Leading Australian doctors and clinical researchers set new priorities

Wondering what sorts of articles the *MJA* might be publishing in the near future, and what might be the areas of focus and challenge for the medical profession, we asked over 40 of Australian medicine's current opinion leaders:

". . . what area in your discipline is not currently researched or not resourced [by conventional conservative funding bodies], but ought to be developed as it will yield dividends."

In true editorial spirit, we asked each contributor to answer the question in less than 100 words, and to "think outside the square". The full text of their contributions is given here.

Associate Professor Ian P Anderson — Aboriginal Health

VicHealth Koori Health Research and Community Development Unit, University of Melbourne, VIC

The research agenda in Aboriginal and Torres Strait Islander health that has developed over the last three decades provides us with a detailed understanding of the epidemiology of Indigenous health. Whilst there remain some gaps in this foundational knowledge, particularly with respect to the epidemiology of Indigenous health in urban contexts, this research agenda needs to be refocussed on the development and evaluation of interventions (in clinical care and population health) in Indigenous health contexts and research that investigates the systemic barriers to the provision of accessible and effective health care for Aboriginal and Torres Strait Islander people.

Professor Peter A Cameron — Emergency Medicine

Alfred Hospital, VIC

Under-resourced future

A patient arrives by ambulance to the emergency department, "lights and sirens", after a collapse into unconsciousness on the street. The ED team work feverishly to save the person's life, knowing nothing of the past medical history, medications, allergies or advance directives. The chance of incorrect or unwarranted intervention is high. If every citizen were to carry their personal medical history on an encrypted "health card", then many lives would be saved and inappropriate clinical activities could be averted. The card could be updated electronically after each clinical interaction. The technology exists but the resources and political will do not.

Professor Ian D Cameron — Rehabilitation Medicine

University of Sydney, and Northern Sydney Area Health Services, Rehabilitation Studies Unit, Ryde, NSW

Medical rehabilitation is usually provided soon after the onset of disability and is time limited. Management of long term impairment that persists after rehabilitation needs to be improved, through addressing the activity limitation (disability) and participation restriction (handicap) that result. Rehabilitation medicine needs to understand better what will improve life for people with disability in the long term through careful epidemiological studies and clinical trials, looking particularly at appropriate environmental and personal factors. Concurrently health services will need to be reorientated to rehabilitation with a community focus.

Professor Donald J Chisholm — Endocrinology

Garvan Institute of Medical Research, NSW

Type 2 Diabetes. How to achieve prevention?

Changed nutrition and physical activity have doubled the prevalence of type 2 diabetes in Australia since 1980.[1] Large epidemiological studies (eg, American Diabetes Prevention Program[2] have shown that modified diet plus physical activity can dramatically reduce diabetes incidence in predisposed subjects, but the intensive interventions used are prohibitively costly when considering the whole community. We need appropriate cost methods to change lifestyle in the general population, but we can't wait 10-15 years to do conventional research studies. To combat diabetes, obesity and cardiovascular disease Australia should immediately implement "best guess measures" with progressive research analysis and modification as previously done to reduce cigarette smoking.

1. Dunstan D, Zimmet P, Welborn T, et al. The rising prevalence of diabetes and impaired glucose tolerance: the Australian Diabetes Obesity and Lifestyle Study. *Diabetes Care* 2002; 25: 829-834.
2. Diabetes Prevention Program Study Group. Reduction in the incidence of type 2 diabetes with lifestyle intervention or metformin. *N Engl J.Med* 2002; 346: 393-403.

Professor Peter F M Choong — Orthopaedics

Univerity of Melbourne, St Vincent's Hospital, VIC

Surgeons' skills and fallibilities are important factors in successful surgery. Improving surgical precision and accuracy through computer-assisted surgery (CAS), is now a focus of orthopaedics. While prosthetic implantation is a major benefactor of CAS, so too is minimally invasive surgery which will change not only the manner in which surgery is performed, but also the type of surgery possible, implant design, and patient outcomes. Data acquisition/generation through CAS will have a significant impact on peri-operative patient assessment, research, education and risk management. The power of the computer will revolutionise, innovate, and enhance our understanding of what we do as surgeons.

Associate Professor Flavia M Cicuttini — Rheumatology

Department of Epidemiology and Preventive Medicine, Monash University, Alfred Hospital, VIC

An area in rheumatology in which relatively little work is currently under way is the most cost-effective way to investigate common conditions such as back and neck pain or the painful shoulder. As in many other areas of medicine, there has been a history of adding new investigations to the old ones, rather than substitution of new for old. For example, questions remain as to the role of plain radiography of the spine and when this should be used. Given the vol-

ume of such investigations, perhaps we need to address such questions.

Professor Enrico W Coiera — Health Informatics

University of New South Wales, NSW

The sacred ground in health informatics research is the computer and the myriad information systems built upon it – the electronic health record, the Internet, mobile computing. The profane ground, largely ignored, is the broader human system that is needed to make anything actually work. Technological systems repeatedly fail for cultural and organisational reasons, the very same barriers that proponents of other systemic changes like evidence-based medicine, and safety and quality initiatives, flounder upon. There needs to be recognition that many of the fundamental changes needed in healthcare are at the system level, and that we know very little about ways to reliably and effectively design and implement what in effect are complex socio-technical systems.[1]

Coiera E. Four rules for the reinvention of health care. *BMJ* 2004; 328: 1197-1199.

Professor Ian J Constable — Ophthalmology

Lions Eye Institute, Nedlands, WA

Macular degeneration (MD) dominates the blindness register and available therapies for the wet exudative type are efficacious only at the margin. The dry type remains in the province of alternative medicine. Australian research has contributed to epidemiology of MD and has linked smoking and cardiovascular risk factors, but shed little light on genetic pre-disposition and biological determinants. Cellular biology, genetic manipulation, transplantation and induction of animal models will accelerate our understanding, create intellectual property and result in an early interventional approach to this big epidemic in the ageing population.

Professor Stephen M Cordner — Forensic Medicine

Monash University, and Victorian Institute of Forensic Medicine, VIC

- Research into new imaging techniques at autopsy (and clinical forensic situations) has barely begun. Improved characterisation of pathology, and improved decision making about the value of autopsy in particular cases, will follow.
- The need to consult families about autopsy (eg, tissue retention for transplantation, research or diagnosis) and provide them with its results, with consequent physical and psychological health benefits, is unresourced.
- Developing countries have no resources to train their own forensic pathologists and physicians. On the front line of detecting human rights abuses, this failing means community mistrust of the criminal justice system, and therefore instability and poverty, continues.

Professor David C Currow — Palliative Care

Flinders University, and Southern Adelaide Palliative Services, Daw Park, SA

Care for a person with a life-limiting illness is mostly provided in the community by family and friends. With minimal support or training, this person's community takes on round-the-clock responsibilities creating satisfaction and challenge for carers. Our community needs to invest in excellent carer support – information, emotional support, respite that is responsive and funded – over the entire course of the role.

Palliative services should be judged on the long-term health outcomes of caregivers, not just patient function and comfort. This includes the ability of caregivers to move on with their lives: have health; create a life without the person for whom they have cared; achieve a level of function with which they are satisfied.

Dr Geoffrey J Dobb — Intensive Care

Royal Perth Hospital, Perth, WA

- Severe sepsis is a major cause for admission to intensive care. Current mortality is 35%-40%. Antibiotic resistant bacteria are reducing antibiotic effectiveness as part of the treatment of severe infection, threatening increased mortality from severe sepsis in the future. Treatments that reduce bacterial virulence and enhance host defences would provide alternative ways to reduce the effect of bacterial invasion. Developing such treatments will require an understanding of the factors that lead to bacterial invasion, bacterial virulence and how bacteria overcome host defences, with treatment aimed at modifying bacteria to render them harmless rather than killing them or preventing multiplication.
- During severe illness many organs stop functioning normally or, as for example the kidneys, they virtually stop working completely. And yet, they are not dead. With treatment of the underlying problem, function will usually return. What underlies this suspended animation? Does it protect organs so function can return or should we work to find the "switch" that might cause more rapid recovery, shortening intensive care stay and lessening exposure to the risks associated with the treatment of failing organ function?
- As the Australian population ages and the cohort of elderly becomes larger, the need to better target intensive care to the patients who will truly benefit will become a major priority. Intensive care is expensive, financially and emotionally for patients and their families. We can do ever more to enable patients to survive severe illness but the body does not come through unscathed. Understanding more about recovery from severe illness, the process and duration of rehabilitation and the effects of age, co-morbidities and functional status on recovery would inform the physician and patient decisions before and during intensive care.

Dr Tim Driscoll — Occupational Health

School of Public Health, University of Sydney, NSW

Occupational health research in Australia is poorly funded and supported by a limited number of academic centres. Key areas requiring research support are valid evaluations of interventions (for most prevention activity there is little evidence that it works); the ability to establish a link between exposure and disease, preferably at a stage early enough to modify the disease process (difficulties identifying the exposure-disease link in individual cases leads to a major underestimation of the occupational disease burden); and better understanding of health risks (and benefits) associated with the large-scale transfer of jobs from heavy industry to information and service industries.

Professor Leon A Flicker — Geriatric Medicine

University of Western Australia, Perth, WA

Human beings are the embodiment of complex physiological, psychological and sociological systems, all of which are affected by ageing. Not surprisingly, in advanced old age, individuals often manifest multiple chronic inter-related diseases, and doctors have little evidence to guide their management. There is a need for the evaluation of multicomponent interventions for many coexisting diseases in individuals with a reduced physiological reserve due to ageing. Even better would be to know which mix of lifestyle, health and social activities would maximise our chances of ageing well, an outcome which is not simply the absence of disease.

Professor Richard M Fox — Medical Oncology

Royal Melbourne Hospital, Parkville, VIC

Cancer – a greying issue

Dramatic developments are occurring in cancer research in terms of aetiology, molecular biology and therapy. We virtually ignore the implications of the increasing age of cancer patients at diagnosis. Life expectancy is increasing at 25% of time lapsed and is currently about 80 years. If the past predicts the future, in 40 years it will approach 90 years. Cancer incidence is inexorably linked to age and effects one in 20 individuals aged 50-59, and the risk doubles with each subsequent decade. Some 50% of cancer patients are now aged over 70 at diagnosis.

However, clinical trials in cancer therapy have had upper age entry limitations at about 70 years, excluding some 50% of patients. The median age of patients at entry to such studies is in the 50s or low 60s and had remained so for the last few decades.

Increasingly there is insufficient evidence-based data to guide management of progressively aging patients. We need to recognise that cancer will be predominantly a disease of the aged, investigate it and manage as such. This is not always enthusiastically pursued by younger investigators.

Professor Mark F Harris — General Practice

School of Public Health & Community Medicine, University of New South Wales, Kensington, NSW

Two sides of one coin? GP–patient concordance

Australian GPs pride ourselves on our patient centred approach. However there has been little research on how much Australian GPs and their patients agree on management or what factors or supports can make agreement easier or harder to achieve. These are not academic questions. There are more and more ways to prevent chronic disease and their sequelae with lifestyle changes, medications and involving other health professionals. Yet our patients become more and more skeptical and misinformed (especially by the media and internet). About half fail to follow treatment regimes resulting in significant health and economic costs.

Dr Geoffrey S Hebbard — Gastroenterology

Royal Melbourne Hospital, VIC

The Cinderella of gastroenterology

"You give me the shits!". Such common expressions indicate the degree to which we accept the close relationship between the CNS and the gut, which is unique amongst (non-CNS) organs for the complexity of its intrinsic nervous system, the function of which is to control digestion without conscious input. Nevertheless, the gut must occasionally alert higher centres when action is required. "Stop eating now!" "Don't eat that food again!", "Help me get rid of this stuff!", and higher centres must occasionally exert executive control over digestive function. So what happens when it all goes wrong?

A significant proportion of visits to gastroenterologists are for symptoms related to disordered gastrointestinal function. "Organic" causes are excluded and the skill of the doctor is invoked to explain the origin and significance of the symptoms to the patient in a manner that leads to a positive outcome rather than frustration and further investigation.

A more rational and scientific approach to the study of these disorders has only recently begun in earnest with the development of the subspecialty of neurogastroenterology. Major hurdles have been the classification of the disorders and measurement of the relevant "functions". Subclassification of patients, initially based purely on symptomatic grounds, has more recently moved to detailed epidemiological, psychological and symptom analysis, measurement of function by sophisticated motor and sensory testing, and an increasing understanding of the anatomy and neurophysiology of the enteric nervous system. Such approaches are beginning to help us understand what is happening in the 30%–50% of our patients who present with these disorders.

Dr Geoffrey H L Hirst — Urology

Mater Hospital, and Taylor Medical Centre, Woolloongabba, QLD

The last 30 years has seen a significant shift in medicine from a moral economy to an increasingly market-based economy. The forces driving this change include the pharmaceutical, instrument and device manufacturers on the one hand and the overt competitive stances by individuals within the profession on the other. The impact of this directional change has been particularly profound in the procedural specialities, including urology. The question to be resolved is the impact this is having on the quality and cost of healthcare, the training of future specialists and the measures required to ensure that the impact is entirely positive.

Associate Professor Stephen J Kent — HIV Medicine

Melbourne University, Melbourne, VIC

The world desperately needs a HIV vaccine. But the field is stagnated: nobody can generate neutralising antibodies, cellular immunity provides only partial control (which often results in immune escape) and drug therapies are toxic, expensive and frequently result in drug-resistant mutants. Where will the clever ideas come from to control HIV? How can this slippery virus be checkmated? Where is the Achilles heel of this virus? What cells can be manipulated to exploit any weaknesses? What is the innate immune system doing? Can we generate an immune barrier to resistant stains? The time is ripe for a scientific breakthrough. History will judge our dedication to this task.

Dr Ross K Kerridge — Anaesthesiology

John Hunter Hospital, Newcastle, NSW

Clinical anaesthesia and perioperative medicine requires rapid access to comprehensive patient and other information, and deci-

sion making in the face of uncertainty. The speed and complexity of in-hospital patient care has increased this requirement. Transformational development of clinical information systems and decision support technology is now required for safe and high-quality clinical care.

Research must shift from small studies using surrogate endpoints such as physiological or biochemical changes. Future research must use large, multicentre trials to examine common "simple" interventions in "normal" patient care, and look for "real" outcomes such as mortality, morbidity, or length of stay.

Professor Stephen R Leeder — Public Health

Australian Health Policy Institute, University of Sydney, NSW (Currently, Earth Institute at Columbia University, New York, USA)

For Jeffrey Sachs, Director of the Earth Institute at Columbia University, public health is "whatever it takes to improve the public's health." If ARV treatment of HIV promotes the public's health, do it.

Don't like this definition? Unethical? OK. Develop a robust ethic for public health. None exists now.

Will we improve the public's health by inviting private enterprise, unions, insurers and the public to the public health table? Yes. Do we speak eloquently with these people? No. Develop the skills to do so? Absolutely.

Should public health study the genotype as intensely as the phenotype? Emphatically.

Whatever it takes.

Professor Guy J Maddern — Surgery

University of Adelaide, and Basil Hetzel Institute, Queen Elizabeth Hospital, Adelaide, SA

Getting what we expect from surgery

The community expects their surgeons and hospitals to be competent, up-to-date and able to achieve world-class results. At present, this expectation is largely unproven anywhere in the world. The future challenge for surgical research will be to demonstrate not only short-term outcomes for the procedures performed but also their long-term results in terms of cure or function within communities. Research is needed to establish optimal training environments so surgeons and their teams can master the necessary skills prior to treating patients. Surgeons, hospitals and operative approaches will need national ongoing audit to ensure all areas of the community receive the best possible care and, if not, corrective system are in place.

Dr Guy B Marks — Respiratory Medicine

Liverpool Health Service; and Institute of Respiratory Medicine, Camperdown, NSW

The high prevalence of suppurative airway disease in Indigenous Australian children and adults and in other Indigenous populations worldwide[1,2] remains a largely unexplained,[3] but substantial health issue, that is symbolic of the health divide in this country. High rates of obstructive lung disease in indigenous adults may reflect a common pathological pathway. Understanding the respective roles of a pathogenic environment and compromised airway and mucosal defences will lead to rational strategies to address the problem at its source. This knowledge may have ancillary benefits for the control of respiratory infectious diseases in the wider community.

Chang AB, Grimwood K, Mulholland EK, Torzillo PJ. Working Group on Indigenous Paediatric Respiratory Health. Bronchiectasis in Indigenous children in remote Australian communities. *Med J Aust* 2002; 177: 200-204.
Singleton R, Morris A, Redding G, et al. Bronchiectasis in Alaska Native children: causes and clinical courses. *Pediatr Pulmonol* 2000; 29: 182-187.
Morris PS. A systematic review of clinical research addressing the prevalence, aetiology, diagnosis, prognosis and therapy of otitis media in Australian Aboriginal children. *J Paediatr Child Health* 1998; 34: 487-497.

Professor Robin Marks — Dermatology

University of Melbourne, St Vincent's Hospital, Fitzroy, VIC

Atopic eczema

At the moment, virtually all research into atopic disease is directed at what turns on the inflammatory/immunological response. Atopic people seem to react too quickly to the environment. But, additionally, once they start reacting they don't seem to turn off the reaction in a rapid and effective way, as normal people do.

I think there is enormous reward to be gained from taking the opposite approach, ie, studying what turns off the inflammatory/immunological response in these people. The benefit would be not only to dermatology, but also to all the disciplines dealing with these inflammatory/immunological diseases.

Associate Professor Richard M Mendelson — Radiology

Royal Perth Hospital, Perth, WA

In this era of expensive medical technology and limited availability an emphasis on outcomes of any intervention is fashionable, but necessary. Nowhere is this more true than in diagnostic imaging. And yet imaging specialists have been slow to take to this challenge. Little is known about the effects of imaging on patient outcomes and quality of life. Examples of such knowledge gaps include: Does the detection of "incidentalomas" benefit the patient or just cause anxiety, expense and morbidity? Does recurrent imaging of patients receiving palliative therapy for malignancy confer any benefit? Do some resulting interventions just substitute one mode of death for another?

Professor Adrian Mindel — Sexual Health

Westmead Hospital, NSW

Bacterial sexually transmitted infections (STIs) cause considerable morbidity and mortality. However, as most infections are asymptomatic, the problem is hidden and control remains problematic. Nonetheless, major personal and public health gains are achievable, particularly for chlamydia, now the commonest bacterial STI in Australia, a leading cause of infertility and a significant drain on the public purse. What is needed is a national strategy to encourage yearly screening of sexually active adults below 25 with a suitable urine chlamydia test, treating the positives, ensuring contacts are seen and treated and encouraging consistent condom use and testing and treatment for other STIs.

Professor Philip B Mitchell — Psychiatry

Prince of Wales Hospital, Randwick, NSW

Research directions for psychiatry

A recent "conjunction of the planets" is providing the means to obtain profound insights into those factors that determine the de-

velopment of major mental illnesses such as schizophrenia, bipolar disorder and depression. First, the investigatory tools that psychiatry has lacked for so long have become available, ie, genetic markers for the entire human genome, and sophisticated structural and functional brain imaging methodologies. Second, psychiatric research has "re-discovered" gene–environment interactions. The landmark studies of Caspi et al (2002, 2003) recently published in *Science* have demonstrated specific genetic variants that increase risk to conditions such as depression and antisocial behaviour — not in isolation, however, but only in conjunction with environmental factors such as life stressors or childhood maltreatment. The time is now ripe for government to fund large-scale longitudinal studies to examine the roles and contributions of a number of these factors combined (and in isolation) in determining the development and timing of onset of illness. Such factors need include biological determinants such as genetic polymorphisms and brain imaging on the one hand, and sophisticated appraisals of psychosocial and other environmental issues (such as the quality and nature of childhood experiences, personality/temperament, life stressors, and substance abuse) on the other. The potential benefits in understanding aetiology and thereby designing "tailored" therapies are enormous. However, like governments, funding bodies think short-term. The challenge now before us is to utilise the expertises already available in this country, and "grasp the nettle" of investing in such a promising long-term enterprise.

Professor Kenneth A Myers — Vascular Surgery

Monash Medical Centre, and Epworth Hospital, Richmond, VIC

Chronic venous disease remains the forgotten child of vascular surgery. There are enormous costs for treating varicose veins and their complications.

The pathogenesis must be understood if development, progression and recurrence are to be avoided. Do abnormal haemodynamics distend normal veins or do normal pressures distend abnormal veins? If the latter, is weakening from systemic influences such as hormonal, genetic, biochemical or environmental factors, or from local corruption for which disordered endothelial factors, fibroblast function, inflammatory cytochromes, white cells and defective enzymes have been implicated.

Debate continues as to whether fibrinogen or leukocyte deposits block capillary diffusion to cause venous ulceration, and whether inflammatory mediators and growth factors retard or promote healing.

Intensive biochemical and cellular research is needed to devise biological mechanisms to retard varicose disease.

Professor Robyn E O'Hehir — Immunology and Allergy

Alfred Hospital, Prahran, VIC

The enthusiastic and escalating usage of unproven or scientifically disproved alternative therapies in medicine generally, but especially in allergy and immunology is surprising to me. Well-conducted qualitative studies could assist in determination of motivations for the uptake of these therapies, in many cases in preference to inexpensive but proven effective available treatments. Rigorous clinical evaluation of whether such therapies are efficacious and safe together with fundamental laboratory research investigating claimed immunological and pharmacological mechanisms of action, routes of administration, dosage determination and adjuvant effects should together inform clinical governance of the best available therapies with subsequent cost efficiencies and improved health outcomes.

Associate Professor Stephen J O'Leary — Ear, Nose and Throat – Head and Neck Surgery

Royal Victorian Eye and Ear Hospital, Melbourne, VIC

Virtual reality training could revolutionise how Ear, Nose and Throat – Head and Neck surgeons learn their surgical craft. Immersed in a 3-D environment, with force-feedback (haptic) instruments in hand, trainee surgeons may one day be able to "see" and "feel" their virtual patient, as they acquire skills in ear and nose surgery. This will make surgical training safer, provide the opportunity to develop standardised training programs, enable remote training across the internet, and ensure that minimum standards of expertise are met prior to the trainee advancing to the operating theatre. Now is the time to develop and validate virtual surgical training environments.

Professor Lester J Peters — Radiation Oncology

Peter McCallum Cancer Institute, East Melbourne, VIC

Radiation as an activator of cytotoxic prodrugs: an unresearched area with potential high yield

The single greatest attribute of radiation as a therapeutic tool is the accuracy and certainty with which a specified dose can be delivered to any site in the body. This offers the possibility of using highly targeted beams of radiation to activate toxic prodrugs selectively within tumour-bearing tissues. Although this concept has been previously proposed, it has not been properly researched or tested. The opportunity is ripe for Australasian radiation oncologists to take a leadership role in the field in collaboration with the world-class prodrug development team at the University of Auckland.

Professor Donal M Roberton — Paediatrics

Adelaide Children's Hospital, North Adelaide, SA

Data bank dividends for child health

The most important challenge for any country is providing for the wellbeing of its children. Where is the shortage in research and resources for the health of Australian children?

The singularly important need nationally is development and linkage of databases relevant to child health. Knowledge and linkage of, for example, perinatal statistics, mortality/morbidity data, immunisation records, health service utilisation and prescribing data, cancer databases, educational outcome assessments and Australian Bureau of Statistics and Social Health Atlas information is vital in ensuring evidence-based policy for child health for future generations. What a policy and funding challenge this would be!

Dr Christopher C Rowe — Nuclear Medicine

St Andrews War Memorial Hospital, Brisbane, QLD

Future directions for nuclear medicine

Positron emission tomography (PET) now has a central role in the evaluation of patients with cancer. Access and funding is currently very restrictive but this will change. Over the next decade, PET will become routine, not only for cancer staging, but also for tailoring individual treatment. It will be used to assess early response,

plan radiotherapy and, through the use of more specific tracers, will permit better treatment selection.

PET and SPECT developments in neuroscience will assist diagnosis through use of specific tracers for specific pathology, e.g. dopamine transporter loss in Parkinson's disease and cerebral amyloid accumulation in Alzheimer's disease.

Professor Susan Sawyer, Dr Lena A Sanci, Professor George Patton — Adolescent Health

Centre for Adolescent Health, Parkville, VIC

The major health problems of youth are complex in their origin, their effects and their management. Yet our response to problems such as depression, chronic physical illness, eating disorders and obesity typically draws on too narrow a skill-set from single discipline practitioners who claim clinical expertise and responsibility. More effective clinical, research and training responses require broader engagement of the health system and other sectors. The creation of regional nodes for coordination and support of "youth friendly" health services could greatly advance youth health. In addition to achieving better coordination of primary and specialist healthcare, a youth friendly service model would promote leadership around "joined-up" approaches to youth health research and training with a stronger focus on prevention.

Associate Professor Ian A Scott, Dr Wilton Braund, Dr Kenneth Ng — Internal Medicine

Princess Alexandra Hospital, Woolloongabba, QLD

Stop funding laboratory benches. Start funding decision support and communication

Finding knowledge. Patients of advanced age with multiple morbidities — the general physician's patients — are excluded from most trials. Real-world evidence and decision analysis software for resolving multifaceted problems require wireless networks that bring mobile computers to every bedside.

Excluding useless information. Critically appraised evidence summaries and guidelines, accessible via desktop icons, become the preferred form of research-based knowledge.

As patients see it. Meta-analyses of effectiveness address the physician's perspective. Patients need meta-analyses of downside risk as well.

Remembering to apply what's known saves more lives than new knowledge. Computerised decision support needs R&D funding to fully impact on harmful action or inaction.

Professor Andrew M Tonkin — Cardiology

National Heart Foundation of Australia, Melbourne, VIC

A public interest trial: aspirin for primary cardiovascular prevention in the elderly?

The answer remains unclear despite enormous implications. Only a third of Australians 70 years and over, including those with overt disease take aspirin routinely. Despite its feasibility utilising the extraordinary ANBP2 network, the trial appears unfundable, with few gains for industry and the estimated cost (20 500 subjects, 5-year follow-up, $35 million) daunting for conventional agencies.

The rationale? Previous trials were conducted predominantly in middle-aged males (only 21% females, 12% ≥ 70 years) and bleeding increases with age. Aspirin is also cheap and therefore equitable, and may be extraordinarily cost-effective. It may also prevent cognitive decline, depression and cancer!

Assocate Professor Rowan G Walker — Renal Medicine

Renal Unit, Royal Melbourne Hospital, Melbourne, VIC

Patients with end-stage kidney disease (ESKD) (dialysis and/or transplantation), have dominated research effort and resources, but it is now apparent that in patients who may never progress to ESKD, kidney diseases (KD) defined simply by proteinuria and/or impaired GFR, have assumed epidemic proportions and are major causes of morbidity and mortality. KD is an independent and highly significant risk factor for a dramatically increased risk of death from cardiovascular disease (all causes). Quality studies are strikingly lacking and consistent with the nephrological community's commitment to evidenced base medicine an immediate future aimed at improving outcomes for patients with KD will mandate urgent funding for large-scale intervention randomised controlled trials.

Associate Professor Peter Waring — Molecular Genetics

Peter MacCallum Cancer Institute, Melbourne, VIC

Molecular genetics is a new, rapidly growing, discipline that involves the use of genetic testing to predict, diagnose and monitor disease. Genetic research, performed mostly during the past decade, has identified pathogenic mutations responsible for many important diseases, especially inherited neurological and cardiovascular conditions and cancer. This has created strong clinical demand for genetic testing but this is in it's infancy. There is an urgent need to build integrated clinical and laboratory genetic infrastructure and to train scientists, pathologists and clinicians in molecular genetics. Furthermore, to ensure an efficient and high quality service, government and professional bodies need to work together to develop a national strategy and a funding model for molecular genetics.

Professor Steve L Wesselingh — Infectious Diseases

Monash University, and MacFarlane Burnet Institute, Melbourne, VIC

Over the past 50 years Australian infectious diseases research has been extraordinarily successful and enjoys a high profile both nationally and internationally. However despite this, 3 significant failures particularly haunt the speciality: 1) our Aboriginal communities still suffer from excessive infection related morbidity; 2) our hospitals remain environments where you have a significant chance of acquiring an infection with a multi-resistant organism; and 3) the Asia-Pacific region is following Africa towards an HIV/AIDS- and TB-led catastrophe.

These are complex issues that can only be addressed with adequately resourced, multidisciplinary responses. Funding is needed to fast track the development of appropriate technologies and then most importantly, a major allocation of resources to ensure their use to improve health outcomes in Australia and the region.

Professor James S Wiley — Haematology

Nepean Hospital, Penrith, NSW

Is there a common defect in innate immunity? The human genome project has opened a major opportunity to explore genetic risk factors in man for those pathogens which in some people survive and flourish in our intracellular environment.

These intracellular pathogens include mycobacteria, chlamydia, brucella, toxoplasma, leishmania, salmonella (non-typical) and listeria, and their killing by macrophages of the innate immune system follows a similar pathway.

Despite much recent study of interleukin and toll-like receptors we still have little information on genetic factors in the host which predispose to these diseases in which diagnosis is often difficult or delayed.

Studies which bridge haematology, immunology, and infectious diseases are much needed to define genetic defects in innate immunity, knowledge of which could be translated into clinical practice.

Professor Robert Williamson — Genetics

Murdoch Children's Research Institute, Royal Children's Hospital, Parkville, VIC

The Human Genome Project has given lots of data on genes of known function, and we know about single gene diseases caused by their mutations. However, two-thirds of our genes are still a mystery. Most are expressed in the human brain. Brain function, intelligence, consciousness, values and culture are determined by subtle interactions between genes and environment. I wish somebody in Australia can, courageously, regard "risky" as a recommendation, and fund a project to integrate the human genome project, clinical neurogenetics, psychology, MRI fetal imaging and artificial intelligence so we really could understand how the brain works.

Dr Alex D Wodak — Drugs and Alcohol

St Vincent's Hospital, Darlinghurst, NSW

Regulating the illicit drug market

The irresistible obstacle of community abhorrence of currently illicit drugs currently opposes the irresistible force of demand for these drugs. But communities are unable to suppress demand or supply of these drugs more than marginally. Partial suppression produces appalling health, social and economic outcomes for drug users and non-drug users alike. More effective and less harmful policy arrangement will have to involve some form of regulated supply of orally well-absorbed, dilute and mild opiates, stimulants and hallucinogens. Compromises, such as methadone, will need to be identified which are reasonably acceptable to both the drug abhorring majority as well as the drug-seeking minority.

Professor Fiona M Wood — Plastic Surgery

Burn Service WA, West Perth, WA

Burn care of the future?

Assessment is key in understanding the extent of injury.
Debridement is focused on tissue salvage.
Reconstruction balances repair with regeneration.

- Investigation of multimodality, multiscale characterisation, including confocal microscopy and synchrotron technology will quantify *assessment*.
- *Debridement* using autolytic inflammatory control techniques with image guided physical methods will ensure the vital tissue frameworks are retained.
- *Tissue-guided regeneration* afforded by self-assembly nanoparticles will provide the framework to guide cells to express the appropriate phenotype in reconstruction.

To solve the clinical problem a multidisciplinary scientific approach is needed to ensure the quality of the scar is worth the pain of survival.