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GERIATRIC THERAPEUTICS REVIEW

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30th Anniversary of Geriatric Therapeutics Review: *2016 marks the 30th anniversary of the 'Geriatric Therapeutics Review' series, and the 25th anniversary of its partnership with the Journal. The series was started by pharmacists Robyn Saunders and Geoff Sussman and geriatrician Dr David Fonda in 1986, at a time when geriatric therapeutics and geriatric pharmacy practice were in their infancy. It was initially an in-house publication at the Heidelberg Repatriation Hospital (HRH) in Victoria, Australia. In 1991 it became a regular feature of the Journal, with articles commissioned and edited by a committee based at the HRH and led by geriatrician Associate Professor Michael Woodward AM for nearly 25 years. To celebrate the 30th anniversary of the series, in this issue we take a look at the history and evolution of modern geriatric medicine and geriatric pharmacy practice. In another issue later this year we will look back at the origins of the Geriatric Therapeutics Review series and reflect on some of the changes in therapeutics that have occurred over the last 30 years.*

Geriatric medicine and pharmacy practice: a historical perspective

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Abstract

Modern geriatric medicine evolved in Britain between the 1930s and 1970s. In Australia, the first comprehensive geriatric service was described in the 1950s. However, it was not until the 1980s that geriatric medicine began to gain widespread acceptance as a medical specialty. There has been a slow but steady growth in geriatric services in most developed countries since that time, and more recently in developing nations. Various models of geriatric medical care have been developed, including geriatrician-led geriatric evaluation and management (GEM) services and shared-care services such as orthogeriatrics. The number of older people, often with multiple comorbidities and geriatric syndromes, seen in most areas of medical and surgical practice has risen significantly over recent decades, and as a result some of the principles of geriatric medicine, in particular 'comprehensive geriatric assessment', have been adopted outside of specialist geriatric services, including the primary care setting. Managing and preventing iatrogenic disease and polypharmacy became an important element of geriatric medicine as the range of therapeutic drugs grew and life expectancy and multi-morbidity increased. Geriatric pharmacy practice evolved in the mid-1970s in the USA, and the 1980s–1990s in other developed countries. It was recognised as a specialty with the introduction of the Certified Geriatric Pharmacist credential in 1997. This paper describes the evolution of the principles and practice of geriatric medicine and pharmacy practice.

Keywords: geriatric medicine, pharmacy practice, history.

INTRODUCTION

Demographic shifts leading to increasing numbers of older people, and associated increases in the prevalence of chronic illness and multimorbidity, have led to geriatric medicine becoming a major branch of medicine. The complexity of medication management for older people has led to geriatric pharmacy practice becoming an area of specialisation for pharmacists. As the number of older people worldwide continues to rise, clinicians in most generalist and specialist areas will need to be familiar with the principles of geriatric medicine. This paper provides perspectives on the history and evolution of the practice and principles of modern geriatric medicine.

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DEVELOPMENT OF GERIATRIC MEDICINE

The term 'geriatrics' (from the Greek *geras*, meaning old age, and *iatrikos*, relating to the physician) is credited to Ignatz Leo Nascher in 1909. Nascher was born in Vienna in 1863 and graduated as a pharmacist in 1882 before

migrating to the USA where he studied medicine and authored several articles and a book on geriatrics.[1,2] However it was another three decades before the practice of modern clinical geriatrics began to develop, and some 70 years before the widespread recognition and organisation of geriatric medicine in developed countries.[2–5]

Britain

The origin of modern geriatrics has been attributed to Dr Marjory Warren (1897–1960), an English physician. In 1935 Warren took over the care of several hundred mostly elderly and bed-bound patients in a former 'poorhouse' infirmary that had been integrated into the hospital where she worked.[1] Until that time, it had been usual for these patients to be largely ignored by physicians, as they were felt to be 'incurable and uninteresting', and of less interest for teaching.[4] The fact that many disabilities of late life were potentially preventable or reversible was poorly recognised. There was often a failure to distinguish between disease and the process of ageing, and to fully investigate and treat older people.[5] Warren assessed all patients' states of disability, identifying those who had potential for recovery, even if it was only to a limited degree, and instituted multidisciplinary rehabilitation. She found that patients, some of whom had previously been bedridden, were able to gain some degree of independence.[6] She promoted the establishment of geriatric units in order to protect older people from medical neglect and called for recognition of geriatric medicine as a specialty, stating that "*until geriatrics is recognised as a special branch of medicine it will not receive the attention it deserves*". That recognition began in 1948 with the appointment of the first consultant geriatrician.[1] Through the 1950s to 1970s specialist services developed throughout Britain and the academic base of the specialty became established.[3]

Australia

The situation in Australia in the first half of the 20th century was similar to Britain.[7,8] For example, in Victoria 'benevolent asylums' (re-named 'benevolent homes' in the 1950s) existed to house the 'incurably ill and infirm'.[7] These self-contained institutions primarily provided long-term accommodation, although a form of hospital care was provided in infirmary wards that were built to accommodate sick 'inmates'. Elderly people were prominent in these institutions. Medical care was poor, with perhaps a single medical officer appointed to manage some hundreds of patients, and no formal restorative care.[7] From the mid-1950s to 1960s, benevolent homes were reclassified as geriatric hospitals, with the aim of replacing the model of custodial care with a medical model of restorative treatment.[7] However, this aim was not achieved and these institutions continued to primarily provide long-term care until the late 1970s.[7]

The first comprehensive geriatric medical service in Australia was established at the Royal Newcastle Hospital in the mid-1950s.[9] Dr Richard Gibson (1921–1980), a hospital physician, described the development of a novel multidisciplinary service 'for the care of old people and long-term invalids' which included an inpatient geriatric ward, a reablement (rehabilitation) unit, a day hospital and domiciliary services.[9] The geriatric ward accepted patients who, 'because of their age, infirmity, illness or social circumstances are likely to run the risk of medico-social breakdown or whose aftercare seems likely to prove difficult or lengthy'.[9]

In 1976 Dr Derek Prinsley (1921–), a British geriatrician, was appointed to the first chair in geriatric medicine in Australia, at the University of Melbourne. He was also appointed director of the newly established National Research Institute for Gerontology and Geriatric Medicine (now the National Ageing Research Institute), and geriatrician at the Mount Royal Hospital, a former 'benevolent home' (now a campus of the Royal Melbourne Hospital). Over the next 10 years, Dr Prinsley helped transform Mount Royal Hospital from an institution providing long-term nursing care to a modern inpatient, ambulatory and domiciliary geriatric service.[10]

However, geriatric services were slow to appear in general hospitals. Some physicians questioned the need for a separate specialty[4] and did not view geriatric medicine as compatible with the practice of acute medicine.[11] But in the late 1970s and early 1980s it was increasingly recognised that geriatric medicine and rehabilitation for older people were vital components of a quality medical service, to improve patient care, avoid prolonged hospital admissions, and reduce the rate of discharge to nursing homes.[11] The Australian Department of Veterans Affairs played an important role in driving the development of geriatric services at its Repatriation Hospitals in the 1980s, with the introduction of 'Aged and Extended Care Departments'.[11]

In 1983, Dr Peter Sinnett (1934–1998), Professor of Geriatrics at the University of NSW from 1979 to 1994, stated "*It is only when specialist geriatric services with access to adequate facilities and staffing levels are accepted as an integral component of university teaching hospitals that the standard of care offered to the elderly will start to approach that offered to younger groups*".[11] While there was a steady increase in geriatric services over the next two decades, in 2001 only 39% of general hospitals in

Australia had a geriatric service (and only 22% had an inpatient geriatric service).[12] The development of hospital-based geriatric services has continued since 2001, but availability is still not universal.[13]

Other countries

In the USA, geriatric medicine was slow to develop and there was resistance to its establishment as a specialty.[3] In the late 1970s the Veterans Administration (VA) established Geriatric Research, Education and Clinical Centers at some of its hospitals, with the goal of developing clinicians, educators and researchers ready to face the imminent onslaught of older war veterans.[14] These centres drove the development of interdisciplinary geriatric care in the USA and generated evidence that helped support the uptake of interdisciplinary geriatric care locally and internationally.[14,15] In New Zealand geriatric medicine also developed from the 1970s.[8,16] In most of Europe and Asia, development of geriatric medicine has been more recent.[17,18]

MEDICATION USE AND ADVERSE EVENTS IN THE 20TH CENTURY

Early geriatric medicine had a focus on physical disabilities and social issues. The range of potent therapeutic drugs available in the first half of the 20th century was limited, so medication-related issues such as polypharmacy, adverse drug reactions (ADRs) and drug—drug interactions were less of a concern than they are today.

The number and sophistication of medications increased following the Second World War, and by the late 1960s studies describing the prevalence of ADRs and drug-related hospital admissions began to appear in the literature. An explosion of new therapeutic drugs over ensuing years led to a tendency to concurrently prescribe multiple drugs. However, it was not until the 1990s that polypharmacy and adverse medication events became a major focus within the medical, pharmacy and research communities. The number of papers indexed by Medline that used the word 'polypharmacy' in the context of older people increased from 59 in the 1980s to 300 in the 1990s and 1179 in the 2000s. Tools to help identify and reduce inappropriate prescribing for older people, such as the Beers criteria, the Medication Appropriateness Index and prescribing indicators began to appear in the 1990s.[19–22]

The expression 'giants of geriatrics' (Table 1) was coined by Sir Bernard Isaacs, a geriatrician who practised in Britain in the 1960–80s, to describe the principal syndromes or disabilities managed by geriatricians, namely the 'four Is': immobility, instability (falls), incontinence and intellectual impairment (dementia and delirium). The word 'giant' reflected both the frequency of these syndromes and their huge burden on sufferers. While it was recognised that medications could contribute to these problems, iatrogenic disease was not considered to be a 'geriatric giant' in its own right. But as the prevalence and importance of polypharmacy and ADRs in older people grew toward the end of the 20th century, it was suggested that these should be recognised as an additional 'giant'.[23,24]

Table 1 'Giants' of geriatric medicine[23,24]

Immobility
Instability (falls)
Incontinence
Intellectual impairment (dementia and delirium)
Iatrogenic disease/polypharmacy

As the prevalence of polypharmacy rose, and the burden of adverse medication events on individual patients and the healthcare system became apparent, preventing, detecting and resolving medication-related problems became an important part of geriatric medicine.

MODELS OF GERIATRIC MEDICINE

Models of geriatric medicine vary between countries and even within countries.[3,5,13] However, a common feature is application of the 'comprehensive geriatric assessment' (CGA) approach (Figure 1), which is a central feature of the most widely applied and evidence-based model: geriatric evaluation and management (GEM).[25]

Geriatric evaluation and management and comprehensive geriatric assessment

The GEM model is based on the work of the early pioneers of geriatric medicine such as Dr Marjory Warren. The primary goal of GEM is to improve the functioning of a person with multidimensional needs associated with medical conditions related to ageing and frailty, including the 'geriatric giants' (Table 1) and, often, multiple chronic medical conditions.[26]

Comprehensive geriatric assessment is a multidimensional, interdisciplinary assessment and diagnostic process to determine the medical, psychological, social and functional capabilities and needs of an older person (Figure 1). The assessment is followed by implementation of a coordinated and integrated plan for treatment and follow-up.[27] Comprehensive geriatric assessment differs from general medical care in that the latter

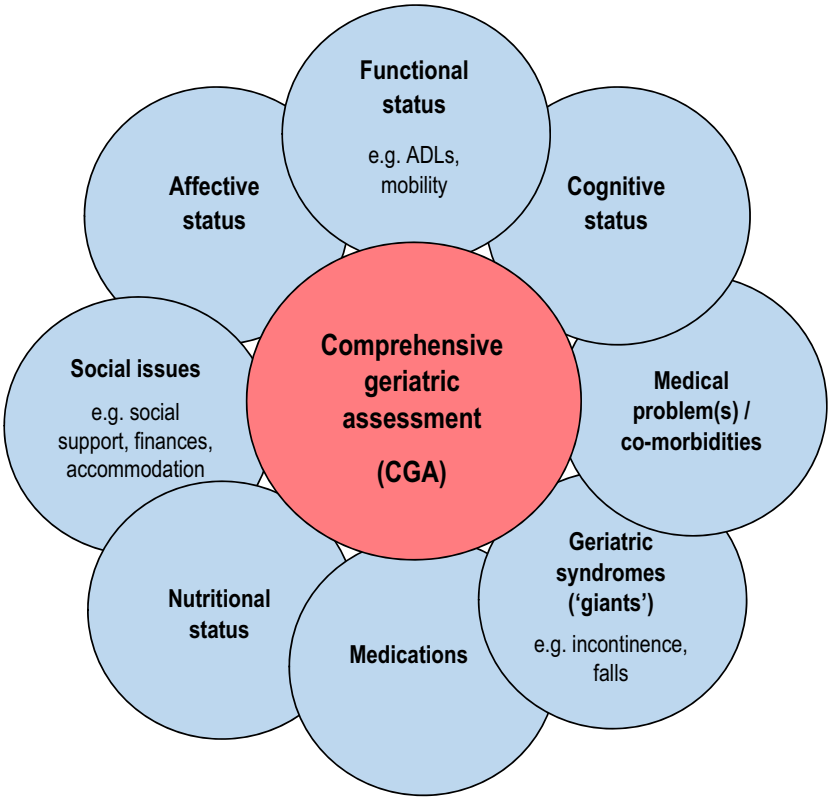

Figure 1 Comprehensive geriatric assessment. ADL, activities of daily living.

focuses primarily on making diagnoses and then managing them medically, whereas CGA provides a comprehensive assessment of the older person, with input into the diagnosis and management plan from multiple disciplines.[28]

A landmark 1984 randomised control trial (RCT) of CGA, delivered within an inpatient GEM unit, showed that patients receiving geriatric care had better levels of functioning, significantly lower mortality, and were less likely to be admitted to a nursing home compared to those receiving usual medical care.[29] Meta-analyses of multiple RCTs confirmed these findings.[30,31] RCTs have also demonstrated that management provided by GEM units, usually with pharmacist involvement, leads to more appropriate prescribing and lower risk of ADRs.[32–34]

Geriatric evaluation and management units may be based in acute or subacute settings, and are often linked with geriatric rehabilitation units. In Australia, implementation of GEM varies from state to state. It is most widespread in Victoria,[27] but is becoming more common in other states.[35] The number of GEM separations in public hospitals is increasing by 16% per year.[27]

The GEM model has also been applied in outpatient and domiciliary settings. 'Day hospitals' (community rehabilitation facilities usually attached to a hospital) are designed to help older people avoid the need for hospitalisation and residential care. They provide multidisciplinary assessment, medical care, rehabilitation, social and recreational activities and respite for caregivers. Aged Care Assessment Teams (originally known as Geriatric Assessment Teams) were established in Australia in the 1980s to 'stem the tide of inappropriate admissions' to nursing homes, by ensuring people who may benefit from restorative care and/or community support services have the opportunity to receive those before moving to long-term care.[5] Specialist outpatient services for older people were also developed over the last 30 years, including continence, falls and memory clinics.[11,13]

Shared care models

As the average age of hospital inpatients climbed during the second half of the 20th century, and the prevalence of multi-morbidity and polypharmacy grew, geriatric expertise was increasingly needed outside of geriatric

units. Geriatric consultation services (in which a geriatrician reviews patients on referral) exist in many hospitals; however, this model of care is associated with poorer outcomes compared to models in which the geriatrician is directly responsible for patient care.[30,31] Therefore, shared care models of practice have been developed within various specialty areas and settings, especially those with a high proportion of older patients (Table 2). In these models a physician or surgeon shares patient management with a geriatrician, usually in conjunction with a multidisciplinary team, utilising the CGA approach.

The emphasis in these models is on early assessment of function, cognition and co-morbidities, medical optimisation before surgery, prevention and early detection of complications (e.g. delirium), prevention of functional decline, management of comorbidities, early discharge planning and avoidance of re-admissions to hospital.[36–38]

The oldest and most widespread examples are psychogeriatric and orthogeriatric services, which were described over 25 years ago.[8,39] Acute care of the elderly (ACE) units were introduced in Australia from the late 1990s,[40] but are not widespread.[12,13] Other models such as oncogeriatrics, cardiogeriatrics and residential in-reach are more recent developments.[38,41,42]

There is evidence for the effectiveness of some of these models. For example, ACE units can improve patients' functional outcomes, and reduce readmissions to hospital and discharges to residential care.[43,44] Hip fracture patients who receive orthogeriatric care tend to have lower in-hospital and long-term mortality and lower rates of delirium.[36,45]

APPLICATION OF GERIATRIC MEDICINE PRINCIPLES OUTSIDE OF SPECIALIST GERIATRIC SERVICES

The principles of geriatric medicine are relevant and applicable in most areas of adult medicine, as today the majority of hospital inpatients are over 65 years old, often with multiple comorbidities and multiple medicines, and almost 30% of GP consultations are for older people.[46] It has been suggested that all medical practitioners working in adult medicine need to be trained in the principles of geriatric medicine. Dr Nick Coni, a British geriatrician and author of the text 'Lecture Notes on Geriatrics' (first published in 1977), once said: "*Geriatrics is too important to be left to geriatricians. We are all geriatricians now*".[47]

In many areas of medicine this has been recognised, and the principles of geriatric medicine (Table 3) and CGA (Figure 1) are increasingly applied in areas including general medicine,[48] emergency medicine,[47] cardiology,[49] oncology,[50] endocrinology,[51] nephrology[52] and primary care.[53] Assessments are conducted by medical practitioners, nurses and/or allied health professionals, with referral to geriatricians or other professionals as necessary. The evidence-base for these models is less well developed than for geriatrician-led care and shared-care models.[28,49,53]

DEVELOPMENT OF GERIATRIC PHARMACY PRACTICE

Clinical pharmacy services with a focus on older people ('geriatric pharmacy practice' or 'senior care pharmacy')

Table 2 Examples of shared care models of geriatric medicine

Model	Medical practitioner collaborating with geriatrician	Patient group
Cardiogeriatrics	Cardiologist	Heart failure
Oncogeriatrics	Medical oncologist	Cancer
Orthogeriatrics	Orthopaedic surgeon	Hip fracture
Psychogeriatrics	Old age psychiatrist (psychogeriatrician)	Mental illness or dementia
Surgegeriatrics	General or specialist surgeon	Surgical needs
Acute care of the elderly (ACE)	General medicine physician	Acute medical illness
Emergency geriatrics	Emergency medicine physician	Acute illness or trauma
Residential in-reach[a] and Transition care[b]	General practitioner	RACF residents at imminent risk of hospital admission; patients discharged from hospital with functional decline

RACF = residential aged care facility.
[a]Hospital-based geriatric service that provides consultation, assessment, planning and/or short-term management of older people in residential aged care facilities (also known as residential care outreach).[38]
[b]Time-limited package of restorative and personal care delivered in the patient's home or at a residential aged care facility following discharge from hospital.[77]

Table 3 Key principles of geriatric medicine[4,49]

- Use an interdisciplinary team (led by a physician with training in geriatric medicine)
- Screen for geriatric syndromes and comorbidities, such as cognitive impairment, falls, depression, functional impairment (use comprehensive geriatric assessment (see Figure 1))
- Be aware of atypical and non-specific presentation of acute illness and adverse drug reactions
- Take a whole person approach – incorporate co-morbidity, functional capacity, quality-of-life and patient preferences (including end-of-life preferences) into the selection of medical treatment and care options
- Review medications – minimise polypharmacy by avoiding or deprescribing unnecessary or inappropriate medicines; consider the evidence for effectiveness and safety of drug therapies in older people; select drugs and adjust doses emphasising tolerability and affordability; simplify medication regimens
- Utilise rehabilitation services, including hospital and home-based programs to restore or improve functional performance and independence
- Implement strategies and supports to help patients remain independent and safe (including with medication management) for as long as possible
- Ensure safe transitions of care, including continuity of medication management
- Recognise caregivers' stress and utilise respite care.

emerged in the mid-1970s, and since then a substantial body of published literature has accumulated, demonstrating patient safety and economic benefits of clinical pharmacy services for older people, including evidence from randomised controlled trials. Clinical pharmacy services have been shown to improve prescribing, prevent ADRs and medication errors, improve patients' medication knowledge and adherence and, in some populations, reduce the risk of medication-related hospital admissions.[32,34,54–59]

In the USA, it was mandated in 1974 that pharmacists provide a monthly drug regimen review for all nursing home residents.[60] This led to the model of clinical pharmacy practice in long-term care settings known as consultant pharmacy. George Archambault (1909–2001), considered to be the 'father of consultant pharmacy', encapsulated the pharmacist's clinical role when he said: *"It is the pharmacist's professional responsibility to protect the public against iatrogenesis in the area of drug prescribing"*. In the late 1970s and early 1980s research led by some of the pioneers of consultant pharmacy practice in the USA, including William Simonson and James Cooper, provided evidence for the benefits of consultant pharmacy services in the long-term care setting.[61,62] In 1978 Professor Peter Lamy (1925–1994) established the first geriatric pharmacy academic centre at the University of Maryland, USA – the 'Center for the Study of Pharmacy and Therapeutics for the Elderly'.

Clinical pharmacy practice in hospitals in the USA, Britain and Australia began to develop from the mid to late 1960s, and over time some pharmacists began to specialise in different areas of medicine.[63–65] Geriatric pharmacy practice in hospitals evolved alongside development of geriatric medicine from the 1980s. In Australia, the Repatriation Hospitals were among the early pioneers of geriatric pharmacy practice, led by the likes of Frank May in South Australia and Geoff Sussman in Victoria. Pharmacists' contributions to patient care included providing drug information to medical and nursing staff, obtaining patient medication histories and reviewing medication regimens, delivering patient education and inpatient self-administration of medication programs, and developing policies and guidelines to improve medication use.[66] By 2011 most hospitals in Australia were providing at least a basic clinical pharmacy service to their geriatric wards, although some provided minimal or inconsistent service.[67]

Australian research led by Professor Mike Roberts in the mid-1990s highlighted the benefits of clinical pharmacy services for older people in nursing homes,[68] and this paved the way for development of consultant pharmacy services in Australia. In 1997 the Australian government introduced a mechanism for publicly funded medication review services in residential aged care facilities, known as Residential Medication Management Reviews (RMMRs), and the Australian Association of Consultant Pharmacy was established to accredit pharmacists to deliver these services.

Subsequent research conducted in the community setting, led by Andrew Gilbert and Mike Roberts, informed development of the Home Medicines Review (HMR) program, which commenced in 2001.[69,70] Also in 2001, the Society of Hospital Pharmacists of Australia (SHPA) was approved as an accrediting body for pharmacists wishing to perform HMRs and RMMRs.

Pharmacist-led medication reviews for community-dwelling people have been implemented in other countries over recent years, including New Zealand, Britain and the USA.[60,71]

In the 1990s Australian pharmacists also began contributing to the care of older people through services aimed at improving continuity of medication

management (e.g. community liaison or hospital outreach pharmacy services)[72] and involvement in ambulatory services such as Aged Care Assessment Teams (ACATs).[73] Outreach pharmacy services have become well established at many hospitals; however, pharmacist involvement in ACATs and other geriatric ambulatory services remains limited.[74]

Recognition of geriatric pharmacy practice as a specialty

Geriatric pharmacy practice special interest groups existed in Australia and the USA in the 1980s.[75] In the late 1980s the SHPA established Committees of Specialty Practice in aged and extended care.

Recognising the specialist knowledge and skills required for geriatric pharmacy practice, in 1997 the Commission for Certification in Geriatric Pharmacy (CCGP) was established in the USA to provide a mechanism for certification in geriatric pharmacy practice – the Certified Geriatric Pharmacist (CGP) credential. This credential is currently held by over 2900 pharmacists from 13 countries. Chris Alderman became the first Australian CGP in 1999, and was pivotal in the recognition and uptake of the CGP credential in Australia (where the examination is administered by the SHPA and there are now over 165 CGPs).[76] In 2006, Andrew McLachlan was appointed to the first (and still the only) chair in aged care pharmacy in Australia, at the University of Sydney.

CONCLUSION

Geriatric medicine evolved over the last 60–70 years, and is now one of the largest medical specialties in developed countries. Geriatric pharmacy practice evolved over the last 30–40 years, and was recognised as a speciality around 20 years ago. As the number of older people globally continues to rise, the need for geriatric medicine and pharmacy practice will increase, and most medical practitioners and pharmacists working in adult medicine will require some expertise in geriatric assessment and management.

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Competing interests

None declared.

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