

## Managing an ageing population: challenging oral epidemiology

### Abstract

*Global population projections indicate that the proportion of older people is increasing and will continue to do for the foreseeable future. Many countries are already experiencing the challenges of managing an ageing population including increased pension contributions from workers, rises to national retirement ages, and spiralling healthcare costs. In oral health terms, in addition to simply an ageing population, epidemiological studies have demonstrated significant changes in the oral health of older adults in recent years. As the numbers of edentulous older adults has declined there has been a significant increase in the number of partially dentate elderly. Changing attitudes, improved access to dental care and more effective preventative programmes have meant that large numbers of patients are now retaining natural teeth into old age. However, as older patients retain natural teeth for longer the dental profession is charged with controlling chronic dental diseases in an increasingly challenging oral environment.*

### MESH terms

Ageing, older patients, epidemiology, population, oral health, chronic disease

### Authors

1. Gerry McKenna. Senior Lecturer / Consultant in Restorative Dentistry, Centre for Public Health, Queen's University Belfast.
2. George Tsakos. Professor of Dental Public Health, Faculty of Population Health Sciences, University College London.
3. Francis Burke. Vice-Dean, College of Medicine and Health, University College Cork.
4. Paul Brocklehurst, Professor in Health Services Research, School of Health Sciences, Bangor University.

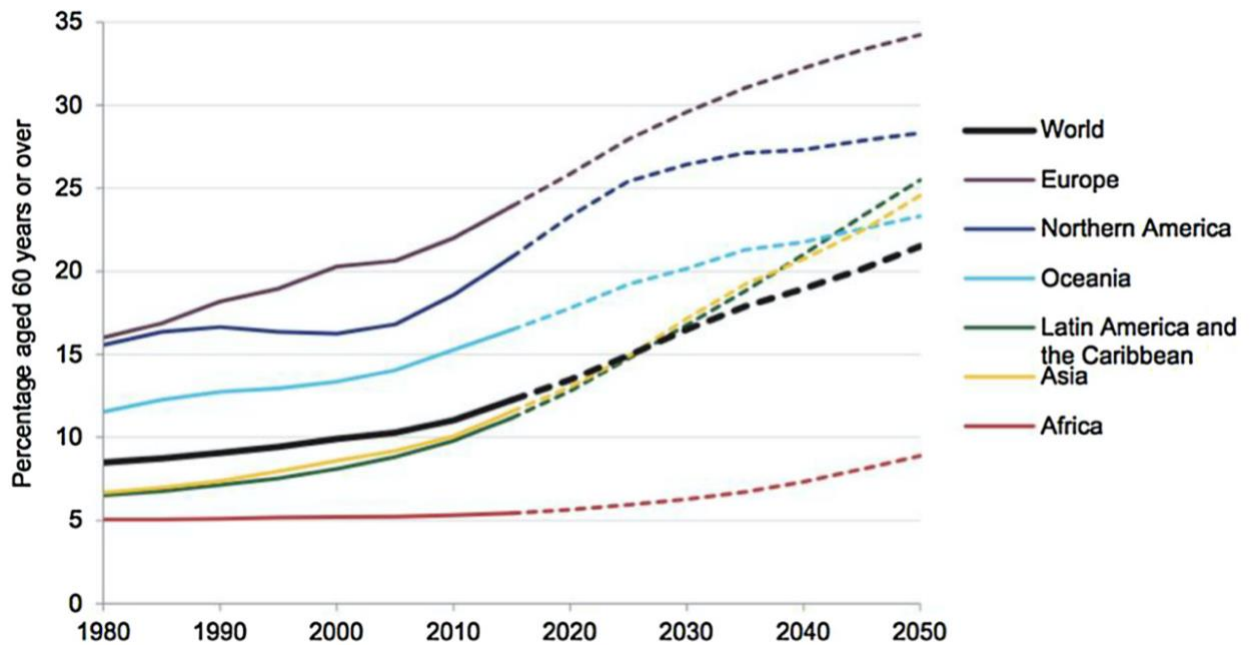
Correspondence to [g.mckenna@qub.ac.uk](mailto:g.mckenna@qub.ac.uk)

## Introduction

In addition to simply managing an ageing population, oral health professionals have seen considerable changes in the oral health of older patients. The traditional picture of older patients with no natural teeth and complete replacement dentures has changed significantly with the emergence of a partially dentate older population. This can be attributed to a number of factors including improved preventative programmes and changing patient attitudes including a desire for treatments which maintain, rather than replace, natural teeth. However, whilst retention of natural teeth in older adults is very positive, this does bring the challenges of managing chronic dental diseases including caries, periodontitis and toothwear into old age (1,2). Unfortunately this means that the burden of oral healthcare for the ageing population is also rising sharply and as oral health conditions exert an excessive burden on older adults, oral health inequalities are therefore a major concern (3). Poor oral health can also impact on the quality of life of older people as well as their systemic health, diet and nutrition (4-6).

## Global Epidemiology

Worldwide, the population is aging. In many industrialised countries, as birth rates fall and life expectancy increases, the proportion of older adults within the general population has increased. This has been one of the most distinctive demographic events of the last century and is expected continue at pace in the twenty first century (7). The underlying process governing global population ageing is termed “demographic transition” where both birth and death rates decline. Whilst international migration also plays a role in population increases in some countries, this is much less important than demographic transition. Fertility rates have reduced in many developed countries below replacement levels as modern contraception and social changes affect behaviour (8). To date fertility decline has been the main determinant of population ageing especially in more developed regions with the global fertility rate halving over the last 50 years. In future the transition towards lower fertility levels is expected to continue in the less developed regions, and to increase slightly in more developed regions (Figure 1).



**Figure 1:** Percentage of the global population aged 60 years and older (7)

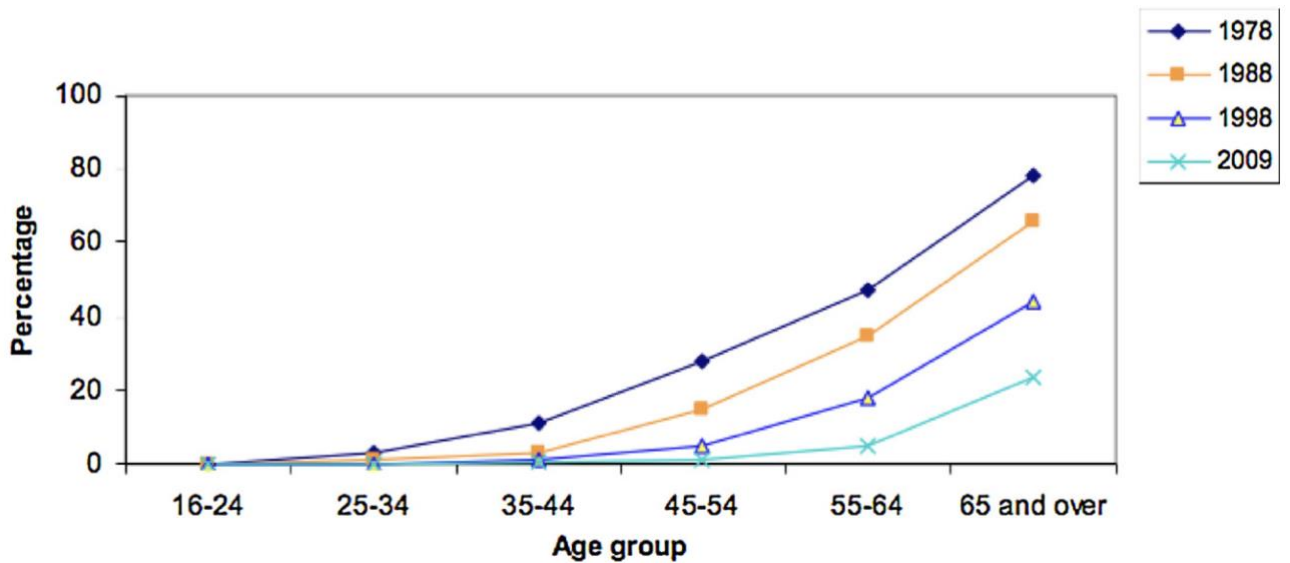
As fertility rates move towards lower levels, mortality decline, especially at older ages, assumes an increasingly important role in population ageing. In developed countries, where low fertility has prevailed for a significant period of time, relative increases in the older population are now primarily determined by improved chances of surviving to old age (9). Over the last five decades, life expectancy at birth increased globally by almost 20 years, from 46.5 years in 1950-1955 to 66.0 years in 2000-2005. On average, the gain in life expectancy at birth was 23.1 years in the less developed regions and 9.4 years in the more developed regions. Over the next 50 years, life expectancy at birth is projected to increase globally by 10 years, to reach 76 years in 2045-2050. As mortality becomes more concentrated at older ages of the population, the gap in life expectancy among regions will tend to decrease. By the end of the next quarter century, life expectancy at birth is expected to reach, on average, 80 years in the more developed regions and 71 years in the less developed regions. As a result of the generalised shift in the age distribution of mortality towards older groups, more people will survive into their 7<sup>th</sup>, 8<sup>th</sup> and 9<sup>th</sup> decades. Under current mortality conditions, almost 3 of every 4 new-borns worldwide will survive to 60 years and approximately 1 of every 3 will live to over 80 years. Not only are more people surviving to old age, but once there, they tend to live longer (7).

The reasons for these improvements in life expectancy vary between countries but include increasing prosperity, education, public hygiene, improvements to housing and social welfare policies. However, progression in healthcare provision has also played an important role. Advances in preventative medicine, pharmaceuticals, imaging and medical technology have all contributed but have come with significant economic costs (10). The result is that many older patients avail of increasingly expensive medical interventions and drugs. This has significant implications for government funded healthcare as typically older patients no longer contribute to the tax base but are instead economically dependent on the state. In the United Kingdom, the Royal Commission on Long Term Care has estimated that the costs of caring for the elderly would quadruple in real terms between 1995 and 2051, from £11.1 billion to £45.3 billion (11).

Amongst older patients the prevalence of chronic medical conditions is very high with significant levels of co-morbidity reported. Chronic diseases are conditions of long duration and generally slow progression. Common chronic diseases include heart disease, stroke, cancer, respiratory diseases and diabetes. They are the leading cause of mortality worldwide and currently account for 63% of all deaths (12). By their nature, chronic diseases are significantly more prevalent amongst older patients. Of the 36 million people who died worldwide from chronic disease in 2008, only 9 million were aged 60 years or less (13). As well as chronic systemic conditions older patients also suffer from chronic oral diseases: dental caries, periodontal disease and toothwear. Destructive dental diseases share many common risk factors with chronic systemic diseases including smoking, diet and a lack of glycaemic control. Although neither are a direct consequence of ageing both are significantly more prevalent amongst older adults (14).

### [The oral health of older adults](#)

A large number of epidemiological dental surveys have indicated that tooth retention has increased as more elders retain natural teeth into old age (15,16) (Figure 2) Unfortunately, the cumulative nature of the two main destructive dental diseases, caries and periodontitis, dictate that aging is always likely to be a factor associated with total tooth loss.



**Figure 2:** Trends in percentage edentate by age: England (15)

Although the overall prevalence of total tooth loss has fallen sharply over recent decades, patients are now becoming edentulous at an older age when they are generally less able to adapt to the limitations of complete dentures. The attitudes of older patients to oral health also appear to have changed as many take advantage of widely available sources of information and demand more from the dental profession. As a result, increasing numbers expect conservative treatment approaches rather than those previously centred around extractions and subsequent replacement of natural teeth (17). There is also evidence to show that has been a generational shift in patient attitudes to oral healthcare. Research from the United Kingdom has illustrated that patients born after World War 2 have very different attitudes to oral health compared with those born pre-war (18).

The report on the Oral Health of Irish Adults 2000-2002 described the findings of a third national survey of Irish adults. It was conducted to facilitate an assessment of the contribution made by the various oral health treatment strategies introduced in the previous 30 years and aimed to inform the further development of oral health policy in Ireland. The report described a “dramatic decline” in the percentage of adults who were edentulous compared to the first national oral health survey in 1979. However, the report illustrated a socio-economic gradient amongst the population where the proportion of edentulous adults was considerably higher amongst lower socio-economic groups (16). These findings have been mirrored by similar results from other countries. Studies from Japan and Korea have both found that socio-economic class has a profound effect on oral health behaviours and status (19,20). A further study from Finland illustrated that childhood Socio-Economic Class had a very strong

relationship with the levels of tooth retention in adulthood (21). Some authors argue that these findings demonstrate a more progressive health promotion approach is required, which recognises the importance of tackling the underlying social, political and environmental determinants of oral health (22).

Whilst increasing tooth retention is seen as a leap forward in the oral health of the older population it also brings with it the challenges of managing chronic dental diseases including caries and periodontal disease. Due to factors such as diet, reduced manual dexterity and xerostomia, these chronic diseases can cause considerable pain and suffering amongst elderly patients and impair oral function (23). Dental caries in particular remains a problem for this age group with a high prevalence of coronal and root surface caries found amongst old-age populations (24,25). In the 1998 UK Adult Dental Health Survey, the proportion of adults with 18 or more sound and unrestored teeth was only 5% among those aged 55 years and over. The 2009 UK Adult Dental Health Survey indicated that this figure had improved but still remained at only 13% (26,27). The 2009 UK Adult Dental Health Survey reported that 27% of adults aged 65-74 years had evidence of dental caries whilst this figure increased to 40% for those aged 75-84 years (27).

The 1998 UK Dental Health Survey showed that almost 25% of the older adults had 12 or more teeth with a root surface that was either exposed, worn, filled or decayed (26). The 2009 Survey reported that 73% of all adults had exposed root surfaces and this increased to 90% for those aged over 55 years. The same survey reported that 11% of 55-64 year olds had active root caries compared with 20% of those aged 75-84 years (27).

### Oral Health in Residential Care

Older patients within residential care are worth particular consideration when discussing issues around oral health. Approximately four per cent of people aged over 65 and one fifth of those aged over 85 live in care homes (28). This equates to around 414,000 older people who reside within residential care homes in the UK (4% of the older population). Around half of all care home residents have some of their own natural teeth but their oral health is typically much worse than their community living peers (29). With increasing age, the ability to care for their mouth deteriorates, poly-pharmacy leads to dry mouth, and diets can become rich in sugars, while good daily oral hygiene is essential for the maintenance of complex dental

restorations (30). All these factors increase the risk of oral disease and directly impact on comorbidities.

Unfortunately, a growing proportion of care home residents are unable to self-care and with increasing dependency oral hygiene practices present a significant challenge. Current prevention practices and service provision in care homes is often poor. Challenges include inadequate resources and training and these are compounded by high staff turnover. There is significant difficulty in obtaining routine dental care due to the very complex needs of institutionalised older people, with a significant proportion suffering from cognitive impairment and dementia. Access to domiciliary services is often variable and difficult with subsequent admission to hospital for dental problems distressing for individuals and their families and very costly to the healthcare provider (30). Therefore, as the numbers of dentate people who are dependent on care increase, understanding how to provide effective prevention is paramount.

Strategies for this population are to prevent disease and reduce pain and co-morbidity as summarised in a recent NICE guideline, NG48, which aims to maintain and improve the oral health of care home residents (31,32). Unfortunately, a Public Health England survey showed current provision and service to be poor, findings mirrored by a recent Care Quality Commission (CQC) investigation in England (33,34). The World Health Organisation has focused on healthy ageing and prioritised the designing of health and long-term care systems that are fit for ageing populations (35). Whilst the published evidence for interventions on promoting oral health among care home residents is currently weak a number of organisations have provided practical guidelines including the European College of Gerodontology and the European Geriatric Medicine Society (36,37).

## Conclusion

Epidemiological surveys indicate that the proportion of older people within the general population is growing as life expectancy increases globally. Alongside changes in population demographics, oral health professionals have observed a significant shift in the oral health of people away from a traditionally edentate group to a partially dentate cohort. This brings with it the challenges of managing older teeth which are susceptible to chronic dental diseases especially caries. These challenges are particularly magnified within residential care where a lack of prevention coupled with cariogenic diets and difficult access can lead to catastrophic consequences.

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