Tanzanian children we have previously shown that NO production/leucocyte inducible nitric oxide synthase (NOS2) expression is inversely associated with disease severity; with levels being highest in healthy malaria-exposed children with asymptomatic parasitaemia and lowest in those with fatal cerebral malaria (*J Exp Med* 1996; 184: 557-567). While mononuclear cell NO production is associated with protective rather than pathological host responses in semi-immune East African children [42], it is important to know whether this association is also evident in adults from regions with different malaria epidemiology [87].

Nick Anstey, Emiliana Tjitra, Craig Boutlis and Oey Tjeng Sien are collaborating with Ministry of Health and local Indonesian researchers supported by the study (Dr Helena Maniboey, Dr Ating



Nicholson & Hill Malaria Field Station,
Genyem, Irian Jaya

Solihin) in Jayapura. They are enrolling patients with severe and cerebral malaria, uncomplicated malaria, asymptomatic parasitaemia and healthy controls. Recruitment in Balikpapan, East Kalimantan ceased in 1998 because of an unexpected downturn in the incidence of severe malaria. Study activities moved to Jayapura, Abepura and Waena in Irian Jaya in November 1998. Jocelyn Saunders is leading the laboratory studies for this project, supported by Estelle Gray. They are measuring nitric oxide metabolites, mononuclear cell NOS2 expression and activity, and other measures of NO production [13, 87, 108, 109] in each study group, correlating these measurements with production/expression of selected T1 and T2 cytokines. This research may have important therapeutic implications for management and prevention of severe malaria in the future. Pak Syahril Harun from the Indonesian Ministry of Health will visit Darwin and work on these assays later in 1999. Later in 1999 the project will be extended to Mimika Hospital in Timika, Irian Jaya. This followed a successful visit to the School in March by Dr Hendra Widjaja of Mimika Hospital and Dr Steve Wignall of PT Freeport. The Unit is also undertaking collaborative studies with Brice Weinberg at Duke University Medical Center and Don Granger and Maurine Hobbs at the University of Utah [41, 42, 110].

Antidisease immune responses in malaria

Craig Boutlis joined the Unit in February 1999 as a Menzies Scholar. He is extending the NO malaria work to examine

the role of NO in anti-disease immunity to malaria. Following his preliminary cross-sectional studies in asymptomatic malaria-exposed adults in Irian Jaya, he will be undertaking longitudinal studies to determine the relationship between NO production/mononuclear cell NOS2 expression and infection with *P. falciparum* and *P. vivax*, and examining factors that may modulate NO production and fever in patients with parasitaemia [13, 108, 109]. His field studies will be complemented by *in vitro* studies performed in collaboration with Jocelyn Saunders exploring the TNF-modulating effects of NO donors in malaria.

In complementary laboratory studies, Jocelyn Saunders, Nick Anstey, and Estelle Gray are collaborating with Katharine Trenholme in the Molecular Parasitology Unit to examine whether the NO donors, S-nitrosothiols (RSNOs), prevent processes linked to the pathogenesis of severe malaria. Studies to date show that RSNOs inhibit expression of inducible endothelial adhesion molecules and the ability of parasitised red cells to cytoadhere to endothelial cells. These NHMRC supported studies are important in understanding the potential role of NO-related molecules in



Screening for asymptomatic parasitaemia in Genyem

protection from disease, and may have therapeutic implications.

Future malaria field studies

Future malaria field studies will include collaboration with David Kemp, and Katharine Trenholme and Don Gardiner of the Molecular Parasitology Unit to extend to the field their recent exciting findings on the role of *clag* in cytoadherence of parasitised red cells.

Tuberculosis

Intensified tuberculosis (TB) program and TB drug resistance in Timor

A major achievement of the Unit has been the commencement of a three year MSHR/THS-initiated *AusAID*/WHO tuberculosis project in Timor, which includes a major programmatic, research and training role for the International Health Program at Menzies^[79]. This project followed extensive interactions over the preceding two years by Nick Anstey and Vicki Krause (Disease Control, Territory Health Services) with *AusAID*, national and

provincial staff from the Indonesian Ministry of Health Sub-directorate of Tuberculosis Control, WHO TB representatives in Jakarta and Provincial Disease Control/ Reference Laboratory in Kupang. Following *AusAID* funding of the project (through WHO) in February 1999, the Program was fortunate to be joined by Paul Kelly, a public health physician with extensive TB experience in Malawi, and Kay Withnall, an experienced laboratory scientist. They will be working with Indonesian Ministry of Health TB control staff at a national, provincial and district level in East and West Timor and Flores to enhance the implementation of WHO's Directly Observed Tuberculosis Shortcourse Therapy (DOTS) strategy and undertake operational research and training. Paul Kelly will be leading the Darwin-based components of the project. He and Kay Withnall will be assisted in Kupang Dr Stuart Collins from WHO, a Research Associate with the School. The major operational research component of the project is the study of TB drug resistance, an important WHO research priority. This is critically important, as multidrug resistant TB poses a major threat to TB control in our region.

Tropical Medicine

Dr Bart Currie MBBS DTM&H FRACP FAFPHM Clinical Assoc Professor/ Unit Head

Mr Alan Clough DipEd BSc(Hons) MSc	Senior Research Officer	
Mr Geoffrey Angeles BAppSc(AbCtyMgmt&Dvlpt)	Research Assistant	
Ms Norma Bengier CertHlthProm	Research Assistant	
Ms Susan Jacups RN BN	Research Assistant	
Ms Paula Lawrie BSc	Technical Officer	
Ms Loyla Leysley AHW	Trainee Research Assistant	
Ms Ngarrawu Mununggurr	Casual Project Assistant	
Mr Reggie Wuridjal	Casual Project Assistant	[from 01.06.99]
Ms Sarah Walton	CRC Trainee	[from 22.03.99]
Dr Graeme Maguire MBBS FRACP BMedSc(Hons)	NHMRC PhD Scholar	

International Health Program

Dr Nick Anstey MBBS MSc DTM&H FRACP Senior Research Fellow/Program Head

Dr Paul Kelly MBBS DTM&H PhD FAFPHM	Senior Research Fellow in TB	[from 01.02.99]
Dr Emiliana Tjitra MD MSc	Eastern Indonesian Research Fellow	
Dr Helena Maniboey MD	Research Officer (Jayapura)	[from 01.01.99]
Dr Jocelyn Saunders BSc(Hons) PhD	Research Officer (Darwin)	
Dr Ating Solihin MD	Research Officer (Balikpapan & Jayapura)	[until 02.04.99]
Ms Kay Withnall BSc DipEd	Senior Laboratory Adviser	[from 01.02.99]
Dr Craig Boutlis MBBS FRACP	Menzies MSc Scholar	[from 01.02.99]
Ms Estelle Gray BSc(HonsIIA)	Technical Officer (Darwin)	
Ms Yusi Kristiani DipLabTech	Research Assistant (Jayapura)	[from 11.11.98]
Ms Ida Susilowah DipLabTech	Research Assistant (Jayapura)	[from 11.11.98]
Dr Stuart Collins MBBS DTM&H	Research Associate	[from 01.02.99]
Dr Oey Tjeng Sien MD	Research Associate	
Dr Roosyana Hasbullah MD MPH	Honorary Associate in TB	[from 01.02.99]
Ms Ruth Boveington	Administrative Assistant	
Ms Mary Dyer BSc(Hons) MPhil	Casual Senior Research Officer	
Mr Roy Albion BSc	Casual Senior Research Officer	
Mr Sri Suprianto DipLabTech	Casual Specialist Microscopist	
Pak Ardi	Casual Project Assistant	
Pak Darwoto	Casual Project Assistant	
Ibu Dyah	Casual Project Assistant	
Ibu Ida	Casual Project Assistant	
Pak Lepong	Casual Project Assistant	
Ibu Maria	Casual Project Assistant	
Pak Robert	Casual Project Assistant	
Pak Samuel	Casual Project Assistant	
Dr Gede Utomo	Casual Project Assistant	

Administration



Back (L-R) : Ken Sawers, Debra Davis, Margarita Bassett and Gabrielle Falls
Front (L-R) : Tracey Burke, Audrey Langlands, Yolanda Jackson and Catheryn Young

Administrative support for the grant funded research and educational activities of the School is provided by a small team of enthusiastic and dedicated staff. The Unit is responsible for the budgetary control systems covering the \$6.7 million of grant funds expended in the current year. The School operates on a base grant from the Northern Territory Government and relies entirely on research grants to do health research. Over the past two years the number of grant funded projects has risen from 57 to more than 120, creating substantial additional reporting and cost control systems to meet the requirements of diverse grant funding agencies. The School competes internationally for research grants such as the National Institutes of Health (USA), Wellcome Trust (UK) and Duke University (USA) to mention a few. These grants do cover overhead, equipment and administrative costs, unlike NHMRC grants which impose substantial costs on the School due to marginal funding of project activities.

For the Administration Unit, all the careful work in monitoring and controlling these diverse project funds was rewarded with an unqualified audit from the Auditor-General for the Northern Territory. In view of the size and complexity of the School's accounts, this is a noteworthy achievement for our Finance Manager, Yolanda Jackson. An unqualified audit encourages further investments in the School by national and international grant funding agencies.

Staff Changes

Katherine Henderson returned to the Northern Territory Public Service in November 1998 after nearly two years with us. Katherine brought to us a wealth of policy experience with Territory Health Services and provided valuable support to the Deputy Director while the Director was on six months leave at Oxford. Ken Sawers commenced as Business Manager on a full time basis from April 1999. Lindy Warrell was appointed in July 1998 to the newly created position of Personal Assistant to the Director and Executive Officer. Lindy was involved in the preparation of policy submissions for the Director until May 1999. Former Business Manager, Lyn Allen, rejoined us at the end of the year for an all-too-short consultancy consolidating our policies and procedures manuals.

Administrative Unit Activities

The major policy outcome during the year was the completion and signing of the Tiwi Legal Agreement. This is a major innovation by the Menzies School of Health Research and the Tiwi Health Board in how

we approach the way health researchers work with Aboriginal communities. The Agreement is seen by many outside the Top End as the benchmark legal and ethical framework for the conduct of Aboriginal health research. Professor John Mathews was instrumental in working with the Tiwi Health Board to develop the concept. Lindy Warrell, Liz Stubbs and other administrative staff have been involved in the many aspects of its formulation and implementation. The Agreement is available on the MSHR website.

The School's submission to the Quinquennial Review in October 1998 was a major report undertaking coordinated by Gabrielle Falls and involved the coordination of many authors, statistical presentations and multi-media productions. Two volumes of the resulting four volume report are available on our website.

The Enterprise Bargaining Agreement was finally voted on and accepted unanimously by staff. The EBA procedure involved extensive advice from administrative staff who were involved in developing the document in consultation with various staff committees. Lindy Warrell was particularly involved in drafting the new enterprise agreement.

The advent of our own Menzies Agreement represents a consolidation of previously inherited award agreements from Sydney University, the Public Sector Employment and Management Act and other NT Legislation on long service leave and superannuation. MSHR staff now have a single agreed public document which governs their wages and conditions. It also provides dispute resolution procedures and

mechanisms for assessing work value to ensure equity across the disparate disciplines and activities of the School. Administrative staff are involved in counselling staff on the application of the workplace agreement principles to a range of Human Resource issues. The Menzies Agreement came into operation on 24 December 1998.

Another initiative commenced by Professor John Mathews prior to his departure was a consolidation and review of the School's administrative policies and procedures. Ms Lyn Allen has returned to the School as a consultant to complete this documentation and to consult with staff on the various drafts. The Finance procedures are now fully documented as required by the Audit Committee. The Personnel handbook and Asset Management handbook have also been drafted by Lyn Allen. These handbooks are an important tool for Unit Heads and will reduce the workload of administrative staff who have spent an increasing amount of time answering queries from researchers.

During the year the Academic Administrator, Liz Stubbs, and the Academic Assistant, Audrey Langlands, worked towards finalising the operating procedures for the Masters of Public Health program. Liz has subsequently joined the Menzies Ear Health and Education Unit but will continue as Secretary to the Joint Institutional Ethics Committee (JIEC) and the Institutional Biosafety Committee

(IBC). She is currently working on a procedures manual and information package which will assist researchers in completing the JIEC application form.

The Building Manager and the Business Manager were involved in the drafting of a lease for our building. Negotiations were undertaken on the pricing and provision of the many infrastructure services provided to the Combined Health Building, particularly power and air conditioning. Further landscaping has been done and, in particular, further shade trees and shrubs have been planted to compensate for the lack of shade structures on the new building. An energy audit of the building was undertaken through the Government Energy Management Program. This resulted in a substantial list of minor alterations which are being implemented with Transport and Works and RDH maintenance staff. The savings in operating costs of the building will accrue progressively through 1999 and beyond. Changes to the telephone system have resulted in reduced charges and further reductions are expected with the privatisation of the Government switchboard. In summary, after two years in the new building, the building management systems are beginning to function closer to the original design parameters. The building is fully occupied with two researchers sharing an office in many instances and limited open area work stations available for future expansion in staff and student numbers.

Dr Ken Sawers PhD MEc DipEcStats BAgEc(Hons)	Business Manager	[from 01.12.98]
Ms Katherine Henderson BA DipEd	Business Manager	[until 27.11.98]
Dr Lindy Warrell PhD BA(Hons)	Executive Officer	[until 24.05.99]
Mrs Yolanda Jackson BBus(Account)	Finance Manager	
Mrs Catheryn Young	Salaries and Personnel Officer	
Ms Margarita Bassett	Accounts Officer	
Ms Elizabeth Stubbs MPH	Academic Administrator	[until 01.07.99]
Mrs Audrey Langlands	Administrative Assistant (Education)	
Miss Gabrielle Falls	Administration Officer	
Mrs Debra Davis	Executive Secretary	
Miss Tracey Burke	Receptionist	
Mrs Sheila Taylor	Casual Reception & Administrative Assistant	
Ms Lyn Allen BSc(Hons) MBA AIMM	Policy Consultant	[from 08.06.99]

Laboratory Services



(L-R) : Karl Gundersen, Sue Hutton and Jann King

Laboratory Services aims to provide a congenial, efficient and safe working environment for the laboratory-based staff, and to remain within budget limits without jeopardising funded research projects.

Highlights

- Successful completion of CRC traineeship by Melita McKinnon.
- Effective cost-coding of consumables against research projects.
- Streamlined purchasing system in place.
- Preparation of fieldwork supplies for use in Indonesia.
- Formal adoption of Building Management duties by the Laboratory Manager.

Laboratory Services staff have had a successful year.

Twenty funded laboratory-based research projects are currently being conducted, with consumables now being charged against individual projects, providing efficiency and accountability within the laboratory. Cost-effective standing orders have been negotiated with nine laboratory suppliers and ordering has been streamlined to one day per week. Proof that this is succeeding is provided in the finances, showing the projects are successfully operating within budgetary constraints.

The Laboratory Manager, Sue Hutton, has played an active and increasing role in the preparation of fieldwork supplies for the International Health Program. With field work in Indonesia now firmly entrenched in the School's research program, the laboratory is set to increase its participation in these projects.

Sue has also formally adopted the role of Building Manager during the financial year. This has provided stronger links between the laboratory and Administrative staff, auditors and insurers.

In early 1998 the laboratory support position was split into a job-share

arrangement between Liz Wilson and Jann King. This arrangement worked well throughout the year. Liz resigned in early June 1999 to return to Brisbane and Jann has continued to provide efficient support. Liz has since been replaced by Karl Gundersen, a laboratory-based CRC trainee, who is showing great promise.

Cooperative Research Centre trainee, Melita McKinnon successfully completed her 12-month apprenticeship and was offered a full-time laboratory position in March this year. Melita will continue her studies through NTU where she has enrolled in a BSc degree.

A sideline for Sue this year has been active participation in many public relations activities. She has hosted tours and camera shoots of activities in the laboratory facility, and was also the driver behind the 'Hutton-Falls Soft Shoe Shuffle', a slide show and tour of the building provided mainly as orientation to Territory Health Services staff being employed to work in rural communities. The tours introduced many new health service providers to the Territory to some of the diseases they could expect to work with.

Mrs Sue Hutton DipMedTech, CertForSci, MSc(Med)	Laboratory & Building Manager
Ms Liz Wilson AssocDipApplBiol	Laboratory Support Officer [until 04.06.99]
Mrs Jann King	Laboratory Support Officer
Ms Melita McKinnon	CRC Trainee [until 17.03.99]
Mr Karl Gundersen	CRC Trainee [from 06.04.99]



Scientific Papers & Publications

Refereed Publications

1. Bartley P, Pender M, Woods II M, Walker D, Douglas J, Allworth A, Eisen D, **Currie B**. Spinal cord disease due to melioidosis. *Trans Royal Soc Trop Med Hyg* 1999; 93 : 175-176.
2. Bennett-Wood V, **Carapetis J**, Robins-Browne R. Ability of clinical isolates of group A streptococci to adhere to and invade Hep-2 epithelial cells. *J Med Microbiol* 1998; 47: 899-906.
3. Bertram J, Young R, Kincaid-Smith P, Seymour A, **Hoy W**. Glomerulomegaly in Australian Aborigines. *Nephrology* 1998; 4: S46-53.
4. Brandt E, Hayman W, **Currie B**, **Carapetis J**, Jackson D, Do K, Good M. Functional analysis of IgA antibodies specific for a conserved epitope within the M protein of group A streptococci from Australian Aboriginal endemic communities. *Int Immunol* 1999; 11: 569-576.
5. Burrow J, Whelan P, Kilburn C, Fisher D, **Currie B**, Smith D. Australian encephalitis in the Northern Territory : Clinical and epidemiological features, 1987-1996. *Aust NZ J Med* 1998; 28: 590-596.
6. **Carapetis J**, **Currie B**, Kaplan E. Epidemiology and prevention of group A streptococcal infections : Acute respiratory tract infections, skin infections and their sequelae at the close of the twentieth century. *Clin Infect Dis* 1999; 28: 205-210.
7. **Carapetis J**, **Currie B**. Mortality due to acute rheumatic fever and rheumatic heart disease in the Northern Territory : A preventable cause of death in Aboriginal people. *Aust NZ J Public Health* 1999; 23: 159-163.
8. **Carapetis J**, **Currie B**. Rheumatic chorea in northern Australia : A clinical and epidemiological study. *Arch Dis Child* 1999; 80:353-358.
9. **Carapetis J**, Walker A, **Hibble M**, **Sriprakash K**, **Currie B**. Clinical and epidemiological features of group A streptococcal bacteraemia in a region with hyperendemic superficial streptococcal infection. *Epidemiol Infect* 1999; 122: 59-65.
10. **d'Abbs P**. Out of sight, out of mind? Licensed clubs in remote Aboriginal communities. *Aust NZ J Public Health* 1998; 22: 679-684.
11. Fisher D, **Carapetis J**, Marks P, **Currie B**. Case Report : Acute rheumatic fever (ARF) in non-Aboriginal patients in the Northern Territory. *Aust NZ J Med* 1998; 28: 63-64.
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Financial Statements 1998-1999

In 1998-99 the Menzies School of Health Research achieved an operating surplus of \$401,971 which, despite the fact that it accurately reflects the surplus for the financial year, must be viewed from the perspective that, at the time of preparing the annual budget, the School was budgeting for a cash flow deficiency.

This operating surplus was largely the result of a Contingent Liability, which was carried over from the previous financial year, as well as the result of capital equipment grants received this year.

In June 1998 it was anticipated that an Enterprise Bargaining Agreement, to be introduced in the following financial year, was highly likely to include a retrospective wage increase. The 1997-98 Balance Sheet therefore included provision for a contingent liability of \$200,000 as part of Accrued Expenses - Salaries and On Costs. In 1998-99 this contingency was reversed and recognised in the Operating Statement.

Acknowledging the effects of the above on the operating result, the surplus was less than in 1997/98.

In 1998-99, researchers competed both nationally and internationally for capital equipment grants, and were successful in attracting \$140,000 to the School. These grants are recognised as Income in the Operating Statement, whilst the expenditure on new assets is recognised in the Balance Sheet under Property, Plant & Equipment. In the short-term this inflates our Operating Result by \$140,000, whilst in successive years it will deflate the Operating Result, through the depreciation expense, at an estimated \$30,000 per annum.

Attracting capital equipment grants to the School has resulted in decreased capital expenditure from core funds.

In 1998-99 Salaries expenditure has increased by less than 1% over total expenditure, and remains below the industry standard.

In 1997-98 the ratio of endowment grants to research grants was 74%. This has reduced to 60% in 1998-99.



Menzies School of Health Research

Financial Statements for the Year Ended 30 June 1999

Statement on Behalf of the Board of Governors

In our opinion the attached Income and Expenditure Statement and Balance Sheet including Notes to and Forming Part of the Financial Statements of the Menzies School of Health Research are properly drawn up so as to give a true and fair view of :

- (a) the financial affairs of the Menzies School of Health Research as at 30 June 1999; and
- (b) the Receipts and Expenditure of the organisation for the year ended on that date.

RV Ryan AO
Chair
Board of Governors
August 1999

LV Asche
Member
Board of Governors
August 1999

Menzies School of Health Research Balance Sheet as at 30 June 1999

	1998/99 \$	1997/98 \$
Current Assets		
Cash on Hand (Note 2)	700	700
Cash at Bank (Note 2)	3,277,440	2,623,184
Trust Account (Note 4)	1,230,159	227,280
Trade Debtors (Note 3)	296,486	297,378
Prepaid Assets (Note 5)	32,240	0
Prepaid Expenses (Note 6)	49,357	29,295
Accrued Revenue (Note 7)	115,660	182,304
Investment (Note 8)	3,540	3,540
Total Current Assets	5,005,582	3,363,681
Non-Current Assets		
Property, Plant and Equipment (Note 9)	868,265	880,772
Total Non-Current Assets	868,265	880,772
Total Assets	5,873,847	4,244,453
Current Liabilities		
Bank Overdraft (Note 2)	0	0
Trust Account (Note 4)	1,230,159	227,280
Accrued Expenses (Note 10)	158,226	349,069
Trade Creditors (Note 11)	134,033	157,694
Receipts in Advance (Note 12)	1,785,671	1,439,515
Provision for Long Service Leave (Note 1d)	104,932	90,940
Provision for Recreation Leave (Note 1d)	468,964	380,255
Provision for Leave Fares (Note 1d)	2,800	27,000
Total Current Liabilities	3,884,785	2,671,753
Non-Current Liabilities		
Provision for Long Service Leave (Note 1d)	103,526	89,135
Total Non-Current Liabilities	103,526	89,135
Total Liabilities	3,988,311	2,760,888
Net Assets	1,885,536	1,483,565
Accumulated Funds		
Surplus/(Deficit) at Beginning of Financial Year	1,483,565	1,407,054
Surplus/(Deficit) at the End of June 1999	401,971	76,511
Total Accumulated Funds	1,885,536	1,483,565

NOTE : The Balance Sheet should be read in conjunction with the accompanying notes.

**Menzies School of Health Research
Income and Expenditure Statement
for the Year Ended 30 June 1999**

	1998/99	1997/98
	\$	\$
<u>Income</u>		
Commonwealth Government Grants	1,749,481	1,731,472
NT Government Grants	2,702,693	2,808,641
Menzies Foundation	100,000	110,000
Non-Government Grants	532,196	497,929
Cooperative Research Centre (Note 4)	666,662	204,178
Overseas Grants	313,036	196,763
Donations	35,664	18,301
Interest and Dividends	168,494	138,576
Reimbursements	452,178	427,360
Sundry Income	52,943	35,858
Profit on Sale of Asset	3,915	3,570
	6,777,262	6,172,648
<u>Expenditure</u>		
Administration - Darwin	70,755	64,154
Administration - Alice Springs	11,962	9,890
Board Expenses	4,022	3,317
Building Maintenance	286,694	280,411
Computing	56,687	77,479
Consultants	78,960	55,875
Cooperative Research Centre Contribution (Note 4)	100,000	100,000
Depreciation	353,016	287,542
Equipment (Minor)	4,610	17,798
Field Expenses	237,246	166,156
Fundraising	0	55,722
Insurance	57,745	49,282
Laboratory Expenses	332,643	320,708
Legal Expenses	12,635	0
Library	67,287	56,879
Personnel Expenses	34,810	44,116
Loss on Sale of Asset	941	0
Public Relations (Printing etc)	44,839	57,737
Safety	2,892	2,546
Staff Salaries	4,338,551	4,111,350
Telephone/Facsimile	95,087	90,881
Travel	120,860	172,356
Vehicles	26,902	35,247
Visitors and Seminars	25,655	12,466
Visual Aids	10,492	24,225
	6,375,291	6,096,137
Net Surplus/(Deficit)	401,971	76,511

NOTE : The Income and Expenditure Statement should be read in conjunction with the accompanying notes.

Menzies School of Health Research
Statement of Cash Flows
for the Year Ended 30 June 1999

	1998/99	1997/98
	\$	\$
Cash Flows from Operating Activities		
Payments		
Salaries and On-Costs	(4,222,006)	(3,849,591)
Suppliers	(2,048,372)	(1,733,664)
Receipts		
Donations	47,807	59,250
Interest and Dividends	179,250	141,538
Reimbursements	393,087	341,606
Sundry Income	54,548	28,188
Net Cash Flows Used in Operating Activities	(5,595,686)	(5,012,673)
Cash Flows from Investing Activities		
Payments for Purchase of Equipment	(297,728)	(285,959)
Payments for Purchase of Vehicles	(128,752)	(17,230)
Proceeds from Sale of Vehicles	98,000	6,050
Proceeds from Sale of Equipment	2,420	0
Net Cash Flows Used in Investing Activities	(326,060)	(297,139)
Cash Flows from Research Grants		
Commonwealth Government	1,689,761	1,794,218
NT Government	729,128	467,966
Non-Government	640,114	755,695
Overseas	351,996	0
Cooperative Research Centre	720,943	305,009
Net Cash Flows Provided by Research Grants	4,131,942	3,322,888
Cash Flows from Endowments		
Endowment - NT Government	2,344,000	2,335,000
Endowment - Menzies Foundation	100,000	140,000
Deposits	60	0
Net Cash Flows Provided by Endowments	2,444,060	2,475,000
Net Increase in Cash Held	654,256	488,076
Cash at Beginning of Year	2,623,884	2,135,808
Cash at End of Year	3,278,140	2,623,884

NOTE : The Statement of Cash Flows should be read in conjunction with the accompanying notes.

Menzies School of Health Research

Notes to and Forming Part of the Financial Statements for the Year Ended 30 June 1999

1. Summary of Significant Accounting Policies

The Menzies School of Health Research was established as a body corporate under the Menzies School of Health Research Act, No 60 of 1985.

Statement of Economic Dependency

The management of grant funded projects by the School is dependent on continued funding from the Northern Territory Government and other granting bodies.

Set out hereunder are the significant accounting policies adopted by the School in preparation of its accounts for the year ended 30 June 1999. Accounting policies adopted are consistent with last year, unless otherwise stated.

a) Basis of preparation of financial statements.

These financial statements have been prepared in accordance with the historical cost convention.

b) Stocks

Stocks of consumable scientific and administrative items purchased in the normal operations are not taken into account at close of balance date as assets, but are written off at the time of purchase.

c) Revenue Recognition

Grant and Donation Income received for specific research is matched to the incidence of the related expenditure as follows:-

- i. revenue received but unexpended for projects commenced but not complete by the year end, is carried forward in 'Receipts in Advance'.
- ii. revenue received for projects to be commenced in the following financial year, is carried forward in 'Receipts in Advance'.
- iii. all other project related income is fully expended in the year of receipt.
- iv. all grant income (revenue, capital and specific purpose) are recognised as income in

year of receipt. However, where unexpended funds are required to be refunded to the funding body, grant monies are recognised as income to the extent of the expenditure of such grants. The unexpended is disclosed as a liability.

d) Employee benefits

Provision is made for long service leave, annual leave and airfares estimated to be payable to employees. The amounts provided have been apportioned between current and non-current, the current provision being the portion that is expected to be paid within the next twelve months.

In the case of long service leave, employee entitlements vest after the completion of ten years service. A special pro-rata entitlement may be paid in lieu of long service leave on resignation of employment after seven or more years of service. In accordance with accounting standard AAS30 - Accounting for Employee Entitlements - the School has calculated long service leave entitlements not settled at 30 June 1999 on a present value basis.

Sick leave entitlements are non-vesting. Experience shows that sick leave taken is less than the entitlement accruing, so that no liability has been recognised.

e) Superannuation

Employee's superannuation entitlements are principally provided through the Northern Territory Government and Public Authorities Superannuation Scheme (NTGPASS), the Commonwealth Superannuation Scheme (CSS) and the Superannuation Scheme for Australian Universities (SSAU). Benefits from these Schemes are supplemented by a minimum '3% productivity' benefit from the Northern Territory Supplementary Superannuation Scheme (NTSSS). Scheme membership among employees at 30 June 1999 was as follows :

NTSSS	73
NTGPASS (plus NTSSS)	35
CSS (plus NTSSS)	1
SSAU	22

The cost of employer-financed benefits in the NTGPASS, NTSSS and CSS is met by the Northern Territory Government with administration being undertaken by the Northern Territory Superannuation Office.

f) Income Tax

The income of the School is exempt from income tax pursuant to the provisions of Section 23(e) of the Income Tax Assessment Act.

2. Cash

For the purposes of the Statement of Cash Flows, the School considers cash to include cash on hand and in banks. Cash and cash deposits at the end of the reporting period are reconciled to the Balance Sheet as follows:-

a) Reconciliation of Cash

	1998/99	1997/98
Cash on Hand	700	700
Cash	3,277,440	2,623,184
Total Cash	\$3,278,140	\$2,623,884

b) Reconciliation of net cash used in operating activities to operation results

	1998/99	1997/98
OPERATING RESULT	401,971	76,511
Changes in :-		
(Inc)/Dec Trade Debtors	892	96,979
(Inc)/Dec Prepaid Assets	(32,240)	0
(Inc)/Dec Prepaid Expenses	(20,062)	2,244
(Inc)/Dec Accrued Revenue	66,644	(104,589)
Inc/(Dec) Trade Creditors	(35,136)	15,602
Inc/(Dec) Accrued Expenses	(190,843)	308,317
Inc/(Dec) Receipts in Advance	346,156	150,742
Inc/(Dec) Provision for Recreation Leave	88,709	(29,505)
Inc/(Dec) Provision for Long Service Leave	28,383	(620)
Inc/(Dec) Provision for Leave Fares	(24,200)	27,000
Income from Research Activities	(4,131,942)	(3,322,888)
Income from Endowments	(2,444,060)	(2,475,000)
Depreciation	353,016	287,542
(Profit)/Loss on Sale of Plant	(2,974)	(3,570)
Assets purchased by grantor in USA on our behalf	nil	(41,438)
Net cash flows used in operating result	\$(5,595,686)	\$(5,012,673)

3. Trade Debtors

Trade debtors constitute normal trade debtors in addition to those with an obligation to the Menzies School of Health Research.

	1998/99	1997/98
Total Trade Debtors	\$296,486	\$297,378

4. Cooperative Research Centre

The Cooperative Research Centre for Aboriginal and Tropical Health is a joint venture funded by the Commonwealth of Australia, Territory Health Services, Northern Territory University, Flinders University of South Australia, Danila Dilba Biluru Butji Binnilutlum Medical Service Aboriginal Corporation, Central Australian Aboriginal Congress Inc., and the Menzies School of Health Research.

The Menzies School of Health Research, in its role as the Centre Agent for the Cooperative Research Centre, established a trust account in the name of the Cooperative Research Centre for Aboriginal and Tropical Health. All funds from the Commonwealth of Australia and other contributing partners are received by the School in trust, on behalf of all the partners. Funds received by the School are shown in the School accounts. Receipts, expenditures and balances of the Cooperative Research Centre Trust Account, managed by the School are summarised below:-

	1998/99	1997/98
Opening Balance	227,280	0
Receipts	2,541,587	1,077,542
Expenditure	1,538,708	850,262
Balance in Trust Account	\$1,230,159	\$227,280

5. Prepaid Assets

	1998/99	1997/98
Computer Equipment	22,853	0
Laboratory Equipment	9,387	0
Total Capital Equipment Commitments	\$32,240	\$0

6. Prepaid Expenses

	1998/99	1997/98
Salary	14,581	nil
Insurance	856	735
Conference	nil	220
Maintenance Agreements	nil	1,079
Office Expense	nil	160
Subscriptions	33,920	27,101
Total Prepaid Expenses	\$49,357	\$29,295

7. Accrued Revenue

Accrued revenue is estimated as due to the Menzies School of Health Research.

	1998/99	1997/98
Reimbursements	nil	17,495
Bank interest	5,195	15,951
Grants	110,465	148,858
Total Accrued Revenue	\$115,660	\$182,304

8. Investments

Investments comprise of 1,060 shares in The Australian Gas Light Company donated to the School in 1992 by Miss Elizabeth Phillips, and are valued at cost. Dividends are brought to account as they are earned.

Current Value of Investment is as follows :-

	1998/99	1997/98
1060 Shares @	\$9.20	\$10.20
Total Investment	\$ 9,752	\$10,812

9. Non-Current Assets

- Property, Plant and Equipment are brought to account where the value is greater than two thousand dollars and depreciated over 3 - 5 years using the straight line method.
- Motor vehicles are depreciated on a diminishing value basis at the rate of 22.5% per annum.

	1998/99	1997/98
Buildings and Fittings - at cost	491,977	473,977
Accumulated Depreciation	(291,844)	(211,246)
	200,133	262,731
Computer Equipment - at cost	561,901	439,659
Accumulated Depreciation	(401,343)	(305,388)
	160,558	134,271
Laboratory Equipment - at cost	672,841	557,631
Accumulated Depreciation	(358,549)	(254,073)
	314,292	303,558
Office Equipment - at cost	132,115	74,768
Accumulated Depreciation	(64,400)	(30,954)
	67,715	43,814
Vehicles - at cost	171,616	177,420
Accumulated Depreciation	(46,049)	(41,022)
	125,567	136,398
Total Non-Current Assets	\$868,265	\$880,772

10. Accrued Expenses

	1998/99	1997/98
Salaries and On Costs	87,336	257,069
Administration	70,890	92,000
Total Accrued Expenses	\$158,226	\$349,069

11. Trade Creditors

	1998/99	1997/98
Total Trade Creditors	\$134,033	\$157,694

12. Receipts in Advance

Income in Advance	1998/99	1997/98
Commonwealth Grants	78,301	0
NT Government Grants	150,000	60,000
Non-Government Grants	49,000	0
Donations	0	10,000
Total Income in Advance	\$277,301	\$70,000
Unexpended Income		
Commonwealth Grants	509,716	699,246
NT Government Grants	286,348	168,798
Non-Government Grants	310,883	219,844
Overseas Grants	156,813	100,015
Cooperative Research Centre	145,488	106,907
Consultancy	0	11,170
Deposits	140	80
Donations	98,982	63,455
Total Unexpended Income	\$1,508,370	\$1,369,515
Total Receipts in Advance	\$1,785,671	\$1,439,515

13. Capital Expenditure Commitments

Capital Expenditure Commitments as at 30 June 1999 include purchases of a capital nature which have not been received by close of business on 30 June 1999.

	1998/99	1997/98
Computer Equipment	0	85,645
Laboratory Equipment	0	11,277
Motor Vehicles	0	12,902
Total Capital Equipment Commitments	\$0	\$109,824

14. Provision for Contingencies

Negotiations are currently in process with respect to Services and Lease Agreement. Contingent upon the outcome of this agreement, the School may be liable for additional costs yet to be determined. (Refer to Note 17.)

15. Financial Instruments

a) Significant Accounting Policies

Details of significant accounting policies and methods adopted, including the criteria recognition, the basis of measurement and the basis on which revenues and expenses are recognised, in respect of each class of financial asset, financial liability and equity instrument are disclosed in Note 1 to the accounts.

b) Interest Rate Risk

The following table details the School's exposure to interest rate risk at 30 June 1999.

	Average Interest Rate (%)	Variable Interest Rate	Fixed < 1 year	Fixed 1 to 5 years	Fixed > 5 years	Non Interest Bearing	Total
Financial Assets							
Cash	3.65	478,140					478,140
Trade Receivables						496,486	496,486
Short Term Deposits	5.00	2,800,000					2,800,000
Listed Shares						3,540	3,540
		\$3,278,140	0	0	0	\$500,026	\$3,778,166
Financial Liabilities							
Trade Payables						292,257	292,257
Employee Entitlements						686,095	686,095
		0	0	0	0	\$978,352	\$978,352

c) Credit Risk

Credit risk refers to the risk that a counter-party will default on its contractual obligations resulting in financial loss to the School. The carrying amount of the financial assets recorded in the balance sheet, net of any provision for losses, represents the School's maximum exposure to credit risk.

d) Net Fair Value

The net market value at 30 June 1999 of each class of financial asset and financial liability, is their carrying amount as stated in the balance sheet of the School, determined in accordance with the accounting policies disclosed in Note 1 to the accounts, with the exception of listed shares whose aggregate net fair value is \$9,572.

16. Rights and Obligations

In April 1993 the School became a member of the Australian Medical Research and Development Corporation (AMRAD), giving AMRAD first refusal to develop products and to acquire the intellectual rights to such products arising from research (except for intellectual property rights of Aboriginal persons).

In consideration of the School agreeing to enter into this agreement, AMRAD allotted to the Victorian Medical Consortium Pty Ltd acting as trustee of the Institutes of Biotechnology Trust 166,667 fully paid shares of \$1 each in the capital of AMRAD at a premium of 200 cents per share being the equivalent of a \$500,000 share holding in AMRAD.

The School has the right on the 9th anniversary (2002) to have the shares transferred to it from the trustee or to sell the shares and receive the proceeds.

AMRAD, listed on the Australian Stock Exchange since December 1996, has the right to review the School's contributions to the Consortium, and remove the School as beneficiary to shares if no contributions or endeavours to make contributions have been made.

17. Rental Arrangements

In 1984 the Northern Territory made a commitment to provide the Menzies School of Health Research with premises and facilities for its work. Through the goodwill arising out of the School's past and its on-going record of research and education, funds were appropriated in 1995 by the Commonwealth of Australia and the Northern Territory Government to construct the new building on Northern Territory Government land at the Royal Darwin Hospital site. Following occupation of the new building in November 1996, and as a result of the aforementioned goodwill, a nominal rental is to be charged for the premises. A lease agreement reflecting this goodwill is currently under negotiation.

18. In Kind Contributions

The School provides in kind contributions to the Cooperative Research Centre for Aboriginal and Tropical Health for research and administrative services.

Auditor-General's Report
To The Minister for Health,
Family and Children's Services

Menzies School of Health Research
Year Ended 30 June 1999

Scope

I have audited the accompanying financial statements of the Menzies School of Health Research for the financial year ended 30 June 1999 comprising Statement on behalf of the Board of Governors, Balance Sheet, Income and Expenditure statement and Statement of Cash Flows together with Notes to and forming part of the financial statements. The Board of Governors is responsible for the financial statements. I have performed an independent audit of these financial statements in order to express an opinion on them to the Minister for Health, Family and Children's Services.

My audit has been conducted in accordance with Australian Auditing Standards to provide reasonable assurance whether the financial statements are free of material misstatement. My procedures included examination, on a test basis, of evidence supporting the amounts and other disclosures in the financial report, and the evaluation of accounting policies and significant accounting estimates. These procedures have been undertaken to form an opinion whether, in all material respects, the financial statements are presented fairly in accordance with Accounting Standards and other mandatory professional reporting requirements and the requirements of the Menzies School of Health Research Act so as to present a view which is consistent with my understanding of the financial position of the Menzies School of Health Research and the results of its operations and its cash flows.

The audit opinion expressed in this report has been formed on the above basis.

Audit Opinion

In my opinion, the financial statements present fairly the financial position of the Menzies School of Health Research as at the 30 June 1999 and the results of its operations and its cash flows for the year ended on that date in accordance with Accounting Standards, other mandatory professional requirements, and the Menzies School of Health Research Act.

Iain Summers
Auditor-General for the Northern Territory
Darwin, Northern Territory

September 1999



Donations, 1998-1999

Scholarship

Mrs M Edwards \$40,000

In June 1996 these funds were kindly donated to establish a two-year scholarship. The funds are brought to account in the financial statements as they are expended. In the 1998-99 Financial Year the amount of \$7,194 was brought to account, with the remainder included as “receipts in advance”.

Specific Purpose Donations

These funds are brought to account in the financial statements as they are expended. In the 1998-99 Financial Year the amount of \$28,470 was brought to account, with the remainder included as “receipts in advance”.

Professor JD Mathews AM	Collaborative work.....	\$807
NBC Consultants	Multi-Media.....	\$1,000
Mr M Nicholson & Ms A Hill	Malaria Research	\$15,000
Tudor Foundation	Malaria Research	\$20,000
		<u>\$36,807</u>

General Purpose (Research) Donations

Anonymous.....	\$10,000
Mrs S Frey	\$1,000
	<u>\$11,000</u>

**Donations of \$2:00 or more to the Menzies School of Health Research are tax deductible
under Section 78(1)(a)(x) of the Income Tax Assessment Act.**



New Grants Received, 1998-1999

Granting Organisation	Chief Investigator(s)	Title	Duration
Australian Kidney Foundation (E0599)	Dr Stephen McDonald	<i>Equipment</i> : DCA 2000 Analyser	1999
Australian Pharmaceutical Manufacturers Association Inc Aboriginal Health Initiative	Dr Stephen McDonald Dr Graeme Maguire	Angurugu Adult Health Project	1999
Central Australian Remote Health Training Unit	Dr John Rumble Dr Komla Tsey Dr Ken Sawers Mr Peter Bailie Dr John Wakerman	A Contract for Consultancy Services Between the Central Australian Remote Health Training Unit and the Menzies School of Health Research and the Centre for Remote Health in Respect of the Evaluation of Training Activities	1999-2000
Centre for Kidney Research, New Children's Hospital, Sydney	Dr Alan Cass	<i>Scholarship</i> : Correlations between Glomerular Number and Size and the Susceptibility to Renal Disease in Australian Aborigines	1998-2001
Channel 7 Children's Research Foundation of SA	Prof David Kemp	A New Approach to the Epidemiology of Scabies (Year 2)	1998/99
Channel 7 Children's Research Foundation of SA	Dr Alison Goodfellow	Evaluation of Type-Specific Antibodies to Circulating Group A Streptococci in Aboriginal Children	1998/99
Colonial Foundation Limited	Dr Susan Sayers	Perinatal influences on Aboriginal Child Health and Potential Markers of Chronic Adult Diseases	1999
Community Health and Anti-Tuberculosis Association : Harry Windsor Medical Research Grant	Dr Graeme Maguire Dr Bart Currie Ms Norma Bengel	Chronic Lung Disease in Aboriginal Australians : Factors in Aetiology and Treatment	1999

Granting Organisation	Chief Investigator(s)	Title	Duration
Cooperative Research Centre for Aboriginal & Tropical Health/ OATSIH	Dr Anne Lowell	Indigenous Health and Education : Exploring the Links	1999-2000
DETYA/ Cooperative Research Centre for Aboriginal & Tropical Health	Mr Mark Mayo	Co-sponsorship of Cadetship	1998-1999
National Health & Medical Research Council (990350)	Prof David Kemp Dr Katharine Trenholme Dr Donald Gardiner	<i>Clag</i> : A Malaria Gene Required for Cytoadherence to Melanoma Cells	1999-2001
National Health & Medical Research Council (990396 : Uni Wollongong)	Dr Mark Walker Dr KS Sriprakash Dr Bart Currie	Development of Mucosal Anti-Adhesive Vaccines Against Group A Streptococci	1999-2001
National Health & Medical Research Council (990498 : Melbourne Uni)	Prof John Bertram Dr Wendy Hoy	Glomerular Number and Size in Australian Aborigines and African Americans	1999-2001
National Health & Medical Research Council (990758)	Dr KS Sriprakash Prof David Kemp Dr Francis Bowden	Development of Molecular Diagnostics for the Detection of Donovanosis (<i>Granuloma inguinale</i>)	1999-2001
National Health & Medical Research Council (990975)	Dr KS Sriprakash Dr Garry Myers Dr Bart Currie	Factors Influencing the Epidemiology and Virulence of the Agent of Melioidosis, <i>Burkholderia pseudomallei</i>	1999-2001
National Health & Medical Research Council (991398)	Dr Peter d'Abbs	Determinants of Sustainability in Community-Based Action to Reduce Alcohol Problems	1999-2000

National Health & Medical Research Council (991689)	Dr KS Sriprakash Prof John Mathews Prof David Kennp Dr Bart Currie	Equipment : Revco 487L Elite Upright Freezer and Inventory System	1999
National Health & Medical Research Council (997027)	Dr Peter Morris	<i>Public Health Fellowship : Understanding Generalisability : How to Get the Most Out of Cochrane Reviews on Use of Antibiotics in Children with Respiratory Disease in Rural and Remote Aboriginal Communities?</i>	1999-2003
National Health & Medical Research Council (997509)	Dr John Condon	<i>Public Health Postgraduate Research Scholarship : Health Services and Other Factors which Affect Cancer Survival in Aboriginal People in the Northern Territory</i>	1999-2001
Office of Aboriginal Health, Health Dept of Western Australia (HSC 756/99)	Mr Ilan Warchivker	Primary Health Care Services Evaluation in the Balgo Region of the South East Kimberley	1999
Territory Health Services (C97/101)	Dr Peter d' Abbs	Local Evaluation of Katherine West Coordinated Care Trial	1999-2000
Territory Health Services	Dr Dorothy Mackerras Dr Lindy Warrell	Proposal and Estimate Evaluation of the Implementation of the NT Food and Nutrition Policy 1996 and 5 Year Strategic Plan	1999
The Clive and Vera Ramaciotti Foundations (RAMA 98056)	Dr KS Sriprakash	Properties of Streptococcal Protein Associated with Acute Glomerulonephritis	1999-2000
World Health Organization (INO TUB 030/D)	Dr Paul Kelly Ms Kay Withnall	<i>Technical Services Agreement : Operational Research : TB Drug Resistance Surveillance in Indonesia</i>	1999



For Further Information ...

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