

Leist, A. K. (2018). Population aging, demographic trends and consequences for long-term care. In T. Boll, D. Ferring, and J. Valsiner, Cultures of care in aging, pp. 3-19. Charlotte, NC: Information Age Publishing. DOI: <https://doi.org/10.1108/978-1-64113-139-120251003>

PART I

CONTEXTS OF CARE IN AGING: DEMOGRAPHIC, HISTORICAL, POLITICAL, AND NORMATIVE ISSUES

POPULATION AGING, DEMOGRAPHIC TRENDS, AND CONSEQUENCES FOR LONG-TERM CARE

Anja K. Leist
University of Luxembourg, Luxembourg

ABSTRACT

This chapter reviews recent projections related to the aging of populations, developments in health expectancy and disability, and associated trends in need for and provision of long-term care, focusing on the developments in Europe but mentioning worldwide trends where possible. First, I present demographic trends in changing age structure of populations, expected costs of those changes, and discuss how innovative measures such as the ‘real elderly dependency ratio’ could offer a more balanced view on those trends. Second, projections of healthy life expectancy and time spent with morbidity and disability are presented. Then possible limitations of those projections are discussed, especially regarding recent evidence on changing incidence of dementia, and the possible further reductions in incidence if unfavorable lifestyle and health behaviors were reduced. After that, I will delineate demographic trends in need for assistance with care, and their implications for both formal and informal long-term care provision and costs. Specifically,

a “care gap” both in the provision of formal and informal care has been foreseen for several countries. Lastly, I discuss some trends and phenomena in long-term care provision which may influence the trends in long-term care needs and provision. In particular, estimated care gaps could become less threatening if the trend of migration of trained and untrained caregivers to provide live-in and institutional care in understaffed countries will continue, and if technological innovations will reduce care needs by enabling persons with disabilities to carry out activities of daily living autonomously.

INTRODUCTION

In most countries worldwide, populations are aging due to declining fertility and increasing life expectancy, with profound implications for societies (Rechel et al., 2013; World Health Organization, 2015). These changes are only starting to become visible in some countries, especially some low- and middle-income countries, and are already pronounced in the so-called superaging societies such as Japan and South Korea (Muramatsu & Akiyama, 2011). These trends of aging populations worldwide pose questions regarding the stability and duration of these trends, due to their implications for the sustainability of welfare arrangements related to healthcare and long-term care of older persons. As welfare system measures are mainly financed by the economic contributions of working-age people active in the labour market, an increasing share of older persons no longer active in the workforce along with a decreasing share of working-age persons puts pressures on the sustainability of welfare systems. This chapter is focusing on the implications of population aging and related demographic trends on long-term care needs and provision from a demographic and epidemiological perspective. Due to the complexity of projections for different countries, the review will necessarily be selective, but will be highlighting general trends that affect many countries across the world.

The remainder of this chapter is organized as follows. First, I will provide estimations on population aging (1.2), and associated demographic trends related to health (1.3), and discuss limitations of those projections (1.4). After that, demographic trends related to care needs are presented (1.5), I will delineate in this chapter some possible consequences of these trends for long-term care provision (1.6). Then I will discuss trends and phenomena with regard to changes in care needs, and improvements and changes in care provision that may alleviate the imbalance of caregiving needs on a global level (1.7), and present some conclusions (1.8).

POPULATION AGING—ESTIMATIONS AND PROJECTIONS

Population projections, taken from the United Nations Department of Economic and Social Affairs statistics in 2011, suggest that the world's population will be composed by as many people older than age 65 as people younger than age 15 in 2060 (Uhlenberg, 2013). For Western Europe, the population older than age 65 is expected to increase from 20 % in 2015 to a total of 27 % in 2060 (Uhlenberg, 2013). Recent projections suggest that the overall size of the EU population will be only slightly larger by 2060, but much older (European Commission, 2015). Figure 1.1 gives an overview of the increase in the share of the population aged 65 years or over between 2004 and 2014 (Eurostat, 2015).

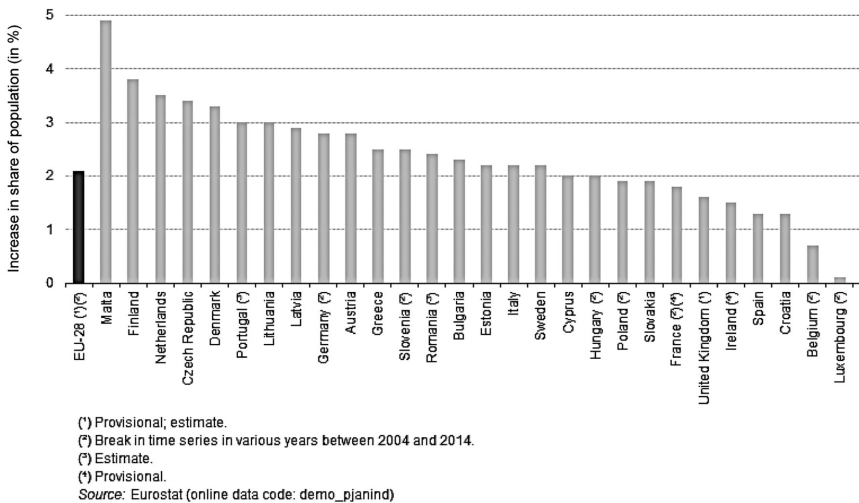


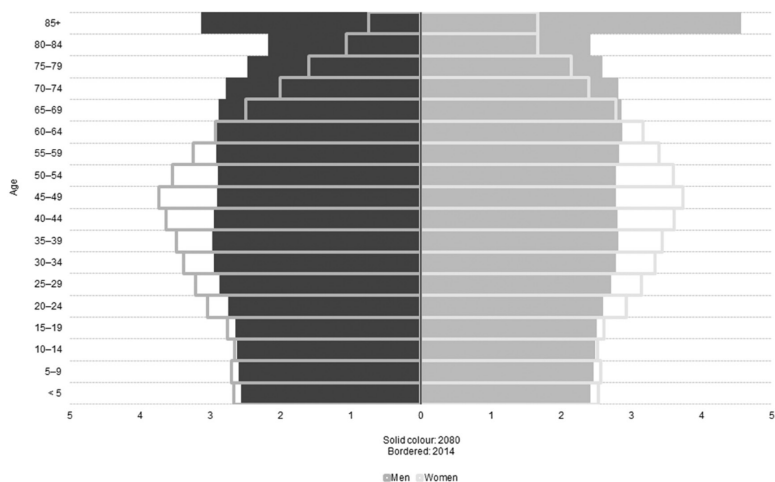
Figure 1.1. Increase in the share of the population (in %) aged 65 years of over between 2004 and 2014 for EU-28 countries (source: Eurostat 2015; non-EU countries not displayed).

Recent large migration flows into the EU are not yet acknowledged in this scenario. However, projections from the U.S. suggest that migration flows to a country will not make its population substantially younger, as migrants (assuming most of them immigrate at working ages) will also age, and population aging is only slightly slowed down even in the face of large, steady migration (Uhlenberg, 2013). Of course, the U.S. is a special case as it has exceptional low levels of population aging compared to other countries, due to the high fertility of the Hispanic population, especially Mexican-origin women (Cherlin, 2010). Projections of how European population

aging is changing after the so-called refugee crisis in 2015 are not available yet at the time of writing. In the EUROPOP13 projections until 2060 of the Ageing Working Group of the European Commission, total fertility rates for the EU are projected to rise as a whole, though they are too low to compensate for population aging and mortality (European Commission, 2015). Further life expectancy is expected to increase markedly over the projection period until 2060. Life expectancy at birth for men is expected to increase by 7.1 years to 84.8 years in 2060, for women the increase is 6.0 years, reaching 89.1 years in 2060 (European Commission, 2015). Those projections take into account the current demographic situation, assuming that unlikely (though possible) political developments or health threats will not drastically influence population structure or fertility.

The changes in the age structure of the population become even more visible if the ratios of age groups are compared across the whole age spectrum. Figure 1.2, taken from projections from Eurostat, shows the current and projected population pyramids of the EU-28 for men and women for 2014 and 2080. A sharp increase of the older population (above 65 years of age) can be noted while the share of the working age population will decrease in both men and women.

Coming back to the EUROPOP13 projections until 2060, the old-age dependency ratio (people aged 65 and older relative to the ‘working age’



(*) 2080: projections (EUROPOP2013).
Source: Eurostat (online data codes: demo_pjangroup and proj_13nprms)

Figure 1.2. Population pyramids of men and women in 2014 and 2080 for EU-28 in % of the total population (source: Eurostat 2015).

population aged 15 to 64) is projected to nearly double over the projection period, from 27.8 % to 50.1 % in the EU until 2060 (European Commission, 2015). This calculation is helpful to forecast the expected and possible contributions from the working-age population in order to finance the welfare system. However, traditional measures of aging populations such as the Old Age Dependency Ratio (OADR) or its reverse (and terminologically less ageist) Support Ratio have been heavily criticized and a number of alternative indicators has been proposed (Spijker, 2015).

The OADR simply counts persons over age 65 as ‘dependent’ in sense of depending on financial transfers coming from the working-age population, thereby ignoring that age 65 still marks a relatively healthy young old. Not only is a substantial part of the working-age population not actually in work (unemployed, students), but also is today’s older population in better physical and cognitive health compared with earlier-born cohorts at that age, and also contributes more economically by longer participating in the labour market, partly due to the abolishment of early-retirement schemes and raising age at which retirement pensions become available. Moreover, persons over age 65 provide financial transfers to younger generations, and to family and society by volunteering and caregiving for both younger generations (e.g., taking care of grandchildren) and older generations (e.g., caregiving for spouse or relatives with care needs). Also, after retirement, consumption, and other spending is still significant and contributes substantially to economic welfare of a country. A better way to mark old age would be to take remaining time to death, that is, remaining life expectancy, for example 15 years, as indicator for being old. In line with these criticisms, approaches to calculate “dependency” ratios with remaining life expectancy of 15 years have been developed (Sanderson & Scherbov, 2013; Spijker, 2015). Using similar approaches to arrive at a “real elderly dependency ratio,” Spijker and MacInnes (2013) find that numbers of dependent older people have indeed been decreasing lately.

Indeed, much evidence has been provided that for healthcare, proximity to death is a more important indicator than chronological age. Among others, Werblow, Felder, and Zweifel (2007) have examined the hypothesis that population aging contributes little to increasing health care expenditures. Distinguishing between different health care expenditures, they confirm that population aging does not contribute much to healthcare expenditures, with the exception of *long-term care expenditures*, which markedly increase with aging and may increase in the future with the aging of populations, regardless of proximity to death. Meijer, Bakx, Doorslaer, and Koopmanschap (2015) also show that time to death largely approximates disability and home care expenditures in the older Dutch population.

Further, there is a strong *social gradient in aging*, where recent findings based on the health and retirement study shows that higher educated

men and women age more slowly than their lower educated counterparts, assessed by hand-grip strength, with the exception of African American men, where no social gradient was observed (Sanderson & Scherbov, 2015).

DEMOGRAPHIC TRENDS IN HEALTH EXPECTANCY, MORBIDITY AND DISABILITY

Health expectancy and disability. With longer life expectancy, the question remains if this period of living longer is spent in good health or in need for assistance with care. There is mixed evidence whether there is an expansion or compression of morbidity, relating to the time span between onset of chronic disease or disability associated with old age and the time a person dies. It is not clear yet if healthcare-related efforts of prevention and treatment of disease are able to compress the length of morbidity in the context of longer life expectancies. This can though also be interpreted as a success of medical innovation being able to save lives after heart disease and stroke. Current evidence points to large cross-national differences in the share of the older population in bad health and with limitations in activities of daily living (Chatterji, Byles, Cutler, Seeman, & Verdes, 2015; Jeune, Eriksen, Andersen-Ranberg, & Brønnum-Hansen, 2015). As a general trend, healthy life expectancy has in most countries slightly less improved than life expectancy itself, which suggests that at least part of the gained years are spent in bad health, and with possible restrictions in the ability to care for oneself. For disability, recent estimations suggest stable incidence: Using data from five national U.S. surveys (Freedman et al., 2013), show that personal care and domestic activity limitations continue to decline during the years 2000 to 2008 for those ages 85 and older, were flat for those ages 65–84, and were modestly increasing but in total still rare for those ages 55–64.

Prevalence of dementia. The prevalence of dementia, which is largely contributing to disability and care needs, is expected to increase sharply globally, with 68% of the projected increase in low and middle income countries (Prince et al., 2015), due to lower child mortality, longer life expectancy, but also improvements in awareness and diagnostics. Other projections for Alzheimer Disease incidence in the United States estimate that from 4.7 million individuals aged 65 years or older in the U.S. (1.8 million aged 85 and over), numbers will increase until 2050, with 13.8 million people being affected by dementia by then (7.0 million aged 85 and older) (Hebert, Weuve, Scherr, & Evans, 2013). Dementia is in many cases the root cause of older people's needs for care. According to the World Alzheimer Report 2013, around half of all people with dementia need personal care, and those without current care needs will most likely be in

need for assistance with care during later stages of the disease. About half of all older people in need for assistance with care have dementia, while four fifths of older people in nursing homes are people with dementia (Prince, Guerchet, & Prina, 2013).

LIMITATIONS OF PROJECTIONS RELATED TO HEALTH, MORBIDITY AND DISABILITY

A note on the limitations of those projections related to future burden of disease seems necessary. The worldwide prevalence of dementia may not increase as steeply as projected for the aging of populations. First, recent evidence from several studies suggests that dementia rates have been falling across the last decades (Matthews et al., 2016; Satizabal et al., 2016), with one candidate explanation being the higher average educational attainment of the younger cohorts now reaching old age. Further, taking into account that many cases of Alzheimer's and other dementias are caused by modifiable risk factors, namely diabetes, midlife hypertension, midlife obesity, physical inactivity, smoking, depression, and educational attainment, reducing the prevalence of these risk factors could lead to substantial reductions in dementia cases (Norton, Matthews, Barnes, Yaffe, & Brayne, 2014). Indeed, the authors estimate that, assuming interrelations between risk factors, one third of worldwide Alzheimer's disease (AD) cases are attributable to these modifiable risk factors. Projecting the results of prevention efforts, a 20% reduction per decade in each of the risk factors would lead to a reduction of over 15% in prevalence of Alzheimer's disease (Norton et al., 2014). Of course, the question to which extent such large reductions are possible is justified, and especially raising educational attainment of the younger cohorts will only have visible effects half a century and more after the intervention, that is, long after 2050 (Biesels, 2014). Lastly, these projections cannot deal with complexifications, for example would medical interventions and preventing mortality from vascular causes lead to longer life expectancy, which may paradoxically increase AD prevalence (Norton et al., 2014). Factors leading to (slightly) increasing death rates as recently detected in the United States (National Center for Health Statistics, 2016) due to influenza and other health risks are difficult if not impossible to foresee. Similarly, policy changes that may drastically reduce risky health behaviors are difficult to foresee more than a few years in the future—think of policies similar to mandatory wearing of seatbelts in cars, the recent smoking bans, taxes on sugar etc. For these reasons it is well advised to keep in mind that projections cannot deal with the unknown, and only infer from current conditions.

DEMOGRAPHIC TRENDS IN NEED FOR ASSISTANCE WITH CARE AND CARE PROVISION

Need for assistance with care. Long-term care is defined as a range of services required by persons with reduced functional (physical or cognitive) capacity and who are dependent for an extended period of time on help with basic and/or instrumental activities of daily living (European Commission, 2015, in concordance with definitions from the OECD [Organization for Economic Cooperation and Development], Eurostat, and WHO [World Health Organization]). Long-term care is needed by 10.9 million community residents in the United States, half of them of older age, and 1.8 million nursing home residents (Kaye, Harrington, & LaPlante, 2010). The World Alzheimer Report 2013 estimates that until 2050, the total number of people being dependent due to dementia worldwide will nearly double from 349 million to 613 million, but the numbers of older people with needs for care will nearly treble from 101 to 277 million (Prince et al., 2013).

Applebaum, Bardo, and Robbins (2013) report estimates of the U.S. Census Bureau that between 2008 and 2040, the number of people worldwide who may need long-term services will increase by 233% (Kinsella & He, 2009). To give a definition “individuals who require long-term services and supports primarily need ongoing assistance with the basic tasks of daily living” (Applebaum et al., 2013, p. 59). Whereas in some cases acute medical needs may come on top of that, long-term care mostly reflects needs to accomplish personal and instrumental tasks of daily routines, such as bathing, dressing, or doing laundry.

Care provision. According to a recent OECD report, over 12% of persons aged 65 and older were receiving some long-term care services at home or in institutions in 2011, with large cross-national variations ranging from 1% receiving formal care (and more receiving informal care) in Poland, up to one-fifth of that population receiving long-term care in Israel and Switzerland (OECD, 2013). Across almost all OECD countries, over the last years an increase in the provision and use of home-based care can be stated, with figures being already high in Japan and Hungary, where about 75% of long-term care recipients receive care at home. In contrast, in the U.S. only around 40 % of those receiving long-term care received care at home in 2009 (OECD, 2013).

The majority of care recipients are informally given care by their family members, which is in line with the wish of most older people to stay at home and to receive care in their familial environment provided that they can live alone and not in co-residency with their children (Pinquart, Sörensen, & Song, 2017). Depending on complexity of care needs, a nursing home may provide a better care environment. In some countries institutional

long-term care rates are falling, however still being on a high level, which is due to more adequate responses to care needs: people with higher and more complex care needs are cared for in institutions, whereas people with lower care needs receive community-based care (Meijer et al., 2015).

Not only have women a higher risk of being affected by dementia due to their higher life expectancy and have to rely on people other than the spouse in case of care needs, as the higher life expectancy contributes most to becoming dependent and in need for assistance with care. Women also provide the majority of the workforce of formal caregivers as well as the majority of informal caregivers. As informal caregivers, women often have to give up work, are not adequately reimbursed, face caregiver strain and burnout, and have, on the long run, also to cope with giving up their career, reduced income, fewer possibilities to acquire wealth, fewer pensions and security in old age (Erol, Brooker, & Peel, 2015). However, men also face problems as caregivers, are not acknowledged adequately and in few cases reimbursed for the economic losses they have if care efforts are hindering paid work. Problems related to caregiving are largely culturally shaped and dependent on institutional context, as many Scandinavian countries have formalized caregiving for family members (Timonen & Rostgaard, 2017).

The “care gap.” An important strategy to forecast balances in future long-term care provision is to estimate the future demand and supply of informal care of children for their parents, and estimate if these number are keeping pace. Pickard (2015) estimates that supply of informal care by adult children in England will not be as sharply increasing as demands for unpaid care. Demand for care will according to these calculations already exceed supply by 2017 and increase further after. Indeed, by 2032, the identified “care gap” would rise to 160,000 cases in need for but without supply of informal care by children. It is unlikely that this gap can be filled by other providers of informal care such as spouses, siblings or other relatives. These estimations suggest that many people in need for assistance with care may fail to receive assistance due to the smaller care workforce and fewer available informal caregivers, with problematic consequences, since inadequate care may lead to medical complications, disability, hospitalization and even death.

CONSEQUENCES OF DEMOGRAPHIC TRENDS FOR LONG-TERM CARE PROVISION AND EXPENDITURES

The challenges to societies with regard to population aging comprise the sustainability and improvement of health and welfare systems with regard to health promotion and disease prevention, self-care, improvements to infrastructure, coordination and capacity of health care and long-term care

(Rechel et al., 2013). Further macroeconomic implications, e.g. related to savings are expected, although often-cited challenges to the current welfare systems are likely overestimated (Bloom et al., 2015). What is acknowledged as well is the importance of the aging of the health workforce, which, without adequate replacement by younger health workers, could lead to care gaps in the future (Rechel et al., 2013).

For Europe, long-term care expenditures are already currently constituting a significant part of the overall healthcare expenditures, with current long-term care (both medical and social components) expenditures ranging between less than 2.0% of healthcare expenditures (five Member States) and 34.9% in the Netherlands and 40.3% in Sweden. Figures are below 10 % for Australia and the United States, above 20% for six EU Member States and Switzerland, Japan, and Norway (Eurostat, 2015). Per inhabitant, the amount of long-term care expenditures is above 1,000 EUR in Sweden, the Netherlands, Luxembourg and Denmark, whereas 12 other countries report less than 100 EUR such as Bulgaria (Eurostat, 2015). Indeed, much of the current long-term care costs is attributable to dementia; recent estimations show that if dementia care would be an economy, it would be the 18th largest economy in the world (Prince et al., 2013).

A recent OECD report estimated care cost increases for two scenarios, a cost-containment scenario where policies act more strongly than in the past to rein in some of the expenditure growth, and a cost-pressure scenario with no stepped-up policy action. Their projections, on average across participating countries, suggest that health and long-term care expenditures will increase by between 3.3 and 7.7 percentage points of GDP between 2010 and 2060 in the two scenarios, to a total of between 9.5 and 14 % of GDP. For long-term care, comprising health care and social services for those dependent, i.e. having limitations in (basic or instrumental) activities of daily living, the costs are expected to rise from 0.8 to 1.6 % (cost-containment scenario) or even to 2.1 % (cost-pressure scenario; De La Maisonnette & Martins, 2013). De La Maisonnette and Martins (2013) state that “a striking difference between spending on health and long-term care is that the cost of long-term care per beneficiary is roughly independent of age” (p. 23).

TRENDS AND PHENOMENA IN LONG-TERM CARE PROVISION

The projections presented here regarding demographic trends in care needs and care provision are based on current state of knowledge combined with rough assumptions about future conditions. They are not well able to very precisely forecast the future due to likely changes in care needs

and care provisions coming from different kinds of innovation. These kinds of innovations could drastically change the pessimistic view of imbalances of care needs and provision. They could help delaying or entirely omitting care needs on the one hand, and providing care workforce and improve their conditions to fill the care gap on the other hand. After presenting medical innovations related to delaying onset and progression of diseases associated with aging, changes in the provision of care and technological innovations to improve autonomy will be discussed.

Innovations Related to Changes in Need for Assistance With Care

Delaying onset and progression of diseases associated with aging. One main development, which may reduce the number of care recipients worldwide and help older persons to live independently as long as possible, is the search for medication to delay onset or progression of Alzheimer's Disease, the most common form of dementia and one of the main contributors to becoming dependent and in need for assistance with care. Even if onset and progression of disease, especially dementia, would only be a bit delayed, this could make a huge difference for prevalence of dementia (Norton et al., 2014), with consequences for quality of life of the affected person and their close ones, to public and private care costs. However, currently there are only few promising results for delaying the progression of dementia and mild cognitive impairment. Mentioning the efforts to delay onset and progression of diseases cannot be complete without noting another medical approach that is quite promising, and reflected in ongoing research. This is the search for solutions not to target single conditions and diseases related to aging, but to delay the aging process altogether, thereby delaying onset and progression of aging-related chronic conditions such as cancer, cardiovascular disease, dementia, and Type II diabetes (Olshansky, 2016). Success in delaying the aging process could lead to drastic changes in incidence of aging-related diseases and may result in an increase of life spent in good health, with little or no care needs.

Technological innovations increasing autonomy. Many technological applications of lower and higher complexity have been developed during the last decades in order to increase mobility and safety, such as stair lifts or devices with which medical help can be requested in an emergency such as after a fall. Indeed, technological innovations could help to maintain the widely shared goal of autonomy (e.g., having a bath or going to the toilet by oneself) and to become less dependent on care provision by formal or informal caregivers. Schulz et al. (2014) provide a comprehensive framework of domains, purposes, and examples of technology related to aging.

There is however still a gap between the development of new technological devices and their diffusion regarding use in homes of older people, with highly complex and efficient technologies being developed but not widespread in use. One example are sensors to monitor movements in and around the bed which could help to detect anomalies in behavior, possibly indicating falls or other health problems. Explanations for the slow diffusion of technologies like these into homes is the perception of being “monitored” as perceived loss of autonomy, the costs of new technologies, and the inability to maintain the devices oneself (professional support is often needed when an error occurs). Still, medical and technological innovations could to some extent reduce or even eliminate specific care needs, for example home arrangements and devices that enable autonomous toilet use will make care provision in that life domain obsolete. Other, softer and communication-related technologies are well-received and have been shown to have positive effects on health and well-being. Social media, for example, online platforms and forums, can provide information for people with care needs and their caregivers (Leist, 2013) and thus help to increase autonomy, safety, and health through education. Thomas and Applebaum (2015) point out that many informal caregivers are occupied with highly complex tasks such as wound care or helping with assistive devices, for which the caregivers often report to teach themselves how to perform those tasks. Here, short tutorials, webinars or other tools can be used to educate and train the informal and formal caregiver workforce.

Changes in the Provision of Care

The ongoing trend for specialization of the care workforce is likely to continue to grow; highly trained nurses and physiotherapists take over complex care tasks while lower trained workers take over cleaning and other basic care-related tasks.

Migrants from lower-income countries provide live-in and professional care. An almost worldwide trend towards cheaper provision of care at home is the share of people cared for by live-in and institutional migrant care workers. In many countries such as United Kingdom, Ireland, Canada, and the United States, attracting migrant care workers for live-in and institutional care work is already common (Spencer, Martin, Bourgeault, & O’Shea, 2010), Taiwan receives migrants from the Philippines, Indonesia, Thailand, and Vietnam (Chou, Kröger, & Pu, 2015), Japan from Indonesia (Tsukada, 2013), and urban China from rural China (Zhan, 2013). Scandinavian countries with a more formalized care system do not have large shares of live-in migrant care workers. This arrangement of migrant care workers either live-in or in institutions pose challenges for both

the workers and cared-for persons. Even if adequate professionalization and training are ensured, language and cultural barriers challenge the interaction between caregiver and care recipient. Research is needed on what works in facilitating these care arrangements, as projections of care gaps clearly demonstrate the necessity for migrant care workers in many countries.

Support of formal and informal caregivers by technological innovation. It is important to note that increasing work and life satisfaction helps with retention of care staff (Rechel et al., 2013), thereby relieving the pressures of high fluctuation (and needs to train new staff) and carer shortage in institutions, hospitals and homes. For informal caregivers, several initiatives have been formalized to provide training and support for informal caregivers, such as “InformCare,” the first European web platform for informal carers providing information and support in each EU country in the national language(s) (Eurocarers, 2016). Further, social media, especially through forums on specific topics can facilitate the exchange of emotional and other support (Leist, 2013). ICT-based services may increase quality of life for caregivers and cared-for persons, but also generate savings contributing to the economic sustainability of the care systems (Carretero, Stewart, & Centeno, 2015). It should also not be downplayed that different technological applications have been developed that are able to relieve some of the emotional stress of caregivers by providing emotional support for people with dementia at later stages who show behaviors that can be perceived as challenging by their caregivers. It could be helpful to use a therapeutic robot, for example, the seal Paro, with which the person with dementia can interact similarly to interacting with a pet. There is promising evidence for positive psychosocial effects, especially related to loneliness (Robinson, MacDonald, Kerse, & Broadbent, 2013). Further, a caredroid Alice, a 60 cm big doll-like robot with a friendly face, has been developed to interact with persons with dementia, able to provide some form of emotional support. Alice has been accepted by several women with dementia in a pilot study who interacted by behaviors such as reading to Alice or telling her stories (Harrison, 2015). The medical benefits and comfort in interacting with a nonhuman assistant raises hopes for the success of technologically assisted emotional support.

CONCLUSIONS

To conclude, current projections of population aging are forecasting populations in Europe and almost all countries across the world to become older on average, with a larger share of old and very old residents over the next decades. Demographic projections on the compression of morbidity and

the magnitude of increases in health expectancies are less clear, but it can be expected that moderate to strong increases in the number of people in need for assistance with care will have to be responded to in the next decades. Natural limitations of those projections are the unforeseeability of political developments such as current strong migration flows into Europe, policy developments influencing health behaviors, and possible health threats on a large scale such as influenza epidemics. Further, current projections are alluding to a failure to cover projected care needs due to slower increases or even decreases in the number of informal and formal caregivers, resulting in a likely care gap. As I have been alluding to throughout this chapter, it is however far from certain that these projections are an exact depiction of the realities of care needs and provision in a few decades. Especially for developed countries, with younger cohorts now entering old age in more favorable conditions, with higher literacy, higher education and associated higher cognitive functioning, better nutrition and better healthcare across large spans of their life, many of the threats depicted by projections of population aging and associated demographic health trends may not become reality, and older age for those younger cohorts may be more favorable compared to the older age of earlier born cohorts.

ACKNOWLEDGMENTS

This work was supported by the Fonds National de la Recherche Luxembourg (FNR/P11/05 and FNR/P11/05bis). I would like to thank Dr Benedikt Wilbertz for helpful discussions, and would like to thank the participants of the Cultures of Care workshop in Remich, Luxembourg, in September 2015, especially Dr Tine Rostgaard, for their valuable input.

REFERENCES

- Applebaum, R., Bardo, A., & Robbins, E. (2013). International approaches to long-term services and supports. *Generations*, 37(1), 59–65.
- Biessels, G. J. (2014). Capitalising on modifiable risk factors for Alzheimer's disease. *The Lancet Neurology*, 13(8), 752–753.
- Bloom, D. E., Chatterji, S., Kowal, P., Lloyd-Sherlock, P., McKee, M., Rechel, B., ... Smith, J. P. (2015). Macroeconomic implications of population ageing and selected policy responses. *The Lancet*, 385(9968), 649–657.
- Carretero, S., Stewart, J., & Centeno, C. (2015). Information and communication technologies for informal carers and paid assistants: Benefits from micro-, meso-, and macro-levels. *European Journal of Ageing*, 12(2), 163–173. doi:10.1007/s10433-015-0333-4

- Chatterji, S., Byles, J., Cutler, D., Seeman, T., & Verdes, E. (2015). Health, functioning, and disability in older adults—present status and future implications. *The Lancet*, 385(9967), 563–575.
- Cherlin, A. J. (2010). Demographic trends in the United States: A review of research in the 2000s. *Journal of Marriage and Family*, 72, 403–419. doi:10.1111/j.1741-3737.2010.00710.x
- Chou, Y.-C., Kröger, T., & Pu, C.-y. (2015). Models of long-term care use among older people with disabilities in Taiwan: institutional care, community care, live-in migrant care and family care. *European Journal of Ageing*, 12(2), 95–104.
- De La Maisonnette, C., & Martins, J. O. (2013). Public spending on health and long-term care: A new set of projections. *OECD Economic Policy Papers*, No. 06. Retrieved from <http://www.oecd.org/eco/growth/Health%20FINAL.pdf>
- Erol, R., Brooker, D., & Peel, E. (2015). Women and dementia: A global research review. *Alzheimer's Disease International*. Retrieved from <https://www.alz.co.uk/women-and-dementia>
- Eurocarers (2016). InformCare—The EU information hub on informal care. Retrieved August 1, 2016, from <http://eurocarers.org/InformCare>
- European Commission. (2015). The 2015 ageing report. Economic and budgetary projections for the 28 EU Member States (2013–2060). Luxembourg: Publications Office of the European Union.
- Eurostat. (2015). Europe in figures—Eurostat yearbook. Retrieved from http://ec.europa.eu/eurostat/statistics-explained/index.php/Europe_in_figures_-_Eurostat_yearbook
- Freedman, V. A., Spillman, B. C., Andreski, P. M., Cornman, J. C., Crimmins, E. M., Kramarow, E., ... Schoeni, R. F. (2013). Trends in late-life activity limitations in the United States: an update from five national surveys. *Demography*, 50(2), 661–671.
- Harrison, N. (2015). Caredroids in health care. *The Lancet*, 386(9990), 235–236.
- Hebert, L. E., Weuve, J., Scherr, P. A., & Evans, D. A. (2013). Alzheimer disease in the United States (2010–2050) estimated using the 2010 census. *Neurology*, 80(19), 1778–1783.
- Jeune, B., Eriksen, M. L., Andersen-Ranberg, K., & Brønnum-Hansen, H. (2015). Improvement in health expectancy at ages 50 and 65 in Denmark during the period 2004–2011. *Scandinavian Journal of Public Health*, 43(3), 254–259.
- Kaye, H. S., Harrington, C., & LaPlante, M. P. (2010). Long-term care: Who gets it, who provides it, who pays, and how much? *Health Affairs*, 29(1), 11–21.
- Leist, A. K. (2013). Social media use of older adults: a mini-review. *Gerontology*, 59(4), 378–384. doi:10.1159/000346818
- Matthews, F. E., Stephan, B. C. M., Robinson, L., Jagger, C., Barnes, L. E., Arthur, A., ... Ageing Studies, C. (2016). A two decade dementia incidence comparison from the Cognitive Function and Ageing Studies I and II. *Nature Communications*, 7. doi:10.1038/ncomms11398
- Meijer, C., Bakx, P., Doorslaer, E., & Koopmanschap, M. (2015). Explaining declining rates of institutional LTC use in the Netherlands: A decomposition approach. *Health Economics*, 24(S1), 18–31.
- Muramatsu, N., & Akiyama, H. (2011). Japan: super-aging society preparing for the future. *The Gerontologist*, 51(4), 425–432.

- National Center for Health Statistics. (2016). Quarterly provisional estimates for selected causes of death: United States, 2014–Quarter 4, 2015. National Vital Statistics System, Vital Statistics Rapid Release Program.
- Norton, S., Matthews, F. E., Barnes, D. E., Yaffe, K., & Brayne, C. (2014). Potential for primary prevention of Alzheimer's disease: an analysis of population-based data. *The Lancet Neurology*, 13(8), 788–794.
- Organization for Economic Cooperation and Development [OECD]. (2013). Health at a glance: OECD indicators. OECD Publishing.
- Olshansky, S. J. (2016). Articulating the case for the longevity dividend. *Cold Spring Harb Perspect Med*, 6(2). doi:10.1101/cshperspect.a025940
- Pickard, L. (2015). A growing care gap? The supply of unpaid care for older people by their adult children in England to 2032. *Ageing and Society*, 35(01), 96–123.
- Pinquart, M., Sörensen, S., & Song, Y. (2017). Older persons' care-related preferences: Cultural and cross-cultural influences. In T. Boll, D. Ferring, & J. Valsiner (Eds.), *Cultures of care in aging* (pp. xxx–yyy). Charlotte, NC: Information Age Publishing.
- Prince, M., Guerchet, M., & Prina, M. (2013). *World Alzheimer report 2013: Journey of caring: an analysis of long-term care for dementia*. London, England: Alzheimer's Disease International.
- Prince, M., Wimo, A., Guerchet, M., Ali, G.-C., Wu, Y.-T., Prina, M., & Alzheimer's Disease International. (2015). World Alzheimer Report 2015. The global impact of dementia, an analysis of prevalence, incidence, cost and trends. London, England: Alzheimer's Disease International.
- Rechel, B., Grundy, E., Robine, J.-M., Cylus, J., Mackenbach, J. P., Knai, C., & McKee, M. (2013). Ageing in the European union. *The Lancet*, 381(9874), 1312–1322.
- Robinson, H., MacDonald, B., Kerse, N., & Broadbent, E. (2013). The psychosocial effects of a companion robot: A randomized controlled trial. *Journal of the American Medical Directors Association*, 14(9), 661–667.
- Sanderson, W. C., & Scherbov, S. (2013). The characteristics approach to the measurement of population aging. *Population and Development Review*, 39(4), 673–685.
- Sanderson, W. C., & Scherbov, S. (2015). Faster increases in human life expectancy could lead to slower population aging. *PloS one*, 10(4), e0121922.
- Satizabal, C. L., Beiser, A. S., Chouraki, V., Chêne, G., Dufouil, C., & Seshadri, S. (2016). Incidence of dementia over three decades in the Framingham Heart Study. *New England Journal of Medicine*, 374(6), 523–532. doi:doi:10.1056/NEJMoal504327
- Schulz, R., Wahl, H.-W., Matthews, J. T., Dabbs, A. D. V., Beach, S. R., & Czaja, S. J. (2014). Advancing the aging and technology agenda in gerontology. *The Gerontologist*, 55(5). doi:10.1093/geront/gnu071
- Spencer, S., Martin, S., Bourgeault, I. L., & O'Shea, E. (2010). The role of migrant care workers in ageing societies: Report on research findings in the United Kingdom, Ireland, Canada and the United States. *IOM Migration Research Series*, No. 41. Retrieved from <http://publications.iom.int/system/files/pdf/mrs41.pdf>

- Spijker, J. (2015). Alternative indicators of population ageing: An inventory. Vienna, Austria: Vienna Institute of Demography Working Papers.
- Spijker, J., & MacInnes, J. (2013). Population ageing: the timebomb that isn't? *BMJ*, 347, f6598.
- Thomas, K. S., & Applebaum, R. (2015). Long-term services and supports (LTSS): A growing challenge for an aging America. *Public Policy & Aging Report*, 25(2), 56–62.
- Timonen, V., & Rostgaard, T. (2017). Turning the 'problem' into the solution: Hopes, trends and contradictions in home care policies for ageing populations. In T. Boll, D. Ferring & J. Valsiner (Eds.), *Cultures of care in aging* (pp. xxx–yyy). Charlotte, NC: Information Age Publishing.
- Tsukada, N. (2013). The foreign long-term worker challenge in Japan. *Generations*, 37(1), 66–69.
- Uhlenberg, P. (2013). Demography is not destiny: The challenges and opportunities of global population aging. *Generations*, 37(1), 12–18.
- Werblow, A., Felder, S., & Zweifel, P. (2007). Population ageing and health care expenditure: a school of 'red herrings'? *Health Economics*, 16(10), 1109–1126.
- World Health Organization. (2015). *World report on ageing and health*. Geneva, Switzerland: World Health Organization. Retrieved from <http://www.who.int/ageing/events/world-report-2015-launch/en/>
- Zhan, H. J. (2013). Population aging and long-term care in China. *Generations*, 37(1), 53–58.

