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Design and Typesetting

ArtWords Pty Ltd

Enquiries and Correspondence

University of Melbourne Medical Society

School of Medicine

The University of Melbourne

Victoria 3010 Australia

Telephone: (+61 3) 8344 5888

Facsimile (+61 3) 9347 7084

Email: umms-medicine@unimelb.edu.au

Website: <http://www.medicine.unimelb.edu.au/umms/index.html>

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CHIRON THE CENTAUR, TEACHER OF MUSIC,
MEDICINE AND HUNTING

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ANATOMY AND PATHOLOGY CENTENARIES

BY PROFESSOR ANTONY GOODWIN

Professor and Head

Department of Anatomy and Cell Biology

IN 1906, RICHARD James Berry took up his appointment as professor of anatomy at the University of Melbourne, forming the first free-standing anatomy department in the faculty. Harry Brookes Allen, who up until then was professor of surgical and descriptive anatomy and pathology, became the first professor of a separate pathology department. Thus, two of the oldest departments in the faculty celebrate their centenary this year.

The history of both departments goes back to 1862, when George Britton Halford was appointed the professor of general anatomy, physiology and pathology shortly after the formation of the medical school. In 1882, that department split, with Halford retaining physiology and Harry Brookes Allen taking the chair in surgical and descriptive anatomy and pathology. There was a close nexus between the teaching of anatomy and pathology, including the establishment of a common museum.

Today both departments are very different to their precursors of 100 years ago. Teaching has expanded to include science, dental science and physiotherapy students as well as medical students.

In Berry's day anatomy formed a large part of the curriculum and the principal function of the department was teaching medical students. There were only five salaried members of staff and little research was done. Currently there are eighty employees in the department and research is a major focus, concentrated in the three areas of functional anatomy, neuroscience, and cell and developmental biology. There is corresponding teaching in all three areas. In recognition of the changing nature of the department, it was renamed the Department of Anatomy

and Cell Biology in 1993, a development that is common throughout the world.

As was true in Allen's time, the Department of Pathology still plays a major role in the public hospitals, providing leadership in teaching and research in the clinical departments of pathology. In addition, fundamental research in a range of body systems, particularly neuroscience and haematology, takes place at the department's campus base. Research ties with the Peter MacCallum Cancer Institute and the Austin Research Institute have been maintained, and ties have been expanded to include the Murdoch Childrens Research Institute and the Mental Health Research Institute, ensuring a wide range of research within the department.

Recently the historical ties of the two departments have been re-formed in a number of ways. Their two museum collections have been amalgamated to form the Harry Brookes Allen Museum of Anatomy and Pathology and the two departments jointly teach basic histopathology. They share a number of research facilities such as electron microscopy, histology and an animal house.

To celebrate its centenary, the Department of Anatomy and Cell Biology is publishing its history written by Ross L Jones. The book, to be titled *Humanity's Mirror: 150 Years of Anatomy in Melbourne*, will be launched at the opening of a commemorative exhibition in the museum in March 2007. Selected excerpts from the book are published in this issue of *Chiron*. (pp51-52)

The Department of Pathology plans to celebrate by a series of commemorative public lectures to be held in late 2006. For further information about the commemorative lectures contact the Department of Pathology on (+61 3) 8344 5868.

COVER STORY

Front cover

Background. Embolism, from the Ross Anderson collection of slides currently being used to create a digital library of pathology images for teaching, a project made possible by generous donations from medical alumni (see p50).

Main picture. From the anatomy collection. A dissection of the left half of the head, neck and upper thorax of an adult male. Dissection by Gerard W Crock, 1958 (see p49).

Side, top to bottom:

Brain. Part of a series of ten sagittal sections of the brain. Mulligan's stain has been used. This item was in the anatomy museum catalogue of March 1959. No name is attached.

Lung. The lung parenchyma as well as the pleura shows caseous necrotic foci and cavity formation by mycobacterium tuberculosis. Areas of consolidation due to tuberculous pneumonia are also present. From the pathology collection.

Small Bowel. Congestion and severe edema of the small bowel due to mesenteric vein thrombosis. From the pathology collection.

Heart. Hypertrophy of the left ventricle with extensive healing following myocardial infarction. From the pathology collection.

Hand. A dissection of the right palm which demonstrates the superficial palmar arch and superficial nerves. This item was in the anatomy museum catalogue in March 1959.

Back cover

Background. Cerebral abscess. From the Ross Anderson collection, Pathology.

Centre. This image of a section of a mouse bone was taken by Associate Professor Paul Whittington, from the Department of Anatomy and Cell Biology, using DIC Optics. This method is particularly useful for observation of living specimens as it avoids the need for staining, which often kills the object. Bone tissue is continually remodelled during the life of an animal. Cells called osteoclasts bore tunnels in the bone matrix. These holes are filled in with new matrix material, which is progressively deposited by osteoblasts in concentric layers to form a structure known as an osteon. In this section of bone, several osteons, each with its layers of collagen fibres alternately oriented in different directions, are visible. The pink structure in the middle of each osteon is a blood capillary which invades the original tunnel soon after it has been excavated. Osteoblasts develop into osteocytes, the small dark purple cells scattered within the osteons. Whilst surrounded by bone matrix, each osteocyte maintains communication with its neighbours via long cellular extensions, visible in the section as the network of spidery lines.

*Photos courtesy Dylan Kelly and Ben Kreunen,
Department of Pathology and Stuart Thyer,
Department of Anatomy and Cell Biology.*

SEMINAR

Friday 22 July 2005

DESIGNER BABIES Are we going too far?

CONVENER, PROFESSOR GRAHAM BROWN

*James Stewart Professor of Medicine and Head, Department of Medicine, the Royal Melbourne Hospital and Western Hospital;
Interim Director, Nossal Institute for Global Health, University of Melbourne*

Introduction

GRAHAM BROWN

EVERY YEAR WE read about newly recognised genetic mutations responsible for part of the manifestations of human difference or disease, thus providing us with a mechanism for predicting risk for an individual or an unborn baby. The ability to test for a particular physical or mental condition puts the onus on expectant parents to consider whether genetic testing, which could influence the outcome of the pregnancy, should be performed on their unborn child. Those with the technical ability to perform pre-implantation genetic diagnosis (PGD) in association with in-vitro fertilisation look to society, or its laws, for guidance in deciding the circumstances in which such tests should be offered. Parents and the community, therefore, have an enormous responsibility in deciding whether such tests, which interfere with the process of chance, should be applied. As increasing numbers of genetic tests become available, we need to consider the extent to which the results of these tests should be used to modify the mix of humanity, bearing in mind that many people with conditions considered by some to be great disabilities make wonderful contributions to life on the planet.

When people first become aware that this technology is available, their first reaction usually assumes that the goal is to prevent 'imperfect babies', whatever 'imperfect' may mean. The community and lay press, however, have demonstrated concern at the frighteningly rapid progress of this technology and its application. Most members of society accept the use of new technology to diagnose or prevent serious illness, but all are concerned about its application for apparently trivial reasons. Calls in both the international and local press to scrutinise embryo testing have also raised concerns that the children born following this technology could develop other problems of which we are not yet aware.

Recognising the growth of the use of PGD in association with in-vitro fertilisation to allow sex selection, or to select for or against particular genetic mutations, the Australian Health Ethics Committee (AHEC) has issued guidelines for its use. In Victoria, the Infertility Treatment Authority currently provides a framework for regulating the choices that can be offered. For example, sex selection simply to balance the number of boys or



Graham Brown

'...we need to consider the extent to which the results of these tests should be used to modify the mix of humanity...'

girls in a family used to be offered by clinics in Sydney, but when AHEC issued guidelines suggesting this was inappropriate, the service was discontinued even though many practitioners disagreed with the recommendation.

Highly emotive language has been used to characterise the application of this technology to influence the outcomes of pregnancy. The term 'designer babies' is often used as a shorthand way of describing what others refer to as 'reprogenetics', and the term 'saviour sibling' has been used to describe a child conceived for the purpose of providing bone marrow for transplantation to a sibling. Attempts to select against particular traits to prevent the birth of children likely to suffer severe debilitating illness are referred to as 'negative eugenics'. 'Positive eugenics' refers to selection for particular traits. When a British parliamentary committee defended the practice of 'family balancing', many protestors argued that the practice 'ignored the dignity of human life' and concern was expressed in the lay press that the final report opted for 'a shock-

Speakers and panel members

Ms Rita Alesi—Senior Counsellor, Monash IVF

Dr Lisa Bridle—Bioethics Advocacy Worker, Queensland Advocacy Inc

Professor Jock Findlay—Deputy Director and Head, Female Reproductive Endocrinology Group, Prince Henry's Institute of Medical Research

Dr Lynn Gillam—Lecturer in Ethics, Centre for the Study of Health and Society; Research Fellow, Centre for Applied Philosophy and Public Ethics, University of Melbourne

Dr Fay Marles AM—Former Chancellor, University of Melbourne

Professor Alan Trounson—Professor of Stem Cell Sciences and Director, Monash Immunology & Stem Cell Laboratories

Professor Loane Skene—Professor and Associate Dean (Undergraduate), Faculty of Law, and Faculty of Medicine, Dentistry and Health Sciences, University of Melbourne

Father Bill Uren—Rector, Jesuit Theological College

jock libertarian approach...advising some changes to the law that are completely out of step with public opinion and any concept of ethics and dignity of human life' (*Sydney Morning Herald*, 25 March 2005).

Professor Julian Savulescu, of Oxford University, has argued for 'procreational beneficence', which defends the principle that any parent could and should strive for 'the best possible baby' (whatever that is). 'If we have a nature, it is to... make things better, including ourselves', he contends. Such a position can rapidly progress to an obligation or moral pressure for a parent to avoid conditions that others consider deleterious to the quality of life of an affected individual. Of course, people who have children with a disability are quick to respond to Professor Savulescu's argument, stressing that we do not understand the value and meaning of life, and cannot attempt to define a 'perfect' baby.

Many in Australia and abroad have expressed strong views about the creation of children specifically to save the lives of their seriously ill siblings as described, for example, by Jodi Picoult, in her book *My Sister's Keeper: A Novel*. If you use one of your children to save the life of another, are you being a good mother or a very bad one? Others are concerned about the long-term health effects in children subjected to PGD as embryos.

In order to debate the topic before the wider community, we gathered a group of experts to look at the scientific, technical, social and ethical issues surrounding PGD and asked them to consider the future possibilities as the technology inevitably develops and provides more data around potential outcomes of products of conception.

The papers which follow provided the basis for a lively and varied discussion by our panel and our audience.

What can genetic selection technology do for the health of new babies?

ALAN TROUNSON

THE BIOLOGY BEGINS with a human egg, produced in the ovary in response to hormones that occur naturally in a woman at the time of ovulation, given as fertility drugs.

After fertility treatment, patients who are infertile or have an inheritable genetic disease are able to produce eggs that can be inseminated or injected with sperm to form embryos. Those embryos can then be screened for the absence of a genetic disease and transferred to the mother's uterus to develop through a safe pregnancy to a baby free of that disease.

Each cell in these early embryos—the two-cell, four-cell, eight-cell embryo—is totipotent; it can go on to form an entire embryo, or offspring if grown separately.

The eight-cell embryo is formed by the fifth or sixth day, when the embryo hatches out of its zona pellucida or shell. The outer cells of the hatching 'blastocyst' [trophectoderm] are the ones that attach the embryo to the uterus. The cells on the inside of this structure are called the inner cell mass cells and they form the embryo proper. The genetic diagnosis procedure involves sampling from these early embryos in one of a number of ways.

You may sample what is known as a polar body from the unfertilised or fertilised egg. This is not commonly done but it will tell you whether that egg is genetically normal or not. The biopsy



Alan Trounson

'...pre-implantation genetic diagnosis is an ethical and humane technology...'

of a human embryo involves holding the embryo stationary on a suction pipette. A small hole is then put in the shell of the embryo and we draw some of the cells that are protruding through the zona pellucida and cut them off. The cut in the embryo heals within an hour and the sampled cell can then be assayed, or assessed, for its genetic normality. This is called pre-implantation genetic diagnosis (PGD) and if done, of course, the patients will be interested in having only unaffected embryos transferred to the uterus for pregnancy.

Cells for genetic diagnosis are mostly taken from the eight-cell embryo prior to the time that the cells compact on one another. You can also take cells from the blastocyst—the outer trophectoderm—on day five or six. This is akin to chorion biopsy and is becoming a more common procedure than the sampling of the eight-cell embryo. If you take a single cell, or maybe even two cells, from an eight-cell

embryo, you have only one or two sets of DNA to work with and are very dependent on the efficiency of your technical procedures. If you take a sample from the trophectoderm, you can get between five and twenty-five cells or copies of the DNA, which makes the molecular procedure considerably more efficient and more likely to be productive.

At Monash IVF we test for many different types of inheritable genetic diseases. Cystic fibrosis mutations are the most common genetic disease in our community; one in twenty-five people may have a mutation in that region.

Using fluorescent molecular techniques, we can determine whether an allele or a gene of a certain type is present. In this particular case we identify the Delta 508 gene, which causes cystic fibrosis if there are two copies present. If there is a normal copy of that gene as well as the mutated gene, then the patient or the person is a carrier of the disease. The problem occurs only when two carriers have a child (one in four children will be affected).

If only the affected gene has been passed on, the individual, when born, will develop cystic fibrosis and have to live with the consequences and the assistance of medicine available for that disease. A carrier embryo will be unaffected. Embryos which are normal, or carriers, are usually replaced in the patient. So clearly, the disease is not going to go away because its penetrance in the community is very substantial and also because the patients are quite happy to have carrier embryos transferred. They are only concerned about removing those embryos that have duplicated genes which cause the disease. Generally this is in response to already having had a child with cystic fibrosis.

There are many other diseases diagnosed by PGD, for example Huntington's disease. This is a disease where DNA repeats have been extended so there are random sets of repeats of trinucleotides in DNA which may have grown much longer than they were meant to. People who have Huntington's disease inherit extended repeats in their Huntington gene from their mother or their father. They will generally have a normal life for between twenty and forty years, but thereafter the disease expressed is most debilitating and leads to major issues of medical support, family concerns and, in the end, disability to the point where death is inevitable.

Sometimes these diseases aren't diagnosed in prenatal diagnoses—which is the normal identification of the disease in the foetus—because people see that twenty or thirty, or maybe even forty, years of normal life is reasonable, and that one would

expect human medicine to develop drugs or strategies to assist the patient before the serious part of the disease begins. But this has not been the case to date and, of course, knowing that you are going to undergo such a serious decay in health can be very debilitating itself.

There are other situations where genes relate to predisposition. An example of this is the BRCA genes in breast cancer. Carriers of these genes have probably a fifty per cent risk of passing this to their children. If you inherit this gene you have a lifetime chance of breast cancer approaching sixty to eighty per cent. If you have lost your mother, your aunt and/or your sister, you would have major concerns about this particular gene being present in your children. The options at this stage are relatively narrow and patients now ask for diagnosis of the BRCA genes in their embryos.

Other predisposition genes such as the P-53 gene are also related to a reasonably high probability of cancer and, again, a concern would be present if you knew they were in your family's genetic history.

There are also situations where, for example, you have a child affected with a blood disease like Fanconi anaemia. The child becomes seriously sick and will usually die if they cannot get an appropriate bone marrow transplant. If you are going to have another child free of this disease, you can also select for an embryo with an HLA type appropriate for transplant matching. You could give the cells from the umbilical cord blood of the new, unaffected baby to the affected child in the hope that stem cell transfer will enable the older child to recover from the disease. There are now examples overseas where this has happened.

In my personal view, pre-implantation genetic diagnosis is an ethical and humane technology which is making a much needed contribution to healthier families and to reducing the economic burden of genetic disease on health care.

The regulation of pre-implantation genetic diagnosis (PGD) in Victoria

JOCK FINDLAY AND LEXI NEAME

IN VICTORIA, THE *Infertility Treatment Act 1995* (the Act) governs the practice of assisted reproductive technology (ART). It empowers the Infertility Treatment Authority (ITA) to regulate the provision of reproductive services by granting licences to hospitals and day care centres where ART is practised and to doctors, scientists and counsellors involved in the provision of ART services. The ITA also imposes licence conditions and develops guidelines and policies.

The Act specifies who is eligible for infertility treatment and two 'pathways' to accessing treatment. The first is infertility under section 8(3)(a), while the second is risk of transmitting a genetic abnormality or disease. Section 8(3)(b) allows treatment where

a doctor who has specialist qualifications in human genetics [is] satisfied from an examination he or she has carried out that if the woman became pregnant from an oocyte produced by her and sperm from her husband a genetic abnormality or a disease might be transmitted to a person born as a result of a pregnancy.

Although PGD is clearly permitted under the legislation, restrictions apply as to who can access treatment and under



Jock Findlay

'...Victorian legislation explicitly situates the grounds for accessing treatment within a medical paradigm...'

what conditions. Although section 8(3)(b) identifies genetic risk as a pathway to accessing treatment, it does not specify what should be considered 'a genetic abnormality or disease' for the purposes of accessing PGD. Two questions frequently raised in relation to PGD are: what counts as a genetic abnormality or disease and who gets to decide?

Section 8(3)(b) invests responsibility for judging what counts as a genetic abnormality or disease, for the purposes of undertaking PGD, in doctors with specialist qualifications in human genetics. This establishes both the parameters for PGD and the gatekeeper function of the medical geneticist.

It means that the Victorian legislation explicitly situates the grounds for accessing treatment within a medical paradigm, rather than with reference to parental preference, procreative liberty or the freedom of IVF doctors or scientists.

It also means that, should the ability to test for genetic differences emerge that make people more intelligent, diligent or cooperative, it will not be permissible to perform PGD to select for these traits.

This legislation restricts the use of PGD to preventing the transmission of genetic disease and would not allow it to be used to enhance functioning.

Section 50(1) of the Act prohibits sex selection, but section 50(2) provides an exception to this prohibition in those cases where 'it is necessary for the child to be of a particular sex so as to avoid the risk of transmission of a genetic abnormality or a disease to the child'. Social sex selection is therefore prohibited by statute in Victoria, although sex selection is allowed for medical reasons.

In addition to the statutory provisions relevant to PGD, the ITA has developed policies and processes to ensure public oversight of novel uses of the technology. ITA policy on PGD classifies indications for PGD into three broad streams and uses this classification system to engage different levels of regulatory oversight using mechanisms of notification and application.

List A in the schedule [see fig.1] permits PGD for aneuploidy screening to increase the efficiency of infertility treatment. In these cases patients are admitted to treatment on the basis of infertility under section 8(3)(a), with the use of PGD regarded as a clinical decision. No notification or application is required.

List B covers the use of PGD to avoid known genetic conditions, either via direct testing or the use of sex selection for X-linked conditions. This list has general parity with indications for prenatal testing and only requires notification where the condition has not previously been tested for in Victoria.

Finally, List C includes those novel or expanded applications of PGD for which greater public oversight is considered appropriate. In this category the ITA has included PGD with human leukocyte antigen tissue typing, as well as sex selection where there is inconclusive evidence about transmission (e.g. autism) and selection against embryos that are carriers of an autosomal recessive disorder. Activities on List C require an application to the ITA, including information from a clinical geneticist detailing the nature and severity of the condition, the evidence for a genetic link, the likelihood of incidence, and the family history. In these cases, approval by an institutional ethics committee is required, and the ITA may impose other conditions.

Stream	List A	List B	List C
Purpose	PGD to increase the efficiency of infertility treatment with prenatal testing)	PGD to avoid transmission of a genetic disorder (general parity of prenatal testing)	Expanded applications of PGD (uses which exceed the parameters)
Practice	Aneuploidy screening	<ul style="list-style-type: none"> • Direct testing for heritable single gene disorders • Sex selection for X-linked conditions 	<ul style="list-style-type: none"> • Sex selection where there is a higher incidence of a condition in one sex, but inconclusive evidence about transmission (e.g. autism) • PGD with human leukocyte antigen tissue typing
Regulatory Mechanism	No notification required; patients admitted on the basis of clinical infertility under section 8(3)(a)	Prospective notification required for applications which have not previously arisen	Application required, detailing: <ul style="list-style-type: none"> • nature and likely severity of the condition • evidence for a genetic link • likelihood of incidence • family history Institutional ethics committee approval ITA may impose other conditions

fig.1

There is significant public debate about whether and how PGD should be regulated. Many of these debates circulate around the tension between individual freedom and other concerns, including the welfare of children, the public interest and social responsibilities.

Some argue that individuals should have unrestricted access to ART, including PGD, while others claim there are public interest constraints which may legitimately restrict the use of reproductive technologies. Many argue that PGD does not primarily affect those who use it (the parents), and that there is a community responsibility to protect the interests of the children who are born as a result of PGD.

It can often seem that the only purpose of regulation is to restrict the use of PGD. However, legislation can also facilitate the use of new technologies. In states with religious or historical considerations that make PGD extremely contentious, legislation can be enabling, by providing certainty and security for practitioners and patients. Furthermore, in establishing boundaries around the use of the technology, facilitative regulation can avoid prohibitive 'knee-jerk' legislation, which is sometimes enacted when new technologies are used in ways that provoke public outcry.

Lexie Neame is a senior research and policy officer at the ITA

The emotional and psychological issues associated with IVF and pre-implantation genetic diagnosis

RITA ALESI

IN RECENT YEARS IVF technology has grown and evolved, giving people the opportunity to test embryos for genetic disorders before implantation in the woman's uterus. Despite the public controversy over the technological procedures of pre-implantation genetic diagnostic (PGD) embryo testing, a couple's decision to undergo IVF and PGD is usually well considered before they commit to the process.

In Victoria the process of informed consent for infertility medical procedures is well established thanks to the *Medical Procedures Act 1984* and the *Infertility Treatment Act 1995*. The legislation requires that everyone undergoing IVF must receive counselling with an Infertility Treatment Authority approved counsellor prior to commencing treatment. The established practice with people requiring PGD is that, in addition to their pre-treatment IVF counselling, they also undergo counselling

with a qualified genetic counsellor before they even register with the IVF unit. This enables them to consider the issues and the risks associated with the outcome of any prospective treatment.

Common reasons for seeking PGD

The main reasons people may seek PGD treatment include testing for single gene disorders such as cystic fibrosis, Huntington's disease, β thalassemia, spinal muscular atrophy and fragile X—disorders that are genetically inherent and where often there is a prior family history—or chromosome testing for multiple miscarriages; implantation failure of embryos (usually done after many IVF treatment cycle failures); advanced maternal age problems (chromosome 13,18,21); or XY testing for sex-linked disorders.

Emotional and psychological issues

It is important to remember that the decision to undergo IVF and PGD is usually a last resort for many people, not an easy convenience as often portrayed by the media and those who are anti-IVF. The majority of people undergoing IVF and PGD have a longstanding history of grief, loss and trauma associated with their own medical condition and/or infertility. They may be presenting for treatment because they have already had a child or children with a particular genetic disorder and have had to watch that child succumb to a degenerative disease and either become permanently disabled, or die at a young age as a consequence. As parents, they may be carrying the burden of



Rita Alesi

'... the decision to undergo IVF and PGD is usually a last resort for many people, not an easy convenience...'

responsibility for their child's disorder. Feelings of guilt and anguish are frequently reported and form part of the motivation to seek preventive treatment so the same illness will not afflict another child.

Other issues confronting couples may be of an ethical nature whereby they may have had to terminate one or more pregnancies as result of a genetic condition. The decision to terminate a pregnancy is a difficult one regardless of the circumstances, but particularly so when the pregnancy is very much wanted and the decision is based on preventing a life of trauma and suffering for an unborn child. The decision to pursue a preventive intervention like PGD is also to minimise the psychological trauma and anxiety associated with having to wait for testing during different stages of the pregnancy, and to terminate if a genetic disorder is confirmed.

PGD is also an option for people who are able to fall pregnant but miscarry as a consequence of a chromosomal problem. Undergoing PGD and transferring viable embryos reduces the risk of miscarriage for these people.

PGD reduces some of the longer term risks and consequent emotional anguish associated with difficult decision making. Sadly, IVF does not guarantee immediate success. Treatment still may fail. There may not be any viable embryos for transfer after PGD if all are affected. Viable embryos may not implant. Pregnancies can still miscarry. Furthermore, the very process of IVF treatment alone brings its own risks and side effects. These all add to the emotional and physical risks associated with undergoing such a technological procedure and are considered at length in the counselling process before a commitment is made to undertake treatment. IVF and PGD may reduce some of the risks but the emotional journey is still tumultuous, with no guarantees at the end.

As outlined above, every person entering the IVF program comes with their own unique experience and history of emotional pain and trauma. The very process of infertility treatment is like a roller coaster ride with various obstacles to overcome, such as a positive response to hormone treatment (eggs and sperm are required before any IVF can be performed). Anxiety is often associated with the various stages of IVF: the fertilisation of eggs, development of viable embryos, PGD testing and assessment of embryos for genetic disorders. If any non-affected embryos are available and an embryo transfer occurs there is another period of waiting—two weeks for a pregnancy test. If treatment is unsuccessful there is often a grief response to the treatment failure, accompanied by feelings of anger and disappointment. If successful, then there is a further period of testing, follow-up pregnancy blood tests and ultrasounds at six and twelve weeks. In many cases, in spite of the PGD testing, people are still recommended to undergo an amniocentesis during the pregnancy to ensure that the pregnancy is normal and healthy. PGD may be up to ninety-seven per cent accurate but it is not 100 per cent accurate.

Due to the complexities involved, some people choose not to proceed with IVF and PGD after undergoing counselling. There are also some who do one treatment cycle, find the whole process too emotionally stressful and don't return for any further treatment.

The role of counselling is important throughout the whole IVF and PGD journey and beyond, even once treatment is complete and the outcome is either positive or negative. At the beginning of a couple's journey it may be helpful to assist with decision making and informed consent, and to help manage expectations,



Bill Uren

'Our reproductive autonomy should not overrule equality of opportunity for the next generation.'

as a preparatory tool to deal with potential causes of stress. If treatment results in a successful pregnancy the anxiety may continue and is often refocused on pregnancy related issues. If treatment has failed then renewed feelings of grief and loss predominate. Supportive counselling is important to help people recover and make an informed decision about whether they will continue with treatment or decide to pursue other options and achieve closure.

The grief associated with infertility and reproductive loss is often an experience reported to have a lifelong impact on a person's self-esteem, mental health and marital relationships. The cause of stress (such as the IVF and PGD treatment) may come to an end, but the emotional loss and grief may continue for a lifetime, becoming inactive or dormant for a period of time, but re-activated at significant life stages such as one's peer group having children or, decades later, grandchildren. The decision to subject oneself to a journey of potential emotional

distress such as that involved in IVF and PGD is not taken lightly. For many people it may be the only hope they have to achieve their dream of having a child. In order to achieve closure at the end of their journey, many state that it was important they at least tried.

Are we going too far?

BILL UREN

IBEGIN IN a somewhat unusual context—and hope it will not unduly excite secular sensibilities!

When St Paul wrote his First Epistle to the Corinthians in the middle of the first century AD, there were factions in the Christian community. Some claimed superiority because they were disciples of St Peter, others because they were disciples of St Paul, others again because they were followers of an itinerant Christian preacher, Apollos.

To resolve this dispute St Paul reminds them that their claims to superiority in any form are not only unchristian but downright hypocritical.

For consider the circumstances of your own calling. Not many of you were wise according to worldly standards; not many of you were powerful; not many of you were of noble birth. But God chose what was foolish in the world's eyes to confound the wise. God chose what was weak in the world's eyes to confound the strong. God chose what was of lowly birth, what was nothing in the world's eyes, to bring to nothing the things that are. (First Epistle to the Corinthians, Chapter 1, vv. 26-28).

We may need to have recourse to parallel considerations of our own origins when we reflect on the ethical implications of embryo selection and designer babies. We were all embryos once.

Let us begin with the circumstances of our own origins. Were you the first-born sibling of your family and were you female? Would your parents, if they had a choice, have chosen you in preference to a male? Was your elder sibling female, and were you, the second-born sibling, also female? Would your parents, if they had a choice, have chosen you in preference to a male? Are you the second-, third- or fourth-born male sibling in your family, and are all your elder siblings male? Would your parents, if they had a choice, have chosen you in preference to a female? And *a fortiori*, if you are female and all your elder siblings are female, would your parents, if they had a choice, have chosen

you in preference to a male? How strong still is the 'son and heir' syndrome?

We were all embryos once and none of us, I suspect, selective abortion excluded, were subject to designer sex selection. Remember, designer sex selection is not remedial of an existing foetus or embryo; it is literally a definitive life choice and of its nature exclusionary. It isn't as if you might have then been the second, rather than the first, sibling. It simply would not have been you at all; but another sibling. You would have been excluded from the 'birth lottery'.

So, isn't designer sex selection just a little too autonomous, a little too self-interested and discriminatory, a little selfish? We are willing to employ sex selection for the next generation, to rig the 'birth lottery', when we didn't have to undergo it ourselves!

We should remember St Paul and the circumstances of our own origins before we start imposing restrictions on the ways in which others come into existence. Our reproductive autonomy should not overrule equality of opportunity for the next generation.

Further, are you disabled? Not the one or two in a hundred who suffer from a major handicap—perhaps a severe adult onset disease—but the one in twenty-five or thirty who were diagnosed at birth with a lesser, but nonetheless significant, disability. Would you even have been born? Would your disability then have been remedied through modern medicine? Would you have been able to live at least a useful life? Would all this have eventuated if the designer baby project had been in operation when you were an embryo?

Thus the born 'perfect' or the remedied 'perfect' of one generation select the born 'perfect' of the next generation, and the reproductive autonomy of the first generation disenfranchises the equality of opportunity of the next generation in the birth lottery.

The paradox of embryo screening and selection is that, if it were employed systematically, we wouldn't need to discuss 'saviour siblings'. The original handicapped sibling, betrayed at the embryonic stage by its defective genetic profile, would simply be discarded in favour of his or her sibling. This sibling, far from being a saviour, would be a usurper, displacing the original!

But, thanks be to God, at least at present, embryonic selection is not employed systematically except in presumed cases of genetic disability, and handicapped originals in need of a 'saviour sibling' still do slip under the genetic screening radar. This is patently the strongest case for a designer baby, a genetically matched sibling who can come to the aid of the jeopardised original.

On the one hand, this can be characterised as a mission of mercy. On the other hand, it can be seen as part and parcel of the instrumentalisation and commodification of children that is at the heart of the designer baby project. It is treating one child as an instrument to save another. This is something we are generally loath to allow even between siblings, particularly when the procedures are likely to be experimental, and when recourse to an alternative system—saving umbilical cord blood—in many cases is likely to be just as effective. So it is important to see the question of 'saviour siblings' against the wider background of the 'progressive' agenda, of which perhaps it is the most appealing aspect.

In March 2005, in the United Kingdom, the science and technology committee of the House of Commons recommended that couples should have the right to create tissue-matched genetically screened 'saviour siblings' to help seriously ill children. They further recommended that IVF couples should be allowed to choose their baby's sex. But they did not stop there. Scientists, they said, should be able to create embryonic hybrids of humans and animals for research purposes, and current research involving cloned human embryos should be allowed to continue, at least until they are fourteen days old. Requirements on clinics to give priority to the welfare of any potential child

should be scrapped, and sperm and egg donors should be allowed to remain anonymous indefinitely, i.e., children or young adults in these cases should not have access to their genetic parent's identity.

These far-reaching proposals were not supported by all members of the committee but have the virtue of rehearsing the full 'progressive' agenda in which the interests of potential and, indeed, actual children are instrumentalised and subordinated either to reproductive autonomy on the one hand or to scientific experimentation on the other. In particular, the recommendations to no longer regard the welfare of the potential child as of paramount importance and to protect sperm and egg donor anonymity can be construed as constituting a new low-point in the ethics of artificial procreation. In fact it is no longer pro-creation but re-production.

It is instructive, then, to see the company that 'saviour siblings' keep. It is, as I say, embryo selection and destruction aside—for this is an inevitable accompaniment of the screening process—the most appealing aspect of the designer baby project, but in condoning it are we not committing ourselves one further step down the slippery slope to the 'hatchlings' and hybrids of Aldous Huxley's eerily prescient 1930s *Brave New World*?

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ADOLESCENT SEXUAL HEALTH

Sins of emission, omission, commission and permission

13 September 2005

BY PROFESSOR SUSAN SAWYER

Director, Centre for Adolescent Health, Royal Children's Hospital; Department of Paediatrics, University of Melbourne

I AM INCREASINGLY concerned that discussions about adolescent sexual health generate too much heat and not enough light. We risk moving into an era where the community's understanding of actual adolescent sexual behaviours is based, at best, on naivety and, at worst, denial.

If we think about the various health, social, legal and political contexts in which young people now mature, we recognise that certain features are very different for contemporary youth than for previous generations.

The sexual and reproductive health context for contemporary young people is different for a number of reasons. Firstly, there has been a dramatic reduction in the median age of onset of sexual activity. Secondly, young people are exposed to a broader array of sexually transmitted infections, with rising notifications rates of chlamydia, herpes simplex virus and HIV.

Equally powerful is the changing social context. Our community is concerned about women delaying having children but we have failed to understand the significance of this in terms of sexual health. If the median age of onset of sexual activity is in the late teens, and young people are not settling down with stable life partners for another ten to twenty years, obviously the sexual and reproductive health risks faced by young people are very different to previous generations.

In the space of a few decades we have moved from a legal view of children and young people as the property of parents, with no independent legal rights, to one where young people have increasing autonomy and expect to be treated independently of their parents regarding broad decisions affecting their future and particularly in relation to privacy and the confidentiality of their health care.



Susan Sawyer

Finally, one of the most dramatic recent changes is the increasing conservatism of the Australian political landscape that too often seeks fairly simplistic responses to complex situations.

We currently face two interesting paradoxes. The first is that, although we live in a highly sexualised society (turn on your television, go to a movie), we are no more prepared to engage honestly and openly when talking about adolescent sexual activity than we were thirty or forty years ago. Many parents continue to have great difficulty engaging with their sons and daughters about adolescent sexuality.

The second paradox is that whilst, as a society, we appear very concerned about sexual health in our young, we risk being accused of superficiality because we have yet

to engage in some of the issues of greatest significance.

Emission—surveying sexuality in adolescents

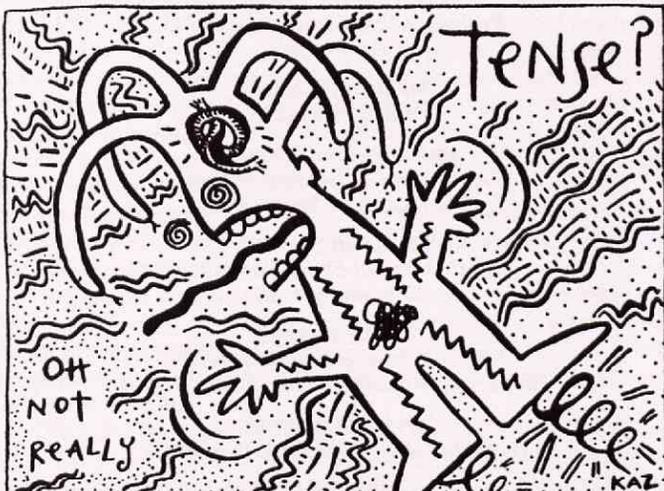
The onset of puberty has historically marked the onset of adolescence so it seems a fairly important place to start. Between the mid-nineteenth and twentieth centuries, the average menarchal age in Australia decreased from seventeen to under fourteen years. There is no evidence, however, of a continuing downward trend: the mean age of onset of first menstruation is approximately twelve and a half years.

In contrast, China has experienced dramatic improvements in nutritional status over the last hundred years, which is thought to explain the downward trend in menarchal age that continues to the present day. A similar trend can be seen in India and other developing nations.

What of western European nations? There was no change in the median age of menarche in Belgium from 1960 to 1980. Sweden has seen not only an arrest in terms of downward age trajectory but the suggestion of an increase in the median age of menarche in the 1990s.

Despite what the media would have us believe, there has been no consistent downward trend in menarchal age over the past three decades in the developed world. Trends we saw in Australia up until the mid-1960s to '70s continue in the developing world, but will, no doubt, also cease at some future stage.

There is less debate about the declining age of first sexual intercourse in both men and women in Australia. Over the past fifty years, the median age of first vaginal intercourse for girls fell from eighteen years in the 1940s to sixteen years currently. A quarter of year ten students and half of year twelve students have had sexual intercourse. Of course, that also means that half of all year twelve students have not had sexual intercourse! It's also interesting to note that there has been a marked downward age trend in the onset of oral sex for women over the past forty years. At adolescent health conferences in North America, Bill Clinton constantly gets a bad



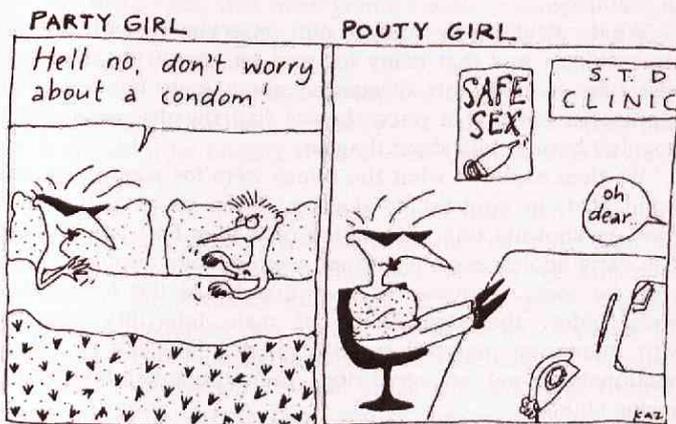
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rap from the adolescent health field about 'what he has done to oral sex'. However, Australian data demonstrates that we can't blame Bill and Monica for everything.

More concerning is the fact that there is much unwanted sexual activity taking place. Twenty-five per cent of sexually active students report unwanted sexual activity, with alcohol the most commonly cited explanation. Twenty-five per cent of students similarly report that they were drunk or high at their most recent sexual encounter, with significant rates of sexual coercion (described by about one in five women and one in ten men), most commonly under the age of seventeen.

It is also important to remind ourselves that not all sexual activity taking place is heterosexual. Adolescence is a time of development and maturation of identity, including sexual identity.

From the 1950s to the early 2000s, there have been consistent positive trends in the likelihood of contraceptive use at first sexual activity. These trends have stabilised over the last five years, particularly with regard to condom use, which is concerning given the prevalence of STIs. Rates of contraceptive use are lower in younger people. In the UK, half of those who are sexually active under the age of sixteen did not use contraception at first sexual intercourse compared to a third in the sixteen- to nineteen-year-old age group. Similarly, younger women are less likely to use reliable contraceptive methods.



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There is no evidence that emergency contraception reduces reliance on more regular forms of contraception and we should be actively encouraging young women to understand its role. Ideally, young girls grow up prepared for menstruation, with period pads available from the age of ten years or so for when 'it' happens. Perhaps mothers of fifteen-year-old girls should also provide a pack of the morning-after pill, 'just in case'.

Many of you will remember the Centre for Adolescent Health's involvement in the debate about condom vending machines in schools, led by Professor Glenn Bowes, in the early '90s, in response to the rising rate of HIV in Victoria at the time. In the context of other health promotion campaigns also focused on condoms, it was a powerful way to get condoms talked about in schools. While few schools introduced condom vending machines, the normalisation of condoms that occurred as part of this debate was what mattered.

Rising rates of STIs suggest it is time to get condoms back where they belong. In just a decade, notifications of *Chlamydia trachomatis* have trebled throughout Australia, in both men and women. Not surprisingly, when you think about their numbers of sexual partners, people under twenty-five are disproportionately infected.

The overwhelming majority of chlamydia infections are asymptomatic: you can change sexual partners and pass it on

unknowingly. This has major repercussions for public health responses. There are increasing calls for introducing (and funding) routine urine screening, which is now highly sensitive, reliable and effective—chlamydia is readily treatable with simple antibiotics, thus preventing long-term complications of tubal or ectopic pregnancy, infertility and pelvic inflammatory disease.

There has been a gradual decline in teenage birth rates in Australia, including Victoria, and a declining proportion of teenage births as an overall proportion of the total number of births per year. However, teenage birth rates are disproportionately represented in some groups, particularly young Indigenous women. Victoria has the lowest teenage pregnancy rate of all states and territories, however, rates are widely disparate between regions, with teenage pregnancy much more likely in lower socio-economic regions.

It is worth reminding ourselves that only about twelve per cent of all abortions in Victoria are performed on teenagers. Indeed, a significant proportion of abortions are performed on married women. The lack of reliable abortion figures in this state has recently been rectified, although we have no reliable data to inform trends over time. Those working in the field, however, sense that there has been a steady decline in the rate of teenage abortions in the last decade. Notwithstanding this, there appears to be the same number of terminations as live births in teenagers.



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The Australian teenage birth rate lies somewhere between the United States (one of the highest teenage birth rates internationally), and the Netherlands (the lowest teenage birth rate in western Europe). Australia has previously been pleased that our teen births are closer to the Netherlands than the United Kingdom, whose health officials have publicly described their rate of teen pregnancy as 'shameful'. However, when we combine teen birth rates and abortion rates to measure overall teenage conceptions, we can no longer kid ourselves that we come close to the Netherlands. While I agree with our politicians that this is concerning, I strongly disagree about what we should do about it. We need to be very wary of simple answers to these complex problems—such as funding more counselling services once unplanned pregnancy has already occurred or reducing access to over-the-counter emergency contraception or RU486.

Omission—sexuality and chronic illness

I'd like to highlight some of my own research in the area of young people with chronic illness, a group who face particular sexual and reproductive health risks. We have seen tremendous improvements in mean survival rates of young people with chronic disease. These remarkable shifts are due to many different factors, including improved medical technology, pharmacological advances and increasing subspecialisation within paediatrics.

Many young people survive with a relatively complex risk burden in terms of co-morbid aspects of adjustment disorder, mental disorder, threats to academic achievement because of lack of social engagement or time away from school or, indeed, in terms of health risk behaviours. There is no evidence that young people with diabetes or asthma, for example, smoke any less than otherwise healthy young people, but there is a lot of evidence that when they do, their attributable risk is much greater.

However, the discipline of paediatrics has largely ignored aspects of sexual and reproductive health. There is an apocryphal saying that doctors go into paediatrics because they're scared—either of sex or death—and I laugh when I realise that I am actively involved in research in both these areas!

Cystic fibrosis (CF) is a recessive condition affecting approximately one in 2500 live births. It is due to a genetic defect which causes altered electrolyte transport across epithelial cell membranes, affecting the body in complex ways. Chronic respiratory infection with gradual deterioration of lung function is a hallmark of the disease.

In Victoria we can be very proud of the quality of our clinical services. We have seen dramatic improvements in survival over the past fifty years, from a time when CF was a fatal disease of infancy to where it's now considered a life-limiting condition of the adult years.

When I first started training as a respiratory specialist at the Royal Children's Hospital, many young men and women on the ward already knew me because of my previous rotations as a resident and registrar. In my first few weeks on the ward, a number of the young women asked me questions. Can I get pregnant? What contraception should I be using? Will I be able to have more than one child? Should I have children earlier rather than later? What happens if I die? Who is going to look after my children?

These were important questions I'd never given any thought to in my paediatric training. I confessed my ignorance but said I'd find out. However, my bosses didn't know either and my library search drew a blank. I returned to the young women feeling I'd diligently done what they asked, but they were singularly unimpressed: 'What do you mean there are no answers? Well, find out!'. It is interesting where simple questions can take you.

One of my first questions was: 'Why don't these young women get vaginal yeast infections? They're on antibiotics all day long.' We recruited a cohort of young adult women with CF from the Alfred Hospital and a control population, and asked how often they were getting yeast infections. Compared to the background level of about four per cent, twenty-four per cent of adult women with CF experienced recurrent vaginal yeast infections about once a month. I published this data, although I didn't believe it. How could we not know this? Admittedly, the women didn't view it as having any relationship to their CF, saying, 'My vaginal symptoms have nothing to do with my lungs'.

When I trained subsequently in Boston, I resurveyed a similar sized adult population and found an even greater prevalence. We were making a large investment in improving mortality but weren't investing similarly in improving quality of life.

What were the issues for young men? Ninety-eight to ninety-nine per cent of males with CF are infertile, due to an absent or defective vas deferens resulting from the underlying genetic defect. When first described in the late 1960s this would have been a somewhat irrelevant finding, as the average survival was only into the early teens. However, improving survival

'Like parents, doctors also struggle to discuss sexual and reproductive health with their patients...'

has dramatically changed the significance of male infertility in CF. Furthermore, a range of assisted reproductive techniques are now available by which young men with CF, for whom survival is better than young women, can achieve fertility. We recently showed that nearly twenty per cent of men with CF in Victoria have children but eighty-four per cent wish to have children. This information is important now that men are surviving for longer.

At what age should health professionals inform young men with CF of likely future infertility? In a qualitative study in Boston, and again more recently in Victoria, we explored what these adult men believed, in retrospect, would be the right age for them to find out about male infertility. In North America and in Australia, the answer was about fourteen years with most hearing later than they wished. One young man disclosed that he first found out about his infertility when he brought his fiancée to meet his respiratory specialist to talk about CF!

Like parents, doctors also struggle to discuss sexual and reproductive health with their patients. When asked, some doctors were pretty explicit that this was embarrassing for their patients, some acknowledged that it was embarrassing for them, while others recognised that it was 'pretty embarrassing all round'.

What struck me about our interviews with health professionals was that many focused on identifying the *single* best time to have this discussion about male infertility: the implication being that once they've had the discussion, they wouldn't have to talk about it again.

We then explored what the issues were for young men and found that, in contrast to doctors' fears, when young men grew up knowing this information or if they first heard about it in early adolescence, it did not seem a major problem. They were far more distressed if they first heard the information when older: the significance of male infertility changes with increasing maturation, with greater intimacy of sexual relationships and as age brings more personal interest in having children.

However, other concerns also became apparent. Nearly one in ten adult men claimed they had some confusion about the words 'infertility' and 'impotence', and one in three had believed that because they were infertile they didn't need to protect themselves from sexually transmitted infections.

In a further study of young Victorian women, we asked where the young women and their parents were getting information about CF specific elements of sexual and reproductive health. At first glance, we might have felt reassured that the majority of young women reported obtaining most information from their mothers and that the majority of mothers were getting most of their information from CF specialists. However, we also asked about the frequency of any discussions about sexual and reproductive health. Ninety per cent of teenagers as well as their mothers reported they 'hardly ever' or 'never' had such discussions in the clinic—a clinic that is internationally recognised as delivering 'best practice'.

Commission—the role of schools in sexuality education

In Australia, we should be proud of our community's strong support for comprehensive sexuality education in schools. Comprehensive sexuality programs actively try and discourage the onset of sexual activity until a time when young people feel ready. While they do not promote sexual activity, they are based on a harm minimisation premise, that is, that once young people do commence sexual activity, they should be

encouraged to use strategies to reduce unplanned pregnancy (e.g. contraception) and STIs (e.g. condoms). These Australian models are philosophically poles apart from the US 'abstinence only' programs which, without any scientific evidence of efficacy, focus solely on celibacy. Most Australians are amazed to learn that, in the US, the country with one of the highest rates of teenage pregnancy in the world, sexuality education programs that discuss contraception or STI prevention outside of marriage are not eligible for federal funding. I don't believe this audience would share the concerns of many North American politicians and parents, that simply discussing sexual health will encourage promiscuity. Instead, there has been a mature acceptance in Australia that school-based comprehensive sexuality programs, especially those that go beyond the 'nuts-and-bolts of biology' to focus on attitudes, values and skills, are an important component in promoting youth sexual health.

The problem is that not all programs are equally effective. Furthermore, our communities and schools appear to have taken for granted what 'sex ed' is, and have not debated what constitutes appropriate content for sexuality education.

Given the emerging political conservatism around sexual politics, it is likely that 'abstinence only' arguments will soon be heard. There is absolutely no scientific evidence that these approaches make any difference whatsoever to youth sexual behaviours. Indeed, there is some evidence that they are actually dangerous; that once young people commence sexual activity, they are less likely to engage in sexual health promoting practices (e.g. condoms).

There are big questions to explore in our schools. What should be taught within a sexuality curriculum? At which year levels should it be taught? What are the qualifications of those who teach it?

We have a Victorian schools' curriculum and standards framework that, pleasingly, is moving towards more than the 'nuts-and-bolts of biology'. While we have a recommended curriculum for sexuality education, a challenge is limited curriculum resources. We have a good new STI resource for students in years nine and ten known as 'Catching On', but there is a lack of integration, I would argue, and a lack of thinking about how this interdigitates across the years: what should be taught in primary schools? Nor are there any minimum standards or certified courses for teachers of sexuality education in Victorian schools.

We recently had a senior public health official from Malaysia visit the Centre for Adolescent Health, funded by a WHO scholarship. She shared some Malaysian data about who talks about what with secondary school aged students which showed that, whether talking about puberty and menstruation, contraception or sexual relationships, there is very little discussion of sexual health in Malaysia by parents or by schools. Given the multicultural nature of Australian society, I think we need to be very careful about making assumptions that the

sorts of conversations that *you* might have with your children are necessarily the same as those which others might have. Further, young people consistently report wanting to hear this information from their schools, as well as their parents.

Permission—the medico-legal context

Young people seek help on complex questions about health (and life) from a wide variety of sources including parents, teachers and doctors, and they don't just seek help from anyone—they are pretty discriminating. They are most likely to ask questions and seek help from people who they believe will take them seriously and treat their questions with the confidentiality they believe they deserve.

Doctors have a legal requirement to maintain confidentiality when requested by a legal minor, as long as they are mature and we believe it is in their best interest. There are clear medico-legal exceptions to confidentiality, such as sexual abuse or self harm. The duty of confidentiality does not preclude doctors from trying to work actively with young people to encourage them to discuss sensitive issues with their parents, which I spend a fair amount of time doing. However, while a number of young people are happy to discuss even sensitive issues with their parents (especially mothers), studies show that young people who choose not to share information with parents often have highly valid reasons for doing so. Confidentiality matters.

The challenge—how to respond

How do we respond to these changing health risks? One response is to limit young people's access to sexual health services and resources—to limit sexuality education in schools, or reduce access to emergency contraception or abortion services.

In thinking how best to respond, it is important to recognise that young people are sexual beings, whether they are sexually active or not. Denial of adolescent sexuality—by parents, doctors or politicians—is not in young people's best interests. Young people deserve safe environments (recent publicity about the extent of teachers engaging in sexual activity with students reinforces the importance of this point), comprehensive school-based sexuality education, access to a range of adolescent-friendly, appropriate sexual and reproductive health services, healthy role models and a culture that acknowledges that sexuality is part of what it is to be human.

Why are adolescent sexual health outcomes so good in the Netherlands? I would argue it's because, as a society, they're able to talk, as adults, about sex: about the joys of sex and the reality of sex as a meaningful part of adults' lives. If we look at America, on the other hand, which has such poor adolescent sexual health outcomes, it is sobering to reflect how difficult it seems for America to acknowledge sexuality. Abstinence only programs taught in their schools are framed by the notion of sexuality as fearful and sinful.

Whether as doctors or parents, we need to find the language to discuss sexuality with young people in ways that make it more likely that young people's sexuality will be rewarding, enjoyable and healthy.

A large number of people helped me put this talk together but I would particularly like to thank my mother, Dr Barbara Sawyer, who, in my own adolescence, was a strong supporter of sexuality education in schools and the establishment of sexual health services in north-east Victoria, and whose capacity to talk about sexual health over the breakfast table when I was growing up is no doubt one of the reasons why I'm happy talking about this subject.

'...in the US, the country with one of the highest rates of teenage pregnancy in the world, sexuality education programs that discuss contraception or STI prevention outside of marriage are not eligible for federal funding.'

INTENSIVE CARE FOR THE TINIEST BABIES

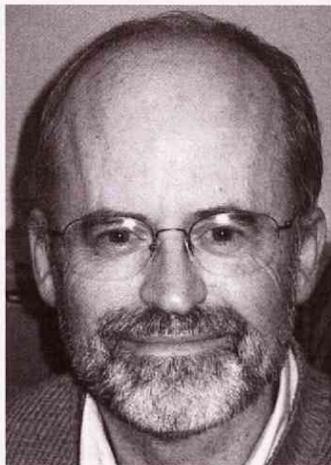
Is it worth it?

24 May 2005

BY PROFESSOR LEX W DOYLE

Professor of Neonatal Paediatrics, Department of Obstetrics and Gynaecology, and Department of Paediatrics, University of Melbourne; Consultant Paediatrician, Royal Women's Hospital

MOST BABIES ARE born on time, with gestational ages between 37 to 41 weeks, and are of normal birth weight, weighing $\geq 2500\text{g}$. However, approximately 6-7% are born preterm (<37 weeks) or with low birthweight ($<2500\text{g}$), and even fewer (0.5%) are either very preterm (<28 weeks) or have extremely low birth weights ($<1000\text{g}$). Caring for infants $<1000\text{g}$ birth weight always involves intensive care, which is expensive. The cost is measured not only in financial terms but also by the burden of illness caused by foregoing alternative health care programs to finance neonatal intensive care. For those responsible within the health care system, including those who treat the babies directly, it is vital to evaluate neonatal intensive care thoroughly. To address the issue it is useful to consider, firstly, how modern neonatal intensive care evolved, then secondly, the relationships between survival, long-term outcome, and costs.



Lex Doyle

Advances in neonatal care in the latter part of the twentieth century

In the 1960s few very tiny babies survived. At the Royal Women's Hospital in Melbourne approximately one in three infants $<1500\text{g}$ birth weight and only 6% of those $<1000\text{g}$ birth weight survived to hospital discharge. The outcome for the few survivors $<1000\text{g}$ birth weight was not particularly good as most had some neurological impairments or disabilities that resulted in problems with thinking, hearing, walking, talking or seeing. The commonest cause of death in these very tiny babies was respiratory failure caused by a lack of pulmonary surfactant which coats the inside of the lungs in all living people, including more mature babies at birth. A lack of surfactant causes the lungs to collapse after birth and the development of hyaline membrane disease. An interesting historical note is that both Bob Hawke and John F Kennedy had baby sons born within a week of each other, in August 1963. Both babies died a few days after birth from respiratory failure, probably caused by surfactant deficiency. Today, these babies would almost certainly not have died as they were 33 and 34 weeks gestation respectively—babies this mature no longer die from hyaline membrane disease. Three months later John Kennedy was killed in Dallas, Texas.

Intensive care of tiny babies in Melbourne in the 1960s was rudimentary by today's standards. Babies were kept warm in incubators and could be given additional oxygen to alleviate respiratory distress, but there were no infant ventilators to prevent them dying from respiratory failure. The first (and only) trial of 'neonatal intensive care' as a package was evaluated by Bill Kitchen and his colleagues at the Royal Women's Hospital. The infants in the trial were of birth weight $<1501\text{g}$ and were born between 1966-70. They were allocated alternatively either to standard or intensive care, which included the ability to measure arterial oxygen tensions with blood obtained

from an indwelling umbilical arterial line and to give infusions of glucose and bicarbonate. The survival rate of babies in intensive care rose, but the rate of handicap in the survivors increased.

The early 1970s saw the development of ventilators suitable for infants, as distinct from adult ventilators applied to infants. Since then, assisted ventilation has been at the forefront of modern neonatal intensive care. Initially, the ventilators were used mostly as a last resort in dying babies and had little impact on survival rates. However, as experience with the technique of assisted ventilation grew, the consumption of ventilator resources increased and survival rates started to rise.

The other major advance in the 1970s was antenatal corticosteroid therapy to accelerate lung maturity in preterm babies, discovered serendipitously by GC (Mont) Liggins, an obstetrician in Auckland, when he was evaluating corticosteroids as a method of inducing preterm labour in sheep. He observed that fetuses exposed to steroids had less respiratory distress after preterm birth. Liggins and a paediatric colleague, Ross Howie, then conducted a large randomised controlled trial in women threatening to deliver preterm and reported that respiratory distress was reduced and mortality rates were 40% lower.

In the 1980s, with increasing recognition that extremely low birth weight (ELBW) infants could survive, more mothers were treated with antenatal corticosteroids, more infants were delivered alive as distinct from being stillborn, and more were offered intensive care, including assisted ventilation after birth. Those caring for the mother, those caring for the baby, and the families concerned were all involved in the process of deciding which baby was to be treated. As babies who survive consume more resources than those who die, the consumption of ventilator resources rose steadily through the decade.

The major advance in the 1990s was a further reduction of mortality from surfactant deficiency with the introduction of exogenous surfactant, a therapy which had been developed through the 1970s and '80s, culminating in a series of randomised controlled trials which proved beyond doubt that it was an effective treatment. The first baby in Australia treated with exogenous surfactant was at the Royal Women's Hospital in March 1991. As restrictions on who qualified for surfactant were relaxed, and as a better surfactant became available in Australia, survival rates rose even further through the 1990s. By the end of the decade, 87% of babies $<1500\text{g}$ birth weight and 75% of babies $<1000\text{g}$ birth weight born alive at the Royal Women's Hospital, survived—huge increases from the rates in the 1960s.

To fully evaluate neonatal intensive care, both the costs and the consequences must be considered. Bill Kitchen from the Royal Women's Hospital was one of the first in the world to realise that it was also important to evaluate neonatal intensive care from a regional perspective, as distinct from a hospital viewpoint, since survival rates will be higher for babies born at

a high-risk maternity hospital such as the Royal Women's Hospital, compared with those born elsewhere. In the 1980s, Bill Kitchen established the Victorian Infant Collaborative Study Group in collaboration with the other intensive care nurseries in Melbourne (Mercy Hospital for Women, Monash Medical Centre and the Royal Children's Hospital), the Newborn Emergency Transport Service, and the Victorian Perinatal Data Collection Unit, to obtain data on all tiny babies born in the state. This group has subsequently evaluated neonatal intensive care for infants of birth weight 500-999g in Victoria over four distinct eras comprising the years 1979-80, 1985-87, 1991-92, and 1997.

The increasing effectiveness of neonatal intensive care over time is best illustrated by the steadily increasing long-term survival rates in tiny babies born in the state over successive eras, from 25% in 1979-80 to 38% in 1985-87, to 56% in 1991-92, and finally to 73% in 1997. At the same time the rate of blindness from retinopathy of prematurity has fallen substantially, although other neurological complications have remained constant. Approximately 50% of the survivors will have some disability—problems with thinking, hearing, walking, talking or seeing. At first glance it seems that these rates of disability are far too high—that before long before our schools and disability services will be swamped with children who weighed <1000g at birth. However, approximately 18% of children who are born on time and who are of normal birth weight will also have a disability as defined above.

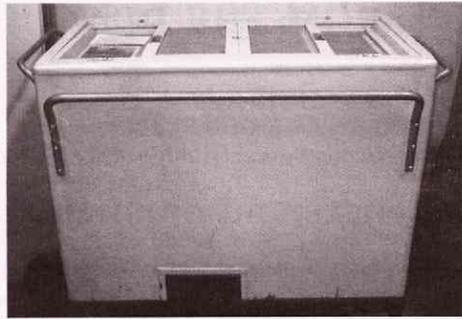
Extrapolating to today's birth and survival rates in Victoria, this represents approximately 10,000 normal birth weight survivors per year who will have some disability in the state, compared with about 100 survivors 500-999g birth weight. There is no doubt that the overall rate of neurological disabilities in survivors of birth weight 500-999g is too high; currently there are a large number of randomised controlled trials of interventions before, during and after birth that have as their major goal to reduce the rate of these adverse neurological outcomes.

The survival rate and the disability rates can be combined to calculate quality-adjusted survival rates. For Victoria, the quality-adjusted survival rate for infants <1000g birth weight rose three-fold, from 19% in 1979-80 to 59% in 1997.

Is neonatal intensive care for tiny babies worth it?

This question concerns the efficiency of neonatal intensive care. The relationships between survival, long-term outcome and costs can best be described by considering two ratios: cost-effectiveness and cost-utility, in which the change in costs over time is divided by the change in outcomes over time. The costs are mostly related to the duration of assisted ventilation, which has risen steadily over time. In cost-effectiveness the outcome is the change in the survival rate, whereas in cost-utility the outcome is change in the quality-adjusted survival rate. A high cost-effectiveness or cost-utility ratio is less efficient, i.e. more expensive, than a low ratio. A negative ratio, which is uncommon for most health care programs, means that you are not only gaining health outcomes you are also saving money at the same time.

The cost-effectiveness ratios for Victoria have been approximately \$5000 per life-year gained each time these have been calculated for the mid-1980s, early 1990s and late 1990s. The cost-utility ratios have been similar to the cost-effectiveness ratios. The cost-effectiveness and cost-utility ratios have been generally higher in lower birth weight subgroups, but there have been consistent gains in efficiency over time in infants of lower



Technological changes in neonatal care for premature babies. (L) Incubator c1947 for transporting babies within the hospital. Note the design features of pneumatic tyres and spring suspension sadly lacking in today's transport incubators. (R) Modern day technology for the tiniest babies.

birth weight (<750g). There is no birth weight subgroup where the ratios are so high as to consider withholding intensive care on economic grounds alone. As there have been large increases in effectiveness, with higher survival and quality-adjusted survival rates from the late 1970s to the late 1990s, the efficiency of neonatal intensive care for ELBW infants in Victoria has remained relatively stable.

Comparison with other health care programs

As it turns out, neonatal intensive care compares very favourably with most other intensive health care programs, such as adult coronary care, dialysis, or organ transplantation. Perhaps surprisingly, neonatal intensive care also compares favourably with many non-intensive health care programs, such as treating high blood pressure or high blood lipids, treatments that would be very familiar to readers both as prescribers and recipients. Cost-effectiveness or cost-utility ratios for these health care programs are higher, i.e., more inefficient, than neonatal intensive care.

Who wants to know?

In the final analysis, the answer to the question of the value of neonatal intensive care will vary with the perspective of those asking the question. The perspective could be that of society, but we cannot expect every person in the community to need to know or understand the issues involved. As a society we elect governments to make the difficult choices in deciding where to allocate scarce health care dollars. Of course, governments are advised by health departments, who in turn might seek advice from health care professionals or economists. Having determined how much is to be spent, health departments usually delegate responsibility for allocating resources to individual health care regions or hospitals, some of which can have a very narrow view when it comes to their budgets. Within hospitals, the medical or nursing staff might have their own views, as will the parents of very tiny babies, both before and after birth, although these views can change with the circumstances; for example there may be a collective decision between parents and caregivers that intensive care is not warranted at 23 or 24 weeks of gestation, whereas it might be warranted after that time. Later, we can ask the survivors of neonatal intensive care themselves. When this has been done they usually rate their health outcome as superior to that as assessed by health professionals and so usually they think neonatal intensive care is well worthwhile. Increasingly, we will also be able to ask the children of these survivors; of the many we have followed into adulthood and who we know are parents, all have so far had children who were not born too early and were of normal birth weight.

In conclusion, neonatal intensive care for very tiny babies is increasingly effective, relatively efficient, and clearly worthwhile from all viewpoints that matter, including that of the author. It is why I do what I do, especially at 3am on a Saturday!

FROM THE DEAN

BY PROFESSOR JAMES A ANGUS FAA

Dean, Faculty of Medicine, Dentistry and Health Sciences; Head, School of Medicine

Challenges and opportunities

AS I WRITE (June 2006), *The Australian* newspaper, in particular, has taken up the theme of the Australian Doctors' Fund to discredit the current undergraduate curricula in medical schools, particularly the reduction in anatomy, dissection and basic science content, and, more generally, the loss of didactic lecture-based teaching that has largely been replaced by problem-based and self-directed learning.

As with curricula the world over, there is no recognised perfect model, indeed the accrediting Australian Medical Council encourages diversity. Our medical school now has seven years experience with the new curriculum and we continue to strive to provide an outstanding course in which a science-based curriculum, integrated contextual learning and balance of professional attributes are the hallmark, enabling our students to enter the full range of career paths in postgraduate medicine.

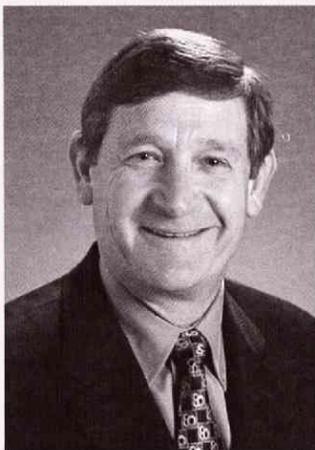
In addition to changes in delivery and course content, many in the profession are concerned by current selection instruments, which they see as potentially biased and unfair. Some schools (but not Melbourne) use a constructed interview, school leaver results and the Undergraduate Medicine and Health Sciences Admission Test (UMAT) to rank candidates.

Melbourne has adopted arguably the fairest process in Australia to select students for its two medical streams: a school leaver entry based on final year results and the UMAT; and a graduate entry (twenty-five per cent) based on an interview, a GAMSAT and the applicant's undergraduate academic performance.

We are very concerned with equity of access and thus allow twenty per cent of Commonwealth supported places to be filled by applicants with some degree of disadvantage (such as rural or socio economic). In addition, applicants have two opportunities to enter medicine—as school leavers or graduates.

In the school leaver entry course, the Advanced Medical Science year (semesters 6 and 7) provides a compulsory year in which students are introduced to research in a field related to medicine. The expectation is that they will develop an understanding of research methodologies and their importance in health care, and embrace evidence-based medicine for lifelong learning. The year is important and we hope it will lead to many physician researchers in years ahead.

Growing Esteem, the university's new ten-year strategic plan, is a comprehensive vision to empower the university's graduates and staff to make distinctive, world class contributions to society in research, learning and knowledge transfer. In medicine, this vision will change the proportion of undergraduates towards graduate entry and our MBBS degree may change to MD. The timetable for these changes is still under consideration. This trend recognises the European 'Bologna Model' of graduate professional degrees and North American career pathways. It allows for mature entry to medicine with a shorter (four-year) medical course. Critical issues we are addressing include: career choices for school leavers who are unsure of their destiny versus those keen to pursue medicine as soon as they leave school; the additional three-plus-four years in the Bologna Model versus the current six-year course for school-leaver entry for the undergraduate degree; the need for the undergraduate degree to balance opportunities for enriched experiences in the humanities with the requirements for 'hard' enabling sciences



James Angus

and prerequisite bioscience subjects; and the need for our bright students to experience research training in their formative years. We are concerned that any changes maintain the opportunities for research training to PhD level, a hallmark of our school and a normal attribute for our clinical leaders.

Decisions will be strongly affected by our capacity to provide the best clinical training places in the latter part of the course. Traditionally, the university hospital training venues have been our St Vincent's/Geelong; Austin/Northern, Royal Melbourne/Western, Royal Children's and Royal Women's hospitals, and specialist schools such as the Rural Clinical School at Shepparton, Ballarat and Wangaratta. Times change. Deakin University is to have a new rural and regional graduate entry medical school that will directly affect our well-established clinical training arrangements at Barwon Health and Warnambool, and possibly at our Ballarat Rural Clinical School. In addition, Notre Dame's second medical school in Sydney has asked the University of Melbourne for assistance in training their students at St Vincent's and Western hospitals. There must be careful planning of undergraduate clinical training places throughout Victoria and a concerted effort to maximise the student experience in a variety of settings—clinics, rural and regional, metropolitan university hospitals and even private hospitals—to ensure a long-term, competent and sustainable medical workforce.

In other news, I am delighted to report on our success in securing Commonwealth support for youth mental health. Professor Pat McGorry (Psychiatry) will lead a consortium on behalf of the university and the ORYGEN Research Centre, the Brain and Mind Institute, Australian Psychological Society and the divisions of general practice, to fund projects over the next four years to provide service delivery and evidence-based models for youth mental health.

In neuroscience, the Commonwealth and Victoria have joined philanthropic organisations to fund a major new neuroscience institute, located at the current biochemistry building site and at the Austin Hospital. This institute will house three of our affiliated institutes—Howard Florey Institute, Brain Research Institute and National Stroke Research Institute—under one structure and co-locate the Mental Health Research Institute at Parkville. This is a major initiative to bring university employed neuroscientists together with other leading neuroscientists in world class facilities to fully exploit collaboration and training opportunities.

We are facing arguably the greatest challenges in medical training and research for fifty years as the Commonwealth and State governments wrestle over control and funding of health services. Many of our major university hospitals will be rebuilt, and there will be a rapid doubling of doctors requiring clinical places, postgraduate training and specialist openings to meet workforce demands. Add to this the major audit of research excellence, with its funding implications for universities, the battle to recruit and retain first class staff, and you may observe a slight anxiousness! I am confident the school will triumph because of its people, their skills and dedication to excellence, and the support of our affiliated medical research institutes.

ACADEMIC DEPARTURES AND APPOINTMENTS

Ken Gayler

Head, Department of Biochemistry & Molecular Biology, 2003-2006

IN APRIL THIS year, Associate Professor Ken Gayler retired as head of the Department of Biochemistry and Molecular Biology. His retirement ended thirty-five years with the department and made him the last person to administer the department from the Russell Grimwade School of Biochemistry.

Born in Adelaide, Ken attended Pulteney Grammar School, where he was a school prefect and participated in football and sailing. His school days finished, he enrolled in agricultural science at the Waite Agricultural Research Institute and topped the faculty in his third year. Upon graduating, he moved to Queensland where he worked for seven years as a research scientist with the Colonial Sugar Refining Company, while pursuing a PhD at the University of Queensland.

This period of research led to an interest in the hormonal regulation of plants and the role of mRNA turnover in the growth and physiology of sugar cane crops. He was the first to measure mRNA turnover in plants and has retained this interest throughout his career, applying molecular biology techniques to enhance the growth and development of crop plants, both cereals and legumes, and recently characterised an mRNA decapping enzyme likely to be a key regulator of the fate of mRNA in plants and animals.

His collaboration with Associate Professor Bruce Livett enabled the discovery of a novel analgesic from the venom of the Australian marine cone snail, *Conus victoriae*. The patented analgesic, a peptide called ACV1, is estimated to be between 1000-10,000 times more potent than morphine but shows no dependency. It is now being developed by the Melbourne-based company Metabolic Pharmaceuticals and is entering phase two clinical trials aimed at treating intractable neuropathic pain such as that experienced by patients with sciatica, shingles, phantom limb syndrome, terminal cancer and AIDS.

Such research is a good example of the way basic research (in this case initially on plants) can lead to advances in medical research with clinical outcomes, the philosophy behind the Bio21 Research Institute.

Ken Gayler has had the difficult task in the last two years of shepherding the transition of his department to Bio21. With most of his research staff now resident there, the teaching and administrative staff will soon be relocated from the Russell Grimwade School of Biochemistry. The old building, a friendly and welcoming home for many students since it was established in the late 1950s, will soon be demolished to make way for a new research complex to house neuroscience and the Howard Florey Institute.

The discipline of biochemistry has changed greatly over time, as reflected by the department's current title, Biochemistry and Molecular Biology. The importance of the subject to medical teaching has extended into virtually every sphere of clinical endeavour. Every department teaching medical students has staff engaged in biochemical and molecular approaches to their teaching and research.

We thank Ken for his enthusiastic support of medical teaching and for his contributions to the faculty by integrating topics in medical biochemistry and molecular biology into medical teaching at all levels. Over the twenty years he has been involved with the Melbourne medical course, he has assisted over 5000 medical students to experience the latest advances in medical biochemistry and molecular biology, a substantial contribution for anyone and, as he says, 'a most satisfying experience upon which to retire'.

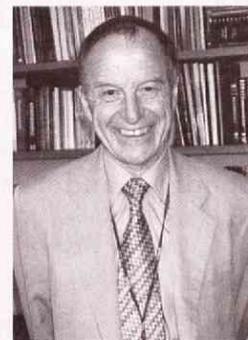
A keen sailor, Ken is looking forward to extending his experience of ocean racing and taking on challenges and adventures of another kind during his well earned retirement. We wish him good health and, above all, smooth sailing.

*Associate Professor Bruce Livett,
Colleague and friend, Department of Biochemistry
and Molecular Biology*

Professor William (Bill) Louis

*Foundation Chair, Clinical Pharmacology and Therapeutics Unit,
Department of Medicine, Austin Health, 1975-2005*

BILL LOUIS, A graduate of the University of Melbourne (MB BS 1960, MD 1966), gained his MRACP in 1966 and FRACP in 1971. After a period of research at the National Institutes of Health in Bethesda, USA, and St Mary's Hospital in London, he returned to Melbourne and a university appointment in 1974 as foundation professor of clinical pharmacology and therapeutics (Department of Medicine, Austin Hospital), a position he held until his retirement in 2005.



Bill Louis

Bill made a major contribution to research and teaching for thirty-one years by personally developing and presiding over the largest and most productive clinical pharmacology unit in Australia. Under his direction, the unit energetically pursued the goal of maximising pharmacology's contribution to therapeutics by teaching, by example and by collaborating with pharmacists to enhance drug use effectiveness in hospitals and the community.

In 1992, Bill obtained major funding from the Commonwealth Department of Health to fund the university's Drug Evaluation Unit, which performs a critical national and international role in evaluating new therapeutic compounds.

Bill has personally supervised over forty doctoral students for PhD and MD, and fifteen of his students and collaborators have been appointed to chairs in Australia and overseas. Others have taken up senior positions in universities, the public service and industry.

The quality of Bill's research has been recognised internationally. His research has ranged from basic biological sciences to extensive clinical trial involvement, with major funding from the NHMRC, NHF and industry. Bill's outstanding achievements relate to his successful developments of several novel cardiovascular compounds within his laboratory, from synthesis through to first use in human clinical trials. This is an outstanding achievement which distinguishes his work from that of all other Australian clinical pharmacology groups and has afforded him well-deserved and sustained international recognition in the fields of clinical hypertension, adrenoceptors, peptide receptors and neuroprotection.

He has published extensively, with almost 400 articles in highly regarded peer review journals, has had over seventy patents granted in Australia, the US, Europe and Japan, and receives many invitations to present his work at national and international meetings.

Bill has served on many key government therapeutics committees, including the Pharmaceutical Benefits Advisory Committee, the Australian Drug Evaluation Committee, the board of the National Drug Information Service, the NHMRC, the Commonwealth AIDS Research Grants Advisory Committee and the editorial board of *Australian Prescriber*. He is a past president and secretary of the Australian Society of Clinical and Experimental Pharmacologists and Toxicologists and has also been a member of the National Committee for Pharmacology of the Australian Academy of Science and of the scientific board of the National Heart Foundation of Australia. He has served on the editorial boards of many journals that deal with clinical pharmacology, cardiovascular therapeutics and hypertension research.

Bill has also been the director of the joint hospital/university Department of Clinical Pharmacology and Hypertension Services, co-director of Toxicology Services at Austin Health, chairman of the university's Standing Committee in Clinical Pharmacology and Therapeutics and was acting chairman of the Department of Medicine, Austin and Repatriation Medical Centre (1999-2000).

He is president of the International Society of Cardiovascular Pharmacotherapy and a board member of the WHO Council of Clinical Cardiology. He is also the vice-chairman of the Medical Research Committee and a board member of the Sir Edward Dunlop Medical Research Foundation.

In his forty-odd years on the staff, Bill Louis has given long and loyal service to the university and has brought great prestige to the institution. He is now professor emeritus and continues to serve the university well in his new role.

Associate Professor Albert Frauman

*Acting Head, Clinical Pharmacology & Therapeutics Unit,
Department of Medicine, Austin Health/University of Melbourne*

Lenore Manderson

*Professor of Women's Health and Director,
Key Centre for Women's Health in Society, 1999-2002
Federation Fellow, Key Centre for Women's Health in Society*

PROFESSOR LENORE MANDERSON, federation fellow in the Key Centre for Women's Health in Society, has moved to Monash University's Department of Psychology, Psychiatry and Psychological Medicine.

Professor Manderson was appointed as the first professor of women's health at the university and was director of the Key Centre from January 1999 until May 2002, when she took up a five-year federation fellowship within the centre.

Most of the work of the federation fellowship program has focused on chronic disease and disability; severe illness responses in different socio-economic environments and cross-cultural perspectives of well-being. The work is being conducted in Thailand, Malaysia and Australia.

'Lenore made a considerable contribution to the work of the centre during her time here, especially in expanding our research, teaching and training in the region,' said Professor Doreen Rosenthal, Key Centre director. 'We wish Professor Manderson and members of her team success in their new positions. We shall miss their contributions to the centre's activities.'

Michael Berk

*MB BCh (Witwatersrand), MMed (Witwatersrand),
PhD (Pretoria), FF(Psych), FRANZCP*

*Professor and Chair of Psychiatry
(Barwon Health and the Geelong Clinic)*



Michael Berk

IN ADDITION TO his appointment to the chair of psychiatry for Barwon Health and the Geelong Clinic, Michael heads the bipolar program at Orygen Youth Research Centre.

He has published over 132 papers on a range of topics, with his research interests focusing on mood and psychotic disorders, particularly bipolar disorder. He has published sixteen self-initiated, randomised controlled trials, predominantly in bipolar disorder, and is the recipient of a number of grants, most recently a Stanley Foundation award. He is the

principal investigator on a number of current trials including the first published randomised controlled trials of atypical antipsychotics in bipolar disorder and lamotrigine in both bipolar disorder and resistant depression.

Michael established a clinical professorial unit at the Geelong Clinic and a research unit within the division of Community and Mental Health at Barwon Health. He chairs the university's Bipolar Special Interest Group and the Melbourne Academic Consortium Clinical Research and Clinical Trials Domain. He is

on the editorial board of four journals, a reviewer for twenty-one other journals and is a member of a number of international advisory boards. He is vice-chair of the International Society of Bipolar Disorders and sits on committees of the Collegium Internationale Psychopharmacologicum and World Federation of Societies of Biological Psychiatry.

David J Castle

*MBChB (Cape Town), MSc (Cape Town), MD (London), DLSHTM,
MRCPsych, FRANZCP*

Professor and Chair of Psychiatry (St Vincent's Health)

DAVID HAS WORKED in clinical, research and academic settings in Cape Town, Johannesburg, London, Western Australia and Victoria. Prior to joining St Vincent's Mental Health in January 2006, David was head of the clinical stream at the Mental Health Research Institute of Victoria, a professorial fellow of the Department of Psychiatry, and a consultant psychiatrist with North West Mental Health at Melbourne Health.

An international leader in research into schizophrenia, David is continuing to develop psychosocial treatments for people with schizophrenia and related disorders, bipolar disorder and people with mental illness and substance abuse comorbidity, and is pursuing his interests in disorders of body image and anxiety disorders.

David has published widely in prestigious journals, and co-authored or co-edited ten books, the most recent being *Marijuana and Madness* (with Robin Murray, UK), which was awarded the 2005 Mental Health Book of the Year by the British Medical Association.

He has been successful in attracting substantial grant funding from a number of different sources, and has strong research links in Australia and overseas. David sits on a number of advisory and editorial boards and is a regular reviewer for over twenty national and international scientific journals. He teaches undergraduate and postgraduate students and speaks regularly about his research at scientific meetings.



David Castle

Peter R Ebeling

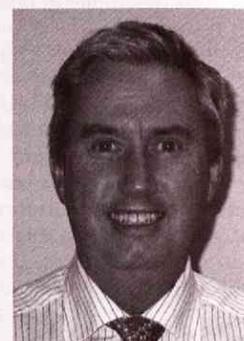
MB BS, MD, FRACP

Professor of Medicine, Western Hospital

PETER EBELING TOOK up the chair of the university Department of Medicine at the Western Hospital in December 2005, where he is also head of endocrinology. In 2003 he was a visiting research fellow at Oxford University.

His research interests are in public health problems of vitamin D deficiency; the pathophysiology and management of post-transplantation osteoporosis; and the role of vertebroplasty and the clinical utility of biochemical bone turnover markers. Peter was previously

president of the Australian and New Zealand Bone and Mineral Society, serves on the editorial board of the *Journal of Bone and Mineral Research*, is honorary editor of *Osteoblast* and serves on the medical and scientific committee of Osteoporosis Australia. He is chair of the Victorian state committee of the Royal Australasian College of Physicians.



Peter Ebeling

Peter McIntyre

BSc (La Trobe), PhD (La Trobe)

Professor and Head, Department of Pharmacology



Peter McIntyre

AFTER COMPLETING HIS PhD, Peter McIntyre took up postdoctoral positions at the Walter and Eliza Hall Institute and the Imperial Cancer Research Fund Laboratories in London (now Cancer Research UK). He then joined Sandoz Pharmaceuticals in University College London (UCL) where he set up molecular pharmacology laboratories under the direction of Professor Humphrey Rang. His group worked on a range of targets for the treatment of chronic pain and was important in developing a number of compounds,

novel approaches to treating chronic pain, several of which entered clinical trial.

After the merger of Sandoz and Ciba Geigy to form Novartis Pharmaceuticals in 1996, Peter took on increasingly senior roles within the Novartis Institute for Medical Sciences at UCL.

Peter is interested in the thermosensitive 'transient receptor potential' ion channels and he has been involved in major discoveries of the thermal sensitivities of three of these channels, two of which were published in *Cell* and one in *Science*. His group was the first to show that antagonists of capsaicin, the hot principle in chilli peppers, are an effective treatment for chronic pain associated with inflammation or with nerve damage.

He now plans to apply the experience he gained working in a multinational pharmaceutical company to teaching students, to run the Department of Pharmacology and help build the fledgling Australian pharmaceuticals sector.

Paul T Monagle

MB BS (Monash), MD (Monash), MSc (McMaster),
FRCP, FRCPA, FACC

Professor and Head, Department of Pathology



Paul Monagle

PAUL COMMENCED AS head of the Department of Pathology in April 2005 and continues as director of haematology at the Royal Children's Hospital with an active clinical hospital practice.

During 1996-98, Paul completed an MSc while working as a research fellow in the Department of Paediatrics at McMaster University, Hamilton, Ontario.

He returned to Melbourne in 1998 as laboratory haematologist with the Women's and Children's Health

Care Network and later, director of the Division of Laboratory Services. In his capacity as director, he has overseen considerable improvements in quality systems, clinical interfacing, management and financial accountability. In 2001 Paul was the youngest recipient of the RCH gold medal for his efforts in dealing with the organ retention after autopsy issue.

Paul remains involved in undergraduate and postgraduate teaching and is a strong advocate for his profession. He is involved in a number of RACP committees, is on the editorial board of *Thrombosis Research*, a reviewer for many international journals and participates in the McMaster online evidence based review process.

He has published extensively in the fields of developmental haemostasis and paediatric thrombosis and anticoagulation, co-authoring the only major textbook in the field (*Thromboembolic complications during infancy and childhood* Andrew M, Monagle P, Brooker L. Decker Inc. 2000), as well as chapters in many other major texts. Paul is principal investigator of the Fontan A study, currently the only open multinational RCT of anticoagulation in children with cardiac disease.

Paul has published over fifty peer-reviewed papers, and numerous reviews. He chairs the paediatric chapter of the American College of Chest Physicians (ACCP) Antithrombotic Guidelines, and co-chairs the International Society of Thrombosis Haemostasis paediatric subcommittee.

Paul is married and spends all his spare time driving his four children to their respective sporting competitions.

Readers can find Paul Monagle's recent Dean's Lecture, 'From little things big things grow: the broader implications of paediatric coagulation research' at: www.mdhs.unimelb.edu.au/news/deanslecture/11apr06.html

Ingrid E Scheffer

MB BS (Monash), PhD, FRACP

Professor of Paediatric Neurology Research

INGRID SCHEFFER IS the first paediatric neurologist in Victoria appointed to a chair. She is based in the Department of Medicine at Austin Health and the Department of Paediatrics at the Royal Children's Hospital. Her work with Sam Berkovic in the genetics of epilepsy has been at the international forefront since their collaboration with Grant Sutherland and John Mulley, at the Women's and Children's Hospital in Adelaide, led to the discovery of the first epilepsy gene in 1995. They have subsequently identified eight of the fourteen genes known for idiopathic epilepsy.

Ingrid graduated in medicine from Monash University and specialised in paediatrics at the Royal Children's Hospital in Melbourne. She then trained in child neurology at the Great Ormond Street Hospital for Sick Children in London and did a PhD at the University of Melbourne while completing an epilepsy fellowship at Austin Health. Her PhD resulted in the description of four new inherited epilepsy syndromes and changed thinking about the genetic inter-relationship of febrile seizures and epilepsy. She was awarded the university Chancellor's Prize for an outstanding PhD in 1999 and a commendation for the Premier's Award for Medical Research in 1998. Ingrid received the Post-doctoral Investigator's Award from the National Association of Research Fellows of the NHMRC in 2003 and was an inaugural NHMRC practitioner fellow.

With more than 100 papers to her name, Ingrid speaks regularly at international meetings and was on the scientific committee of the last International Epilepsy Congress. She is a chief investigator on her second NHMRC program grant with molecular geneticists, physiologists, imaging specialists and clinical researchers.

Readers can find Ingrid Scheffer's Dean's Lecture 'Understanding childhood epilepsy: from bedside to bench and back again' at: www.mdhs.unimelb.edu.au/news/deanslecture/30may06.html



Ingrid Scheffer

RESEARCH INFRASTRUCTURE

Who pays and what are the rules?

BY PROFESSOR JAMES McCLUSKEY

Associate Dean, Research, Faculty of Medicine, Dentistry and Health Sciences;
Head, Department of Microbiology and Immunology

THE AUSTRALIAN MEDICAL research community depends substantially on nationally competitive project grants (NHMRC and ARC grants), and contract research to fund its activities. However, before any research can begin, a foundation of facilities, services and installations (research infrastructure) is needed. This is especially so for laboratory-based research, but is true for all research. Buildings, electricity, internet, library, ethics committees, animal houses, computers and high tech facilities are all needed to carry out research. These are not supplied by most project grants or contract research funds. Indeed, ARC and NHMRC grants are conditional upon organisations providing infrastructure.

The need to provide infrastructure funding on top of project funding is recognised by the federal Department of Education, Science and Technology (DEST) providing roughly forty-four cents of infrastructure funding for every dollar of grant funding received by an institution. This figure is arrived at by a fairly complex algorithm that takes into account research higher degree completions, publication output, and total grant income. Traditionally, infrastructure has flowed pretty much in direct proportion to the level of grant income; expensive research generally requires expensive infrastructure. Peer review processes for determining the quality of research are carried out when the project grant is assessed so there is little need to go through the exercise again when awarding infrastructure funding.

The federal government, however, has recently moved towards implementing an exercise that will do just this. The Research Quality Framework (RQF) will examine the quality and impact of university research institutions around the country. The RQF assessment will rank universities, departments and disciplines nationally and then distribute a substantial amount of the current infrastructure funding according to the rankings. The exercise has universities around the country frantically trying to position themselves for the day of judgment.

When a similar approach, the Research Assessment Exercise (RAE), was introduced in the UK over twenty years ago, it had a dramatic effect on the higher degree education sector. In order to achieve high RAE scores, universities poached top researchers and shut down non-performing departments. Research deemed to be low impact was terminated and funds funnelled into high-performing areas. Small departments, schools of archaeology, music, the classics, disciplines where quality and impact were difficult to measure were closed—sacrificed to an improved quality of research in the remaining areas.

Minister Julie Bishop has formed a small task force to advise her on whether and how such an exercise should be implemented in Australia. The concept has an air of déjà vu given that UK Chancellor of the Exchequer, Gordon Brown, recently announced plans to scrap the RAE. Why would Australia adopt an exercise the British are scrapping? Minister Bishop and her adviser, Sir Gareth Roberts, claim that the exercise was successful in the UK but has run its course; that we need to implement it to gain the same improvement in research outcomes. All the evidence, however, suggests that Australian research already performs at an extremely high level relative to the funding it receives. It is estimated that Australia spends 1.6% of its GDP on research and development,



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compared to 1.9% in the U.K. and 2.7% in the USA. Yet we have a vibrant and productive research community as exemplified by recent Nobel Prize winners Robin Warren and Barry Marshall.

In the US, research infrastructure flows directly and logically with peer-reviewed research grants. Australia's medical research institutes all wrestle with the question of research infrastructure since they do not receive the same DEST allocation as universities. This is because they are not higher degree institutions. Most state governments, recognising the importance of medical research institutes, provide some infrastructure and the federal government has recently agreed to provide additional infrastructure following lobbying by the medical research institutes.

Contract research, carried out by universities on behalf of industry, is required to have an overhead that reflects the cost of infrastructure associated with research. The University of Melbourne recommends that this be at least forty-five per cent of the total contract cost. Many industry parties balk at providing such additional funds and the actual sum negotiated for infrastructure is often much less. As a result universities often find themselves subsidising contract research. Some medical research institutes use a multiplier of three on all staff appointments related to contract research. Thus, if two scientists at \$50,000 each are employed on a \$150,000 project, their salaries would be multiplied by three, adding \$200,000 of infrastructure funding to the \$150,000 project. This is probably closer to the real cost of doing the research when the infrastructure is measured proportionally to the activities of the whole institute.

Once institutions have infrastructure funds, they can use them for all sorts of discretionary purposes. The cynics among us often wonder why the university administration seems to have such lavish accommodation and offices, and why the senior mandarins of the university appear to be wining and dining every other evening, while researchers in the trenches work in sub-standard facilities, decaying buildings and receive poor salaries. This is probably a harsh view, but not unique as revealed by the cartoon pictured above.

Researchers get passionate about infrastructure. They feel that they earn the income and should receive it. Institutions are at pains to defend the infrastructure they provide and to illustrate just how much it costs them to run an institution. There is an ongoing tension that is magnified the more research income a researcher has attracted. Heads of departments and deans are often involved in small battles with their researchers to try and protect infrastructure to fund departments. At the same time, they are duty bound to provide appropriate infrastructure for high performing researchers. These issues, and many more, will come to a head if the federal government implements the RQF. Institutions will be left receiving large amounts of money based on a complex league table assessment in which much of the detail may be lost and the direct relationship between research excellence at an individual level and infrastructure payment will be blurred. How institutions choose to distribute this infrastructure will become a matter of intense interest to all engaged in research.

THE BIO21 INSTITUTE

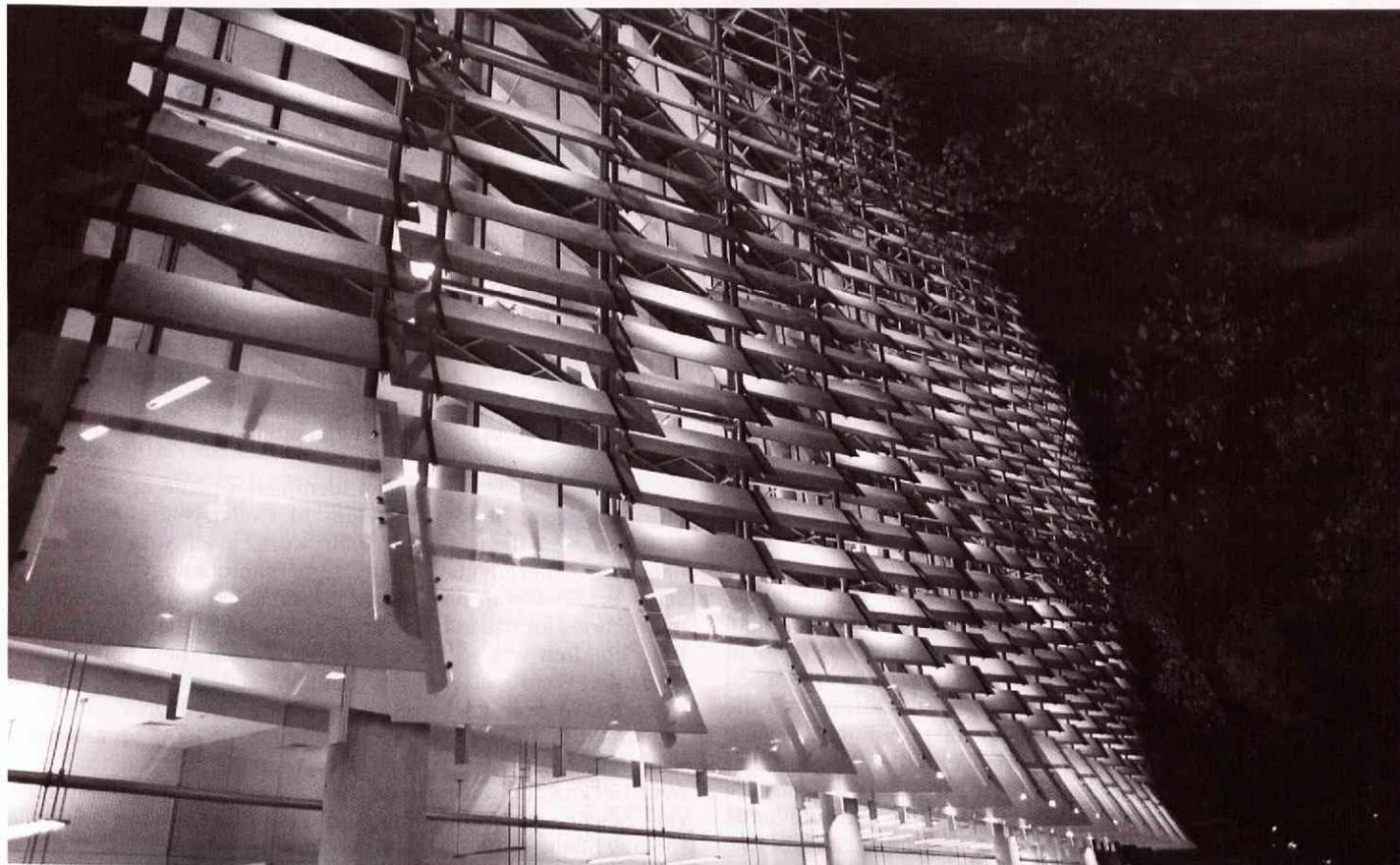
Interdisciplinary collaboration maximises results

BY PROFESSOR DICK WETTENHALL

Director, Bio21 Institute

AND DR PETER GOSS

Business Development Manager and Head, Bio-Innovation Centre, Bio21



The Bio21 Institute building, on Flemington Road in Parkville, has received a number of prestigious design awards. *Photo Michael Silver*

THE BIO21 INSTITUTE, which recently celebrated its first birthday, is currently the home of 300 university and industry research and support staff, with numbers due to increase to 450 following the completion of the new laboratories early next year. The institute building, with its state-of-the-art laboratories and spectacular atrium and auditorium, has received a number of prestigious design awards. This stunning facility and the institute's innovative approach to multidisciplinary biomedical and environmental research and commercialisation differentiate it from other recent university ventures in the region.

The institute has substantial conference facilities that have already been used to host several national and international meetings. A research transfer facility enables researchers from around Australia and overseas to work and interact with the Bio21 community, thereby accessing new technologies, state-of-the-art equipment and expertise not otherwise available to them. The institute's business incubator provides longer term accommodation for staff developing the commercialisation of the institute's discoveries.

While five faculties participate in the institute, the Faculty of Medicine, Dentistry and Health Sciences is a lead participant, with substantial involvement from the Department of Biochemistry and Molecular Biology and the School of Dental Science, as well as individual research groups from the departments of

pathology, pharmacology, medicine (Royal Melbourne and St Vincent's), physiology and medical biology (Walter and Eliza Hall Institute), and the Murdoch Childrens, Howard Florey and Peter MacCallum research institutes. The faculty is also a partner in the institute's high resolution electron microscopy and nanotechnology centre, which specifically caters for bio-imaging analyses and the development of nanomaterials-based therapeutics and biosensors.

In biomedical areas, the institute's focus is on the discovery of new candidate therapeutic targets and molecular diagnostics, particularly in medical and dental microbiology, neurodegenerative disease and autoimmunity. Critical mass is further developed through interdisciplinary collaborations between institute-based research groups and strategic partnerships with the Royal Melbourne Hospital and wider Bio21 community.

The institute's safe environment program is founded on its two ARC Centres for Environmental Adaptation Research (CESAR) and Free Radical Chemistry Research, led by CESAR director Phil Batterham, federation fellow Ary Hoffmann, and chemistry professor Carl Schiesser. CESAR researchers have teamed up with Bio21 Institute biomolecular scientists to apply biomolecular and chemical approaches to investigate the causes of pesticide resistance, to design and synthesise new pesticides and to use the epidemiological characteristics of natural insect populations as indicators of environmental chemical pollutants

and climatic variations. The free radical chemistry researchers have teamed with biochemists and pharmacologists to investigate the effects of atmospheric free radicals on the integrity of biological tissues exposed to the environment, particularly the nitrate radicals which trigger chemical transformations in the night-time atmosphere.



Andrew Hill (R) with (L-R) PhD students Laura Vella, Sen Han, Rebecca Nisbet, Chris Harrison and research assistant Robyn Sharples. Photo Michael Silver

Developing the institute's young talent

At the heart of the Bio21 Institute is its young talent, particularly its research students, postdoctoral fellows and emerging research group leaders. The community of resident research students and postdoctorals, whose numbers will exceed 200 when the institute is at full strength, work closely with the institute's executive to deliver a range of programs designed to add value to their research experience and extra-curricular career development activities. Importantly, while students are enrolled through their home disciplines, the institute adds value to their research through the provision of state-of-the-art platform technologies and the fostering of interdisciplinary collaborations and career development activities. Student satisfaction with their new environment is reflected in the recent comment by one member that: 'The Bio21 Institute houses such a bewildering array of equipment and facilities that, suddenly, the main obstacle holding back research and innovation is your own imagination'.

Research students and postdoctoral fellows from neighbouring university-affiliated institutions also benefit from the institute's programs by joining the institute's associations for research students and postdoctoral fellows. They can also use the visitors' laboratories and interact with institute-based industry scientists and entrepreneurs.

Outstanding young research group leaders include Andrew Hill, Trevor Lithgow and Matt Perugini, who have received a number of prestigious national and international awards for their recent research achievements. Andrew Hill, together with Colin Masters and colleagues, has also been awarded a major NHMRC program grant to investigate the neurotoxicity and pathogenesis of mad-cow-causing prion, Alzheimer's and Parkinson's diseases. Andrew's award winning work aims to understand the processes by which the normal prion protein folds into the abnormal infectious form, giving rise to protein plaques characteristic of neurodegenerative disorders. From a public health perspective, a priority for Andrew's team is the development of rapid and sensitive diagnostic tests for prion infection and other plaque formation. Related investigations of the molecular indicators of Alzheimer's disease and the role

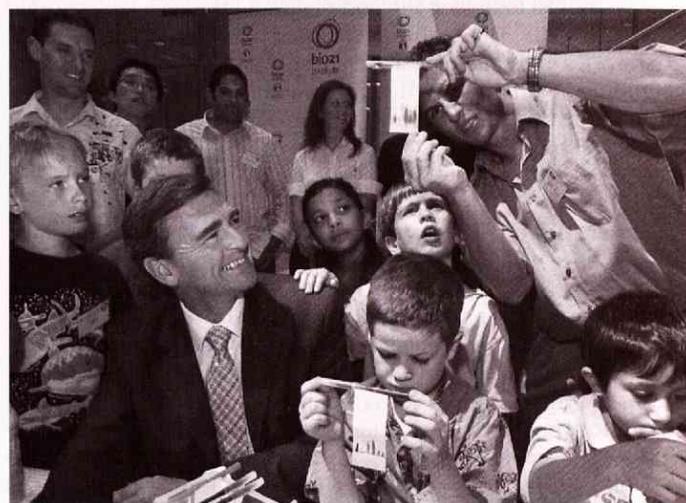
of metal ions in the formation of neurotoxic protein plaques will intensify following the relocation of the Masters' medicinal chemistry group to the institute in July 2006.

Training future leaders of industry

The institute's most tangible extra-curricular offerings for its young scientists have been career development programs that target careers in corporate biotechnology. These are attractive to many of the institute's young scientists who are excited by business opportunities generated by the ongoing biotechnology revolution and who are uncertain whether an academic career is best for them.

The programs focus on intellectual property, management, business development and entrepreneurship and are designed to foster the skills required for success in the corporate sector. A major activity in 2005 was the formation of a team of postgraduate students and postdoctorals associated with the Bio21 Institute. Under the mentorship of the institute's business development manager, Dr Peter Goss, they took time out from their research pursuits to learn about business and entrepreneurship. The team entered the Biotechnology Entrepreneur Program competition, sponsored by the Victorian State Government and developed by Young Achievement Australia. During the six month program, the team established a company called Scyance, sold shares to raise capital and produced and marketed a real product of their choice.

The Scyance business plan identified a niche in the market for introducing biology to eight- to twelve-year-olds. Biology Madness was the result of their work, a kit with twenty-six hands-on experiments ranging from microbiology to forensic science, genetics to physiology. A DVD and a fun comic book of instructions for use at home or school ensured that the response from children was as strong as it was from their parents and teachers. Where else can a budding scientist learn how to extract DNA from kiwi fruit (or even their own DNA), dissolve the shell of an egg to see the membrane, or blow up a balloon using yeast? By the end of the program, the company had sold over 150 kits and was in tense three-way negotiations for a trade sale. Science and Nature bought out the company and now sells Biology Madness in Australia and internationally (www.scyance.com). The company's imaginative product, impressive business plan and extraordinary performance in the market place was recognised at the final awards evening in February 2006, where Scyance took the bulk of the glory, walking away with Company of the Year and three other awards.



Victorian Minister for Innovation John Brumby (front left) with members of the Scyance team (top, from left, Ben Atcliffe, Robert Lieu, David De Souza, Sarah Henneby and Tim Silk) showing school children at the Biotechnology Entrepreneur Awards presentation components of their prize winning Biology Madness science education kit. Photo Peter Casamento

THE BIONIC EAR INSTITUTE

Taking medical bionics to new frontiers

BY ASSOCIATE PROFESSOR ROBERT K SHEPHERD

Acting Director, Bionic Ear Institute

Wagstaff Fellow in Otolaryngology, Royal Victorian Eye & Ear Hospital

Associate Professor, Department of Otolaryngology, University of Melbourne

THE BIONIC EAR Institute (BEI) is celebrating its twentieth birthday and with this celebration comes significant change. It is an independent medical research institute that grew out of the pioneering research which resulted in the development of the multichannel cochlear implant (bionic ear) by Professor Graeme Clark and a multidisciplinary team from the university's Department of Otolaryngology at the Royal Victorian Eye & Ear Hospital (RVEEH).

Until the clinical application of these devices in the 1980s, deaf people, who received little benefit from conventional hearing aids, were restricted to use of signing or lip reading to aid communication. Today, more than 80,000 individuals worldwide have received the Australian-made bionic ear manufactured by Cochlear Ltd. Many of these patients are young children (these devices are now routinely implanted in children as young as twelve months old), who thereby receive important speech cues during a critical period in their language development.



Rob Shepherd

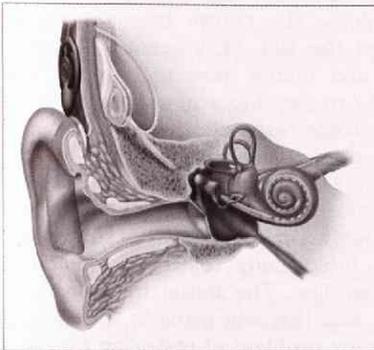
In contributing to the development of the bionic ear, institute staff have developed expertise in a range of areas: the rejection of surgical implants; speech science; interfacing electrodes with nerves; principles of safe electrical stimulation; and the rescuing and re-sprouting of damaged nerves. Through this expertise, the institute has become a leader in the practical application of biotechnology and nanotechnology in medicine. Our research interests are expanding into a new frontier of medical bionics and we are collaborating with new research partners to begin research on nerve and spinal cord repair, the detection and control of epileptic seizures, and infection control for implantable devices.

Improved bionic ears

The bionic ear is designed to electrically stimulate residual auditory nerve cells in the inner ear. Following deafness, however, these neurones gradually degenerate. Techniques aimed at rescuing these neurones from degeneration will result in improved clinical performance for bionic ear recipients. The death of auditory neurones is connected to a specific intracellular signalling pathway; we aim to identify this pathway so that a targeted therapy can be developed. We are currently developing strategies to rescue these neurones by combining exogenous neurotrophins with a bionic ear. In addition to neurone rescue, we are investigating the plastic reorganisation that occurs within the auditory brain following deafness and its response to a bionic ear. This work is intended to provide important fundamental knowledge of brain function and address key clinical questions concerning critical periods and cross modal plasticity.

In collaboration with colleagues from the ARC funded Australian Centre for Electromaterials Science at Wollongong and Monash universities, we are working towards the development of advanced electrode arrays using a polymer coating that delivers neurotrophins to the inner ear in order to both preserve auditory neurones and to encourage them to grow towards the electrode. By electrically triggering a polymer doped with a neurotrophin, the protein is released on demand in quantities required to support auditory neurones. The group has also shown that neurones will grow onto the polymer, suggesting the possibility of providing a scaffold for regenerating nerves to grow directly onto the electrode.

There has recently been an international re-evaluation of the risks of meningitis with cochlear implants. The bionic ear developed at the University of Melbourne and the BEI is regarded as the safest in the world, due largely to a commitment to safety. In collaboration with colleagues from the university Department of Microbiology and Immunology we are investigating how *Streptococcus pneumoniae*, the bacterium most often responsible for meningitis, spreads from the ear to the brain, whether the infection risk is affected by the presence of a bionic ear, and evaluating immunological, implant design and surgical techniques that may eliminate this risk.



Schematic diagram illustrating the external and internal components of a contemporary multichannel cochlear implant (bionic ear).
Photo courtesy of Cochlear Ltd

A contemporary bionic ear consists of two main components: a fully implantable receiver-stimulator that is implanted in the mastoid, behind the pinna, and is connected to an electrode array inserted into the cochlea; and an external speech processor worn behind the ear like a conventional hearing aid. The speech processor must be programmed for each patient by an audiologist. Differences arise because electrodes are not always in the same position relative to the surviving nerves and neural survival is variable. The clinician determines the lowest and maximum current for each of the twenty-one electrodes in order to determine the softest and loudest sounds that will be heard. Once programmed, implantees typically use their bionic ear throughout their waking life, many with phones and even MP3 players. Most children with a bionic ear attend mainstream schools with varying levels of additional support.

We are committed to working with the university Department of Otolaryngology and the CRC for Cochlear Implant and Hearing Aid Innovation to develop a new generation of bionic ears and expand our hearing sciences research towards improved understanding of language development in children, improved speech processing strategies for bionic ears and hearing aids, and a greater knowledge of auditory processing within the brain.

Auditory brainstem implants (ABIs) are designed to provide sound information to people who have extensive auditory nerve damage (preventing them gaining benefit from a bionic ear) by stimulating sites within the auditory brainstem. In collaboration with surgeons from the RVEEH and engineers from La Trobe University, physiologists at the BEI are using simultaneous multi-channel recording techniques to investigate new stimulating electrodes and speech processing strategies for ABIs that take into account the complex nature of the neural architecture in the auditory brainstem and the fine timing of neural firing crucial for the processing of frequency.

Institute engineers and clinicians are also undertaking the development and evaluation of a new speech processing strategy which more closely replicates the patterns of neural activity present in the auditory nerve to sound and aims to improve the performance of the bionic ear, especially in noisy surroundings. In collaboration with Department of Otolaryngology and RVEEH clinicians, a pilot study is underway in implant subjects to evaluate the effectiveness of this strategy.

Using mathematical modelling and engineering principles we are gaining new insight into the behaviour of neural systems in the presence of different types of stimuli. Adaptive learning techniques train neural systems to recognise temporal patterns of neural activity. This approach captures information about neural spike timing that is missed in existing techniques. The development of a reliable method that is fast and robust to noise will have wide application in many areas of speech recognition.

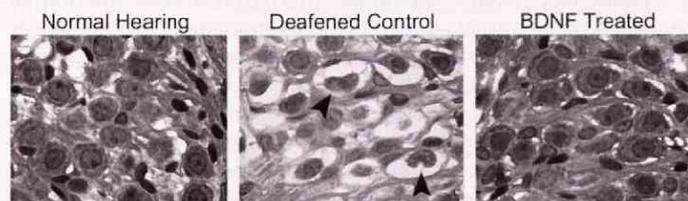
An increasing number of bionic ear users have residual hearing in the non-implanted ear. Many continue to wear a hearing aid in this ear after implantation despite poorer speech perception in that ear. Collaborative study with the Department of Otolaryngology is investigating the effect on speech perception of using a hearing aid in conjunction with a bionic ear (bimodal hearing). Results show that the major benefit of bimodal hearing arises from improved perception of the low frequency components in speech, raising the possibility of improved speech processing for these subjects.

Auditory physiology and perception

A fundamental understanding of the physiological mechanisms underlying the auditory pathway is key to future improvements in the bionic ear. For example, we are conducting studies on the response properties of auditory nerve fibres in order to categorise the effects of deafness and neurotrophin treatment on neural activity evoked via a cochlear implant.

Extracellular and intracellular recording techniques have been used to examine how different cell types within the auditory pathway code key features of speech. Results suggest that certain cell types maintain precise pitch coding in the presence of noise while others maintain accurate phase-locking. These insights will be used by engineers to derive improved speech processing strategies for bionic ear users. Recordings from other brainstem structures have revealed a population of neurones that respond to amplitude modulated (AM) signals with responses that are locked to the modulation frequency. These cells are in effect 'demodulating' AM stimuli. Again, this may be important in processing human speech.

Finally, we are using these electrophysiological data in order



Photomicrographs of auditory neurones—the target nerves for a bionic ear. Chronic neurotrophin treatment (brain derived neurotrophic factor) protects auditory nerves from the degeneration evident in deafened control cochleas (arrows).

to improve our understanding of how neural pathways in the brain process sound. We have modelled the cochlear nucleus, which is the first stage of processing in the central auditory pathway. Understanding how speech and other sounds are processed using this model will allow us to simulate how neural activity generated via a bionic ear is represented at this early level of auditory processing.

New applications in medical bionics

We are collaborating with polymer chemists from Wollongong and Monash universities, and with scientists from St Vincent's Hospital Department of Neurology, to construct three-dimensional scaffolds for spinal cord repair. Made from a polymer that can be loaded with neurotrophins, its controlled release of this protein will enhance the growth of damaged nerve fibres, while the scaffold guides the regrowth to bridge the damaged area of the spinal cord. To date, corticospinal tract neurones have been successfully grown on the polymer; we are now determining the type and amount of neurotrophin and the electrical stimulus needed to generate optimal neural growth.

By applying techniques developed for the bionic ear, institute engineers are modelling electrical activity in circuits of neurones within the spinal cord that control the timing of the contraction and relaxation of muscles in the limbs. Pattern generator circuits enable the performance of complex coordinated movements, such as walking. These circuits are potential targets for functional electrical stimulation when an injury to the spinal cord stops input from the brain. In addition, the group is developing algorithms that will provide a reliable and robust prediction of the onset of epileptic seizures based on clinical EEG data. The team is developing the theory, design and decision support software required to interpret the EEG data. The Department of Neurology, St Vincent's Hospital, and the university Department of Electrical Engineering are our collaborators on this project.

A recent Victorian Government science, technology and innovation initiative was to establish the Victorian Centre for Medical Bionics (VicBionics). The centre brings together the collaborative expertise of the BEI, St Vincent's Hospital, CSIRO's molecular sciences and textile fibre technology and PolyNovo Biomaterials Pty Ltd to develop a new generation of bionic technology. It will undertake research, development and commercialisation focused on the following applications:

Nerve & spinal cord repair This program aims to develop nerve conduits that deliver nutrients, biological stimulation and regrowth guidance simultaneously. On completion of the repair, the conduit will degrade to biologically tolerated molecules leaving the repaired nerve bundles. The initial focus will be on peripheral nerve damage, and this will provide the critical foundation for the more complex problem of restoring function after spinal cord injury.

Control of drug-resistant epilepsy Epilepsy is a serious neurodegenerative disorder that affects approximately 1.5 per cent of the world's population. This program will apply signal processing technology developed for the bionic ear in order to detect the onset of an epileptic seizure and suppress it via controlled electrical stimulation of the lesion site in the brain.

Infection control This program will focus on improved anti-microbial agents for infection control in implantable devices such as cardiac pacemakers, shunts and bionic ears. Initial experiments will involve specialised polymers being impregnated with anti-microbial agents and tested for efficacy with an experimental model developed at the institute.

The BEI provides a multidisciplinary research environment in the emerging field of medical bionics. It works closely with key research partners to improve the bionic ear and develop new neural prostheses for individuals with neurological disorders. Affiliated with the University of Melbourne, the institute provides exciting opportunities for research-based postgraduate study.

Email: enquiries@bionicear.org Web: www.bionicear.org

AMS ADVENTURES

Adolescent Psychiatry

BY AI-LAN NGUYEN

*It is sometimes more important to know
what kind of person has an illness than
what kind of illness a person has.*

William Osler

PSYCHIATRY: A SOMETIMES frightening yet fascinating area of medicine where mood, psychosis and personality are intimately related, and where the boundaries between normality and mental illness are often tenuous.

For me, the Advanced Medical Science (AMS) year marked a wonderful opportunity to finally get some clinical exposure in a field that interested me. Thus, I chose to go to ORYGEN, a public mental health service for young people living in western metropolitan Melbourne. The centre embodies a dynamic team of psychiatrists, psychologists, social workers and occupational therapists who collaborate to provide early assessment and treatment of young people experiencing severe psychiatric problems. I happily shadowed staff on home visits and interviews, where I met adolescents with schizophrenia, bipolar disorder, major depressive disorder, anorexia nervosa and all sorts of personality disorders.

My project was to investigate the relationship between Borderline Personality Disorder (BPD) and psychotic symptoms. BPD is a commonly diagnosed disorder defined by unstable relationships, mood and identity problems as well as impulsive and self-harming behaviour. Although psychotic-like symptoms have been reported in BPD, there has been debate over whether these symptoms are different from those in psychotic and mood disorders. This therefore raises the problem of accurate diagnosis and hence appropriate treatment of adolescents when they first present.

The transition from university student to research student was swift, and adaptation was the key to survival. Armed with a few semesters of Health, Mind and Behaviour in one hand and a DSM-IV manual in the other, I felt akin to Dorothy after she'd been whisked by the tornado to the land of Oz, except there was no yellow brick road to guide me, only a maze with infinite paths and constant detours, and the occasional tornado that spiralled me towards deadlines. After surviving the frantic rush of ethics approval and then the ominous task of recruitment, where we managed to recruit over a hundred participants during a three-month period, data analysis and thesis write-up passed like a storm around me. I emerged shaky and slightly dazed, but somewhat comforted by the knowledge that much had been gained.

Interestingly, the study showed that hallucinations and delusions occurred just as frequently in BPD as they do in psychotic disorders, which makes the distinction between these disorders more difficult than previously thought. Whilst I was happy that my findings had made a small contribution to an important clinical domain, the most important result was, inevitably, that related to my personal development.

The research year fosters independence, initiative and efficiency. I learnt to track potential participants through daily collaboration with clinicians and fellow researchers; and initial anxieties about consenting patients were quickly banished as we gained experience and confidence.

My reward was the unique opportunity to witness firsthand the impact of mental health on adolescents and young adults—I will carry their stories with me for many years.

A Year of Research in Microsurgery

BY PRAVEEN KUMAR

*We shall not cease from exploration
And the end of all our exploring
Will be to arrive where we started
And know the place for the first time.*

TS Eliot, 'Little Gidding'

HUNDREDS OF YEARS after the birth of modern surgery, despite continuing investigation, much of the body remains a mystery. The AMS year is a chance for medical students to become a small part of this search for answers and understanding. For my part, I undertook to do research investigating blood vessel behaviour with the angiogenesis team at the Bernard O'Brien Institute of Microsurgery (BOBIM).

Though the role of the vasculature is known, the minutiae of vessel function are still to be elucidated. The key to angiogenesis [Gr. *angeion*, vessel; *genesis*, creation] or neovascularisation, the growth of new vessels from the extant vascular tree, is thought to lie in these minutiae. Exactly how the interaction of endothelial cells, pericytes, factors and co-factors and manifold receptors results in a vessel forming remains unclear. A particular group of enzymes, the nitric oxide synthases, are thought to be of particular importance. My project at BOBIM involved looking at the influence of inducible nitric oxide synthase (iNOS) on the angiogenic machinery.

The project looked at three different murine models of angiogenesis: an incisional wound, an excisional wound and a synthetic growth chamber. The chambers were made of silicon, filled with a synthetic matrix and loaded with a growth factor, either fibroblast growth factor 2 (FGF 2) or vascular endothelial growth factor (VEGF).

For the first time I had to work in many different areas of medical science, engaging in everything from the surgical implantation of synthetic growth chambers to immunohistochemical analysis of vessel growth.

At the end of the year, based on my research, further characterisation of the part that iNOS plays in the long, complicated angiogenic cascade was made possible. It would seem, from the results and work done before, that iNOS lies downstream of VEGF and upstream of FGF 2 in the neovascularisation pathway. The ultimate aim of the work is to develop stable vessels in chambers that may be used in surgical procedures. Being able to grow surgically useable vessels has vast implications. Any implanted or repaired tissue could be custom-fitted with its own blood supply rather than having to harvest vessels from elsewhere in the body. Organ transplants, skin and tissue grafts, even vascular and cardiac procedures would benefit greatly from such technology.

I have learnt so much and feel honoured to have been in close proximity to some of the finest minds in the country. The AMS year allowed me to glimpse what may lie ahead and to appreciate the work of those who have gone before. Most importantly, perhaps, I have gained a greater understanding of the ground breaking work being undertaken in Australia and overseas by surgeons, physicians, researchers and students to map the farthest, and the most minute, regions of the human body.

I am grateful to the angiogenesis team and BOBIM for giving me the opportunity to undertake this project.

Just the Beginning

BY SING-PEY CHOW

EVERYONE APPROACHES THEIR AMS year with their own priorities. I had two: to undertake a clinically-based project in a research area that interested me and to do it both overseas and at home in Australia. In hindsight, I am amazed at how this initially vague idea developed into the amazing personal and professional experience of my AMS year. I certainly would never have predicted the extent of its flow-on effects two years after submitting my AMS thesis.

I completed my AMS year jointly at the Harvard Medical School-affiliated Joslin Diabetes Center in Boston, USA, and the Centre for Eye Research Australia (now ERA) in Melbourne during 2003-04.

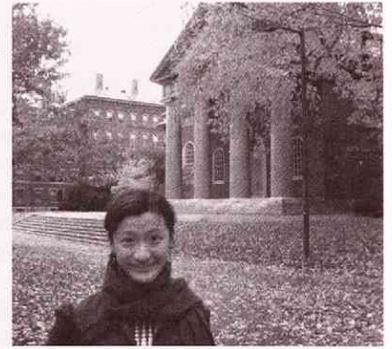
Under the preceptorship of Associate Professor Lloyd Paul Aiello in Boston, I learnt about their unique Joslin Vision Network (JVN) telemedicine initiative. The JVN aims to prevent blindness by enabling comprehensive eye evaluation to isolated communities and had thus far been validated for diabetic eye disease. Hence, it seemed a good idea to evaluate the JVN's ability to detect ocular conditions other than diabetic retinopathy (termed 'non-DR conditions') in patients with diabetes and this was my research focus. My work was eventually presented at the Association for Research in Vision and Ophthalmology (ARVO) conference in Florida, an American Telemedicine Association meeting in Colorado, and is currently in press.

When I returned home to Melbourne I did further work, under the preceptorship of Associate Professor Jill Keefe and Dr Alex Harper at ERA, evaluating the local prevalence of non-DR conditions in patients with diabetes and its detection through screening programs. ERA and the team at Joslin and Harvard

are now collaborating to further this research, which has important implications for preventing blindness in Australia.

Personally, my AMS year was also full of adventure and discovery. I was invited to my first Thanksgiving, complete with turkey, hot apple cider and pumpkin pie; experienced a white Christmas (while visiting New York to gaze at the enormous Rockefeller Center Christmas tree); learnt to convert Fahrenheit to Celcius (so I could ring home with weather reports of 'it's *minus* fifteen tonight!'); watched an Ivy League rowing regatta, and lined up for student-rush tickets to musicals trying their luck before an off-Broadway stint. I also attended the Asian Pacific American Medical Students' Association conference in Washington DC, where I listened to White House staffers outline their health care vision on Capitol Hill, learned about issues affecting my American peers and made great friendships over late-night Mexican food.

Overall, the value students derive from the AMS experience greatly depends on how much they are willing to put in. It is an invaluable opportunity to gain an understanding of what makes good research while cultivating your curiosity in areas outside the standard medical curriculum. My AMS year enriched my life and equipped me with skills that will help me to become a more well-rounded and evidence-based clinician.



Sing-Pey Chow at Harvard in the autumn

AMSA EXECUTIVE IN MELBOURNE

BY TERESA COSGRIFF

National President, AMSA

THE AUSTRALIAN MEDICAL Students' Association (AMSA) works to connect, inform and represent all medical students in Australia. Our diverse membership encompasses students from the fifteen medical schools nationwide. The AMSA national executive is based in Melbourne in 2006 which has provided a great opportunity to collaborate with our own medical school and the many enthusiastic and hard working students at the university.

Our first national council in February saw representatives from all medical schools together for the first of three meetings for the year. Much productive discussion, debate and policy making took place—the two biggest issues being the employment of medical students in hospitals and the hike in full-fee-paying places in medicine.

It was reported that, due to workforce shortages, some hospitals have seen fit to employ final year medical students to undertake the role of interns. There have been reports that these students have been left to undertake tasks without adequate supervision and for which they are unqualified, posing many risks to both students and patients.

AMSA is also wary of the pressure that increased student numbers place on the teaching system. We are concerned that our already stretched teaching hospitals may not be able to continue to deliver the best standard of education as they are faced with larger student cohorts. The full impact of these increases, however, may not be felt until 2007 when the first students from the three new medical schools start their clinical training. AMSA



Teresa Cosgriff is a fourth year MB BS student doing her AMS research in emergency medicine at the Western Hospital.

will continue to monitor the standard of clinical teaching our members are receiving.

There was overwhelming support for AMSA's stance on full-fee places. AMSA believes the COAG proposal to lift the cap on full-fee places is not an equitable way to recruit students to the profession, nor that it values aptitude over bank balance. Full fee medical places are prohibitive for all but the wealthiest Australians, thus decreasing the diversity of our student population and future doctors. Students struggle with these hefty fees and massive debts are incurred through the Fee-HELP scheme and other loans. It is our belief that debt concerns are likely to drive these students into higher paying specialties and private practice. Areas like general practice will miss out as will the public system. The aim of increasing the number of students is to have

more doctors working in areas of need, but it is short sighted to imagine that doctors graduating with enormous debts will be enticed into such areas.

Communications are central to our role of connecting and informing medical students around the nation and we have revamped our website as a useful resource for our members. (www.amsa.org.au)

We will also produce two *Panacea* magazines this year, the *Intern and Resident Guide* and our monthly e-newsletter. Our newest publication is the free AMSA calendar, featuring photos from the medical school societies and all the important AMSA dates such as the annual convention, developing world conference and leadership development seminar.

2005 PETER G JONES ELECTIVE ESSAYS

Each year, final year students are invited to submit essays describing their elective experiences, for which up to three students are awarded Peter G Jones elective essay prizes. In 2005 seventeen essays were submitted and prizes were awarded to Nicholas Potter for 'Hospital Rwanda',

to Emma Boddy for 'When You Hear Hooves' and to Molly Williams for 'Mmmm...Checklisty'. The full text of these essays can be found at: www.medicine.unimelb.edu.au/umms/publications/chiron/index.html The following pieces have been selected for publication.

Fahrenheit Minus 30

Mayo Clinic, Rochester, Minnesota

BY OM NARAYAN

THE PITCHED BATTLE between mother nature and the stubborn inhabitants of the American northwest formed the backdrop to my month long elective at the Mayo Clinic. Tonnes of salt were sprinkled onto icy roads, untold quantities of heating oil were burnt and gallons of hot apple cider downed to keep the cogs of civilisation turning. In retrospect, I doubt I spent more than twenty minutes of my elective outdoors. What, in God's name, I wondered, had possessed the Mayo brothers to establish their world-renowned group practice here? Even more bewildering were the legions of patients from across the globe who made the pilgrimage to the clinic year after year. The answers became clear during my elective.

As my interests lay in cardiology, I sought a clerkship with the cardiovascular diseases department. Comprising 125 consultant cardiologists caring for 59,000 patients annually, it was an order of magnitude larger than any similar service I had encountered. I was allocated to the heart rhythm services division, which was in turn composed of pacemaker and catheter ablation services.

Over the four weeks, I became part of the electrophysiology consulting team as a sub-intern—attending ward rounds, clerking referrals to the unit, discussing medical management with interns and registrars, attending meetings and theatre. Before arriving I had visions of sixteen-hour days, sleepless nights and a comprehensively bruised ego. Thankfully, this never eventuated and there were never more than six or seven patients under rhythm services at any one time. This allowed me to observe procedures including catheter ablation of several arrhythmias and implantable defibrillator insertion.

At Mayo, doctors are encouraged to take an hour to complete the initial patient assessment. This, more than anything, I thought, explained the high levels of patient and doctor satisfaction. Secondly, everything at the clinic seemed cutting edge—from the medical technologies to the coffee machines. I remember being struck by the sheer complexity of the catheter ablation procedures at the start of my elective. These doctors would manipulate catheters to millimetre specific points around the endocardial surface simply by tracking the different electrical waveforms at each site. Each procedure could take up to six to eight hours as each arrhythmia was painstakingly mapped, tested, ablated and re-tested. I compared it to playing pin the tail on the donkey with a metre-long flexible pin and a constantly moving donkey. During my first week at Mayo, I found myself nodding off during these procedures. As I gained a better understanding of the rationale behind the testing protocols and arrhythmias in general, my attention span progressively lengthened. Very few of the techniques I witnessed were actually in textbooks—most had only been developed in the last ten years. Indeed, many were still experimental and were only performed in large specialist centres like Mayo. For instance, pulmonary vein isolation as a

curative procedure for atrial fibrillation had been first described in 2000. By 2004 nearly 530 pulmonary vein isolation procedures had been performed at Mayo. Such rapid deployment of new technologies to clinical medicine was something I had expected, but was still amazed by.

I remember one patient particularly well. She was a six-year-old from Wisconsin who had the rare misfortune to suffer recurrent bouts of ventricular tachycardia. Her arrhythmia was refractory to medical anti-arrhythmic therapy, leaving her imprisoned in the town emergency department, receiving defibrillator shocks three to four times a week. On three previous occasions, catheter ablation of the circuit causing her arrhythmia had been attempted, with no success. Worse, scarring left from these procedures complicated any further attempt to ablate the arrhythmia. Her parents brought her to Mayo for one last attempt at ablating the arrhythmia. The presence of scar tissue had created islands around which re-entry circuits had formed. So each circuit was patiently ablated. Eighteen hours after starting, at four in the morning, the procedure was finally completed. The doctor performing the procedure (who had not eaten since the procedure started) told me later, 'If that was my little girl, I wouldn't want her living in an ER'.

Whilst such heroics and commitment to patients were part of the ethos at Mayo, it was clear that they were not for free. This was a little difficult to digest, coming from a system where health care is heavily subsidised by taxpayers. I was not used to formulating management based on whether the patient could afford a drug or procedure. Surprisingly, many doctors were sceptical about the benefits of a state-subsidised system. They felt that such a system, whilst providing health care for everyone, would remove the incentive for doctors to provide better, more effective (and expensive) therapies. The Mayo Clinic, in particular, owes its existence to wealthy benefactors, artists and politicians who bequeathed vast sums and spread its name far and wide. During my stay a minor sheik from Saudi Arabia flew into Rochester in his Lear jet to receive ongoing treatment for his ailing heart. It is hard to imagine such brand name loyalty in Melbourne hospitals.

After an intense four weeks learning about the latest in arrhythmia management, I left hoping to someday return to the Mayo Clinic for further training. Every doctor I spoke to described a 'certain something' about the clinic which set it apart from most other institutions. This x-factor some described as the teamwork mentality and spirit of commitment to patient care. Some of the more cynical suggested that the biting cold and sheer remoteness of Rochester selected a certain breed of doctor. When I asked my mentor about living in Rochester, he suggested I start a family should I ever decide to work at Mayo permanently. Either that or take up hunting reindeer.

Indigenous Health Electives

The following excerpts are from Julie Teague's essay about her elective at Mossman Hospital in Far North Queensland and from Emma Goeman's essay about her elective in the remote community of Kalkaringi, 450 kilometres southwest of Katherine in the Northern Territory.

Julie Teague

FOUR WEEKS INTO my elective a young man was brought in. He fell from a balcony. It was new year's eve. I was put in charge of his airway and, although he was talking a little, I was scared. Not just because we knew there was something wrong with his back (he couldn't feel his legs) and I had to support his neck while we rolled him for the doctor to examine his back, but because I became his line of communication. I was the only one close enough to understand the muffled sounds under the mask and became the person who explained things to him as they happened. I watched the slow process of discovery as a physically healthy man unexpectedly found himself a paraplegic.

Was I okay to put in a catheter while the doctor and the on-call radiologist were explaining to his father what the x-rays showed? 'Yes.'

One of the nurses took over his airway, and while I scrubbed, another set up a trolley for me: 7½ gloves, chlorhexidine prep, forceps, gauze, drape, anaesthetic gel, 10ml syringe, 10ml saline. Saline? No, water, I'm sure it's supposed to be water. Calm. Think. Saline crystallises, but is water osmotically bad? I'm sure it's water, well, if I'm wrong, the water will just diffuse out, the balloon deflates and the catheter will come out. So they have to put in another one later, big deal, but if I put in saline and it crystallises that could be problematic.

'Cathy, I think I need water, not saline.'

'Okay, I wasn't sure.'

'Neither am I. Anyone else sure?' There was a general shrug of shoulders. Should I wait until the doctor gets back?

'Where's the catheter?'

'I wasn't sure what size you wanted.'

The number twenty-four pops into my head, or was it fourteen? I look at the numbers on the back of the three options Liz is holding out for me to see, and my mind goes blank.

'I can't remember the number, but if you turn them over I can eyeball the size through the plastic.' Too small, both the other two are similar sizes, and look okay, I look at the size of his urethra, pick the smaller of the two figuring that even if it's not as rigid as the other, as long as I aspirate urine I can't do any damage with a smaller one.

I talk to Dave slowly and clearly, knowing that he probably can't hear me. Prep, circular motion centre to edges, my left hand is my 'dirty' hand, drape, gel, move the nozzle to squirt, slowly, hold up, wait a while, my hand is shaking a little. Kidney dish, over the drape the end of the catheter sits there while I push the other end, it goes easily up to the hilt. No urine. Deep breath. I pick up the gel syringe, aspirate the end, urine comes back easily, and when I take the syringe off it continues to drip into the dish. I breathe a sigh of relief, blow up the balloon, remove the drape, attach the end, tape it to his leg and cover him up again with blankets. I feel like I'm tucking a child into bed. We let his dad in now. I'm back at the airway, he's looking better and talking more easily.

'Why can't I go to Cairns?'

'They don't have a spinal unit.' I listen to myself tell him that the rehabilitation will be better in a place where they have a dedicated spinal team. The helicopter has arrived now. He starts to cry, so does his dad. They tell each other they love each other. I walk out with the crowd who put him in the chopper, and watch as they take off. It's now almost 4am. Happy new year.

Emma Goeman

DESPITE BEING WARMLY welcomed by all the clinic staff, no amount of knowledge had prepared me for the emotional experience of remoteness. For the first few days my isolation was palpable. This soon passed, but it was a timely reminder not to underestimate the implications of a professional decision to work in remote areas.

I was involved in seeing patients as they came through the door—history taking, physical examination, investigations and treatment—under close and supportive supervision. By virtue of my gender, I saw very few male patients, but otherwise saw a broad spectrum of illnesses and injuries. The clinic was open from 8am until 4:30pm, but someone was on call twenty-four hours for emergencies, and I was lucky enough to do many nights and weekends on call with Amanda, one of the remote RNs. At times our definition of an emergency clashed with that of our patients: 'Sister, I have chest pain', turned out to be a boil, and a purported cardio-respiratory arrest was in fact a child with fever. We did, however, have one hectic day in which we instigated aerial evacuations of three patients: a man with end stage renal failure, a little boy with suspected sepsis, and a young male victim of assault with suspected head and facial injuries. Those intense clinical experiences will certainly stay with me and remind me of the luxuries of studying and working in a tertiary referral hospital.

One of the most successful health initiatives was led by an inspiring young health worker at the clinic. Rates of paediatric iron deficiency anaemia in the area are historically quite high, due to poor diet and endemic parasite infections. This woman worked tirelessly, identifying all cases and initiating treatment, but also educating parents and the community about 'good' iron foods and 'bad' iron foods, and presenting complex medical information in stories and pictures for people to remember. The rates of anaemia have dropped staggeringly.

The more I learnt and experienced of life and medicine in Kalkaringi, the harder it became to conceive of remedies for the prevailing milieu of poverty, overcrowding, underemployment and violence I observed. Money and infrastructure are necessary, but not sufficient. Primary health care must play second fiddle to preventive medicine and public health. Most importantly, I think, health care and advice must come from members of the community itself, as well as from non-Indigenous health professionals.



Mossman Hospital

Electives in Africa

The following excerpts are from Nick Potter's essay about his elective at the Hôpital de Gahini in Umatra Province, Rwanda, a small hospital serving a large area and administered jointly by the Rwandan Health Ministry and the Anglican Church of Rwanda; Emma Boddy's essay about her time at the Tumaini Clinic in Kibera, a slum in Nairobi, Kenya; and from Mpho Selemogo, who returned to Botswana, his home country, for his elective.

Nick Potter

LIKE MOST HOSPITALS in the region, the caseload is predominantly infectious disease, but also trauma and obstetric difficulties. Malaria is common and HIV/AIDS, as in all sub-Saharan African nations, is endemic.

My time was predominantly spent on the paediatric ward. I managed the common infections that are easily diagnosed and treated—malaria, typhoid and other infectious diarrhoeas—swiftly 'handpassing' any more complicated decisions to the senior doctors.

The doctors have knowledge and wisdom to pass on that can be difficult to gain in a western hospital. Dominant amongst these is the management of infectious diseases that simply do not occur, or do not cause the same complications, in Australia—one case of cerebral malaria is almost a sentinel event at home, but a fairly slow morning in Rwanda. Other traps for young players are the local rarities, such as podoconiosis (elephantiasis due to volcanic soils, not parasites, and treated with twenty-cent sandals rather than agricultural grade antimicrobials).

It's hard not to see medicine as an economics-driven industry in such an environment. If patients cannot afford to pay for their treatment, they go without. Families will split one dose of anti-malarials between four children (and re-present one week later with a relapse in two). Yet the maximum benefit is extracted from every health dollar—fishing line soaked in ethanol for skin sutures and categorically blunt scalpel blades boiled and resold for kitchen use. Improvisation is the better part of efficiency and \$28.60 for prescription medications seems astronomical.

Emma Boddy

IN KIBERA, MEDICINE is about the twenty-one-year-old male who presented with urethral discharge. It is about the chance to counsel him and educate him on sexually transmitted infections. It is about the opportunity to suggest HIV/AIDS testing and him taking up the opportunity. It is about him going home that night knowing whether he is infected, how to protect himself from becoming infected, and how to protect others from becoming infected through him. Ultimately, it is about saving his life and the lives of others through the power of knowledge.

In Kibera, medicine is about expecting the unexpected. It is about the five-year-old boy who presents in severe respiratory distress and tells you he feels like he is drowning. It is about examining him and finding bilateral basal crepitations, a respiratory rate of ninety breaths per minute and sacral oedema. It is about sending him to the hospital for further investigation of the causes of this cardiac failure. It is about thinking rheumatic heart disease, then finding on investigation that heart valves are all competent and patent, and instead identifying a pericardial effusion; likely diagnosis TB. It is about starting him on a TB treatment regime, and then draining the effusion and discovering it is a pericardial empyema, 'likely diagnosis unknown'. It is about doing the Medline search for advice on how to manage this boy, and finding only three case studies on pericardial empyema, ever. It is about hearing hooves and thinking zebras.

Mpho G Selemogo

BY THE END of the first week I had already begun to wonder how one, particularly a doctor, survives all the circumstances which are potentially so frustrating. I noticed that there were doctors who seemed to do well despite the circumstances. These doctors were not just strong on the science but also the art of medicine. They were the effective communicators; those who, with their voice and supportive little acts, could give comfort, impart hope, show empathy and demonstrate a genuine interest in their patients' shattered lives and thereby provide healing for the ailments and the anxieties of their patients and their relatives. They would always seem to find a bright side and paint it for their patients to see.

The realisation that communication skills could be at the heart of doctoring was personally an invaluable lesson. This is despite the efforts of all those who, throughout my medical education, tried to hammer this into my head.

It also occurred to me just how effective preventive medicine could be in avoiding this amount of human suffering. Simple 'low tech' things, done 'upstream' in the public health domain will be the only cost effective way to bring about the greatest relief to Botswana's health crisis. This is something that could easily be forgotten as the frustration over the shortage of antiretrovirals preoccupies minds. It is because of this that the previously unattractive option of a career in epidemiology and public health is now, for me, a serious possible postgraduate occupation.



Postscript from Mpho Selemogo. After a rewarding six years in Australia I am finally back home. I started work as an intern in January 2006, in Nyangabgwe Referral Hospital, Francistown, about 450km from my home village. Thankfully, I am not alone. I am with three Botswana classmates from the class of 2005 (pictured, clockwise from top left: Biki Maphane, Mpho Selemogo, Kenneth Maswabi and Noma Raphaka). We are four of only eight interns in the hospital.

As I write this, the country is battling an almost nationwide diarrhoea outbreak which is affecting children under the age of five years. It has been going on for four weeks now. The paediatric ward, where I am currently doing a ten-week rotation, is more than twice its capacity which means more work for our already hard-pressed small team. The key issue here is the same as the HIV/AIDS epidemic: prevention.

Being some of just a handful of Botswana doctors in the hospital, we can't wait to welcome the second group of Melbourne University's Botswana graduates into our workforce! Ke a Leboga (thank you).

Mmmm...Checklisty

Wimmera Base Hospital Emergency Department

BY MOLLY WILLIAMS

BY AUGUST, I'M already in the habit of apologising for my elective. I wish I could gush about travel plans and backpacking, but instead I mutter, 'Dette and I are writing a clinical pathway for fracture management in the Horsham hospital emergency department'. There is a brief, uncomfortable pause. Eyes glaze. 'Sorry, honey,' says a friend, 'but that sounds like the most boring thing I ever heard of'. I bow my head in shame.

I suppose I can admit it now. I was pretty excited by the idea of my elective. I adore organising things: I'm a good communicator and a great mediator. And Dette and I get along well: we like to bake and invent new cocktails and make lists. Anyway, everyone in Horsham was lovely when we went there for block five, and what's the harm in hanging out with nice people for five weeks? Plus, we'd be leaving behind something concrete that would help us if we came back as interns.

I know that's controversial, too, but I love the idea of pathways. My one great intern fear is that I will miss something simple but vital, and that this, so easy to avoid, will kill someone. That's what pathways are really for—they're reminders so that inexperienced people don't make dumb mistakes.

That's the first obstacle we meet in Horsham. Because you either love pathways or you hate them. The sardonic emergency registrar's face distorts with loathing.

'Pathways?!' he spits. 'What are they? A waste of my time!'

He waves the carefully constructed stroke pathway (I think it's beautiful), pinched between thumb and forefinger, as if it's a serpent's corpse.

'Cookbook medicine!'

We see quickly that this is not a man to reason with. We back away.

Luckily, our early pain and disillusionment is alleviated when a little intern admits shyly that pathways have saved her life when she's been frozen with terror and alone in the ED at night. Still, we vow to be circumspect in future. No more 'pathways' for us. We are writing a 'checklist' that may, in the fullness of time, become a 'package' or 'bundle'. And whenever we ask for feedback or suggestions, we will do so in the context of home-baked goods.

And then we get the love. Jeremy, the ED NUM, takes a chocolate-chip cookie and says, 'Fractures?' His eyes begin to burn with holy zeal. 'We need a fracture clinic. Our patients wait for six hours. If you can get them to agree to a clinic...' He trails off. But we can see in his wretchedly hopeful eyes just what this would mean to him. Jeremy would worship us as gods if we could do it. So we have to try.

We ask the town GPs to contact us with concerns and suggestions, but they're too insanely busy. So we take a leaf from the drug reps' books and stake them out in the tearoom

SUSPECTED FRACTURE?



Why not try a new FRACTURE CHECKLIST?!

Goodness of communication...
Convenience of a checklist!

with mini-muffins and peanut biscuits. Munching gleefully, they agree that a clinic would be delightful. But they can't staff it. 'We're losing five GPs next month,' says Tim, who is young, cool and already cynical, 'no way will anyone have time to do a clinic'.

Over a gin-and-blood-orange-juice or three, we make a Powerpoint progress update for Alan, our supervisor. Next day, Alan's like a kid at Christmas. 'No-one's ever done one of these for me before!' he says, delighted. Our cult is growing.

We're becoming known round the hospital as 'those pathways girls'. 'Don't say the "P" word,' we beg, 'it's a bundle!' We're not fooling anyone. We run a trial of the checklist with scones and blackberry jam and thick cream. Whenever we see Jeremy in the corridor, he pretends to flee. Each day Shirley, the librarian, finds us a new article to support our program. Random nurses wave to us as we pass. Fitting in is...nice.

Committee meeting. Both surgeons present. This is a miracle you just won't

understand unless you've tried coordinating two men who work on alternate days and so could, hypothetically, be the same person. Tremblingly, we present the pros and cons of each clinic staffing possibility. And we hand around our work: two checklists; a new cast care handout with space for follow-up appointments, and our pride and joy, the reminder posters for the ED—Homer Simpson drooling and saying 'Mmmm...checklisty!', and a fifties housewife, complete with cookbook, exclaiming, 'Why not try a new fracture checklist?'

'Fracture clinic?' barks the loud surgeon. 'Well, if we need one, we need one.' Then it's down to the nitty-gritty of when, who and how we'll get the patients' files pulled. Do they look depressed or impressed? Is Jeremy wiping a tear from his eye? We can't believe it. We've been planning defeat for weeks. And then the ED nurses grin at us, and Jeremy shakes us by the hand, gleeful.

This is what rural medicine is really about. A GP who mumbly greets all his patients by name as he wades through the waiting room to shake your hand. A couple with a colicky baby who remember meeting you in the hospital eight months ago and give you follow-up on the sick elderly neighbour they were visiting then. The triumphant acclaim you're showered with when you get both town surgeons into one committee meeting. Shirley going out of her way to find those articles. And from everyone—the GPs, checkout chicks, the lady who runs the kitchenware store with the beautiful baby-pink stand-up mixer in the window, the nursing staff—'So you'll be back next year, yeah?'

And in a community like that, despite the warbling magpies and the bugs, despite the heat and hayfever, despite the fact that I always said I hated the country...I want to say, yes.

UMMS CONGRATULATES...

Gary Anderson (PhD 1990; Pharmacology)—Research Medal of the Thoracic Society of Australia and New Zealand for outstanding contributions to lung research. **Samuel Berkovic AM (BMedSc 1977, MB BS 1977, MD 1985; Medicine, Austin Health/Northern Health; Epilepsy Research Centre)**—joint recipient of the Zülch Prize from the Max Planck Society and the Gertrud Reemtsma Foundation of Germany for outstanding achievements in basic neurological research; elected to the Australian Academy of Science; awarded a 2005 Curtin Medal for outstanding contribution to Australian medical science. **Ye Chen (MB BS 2004—2006 Victorian Rhodes Scholarship. Graeme Clark AC (Laureate Professor)**—2006 Ian Wark Medal from the Australian Academy of Science. **Mark Dawson (BMedSc 1999, MB BS Hons 1999)**—General Sir John Monash Award to study for a PhD at Cambridge University. **David De Kretser AC (MB BS 1962)**—appointed Governor of Victoria. **Lorraine Dennerstein (MB BS 1970, GDip Psych Med 1981; Office for Gender and Health, Psychiatry)**—World Association of Sexology gold medal for her lifetime research achievements. **Susan Elliott (MB BS 1982, MD 1993)**—appointed Assistant Vice-Chancellor (Teaching, Learning and Equity), University of Melbourne. **Ian Frazer (MD 1988)**—2006 Australian of the Year. **Harriet Gee (MB BS 2005)**—2006 Rhodes Scholarship for Australia-at-Large. **Richard Gilbert (PhD 1996; Medicine, SVH)**—RACP 2005 Eric Susman Prize for his outstanding contribution to new therapies for treating diabetes and kidney disease. **Yona Goldshmit (PhD 2005; Centre for Neuroscience)**—SpinalCure Australian Fellowship for pioneering research into regrowing damaged spinal cord nerves. **Anthony Hannan (Howard Florey Institute)**—British Council Eureka Prize for Inspiring Science for research showing that brain disorders in mice can be affected by environmental factors. **Alicia Jenkins (MB BS 1983, MD 1993; Medicine, SVH)**—Australian Museum Eureka Prize for Research which Replaces the Use of Animals or Animal Products for research using small sections of human artery, rather than rats, to research blood vessel growth. **Graeme Jones (MB BS 1966; School of Rural Health)**—inaugural Victorian Rural Doctors' Award for Outstanding Service to Rural Communities for his commitment to the greater Shepparton community. **Louise Judd (Medicine, RMH/WH)**—awarded the faculty's 2005 CR Roper Fellowship for her research into gastrointestinal cancer. **Jonathan Kalman (MB BS 1983, PhD 1996; Medicine, RMH/WH)**—RACP 2006 Eric Susman Prize for his outstanding contribution to cardiovascular research. **Robert Kemm (PhD 1975; Physiology)**—2005 Universitas 21 Fellowship. **Ruth Lim (MB BS Hons 1997, MMed 2005)**—Fulbright Professional Award to study cardiac disease in type II diabetics at the NYU Medical Centre. **Colin Masters (Pathology)**—joint recipient of the Lennox K Black Prize for scientific excellence in biomedical research. **Frederick Mendelsohn AO (MB BS 1965, PhD 1972, MD 1973; Howard Florey Institute)**—2005 Bethlehem Griffiths Research Foundation Medal for medical research in palliative care or progressive neurological diseases. **Terence O'Brien (MB BS 1988, MD 2000; Medicine, RMH/WH)**—2006 Driefuss-Penry Award from the American Academy of Neurology for outstanding achievements in epilepsy research; Independent Investigator Award from the US-based National Alliance for Research on Schizophrenia and Depression.

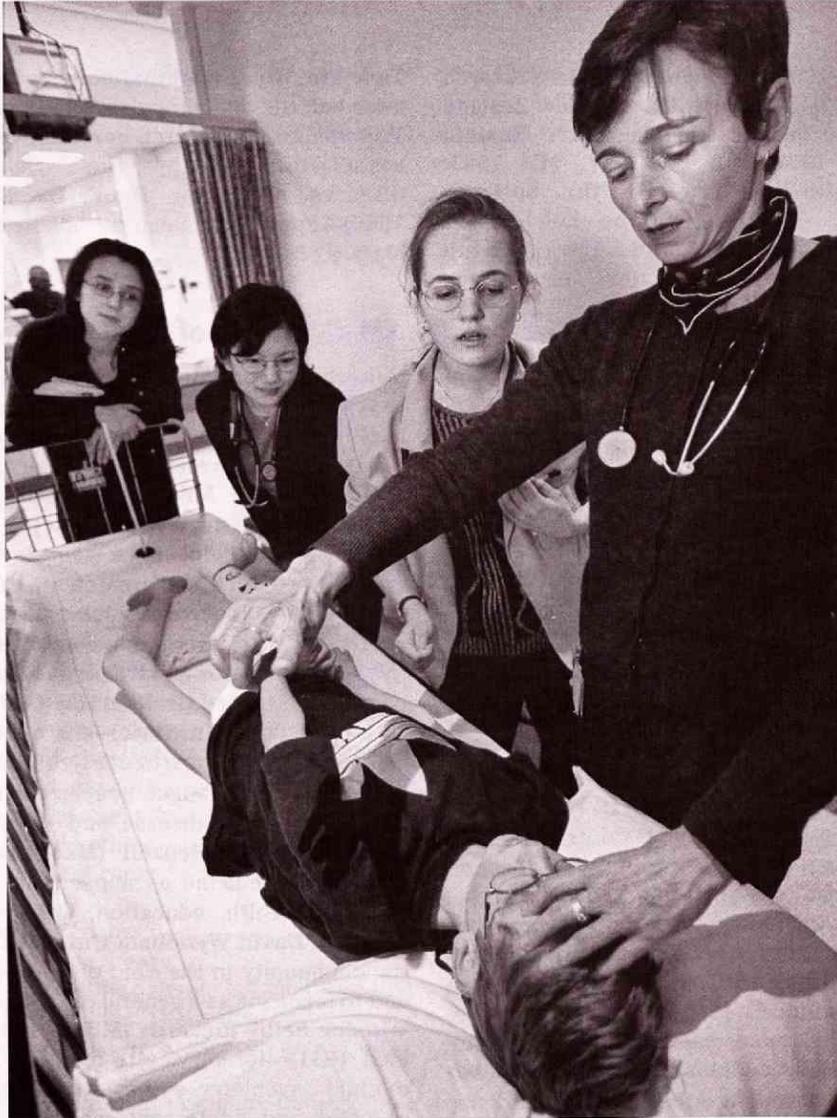
Tien Yin Wong (Ophthalmology; Eye Research Australia)—awarded the university's Woodward Medal in Science and Technology for research in retinal vascular diseases and their associations with the risk of cardiovascular diseases. **Professor Dato' Dr Khalid Yusoff (MB BS 1980)**—appointed Dean of Medicine, Universiti Teknologi Mara (UiTM).

AM (Member of the Order of Australia)

Robert Trevor Anderson (deceased) (MBBS 1966, GDip Psych Med 1973)—for service to psychiatry, to the visually impaired, particularly through the Royal Victorian Institute for the Blind and to veterans and their families. **Samuel Berkovic (BMedSc 1977, MBBS 1977, MD 1985; Medicine, Austin Health/Northern Health; Epilepsy Research Centre)**—for service to medicine as a neurologist, particularly through epilepsy research and treatment. **Geoffrey Ian Bird (MB BS 1958)**—for service to medicine in reconstructive and plastic surgery, and to international relations through the provision of medical services and training for surgical staff in developing countries. **Richard Graham Hay Cotton (PhD 1967, DSc 1982; Howard Florey Institute)**—for service to science through genetic research, particularly through the development of technologies to detect gene mutations that underlie birth defects or cause disease and through efforts to document findings. **Judith Henzell (Macdonald) (MB BS 1951)**—for service to medicine as a paediatrician and as an advocate for child health, education, welfare and disability support services. **David Wyndham Quin (MB BS 1953)**—for service to the community in the field of housing for the disadvantaged, and to medicine as a general practitioner in Papua New Guinea. **Winston Selby Rickards (MB BS 1943, MD 1950, GDip Psych Med 1951)**—for service to medicine, particularly in the field of child psychiatry, and as a contributor to the advancement of child and adolescent mental health at a national and international level.

OAM (Medal of the Order of Australia)

Ida Bell Brodrick (MB BS 1944)—for service to the community through the administration of public health programs, particularly maternal and child health. **Barry N Edwards (MB BS 1965)**—for service to the community, particularly through fundraising for the Leprosy Mission Australia. **Karla Fenton (BMedSc 1954)**—for service to medicine as a practitioner, educator and counsellor in drug and alcohol abuse, sexual trauma and mental health. **Richard C Gutch (MB BS 1953)**—for service to medicine as a general practitioner and executive roles with various medical organisations. **Francis Victor Harder (MB BS 1950)**—for service to the community of the Shepparton district, particularly in adult education and health. **Peter Hardy Smith (MB BS 1954)**—for service to medicine in the field of ophthalmology and through support for professional organisations. **Jonathon Richard Wardill (MB BS 1969)**—for service to medicine in the Northern Territory, and the provision of lifesaving surgery to patients following the 2002 Bali bombings. **Brian W Walklate (MB BS 1952)**—for service to the community of Charlton as a GP, and through community organisations, particularly the Rotary Club of Charlton.



Rachel Skinner (front) training medical students in clinical skills at the Royal Children's Hospital. Photo Michael Silver

Honorary Clinical Academic Staff

AN ESSENTIAL PART of the training of health professionals is clinical training. Graduates need the clinical skills to be able to provide patient care, albeit under supervision, upon graduation. Clinical skills are most effectively taught, in the context of patients, through an apprenticeship model of teaching. The contribution of health professionals to this training is enormous and essential, as the task is well beyond the capacity of faculty clinical academic staff. In the School of Medicine, for example, more than seventy-five per cent of clinical teaching is delivered by hospital clinical staff or private practitioners.

Changes in recent years have made clinical teaching very challenging. Financial constraints for hospitals have meant that the length of most patients' stay has reduced and day surgery has expanded. Clinicians are busier with patient care and have less flexibility to teach. Clinical academic staff and full-time hospital staff face increasing competition for research funds and the necessary increased commitment to research also curtails their capacity to teach.

Training the next generation of health professionals is a shared responsibility between education and health. In recognition of this, the federal Department of Health and Ageing provides clinical teaching grants for hospital teaching, but only

for medical students. The department also funds teaching in general practice through the Practice Incentive Payment, made to practices which teach medical students. This funding needs to be extended to other health professionals. It also needs to be increased substantially to adequately reflect the cost of clinical teaching, which has increased significantly with the introduction of new curricula in the faculty.

All of these changes and challenges mean that the faculty relies more than ever on the altruism of its honorary staff. Fortunately, many clinicians see contributing to training the next generation of health professionals as a privilege and an obligation, as well as intellectually and personally rewarding. However, it is also a significant imposition on busy clinicians and we acknowledge that this is often not adequately recognised.

Through the Committee of Deans of Australian Medical Schools, the Dean is working to convince the Department of Health and Ageing to increase payments for clinical teaching and to extend payments to other health professions such as physiotherapy. This year the faculty and the university introduced a new system of honorary clinical academic titles—clinical lecturer, clinical senior lecturer, clinical associate professor and clinical professor—which recognise the professional expertise clinicians bring to their teaching and research contribution to the university.

This year we will examine further ways of acknowledging our honorary clinical academic staff (and indeed our university-employed clinical academic staff). The Associate Dean (Academic Programs) Geoff McColl, in partnership with the Associate Dean (Medicine) Glenn Bowes and heads of other schools in the faculty, will develop a systematic approach for further recognition of clinical teachers.

In the meantime, on behalf of the faculty we wish to assure our honorary clinical teachers that they are highly valued, not only because the present standing of our profession relies on their contribution to patient care, but because they have made the commitment to ensure the future of the profession through training the next generation.

*Professor James Best
Deputy Dean*

Donors to the School of Medicine

THANK YOU TO alumni who have generously supported our teaching and research programs over the last year. Your financial support is greatly valued as it helps the School of Medicine continue to develop and maintain the highest quality medical education and research programs, and provides support for students in financial need. In 2005 alumni donated a total of \$67,778 to the School of Medicine through UMMS membership and through the University Annual Appeal. The funds have contributed to the following programs:

Priority needs supporting our clinical training program—\$43,813 This income will support the production of audiovisual materials for the Introduction to Clinical Medicine

program, a foundation course in clinical skills that takes place in the first two and a half years of the medical curriculum. This program introduces students to medical interviewing and physical examination techniques using a developmental and behavioural approach. Audiovisual materials help to demonstrate core principles to students before they embark on simulated practise, using role play and peer physical examination, and before they interact with real patients.

Helping medical students in financial need—\$15,290 These funds assist medical students who are suffering a disadvantage or who encounter unexpected difficulties, for example students who are suddenly homeless or who encounter a family or medical problem that affects their capacity to continue in part-time employment. Students from low socio-economic backgrounds have received grants to help them relocate to Melbourne or assist them with their transition to university.

Student prizes to encourage outstanding achievement—\$1800 This income helps the school provide student prizes to award and inspire some of our most talented students. Prizes include the Advanced Medical Science Prize (see p35) and the Peter G Jones Elective Essay Prize (see p25).

Supporting medical research—\$6275 Alumni donations help support the faculty's promising young medical researchers working to develop diagnostic strategies and treatments for some of the world's major health problems. Based on this research, the faculty in turn works to develop commercial applications and practical solutions for disease control. The faculty's research underpins our teaching programs, putting students in touch with the latest developments.

Specified by donors—\$600 To support departmental needs.

WE WARMLY ACKNOWLEDGE and thank all UMMS members who contributed to School of Medicine initiatives in 2005. We list here those members who donated \$100 or more to teaching, research and student programs in the School of Medicine in 2005, and who gave their permission for this acknowledgment. These donations were made through UMMS memberships and the university's Annual Appeal. We also thank those UMMS members who contributed to broader programs and initiatives within the school, but whose names are not included here.

Bill Adam, Adrienne I Anderson, James A Angus, Deana H Ashton, Mandy Baric, Ronald M Barry, John Bartlett, Ian Beasley, Virginia R Billson, Robert J Bond, Liz Boyd, Neridah A Brinkley, Jennifer M Brown, DSB Brownbill, Peter D Brukner, Greg Buist, David C Burke, Peter F Burke, James M Butler, David J Butterfield, Jack Cade, Peter E Campbell, Stephen A Cantor, Elizabeth A Carew-Reid, Bernard J Carroll, Anne D Cass, Simon Ceber, Robert Chan, Catherine L Cherry, Min L Chong, Arthur Clark, Anthony A Coates, Howard Connor, David M Conroy, Terence I Cook, Keith S Crowley, Marie E Dalziel, June Danks, James V De Crespigny, Lachlan J De Crespigny, Christopher F Dibden, Michael G Dobson, Brendan J Dooley, John T Dowling, James R Downie, Barry J Dowty, Douglas M Druitt, Roslyn M Drummond, Gwynne E Duigan, David F Eckel, James E Elder, Susan L Elliott, Joseph Epstein, Hamish P Ewing, Harold Fabrikant, Leslie Fisher, Donald W Fleming, Julia A Fleming, Derm Foster, Joc R Forsyth, Voala Furlanos, George Freed, Dick Galbraith, Alexe Gale, James M Gardiner, Allan S Garfield, Janice E Garland, Giuseppe Garra, Maxwell B Gayner, Douglas M Gee, Gwendolyn L Gilbert, Harindra D Goonatillake, Barbara D Goss, Leeanne E Grigg, James S Guest, Ian D Gust, Danielle Haller, John E Hammond, William T Han, William S Hare, Suzanne M Harrison, Roger F Haskett,

Maxwell E Haverfield, Margaret M Henderson, Robert Herrmann, John T Herrin, Bob Hill, David B Hipgrave, Robert J Hjorth, Fred Hocking, Boon H Hong, William Hsu, Roland F Hunt, Howard D Irish, Rebecca K Iseli, Kate Jackson, Rodney Jacobs, Frank C Jones, Allan M Kalus, Jamie A Kearsley, Tony Keeble, Laurence A Kellam, Warren A Kemp, David J Kerr, Geoff Kerr, David J Kidman, Barry King, Paul R Kitchen, Henryk Kranz, Gabriel A Kune, Sze W Kwong, Richard G Larkins, Henry A Larwill, Hok C Lau, Andrew P Lawrence, Keith B Layton, Kwok C Leung, John Levin, David A Lindsay, Gail Littlejohn, Lance L Liu, Katherine E Lubbe, Margaret D Lush, Peter N McDougall, Heather McKenzie, Richard I McMullin, Ruth P McNair, Leslie Markman, Allan Mawdsley, Kathleen M McBeth, Gabriele Medley, Mary E Meldrum, Les Mendel, John W Middleton, Vicki L Miezis, Anna C Miller, Jim Milne, Gary J Morgan, Peter T Morley, Christopher J Moss, John G Mullett, Ken Muirden, Bob Newnham, Nick Niteckis, Margaret M O'Brien, Fred Owies, Mark A Paine, Ronald W Parker, John W Parry, John Pawsey, John S Penington, David G Penington, Justin S Peters, Peter D Phelan, Michael C Poon, Shirley Prager, Desmond A Prentice, Dulcie G Rayment, Marilyn A Rees, Penny Roberts-Thomson, Paul Rosenberg, Annette M Rowe, John P Royle, Barbara Sawyer, John J Scally, Max Schnapp, Malcolm E Scott, Warren R Seager, James A Shaw, Michael A Shembrey, Michael P Shoobridge, Kenneth A Sikaris, John H Silver, Mark S Skinner, David M Smallwood, Edward D Smith, Bryan R Speed, Don Stewart, Michael J Stewart, Bernice F Stratford, Bernie Sweet, Ian K Symington, Greg Taggart, Rosalind F Terry, Karin Tiedemann, George H Tippett, Stephen A Tobin, David Torii, Peter W Trembath, Nicholas M Trost, Cedric S Vear, Janette M Vincent, Ben M Wadham, David J Warburton, Richard A Ward, John B Webb, Morris J Williams, Simon J Williams, Charles W Wilson, Simon D Woods, Robert L Yewers, Neville York, Katherine C Yu, James J Yun, Rob Ziffer.

OCCASIONAL ADDRESS Conferring of degrees ceremony

3 December 2005

BY PROFESSOR SAM BERKOVIC AM

Department of Medicine, Austin Health/Northern Health

FIRST, LET ME congratulate you on your wonderful achievement. You are graduating from the leading university in Australia, from perhaps the most challenging course, and you are embarking on a noble career whose purpose is to help, heal and comfort your fellow man. You have studied long and hard, grappled with the exploding fund of knowledge in the biomedical sciences and are now graduating to take on the challenge of further learning as junior doctors in the exciting, at times confusing, and rapidly changing world of medicine.

Second, let me congratulate and pay tribute to the parents, siblings, partners and spouses who are here today with, justifiably, broad smiles and a sense of pride.

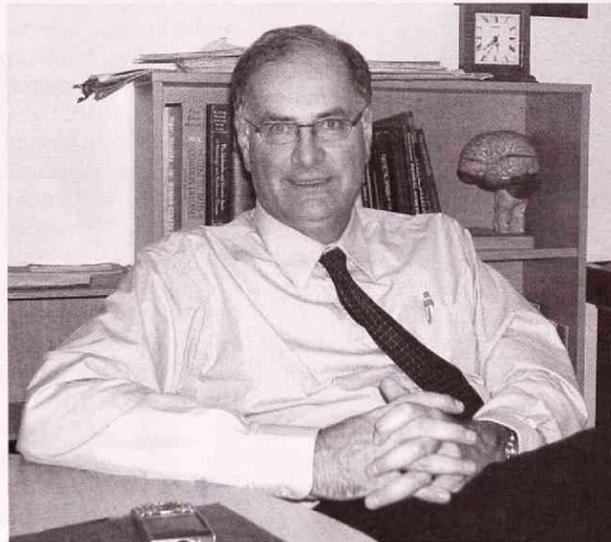
Third, I want to acknowledge and congratulate the overseas students and their families. Internationalisation is an important part of the university's direction. Just as you gain by studying here, the university grows stronger by having an international presence. The university is particularly proud of the strong presence of students from our neighbourhood of South-East Asia. We are also delighted to have the first group of medical students from Botswana graduating today.

As medical students at this university you are the brightest of the bright, you are critical thinkers and have been taught to analyse complex problems. Most of you will now enter internships and then training as junior residents. Unlike other disciplines, where learning after an undergraduate degree is unstructured, open and creative, perhaps by necessity the junior doctor goes into a period of learning and behaviour of applying protocols 'by the book'.

Indeed, in a few months, when you are faced in the emergency department with a child suffocating from an asthma attack or a patient with a potentially fatal cardiac arrhythmia, it is not the time to be reflective or creative. You must diagnose quickly and accurately, and then rapidly administer the treatment required. Hospitals are complex places, rules and protocols abound—many for good reasons—and this can insidiously affect the way you practise, potentially numbing creative thought and ideas.

Remember that while we do need to do things 'by the book', the book itself may be wrong. It is an interesting exercise to look at a textbook of medicine from forty years ago and chuckle at some of the advice given. What we do not know is what textbooks in 2040 will say about our cherished practices and protocols of 2005.

I implore you to keep that creative, questioning and inquisitive spirit in all your professional activities. Those on the podium who are receiving higher research degrees today are excellent examples of this. A few of you will use your medical degree as a springboard for a pure laboratory research career,



Sam Berkovic AM

and many distinguished medical scientists have begun as doctors, for example, Professor Donald Metcalf from the Walter and Eliza Hall Institute, whose lifelong studies have led to understanding of how blood cell formation occurs, with resultant enormous impact on treatment of leukaemia and related diseases.

Others may choose a career in clinical research. That is what I do—combine the clinical practice of neurology with research. I feel very privileged to have had this opportunity through the university. It is an old aphorism that, as

doctors, we must never cease to learn from our patients. Every consultation has the potential to teach us something about disease. For me, there is no greater professional sense of achievement than the 'aha' of listening to a patient analysing their problem and suddenly realising that they have provided me with an insight into a fundamental scientific problem. It is a great feeling, to not only help the patient in front of you, but to take that information to a level that adds to the universal corpus of medical knowledge.

My job allows me to follow up, think and develop ideas. For most busy clinicians, which most of you will become, that is not realistic. However, you can, and should, think creatively and pass the ideas on to others to test. One of the university's new initiatives is a graduate program in clinical research training. We hope this will enhance the ongoing scientific contribution of our young doctors. The clinical observations are there to be made; one is never too young or too junior to make them. Question your senior consultants if you think 'the book' is wrong. Do not ignore clinical observations that do not fit with the conventional wisdom. Protocols and medical dogma have their place, but do not let them stifle your inquisitiveness and creativity.

What better example can there be than Barry Marshall, who recently won the Nobel prize with his colleague Robin Warren. They have transformed the understanding and treatment of peptic ulcer disease. Marshall was a junior doctor, a gastroenterology trainee, not much further along in his career than all of you, when he made his first observations based on Warren's pathological data. They challenged the conventional wisdom and doggedly pursued their ideas to the benefit of many millions of people. Is it not wonderful to think that, amongst the young graduands here today, there will be some who will be responsible for re-writing aspects of the textbooks, and perhaps one or two who will have an impact on mankind as profound as that of Marshall and Warren?

I now wish to turn from the scientific to the human side of being a doctor. There is a remarkable paradox for the doctor in society now. Medical science has endowed us with tremendous power. We can break apart clots that cause heart attacks and strokes, we can rapidly kill microbes that used to kill millions, we can cure some cancers, we can replace failing organs etc. Yet with this level of knowledge and power to heal, the doctor has been somewhat devalued in society. More is spent (wasted) on alternative medicines than real therapies. Paradoxically, despite real medical miracles and science fiction becoming medical fact, quackery is rife.

Historically, the doctor has long held a highly respected place in society. Viewed as learned, wise and trustworthy, with knowledge of the healing arts, the doctor of old relied largely on nature to heal. We can do no better than look at the four principles used by Hippocrates, father of our profession.

- Observe all. Leave nothing to chance, overlook nothing, combine contradictory observations and allow yourself enough time.
- Study the patient rather than the disease. When we walk around the wards, one still hears about 'the case of pulmonary oedema', rather than Mrs Jones with pulmonary oedema, who probably hasn't eaten fresh fruit or vegetables at home for a month and whose main worry is who is looking after her cat.
- Evaluate honestly. Admit when you do not know and when treatment has failed expectations. We deal badly with failure or impotence to treat. The patient just wants to know the truth, which may take time to explain, especially if the news is bad.
- Assist nature. The physician's chief function is to make conditions optimal for natural healing.

The paradox is resolved by the realisation that good doctoring is far more than quick diagnosis by fantastic machinery and rapid cure by new drugs. While we use medicines that really work and our scans and scopes make our diagnoses faster and better, we cannot delegate our listening skills to a robot nor put our counselling skills on an iPod.

The bodies of our patients can be helped more quickly and effectively with medical science, but their minds and souls cannot. We need time to listen, empathise and console, and there is no way to make that go faster.

In closing, I want to remind you of what it means to be a graduate of the University of Melbourne. Wherever your career takes you throughout the world, your university will be known. The university is a wonderful institution, which transcends time and place—the concept of a university encompasses the entire corpus of its teachers, students and graduates, all scholars who make up that body. No matter how substantive they appear, our institutions are only as strong as those who believe in them. The University of Melbourne exists in a geographical sense, of course you only have to look around at the wonderful buildings, but were these structures to disappear, the university would live on through the lives, ideals and scholarship of its teachers and graduates. You will walk out of here today, some never to physically return, but you never leave your university—you are always part of it and it is always a part of you.

Be great doctors, both as inquisitive scientific practitioners and great listeners to your patients. Tend to their bodies, their minds and their souls. Carry the traditions and methods of Hippocrates, supercharged by the scientific knowledge you have gained and will continue to gain.

Take pride in this day, enjoy it—you deserve it—I congratulate you again.

References

Lyons AS, Petrucelli RJ. 'Hippocrates'. In: *Medicine an Illustrated History*. The MacMillan Company of Australia, Artarmon NSW, 1979: 206-217.

Occasional address, by Professor Bruce Singh, the University of Melbourne, 10 Dec 1994.

Apologies to David Hipgrave, PhD (Paediatrics) 2004, who was inadvertently omitted from our graduates list in last year's issue. *Chiron* will no longer publish lists of graduates. Graduations information is available from the university's student services at: www.studentadmin.unimelb.edu.au/graduations/index.html

2005 TOP STUDENT

BERNADETTE YOUNG WAS the top student in the semester twelve MBBS examinations at the University of Melbourne. This was the culmination of a highly successful and productive undergraduate medical (and other) career. Bernadette is one of a small number of medical students who has completed an MB BS, BA. Her BA involved an eclectic mix of subjects, contrasting her medical subjects, including the Victorian novel and Art/Pornography/Blasphemy/Propaganda, the latter stimulating some interesting mealtime conversations at home.

During her medical course Bernadette particularly enjoyed her children's and women's and Horsham surgery rotations. She returned to Horsham for her elective and again during her internship, and I am sure the local residents would be delighted if she returned again for a longer period in the future.

In addition to the interests she developed during her BA, Bernadette has been involved in other activities



Bernadette Young

including the Young Scientists of Australia, an organisation that promotes science to young people, particularly those at high school when decisions are being made regarding careers. She has also worked with the 'heart of philosophy', a Melbourne philosophical interest group which holds fortnightly discussions as well as reading groups and symposia. This fits well with the interests of Toby, her partner, who is currently completing a PhD at Oxford on ethical philosophy. They intend to marry at the end of this year after which Bernadette will work in or around Oxford for a couple of years.

I think it would be difficult to find a better exemplar of the modern doctor than Bernadette, clearly someone with skills that will benefit our community (and perhaps others around the world) for years to come. Congratulations, Bernadette.

Geoff McColl, Clinical Dean,
RMH&WH Clinical School

2005 Dean's Honours List

Semesters One and Two

Sandeep Arunothayaraj
Cengiz Cimenkaya
Harry Georgiou
Angela Keen
Omega Leung
Ji Lie
Ee May Cindy Ong
John Ozcan
Heather Pascoe
Stavroula Papapostolou
Rifly Rafiudeen
Rami Subhi
Li Yuan Nicole Tham
Chang Yang Yew
San San Xu

Semesters Three and Four

Luke Campbell
Jessica Day
James Hillis
Chiew Woon Lim
Vincent Mok
Kanae Nagao
Candice Simpson

Dalveer Singh
Bonnie Swan
David Syfret
Nilmini Wijemunige
Angela Wilson
Nathan Jun Yew Wong
Henry Zhao

Semester Five

Malaka Ameratunga
Kirsty Burn
Teresa Cosgriff
Marissa Ferguson
Jodi Halford
Pungavi Kailainathan
Georgina Lyons
Julia Marshall
Sarah McDonald
Yvonne Ng
Scott Shemer
Hannah Skrzypek
Xueling Tan
Jessie Huey Teng
Sidharth Vemuri
Sarah Wongseelashote
Yiyng Zhao

Semesters Eight and Nine

Britt Christensen
Robert James Commons
Caroline Czarnecki
Jennifer Jiaping Fu
Andrew James Gogos
Matthew Kok-Hao Hong
Michael Kok-Yee Hong
Chun Hin Angus Lee
Emily Littlejohn
Jacky Loa
Li-Sen Sandra Neoh
Mei Lin Tan
Anne Trinh

Semesters Ten and Eleven

Nan-Chuan Janice Cheng
Harriet Gee
Emma Goeman
Emily Keane
Christabel Kelly
Arian Lasocki
Nicholas Mason
Om Narayan
Ching Hui Ng
Anita Pogorzelski

Bernadette White
Katherine Wilson
Bernadette Young

Semester Twelve

Marian Abouzeid
Nishi Susan Alex
Christopher Earle Brooks
Anita Louise Bursell
Katherine Anne Buzzard
Nan-Chuan Janice Cheng
Chia Chin Gan
Devinder Paul Singh Garewal
Melody Choon-Ying Hiew
Anna Jane Holwell
Paul Yanxing Huang
Emily Claire Keane
Arian Lasocki
Kian Seng Jason Lee
Om Narayan
Sarah Dare Nicole
Joseph Michael Johann Paiva
Anita Lee Pogorzelski
Nicholas John Potter
Siang Yong Soh
Elaine Su-Peng Tho
Bernadette Young

2005 School of Medicine Prizes

Australian Medical Association Prize
Harriet Gee

The Clara Myers Prize in Surgical Paediatrics
Clare Looker

Dr Kate Campbell Prize
Bernadette White

Dwight's Prize in Integrated Clinical Studies
Matthew Hong

The Edgar and Mabel Coles Prize
Bernadette Young

The Edgar Rouse Prize
Anita Pogorzelski & Harriet Gee

ESJ King Prize
Sarah Wongseelashote

GA Syme Exhibition
Chance Pistoll, Ella Ellwood-Shoosmith & Cindy Ong

Geoffrey Royal Prize in Clinical Surgery
Matthew Hong

The GlaxoSmithKline Semester 5 Prize
Sarah Wongseelashote

The Harold Attwood Prize in Pathology
Matthew Hong

Hedley F Summons Prize (for Otolaryngology)
Arian Lasocki

Herman Lawrence Prize in Clinical Dermatology
Om Narayan

Howard E Williams Prize
Bernadette Young

Ian Johnston Prize in Reproductive Medicine/Biology
Anita Pogorzelski

The James Stewart Bequest
Sarah Wongseelashote, Scott Shemer & Nicole Campbell

The Jamieson Prize
Bernadette Young

John Adey Prize in Psychiatry
Harriet Gee

John Cade Memorial Medal in Clinical Psychiatry
Anita Pogorzelski & Bernadette Young

The John Fulton Prize
Bernadette Young

The Keith Levi Prize
Bernadette Young

The Max Kohane Prize
Harriet Gee

The Neil Johnson Prize
Michael Hong & Caroline Czarnecki

Novartis Prize
Georgina Ruth Lyons

Prize in Clinical Gynaecology
Christabel Kelly

RACGP Victoria Faculty Prize
Bernadette Young

RANZCOG Women's Health Award
Emma Goeman

RAPP (The Rehabilitation, Aged Care, Palliative Care and Psychiatry of Old Age Prize)
Anita Pogorzelski

RD Wright Summer Research Studentship in Physiology
Bree-Danielle Slusarczyk

The Robert Gartly Healy Prize in Medicine
Bernadette Young

The Robert Gartly Healy Prize in Obstetrics
Prahlad Ho

Robert Yee Prize in Medicine
Jacky Loa

Rowden White Faculty Prize
Bernadette Young

The Royal Australian and New Zealand College of Ophthalmologists' Prize
Ching Hui Ng

Royal Children's Hospital Paediatric Handbook Award
Molly Williams & Michael Bulman

Sir Albert Coates Prize
Sarah Wongseelashote

Sir Alfred Edward Rowden White Prize in Clinical Obstetrics
Prahlad Ho, Ching Hui Ng, Katherine Wilson & Bernadette Young

Smith and Nephew Prize
Devinder Garewal

The Thomas and Elizabeth Ross Scholarship
Jeremy Chin

The Vernon Collins Prize in Paediatrics
Harriet Gee

Victorian Metropolitan Alliance Prize in General Practice
Joseph Paiva

Walter & Eliza Hall Exhibition
Sarah Wongseelashote

UMMS ADVANCED MEDICAL SCIENCE PRIZE 2005

The UMMS Advanced Medical Science Prize is supported by donations from UMMS members. Two prizes of \$500 each are awarded each year. Prizes for 2005 were awarded to Mary Qian and Min Zhao Lee.

Efficacy of the hepatoma screening program at Austin Health

MARY QIAN

Victorian Liver Transplant Unit, Austin Health
Supervisor: Dr Paul Gow

HEPATOCELLULAR CARCINOMA (HCC) is a highly malignant tumour with poor prognosis upon symptomatic presentation. Currently, it is standard practice to screen high-risk patients every six months with ultrasound (US) and α -fetoprotein (AFP) tests. However, there is no definitive evidence that this improves survival, with reports varying between countries. Preliminary studies in Australia suggest that whilst tumours are smaller if detected through screening programs, no difference in mean survival is observed. Regardless, the widespread application of the HCC screening program necessitates evaluation of its validity, including its compliance to screening guidelines and tumour yield.

This study assessed the efficacy of the Austin Hospital in providing an HCC screening service. The nature of lesions identified will be examined; in particular, the features of HCCs found and outcomes of these patients will be documented. Cost-effectiveness of the program will be evaluated to determine its financial viability.

The medical records of patients with at least two AFP measures and two US examinations between October 1998 and August 2004 were reviewed. Those confirmed as participants in the HCC screening program were then retrospectively followed up, with attention to screening dates, abnormalities, secondary investigations and tumours found.

There were 268 patients identified as participants in the HCC screening program. In this group, cirrhosis due to hepatitis C virus (HCV) infection was the most common underlying liver disease (34%). Within the screened population, US and AFP screenings were performed at a median of 6.5 and 4.0 months respectively. Only 13.4% of patients had an average US screening interval over twelve months and were mainly chronic hepatitis B virus (HBV) carriers. Twenty-two (8.2%) patients had HCCs detected through the program, of whom twenty-one had cirrhosis secondary to HBV, HCV or alcohol as their background liver disease. Seventeen of the HCCs (77%) were initially visualised on US. AFP only appears to provide definitive diagnostic value at extremely high levels (above 500 KU/L). Of the twenty-two HCCs, fifteen (68%) were deemed 'potentially curable'. Four renal cell carcinomas were detected as an incidental finding. The cost per potentially curable HCC was calculated to be \$21,469.

At the Austin Hospital, HCC screening is implemented at appropriate intervals. HCCs are being detected at an early stage, making them more amenable to potentially curative therapy. Overall, the cost of the program appears to be justified, comparing favourably with other national cancer screening programs. Furthermore, the study has identified a core group of high-risk patients, with 95% of patients found to have HCC belonging to this group. Thus, cost-effectiveness may be further improved by targeted screening of these patients.

Mapping the functional neuroanatomy of critical thinking and modelling cortical networks in higher cognitive processes

MIN-ZHAO LEE

Centre for Neuroscience, University of Melbourne
Supervisor: Associate Professor Gary Egan

WHILE CRITICAL THINKING (CT) skills are widely deemed to be important, surprisingly little is known about these processes. This project aimed to identify areas of the brain that are implicated in critical thinking processes. Performance of subjects on CT tasks before and after specific training in CT was assessed. Network models of critical thinking were developed and imaging analysis methods evaluated.

Twelve subjects, recruited from students enrolled in a tertiary-level CT course, performed CT tasks while functional magnetic resonance imaging (fMRI) data were acquired. Longitudinal data were collected for subjects early in the semester and following completion of the CT training. Blood oxygen level dependent (BOLD) changes in the signal intensity for these images of their brains were analysed using FEAT, producing 'activation maps' of regions specifically activated during CT. Data were also analysed with independent component analysis (ICA) and artificial neural networks, and functional connectivity measures for CT were estimated.

Subject accuracy on control tasks was significantly higher than accuracy for CT tasks (0.76 vs 0.53 before training, 0.72 vs 0.54 after training). Activation maps for reading of CT

tasks revealed greater activity in brain regions for language processing and advanced reasoning (left superior and inferior parietal lobules, left inferior frontal cortex, Wernicke's area and Broca's area); maps for response to CT tasks revealed greater involvement of areas used in short-term verbal memory and 'Theory of Mind' (left inferior parietal cortex, left inferior frontal cortex, superior cerebellum and left superior medial frontal gyrus).

Further analysis revealed results mostly consistent with the initial analysis, additionally identifying brain networks of functionally connected regions involved in CT. Networks for language processing and point-of-view switching were identified. Results supported the validity of multivariate analysis methods. Analysis using artificial neural networks was moderately successful, and further investigation is proposed, to more conclusively establish their validity and to determine the full potential of such methods.

Data collected before and after specific CT training provide an avenue for future investigation of changes in brain function alongside development of enhanced CT skills, with potential benefits in increasing effectiveness of CT training programs.

REUNIONS

MB BS 1995

Ten Years Reunion



From Yelda Kaya—On 16 April 2005, MB BS 1995 alumni gathered to celebrate the ten years since their graduation. Over forty-five alumni attended a cocktail carousel at No 3 Station Pier, Port Melbourne. The delightful venue was convivial to animated conversation as friends and colleagues relayed stories of their holidays, children and burgeoning practices over drinks and fine food.

MB BS 1980

Twenty-Five Years Reunion

From Rod Sittlington—On 8 October 2005, in the magnificent old dining room of the Australian Club, 120 graduates and partners celebrated the twenty-fifth anniversary of our graduation. The venue was marvellous with high, embossed ceilings, antique sideboards and fireplaces, and it was good to be able to have pre-dinner drinks in one of the anterooms before moving to the main dining room.

There was much discussion about the events of the last twenty-five years and there was general agreement that the physical changes that have beset us were, at most, minimal and that as a group we were in remarkably good shape. Many had made the trek from both interstate and overseas as well as the usual suspects from both rural and metropolitan Victoria.

During the evening, we were entertained by local identity Rod Quantock who meandered through a journey in and around university life and the goings-on in our undergraduate years.

It was a successful occasion in which old friendships were reinvigorated and this was evident by the many people who kicked on for further reminiscing at various establishments around Melbourne. Some members were even seen attempting to relive their youth and gain some sustenance at various tried and proven venues in Lygon Street at around three or four am. (Nothing like a 'sou' or hamburger to give you strength in the wee small hours of a Sunday morning.)

MB BS 1975

Thirty Years Reunion

From Robin Wilson—The year of '75 had a reunion dinner at the Harbour Room, Royal Melbourne Yacht Squadron, St Kilda, on Saturday 19 November 2005. There were 133 people there, with some graduates bringing partners. Four travelled from overseas to join us: Tim Cunningham who lives in Geneva, Sue Kirkwood and Terry Howells from the UK, and Chris Scown from Boston. Many others came from interstate or country Victoria.

There were two highlights of the night. The first was the talk from our guest speaker, Peter Clifton, a 1975 graduate who is research director of human nutrition at CSIRO and co-author of *The CSIRO Total Wellbeing Diet*, which has sold 600,000 copies and been translated into eight languages. Peter made everyone laugh with his life story and then related some fascinating facts about his research and the diet book. The second highlight was the music from the band Bad Medicine, three of whose members—Dave Vivian, Steve McLaughlin and Gordon Wallace—were part of our year group. They played and sang rock from our era to a full dance floor from the end of dinner until closing time. The consensus was that it was an excellent evening and that all are looking forward to meeting again in another five years. We remind alumni to update their contact details at <http://www.unimelb.edu.au/alumni/details.html>

MB BS 1950

Fifty-Five Years Reunion



From Mary Morland—The reunion luncheon celebrating fifty-five years since our graduation in 1950 was held at the Melbourne Club on 22 October 2005.

Forty-two graduates and twenty-six partners (which included two sons) attended. Interstate graduates made the effort to come from Queensland, NSW, Western Australia, ACT and Tasmania. Professor Donald McLean came out from Vancouver, Canada. There were twenty-six apologies.

Drinks were served in the beautiful courtyard of the club, a collection of photographs from previous reunions brought back memories and old friendships were renewed. The photograph of our group gathered on the staircase was taken by Eric Laird's son, Rod, before we all headed into lunch. A DVD was made by Guy Hutchinson of all the photographs taken at the club.

We hope to all meet up again at our next reunion.

Planning a Reunion?

University House is the home of The University Club, at the University of Melbourne, housed in a beautiful Victorian home with gardens to its east and west. Dating back to 1885, University House is the sole survivor of a number of Victorian professorial houses that once lined Professors Walk. Situated within the grounds of the university, University House is located five minutes from the city centre. The club features large and small function rooms, catering from six to 300 guests. Please contact our functions manager on (+61 3) 8344 5254 for a tour and further information.

2006/2007 MB BS REUNIONS

67th Year of 1939

23 March 2006
Graduate House
Frank Kenny
(+61 3) 9596 2522 (ah)

65th year of 1941

15 September 2006
University House
James Guest
(+61 3) 9347 3852 (ah)

64th Year of 1942

1 June 2006
South Yarra Tennis Club
John Tucker
(+61 3) 9815 6500/6538 (ah)

60th year of 1946

13 April 2006
Royal South Yarra Lawn
Tennis Club
John Snell
(+61 3) 9882 6644 (ah)

57th year of 1949

8 November 2006
Kooyong Tennis Club
Noel Cass
(+61 3) 5974 1489 (ah)
noelcass@melbpc.org.au

55th year of 1951

24 November 2006
Long Room, Melbourne
Cricket Club
Brian Entwisle
(+61 3) 9598 1645 (ah)

50th year of 1956

25 November 2006
Melbourne Cricket Ground
Mrs Sue Elger (secretary)
(+61 3) 9594 4397 (b)
sue.elger@phimr.monash
edu.au

45th year of 1961

tbc
Jack Warhaft
jack@vdhp.org.au

40th year of 1966

24–25 November 2006
Long Room, Melbourne
Cricket Club
Stan O'Loughlin
(+61 3) 9510 1402 (ah)
solust@iprimus.com.au

35th year of 1971

November 2006 (tbc)
Windsor Hotel (tbc)
Elizabeth Dax
(+61 3) 9418 1117 (bh)
Michael Wilson
(+61 3) 9848 6611 (bh)

Grant Barham

(+61 3) 9438 5666 (bh)
dr.grant.barham@mediplex.
com.au

25th year of 1981

20 May 2006
RACV Club
Tony Sellars
(+61 3) 9459 1100 (bh)
tsellars@optusnet.com.au

20th year of 1986

7 October 2006
Leonda
Martin Richardson
(+61 3) 9426 4333
surgeons@
orthopaedicsvictoria.com.au

2007 Reunions

60th year of 1947

Late 2007
Melbourne Club
Bernard Neal
(+61 3) 9830 7174 (ah)
bnea5801@bigpond.net.au

45th year of 1962

21 April 2007
University House
George Santoro
(+61 3) 9827 6775

MB BS graduate anniversaries in 2006

5th year of '01
10th year of '96
15th year of '91
20th year of '86
25th year of '81
30th year of '76
35th year of '71
40th year of '66
45th year of '61
50th year of '56
55th year of '51
60th year of '46

If you are organising a reunion, please contact the UMMS office for a list of graduates for your year. To ensure you continue to receive information about reunions, please let us know of address and email changes.

UMMS, School of Medicine, University of Melbourne VIC 3010. Tel (+61 3) 8344 5888, Fax (+61 3) 9347 7084, Email: umms-medicine@unimelb.edu.au Web: <http://www.medicine.unimelb.edu.au/umms/index.html>



MB BS 1941

Sixty-Four Years Reunion

The medical graduates of 1941 at their reunion at University House, on 16 September 2005. Back Row (L to R): Frank de Crespigny, Stewart Moroney, Bill Sloss, Clarice Hetherington, Doug Atkinson, Brian Costello, Michael Benson, Peter Bird. Front Row (L to R): John Billings, David Pitt, Mary Wheeler, James Guest, Alexe Gale, Ida Seward, Sheila Clerehan, Elizabeth Kenny.



MB BS 1942

Sixty-Three Years Reunion

The medical graduates of 1942 at their reunion at University House on 1 June 2005. L-R (back): Len Satchell, John Tucker, Rita Satchell, John Billings, Arthur Schweiger. L-R (front): Lyn Billings, Ian Chenoweth, Ruth Chenoweth, Spot Turnbull (MB BS 1933), Dorothy Schweiger.

Bill Cooper attended the reunion but left before the photograph was taken. Don Frearson also attended the reunion in honour of his late wife, Gwen (Hewitt) Frearson, but is not photographed.



MB BS 1943

Sixty-Two Years Reunion

From Dulcie Rayment—The sixty-two years reunion of the 1943 graduates was held on 16 March 2005, at Leonda, the site of previous get-togethers.

Seventeen of the original graduates attended, with wives and partners. As a group we are wearing very well and a very good time of recollection and reminiscences was had by all. Sandy Ferguson was our MC.

We had one member who had travelled from Queensland and at least two from country Victoria, plus letters and phone calls from New Zealand and the USA.

Harold D Attwood

MD (STAND & MELB), FRCPA,
FRCPATH, FRACP

1928—2005

HAROLD ATTWOOD WAS born in Scotland in 1928 and died in Melbourne on 8 June 2005. His son, Alan Attwood, an *Age* columnist, wrote of Harold's early life:

Harold Attwood, who has died peacefully in Melbourne after a long illness, was a distinguished pathologist, teacher, and medical historian. He was also blessed with a sense of humour and resolute determination not to take himself too seriously—demonstrated in a *Who's Who* entry that, after citing his numerous qualifications and achievements, listed his recreations as 'painting and fencing'. Meaning that he once built a fence and painted it.

He was a Scot who emigrated to Australia with his young family in 1961 and came to love Australian wildlife and landscapes. He grew up in a tenement in Dundee, where his father was a cabinet maker and his mother a former assistant in a fish shop. Despite the modest circumstances—theirs' was one of four flats, sharing one lavatory on a staircase—his parents were generous and supportive. Both Harold and his older brother, Jimmy, went on to have successful academic careers far from the backstreets of Dundee.

Harold was a sickly child. All his earliest memories were of hospitals. He recalled 'a large, white enamel jug suspended high over my head. From the jug came two red rubber tubes that disappeared into my chest: I was being given fluid through my skin because I could not swallow easily.'

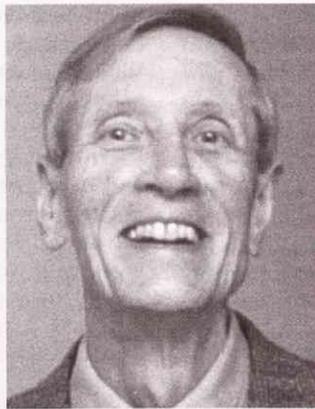
A stricture in his gullet led to regular, crude treatments with a flexible steel rod forced down his throat. The gagging sensation this caused was later eased by ice cream, but seldom anaesthetic. Later he described this as his 'sword-swallowing' period, and felt sorry for his mother, who had to listen to her child's distress, than himself.

The congenital condition and subsequent complications necessitated drastic surgery in his early twenties. These early experiences might have turned others off medicine; for Harold, they inspired both a lifelong interest in the field and an abiding empathy with patients. In his final years, when he was a resident at The Terrace in Camberwell, where he received loving care, it was not unusual for Harold to be found in the room of anyone who was ailing, offering comfort. As a patched-up medical man it would have intrigued him that he lasted almost to his seventy-seventh birthday. The best explanation is that he had a very good heart—in all sorts of ways.

After attending the local primary school he won a bursary to the Morgan Academy, also in Dundee, where he excelled in everything except sport. When forced to play rugby on icy fields he would hand the ball to anyone wanting the ball more than he did. During the Second World War, another successful bursary exam won him a place at St Andrews University.

Harold graduated in medicine from St Andrews in 1951 with the gold medal in medicine. After an intern year in the USA and a post in Dundee he became interested in pathology as a career. Initially this interest was pursued with AC Lendrum at the Dundee Royal Infirmary, as lecturer in pathology, where his research in the area of amniotic fluid embolism as a cause of maternal death led to an MD (St Andrews) in 1957. Harold returned to the USA to work at Yale with Averill A Liebow, then in 1959-61 he was senior pathologist to Pfizer Ltd in Kent, England, where he developed an interest in the spectrum of naturally occurring pathological changes in experimental animals.

In 1961 Harold took up an appointment as assistant director of pathology at the Royal Women's Hospital, Melbourne, with HF Bettinger. His experimental work and further clinical studies in amniotic embolism gained him a Melbourne MD in 1964. At the same time he was appointed as pathologist to the committees set



Harold Attwood

up to monitor perinatal and maternal mortality in Victoria. The reports of these committees had a major influence on clinical improvement in these areas.

He became director of pathology at the Royal Women's Hospital in 1965. In recognition of this appointment, the university appointed him as a senior associate with an annual honorarium of £100. At that time the Austin Hospital was being established as a teaching hospital of the university, after the Commonwealth Government's agreement to fund an increase in the number of medical students. As part of this expansion, the university reached an agreement with the Austin to establish a second chair in pathology based at the hospital, and for the appointee to be head

of the hospital department. Harold applied and was eventually appointed in March 1966.

The department he built over the next ten years was strong, but not strong enough to withstand the politics of Austin Doyle, the professor of medicine. In the mid 1970s, as the university began to introduce a new 'integrated' medical curriculum, the teaching load of pathology was being reduced. This led, in late 1977, to Harold resigning from the position, as he foresaw that the reduction in teaching load would financially cripple the academic side of the hospital department. Around this time his previously inactive tuberculosis became reactivated, requiring surgical intervention. His eventual re-location from the Austin Hospital back to the Parkville campus in February 1980, together with his loyal secretary, Ms Edna Bird, must have come with some sense of relief. With this change he was able to pursue his interests in medical history and curating the pathology and medical history museums. During this time he also devoted himself to the care of his beloved wife, Isobel, who was first diagnosed with breast cancer in 1981 and died late in 1985. He continued to give lectures and tutorials to medical students for many years, and was perhaps best appreciated for his introductory lecture on the value of the autopsy.

His leadership in the field of medical history was of special significance. He co-edited several volumes of papers for the Medical History Unit and, in 1986, brought together the original drawings of William Clift to produce a magnificent facsimile edition of *The Morbid Anatomy of the Human Body* by Matthew Baillie (1799).

He was at various times chairman of the AMA section of medical history, honorary historian to the Royal College of Pathologists of Australasia, co-editor of the medical history Australia newsletter and secretary of the Australian Society of the History of Medicine.

Alan concludes:

Harold retired from the pathology department in 1988. But as a professor emeritus, he remained busy in medical history. Having been a founding member of the Australian Society of the History of Medicine in 1986, he was the society's second president. He also held several senior positions with the Wallaby Club, which provided companionship, good conversation, and walks.

Until illness curtailed his professional life in about 2000, he was an eminent consultant pathologist (expert in the field of mesothelioma) and was a regular visitor to the Victorian Institute of Forensic Medicine.

Many of the doctors who treated him in recent years were former students. They remembered him with admiration and affection. His interests outside medicine ranged from reading to woodworking (a trait handed on from his father), wombats to wine.

Before his wife's untimely death in 1985, Harold and Isobel spent much of their time at a bush block at Launching Place, where they found joy and peace growing plants and feeding kookaburras.

Even in his last months, he could enjoy a glimpse of sky, the smell of a rose, or the sight of birds feeding. He endures in all the books he left behind (many of them annotated) and the countless people he touched in different ways. He was a teacher, a writer, a reader. Above all else, he was a gentleman.

Colin Masters

Harold joined the editorial board of Chiron in 1987 and began editing the Books section in 1991. During this time, and under his editorship from 1995 to the end of 1997, the journal benefited greatly from his broad cultural interests and infectious enthusiasm. He is still missed. (ed)

John Lawrence Bignell

MB BS 1940, GRAD DIP OPHTH 1947,
BA 1985, FRACS, FRCS, FACS

1917—2005

AFTER GRADUATING MB BS, John Bignell spent the war years with the navy, and studied ophthalmology upon his return to Australia. He returned to England for some years where he worked at Moorfield Eye Hospital before settling back in Australia. During his long career in ophthalmology he restored sight to many people both in Australia and abroad. His interests in aviation and yachting may have contributed to his motivation in studying for a BA, majoring in geography, later in his life.

The editors are grateful for the assistance of John Bignell's widow, Dorothy, in composing this short tribute

Theodore S Ceraolo

BA (NYU) 1949, MB BS 1956, FACS, FAAOS

1925—2005

THEODORE (TED) CERAOLO travelled to Australia from New York City in 1951 to study medicine at the University of Melbourne. Prior to this he completed his premedical training at New York University, Manhattan, graduating with a BA in 1949. While there he met his future wife, Alice Ferrara, a secondary education major.

Ted grew up in New York City where, at the age of eleven, he was introduced to the art of fencing under the tutelage of an olympic coach at the Boys' Club of New York. This was the beginning of what would become a lifelong interest, but his ability to compete in the sport abruptly ended following a serious injury sustained in a fall during a sabre fencing competition. This left him with a permanent weakness and muscle atrophy in his right lower leg, with reduced push-off of the right ankle.

He turned his attention to medicine and chose to study in Australia. He was attracted to the University of Melbourne, which he considered the premier medical school, with Professor Sir Macfarlane Burnet on the staff.

In 1951, Ted bid a tearful goodbye to his fiancée, Alice, and his family. After he had successfully completed two years of medical school and corresponded with Alice for two years, Ted asked her to join him. She set sail on the six-week voyage



Theodore Ceraolo

from New York to London, then Italy, the Suez Canal, Sri Lanka and finally Perth, Adelaide and Port Melbourne. While Ted studied medicine, Alice taught in secondary girls' schools for four years. Ted and Alice were married in Melbourne at the Sacred Heart Church in 1953.

In 1956 Ted graduated in the top ten of his MB BS class. He and Alice then returned to the United States, sailing across the Pacific, through Panama, up the Atlantic coast to Boston and New York. Ted completed a four-year residency in orthopaedic surgery in New York City. He maintained a solo practice in New Jersey for approximately twenty-five years.

After retiring in 1986, Ted and Alice moved to New Mexico where he taught fencing at New Mexico State University. In 1988 he became a part-time orthopaedic consultant for the government's social security program, evaluating claimants applying for disability benefits.

Ted had fond memories of his time as a medical student at Melbourne University and generously supported the School of Medicine. He and Alice travelled back to Australia for a number of medical graduate reunions.

Ted is survived by Alice and their children, Lisa, Emily and Guy. He will be greatly missed by those whose lives he touched.

Robin Orams and Alice Ceraolo

John H Colebatch AO

MB BS (ADEL) 1933, MD 1937

1909—2005

JOHAN COLEBATCH, THE paediatrician who pioneered the use of chemotherapy in children with cancer in Australia, died in November 2005 at the age of ninety-six.

Born in country South Australia, he was in many ways a man of his time. His primary education was in a small country town where his father was principal of a veterinary college. His secondary education and medical school years were spent in Adelaide where, his academic distinction recognised, he graduated MB BS from the University of Adelaide with honours. In his postgraduate training years he moved to Victoria, working at both the Royal Melbourne and Melbourne Children's hospitals before undertaking further training in London. He had already developed his lifelong interest in haematology and, on his return to Melbourne, must have been amongst the first in Australia, if not the first, to practise this specialty within the field of paediatrics. By this time he was married to Betty, and embarking on the private practice which was then essential for financial survival.

His war years were spent in the Army Medical Corps, where he served in Tobruk and in Borneo. After the war he was appointed to the Melbourne Children's (now Royal Children's) Hospital as a general paediatrician. Paediatric haematology was still in its infancy, and it was necessary for him to update his knowledge in that field through contact with adult specialists. With John Bolton, John McLean, Carl de Gruchy and others, he established an informal Blood Club, which met for many years until the Australian Haematology Society and, later, the Clinical Oncological Society of Australia, made it redundant.

In 1948, Sydney Farber and his colleagues in Boston published a report of induction of remission in acute lymphoblastic leukaemia of childhood, using the folic acid antagonist aminopterin. By 1950 Colebatch had obtained supplies of aminopterin and commenced his own pilot studies with a controlled trial of the drug in children with acute leukaemia. In that year I attended his outpatients clinic and I recall my distress at seeing a young boy with acute leukaemia suffering from severe ulceration of his mouth induced by aminopterin. It must have been such experiences which led to a deep division within



John Colebatch AO
Photo courtesy RCH archives

the medical staff at the hospital. Several paediatricians refused to refer their patients for treatment, preferring to allow them to die, if not in peace, at least without drug toxicity. No doubt Colebatch was equally distressed, but he was not given to displays of emotion. His reaction was to continue to modify his drug treatments to reduce toxicity to acceptable levels, while eventually securing control of leukaemia.

With the growing recognition that chemotherapy could influence the course of leukaemia came an interest in its use in other forms of cancer, particularly in childhood. In general it fell to the lot of haematologists, whose training was the most relevant, to become oncologists and Colebatch became a leader in both fields.

By the early 1960s, drug treatment of leukaemia and other cancers had achieved sufficient success that almost all of his colleagues were referring their patients to Colebatch for treatment. A major problem was that patient numbers in the relatively small local population were insufficient to allow comparative studies of different drug combinations and doses. By 1963 Colebatch had organised the first comparative study of different methods of using drugs for childhood leukaemia in Australia. Nearly all the children's hospitals in Australia participated. The trial, which continued for five years, attracted much interest around the world and in Australia became the model for both child and adult cancer studies. During that first decade of chemotherapy of childhood cancer, improved results came slowly although there were dramatic successes in Wilms tumour, a form of cancer of the kidney, where the use of chemotherapy combined with surgery and radiotherapy became a model for similar combinations in other tumours.

In 1958 Colebatch was appointed Kilpatrick research fellow by the Anti-Cancer Council (now Cancer Victoria), but it was not until 1967 that the hospital set up a haematology clinic with Colebatch as its clinical director. The AMA recognised his work on childhood leukaemia with its Triennial Prize in 1971, and in 1983 he became an Officer of the Order of Australia.

By 1974, now recognised nationally and internationally, he reached the hospital retiring age, although he continued a small private practice for almost another twenty years and took up a position at the Anti-Cancer Council, where his expertise in the conduct of chemotherapy trials was much valued.

John Colebatch was certainly not easy to work with, expecting others to comply with his almost obsessional attention to detail. His more irritating habits included perpetual lateness for clinics and meetings, and an apparent unawareness of the effect of this on others. On the other hand, he was an extraordinarily hard worker, demanding more from himself than from his juniors. He was also generous to those who worked with him—I have reason to appreciate this, for he arranged for me to work in Boston with Sydney Farber early in my career.

Colebatch was not a man who expressed his emotions, even working in a field where so many of his patients died. His devotion to Betty, however, and his loving care of her during the long years of her decline with Alzheimer's disease, revealed a side of his nature not obvious to many except his patients and their families.

Like most of his contemporaries, his approach to his patients would nowadays be described as paternalistic. This

characteristic, often used in a derogatory way today, may have made it easier for him to conduct some of his studies and was certainly helpful to many of the families. Modern critics would also consider that he paid insufficient attention to the privacy of his patients and their families. In his last years, in attempting to follow up patients he had treated up to forty years before, he found modern concepts of privacy hard to cope with. Only a year before his death, he was to be found in the Records Department of the Royal Children's Hospital, often late at night, studying records of his old patients.

Overall, one must conclude that it was his obsessive attention to detail, his single-minded commitment to the treatment of children's cancer, and sheer hard work that enabled him to achieve what he did in a difficult field that was eventually to see the cure rate for children's cancer go from almost nil to over eighty per cent. Who could ask for a better legacy?

Arthur Clark AM

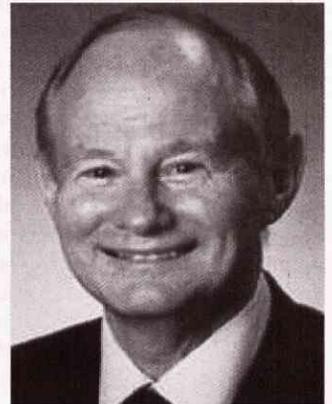
John Colvin AM

MB BS (QLD), FRCS (EDIN), FRACS, FRACO

1929—2005

JOHN COLVIN HAD the typical characteristics of a superhero. He seemed a mild mannered Clark Kent yet, when given a microphone and lectern, he transformed into a witty and compelling superman. An inspired and inspiring medical educator, he was often the only lecturer a medical graduate would remember in later years.

John's training in ophthalmology was in the United Kingdom, under John Foster, a towering ex-boxer with whom the rather lightly built John



John Colvin AM

Colvin soon realised you never argued. Foster told Colvin that one of his tasks was to lecture the medical students and so began a lifelong passion. Upon returning to Australia in 1961, he was appointed to the Royal Victorian Eye and Ear Hospital as a consultant ophthalmologist. He was keen to teach and began tutorials for the few medical students who came to hear him, initially in the bowels of the hospital, next to the boiler room.

He would start, at 8.30am on a Saturday, with a simple philosophy: be didactic, humorous and keep them awake. With Tom Cottier on the trumpet, to emphasise his famous golden rules, and Glenys Grant balancing the dual projection, he would harangue the students in his own inimitable style. Students were rewarded with rulers and pin-hole occluders when they got the answer right. A wrong answer would result in some verbal rhubarbs or, even worse, the loud ringing of a gong for what he called the ocular nong. All this was delivered with such good humour that the poor student would come back the following week for more.

The late Campbell McComas, master of disguise and a brilliant speaker, would give his very valuable time to come to John's lectures as the ever more honoured visiting lecturer, Lord Occleshaw from the UK. He and John would combine to deliver a hilarious lecture on the red eye, which included the perils of herpes conjunctivitis, especially when caught in the back seat of an FJ Holden.

There was laughter, bugle blowing competitions and a reverence for John that grew over the years. No matter that the lectures were not compulsory, that they were early on a Saturday morning when half the students seemed to be on their way home from the night before, or that they were not examinable. For years students not only filled every seat in the Lucy Jones Hall at the hospital, but sat on the floor down the aisle.

John sprinkled his lectures with a commonsense rarely taught in medical courses. 'More mistakes are made in medicine by not looking than by not knowing'; 'he would thunder; 'Become a doctor and keep a lawyer in work'; 'Symmetry is normal' and; most famous of all, 'Beware the unilateral or one red eye'. The value of this is easy to quantify—years later we still get referrals saying, 'Could you please see this patient, I'm not sure what is wrong but I can hear a bugle blowing'. The result has been that, in Victoria, we have had the best educated medical practitioners in terms of eye care anywhere in Australia.

John taught that 'proper preparation prevents poor performance'. He lived by this dictum and, even after thirty-seven years, no lecture was unrehearsed and slides were always previewed prior to showing.

Well known for his caring and loyal nature, he was a loyal partner to Tom Travers for many years, became friends with many of his patients and would teach registrars that treating a patient was not a right but a privilege.

He was loyal to the hospital, teaching in an honorary capacity for years after most other lecturers received payment. He would help the auxiliaries raise funds for the hospital, teach the nursing staff, and was always the star attraction at the annual hospital postgraduate medical courses. He never said no to the constant demands on his time.

As director of medical education, he treated all staff with equal respect—I remember him calling to the stage the porter who opened the Lucy Jones Hall to thank him for his help with the lectures that year. The charter of the hospital included teaching and John ensured that, whatever other pressures it faced, teach it did.

He gave equal time to his responsibilities as head of the hospital J Clinic, a position he held for fifteen years, and to caring for the needs of every overseas undergraduate student on an elective to Melbourne. These students continued to write and visit for years and in 1985 he was honoured by the hospital when it named the clinical school after him.

John was also a fiercely loyal friend. Matship was something he treasured and, as a constant correspondent, in his beautiful longhand script, he had many true friends. They included his colleagues in Australia and throughout the world, and the more than 10,000 students he taught. He had mates in NASA, in the air force and at the Hawthorn football club.

On the day he had his first stroke he was sitting beside me in the operating theatre. He dropped an instrument and apologised for the fact that he had lost the feeling in his arm that morning. He apologised when we insisted he go straight to hospital. His greatest concern was letting the team down. This was the way he lived his life.

Maimomides, the great scholar and doctor, wrote that one should assist one's fellow man by teaching him a trade rather than by offering charity. John understood this intuitively and knew that, as a doctor, he could achieve greater good by teaching others than by treating individual patients. For this reason, John Colvin's legacy in medical education will continue.

Amidst all the levity at John's thirtieth anniversary lecture in 1990, was a poem written by Chris Hogan. John deeply appreciated these few words, and I feel they are an appropriate final tribute to a great and respected teacher.

Time goes on as time will do,
But time has not diminished you,
Thirty years and still the fire
Burns bright to clear the mire,
Which does not kill but without defences
Loses sight, the Queen of Senses
We are born to ignorance, it's true
But knowledge has a friend in you
May your spirit live long and never tire
For your skills and presence
Shall long inspire!

Joseph Reich

Howard Windham Cooper

MB BS 1983, MPM, FRANZCP

1960—2005

HOWARD COOPER DIED in 2005 following a cycling accident in Darwin.

Howard was my friend and colleague. We met in 1987 at the beginning of our psychiatry training. From the outset it was clear that he was equal to the challenges that psychiatry can throw up. He possessed a rare combination of creativity, humility, integrity, humanity and incisive intellect that made him an excellent trainee and, later, an outstanding child psychiatrist. He was admired and respected by his patients, peers, supervisors and later trainees alike. As well, he had a healthy capacity for scepticism, a self-effacing sense of humour and a wicked sense of fun.

He met Linda Judge, herself the daughter of a child psychiatrist, in 1988. Their relationship brought a spring to his step and it was clear from the outset that he adored her. He took great pride in Lindy's achievements and her artwork hung in his consulting room. He delighted in their children and seemed ready to move heaven and earth for them. One day, in order to make way for a trampoline, he decided to move the cubby house from one side of the garden to the other, without dismantling it. It is no minor structure and I wondered if Howard had finally met his immovable object. But once assorted family and friends had arrived and the rollers were in place, move it did.

After general psychiatry training and advanced training in child and adolescent psychiatry, Howard sought further experience in the UK where he worked mainly in Cambridge. He returned to Australia in 1995 and took up a consultant position at Monash Medical Centre before becoming director of Mindful, then the Victorian post-graduate child psychiatry training program, in 1997. It was at Mindful that Howard's abilities really shone—his abilities as a psychiatrist were matched by his abilities as an administrator.

Howard's focus went beyond child psychiatrists. He maintained a genuinely multi-disciplinary approach to the mental health problems of children and adolescents and saw collaboration with consumers as fundamental to improving services. In 1996 he was involved in organising the second National Conference on Child and Adolescent Mental Health, following which he became a member of the steering committee to form a national body representing child and adolescent mental health professionals and consumers.

He made two trips to Mongolia for the World Health



Howard Cooper

Organisation, where he developed a training package in child and adolescent mental health, and developed ties with China, Vietnam, Sri Lanka, Japan, India and Thailand.

In all of this Howard acted with kindness and a generosity of spirit that greatly endeared him to others. He was known as a gentleman who engaged and remained engaged with those he encountered.

Unlike most of us, Howard's sporting prowess increased as he aged. The triathlon and canoeing were added to a list of sports that included skiing, tennis, swimming, surfing, bushwalking, mountaineering and running. In 2005 he was selected to represent Australia in the Age Group Triathlon World Championships in Honolulu, and at the time of his death was in the final stages of training.

Howard was a friend and colleague to many. He was a person of immense confidence and optimism. Whenever it rained on bushwalks, Howard would say that we were experiencing 'clearing showers'. He was a forward and outward thinker and an energetic leader in the field of child and adolescent psychiatry. His loss will be felt far into the future.

Howard is survived by Lindy, his children Hedda, Conrad and Leo, his parents Graham and Alison, and his brothers Michael and David.

Peter Jenkins

Peter Joseph Davies

MB BS 1961, MD 1991, FRACP

1937—2005

PETER DAVIES WAS born in Terang, Victoria, and educated at St Kevin's College before enrolling in medicine at the University of Melbourne. He graduated MB BS in 1961 and went on to have two outstanding, yet very different, careers.

After a year as junior medical resident officer at St Vincent's Hospital in Melbourne, he joined the Royal Australian Army Medical Corps (RAAMC), serving as a medical officer from 1963-66, including active service in Malaysia in 1964. He then pursued postgraduate training in general medicine and gastroenterology, initially at St Vincent's Hospital, followed by a period as postgraduate fellow with Sir Francis Avery Jones at the Central Middlesex Hospital in London. He became a member of the Royal College of Physicians of London in 1970 and a fellow of the Royal Australasian College of Physicians in 1974.

Peter returned to St Vincent's in 1971 to a senior medical staff appointment, practising in both general internal medicine and as a member of the newly developing department of gastroenterology. He also developed a flourishing private medical practice in gastroenterology. In the mid-1970s he helped pioneer the new procedure of colonoscopy at the hospital.

A second interest gradually drew Peter away from medical practice, such that he resigned from his roles at St Vincent's Hospital in 1985 and eventually gave up private medical practice in 1997. This second interest, perhaps dating back to a scholarship won at the age of ten to join the St Patrick's Cathedral



Peter Davies
Photo courtesy clinical photography department collection, SVHA

Boys' Choir, was in the detailed study of the lives (and illnesses) of some of the world's greatest composers. In this endeavour, his writings attracted international attention. In 1989 he published *Mozart in person: his character and health* [Greenwood Press, New York]. For this work, which included a detailed analysis of Mozart's illnesses and his probable cause of death, he was awarded an MD from Melbourne University in 1991. He subsequently published two books devoted to Beethoven; the first entitled *Beethoven in person: his deafness, illness and death* [Greenwood Press, 2001] and the second, *The character of a genius: Beethoven in perspective* [Greenwood Press, 2002].

Peter Davies was a strong family man, lover of animals, keen Fitzroy supporter, enthusiastic tennis player, avid reader, raconteur and wine connoisseur, but he gained greatest relaxation from listening to classical music.

He died suddenly on 16 July 2005 and is survived by Clare, his wife of forty-four years, and their daughter Maria.

Prepared by Kerry Breen with the assistance of Barbara Cytowicz, archivist at St Vincent's Hospital

Lena Amy Lysbeth Drake (Thomas)

MB BS 1932

1913—2005

LENA DRAKE HAD diary appointments up until the day she died, aged ninety-two, ending a full and interesting life.

She was born in the Methodist Manse in Williamstown, the daughter of Reverend Dr Courtenay Thomas, president of the National Council of Churches, and Mrs Amy Thomas.

Influenced throughout her life by the philosophy of AS Neil, upheld by Preshil school, which she attended before enrolling at Methodist Ladies College (MLC), Lena believed that 'self-motivated and self-directed students would never lose the early joy of learning'. On leaving MLC, Lena gained a scholarship and entered medical school at the University of Melbourne. After graduation she undertook internships at the Queen Victoria and Royal Children's hospitals then Broken Hill Hospital.

Upon her return to Melbourne she taught in the university pathology department until she was enticed by Professor Roy (Pansy) Wright and his professorial colleague Ruth Hoban, head of the social work department, to develop what would lead to the teaching of social biology for social work and humanities students.

Lena met and married John Drake in 1944 and for a time was much caught up with babies and supporting John's business ventures. She returned part-time to the university in 1952 when, drawing upon the experience of Alan Dale from Oxford, she developed a new cross-disciplinary course in social biology, the only such example in an Australian university.

Her broad catholic interest in many issues led Lena in diverse directions. During the 1960s she played an important part in promoting the development of young musicians through her involvement in the Caulfield branch of the Musical Society of Victoria. In contrast, she organised sabbatical study leave trips through Africa, India and Brazil, meeting World Health Organisation representatives on nutrition policy and practice.



Lena Drake

She was also heavily engaged in support of the 'Save Westernport' campaign, using her skills and social biology students to undertake several ecological surveys used to help local action groups argue the case against industrial development. As a result, important aspects of the environment of Westernport Bay were preserved.

Upon retirement from the university she retrained as a general practitioner. Despite physical difficulties, which ultimately required two hip replacements, and increasing deafness, she travelled widely, developed her enthusiasm in music and the arts and continued to read widely. She gained much enjoyment from the company of friends, hospitality and her membership of the Lyceum Club where she was actively involved in book and other discussion groups.

The critical driving quality of Lena's life was her deep, yet simple, moral sense of compassion and justice. She was, in addition, a skilled and careful listener. She was a devoted sister to her brother, who died in his forties, and a caring aunt to his children. She is survived by her three children: Elizabeth, Kathie and Peter, and six grandchildren.

Many modern women ask whether it is possible 'to have it all'. Lena Drake was living proof that you could raise a family, return to your profession, maintain a household, find time for people and maintain your interests and involvement in community activism until your very last day.

Delys Sargeant AM and Peter Hollingworth AC OBE

Norman Gold

MB BS (LOND) 1954, DIPPSYCHMED (ENG) 1959, FRANZCP, AAIHA

1928—2005

NORMAN GOLD, A well-respected teacher at the University of Melbourne medical school, died from cancer at Cabrini hospice on 12 October 2005, aged seventy-seven.

He was a foundation member of the Royal Australian and New Zealand College of Psychiatrists and, in 1997, was elected as a foundation fellow of the Royal College of Psychiatry, London.

Born in London to second generation Jewish parents, Norman grew up in the East End and at the age of eleven won a scholarship to Davenant Foundation Grammar School. After service with the RAF in the Second World War, he studied medicine at the London Hospital. While working in hospitals and general practice he became aware that patients' physical ailments were at times due to underlying mental illness and decided to specialise in psychiatry.

In 1960 he emigrated with his wife, Jenny, to take up a post as consultant psychiatrist at Launceston General Hospital. He was later elected to the council of the Royal Society in Tasmania.

He joined the Victorian Mental Health Department in 1965 as a consultant psychiatrist at Ernest Jones Clinic in Preston, and shortly after became honorary consultant psychiatrist at the Austin Hospital, where he remained involved until just months before his death.

In 1968 he was promoted to psychiatric superintendent of the Malvern Clinic and, in the course of the next twenty years, developed it into a leading facility for patients



Norman Gold

and teaching—medical students, occupational therapists and social workers—emphasising the integration of psychiatry with general practice. He played a leading role in community psychiatry and worked actively with consumer organisations. He played a key role in setting up the Victorian Schizophrenic Fellowship.

In 1988 Norman was appointed director of consultation/liaison psychiatry at the Austin Hospital and spent seven years in this role. His association with the Austin Hospital and medical students at Melbourne and Monash universities spanned nearly forty years, teaching at Larundel, the Austin and St Vincent's hospitals and the Academy of General Practice. His influence on the large number of medical students was immense and a whole generation of psychiatrists, like myself, influenced by him to specialise in psychiatry, owe him much.

He had a long involvement with the Royal Australian College of General Practitioners and was instrumental in establishing the Doctors' Health Advisory Service, a support and referral service for doctors, the importance of which is now widely recognised.

Norman Gold was a man of high intellect, reserved and controlled, but with a quirky sense of humour. He was dedicated to his work, which he pursued with energy and enthusiasm, and it was this enthusiasm, particularly in his role as mentor, tempered with concern and commonsense, which endeared him to those who were lucky enough to be involved with him, once we learned to read his micrographia.

He is survived by Jenny, their children Sarah, David, Paul and Martin and their families.

Adapted with permission by John GE Brown, MB BS 1964, from an obituary published in The Age on 28 November 2005

William (Bill) Carrick Heath

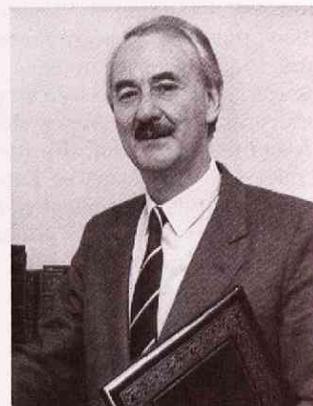
MB BS 1953

1925—2005

BILL HEATH WAS born in Casterton, Victoria, the eldest of seven children. Educated at the local convent school, he gained twelve leaving subjects by the age of thirteen. His father died shortly thereafter, forcing Bill to take up a clerk's position at the AMP Society. Following his eighteenth birthday, he joined the Royal Australian Air Force and trained as a pilot. At the end of the war, not content to leave childhood ambitions unrealised, Bill enrolled in medicine at the University of Melbourne where, at the Mildura campus, he met dentistry student Ann Brennan, who became the love of his life. They were married on Australia Day in 1955.

After graduating with honours, Bill began his distinguished medical career at St Vincent's Hospital, Fitzroy. In 1961 he was awarded a National Heart Foundation travelling scholarship and became a cardiovascular research fellow at Georgetown University Hospital, Washington DC, USA.

Upon his return to Australia, Bill resumed his association with St Vincent's Hospital where, over the next three decades, he acted in a variety of consultant physician positions, established the specialist hypertension clinic, and was chairman of senior



Bill Heath

medical staff in 1987. He also built a busy private practice, predominantly in cardiovascular medicine. His patients remember him as a brilliant and thorough diagnostician, who treated them with compassion and respect.

Among his many appointments, Bill was honorary physician to His Holiness Pope John Paul II, Her Majesty Queen Elizabeth II and the Duke of Edinburgh, the Prince and Princess of Wales, and the Queen of Denmark and Prince Consort, during their visits to Victoria.

In addition to his private practice, Bill regularly provided expert evidence to courts and tribunals. He was a council member of the Medical Defence Association of Victoria and a board member of the Medical Indemnity Protection Society.

He was a great medical educator, believing in the importance of transferring knowledge to the next generations of doctors, students and nurses. His education roles included the University of Melbourne, the National Heart Foundation, and the Royal Australasian College of Physicians (RACP).

In 1993 Bill was awarded the Sands Medal for Valued Contributions to the RACP. He was appointed a life member of the RACP Research and Education Foundation in 2004 and, in 2005, the RACP established the Krongold-Heath Research Fellowship, supported by the Krongold family.

Other notable achievements and appointments were as medical director and board member of the Mercy Private Hospital, governor of the BHP Community Trust, and chief medical officer of the AMP Society (Melbourne) and of Munich Reinsurance Australia. He served on many committees and was a longstanding board member of the National Heart Foundation.

Bill was first and foremost a family man: a wonderful father to his six children, providing unconditional love and constant support. Also a deeply religious man, with a strong faith, Bill was a physician to many members of the religious orders and worked tirelessly to support their charitable work. He was never a zealot, preferring to live his faith rather than talk about it. He treated all people he encountered with respect, from homeless men in Fitzroy to the top strata of society.

Bill died peacefully at home, surrounded by family, after a year battling lymphoma. The large crowd at his funeral at St Patrick's Cathedral was a tribute to the high regard in which he was held and the positive impact he had on so many lives.

John A Heath

Grant Pattison

MB BS 1951

1922—2005

GRANT PATTISON, A 1951 graduate of the University of Melbourne medical school, died in 2005. After training as a general pathologist here and at Hammersmith Hospital in London, he was appointed the first director of clinical pathology and, subsequently, director of chemical pathology at the Austin Hospital. He moved to Perth as deputy director of the Western Australian government pathology service, then pursued a career in medical administration, becoming medical superintendent at Hollywood Repatriation Hospital in Perth before returning to Melbourne in the equivalent position at Heidelberg Repatriation Hospital.

Ben Wadham

Sandford Lloyd Skinner

MB BS (ADEL) 1957, MD (ADEL) 1962

1933—2005

SANDY SKINNER WAS born in Clare, South Australia, third in a family of four boys. He graduated MB BS at Adelaide University and was an intern in medicine and surgery at the Royal Adelaide Hospital. Sandy then became an NHMRC research officer in the University of Adelaide physiology department under RF Whelan, investigating human circulatory physiology, and graduated MD in 1962. This short period yielded fourteen joint articles in refereed journals.



Sandy Skinner

Awarded a CJ Martin Research Fellowship in 1962, he spent two years in the Cleveland Clinic, Ohio, USA, in the laboratory of Irvine H Page, and a third year at St Mary's Hospital, London. At the Cleveland Clinic he worked with Page and McCubbin, establishing the first reliable bioassay for plasma renin activity, which they used to demonstrate the release of renin from the kidney by a baroreceptor mechanism in response to reduced renal arterial perfusion pressure. Sandy then returned to Adelaide where he was NHMRC research fellow 1965-67.

In 1968, RD Wright appointed Sandy reader in physiology at the University of Melbourne where he remained until after his official retirement at the end of 1998, when he was made an honorary principal fellow in the Department of Physiology. For twenty-three years, from 1977, he undertook one to two outpatient sessions per week as assistant physician at the Austin Hospital, which kept him in touch with practical medicine. In the department, Sandy lectured and demonstrated to practical classes in cardiovascular, renal, respiratory and exercise physiology. He took a special interest in setting up and validating multiple choice examinations and was instrumental in establishing the audiovisual facility of the Brownless Biomedical Library. He initiated a course in scientific ethics for honours and postgraduate students, which included criteria for sharing in scientific authorship and which was later taken up across the campus. He served on various university committees over the years, was deputy chairman of the Department of Physiology 1975-79 and chairman from 1982-84, and a member of faculty for many years.

While interested in all avenues of scientific progress, the main object of Sandy's own research remained the growing ramifications of the renin-angiotensin system. His high international standing in this field led to many international invitations as lecturer, and as visiting research worker. He also indulged in a subsidiary area, exercise physiology, rather as an active participatory consultant and mentor for other researchers, including doctoral students.

In personal discussions with colleagues, Sandy showed rigor and breadth in his scientific outlook, an almost intuitive understanding of circulatory and respiratory physiology, and an interest in the history of physiology generally.

Sandy's hands-on research with many honours and postgraduate students in his own laboratory was accompanied by collaborative projects with colleagues in other laboratories. He collaborated in research on experimental hypertension and atherosclerosis, on renal tubular transport, and on the pathophysiology of prorenin and renin substrate. The early investigation of plasma renin in pregnancy probably led to his lasting interest in the production of extra-renal renin in

the female reproductive organs and in other tissues. These included the retina, where the involvement of angiotensin in diabetic retinopathy has become a lasting investigation by former students of his.

Sandy's enthusiasm for research was infectious, often involving special interests shared with younger colleagues, as in a study of the renal basis of resistance to water deprivation in the *Spinifex* hopping mouse, *Notomys alexis*. After retirement he was frequently called upon as a consultant and mentor. In all, he was principal or consultant supervisor to twenty-seven postgraduate and eleven honours students.

One of his finest qualities was generosity to his research students through instruction and by participation in their experimental work, help with editing, group ski weekends and outings. For his older colleagues there were invitations to gatherings at home, or at the Skinner beach house at Anglesea with the lawn tennis court Sandy was proud to have laid down. On my retirement, he organised a party there with invitations to all my former postgraduate students.

Sandy's inspirational guidance of young colleagues persisted into his retirement years when, despite the gathering clouds of his illness, he continued to provide stimulating and critical advice on physiological matters in the honorary fellows' room and to contribute actively in the discussion of research students' presentations. His last paper was accepted for publication not long before his final weeks in hospital.

As for all of us, Sandy was not infallible in his opinions: for example, he once argued vigorously at a dinner party that Gothic architecture originated in Germany (although that was before his first sabbatical in Paris); but he was a scientist of scrupulous honesty and outstanding scientific memory in his fields of interest. I can do no better than to quote his longest-serving graduate assistant, Debbie Weaver:

Sandy set incredibly high standards for the research conducted in his lab...Every single factor that could be was controlled, and no conclusions were made until every conceivable alternative was ruled out. This was a disadvantage to achieving a high number of publications...but the advantage was that each publication was of a high standard...Sandy's enthusiasm for the excitement of research was very contagious—he really looked forward to when I had calculated the latest set of results and loved the brainstorming (very one-sided brainstorming, if I'm honest) about what these numbers really meant. His memory for previous results was phenomenal—and encouraged me to develop the most comprehensive record-keeping strategies in an attempt to keep up with him.'

Sandy Skinner's bibliography lists 115 journal articles or book chapters. He had collaborated with more than twenty-five Australian and international senior scientists. The university is a stimulating work place, where you can mix with others who are expert in diverse fields of knowledge, and Sandy fitted naturally into this genial environment. His joyous, sociable personality made him friends within his immediate circle of colleagues and across the wider university communities around the world. He is grievously missed by those of us in the physiology department who benefited from sharing his knowledge in vigorous discussion and debate—a true physiologist and friend.

Sandy's children inherited his enthusiasm for science: Andrea, Georgina, Rachel and Ben have all pursued successful careers in the area. I am grateful for the indispensable help of Sandy's widow, Lesley, for information and advice in preparing this memoir.

John S McKenzie

Honorary Senior Fellow, Department of Physiology

Contributions to the *Chiron* obituary pages are welcome. Obituaries of up to 400 words can be sent to the editor, *Chiron*, c/- Communications and Alumni Office, School of Medicine, The University of Melbourne, Victoria 3010, Australia, or via email to eabren@unimelb.edu.au

RECORDED WITH REGRET, THE PASSING OF...

Alwyn Joseph Adcock, MB BS 1956
 Robert Trevor Anderson AM, MB BS 1966
 Dian Eleanor Ashton, MB BS 1949
 Igor Balabin, MB BS 1957
 Thomas John Beresford, MB BS 1936
 Ian Henry Cameron, MB BS 1954
 Paul Gerard Carman, MB BS 1974
 Donald Lloyd Dixon, MB BS 1942
 Ronald Keith Doig, BSc, MB BS 1944
 Desmond James Dooley, MB BS 1947
 Thomas William Osborne Farrell, MB BS 1950
 Warwick Lorne Greville, MB BS 1961
 Rex George Guymer, MB BS 1953
 Francis Joseph Hayden, MB BS 1931
 Eris Hess, MB BS 1958
 George Russell Jones, MB BS 1943
 Douglas Charles Loader, MB BS 1956
 Ian Robert McDonald, MB BS 1947
 Lachlan Robert McIntyre, MB BS (Hons) 2000
 John Marshall McMahon, MB BS 1958
 John Douglas Mitchell, MB BS 1963
 John James Morrissey OAM, MB BS 1951
 Thomas Paul Rowan, MB BS 1945
 Joseph Francis Russo, MB BS 1955
 Brian Patrick Kennedy Ryan, MB BS 1938
 John Liddell Stubbe, MB BS 1949
 Horace Finn Tucker, MB BS 1938
 Sir Henry John Wardlaw, MB BS 1956
 Francis Xavier Morris Willis, MB BS 1952

2005 ROBERT L SIMPSON MEMORIAL ELECTIVE AWARDS

The Robert L Simpson Memorial Fund supports students undertaking elective attachments in public health and occasional memorial lectures.

In 2005 awards were made to Shara Kim Nguyen who spent her elective in the Department of Ophthalmology at Alice Springs Hospital; to Laura Reid who spent her elective at the Bairo Pite Clinic, a health care centre in Dili, East Timor; and to Yee Jen Jane Chia who spent her elective at the Mseleni Hospital in rural South Africa.

GREAT LEGACIES

Caring for current and future generations

The David Bickart Bequest

DAVID JOSEPH BICKART (1893-1969) combined a successful medical practice with a family interest in financial investment. In 2005 the university was advised that Dr Bickart had left a substantial bequest, valued at approximately \$6.3 million, to the medical school. His deep interest in the practice of medicine and medical research inspired his bequest.

David Bickart graduated MBBS at the University of Melbourne in 1915. He joined the Australian Army Medical Corps as a captain and served overseas and in Australia during the First World War.

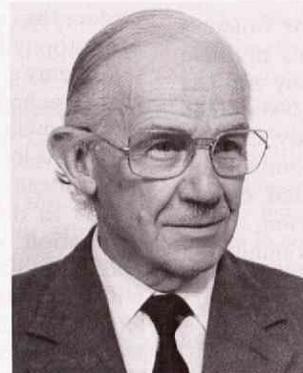
After commencing general practice in Nhill, Victoria, he married Myrtle Parr Robinson and their only child, David 'Louis' James Bickart, was born in 1921. For most of the 1920s, David Bickart ran a surgery in Somerville, on the Mornington Peninsula, but moved to Carnegie in 1931 to run a general practice from the family home. In 1957 the family moved to Brighton, and he retired from medicine shortly afterwards.

David Joseph Bickart was highly regarded as a medical professional for his knowledge, caring nature and calm and reliable temperament. He died on 3 July 1969.

His bequest to the School of Medicine will form an endowment to support scholarships and training, particularly in postgraduate research. It will also contribute to international health initiatives, particularly in our region, and multidisciplinary partnerships in the faculty to enhance teaching and research.



David Joseph Bickart. From a 1915 class photo. Courtesy Medical History Museum



James Smibert



Marie Tehan

The James Smibert Bequest

JAMES SMIBERT (1911-2003) graduated MBBS in 1935 with honours in medicine and obstetrics and gynaecology. After a year of obstetrics and gynaecology training at the Royal Women's Hospital, he travelled to the UK where he completed his postgraduate training.

In the UK he met Helen Winslow, an Irish physiotherapist, who he married in 1940. Five weeks later, he joined the Royal Army Medical Corps, which took him to Sierra Leone, Nigeria, India and Burma. He worked in the UK for another year after the war, before returning to Australia with his family.

Between 1948 and 1964, James Smibert worked in general practice at the Toorak Clinic, where he was responsible for most of the obstetrics. In 1949 he joined the staff of the Royal Women's Hospital and held several honorary positions until he had to retire at the age of sixty. He was then employed part-time as first assistant in the university Department of Obstetrics and Gynaecology until 1978, and continued in specialist private practice until 1989.

James Smibert believed that obstetricians had a responsibility for the care of women during pregnancy and the subsequent care of the child. He was committed to the total management of patients in his care, including their postnatal well-being, and was active in assessing the quality of care provided at many hospitals. He was not averse to questioning accepted practices and alleged advances within the discipline.

Throughout his life, James Smibert was interested in the education of medical students. His bequest of \$50,000 to the School of Medicine will support the clinical training of medical students, particularly in obstetrics and gynaecology

The information on Dr James Smibert was based on his obituary written by Elizabeth Smibert and Roger Pepperell, published in Chiron 2004.

The Marie Tehan Memorial Fund

MARIE TEHAN (1940-2004) is remembered as a strong, articulate and profoundly intelligent woman who was devoted to her family and lived her life working in and for the community. She graduated in law at the University of Melbourne in 1962. In 1963 she married Jim Tehan and, after their sixth child, established her own legal practice in Mansfield, Victoria, in 1970. Elected to the Victorian Parliament in 1987, she served in both houses and held the portfolios of health and conservation in the Kennett government.

As Victorian health minister, Marie Tehan transformed the Australian health system by introducing case-mix funding. She contributed to the improvement of many health services including those dealing with mental health, cancer and breast screening. She was a highly principled champion of human rights and played a leading role in supporting refugees.

Marie Tehan died on 1 November 2004 from Creutzfeldt-Jakob Disease (CJD). Her sister, Helen Arthur, died of the same disease in 1983. In April 2005, members of Marie Tehan's extended family made a \$30,000 gift in her memory to the Department of Pathology to purchase special equipment for research into CJD. In the same year, Jim Tehan began a limited appeal to establish the Marie Tehan Memorial Fund to support research

into CJD at the University of Melbourne. Through the generosity of family, friends and associates, this appeal has now raised an additional \$91,000. Further donations to the fund are welcome.

CJD is one of a group of 'prion diseases' which are rare, invariably fatal brain disorders. The university's Prion Research Group specialises in these diseases and is internationally recognised for its research. Further donations to the fund are welcome.

The Marie Tehan Memorial Fund will help the Research Group investigate accurate early detection of CJD and fund research which may lead to effective drug treatments. For donation, bequest and memorial gift information see p48.

Inaugural Richard Lovell Travelling Scholarship

A PHD CANDIDATE studying ways to improve breast cancer screening is the recipient of the inaugural Richard Lovell Travelling Scholarship, honouring the first professor of medicine at the University of Melbourne.

Carolyn Nickson, PhD student at the Key Centre for Women's Health in Society and the Department of Mathematics and Statistics, has been awarded the \$5000 scholarship for 2006. She will use the scholarship to visit research centres in Europe to explore questions about mammographic density and the effectiveness of screening.

In Australia, free breast cancer screening is available every two years through the BreastScreen program. Research over the last decade has shown that women who have high levels of mammographic density (dense tissue in their breasts that makes areas in mammograms whiter than usual) benefit less from screening.

Breast cancers detected in women with high density tend to be larger by the time they are detected, and are more likely to be detected during the two-year gap between scheduled screens. Breast density tends to be higher in younger women and in women who use hormone replacement therapies.

Professor Anne Kavanagh from the Key Centre for Women's Health in Society leads a research program into this problem which has produced significant findings internationally and has created a record of density measurements for over 10,000 women screened by BreastScreen Victoria. For her PhD study, Carolyn is using Professor Kavanagh's research data in combination with full screening histories of all women who had cancer detected by BreastScreen Victoria over a ten-year period.

She is developing a simulation model that replicates the Victorian screening program to determine whether screening could be improved for women with high mammographic density, if they were offered more frequent screening.

Carolyn will use the scholarship to visit several European research centres, including the Cancer Research UK Epidemiology Unit at Oxford University, and seek feedback about her methodology and findings. Her PhD supervisors are



Carolyn Nickson

Associate Professor Anne Kavanagh and Associate Professor Ray Watson.

Professor Richard Lovell (1918-2000), was appointed to the foundation chair of medicine in 1955 and taught medical students for more than thirty years. He pioneered many areas of academic medicine, in particular clinical epidemiology, and made outstanding contributions to cancer control and human research ethics in Australia. The Richard Lovell Travelling Scholarship is an annual award offered to MSc or PhD students studying within the Faculty of Medicine, Dentistry and Health Sciences in a field related to cancer epidemiology.

2006 Melville Hughes Scholarship

THE MELVILLE HUGHES Scholarship for 2006 was presented to Jeremy L Wilson, a 1994 medical graduate of the University of Melbourne. After a residency at St Vincent's Hospital and a year spent as demonstrator in the Department of Anatomy and Cell Biology, Jeremy gained his RACS fellowship in plastic and reconstructive surgery in 2003. In 2004, he began working towards an MD, since converted to a PhD, in the Department of Surgery, St Vincent's Hospital and at the Bernard O'Brien Institute of Microsurgery, under the supervision of Professor Wayne Morrison and Mr Anthony Penington.

Jeremy's thesis involves research into the critical role that mechanical force plays in adipose tissue growth and development. It is hypothesised that tissue-derived adult stem cells develop into fat rather than other connective tissues if mechanically unloaded within a tissue chamber space. The aim is to determine the optimal mechanical environment for generation of fat from tissue-derived adult stem cells, and to recreate this environment within tissue chambers. Hopefully, observations from this work will lead to the development of tissue chamber models capable of generating large volumes of the patient's own fat, grown to a predetermined size and shape, for the reconstruction of various soft tissue defects, for example after mastectomy.

The scholarship, valued at \$55,000, is offered to medical graduates undertaking further research training in surgery.



Jeremy Wilson

DONATION, BEQUEST AND MEMORIAL GIFT INFORMATION

For information about establishing a memorial gift or making a bequest to the university, please contact: Ms Suzanne McGraw, Bequests and Donations Officer, Development Office, the University of Melbourne, Victoria 3010, Australia. Telephone (+61 3) 8344 5141, email: bequests-development@unimelb.edu.au web: www.unimelb.edu.au/alumni/giving.html or Ms Robin Orams, Communications and Alumni Manager, Faculty of Medicine, Dentistry and Health Sciences, the University of Melbourne, Victoria 3010. email: robinjo@unimelb.edu.au telephone (+613) 8344 5889. All enquiries are treated in strictest confidence.

If you are a resident of or have assets and tax obligations in the USA or Mexico, and are considering a gift or bequest

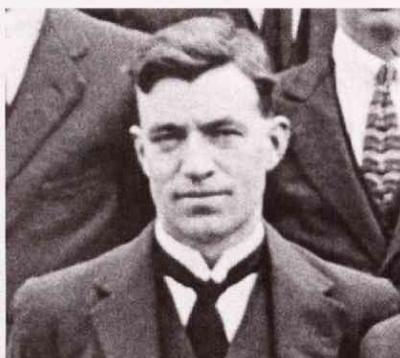
to benefit the university, the University of Melbourne USA Foundation can assist with making such a gift tax effective. The foundation is an incorporated not-for-profit body in the USA. **Contact:** The Administrator, The University of Melbourne USA Foundation, 630 Mt Pleasant Road, Freeville, New York 13068 USA. Telephone (+6 07) 277 8860, email: usa-foundation@unimelb.edu.au

In the United Kingdom, the Friends of the University of Melbourne Charitable Trust is a registered charity and offers similar benefits for prospective supporters in that country. **Contact:** The Trustee, The Friends of the University of Melbourne Charitable Trust, Swire House, 59 Buckingham Gate, London SW1E 6AJ United Kingdom. Telephone (+0 20) 7630 1075, email: uk-trust@unimelb.edu.au

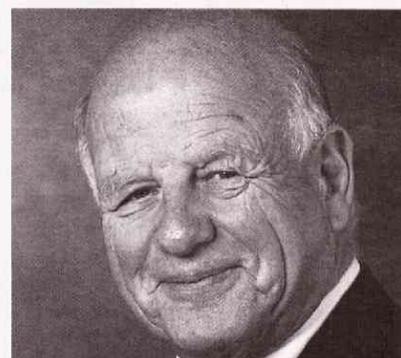
PROSECTORS AT THE UNIVERSITY OF MELBOURNE



Margaret Whyte. From a photograph taken in 1887 of the first women admitted to the medical course at the University of Melbourne. Photo courtesy Medical History Museum



John Eccles as a medical student. From a group photograph of fifth year medical students taken in 1924. Photo courtesy Medical History Museum



Henry Burger AO is now Emeritus Director of Prince Henry's Institute of Medical Research and Honorary Professorial Fellow of the Faculty of Medicine at Monash University.

THE TERM 'PROSECTOR', from the Latin *pro* (before) and *secare* (to cut), has been in use for a long time meaning a number of different things, but it is generally understood to refer to someone appointed to dissect dead bodies in preparation for autopsy, anatomical research or demonstration.

At the University of Melbourne, prior to the arrival of Berry in 1906, the term was used for senior students chosen to be demonstrators and supervisors in the dissecting room. At that time there were some 100 students dissecting for extended periods of time. Berry formalised the position and gave it significance and prestige. Specific cadavers were set aside for the prosectors and their duties included preparing specimens for the museum. This practice continued for some time, but gradually the term came to be used simply for the students with the top marks in anatomy.

The prosector honour board is located in the foyer of level three of the Medical Building, next to the new Harry Brookes Allen Museum of Anatomy and Pathology. It lists the names of prosectors, starting in 1907 and proceeding without interruption to 2000. The list contains many highly successful people including Nobel laureate, John Eccles (1921/22), former faculty deans Sir Sydney Sunderland (1932) and Richard Larkins (1963), twin brothers Professor Emeritus Gerard and Henry (Harry) Crock (1950), and Henry Burger AO, Emeritus Director, Prince Henry's Institute of Medical Research (1953).

In the new medical curriculum, there is no separately identifiable subject of anatomy. Rather, the first two-and-a-half years of the course are divided into systems, with all the basic sciences taught concurrently. In order to preserve the tradition of the honour boards, however, faculty decided to initiate the Margaret Whyte Honour Board which, beginning in 2001, lists medical students with the best overall marks in semesters two to five.

The new board is named in honour of Margaret Whyte (1868-1946) who, with Clara Stone, was one of the first women to graduate in medicine from the University of Melbourne and one of the first locally-trained women registered to practise medicine in Australia.

Margaret Whyte was one of the year's top five students, collecting first prize and scholarships in two fields. Her academic success infuriated the men, and even though the top five students in the honours list were automatically offered residencies at the (now Royal) Melbourne Hospital, she was excluded. She compromised and went to the Women's Hospital. All the new women medical graduates found themselves forced to go to the Women's Hospital for their residencies, to the extent that the (largely female) board of the hospital took fright at the number of women graduates seeking appointments and by 1896 resolved that it would, on principle, appoint a man over a woman if their abilities and qualifications were equal.

Professor Antony Goodwin (Head, Department of Anatomy and Cell Biology) and Professor Janet McCalman (Centre for Health and Society)



L-R: Brothers Gerard W Crock AO & Henry (Harry) V Crock AO took advantage of the opportunity to view specimens they prepared while working in the Department of Anatomy in earlier days, when they attended the 2005 UMMS function in the Harry Brookes Allen Museum of Anatomy and Pathology. Professor Emeritus Gerard Crock was foundation professor of ophthalmology at the university (1963-1986). His dissection of the left half of a male head is pictured on the cover of this issue of *Chiron*.

CENTENARY CELEBRATIONS

This year marks the centenary of the departments of Pathology and Anatomy (Anatomy and Cell Biology) as independent departments. Formed in 1882, as the Department of Anatomy and Pathology, the two departments formally separated in 1906, with Sir Harry Brookes Allen the inaugural chair in pathology and Richard (Dicky) Berry inaugural chair of anatomy.

Pathology

FROM ITS VERY beginning, the Department of Pathology had an emphasis on teaching clinical pathology and all through its hundred years many great teachers in pathology have contributed to the quality of Melbourne medical school graduates. Sir Harry Brookes Allen oversaw the development of the first pathology museum, which subsequently bore his name, and is said to have so enthusiastically collected specimens for display that the building was too small by the time it was completed.

Good teachers need good teaching material and, through the years, dedicated pathologists such as Edgar King, George Christie, John Hurley, Ross Anderson, Harold Attwood and Prithi Bhatthal, amongst others, have continued Sir Harry's tradition and developed significant teaching collections, including macroscopic organs (pots), microscopic slides and 35mm slide photographs.

These activities have been supported by dedicated staff within the department, such as Denis Cahill, who carefully maintained these precious teaching resources.

The new medical curriculum has presented many challenges, not least of which has been the delivery of uniformly high quality pathology teaching to students at multiple sites, including our metropolitan clinical schools and our rural campuses. One challenge is how best to utilise the unparalleled teaching material available in the department.

- The 'King' collection of some 5000 colour 35mm slides has been dormant in the basement for many years. This collection of meticulously catalogued photographs includes clinical photographs as well as macroscopic and microscopic pathological pictures, across almost the full range of systems pathology.



Edgar S.J. King (1900-1966), MB BS 1923, first joined the Department of Pathology in 1928. He was made acting professor of pathology in 1934 and was professor of pathology 1951-56 (succeeding Peter MacCallum). He is pictured here (left) with Peter MacCallum (centre) and Roy D. (Pansy) Wright (right) on the university grounds, in a photograph dating from the 1950s. Photo courtesy Medical History Museum

- The 'Anderson' collection of photographs and microscope slides represents a unique insight into neurological pathology that would be most difficult to emulate.

- In addition, the department has over 12,000 macroscopic pots demonstrating all manner of pathology. These pots are now housed in the joint anatomy and pathology museum, with only a fraction on display at any given time.

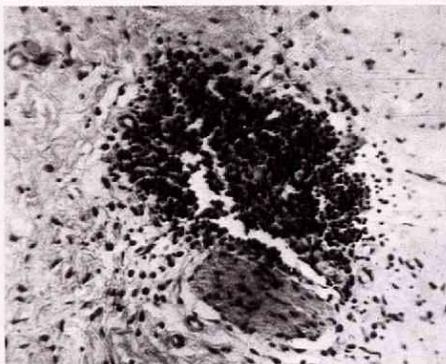
- Teaching collections of microscope slides, ranging from general pathology to specific collections such as the dental collection, are currently under-utilised due to the reduced emphasis on microscope skills for medical and other health science graduates.

The museum is an outstanding teaching resource for students on campus, but offers little to students away from the Parkville precinct.

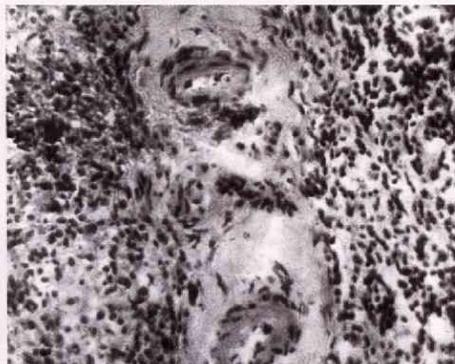
While the department has led the way in e-learning with the acclaimed skin atlas and 'patient under the microscope' programs, thanks to the efforts of Howard

and Virginia Grossman (Departments of Anatomy and Cell Biology and Pathology), the dilemma of how to make the best of the additional resources available now needs to be addressed.

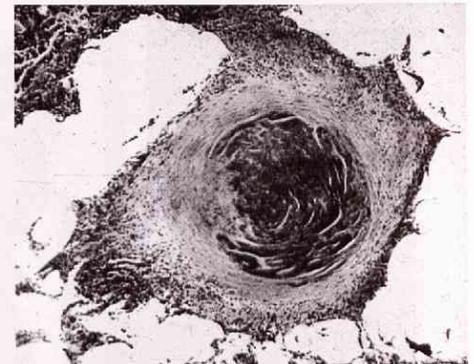
It is fitting then, that in our centenary year, we have commenced a sustained effort to bring these unique teaching resources into the modern medical curriculum. The Department of Pathology has employed clinical photographer, Dylan Kelly, to create a digital library of pathology images that can be used by everyone within the faculty for teaching. Already, the entire King collection of 35mm slides has been scanned by summer students into digital format and catalogued into an electronic database. A number of images will need some colour restoration, however, it is hoped that by mid-year the first module of images will be circulated through the clinical schools. The Anderson slide



From the Edgar King collection. 'Pericardium in Lupus Erythematosus Disseminatus. Micro. Shows cellular infiltration with disintegration of a small vessel.'



From the Edgar King collection. 'Spleen in Lupus Erythematosus Disseminatus. Micro. Shows the development of fibrous tissue layers around the small arterioles in the spleen.'

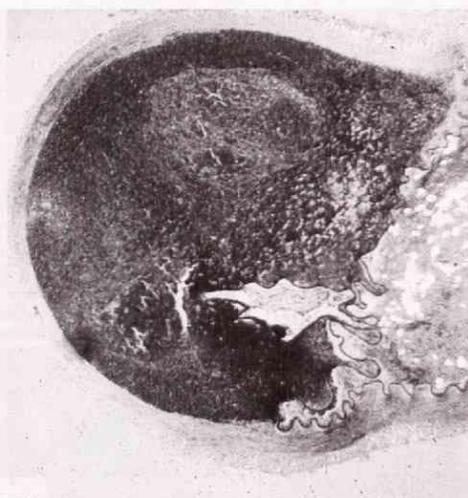


From the Edgar King collection. 'Silicosis of lung. Micro. From Dr A Ferris. Shows area of lung from a 'wet grinder' (edged tools on wet sandstone).'



Ross McDonald Anderson AM (1923-1998), MB BS 1950, spent more than thirty years with the Department of Pathology. He was first appointed lecturer in neuropathology in 1955 then, after some time overseas, returned to the department in positions of senior lecturer, reader and chairman until his retirement in 1988.

Photo courtesy Department of Pathology



From the Ross Anderson collection. Dissecting aneurysm with thrombus.

collection is currently being scanned and catalogued. Already, 2000 macroscopic pots have been photographed, producing pictures of outstanding quality. These will be used to support clinical pathologic cases (CPCs) and teaching modules on CD Rom. Plans are well advanced to create a virtual microscopy library of microscope slides that will be available on a central server for widespread access. Virtual microscopy allows the viewer to look at a microscope slide in different powers of magnification and to scan a whole microscope slide just as a diagnostic pathologist would do. This greatly enhances the teaching experience compared to a still photograph. The progress of these invaluable collections into the digital age, such that they can be used in a broad range of teaching media, is a most exciting venture.

Finally, the department has specifically employed David Kaufman, a diagnostic pathologist with a long background of clinical teaching experience, to develop the associated CPCs and visual modules that will make the most of these images.

Anatomy

THE DEPARTMENT OF Anatomy and Cell Biology is celebrating its centenary anniversary with the writing of a history of the department by Ross L Jones, honorary fellow at the university Department of History and Philosophy of Science, titled *Humanity's Mirror: 150 Years of Anatomy in Melbourne*.

Anticipating the publication of this history, we publish the following selected excerpts:

Melbourne's medical marketplace

The medical profession in Melbourne in the mid nineteenth-century was truly a 'medical marketplace'. As the leading article of the *Leader* newspaper claimed on 28 August 1869, the medical board was compelled to admit 'anyone who, by examination or purchase, has obtained some sort of professional degree from any "body duly recognised in the country to which such body may belong"'. This meant that the medical profession in Melbourne had no unifying qualification. Apothecaries, surgeons and physicians (all with a bewildering variety of qualifications) vied for the patients and their money. For example, in 1881 those who were allowed under the *Medical Practitioner's Act* of 1862 to treat the sick for a fee included not only 454 registered medical practitioners, but also almost 1000 assorted apothecaries, midwives, dentists, Chinese doctors, homeopaths, galvanists, mesmerists and hydropathists, amongst others. All this explains the regular fracas in Melbourne over the propriety of various schemes to attract patients. Rumour concerning the legality and

This year is a good time for the department to reaffirm its commitment to teaching, and to reaffirm the critical need for pathology, as a science and as the clinical basis of diagnostic and therapeutic decisions, to be at the core of any medical curriculum. We hope that the digital resources being generated will be useful throughout our next century of teaching pathology; teaching that will meet the standards one would expect in the University of Melbourne School of Medicine; teaching that would have made Sir Harry Brookes Allen proud.

Paul Monagle

Professor and Head, Department of Pathology

Thank You... to medical alumni whose donations are helping fund the development of these valuable teaching resources. If you would like information about donating to the School of Medicine please contact the Communications and Alumni Office on (+61 3) 8344 5888.

even veracity of many of the qualifications claimed by medical practitioners were the bread and butter of medical Melbourne at this time.

The leader of the raffish clique of Melbourne surgeons, the irrepressible James George Beaney, is an example of such gossip. Beaney, or 'jelly-belly' as he was called in the *Melbourne Medical Record*, was one of Melbourne's most successful surgeons and, according to his enemies, a plagiarist, fraudster, consummate self-advertiser, as well as an undeniably ostentatious high liver. Starting his career as an apothecary's assistant in a Collins Street chemist's shop, he took himself to Edinburgh and obtained a diploma at the Royal College of Surgeons in 1855 during the Crimean War at a time, according to his critics, when the acute shortage of surgeons resulted in a significant dropping of the standard needed to pass. His public extravagance, funded by his tremendous success, antagonised those who despised his methods, or were jealous of his achievements.

Dr GT Howard, one of Beaney's residents at the Melbourne Hospital, reported Beaney expressed much surprise:

when a patient rejected his offer of a glass of champagne in favour of a cup of tea, 'Augh, tea', he snorted—and then jauntily to us, 'I am becoming quite continental in my habits. I take a bottle of claret for breakfast, a small bottle of fizz for lunch and a big bottle for dinner', and he gently stroked a very obvious protuberance.

Beaney, although occasionally successful in the elections at the Melbourne Hospital (notably in 1875 and as a result of bribery, so claimed his opponents) never had the same



This plaster model of the irrepressible James G. Beaney is on permanent display in the Medical History Museum. Note the champagne bottle and cork lying at his feet.

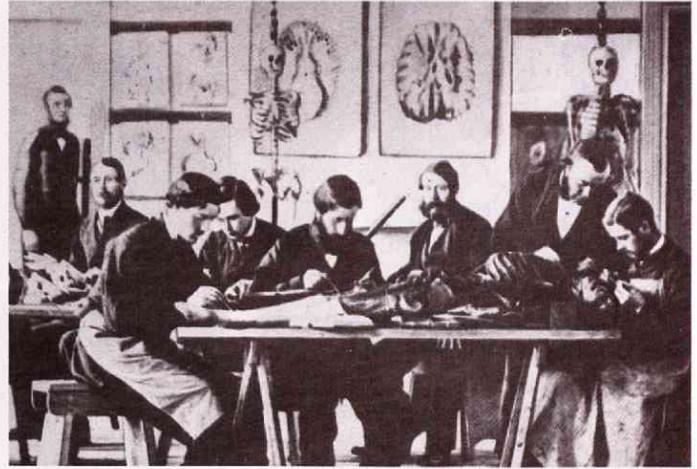
success in gaining a position at the university. Halford was one of those who had little time for Beaney. Indeed, Halford was among a group of medical men who acted as expert witnesses in malpractice cases against Beaney. Perhaps the most famous case that involved Halford giving evidence against Beaney was the death of Mary Lewis in 1866 after a botched abortion. The others in the Halford camp were: William Pugh, who was the first surgeon to administer an anaesthetic in Australia; James Thomas Rudall, honorary surgeon at the Melbourne and Alfred hospitals, ophthalmologist, examiner in pathology and physiology at the university, and the first examiner of anatomy, along with David Thomas in 1862; James Edward Neild, lecturer in forensic medicine at the

university, later forensic pathologist for the state, editor of the *Australian Medical Journal* between 1862-79 and better known as one of Melbourne's leading literary critics; and Richard Thomas Tracy, lecturer in obstetrics, regarded as Melbourne's most distinguished obstetrician. All of them had violent disputes with Beaney at some time or other, and these men were to be important supporters of Halford and the medical school. It is possible to see in these events the beginnings of the unification of the profession under the umbrella of the nascent medical school, even though Halford's team was unsuccessful and Beaney won his cases, using the notoriety so gained for the purposes of self-advertisement.

Inclusion in the inner sanctum of the medical school precinct was not just refused to the under-qualified entrepreneur. Intellectual non-conformity could also tarnish a reputation. The most active proponent of contagion and germ theory and Darwinism in Melbourne, William Thomson, was denied appointment even when he was the only candidate for a position.

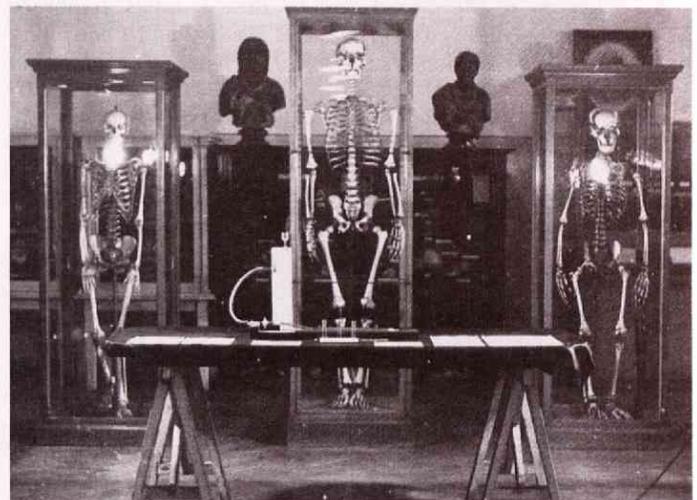
Halford, McCoy, Allen and Darwinism

...on the evening of Wednesday April 29, 1914, the medical school celebrated its coming of age at the celebrations for its fiftieth anniversary. This took the form of a sumptuous dinner at the Grand Hotel, now known as the Windsor, for one hundred and eighty female and male medical graduates of the University of Melbourne...A bevy of political and university dignitaries also attended the celebration. In recognition of the status of the faculty in Melbourne, the chairman of the proceedings was Sir Arthur Lyulph Stanley, the Governor of Victoria. [In reply to a toast of the medical school, George Halford's student and successor, Sir Harry Brookes Allen, Professor of Pathology and Dean of the Medical Faculty, spoke of the tremendous achievement of the fifty years of medical education in Melbourne]. He soon assumed a more sombre tone, however, and conceded that the pace of revolution in science and medicine had thrown up serious challenges for staff and students. He spoke of the great difficulties of the early years of the school and the labours that allowed it to survive and then flourish. What had made establishing medical education in Melbourne even more difficult were, he explained, 'the tremendous changes which have taken place in scientific methods in the first fifty years of the Medical



Halford and students dissecting c1864. Photo courtesy Medical History Museum

School'—changes which the medical school did not always accommodate easily. Allen listed those changes for his audience. First there was the discovery of the periodic law in chemistry, described as the 'Alphabet of Creation'; and the 'coming of the doctrine of Evolution, which has transformed our whole outlook on the world around us, and on ourselves even in our highest relation'. Also, in this period appeared 'antiseptic surgery which ...revolutionised all surgery' along with the beginning of the new science of bacteriology. In professorial fashion Allen instructed his audience to 'think of the great men who have been responsible for these new developments—Mendeleef, Darwin, Lister, Pasteur, and their successors—and you will see how all opinion has been in a state of flux, and the task of teachers and taught has been correspondingly difficult'. The medical school had indeed initially struggled to keep up with the pace of the discovery of new ideas. Throughout the first fifty years of the Melbourne medical school, however, the study of anatomy had been one constant in that sea of change. The assimilation of Charles Darwin's theory of evolution as found in the *Origin of the Species*, published in 1859, is one telling example of the sometimes reluctant acceptance of new ideas in the early decades of the medical school. In this case, the study of anatomy at the university was directly implicated in the tale.



Skeletons on display in the second anatomy building (Berry building). These skeletons have been a feature of the museums since the late 1800s. Photo courtesy Department of Anatomy and Cell Biology

Enquiries about *Humanity's Mirror: 150 Years of Anatomy in Melbourne* can be made to Tricia Hartshorn, Department of Anatomy and Cell Biology, on (+61 3) 8344 5804.

A STORY BEHIND A GIFT

Chinese medical practice in early rural Gippsland

BY ANN BROTHERS

Curator, Medical History Museum

A GIFT TO the Medical Library Special Collections in 1994, from the descendants of Thomas Chong (1877–1950), links the University of Melbourne School of Medicine to the early history of Chinese Traditional Medicine (TCM) in Victoria. The donation consisted of Thomas Chong's professional library of around 300 medical texts and several hundred paper records, believed to be prescriptions for patients from his Bairnsdale practice dating from the 1920s to 1930s.

Apart from the information they contain, the small, compact bundles, neatly bound together with string, are attractive artefacts. They are recorded by hand in the classical form of Chinese used before the language reforms of the Cultural Revolution.¹

The characters are inscribed vertically on the sheet in the traditional manner, using black ink and brush on fine cream rice paper, and indicate the care and pride taken by this professional man. The prescriptions have survived their eighty-odd years in fine condition, and would be clearly legible to the translator of classical Chinese.

The collection of books is of great value and includes some of the ancient classic texts of TCM, and handbooks and texts of the late nineteenth and early twentieth centuries. The text books are all printed in Chinese, probably in both the early and modern forms, some with paper covers bound simply in the traditional Chinese manner. A few contain fine woodcuts illustrating the various plants from which herbal preparations were made for specific patient needs, like the early 'herbals' or materia medica of western medicine when pharmaceuticals were also prepared individually by hand. There are examples, too, of anatomical texts with illustrations of bones marked with their muscular attachments, familiar to the student of western medicine to this day.

Obviously regarded as well qualified by the standards of his time, Thomas's library reflects his lifelong interest in the study of medicine. The books on western medicine, in particular, indicate that he acquainted himself with aspects of western theory and practice.²

Thomas Chong's life is best understood within the context of the then hostile attitude of western practitioners towards TCM and the racial prejudice experienced by the Chinese in general in Australia up to the mid-twentieth century. These were difficulties he dealt with in carrying out his work and raising his family.

Thomas's father, Ong Chong, arrived in Australia from Canton as a youth in 1857 and by the 1870s had become a highly successful shipping merchant in Sydney. With his own fleet of sailing, then steam, ships, docks and warehouses he was involved with the distribution of goods from around the Pacific to Australia, including the shipping of superphosphates from Nauru.



Thomas Chong, aged about twenty-four years.
Photograph courtesy of Dr Dorothy Lau OAM, daughter of Thomas Chong.

Whilst the NSW *Chinese Restriction Acts 1888* (and earlier legislation in the 1850s and 60s) had prevented Chinese naturalisation, many Chinese did settle in Australia before the White Australia Policy came into effect in 1901. Applications for naturalisation were made by Chinese wanting to make their farm titles legal, or by those whose business interests were limited by their alien status. Ong, as a man of means, who had no doubt contributed to the commercial growth of the city and colony, was amongst the successful and gained his naturalisation certificate in 1876.

Thomas, the youngest of Ong's children, was born and raised in Sydney, until he was sent to China (Canton), at the age of twelve, to be educated and trained in TCM. His training was conducted under the traditional apprenticeship system (not long abandoned by western doctors for university training), where he worked and studied under a master for a number

of years, gaining knowledge of diagnosis and treatment with herbs and other therapeutic products. He graduated from the clinic-dispensary of Huang Jy Shen, at Qi Sha, Zhen Jiang, Guangdong in 1889, not returning to Australia until 1908. During his absence, the White Australia Policy had been enacted and racism, which had surfaced periodically in Australia since the gold rushes, had now become institutionalised. Thomas was subject to its discriminatory powers on re-entering Australia, when he was interrogated and fingerprinted despite being Australian by birth—an indignity he strongly resented. Upon his return to Australia, Thomas commenced practice in Nicholson Street, Melbourne, and married Florence Sam, of Irish-Chinese descent.

Thomas would also have become aware of the uneasy peace that existed between registered doctors and the Chinese 'herbalists' (as they were becoming known). This relationship was evident from time to time in the pages of the *Australian Medical Journal* where prosecutions of Chinese using the title of 'doctor' were urged or reported. Cases of malpractice were recorded there too, and comments made on herbalists' thriving businesses (increasingly expressed in racial terms), which no doubt reinforced the existing prejudice.³

Chinese practitioners shared this critical attention with other practitioners—the pharmacists and British herbalists, the unregistered medical practitioners and quacks—who all gave consultations and offered treatment, and who were felt by the medical profession to be in direct competition with themselves. Thomas would have felt the threat of the powerful lobby group of doctors, who in 1905 had seen a bill brought into the Legislative Assembly which, had it been successfully passed, would have prevented anyone but a registered doctor from prescribing or dispensing medicine, or giving medical advice.



Herbal prescriptions recorded by Thomas Chong in the traditional Chinese manner, 1920-30. Courtesy Medical History Museum.

On his return from a later trip to China, Thomas was active in the fight against a further bill (in 1925) to amend the *Pharmaceutical Chemists Act* by limiting the right to dispense medicinal herbs to pharmaceutical chemists. Had herbalists not mounted an intense public campaign, the success of the bill would have put them out of business. Thomas was among forty-six Chinese and European herbalists who proposed their own amendment, supported with a petition signed by 6800 people, to allow some already in practice to continue their business. In the face of such

substantial opposition, this bill too was withdrawn.

However, the herbalists' request, that they be made subject to certain training and practical requirements and registered, was ignored. Had registration of those with professional training been granted, it would have raised the status of and respect for their practice and hastened the reputation of TCM as a complementary medicine rather than its 'alternative' reputation, which lingers to this day.

Thomas appears to have found life in Melbourne unsatisfactory and at intervals made trips into Gippsland before settling in Grant Street, Bairnsdale, where he raised his family and ran his practice. His patient record book (held by the family) for the years 1936-38, examined and translated into western medical terminology and English by Dr Qi Li-yi, yields interesting information about Thomas Chong's practice.⁴ In this twenty-eight month period, he treated 1204 patients including men, women and children. (Readers will no doubt be fascinated to learn that, amongst these patients, on 11 March 1938, was a young Bairnsdale boy by the name of Lance Townsend, who later became a professor in Melbourne's medical school).

Thomas Chong's practice covered 10,800 square kilometres, extending from Sale and Maffra in the west, to Mallacoota in the east, and Delagate in the north. As was the Chinese custom (and unlike his western counterparts), he did not make house calls and many of his patients travelled hundreds of kilometres to be treated. For those unable to travel, he provided an extensive mail order service whereby individually prescribed herbs were posted to them. Patients' names were mostly of British origin, with only a few Chinese, reflecting both the cross-cultural acceptance of his practice and the efficacy of the White Australia Policy, and they came from a wide range of socioeconomic backgrounds.

The range of conditions, in order of those most commonly treated in the 1936-38 period, were lower back pain, hepatalgia and headache (around 100 cases each); rheumatic arthrodynia and gastralgia (around forty-five each); irritability, insomnia, enteritis and exanthema (around thirty each); broncho-pneumonia and cough; and pain on urination (around twenty-four cases each). Historian, Morag Loh, points out that some of these conditions were those for which western medicine had a low success rate and others resulted from poor hygiene which greatly improved with raised living standards. In time also, with the advent of the so-called 'wonder drugs' and advances in surgery, some herbal treatments gave way to these more effective solutions, and later, to the growing use of acupuncture as a significant part of TCM practice. Today we find an easier co-existence between the practices of eastern and western medicine, exemplified by patients who visit practitioners of both traditions for different complaints. There are also instances now, of practitioners like Dr Qi, who are registered with qualifications in both spheres of medicine.

Thomas Chong worked seven days a week, averaging twenty-four to thirty consultations a week. Although his income was considerably lower than a local GP of the same period, his workload was less demanding. He did not have the emergency night calls or deliveries to attend, nor the long distances to travel to patients over rough country roads. His children were able to live a modest but comfortable middle-class life, and recall having a 'typical Australian country childhood'.

Thomas Chong's papers reveal the successful and stable practice of a medical man who was far from being a marginal figure in health care in the east Gippsland area.

Thomas Chong's medical descendants

Thomas Chong's very scholarly life, spent reading and studying when he was not working, provided both example and milieu in which his six children grew up, most of whom pursued careers in medicine or the medical sciences at Melbourne University or the Melbourne College of Pharmacy.

Children of Thomas Chong

- Raymond Victor Chong, born 1917, MB BS (Melb) 1941.
- Albert (Bert) Chong, born 1919, graduated Victorian College of Pharmacy, Melbourne c.1943.
- Dorothy Laurel Chong, born 1922, MB BS (Melb) 1948 (following training as a teacher), was awarded an OAM in 1997 for service to the community and medicine in general practice, particularly in caring for the elderly.
- Norman Chong, born 1925, graduated Victorian College of Pharmacy, Melbourne 1942.
- Gilbert Chong, born c.1926, graduated in chemical engineering, RMIT, Melbourne, c.1945.
- Jeffrey Chong, born 1928, graduated BDS (Melb) 1949.

Grandchildren of Thomas Chong

- John Gooley, MB BS (Melb) 1980, (son of Dorothy Chong) is now an associate professor and surgeon, practising and lecturing in otolaryngology in Boston, USA.
- Alyson Christine Lau, MB BS (Monash) 1985, (daughter of Dorothy Chong) is a Melbourne general practitioner.
- Alan Chong, MB BS (Melb) 1977, (son of Albert Chong).

As a postscript to this substantial family tree in medicine, two of Thomas's great grandchildren are currently undertaking science courses at the University of Melbourne.

¹ By 1917 it was recognised that China needed a living 'democratic' medium of expression, and the archaic form of Chinese was abandoned in favour of the Peking vernacular dialect as the national language.

² When Thomas Chong's children were studying medicine at the University of Melbourne, he always showed an interest in what they were being taught and how they were being trained to use their knowledge in practice. See Morag Loh, 'An Outpost of the Chinese Medical Tradition', *Gippsland Heritage Journal*, 1995, 18:6.

³ See for example *AMJ* October 1874.

⁴ For this information and other aspects of this paper I am indebted to Morag Loh, and Dr Qi Li-yi of the Academy of Traditional Chinese Medicine, Beijing, and Hammersmith Hospital, who is qualified in both western medicine and TCM. Morag Loh, is an historian who has researched and published on the experience of the Chinese in Victoria, and on the practice of Thomas Chong in particular (see 'Western and Chinese Medicine', *RHSV Journal* 1985, 56(3):38-46, and 'The Practice of Thomas Chong at Bairnsdale', *Gippsland Heritage Journal* 1995, 18:2-7. Both have had the opportunity not only to examine the library, but also Chong's patient records from Aug. 1936 to Dec. 1938, which remain with the family. I am most grateful for the work of these two scholars, who with family members, have provided much of the material which now enhances the significance of the material held in the medical history collections, to the benefit of future researchers.

30 November 2005

IDENTIFICATION OF THE DEAD A fundamental human right and a cultural imperative

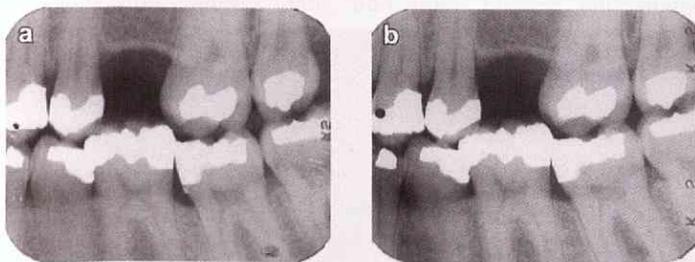
BY PROFESSOR JOHN G CLEMENT

*Inaugural Chair in Forensic Odontology, School of Dental Science, University of Melbourne;
Director, Centre For Human Identification, Victorian Institute of Forensic Medicine*

THIS EVENING I want to speak to you about the contribution of dental science to identification of the deceased, from the standpoint of my own practical experience in forensic odontology over the past thirty years and in the context of recent events in our increasingly turbulent world.

Whilst it is the responsibility of forensic pathologists to establish the cause and mechanism of a person's death, it is more usual for identification to be resolved by comparing some form of pre-existing ante-mortem record with the post-mortem findings at autopsy. This can be done in a variety of ways, such as fingerprint comparison. However, not all human remains are suitable for such comparisons. This may be because of post-mortem alteration of the body by putrefaction, burning or traumatic physical injury. In such circumstances the skeletal remains provide the most robust source of information. In life the teeth are the only parts of the skeleton naturally exposed and visible; hence they are more likely to have been documented in some way. Images of the person may have been recorded in which the subject is smiling. Photographs can inform the investigator of the number, shape and arrangement of the teeth, at least at the front of the mouth, which may be sufficient to establish identity.

Records from the person's treating dentist can furnish x-ray images that record silhouettes of the teeth and the jaws. These images also provide information about past treatments, such as the placement of fillings and other types of restorations by the dentist who has carefully recorded the clinical work and retained the records.



Dental x-rays. Ante-mortem (a) and Post-mortem (b).

Fortunately, the teeth (and materials used by dentists to repair or replace them) are usually very resistant to breakdown. For example, the mineral component of teeth, a calcium phosphate closely resembling hydroxyapatite, does not melt below 1600°C, a temperature that exceeds the melting point of most metals. Further, as dental tissues are progressively subjected to increasing heat the sub-microscopic apatite crystals, which provide teeth with their hardness in life, fuse by sintering so



John Clement

that even after the complete combustion of any binding organic components of the teeth has occurred, their morphology and their component tissues remain, albeit in a shrunken and friable state.

Dentures or false teeth are made either of metal or acrylic, or a combination of the two, both extremely resistant to chemical destruction. Although acrylic is vulnerable to burning, such dentures, protected at the expense of the oro-facial tissues which envelop them, frequently survive a fatal conflagration.

Once a putative identity has been established for a deceased person and because almost everyone in the local Australian population will have had a dental examination at some stage of their lives, excellent records often exist for comparison with these most persistent and

stable parts of the remains.

With the considerable recent success in prevention of dental disease across the population and the corresponding reduction in the prevalence of tooth decay, why isn't forensic odontology seen as a discipline with a short future?

Firstly, from recent experience, the workload of the odontologist has never been greater and our contribution to identification issues does not appear to be declining or less relevant.

Secondly, whilst there has been a huge improvement in dental health as a result of fluoridation and other preventive measures, the improvement in oral health is not universal. Disadvantaged people still carry an unacceptable burden of oral disease. They live in difficult circumstances that result in vulnerability to premature death and violent, sometimes fatal, crimes. This group is therefore over-represented in cases referred to the coroner. In life, choices for disadvantaged people about the provision of dental care are often restricted by financial hardship, so many attend the Royal Dental Hospital of Melbourne or community centres, many of which, as teaching institutions for dental students, keep exhaustive dental records that are excellent for corroborating identity.

Thirdly, for those young and fortunate enough to have been spared the ravages of tooth decay (a widespread epidemic during the 1950s and my childhood) there is a concomitant increased social awareness about the importance of good physical appearance to a sense of well-being and employability. For this reason, particularly among girls (or more likely their parents), there has been an increasing demand for orthodontic treatment. Orthodontics, a speciality within dentistry, seeks to utilise an expert understanding of the growth patterns of an individual to optimise functionality and enhance the appearance of the dentition as a whole. The public are more likely to see orthodontists as dental specialists who make their

children look better and enhance their socialisation among their peers. Nevertheless, whatever differences there may be between the two perceptions of the orthodontist's role, orthodontic treatment may still require the removal of some teeth and the repositioning of others using a variety of removable or fixed appliances. Such appliances are handmade and unique to the wearer, and as such may contribute to identification of the wearer. In addition, the orthodontic examinations themselves generate a huge amount of information ideally suited to the corroboration of identity. Orthodontists need to anticipate children's future growth patterns and often have radiographs taken of the whole head in addition to the smaller x-ray films typically used elsewhere in dentistry. They also make plaster casts of the whole dentition, faithfully replicating a myriad of potentially concordant features of the teeth and jaws, which may be used during any later comparisons of dental records and remains.

The paradox is that as wealth and education increase and dental decay and extractions decline in our increasingly sophisticated society, aspirations about appearance come to assume a greater importance. The result is that more, rather than less, very detailed dental records are generated. This may be a boon to the forensic investigator. Many young people with no evidence of dental treatment in their mouths may still have had their dental status very carefully and comprehensively recorded somewhere. The problem is how to locate the corresponding ante-mortem records. Responsibility for this task lies with the police but input from the odontologist can be very useful for the complete interpretation of the records collected.

Why identify human remains?

Humanitarian reasons for identifying human remains include the need for authorities to be able to return the correct body to the next-of-kin; the need for people to know the fate of a family member with certainty; the need for people to understand the circumstances of a family member's death; the need to afford the bereaved an opportunity to grieve; and the need for the next-of-kin to dispose of the remains in an appropriate way and mark the end of the person's life with appropriate ceremony. Legal reasons include the need to reconstruct the circumstances of an accident or crime; to collect evidence for criminal prosecutions; and issues of inheritance, insurance, litigation, compensation, taxation and social security payments.

Who needs to be identified?

- People who simply go missing—very young children, for example, or the elderly wanderer with Alzheimer's disease—who get lost and die before they can be found.
- People who make the decision to remove themselves from their normal environment before committing suicide.
- Accident victims: car drivers, motorcycle riders, victims of industrial accidents, fishermen and yachtspersons who drown etc.
- Vulnerable people, enticed or forced into slavery and/or prostitution. Such people are frequently abused and sometimes murdered. These cases often have a transnational component and are difficult to investigate because of the reluctance of witnesses to declare themselves for fear of the police or repatriation to their country of origin.
- Murder victims where deliberate attempts have been made to thwart identification by mutilation or destruction of the remains by burning or chemical means.

- Victims of natural mass disasters.
- Victims of inter-ethnic violence, and acts of terrorism.
- Victims of politically motivated violence, for example Argentina and Iraq.
- Victims of genocide.

The investigatory sequence

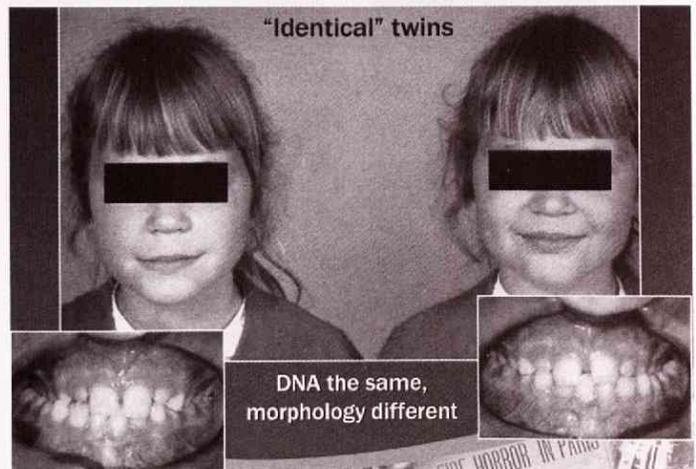
- Locate, recover and document all the remains.
- Establish that the remains really are human.
- Establish whether the remains are those of a single person or commingled.
- Attempt to classify the remains according to population of origin, sex and age.
- Document any uniquely identifying features that can be used for comparison with any available ante-mortem records to prove identity to the satisfaction of the courts.
- Record any injuries that may explain the circumstances of death.

The intellectual challenge

Unlike most scientific investigations forensic investigations cannot change the events of the past or re-run the experiment a second time just to make sure of the results. They are highly inferential in their methodology and hence, are heavily dependent upon the previous experience of the practitioner and their capacity to construct likely scenarios for the limited evidence that is available. (A colleague once encouraged me to think more like Tolstoy than Sherlock Holmes.) In this respect forensic odontology is like archaeology or palaeontology, but with the added rigorous requirements of the law overlaying the proceedings. Forensic odontology also has to cope with incomplete or altered remains, fakes, frauds and attempts to deceive or thwart the investigator.

Whilst largely a comparative discipline, the decision of what to compare, how to do it and in which sequence, can be challenging because some types of examinations destroy the evidence needed for others to be performed. A close working relationship between the coroner, the pathologist, any police investigators involved and the odontologist is essential so that the most important questions (which always include issues of identity) are answered wherever possible.

What of the role of DNA? Molecular biological techniques can be unparalleled in their capacity to identify deceased individuals when corresponding ante-mortem samples can be identified with confidence. However, in real-world situations



'Identical' twins. The DNA is the same, but the morphology is different.

their applications are frequently limited. DNA analysis cannot distinguish between identical twins whereas simple dental morphological comparisons often can. DNA analysis tells us nothing about the life of the deceased but, with intelligent interpretation, much can be inferred about the life of a person from post-mortem dental findings, even in the absence of any ante-mortem dental records for comparison.

For DNA comparisons to be made with the tissues of the deceased, the location and consent of the mother or siblings to provide corresponding biological samples is often required. In a world where families are frequently widely dispersed across continents this is often a difficult, time-consuming and financially restrictive task for investigators. Another option is the location of personal items carrying biological material, such as a comb or razor used only by the deceased in life. Again, to find pristine samples of definite provenance is not always as easy to achieve as it sounds: flatmates sometimes unwittingly use each other's personal effects. There is also the issue of expense and time for analysis, both of which are greater than for the corresponding odontological comparisons. Lastly, there are the problems caused by fragmentation of remains. Expert physical matching of dissociated body parts by a trained anatomist, anthropologist or odontologist can often greatly reduce the amount of DNA analysis that needs to be done. This saves time and expense. Another problem which can reduce the applicability of DNA, is post-mortem tissue decay, which can make extraction of usable samples impossible. In cases where children need to be identified, such as following the tsunami disaster in 2004, the ability of the odontologist to age children using their knowledge of the chronology of human tooth development can narrow the range of possible matches confronting the DNA expert, improve the statistical power of their calculations and enable confident matches to be made. Odontology and DNA are not disciplines in competition, but complementary techniques which, when applied in tandem, can often achieve success in circumstances where the application of either technique alone would be unsuccessful.

Living and working as a dentist in the East End of London thirty years ago taught me some important lessons. As a young, know-all graduate I had to learn to listen to my patients. At the London Hospital Medical College (LHMC) many of our older patients were Jews who had survived the Nazi concentration camps. Many had poor English and many were difficult to deal with because of their prior experiences with those who had once held absolute authority over them, some of whom had even worn white coats.

Thirty years later I'm grateful to the ethicist Alexander McCall Smith for expressing so clearly what these old survivors taught me but which I had struggled to articulate for myself so long ago: that the real success of our society should be gauged by our behaviour to those less fortunate or less powerful than ourselves.

'...once you start denying people a name, you deny them an identity and from there it is a short step to treating them as non-persons.'



The aftermath of the tsunami which hit Phuket, Thailand, in 2004—part of an unimaginably huge disaster with massive loss of life. The rate of resolution for this disaster was very successful compared with '9/11'.

Some people...were impatient with those they thought did not count; the old, the inarticulate, the disadvantaged. The person with good manners, however, would always listen to such people and treat them with respect

Alexander McCall Smith, *The Sunday Philosophy Club* (2005).

Those old Jewish patients told me that in the camps their identity had been reduced to a number. They were no longer people, just an expendable commodity. Since then, thirty years of forensic work has opened my eyes a little to other examples of inhumanity. Even with the utmost effort on my part I realise that I shall never be able to grasp the feelings of people driven to the edge of their existence by the brutality of others whilst witnessing the ongoing and systematic murder of their companions and families.

However, the lesson not lost on me is that once you start denying people a name, you deny them an identity and from there it is a short step to treating them as non-persons. The denial of identity and the dehumanisation of peoples are often the prelude to atrocious behaviour. In times of war, propagandists clearly exploit fear of an enemy, all of whom are depicted as barbarous and despicable, in order to motivate their own side and engender an increased sense of patriotism in the population.

One aim of religious fanaticism is to polarise people and politics. Fanatics wish to make us see people whom we now look upon as friends and colleagues in an adversely stereotypical way. Prejudice and ignorance feed the fires of racism from both sides and can be used to justify any atrocity. When neither side knows the enemy or understands the culture of the other, truly appalling consequences can result. This is the trap confronting our previously largely tolerant societies, challenged by suicide bombers and other terrorists.

How does one defeat an enemy without becoming more like them oneself? It seems oxymoronic to introduce laws that are restrictive of personal freedom and increase the unfettered power of the state in an attempt to preserve the freedoms we cherish and strive to protect. This is easy to say and I fully accept that striking the right balance in legislation is difficult. I have never had to go to war, nor have I ever lived in a society where the police and courts are not to be trusted. Perhaps dangerously, I assume it could never happen here in Australia. I cannot imagine having had the courage to stand up to Hitler, Stalin, Idi Amin or Saddam Hussein from within their own countries whilst they were in power, nor surviving for very long if I had. This understandable fear of terrible retribution on oneself or one's family has a very sobering effect on people such as death investigators who would otherwise be thorough in their task.

For example, Argentina (a country once similar in many ways to Australia) was one of the first countries to introduce identification of the entire population from foot and fingerprints and had extremely good morphometric records held in close proximity to matching registers of births, deaths and marriages. Yet during the years of oppression under Galtieri (1976-83) approximately 10,000 people were abducted, killed and never returned to their families. Although bodies dumped by hit-squads were often quickly identified, the next-of-kin were never informed. Courts were often never involved in any death investigation and the bodies were de-identified and buried as 'No Name'. The medical profession, often out of fear, but sometimes as an act of complicity, faked documents and overlooked clear evidence of torture on the bodies of the victims.

Isolated in the safety and security of Australia, I am not really in a position to preach about lapses on the part of potential investigators in Argentina, but I have very grave concerns for what has undoubtedly been perpetrated at Abu Ghraib prison in Iraq and what, albeit at a lower level, is probably still being done by Australia's most important ally in the Guantanamo Bay US naval base detention centre.

Of course, the current American administration may come to rue such excesses of executive power and the apparent reluctance of some of its most senior members to unequivocally forbid the use of torture by the CIA. Those in the United States with more personal experience of warfare than their current political masters clearly understand the increased dangers for the well-being of any serviceman unfortunate enough to be captured by the enemy in future operations. Senior old soldiers such as Andrew Bacevic, a retired US army colonel, Vietnam veteran and author of *The New American Militarism* (2005), knows that once the moral high ground has been abandoned it is hard to justify to the troops exactly what they are fighting for. Bacevic renounces messianic dreams of improving the world through military force in favour of returning to some of America's own military traditions that were founded on the old idea of the citizen soldier whose principal role was defence of the country and not the stuff of 'conquest, regime-change or imperial policing'.

An intoxicating combination of belief in one's own infallibility, bolstered by certainty in the rightness of one's own cause and a complete disdain for 'less civilised' enemies, can somehow sanction the dehumanisation of one's captives and engender an utter disregard for their most basic human rights. This is only one step removed from even more atrocious behaviour.

Mass graves in many parts of the world attest to the appalling end-point of over-zealous outbursts of intolerance towards people who may once have been neighbours just a little different to oneself, but became conveniently anonymous before they were massacred.

What can the forensic odontologist do to ameliorate or prevent atrocities?

The most important role for the forensic odontologist, and others such as the pathologist and anthropologist, is to gather and document evidence in such a meticulous and comprehensive manner that it will stand the closest scrutiny by courts, international tribunals and historians of the future. Such evidence has been used in The Hague for the prosecution of those charged with crimes against humanity. Certain knowledge that crimes will not go uninvestigated for long may have a moderating influence on anyone contemplating genocidal acts. I am not naïve about such hopes but I think we all have a duty to hope and, if nothing else, by our actions preserve the facts for future generations.

People missing as a result of armed conflict or internal violence is a harsh reality for countless families around the world. Not only is this distressing for those directly concerned, it may also hamper reconciliation and peace efforts by contributing to further outbreaks of violence. Of course, it is impossible to document every atrocity. Human Rights Watch gives the most conservative estimate for the numbers of victims murdered during Saddam Hussein's reign in Iraq at 300,000. For these people to be exhumed and identified and have the manner of their death recorded is beyond the capacity of the world's forensic community at this time. New strategies are needed to bring finality to the next-of-kin and allow affected communities to rebuild themselves.

Professor Stephen Cordner, Director of the Victorian Institute of Forensic Medicine (VIFM), spent a year in Geneva on sabbatical working with the International Committee of the Red Cross. In particular he worked on the Missing project, which aims to shift the emphasis of investigations into the fate of persons who disappear during civil conflict from a prosecution focus to one with broader humanitarian objectives. In the past, when mass murderers were caught it was only necessary to prosecute them for the deaths of a few identified persons. This left traumatised communities with no definite end-point to their wish to know for certain the fate of their friends, neighbours and families. The project has been exploring the feasibility of identifying all the deceased as far as is practicable and developing strategies to do so. This is a daunting task and both Professor Chris Briggs from the Department of Anatomy and Cell Biology and I have been co-opted to assist in our respective specialist areas.

The aim of the Missing project is to heighten awareness among governments, the military, national and international organisations, including the Red Cross and Red Crescent networks, and the general public about the tragedy of people unaccounted for as a result of armed conflict or internal violence and for their families. It aims to emphasise the legal right of families to know the fate of their missing relatives and calls for renewed commitment by the international community to this end. It aims to create and make available tools for action and communication in order to ensure accountability on the part of the authorities responsible for resolving the problem of missing people, to assist families and to prevent further disappearances.

In support of these laudable objectives the VIFM's forensic odontology unit and information technology section is working to improve computer software that can be used on a day-to-day basis to assist with missing persons enquiries by the Victoria Police, by storing and comparing the dental records of those known to have gone missing with postmortem records compiled from unknown skeletal remains. Based upon an earlier version called DAVID (Disaster And Victim Identification), the new software, DAVIDweb, is intended for use in mass-disaster situations and runs over the internet through a browser on almost any computer platform.

Another need disclosed by recent disasters and terrorist attacks in our region is that of training suitably qualified people in neighbouring countries. The Victorian odontology team is heavily involved in negotiations with colleagues overseas and is striving to share its accumulated knowledge and expertise wherever possible. The benefits to professional relationships are obvious, but by strengthening investigatory capacity off-shore Australia is also increasing its own security.

I'd like to leave you with a quotation by Sir William Gladstone, Prime Minister of Britain (1871):

Show me the manner in which a nation or a community cares for its dead and I measure with mathematical exactness the tender sympathies of its people, their respect for the laws of the land and their loyalty to high ideals.

THE BERNARD O'BRIEN INSTITUTE OF MICROSURGERY

Microsurgery with a global outlook

BY ANN WESTMORE

Research fellow, Johnstone-Need Medical History Unit

WHEN JIM ANGUS was researching blood flow in small coronary arteries at the Baker Institute in the early 1980s, he was contacted by the Microsurgery Research Centre at St Vincent's Hospital in Melbourne. An overseas surgical fellow studying tissue blood flow at the centre was having trouble with a flowmeter. Could he possibly help?

Angus, a pharmacologist and now Dean of the Faculty of Medicine, Dentistry and Health Sciences, readily agreed to give whatever assistance he could to the fellow and his colleagues. From that point the inner workings of the institute and its unique surgical fellowship scheme were revealed to Angus. In the process, he started a twenty year involvement with Australia's largest independent surgical research institute, which was renamed the Bernard O'Brien Institute (BOBIM) in 1993 after its founder, Australian microsurgery pioneer, Bernard O'Brien.

The story of Angus's long association with BOBIM and the close bonds that developed between him and the surgical fellows emerged in a Witness to the History of Australian Medicine Seminar in March 2004.*

The fellows and Angus shared an interest in blood vessel spasm, which posed major problems when surgeons raised skin flaps for microsurgery. As time went by they explored whether there was a pharmacological agent that could be dripped onto blood vessels to eradicate the spasm. Together they went through the pharmacopeia, in the process gaining valuable insights that formed the basis of practical improvements in microsurgery and numerous papers in the medical literature.

Another scientist from outside BOBIM to have a big influence on the surgical fellows was John Hurley, former professor of pathology at the University of Melbourne and an international authority on fluid loss and tissue swelling in inflamed and injured small blood vessels. After his retirement in 1986, Hurley spent three half days a week providing advice on research which at that stage was focused on nerve regeneration and skin flap transfer and related subjects such as angiogenesis and ischaemia reperfusion injury.

The BOBIM fellowship scheme

The institute's fellowship program combines research and clinical components, and participants receive a certificate of fellowship on its successful completion.

Between 1969 and 1976, forty-four surgeons worked as fellows in the then Microsurgical Research Centre for periods of two months or more. Just over half were from Australian hospitals with the remaining twenty-one from overseas. Each individual was allocated a new or ongoing research project by O'Brien who kept an attentive watch on progress. In the remaining time, trainees studied surgical and microsurgical techniques and were given opportunities to put them into practice.

Sue McKay, manager of the St Vincent's Experimental Medical and Surgical Unit, recalled that, in the early days of the scheme, the conditions for fellows were not flash. In 1973 they 'had a very tiny office with two chairs which was their tea-room, their office and their lunchroom. They did everything in that room and they

never complained because they were where they wanted to be. And they were learning a lot.'

Much of what they learned came from the scientific and surgical staff attached to BOBIM, but O'Brien was always on the look-out to involve outside scientists with relevant expertise, such as Angus or Hurley.

The fellowship scheme developed a distinctive aspect in the early 1990s after Angus became a member of the NHMRC grants committee. 'Bernie felt if I knew so much...it would be nice if I could also help him write some grants—so I was brought on to BOBIM's scientific advisory committee [and later its board],' Angus said. 'The interesting point was that Bernie wanted [financial] support for [some of] these overseas fellows...around the \$20,000 mark.'

After putting a case together, BOBIM applied successfully to the NHMRC for funds to support a number of overseas fellows. 'It was equivalent to a PhD scholarship and was [held] for a year,' Angus recalled. 'If you looked at surgical research in Australia, it was a very under-resourced area. And here was a group—a critical mass under one roof—who could share so much.'

Angus's colleagues queried the notion of spending tens of thousands of dollars supporting overseas surgical trainees. His response was: 'The benefits are there. They [the fellows] are going to be part of a larger family; the world and the patients are going to benefit. We are part of a global village.'

Many of the surgeons who gained financial assistance were from poorer countries and would otherwise have been unable to get the support needed to study in Australia. 'It's what we're doing for world peace,' Angus said. 'We're world ambassadors for the way we go about our business in research and teaching.'

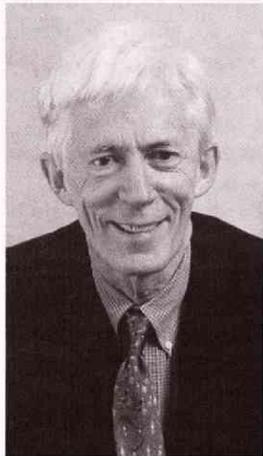
These days NHMRC support for individual trainees at BOBIM is no longer available and fellows are generally self-funding. At the same time, BOBIM is regularly successful in winning NHMRC grants and was recently awarded the largest grant allocated to the University of Melbourne.

Since the fellowship scheme started the number of fellows who have trained at the institute numbers over 200, with representatives from virtually every continent. According to University of Melbourne professor of surgery, Wayne Morrison, who replaced O'Brien as director on his retirement in 1992: 'There aren't many countries I can think of that haven't been part of that group. Many of the fellows have come from Third World countries, but the great majority are from the elite places of the world.'

Yoshio Tanaka, a fellow from Japan, credits the BOBIM experience with changing the direction of his career. During his eighteen months in Melbourne, from late 1996 to the beginning of 1998, he participated in some front-line research and some extraordinarily challenging and memorable surgery. In the process he gained that intangible and invaluable commodity, the 'courage to do microsurgery', particularly involving the face, head and hand. Today he is head plastic surgeon at a private hospital in Japan and also undertakes experimental studies in a university department.

One of Tanaka's most vivid recollections was being part of the team that re-attached the face of a young Shepparton woman after it was torn off in an accident. She was brought to St Vincent's where Tanaka worked in two tag teams with Wayne Morrison. Tanaka was part of the tissue engineering group while Morrison led the microsurgery group. The two teams worked for about thirty-two hours, with a group on one table sorting out the scalp and the face, and the other working with the patient to find the blood supply. They did a remarkable job which resulted in the patient making a full recovery and becoming an eloquent advocate for BOBIM. For Tanaka, occasions like that, which brought the research and clinical work together for the benefit of the patient, made BOBIM a special place to work.

Swimming with the big fish



Wayne Morrison AM, director of the Bernard O'Brien Institute of Microsurgery, Hugh Devine Professor and head of the university Department of Surgery at St Vincent's Hospital, recently announced the ability to grow new heart tissue. The growth of this heart tissue, which beats spontaneously with its own rhythm, is the breakthrough step on the path to creating new organs to replace diseased and injured body parts.

The surgical fellowship program has proved an invaluable investment for Australia on a number of levels. Patients throughout the world have gained through the research and clinical activities of fellows, and they, in turn, have developed international reputations and become enthusiasts for BOBIM, St Vincent's and Australia.

At another level, the scheme has demonstrated Australia's capacity to be a world leader, swimming with the big fish in terms of research and clinical applications.

'In surgery, at least, we've often gone overseas to train and with the concept that we're from a small place that was not worth anything,' Morrison said. 'It's often not until you go overseas and test the ground that you get a feeling for where you are in space. And I can honestly boast that St Vincent's...was very much world-class and people who came here experienced that and went back. People from America and Japan, who

were putting their toe in the water with early microsurgery, saw this place as the epicentre.'

The tradition continues under Morrison with BOBIM breaking new ground in areas such as tissue engineering which uses tiny three-dimensional synthetic frames plus human cells and special growth factors to grow new tissue, cartilage and bone. The field is advancing rapidly, particularly towards tissue engineered for heart operations. It is providing endless opportunities for fellows to work at the frontiers of new knowledge.

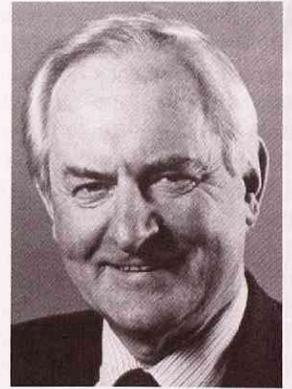


Research fellow Dr Gaetan Willemart with Experimental Medical and Surgical Unit manager, Ms Sue McKay, in the research operating theatre, c1996.

* A transcript of the Witness seminar 'From "soft" to "hard" science: the development of microvascular surgery in Australia' can be viewed at: www.chs.unimelb.edu.au/programs/jnmhu/witness/seminars.html For further information about holding a Witness Seminar in your discipline or organisation, contact Dr Ann Westmore at afwest@unimelb.edu.au

The BOBIM journey

For Bernard O'Brien, overseas study early in his surgical career proved to be a make-or-break experience. Prior to leaving for England, where most Australian doctors headed for postgraduate training at the time, he undertook his residency years and surgical training at St Vincent's Hospital and at the Royal Melbourne Hospital (1951-52). He then worked as a demonstrator at the university in anatomy (1953) and in clinical surgery and histopathology (1954), and obtained a Master of Surgery degree (1955).



Bernard O'Brien AC, CMB

With the help of renowned Melbourne plastic surgeon, Benjamin Rank, he obtained a post as Nuffield assistant in plastic surgery at Oxford University (1956-57), working under Dr Pomfret Kilner. But he found the pace too slow and grew impatient for more hands-on experience. He determined to take another post as plastic surgery registrar at the Odstock Hospital, Salisbury (1957-58), rather than complete the prescribed training at Oxford. While working there he met his future wife, Joan, a triple-certificate nursing sister.

In 1959 he sailed to New York where he was made chief resident to the Plastic and Reconstructive Service at Roosevelt Hospital, becoming one of St Vincent's first graduates to gain formal surgical training in the US.

In Melbourne the following year, he started a private surgical practice and was appointed acting assistant plastic surgeon at St Vincent's. O'Brien was determined to conduct research and, in 1964, undertook studies on small blood vessels and nerves in a disused mortuary at St Vincent's using a microscope loaned to him by Gerard Crock of the university's Department of Ophthalmology at the Eye and Ear Hospital.

Four years later, with the support of Dick Bennett, then head of the university's Department of Surgery at St Vincent's, O'Brien was appointed an honorary research assistant and acting assistant plastic surgeon at the hospital, and received a research grant of \$2000. The following year he obtained a number of other grants—the largest, from the NHMRC, allowed him to continue his research on experimental anastomosis of small blood vessels and nerves under magnification—which helped lay the foundations of clinical microsurgery. His efforts led to the establishment of the Microsurgery Research Centre (later BOBIM) and its associated fellowship program, and to his appointment as head of the St Vincent's Plastic and Microsurgery Unit and professorial associate in the university's Department of Anatomy in 1983.

Ann Westmore

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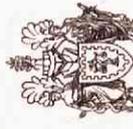
MDAV
Pelham House
165 Bouverie Street
Carlton Victoria 3053

FAX
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165 Bouverie Street
(PO Box 1059)
Carlton Victoria 3053
T 13 MDAV (13 6328)
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