Introducing nosokinetics: modelling to enhance health system management

THE WORLD POPULATION IS AGEING and there is a crisis in hospital care. Correlation is not causation; however, there is an interesting relationship between the introduction of computer assisted hospital statistical returns and the crisis in inpatient care. This issue of *Australian Health Review* contains seven papers from the Nosokinetics Group's first International Health and Social Care Modelling Conference held in Adelaide in April 2006. A broad range of practical and theoretical clinical and managerial topics were discussed at this conference.

The United Kingdom-based Nosokinetics Group is a loose worldwide collaboration of mathematicians, decision scientists, clinicians and health service personnel developing and validating models that describe the process of inpatient care. Literally, nosokinetics brings together the Greek words for disease (*noso*) and movement (*kinetics*). Hence nosokinetics is the science of measuring and modelling patient flow through health and social care systems. The underlying premise of collaborating members is that the world will be a better place when the current tools used to measure the process of care are replaced by a scientifically validated approach.

In times gone by, physicians underpinned their healing art by feeling the pulse, examining the urine and looking at the colour of the skin and faeces. Then, simple tools — thermometers, blood pressure machines, sigmoidoscopes and x-rays — were introduced: slowly at first, but now new tools, new drugs and new specialties are being introduced with ever increasing speed, and medicine has become a science-based art. Consider the benefits brought to mankind by the introduction of a scientific approach — pharmacokinetics and pharmacodynamics — to the understanding of the absorption, distribution, metabolism and excretion of drugs. Similar benefits can arise if we understand better how differences in staff behaviour and resource allocation inside and outside hospitals influence the process of inpatient care.

The papers presented here cover a wide range of issues that need to be resolved to introduce a scientific approach to the planning of health and social care systems. The subjects include probability theory in genetic counselling (*page 24*); a literature review on discharge planning (*page 34*); practical issues associated with fast tracking acute medical care in a New Zealand hospital (*page 50*); a simulation model used to plan a podiatry service (*page 63*); a survey on a predictive technologies framework (*page 73*) and two mathematical approaches to data analysis. One model forecasts monthly attendances to the emergency department in an Australian hospital (*page 83*), and the other reveals the phases of hospital and community care of female patients in a UK geriatric medical service (*page 91*).

The Nosokinetics Group recognises that teamwork by many disciplines will be required to find the solutions to the issues confronting the health sector. Modelling requires clinicians to communicate without professional jargon to capitalise on the logical skills of the mathematicians. The papers presented here show that modelling has a role to play in managing the complex health industry.

Our concern is that health services research, which includes the type of research and application presented at the conference, is not well funded

Peter H Millard, MD, PhD, FRCP, Emeritus Professor of Geriatric Medicine, St George's Hospital Medical School; and Visiting Professor of Health Informatics
Health and Social Care Modelling Group, University of Westminster, London, United Kingdom.

Mark Mackay, BSc(Hons), BEc, BComm
School of Psychology, University of Adelaide, Adelaide, SA.

Correspondence: Mark Mackay, School of Psychology, North Terrace Campus, Level 4 Hughes Bldg, University of Adelaide, Adeliade, SA 5005.
mamackay@psychology.adelaide.edu.au

in Australia.[1] Health services research is a multidisciplinary field, where researchers and others are concerned about questions relating to the need, use, demand, supply and outcome of health services.[2] The term "outcome" has broad meaning and may relate to the appropriateness, equity, effectiveness and efficiency of health services.[3]

Why are we concerned? Australia's total health expenditure for 2004–05 was $87.3 billion, or $4319 per person, and represented 9.8% of the gross domestic product.[4] We posit that in other industries there would be significant analysis in determining whether new investment should occur — be it to reinvigorate, change or create new opportunities. Not only does this analysis appear to be limited in the health industry, but Braithwaite et al[5] recently suggested that much change in the Australian health care environment — or at least those changes that they examined — did not result in positive outcomes.

We hope that these papers will inspire you to consider how modelling might benefit your work.

Peter H Millard and Mark Mackay
Guest Editors

Note

Further information about nosokinetics is available at http://www.nosokinetics.org or from the authors.

References

1 Haas M. Health services research in Australia: an investigation of its current status. *J Health Serv Res Policy* 2004; 9 Suppl 2: 3-9.

2 Last JM. A dictionary of epidemiology. 2nd ed. New York: Oxford University Press, 1988.

3 Pirkis J, Goldfeld S, Peacock S, et al. Assessing the capacity of the health services research community in Australia and New Zealand. *Aust N Z Health Pol* [online journal] 2005; 2: 4.

4 Australian Institute of Health and Welfare. Health expenditure Australia 2004-05. (Health and welfare expenditure series No. 28.) Canberra, Australian Institute of Health and Welfare, 2006. (AIHW Cat. No. HWE 35.)

5 Braithwaite J, Westbrook MT, Hindle D, et al. Does restructuring hospitals result in greater efficiency? – An empirical test using diachronic data. *Health Serv Manage Res* 2006; 19(1): 1-12. □