

# 900 million and counting

## Epidemiologic data for demographic and policy transitions.

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**Abstract:** This paper will highlight current evidence about health and well-being that could encourage investment in health for older populations. The paper uses the example of hypertension throughout to illustrate how data collection efforts are translating research to policy. Hypertension, is a global scourge for poor and wealthy, younger and older adults, increasing the risk of stroke and cardiovascular disease. Although it is easily diagnosed and can be effectively treated the burden of hypertension continues to grow as awareness, prevention and treatment lags, particularly for the poor and old. The focus is brought back to how current research can inform policy for ageing populations in the final section, using Ireland's experience to demonstrate how to legislate the good life for older adults.

**Keywords:** Population ageing, Epidemiology, Surveys, Non-communicable disease, Hypertension, Policy

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## Introduction

The world is in unprecedented demographic territory with global ageing, currently numbering 900 million adults aged 60 years or older and doubling to 1.8 billion by the year 2042 (UN Pop Div 2015), within a current total population of 7 billion and counting (Bloom 2011). Those that are already older (over 900 million people), are living longer – with average life expectancy at age 60 projected to increase from 20.2 years today, to 22.8 years over this same time period (UN Pop Div 2015). The astonishing projected growth in the number and proportion of the older adult population worldwide requires an equally extraordinary policy response – one that should be informed by ageing research. To this end, given the popular media excitement about the new research frontiers presented by “Big Data”, one might think the issue of limited data to inform health policy and prepare for an ageing world mooted (Borgman 2015). Yet the limits to currently available data become ever more evident when examining two ongoing scientific debates about our ageing world: whether or not limits to human life span exist, and whether healthy life expectancy will keep pace with increasing average

life expectancy (Oeppen & Vaupel, 2002; Olshansky et al., 2007, Sanderson & Scherbov, 2010; Lee, 2011). While the demographic data are robust, the lack of epidemiological data to resolve crucial ageing-related questions is profound. These fundamental unknowns about the health of ageing populations have practical implications, as poor health among the growing number of older adults will reduce their social and economic participation, and have real and significant costs for health and pension systems.

In today's currency, demographic change is inexorably linked to development, bolstering the case that people do matter to economics (Schumacher 1973; Sachs 2015). And the economics of an ageing world continues to evolve as this unprecedented population horizon forces shifts in thinking about existing social pacts. This new social settlement needs to take on well-being, health and social justice for all (Stiglitz et al., 2012; nef 2015), and to recognise that investments in health can have widespread and equitable social returns (Suhrcke et al., 2006; Fried & Paccaud 2010; Seychell 2015). While older adults are surely continuing to make considerable social, economic, and cultural contributions to society, this is somewhat dependent on how well we age. How well we age is

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highly dependent on health policies that benefit all, older and younger, over a lifetime (Beard et al., 2015).

Alongside demographic ageing, the world is also undergoing an epidemiological transition as non-communicable diseases (NCD) add to, and already outweigh in some countries, the burden of infectious diseases. Ageing is a major driver in the leading causes of NCD burden, even while the majority of community dwelling older adults are likely to age without considerable disease or disability, and remain economically and socially active. Large variations exist within and across countries, at all levels of development, but universally, individuals at the lower income levels are at higher risk of disease and disability, with greater need for health care, long-term care, social care and pensions. Global NCD burden is increasing, with rapid rise in incidence and prevalence in lower middle income countries (LMICs), and particularly among the poorest people (Hotez & Peiperl 2015). The prevention of NCDs is therefore a global priority, with needs for better understanding of the patterns and determinants of health and well-being, effective prevention strategies, and evolution of evidence-based policies to ensure the extra years lived are quality years. Even with major improvements in the prevention of common chronic conditions, the increase in the numbers of older people will likely result in greater disease burden. Without concerted efforts to decrease the incidence of these conditions, at current health levels or worsening health in successive cohorts of ageing adults, the burden will be even greater. Moreover, given that the largest proportion (66%) of older persons reside in low and middle income countries (LMICs), the largest proportion of NCD deaths and burden are in LMICs (UN Pop Div 2015; Vos et al., 2015).

This paper will highlight current evidence about health and well-being that could encourage investment in health for older populations. The paper uses the example of hypertension throughout to illustrate how data collection efforts are translating research to policy. Hypertension, is a global scourge for poor and wealthy, younger and older adults, increasing the risk of stroke and cardiovascular disease. Although it is easily diagnosed and can be effectively treated the burden of hypertension continues to grow as awareness, prevention and treatment lags, particularly for the poor and old (Olsen & Spencer 2015). The focus is brought back to how current research can inform policy for ageing populations in the final section, using Ireland's experience to demonstrate how to legislate the good life for older adults (Seaford 2011).

## Research and policy to address a silent killer

Hypertension is only second to diet as a leading factor in death and morbidity worldwide, and too often provides no warning signs or symptoms (Bromfield & Muntner 2014, Forouzanfar et al., 2015). Hypertension is defined as systolic blood pressure 140mg Hg or above and/or diastolic blood pressure 90mm Hg or above (World Health Organization 2013), and is a major risk factor for coronary heart disease, stroke, renal failure and congestive heart failure, with significant impacts on premature mortality and disability. Around 54% of stroke and 47% of ischaemic heart disease can be attributed to hypertension as the major risk factor (Lawes 2008). The burden of these conditions is greater in LMICs than in higher income settings, and continues to increase largely due to undetected and uncontrolled hypertension. (World Health Organization 2010).

The risk of hypertension increases with age, and is associated with lifestyle factors such as unhealthy diet, harmful use of alcohol, lack of physical activity, excess weight and exposure to persistent stress. Hypertension also frequently co-exists with other risk factors such as smoking, obesity, high cholesterol and diabetes which also increase the risks of cardiovascular disease and other poor health outcomes for older people (Fan et al., 2015). The risk of hypertension and these other risk factors is also highest among people with the lowest socio-economic status, even in high income countries (Leng et al., 2015).

Hypertension is one of the most common risk factors affecting older people, with prevalence estimates ranging from 46% of adults aged 25 years and over in Africa, to 35% in the Americas and 40% in the rest of the world (Lozano et al 2011). High systolic blood pressure was found to be the sixth leading risk factor for morbidity in sub-Saharan Africa (Forouzanfar, et al., 2015), and the African Union, recently released the "Status Report on Hypertension in Africa" acknowledging the need to share best practices and policies, and for coordinated research efforts (African Union 2013).

Results from the multi-country WHO Study on global AGEing and adult health (SAGE) also showed high rates of hypertension in adults aged 50 years and older ranging from 78% in South Africa to 32% in India, and with consistently higher levels for women than for men (Kowal et al., 2012; Lloyd-Sherlock et al.,

2014). The proportion of hypertensive individuals who were aware of their diagnosis ranged from a high of 72% in Russia to less than 45% in all other countries. Moreover the proportion of people with hypertension whose condition was effectively controlled was very small, ranging from 4% in Ghana to 14% in India (Lloyd-Sherlock et al., 2014).

These striking numbers can excite media attention, spur impetus for action, and bolster political will. Yet the reality of addressing the problem is rather mundane, requiring difficult, multi-sectoral, multi-pronged, coordinated approaches that must go well beyond the ephemera of news headlines and political slogans. In one example of a concerted move to prevention, the South African government has embarked on a strategy to reduce hypertension through salt reduction legislation, and early detection and treatment (Mail and Guardian 2014; Business Day 2014). The South African Department of Health is responsible for operationalising the framework to address NCDs, including a reduction in the mean population intake of salt to less than 5g per day by 2020, and a reduction in the prevalence of people with raised blood pressure by 20%, by 2020, through lifestyle and medication (Department of Health 2013). To meet these health outcomes, South Africa opted for a strategy that involves a combination of legislation and public education, partnering with the Heart and Stroke Foundation South Africa (Charlton et al., 2014; Eksteen & Mungal-Singh 2015). Legislation will take effect in 2016, with WHO SAGE in South Africa (and Ghana for comparison) providing required data to measure changes in hypertension and salt intake (through interviews, measurements and 24 hour urine capture) in Waves 2 (2015) and 3 (2017).

In China, which is a very large and rapidly ageing country, hypertension prevalence in SAGE was 60% in adults aged 50 years and older, with just 43% aware they have high blood pressure (Lloyd-Sherlock et al., 2014). Likewise among people in the Trial on Community-based Screening in Beijing, 53% of people aged 50 years and over had high blood pressure, and 30% of these people were not previously aware of their condition (Jiang et al., 2014). In the China Health and Retirement Longitudinal Study of adults aged 45 years or older, 38.6% had hypertension, more than 40% of these people were unaware they had high blood pressure, and more than half of these were not receiving treatment (Feng et al., 2014).

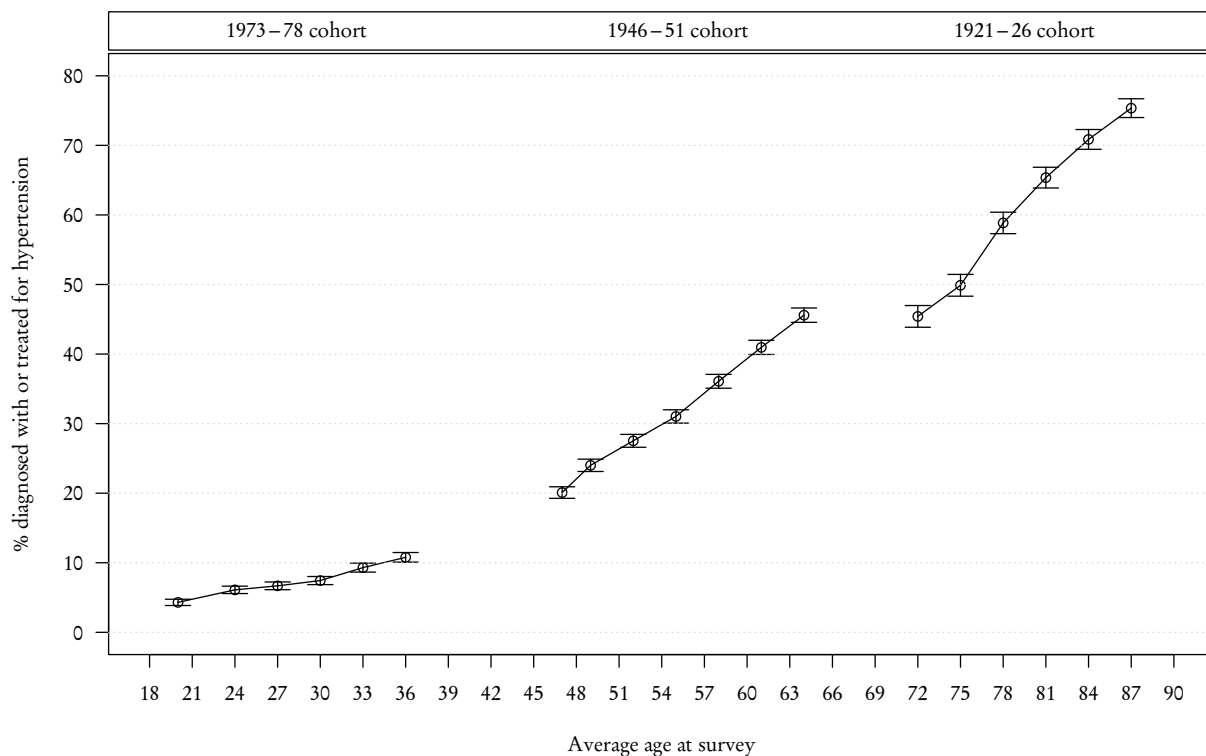
The World Health Organization is currently working to support the Chinese government to reduce

the premature burden of NCDs and to address other challenges of population ageing by taking a life-course approach to health. The strategic approach is to promote advocacy and multi-sectoral approaches to address the social and lifestyle determinants of poor health, and to provide technical and policy support for an integrated package of health services for the prevention and control of NCDs (China Ministry of Health 2013).

Data from another large country, Indonesia, also identify hypertension as a major problem confronting ageing population. The prevalence of raised blood pressure among adults aged 15 years and over in Indonesia was 31.7% in 2007, with significant variations across different economic groups (Ministry of Health Indonesia 2008). This increase in hypertension occurs in the context of rapid economic development, urbanization and increased rates of poverty, and widening inequity. In the Indonesian Family Life Study, the prevalence of hypertension varied greatly across geographical areas and socioeconomic strata. The age-standardised prevalence of hypertension was 28.9% in the less socioeconomically advantaged group and 24.7% in the more advantaged group, with much of this inequality accounted for by different distributions of body mass index (BMI) and education. Higher BMI among the more advantaged group increased the prevalence of hypertension in this group and reduced the inequality (accounting for 18% of inequality), whereas lower education among the less advantaged group increased hypertension inequality (accounting for 30% of inequality) (Christiani et al., 2016).

As in other countries, Indonesia has many opportunities to improve the health of its ageing population through control of NCDs and risk factors. However effective health policy must necessarily intersect with the policy and actions from other government sectors, local governance structures, and the influence of industry. The government has introduced programs for universal access to health services (Sparrow et al., 2013), and runs community-based integrated health services for older people (Pertiwi 2013). However, there is scope for expansion of these programs and to increase their focus on NCD risk factors (Christiani et al., paper accepted 2015).

Just next door to Indonesia, hypertension is one of the most common chronic conditions affecting older people in Australia. Figure 1 shows data from the Australian Longitudinal Study on Women's Health (ALSWH) and demonstrates the increase in prevalence of hypertension with age and across successive



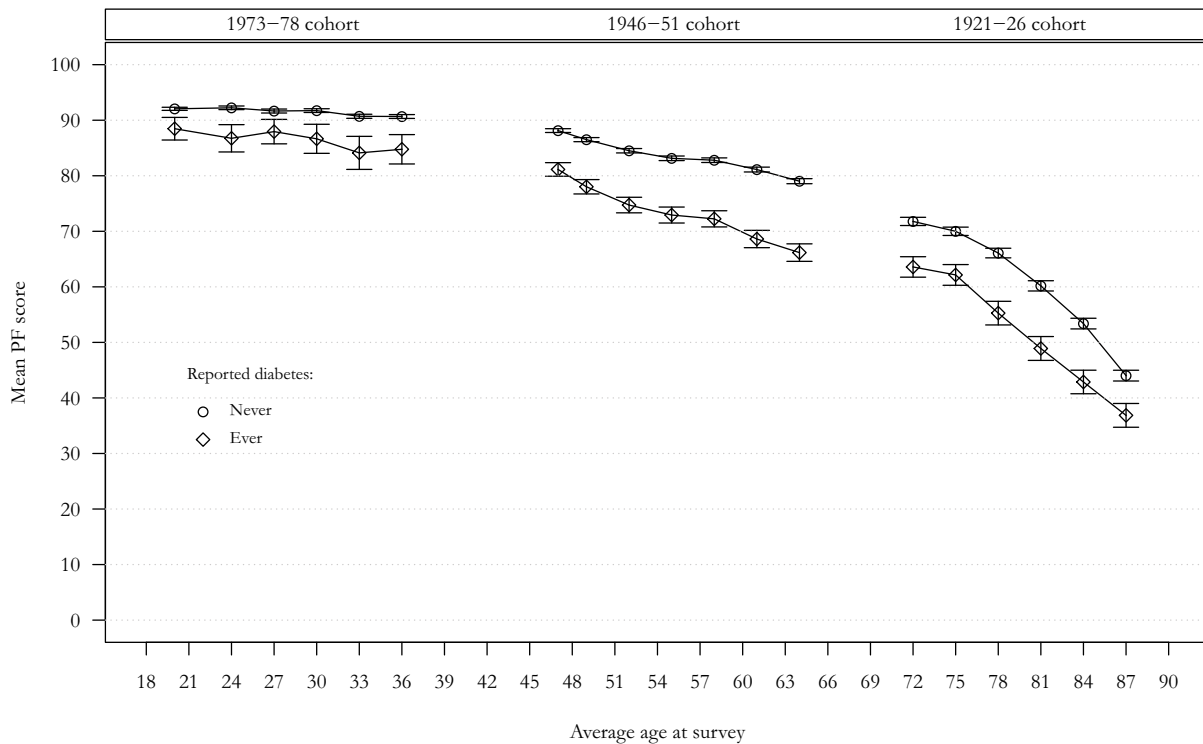
**Figure 1** Prevalence of hypertension in the 1973-78 cohort (Surveys 1-6), the 1946-51 cohort (Surveys 1-7) and the 1921-26 cohort (Surveys 1-6) of the Australian Longitudinal Study on Women’s Health. (Source: Byles et al. 2015. Reproduced with permission of the author)

generations (Byles et al., 2015). Risk of hypertension among these women was strongly associated with overweight and obesity, with greater physical activity partially mitigating against effects of weight (Jackson et al., 2014). The odds of developing hypertension almost doubled among overweight women and more than tripled among obese women compared to women in the healthy weight range. However, the probability of hypertension increases across the entire BMI distribution, with increased risk not exclusive to the overweight or obese group. A hypothetical one unit change in the entire BMI distribution, where every woman loses weight, was estimated to result in a 10.3% reduction in the proportion of women with hypertension. In contrast, if BMI reduced by three units in the top 20% of the distribution (BMI > 29) (that is, only very overweight or obese women lose weight), the corresponding reduction in incidence would be only 7.3%. This analysis demonstrates the importance of a whole-population strategy to disease prevention, rather only attempting to achieve greater weight loss among the most overweight (Brown et al., 2007). Of concern, ALSWH shows a large increase in BMI across successive generations suggesting large increases

in prevalence of hypertension, as well as significant reduction in physical function due to disability associated with obesity and related conditions such as diabetes. To illustrate these effects, Figure 2 shows the changes in physical functioning among three ALSWH cohorts for women with diabetes, and the significant reduction in their physical function scores. As identified in the World Ageing Report 2015 (Beard et al., 2015, p.7), public-health policy must be framed to enable positive trajectories of ageing. Reducing risk factors for NCD such as hypertension and diabetes is critical to ensure optimal functional capacity and well-being for older populations.

## Approaches to management of hypertension

Screening for high blood pressure is universally recommended starting at age 18 years. Strong evidence exists to support treating hypertensive persons aged 60 years or older to a blood pressure goal of less than 150/90 mm Hg (James et al., 2013; Cochrane 2015). Rather unhelpfully though, recent treatment target



**Figure 2** Mean physical functioning scores for women who have ever reported diabetes (at any survey) and women who have never reported diabetes, Surveys 1-6 (1973-78 cohort), Surveys 17 (1946-51 cohort), and Surveys 1-6 (1921-26 cohort) of the Australian Longitudinal Study on Women’s Health. (Source: Byles et al. 2015. Reproduced with permission of the author).

recommendations from the most recent iterations of the European Society of Hypertension and European Society of Cardiology differ from recommendations by the American Society of Hypertension and the International Society of Hypertension, and from those of the 8th Joint National Committee (Lancet 2014). Even with the current recommendation alignment issues, very high level evidence exists indicating that treatment of hypertension reduces the risk of adverse health outcomes (World Health Organization and International Society of Hypertension Writing Group 2003 (WHO/ISH 2003)). However, despite clear evidence of the prevalence and impact of hypertension, and evidence in support of screening and effective treatment, many studies show that hypertension is underdiagnosed and poorly treated in many populations around the world. On World Health Day 2013, WHO called for all adults around the world to have their blood pressure measured (World Health Organization 2013). WHO has also provided a number of evidence-based guidelines on management of patients with hypertension through integrated programmes even in resource-constrained settings (World Health Organization 2007, World Health Organization 2012).

These guidelines recognise that not all people with high blood pressure require medications and some may achieve sufficient reduction in blood pressure from lifestyle changes, including improved diet and exercise, and reduced alcohol intake as recommended for all patients with hypertension (WHO/ISH 2003). Weight loss and physical activity will also reduce risk of diabetes, and cessation of smoking will reduce risk of cardiovascular disease. For people who require additional treatment to control blood pressure, recommendations are available for medications.

Medical management of hypertension does not normally require specialist medical care. A review and meta-analysis of studies on the effectiveness of community interventions for hypertension management in China indicated that community-based care for hypertension care is very effective. Interventions were provided by primary care workers (general practitioners, village doctors, or nurses), and included education directed toward patients, training of care providers, organizational changes, frequent monitoring, patient self-management, and family support (Lu et al., 2012). Importantly, the management of hypertension should not be seen in isolation from

an individual's other health and social needs. Many older people will have multiple risk factors, multiple conditions and functional limitations. Effective health care therefore requires integration of health care and social services to meet the multiple needs of the older person and their carers, within their social context. There is a large body of evidence in support of integrated care programs to improve the quality of care and achieve better patient satisfaction and clinical outcomes (Nolte & Pitchforth 2014). This person-centred approach to care typically features a non-specialist case manager who coordinates care with primary care physicians and specialists (Patel & Chatterji 2015). This team approach also maximizes system efficiencies and dovetails with universal health coverage for noncommunicable diseases. While a number of research gaps remain, sufficient evidence exists for policy makers to immediately implement blood pressure screening and control across all primary care platforms.

## **Policy development for management of hypertension – examples from Ghana and ASEAN**

Fifty-seven percent of older adults in Ghana were found by objective measurement to have high blood pressure in 2010 (SAGE-Ghana), yet only 23% of the respondents were aware of their condition and 4% were effectively treated (Lloyd-Sherlock et al., 2014). These figures opened the door for negotiations with the Ministry of Health and hypertension was identified as a key priority for multi-sector ageing policy development in Ghana (de Carvalho et al., 2015). This problem exists despite the establishment of the Ghana Shared Growth and Development Agenda 2010-2013, with a focus on screening and management of hypertension by local health services (National Development Planning Commission, Republic of Ghana 2010), suggesting other barriers such as low levels of health insurance and poor access to health care may exacerbate the problem of underdiagnosis and undertreatment (Bosu 2010). These access problems exist despite the introduction of the Ghana National Health Insurance Scheme in 2006 that should reduce financial barriers to treatment, with insurance coverage rates for this age group remaining below 50% (World Health Organization 2014a). Having health

insurance was positively associated with awareness in three countries, but the strength of this effect varied from very strong in the Russian Federation to more marginal in Ghana (Lloyd-Sherlock et al., 2014). Other studies also suggest that the low insurance coverage and poor control of this highly prevalent condition may be at least partly explained by a lack of awareness of the nature of chronic disease and the need for long-term treatment that may have no impact on symptoms (Addo et al., 2010). The problem of hypertension in Ghana is potentially not only a consequence of limited access to services and drugs, but also heavily influenced by older people's limited understanding of the nature of chronic disease, risk factors, and the need for ongoing use of preventive medications. In other words, the challenge may be as much related to demand as supply, and any policy response needed to take this into account.

In response to these needs, the government of Ghana determined to increase community awareness of the health needs of older adults, integrate ageing and health into the community health workers programme, and improve insurance coverage and uptake of services. These recommendations have been taken up in Ghana's Medium Term Health Strategy for 2014-2017, with particular objectives to bridge equity gaps in access to health services, and to intensify prevention and control of NCDs (Ministry of Health, Republic of Ghana 2014).

Moving from individual countries, to regions and the benefits gained from cross-country comparisons, member countries of the Association of South-East Asian Nations (ASEAN) have initiated a range of responses to NCD management and control. A review of these responses found that there is a need to re-examine the fundamental nature of health services, and to create innovative solutions to considerable challenges, including a lack of skilled staff, scarcity of equipment and medicines, and difficulties with access to facilities (Lim et al., 2014). Twelve case studies illustrate a variety of approaches, including a focus on lifestyle changes in Thailand, to enactment of a "sin tax" in the Philippines. This same review included a description of a community-based hypertension management programme in Viet Nam, which based its success on engagement of the whole community, support from local authorities, strategic utilization of medical expertise, and the commitment of health care workers. Where reliable data from informed research and political will combine to produce evidence-based policy making, attention paid to both national and

regional solutions offers considerable potential to reinvent ageing (Ferreira 2005; Olshansky et al., 2007).

## Review of strategies on ageing

The wheel need not be recreated in each country and for each renewal of policy commitments, but rather, can be informed by the efforts of other national jurisdictions and international fora, and tailored to country realities. In all cases, a solid research base is required as basic minimum input for policy and planning reformation: the ongoing challenge is to provide data that feeds into the policy process. A positive example from a high income country is provided by Ireland, where the high prevalence of hypertension (64%) and relatively low levels of awareness (55%) in Irish adults aged 50 years and older poses a major public health challenge (Murphy et al., 2014). The Irish National Positive Ageing Strategy was developed with broad domestic input and embedded within the Government's *Healthy Ireland* framework, under the responsibility of the Minister of State (Department of Health 2013). This strategy was informed by policy efforts from no less than eight countries as well as their own previous work on policy development (Department of Health 2014). Data from The Irish Longitudinal Study on Ageing (TILDA) has been a crucial element to the ongoing policy developments and monitoring through the Annual Positive Ageing Forum convened by the Department of Health (Department of Health 2014; Nolan et al. 2014). This illustrates how research can be readily translated into policy, given the political commitment to do so.

## Need for ongoing monitoring and evaluation platforms

Population ageing brings new challenges to health policy and health systems to help people maintain their health as they age, to improve their quality of life and their opportunities to participate in their societies, and to reduce burdens on health and welfare systems. The availability of data to inform the responses to these challenges is of fundamental importance, and this review has provided examples where the availability population data on hypertension has elevated the importance of this problem and driven changes to policy. However, if these responses are to be effective, mechanisms are needed for rapid collection and

analysis of disaggregated data to monitor health trends, system effectiveness, and emerging areas of inequity (WHO 2014b).

## Conclusion

New health horizons are dependent on when and how “Big” and “Little” data are translated into action for the well-being of individuals, including to address the scourge of hypertension across most countries. The public health reality is that in many cases, data availability, access and utilization in many contexts remains an issue. WHO's Study on global AGEing and adult health ([www.who.int/healthinfo/sage](http://www.who.int/healthinfo/sage); Kowal et al., 2012) is proving to be a valuable tool for research and policy in a number of countries, although more funding and a wider range of countries are needed to ensure more proactive and timely inputs into policy and practice. Considerable investment is needed to manage and exploit data now and in the future, so that policy makers informed by an evidence base can act proactively to promote well-being in 900 million older adults and counting.

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