



(From left) Vincent Pelligrino, Lisa Hoggins, Shirley Vallance, Jamie Cooper in front of the PACS machine.

Intensive Care and Hyperbaric Medicine

The Alfred Intensive Care Unit (ICU) remains one of the largest ICUs in Australia following the opening of the 35 bed ICU in the Tattersall's Critical Care Complex in August 2000. Approximately 2000 patients are treated annually for a variety of complex critical illnesses, with major specialties being the management of patients with trauma, burns, heart and lung transplantation, bone marrow transplantation, infectious diseases, or with the requirement for neurosurgery, vascular surgery or hyperbaric oxygen.

Key clinical developments during 2002 included the commencement of a medical emergency team (to treat acutely unwell patients in the hospital wards), a follow-up service (to improve patient's transition between ICU care and the ward), as well as the improvement in quality activities (such as mortality and readmission audits).

The department has a well-developed clinical research program, and the majority of projects fall into the major themes of research. These include (1) trauma (particularly severe brain injury), (2) sepsis, (3) mechanical ventilation and acute lung injury, (4) nutrition, (5) extracorporeal support and (6) post-cardiothoracic surgery. The last few years has seen an explosion of research projects to the point that the majority of ICU patients are eligible for one or other of our studies.

A healthy balance of investigator-driven projects, industry-sponsored trials and multi-centre trials organised by the Australian and New Zealand Intensive Care Society Clinical Trials Group (ANZICS CTG) is fostered. Most of the full-time intensivists participate in research, and in 2002 Associate Professor Jamie Cooper commenced his NHMRC Practitioner Fellowship, allowing him to devote a significant proportion of his time to research.

Funding is from major competitive grants (NHMRC, Victorian Trauma Foundation and Australian and New Zealand Intensive Care

Foundation) and from industry-sponsored projects, which together support the salaries of the ICU research team of five research coordinators. The enthusiastic and dedicated work of this ICU research team, which in 2002 comprised Lynne Murray, Shirley Vallance (profiled), Julie Charlton, Catherine Harry and Katherine Moulden, as well as the helpful attitude of the entire ICU nursing staff, has been crucial to the rapid expansion in the ICU's research output, some of which is highlighted as follows.

Trauma: A double-blind randomised trial testing pre-hospital hypertonic saline (HTS) resuscitation in patients with traumatic brain injury was completed during 2002. Previous studies had suggested that HTS resuscitation improved survival compared to conventional fluids. The study was coordinated by a management team headed by Jamie Cooper and involved all Melbourne hospitals. A total of 229 patients were involved over 3 years. The study found that HTS did not improve long term neurologic outcomes in patients with traumatic brain injury. The findings will directly influence the choice of future resuscitation fluids by the Melbourne ambulance services and also the direction of future research aiming to improve outcomes in patients with traumatic brain injury.

Also in 2002, two large outcome surveys in brain injury patients were completed. These were a 21 month study of current outcomes in patients with traumatic brain injury at the Alfred, and a 6 month study as part of the Australian Traumatic Brain Injury Study (ATBIS). Both these studies provide solid baseline data for future Australasian research in the area of brain injury and also assist in quantifying the substantial disabilities suffered by many patients after traumatic injury.

A prospective randomised controlled trial of early decompressive craniectomy in patients with traumatic brain injury has just commenced in a pilot phase. It is planned to develop this study into a large multi-centre project throughout the major hospitals in Australia, and this will be coordinated at the Alfred.

Sepsis: The VASST (Vasopressin in Septic Shock) study is a 750 patient randomised trial in ICU patients being conducted in collaboration with investigators in Canada. In 2002 The Alfred was the largest recruiter from 20 Canadian, 2 Australian and 1 American sites, and has now achieved funding from the Canadian CIHR (NHMRC equivalent), and is assisting recruitment of three new Australian sites.

In the SAFE (Saline versus Albumin Fluid Evaluation) study being managed by the Australian and New Zealand Intensive Care Society Clinical Trials Group, the Institute for International Health and the Australian Red Cross Blood Service, The Alfred is one of the largest of 16 Australian and New Zealand sites.

At the end of 2002, the study is well on track, having enrolled over 5000 patients, including over 500 patients at the Alfred.

Acute lung injury: Despite showing great promise in animal and preliminary clinical studies, a multicentre randomised study of a neutrophil elastase inhibitor (sivelestat) in acute lung injury was brought to an early end by the data and safety monitoring board, on the grounds of futility. Final results of this study which involved seven Alfred patients out of approximately 500 worldwide are awaited.

Following the completion of this study, a smaller investigator-driven study to determine some of the effects of positive end-expiratory pressure (PEEP) and the recruitment manoeuvre in acute lung injury has commenced.

Nutrition: An observational study of nutritional support practice in Australasian hospitals has just commenced. This project which is headed by Andrew Davies will be coordinated jointly by the ICU and Nutrition departments and should identify nutrition practices in approximately 60 hospitals across Australia and New Zealand to assist in the design of future randomised controlled trials in the field of nutritional support.

Current Projects

DECRA: a randomised controlled trial of early decompression craniectomy in traumatic brain injury

APD: anterior pituitary dysfunction in traumatic brain injury

VASST: randomised controlled trial of vasopressin versus noradrenaline in septic shock

SAFE: a multi-centre double blind randomised controlled trial of the effects of intravenous volume replacement with albumin compared to saline in critically ill patients

SAFE sub-study: effects of albumin on pressure sore incidence

The effects of low dose aminophylline on renal function in critically ill patients

Validation of two new cardiac output devices

ADDRESS: Drotrecogin alfa (activated) in patients with early stage severe sepsis

The efficacy of enteral naloxone to treat opiate-induced constipation in critically ill patients

The relationship between eosinophilia and serum cortisol

The effects of PEEP and recruitment manoeuvres in ALI

Manual hyperinflation in patients on mechanical ventilation

AuSPEN nutritional support study

Mathematical model of the human circulation

FAMAAS: prevention of AF in cardiac surgery

Publications

Journal articles

Cook D, Brower R, Cooper J, Brochard L, Vincent JL. Multicentre research in adult critical care. *Crit Care Med* 2002;30:1636-43.

Cooper J. Drug overdose: a disorder that is now rarely managed in the tertiary hospital intensive care unit? (editorial) *Crit Care Resuscitation* 2002;4:163.

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Salamonsen RF. Improving accuracy of the chemiluminescent analyser for measurement of nitric oxide and nitrogen dioxide in respired gas. *J Clin Monit Comput* 2002;17:173-9.

O'Brien PE, Dixon JB, Brown W, Schachter LM, Chapman L, Burn AJ, Dixon ME, Scheinkestel C, Halket C, Sutherland LJ, Korin A, Baquie P. The laparoscopic adjustable gastric band (Lap-Band): a prospective study of medium-term effects on weight, health and quality of life. *Obes Surg* 2002;12:652-60.

Grants and Other Funding

Bernard S, Cooper DJ, Danne P, Smith K. The use of rapid sequence intubation by paramedics in patients with severe head injury. Victorian Trauma Foundation. 2002-2004: \$255,373.

Cooper DJ, Myles P, McDermott F. Hypertonic saline in head injured patients - a prospective randomised pre-hospital clinical trial. NHMRC. 2000-2002: \$241,956.

Cooper DJ, Myles P, McDermott F. Hypertonic saline in head injured trauma patients - a prospective controlled clinical trial and two year cost benefit analysis. Victorian Trauma Foundation. 2000-2002: \$82,733.

Cooper DJ, Rosenfeld J. Early decompressive craniectomy in brain injury. Australian and New Zealand Intensive Care Foundation. 2002: \$61,495.

Cooper DJ, Stockigt J. Anterior pituitary dysfunction in traumatic brain injury. Victorian Trauma Foundation. 2001-2003: \$88,500.

Doig GS, Finfer S, Simpson F, Dobb G, Mitchell I, Davies AR. Developing and evaluating evidence-based guidelines for feeding in the Intensive Care Unit: a cluster randomised trial. Australian and New Zealand Intensive Care Foundation. 2002: \$150,000.

Kossmann T, Cooper DJ, Rosenfeld J. Reduction in preventable deaths and disability by implementation of advanced techniques and treatment of patients with traumatic brain injury. Victorian Trauma



Shirley Vallance

Shirley Vallance is a Senior Research Officer in the Department of Intensive Care. Shirley initially trained at the Alfred and worked in the ICU when it was located in the Linay Pavilion. She has worked in intensive care units in England and Italy, and was Nurse Unit Manager of the Royal Melbourne Hospital ICU for a number of years.

Prior to her current employment at The Alfred, Shirley was employed for several years at the Victorian Institute of Forensic Medicine. She was an integral team member responsible for supplying quality data for analysis to the Consultative Committee for Road Traffic Fatalities.

Shirley has many years experience with trauma data collection and trauma systems. This experience, along with Shirley's enthusiasm for research, her unfailing work ethic and her good grace have been valuable assets to the Intensive Care research team.

Foundation. Best Practice Program Grant. 2002-2005: \$1.8 million.

McCaughan F, Davies AR. Ventilator induced lung injury in patients with acute lung injury: is an "open lung" approach the best strategy? Alfred Research Trusts Small Project Grant. 2002: \$5,000.

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Norton R, Bellomo R, Cooper DJ, Finfer S, Boyce N, MacMahon S. Randomised comparison of fluid resuscitation with human albumin solution or normal saline among critically ill patients. NHMRC. 2001-2003: \$608,999.