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Health of the population from the cradle to the grave:
how it is changing and what can be done

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Introduction

The life expectancy of the elderly has gradually risen over recent decades, and this trend will continue in the years to come. In particular, the Europe 2020 programme aims to increase the number of years of life with good health by 24 months by 2020. Thus, the world is ageing, and this is good news. Unfortunately, the extension of life we are benefitting from is not always accompanied by good health. The cost and prevalence of chronic diseases are on the rise amongst the elderly, as is serious disability, with considerable consequences for system sustainability: a world which today is barely capable of satisfying the health requirements of its current population will find itself in the coming years needing to deal with and meet the health requirements of hundreds of millions of elderly people.

The combination of public debt, unemployment, globalisation, demographic ageing and rising housing prices we have witnessed over the last 20 years has reduced the levels and buying power of the income and outlooks of millions of young people throughout the developed world, with unprecedented consequences for generational inequality. For the first time in the history of industrialised countries, with the exception of periods of war, the income of young adults has declined compared to the rest of society. In Italy, households under 35 years old have become poorer than those of pensioners under 80 years old. If we accept the assumption that the morbidity rate and life expectancy are indicators influenced by factors such as employment, income and access to healthcare, it is evident that in dynamic terms, the health status of this cohort of young individuals will have considerable repercussions on the future average health of the entire population and on health expenditure as a whole. The organisation and management of these phenomena will represent the real challenge for Italian social and healthcare policies.

As part of its long-term commitment to conducting research in the healthcare field, and to provide a concrete response to these problems, the Farmafactoring Foundation has decided to launch a three-year research project entitled "Health of the population from the cradle to the grave: current dynamics and future prospects". The adoption of a generational approach to the topics of health and healthcare makes this analysis innovative, and unprecedented in this sector.

The research, conducted in collaboration with CERGAS (Centre for Research on Health and Social Care Management) at Bocconi University, has two main aims:

- 1. identifying any differences in Italy in terms of health status throughout people's lifecycle and based on socio-economic condition, and how those differences have changed in recent decades;*
- 2. providing an estimate of the economic impact that younger generations (in particular "Generation X" and "Millennials") have had on healthcare costs in the last 15 years;*
- 3. providing a description of the organisation of regional healthcare services and their capacity to manage the care of individuals throughout their lifecycle, looking in particular at what happens in the paediatric/adolescent years, in the adult years and in the elderly years.*

This first part presents the results of the research entitled “Changes in health in Italy: effects on the silver generation”.

The analysis is focused on the evolution of the health status of the Italian population and the real capacity of the healthcare system to meet the requirements that will arise, investigating the content and characteristics of the demand for healthcare services expressed by the silver generation and the associated aspects of the supply.

The analyses performed show a tendential incapacity of the system to fully and appropriately handle the healthcare needs expressed by the current silver generation. This is a signal that should be read and interpreted prospectively, since in the future the (currently) younger generations could have worse health status when they join the silver generation. In addition, this should make us reconsider how epidemiological and spending trends in the coming years may differ from the main-stream institutional estimates currently available.

With respect to the condition of the current silver generation, the results tell us that there is a care management chain for these individuals. We speak of a chain to highlight how the response to the healthcare and assistance requirements of the silver generation moves through multiple services, places and institutions based on evolving needs, complementary in their characteristics, but also “supplementary” in potential supply gaps in the public system. This ideal chain consists of various settings with increasing intensity of care. The maximum level is the hospital for acute care; then, the hospital with the function of rehabilitation or long term care post-acute care; the local intermediate care network; the network of residential and semi-residential public health and social service facilities (above all, nursing homes); the individual’s own home with in-home assistance through Integrated Home Care, or even informal assistance provided by family assistants, more or less formalised and more or less specialised. The entirety of these healthcare settings ideally represents a network available to families and the elderly, the nodes of which should be activated depending on the evolution of requirements, alternating over time. The various Regions together portray a strikingly varied and uneven panorama in terms of supply geography and the coverage of needs, with the network of healthcare services representing only the tip of the iceberg. The processing and interpretation of the data gathered paints a picture of the system’s tendential incapacity to fully and appropriately manage the healthcare needs expressed by the silver generation. Furthermore, between the individual RHSs the differences are extraordinary, on one hand amounting to the recognition of multiple organisational models and operating solutions to respond to the healthcare needs of the silver generation, and on the other hand showing how the different RHSs are not currently comparable in terms of the quantity and quality of their care management for the elderly population.

The evolution of health status between the generations¹

The primary goal of the welfare system created in the United Kingdom after the Second World War was to provide basic social security for all citizens throughout their lifecycle (from the “cradle to the grave”) (Beveridge Report, 1942). The term “lifecycle” has a dual meaning. In the first place, the term “lifecycle” reflects a continuum of ages in which the needs of an individual change throughout their life, from the moment in which they are conceived until their death. In the second place, the term “lifecycle” refers to the various phases and events of life experienced by an individual or a nuclear family, which often entail changes in status such as, for example, becoming a widow(er), single mother/father, unemployed, disabled, etc.

In today’s fast-evolving world, people’s lifecycles no longer conform with a linear sequence of phases directly connected with their age (birth, education and learning, marriage, work, ageing). On the contrary, they are increasingly affected by economic, social and spatial changes - such as the death of a relative, an accident, a loss, changing jobs, the migration of some family members - which lead to important changes and often require a complete recalibration of one’s life and expectations.

With this in mind, it is easier to understand how the factors that contribute to a person’s vulnerability, throughout their lifecycle, are not only associated with their age (e.g., children, young people, adults and the elderly) and stage of life (e.g., student, employed/unemployed, disabled, widow(er)). For example, those who experience poverty during childhood may continue to be negatively affected by it for the rest of their lives in terms of their nutrition and health and, therefore, personal development and opportunities connected with learning, self-esteem, activities and access to the job market: thus, low socio-economic status of parents is often transmitted to the next generation through these channels. Another way of considering the connection between the generations - and between the head of the family and those that depend on them - in the evolution of the lifecycle is to reflect on how a parent losing their job could result in the entire family entering a new and vulnerable lifecycle.

From this perspective, the combination of social and economic events we have witnessed over the last twenty years (globalisation, demographic shifts, debt, unemployment and increasing home prices) should be considered quite unique and disruptive, an event which has affected individuals differently depending on their age and prevailing socio-economic conditions at that time.

Specifically, these events reduced the levels and buying power of the income and outlooks of millions of young people throughout the developed world, with unprecedented consequences for generational inequality. A survey conducted by *The Guardian* on the outlooks of *Millennials* - people born between 1980 and the mid 1990s, otherwise

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[1] This section of the working paper was edited by Vincenzo Atella, Federico Belotti, Felice Cincotti, Joanna Kopinska, Alessandro Palma and Andrea Piano Mortari. All of the data provided in the Working Paper are based on information available at 15 December 2016, when it was completed.

known as Generation Y - showed that they have been cut off from the wealth generated in western societies. According to data from the *Luxembourg Income Study* (LIS), in seven major economies in North America and Europe, the average income growth of a couple between 20 and 30 years of age is lower than at any time over the last 30 years. In the case of the United States and Italy, disposable income for *Millennials* is just slightly higher in real terms than thirty years ago, while the remainder of the population has experienced consistent gains.

This is the first time in the history of industrialised countries, with the exception of periods of war, that the income of young adults has declined compared to the rest of society. For the first time in France, new pensioners have generated more disposable income than households with a head of household under 50 years of age. In Italy, households under 35 years old have become poorer than those of pensioners under 80 years old. Using the most recent data for the United States, right in the middle of the 2013 crisis, an average household under 30 years of age had income lower than those between 65 and 79 years of age.

The combination of these factors can provoke serious changes in the lifecycles of generations, with both micro and macro effects that have not yet been well studied or understood. Following this line of reasoning, if we accept the assumption that morbidity rates and life expectancy are indicators influenced by factors such as employment, income and access to healthcare, it is evident that the health status of this cohort of young individuals will be influenced by them, in turn triggering considerable repercussions on the future average health status of the entire population and on health expenditure as a whole.

The objective of this working paper is therefore to study and analyse these phenomena and understand if and how epidemiological and spending *trends* in the coming years may differ from the *main-stream* institutional estimates currently available.

The following pages present the results of an empirical analysis aiming to understand the direction of those changes and the *trends* of some of these factors through the various generations. This generational approach makes this analysis innovative, and unprecedented in this sector.

This is the first time in the history of industrialised countries, with the exception of periods of war, that the income of young adults has declined compared to the rest of society.

1.1 The “double expansion of morbidity” (DEM) hypothesis

During the last century, economic development, improvements in environmental conditions in many rural areas, improved lifestyles, progresses made in healthcare and medicine (particularly with the reduction of child mortality) have generated a continuous increase in life expectancy at birth in Europe, and in Italy in particular. This process has been more continuous in Europe than in many other parts of the world, today placing the EU-28 amongst the global leaders in life expectancy. Over the last 50 years, the life expectancy at birth has risen by around 10 years (1 year gained for every 5 years lived), for both men and women. The life expectancy at birth in the EU-28 was estimated at 80.9 years in 2014, reaching 83.6 years for women and 78.1 years for men. Between 2002 (the first year for which data are available for all Member States) and 2014, the life expectancy in the EU-28 rose by 3.2 years, from 77.7 to 80.9 years (3.8 years for women and 2.7 years for men). Looking to the future, EUROSTAT expects the life expectancy to continue to rise in the European Union in the coming decades, to reach 84.6 for males and 89.1 for females in 2060.

However, now that chronic diseases have replaced infectious diseases, and the risk of getting sick is not only linked to the risk of dying, an indicator like life expectancy is no longer capable of providing a clear snapshot of the health status of the population (Riley, 1990). Indeed, with constant or increasing recovery rates, if the risk of death decreases more than the risk of getting sick, the risk of being sick increases. In other words, the prevalence of chronic diseases in the population may increase due to an extension of life expectancy if the reduction in mortality rates is not offset by an equivalent decline in the incidence of chronic diseases.

When these themes were being debated in the 1970s, there were no data available to be able to evaluate exactly what was taking place in the population. Lacking pertinent data on the change in morbidity, the relations that could have existed between the changes in these risks and mortality rates were debated theoretically, giving rise to three prevailing theories:

1. the first expected an improvement in health status due to a “*compression of morbidity*” and, therefore, we live longer and healthier (Fries, 1980, 1989 and 2002; Hubert et al., 2002);
2. the second expected a deterioration in health status due to an “*expansion of morbidity*” and, therefore, we live longer but not as healthy (Gruenberg, 1977; Kramer, 1980; Olshansky et al., 1991);
3. the third, a “*dynamic equilibrium*”, a sort of *status quo* (Manton, 1982) in which although there are increases in prevalence, mortality declines as the prevalent states are on average less severe.

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The empirical verification of these theories requires having information available about the severity of prevalent states or levels of disability. Indeed, although chronic diseases have many different consequences, international classifications place disability at the centre of these consequences.² At the same time, disability is an indicator of the severity of pathological states and an indicator of the quality of the years lived.

The breakdown of life expectancy into years lived with or without disability therefore provided the tools required to confirm which of the three theories is most consistent with the empirical evidence. The indicator we currently use is *Healthy Life Years* (HLY), which measures life expectancy lived without disability.

On the basis of available information, the reality of OECD countries reflects most closely the *trends* of the “*expansion of morbidity*”, in which we observe an expansion of the prevalence of chronic diseases due to an increase in life expectancy [see *Figure 1*]. In EU Member States, in 2008-10, the HLY indicator at birth was 62.2 on average for women and 61.0 years for men. According to Bardi and Pierini (2013), since 2003 in many European countries there has been a significant drop in the HLY indicator at birth, interrupting what had been a continuous growth trend until that time. This drop was particularly clear in Italy, although considerable reductions in terms of HLY were also recorded in France just a few years later. Beyond differences between geographical areas, there are also differences in HLY trends between the sexes: women, who live longer, often live a lower number of healthy years.³

Overall, these data reveal that worldwide, people are living increasingly longer, and this is good news.

However, the bad news is that the extension of life we have benefitted from to date is not accompanied by an equal extension in the years of life spent in good health. So, while on one hand longevity should without a doubt be considered a success and a great achievement for society, also bringing undeniable economic benefits (Breyer et al., 2010), on the other hand, according to many authors, it potentially amplifies the risks connected to the incidence of chronic diseases in later years, triggering an increase in demand for long-term healthcare (Brugiavini, Padula and Pasini, 2010).

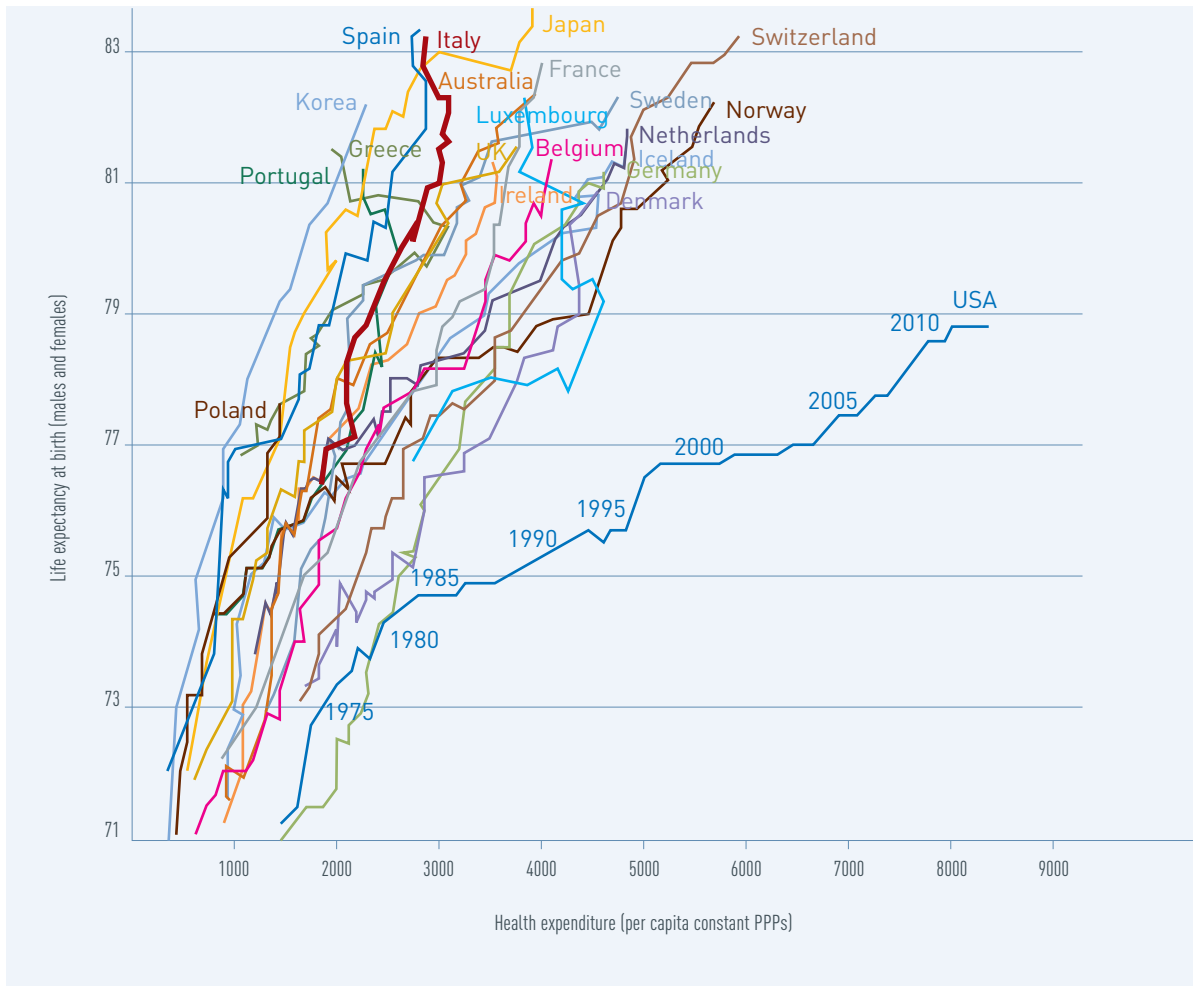
The cost and prevalence of chronic diseases are on the rise amongst the elderly, as is serious disability, with considerable consequences for system sustainability: a world which today seems to be barely capable of satisfying the health requirements of its current population will find itself in the coming years needing to deal with and meet the health requirements of hundreds of millions of elderly people suffering from disabilities (Atella et al., 2016).

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[2] Reference is made to the International Classification of Impairments, Disabilities, and Handicaps (ICIDH) and the International Classification of Functioning, Disability and Health (ICF) (WHO, 1980 and 2001).

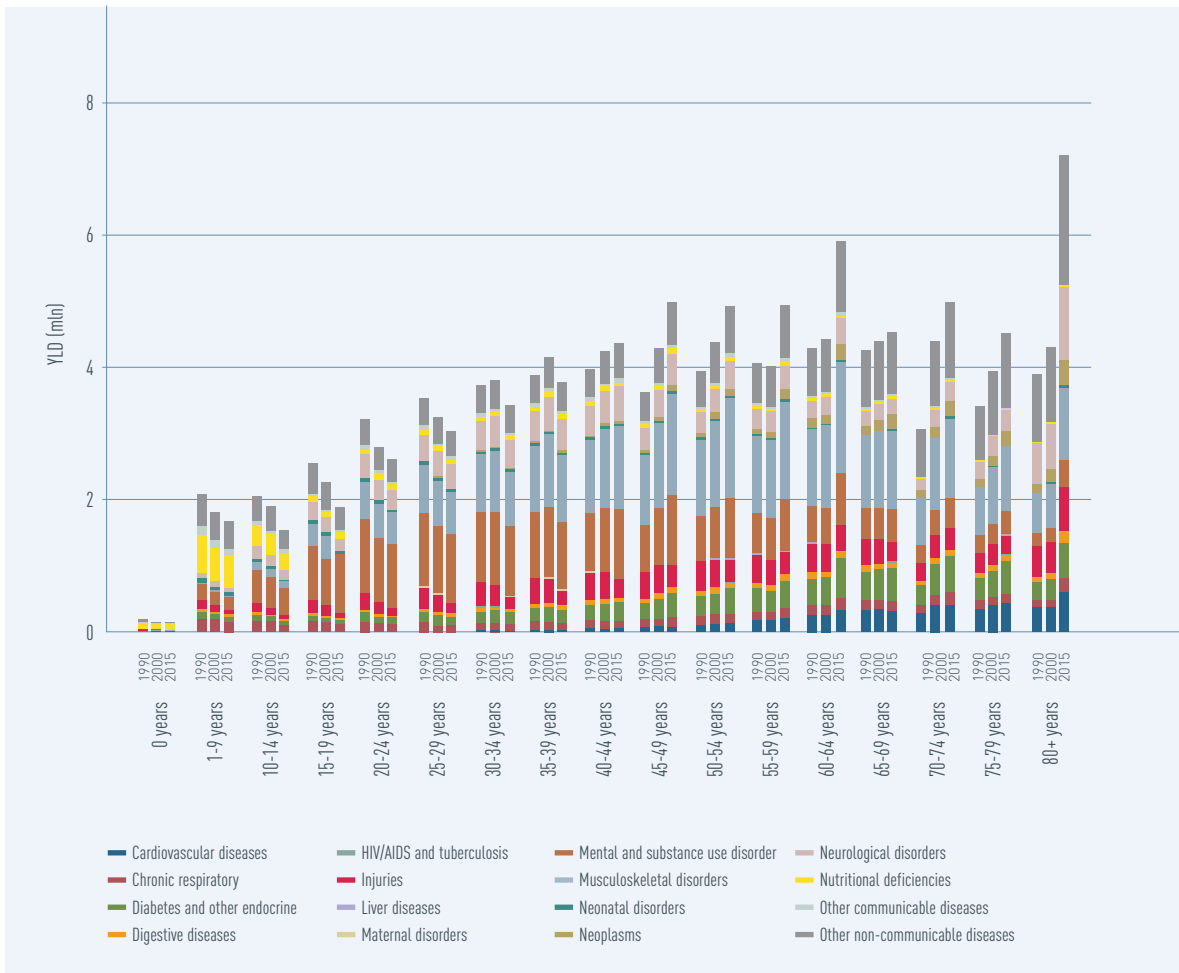
[3] In this regard it should however be recalled that the priority objective of the Europe 2020 programme is to increase the number of years of life with good health by 24 months by 2020.

Figure 1. Trend in life expectancy and health expenditure - OECD



Source: Our processing of OECD Health Data

Figure 2b. Number of years with disability by cause and age range - EU (1990, 2000 and 2010)



Source: Institute for Health Metrics and Evaluation - 2014

Figure 2 shows quite clearly what took place in the European Union between 1990 and 2010 in terms of mortality trends and years of life spent with disabilities (YLD - *Years of Life with Disability*) by cause of death and age range. The first graph (2a) clearly shows how in the last twenty years the number of deaths has declined constantly and substantially for age ranges up to 65-69, and instead it rose for higher ages.⁴ This phenomenon, which is the primary factor driving the extension of life expectancy among the population, has been made possible thanks to improvements in technologies (product and process) and better healthcare management models. Against this positive aspect, graph 2b shows a second, more problematic, aspect. Indeed, during the same period, the number of YLDs rose precipitously, both because years of life spent with disability rose for older age ranges, and because disabilities began to increase amongst younger age ranges as well. In particular, the graph makes evident that up to 30 years the trend was positive, with a reduction in years spent with disabilities; on the other hand, after 40 years the trend was negative, with an increase in years spent with disabilities. In the middle is the age range of thirty-year-olds, for whom the situation has not changed much on average.

Current literature on this matter has highlighted how until 1990 an increase in life expectancy was accompanied by an increase in time spent without disability (Cai and Lubitz 2007) or with moderate limitations (Graham et al., 2004), leading us to imagine that the prevalent theory could be that of dynamic equilibrium. Until the early 2000s, there seems to have been a continuation of the dynamic equilibrium of 1990, with an emerging expansion of certain types of serious disabilities only in Europe and other developed countries (Cheung and Yip, 2010, Galenkamp et al., 2012, Hashimoto et al., 2010).

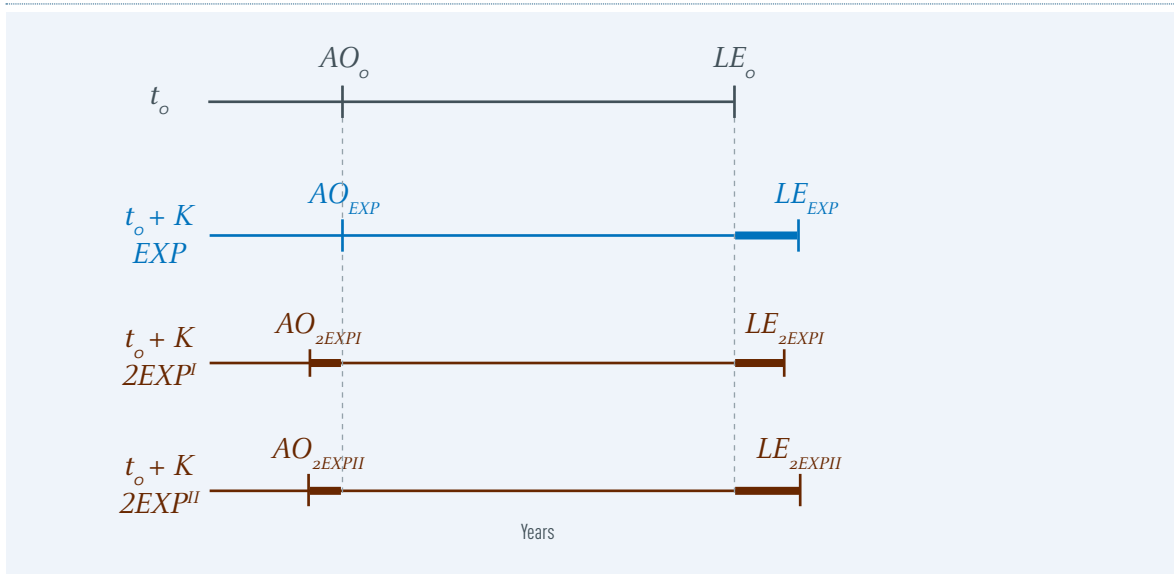
The new factor in these graphs, with respect to the *standard* interpretation of the phenomenon of population ageing, is that over the last 15 years we have witnessed a phenomenon of epidemiological change in which we are observing chronic diseases arising increasingly early amongst younger generations. This phenomenon should lead us to reconsider the idea that younger generations are healthier than older ones, and to imagine a new theory of evolution of the health status of the population, which we will define the “*Double Expansion of Morbidity*” (DEM), understood as an increase in morbidity not only in the direction of the elderly population, but also in the younger population. This assumption can be represented graphically as in Figure 3. The first line refers to a situation in which at time k the life expectancy (LE) of the population had the value LE_0 and the moment in which the population gets sick on average is represented by point AO_0 (*Average Onset*). The distance between LE and AO_0 represents the number of years spent with at least one disease. At time $t+k$, it is possible to observe various scenarios. In the first, it is assumed that life

“Double Expansion of Morbidity” (DEM) refers to an increase in morbidity not only in the direction of the elderly population, but also in the younger population.

[4] In particular, the number of deaths has risen in the 80+ age range, which is not shown in the graph since it would flatten it considerably, making the phenomenon harder to see. For the 80+ age range, the number of deaths has risen from just under 2 million in 1990 to roughly 2.8 million in 2010, an increase of around 30%, which is the highest in absolute value amongst all age ranges in that period.

expectancy extends until point LEEXP and the date of the average onset does not shift. The shift forward of the LE means that the time spent with at least one disease extends, thus giving rise to the “Expansion of Morbidity” hypothesis. The second scenario assumes a worsening in the health conditions of the younger population, which as a result leads on one hand to an anticipation of the AO and on the other to lower growth in the LE with respect to the previous scenario. In this case, it is therefore possible to observe the phenomenon of the “Double Expansion of Morbidity” (DEM), with an increase in the number of years spent with at least one disease. Lastly, in the last scenario, it is assumed that thanks to technological progress, with the deterioration in the health status of the younger population remaining the same, LE increases as in the first scenario, increasing the number of years spent with at least one disease even more.

Figure 3. The “Double Expansion of Morbidity” hypothesis: a graphic representation



The following pages seek to provide a series of evidence to understand what exactly has happened in Italy over the last 25 years and what we should expect to see in the future, based on what has happened in this last quarter century.

1.2. The critical factors of the evolution of health status

There is also a significant amount of literature - economic, medical and epidemiological - which analyses the way various types of *shocks* can have different effects on the health status of individuals in different phases of their lives.

The first and most important cause should be sought out in the increase in the body weight of populations. Technological progress, investments in preventive measures, better education, higher incomes and decreasing smoking rates seem to be nearly completely offset by increases in body weight. In the US (King et al., 2010) and the UK (Allman-Farinelli et al., 2008), the generation of people born straight after the war (*the baby boomers*) have higher obesity rates than people of the same age in the previous generation, associated with a higher prevalence of disabilities and chronic conditions, such as diabetes and hypertension. In Canada (Badley et al., 2015), at the same age, the *baby boomers* seem to have a better health status than people born between 1965 and 1981 (*Generation X*). A similar finding is described by Pilkington et al., (2014) in Australia, where *self-reported* health status between the two subsequent generations has worsened, with higher obesity rates and rates of diabetes, despite the greater degree of higher education and the lower prevalence of smoking in the younger generation. Furthermore, Lee et al., (2010) show that obesity presented in increasingly younger people in the US between 1976 and 2006 and that this early onset is responsible for the premature emergence of illnesses such as diabetes and arthritis.

The differences in terms of body weight thus create disparities between patients in terms of health status. These disparities seem to increase throughout the lifecycle until 50-60 years of age, after which time they decrease. Based on data gathered by General Practitioners, Atella et al., (2015) show how the relationship between health expenditure and body mass index (BMI) is different across the various age ranges with more marked spending differences compared with people of normal weight in individuals between 45 and 65 years of age. In addition, analysing the channels through which body weight can influence health expenditure, the authors highlight that this difference can primarily be attributed to diseases like diabetes, hypertension and cardiovascular diseases. This means that for certain segments of the population, some diseases can emerge significantly earlier and this is correlated with earlier recourse to healthcare services.

In addition, according to Cain (2010), taking account of vulnerabilities connected with specific periods in life, our health status can be heavily influenced by nutritional and environmental factors. On one hand, in terms of risks linked to nutrition, a poor diet, resulting from scarcity

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as well as low food quality early in life, increases the risk of poor health status during adult life (Lucas, 1998). Processed foods, the habit of skipping meals, fizzy and sugary drinks - with an increasingly lower price per kilocalorie consumed, exposure to environmental degradation - such as air pollution, noise, chemicals, polluted water, the reduction of green spaces, smoke and pesticides - have considerable risks in terms of the prevalence of metabolic, cardiovascular and cancerous diseases, which in turn represent the major causes of death in developed countries (Cutler et al., 2003, Drewnowski, 2003, Balbus et al., 2013).

Another important variable for health status is the general condition of the economy. By virtue of the positive correlation between health status and the state of the economy (Propper, 2005), the recent deterioration in economic conditions, with falling job numbers and growing job insecurity, seems to have left an indelible mark in terms of health status. Increasing economic insecurity and financial tensions have particularly struck low-income households with low levels of education. Since the start of the crisis in 2007 many workers have lost their jobs and many households have seen a stagnation or a decline in their levels of income and wealth. In December 2013, there were more than 46 million unemployed people in the OECD area, 11.5 million more than in July 2008. The number of people unemployed for more than one year had reached 16.5 million.

These changes had a lasting effect on people's mental and physical health. In Greece, a country hit particularly hard by the recent economic crisis, Economou et al., (2011) and Madianos et al., (2011) point to a notable increase in mental problems, while Stuckler et al., (2011b) find a link between the economic crisis and suicide rates. Mental health is the area most sensitive to economic changes, with the European Union seeing an inversion of the long trend of declining suicides, with increases concentrated amongst working-age men. In new EU Member States, suicides reached a peak in 2009 and remained at high levels in 2010.

In England, the close relationship between job loss and suicide levels was confirmed, while other research identified an association between the number of suicides and the level of unemployment or the fear of becoming unemployed.

Even general self-declared levels of health status have deteriorated since the start of the crisis and there has been a significant increase in the number of people who have believed they needed healthcare but have been unable to access it (Kentikelenis et al., 2011). In several countries, the number of new cases of HIV amongst drug addicts rose dramatically, perhaps caused by the reduction in the provision of healthcare services (EMCDDA and ECDC, 2011). In Italy, ISTAT (2013) highlighted that following the crisis, there was a deterioration in health indicators amongst the categories most at risk (particularly the elderly and households with low income and education). Negative effects were

also identified by Costa et al., [2012], who in the short term found “preliminary evidence of an increase in the occurrence of unfavourable mental health indicators (suicide, depression, forms of addiction) which could be explained in particular by the increase in job insecurity”.

Case and Deaton (2005) showed how in the United States, an average 20-year-old, low-income male (lowest quartile of the household income distribution) reports on average health status similar to that of a 60-year-old, high-income male (top quartile). In Glasgow, in the United Kingdom, the life expectancy of men in more disadvantaged areas is 54 years as opposed to 82 years in more well-to-do areas (Hanlon et al., 2006). In a recent JAMA study, Chetty et al., (2016) highlight health inequality based on income and social class in the US: there is a 14.6-year gap in life expectancy between the wealthiest 1% and the poorest 1%. Furthermore, this inequality increased between 2001 and 2014: people in the top 5% of the income distribution saw an increase of roughly 2.5 years in their life expectancy, while there was basically no difference for the poorest 5%.

On the basis of the evidence provided until this point, in the following pages we will seek to better understand if and how the Italian population has experienced changes in their health status in recent years in response to economic and social changes, and whether those changes have been different amongst the various generations.

1.3. Definition and importance of generations

A “generation” can be defined as a group of people born in the same period that grew up around the same location. Although it is important to remember that, individually, everyone is different, analyses performed at generation level provide a set of powerful “indicators” which show where the connection begins with other generations and how they can influence people of different ages.

“*Generation-shaping trends*” are those trends that unambiguously characterise people in the same generation as they age, which means that the members of a particular generation will develop and share the same values, beliefs and expectations. The division of cohorts into generations is informed by historical, demographic, attitudinal and cultural factors that characterise the members of a certain generation of children (Pew Research Center, September, 2015).

Increasing economic insecurity and financial tensions have particularly struck low-income households with low levels of education.

The oldest living generation is the *Greatest generation*, those born before 1928, or individuals who were more than 86 years old in 2014, fought in the World Wars and grew up during a time often dominated by a strong sense of civic duty and responsibility.

Thereafter is the *Silent generation*, consisting of people born between 1928 and 1945 (between 68 and 86 years of age in 2014). The term “*silent*” is used to refer to this generation primarily because they had to deal with the consequences of the war and the great depression in the earliest years of their life.

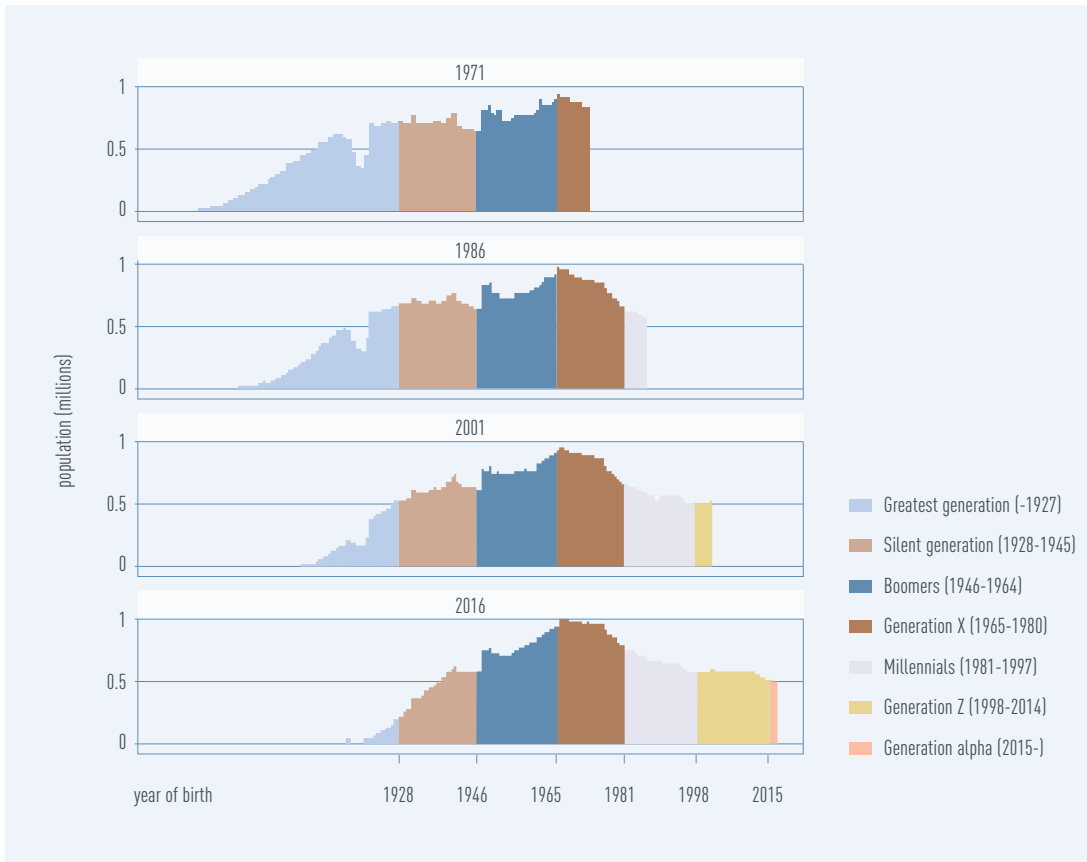
Baby boomers are people born after the Second World War (the “*Baby Boom*” era), during a time period which runs from 1946 to 1964 (between 49 and 67 years of age in 2014). In the years following the Second World War, many western countries experienced a peak in births as the economic difficulties that characterised wartime were gradually put behind them. The last cohort of *Baby boomers*, 1964, instead coincides with a sharp drop in fertility, also following the introduction of the birth control pill. This new generation of *Baby boomers* experienced an unprecedented level of economic growth and prosperity throughout their lifecycle. They came into the world in a moment of relative difficulty, but thanks to public education, high government subsidies, increasing real estate prices and technological improvements, they are a well-to-do and successful generation.

The generation of cohorts born after the *Baby boomers* is described as *Generation X*, with births recorded between 1965 and 1980 (between 33 and 48 years of age in 2014). The birth rate in *Generation X* was considerably lower than that of the *Baby boomer* generation. *Generation X* was shaped by the global political events that took place during this generation’s younger years. Events like the Vietnam War, the fall of the Berlin Wall, the end of the Cold War and the Thatcher-era government in the United Kingdom contributed to shaping the culture, education and openness of *Generation X*.

The following generation is the *Millennials*, those born between 1981 and 1997, with the first born entering into adult life in the new millennium. The *Millennials* are also referred to as *Generation Y*. For the most part, *Millennials* are the children of *Baby boomers*. Finally, the successors to the *Millennials* are known as *Generation Z* (born between 1998 and 2014) and consist of children and adolescents, in many cases the grandchildren of the *Baby boomers*.

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Figure 5. The age pyramid in Italy over the years (1971-1986-2001-2016)



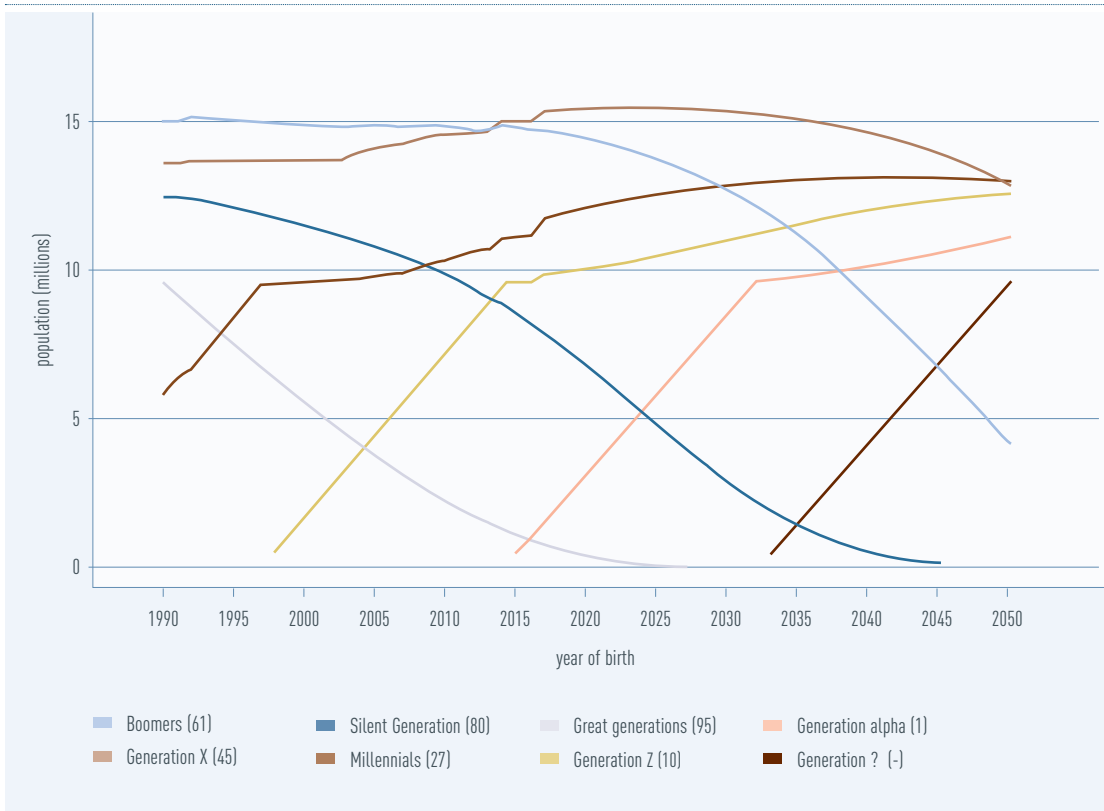
Source: Our processing of ISTAT Demo population data, various years.

Figure 5 describes the generational composition of the cohorts in Italy photographed from 1971 to 2016 every 15 years. As can be seen, the form of the demographic pyramid (not separated by sex) in 1971 followed a structure that indicates a population in relative expansion, with a high percentage of young people, indicated by the *Baby boomers* and Generation X. Already in 1986, a contraction can be observed, with the pyramid shape evolving towards a trapezoid, indicative of a lower portion of young people than middle aged people. This trend was then exacerbated in the period from 2001 to 2015, when the trapezoid shape is increasingly evident due to the ageing of the *baby boom* and X generations. At the same time, there is a decreasing share of younger people and an increase in the density of the more elderly population.

In Italy, like in many industrialised countries, demographic development was characterised by a sharp increase in births after World War II. Until 2013, the *Baby boomers* were the biggest generation in the demographic panorama in Italy (see figure 5). Only in 2013, when the first *Boomers* turned 67, did Generation X become the largest cohort, numbering 15 million people. This was also a result of rising immigration, particularly significant from 2004 onwards, when the entry into the European Union of several Eastern European countries led to a considerable increase in the number of individuals belonging to this generation. Since 2009 the generation of the *Millennials* has been the third largest in size, consisting of around 11 million people in 2011. Immigration also plays a particularly important role in determining the size of the *Millennials* generation.

In Italy, like in many industrialised countries, demographic development was characterised by a sharp increase in births after World War II.

Figure 6. Size of the generations in Italy and average age in 2016 - 1990-2050



Source: Our processing of ISTAT Demo data, various years.

1.4. Evolution of economic and health conditions between the generations

The time interval between 1990 and 2016 was an era of major events that had notable repercussions on the economies of all countries, particularly those in Europe. In the early 1990s, there was a series of currency crises in Europe which led to the closure of the fixed exchange rate system between EU countries, welfare systems went into crisis, also following the signing of the Maastricht Treaty, the foundations were laid for the introduction of the Euro, digital technologies completely revolutionised the functioning of production processes as well as the markets, the dot.com bubble took hold, globalisation became increasingly prominent and China changed the international trade panorama. Early in the new millennium, the Euro was introduced, the geopolitical panorama was shaken by the attacks on the Twin Towers and the housing bubble developed and led to the financial crisis of 2007, resulting in a period of *austerity* in Europe. This (non-exhaustive) list of events taking place over this 25-year period is perhaps the best witness to the stress to which our economies and those working in them have been subject.

The generation of the *Millennials* has experienced the most difficult economic conditions during a period of the lifecycle, around 20-30 years of age, which usually coincides with the achievement of economic independence. For the *Millennials*, this period coincided with the most severe economic crisis since the Second World War. In fact, from an economic perspective the youth of today have to contend with life conditions that are significantly worse than those of previous generations, which negatively impact every personal and financial decision of thirty-year-olds today, with significant side effects for their health as well. The term NEET (*Not in Employment, Education or Training*) begins to be more frequently applicable to describe so many young people in a situation of complete inactivity in terms of employment.

Figures 7a and 7b clearly show how in Italy several important indicators of economic condition have changed between 1993 and 2012 and how this change has been different in different sub-periods and generations. For example, in 2002-2012, employment amongst thirty- and forty-year-olds has a decreasing *trend*, while the trend is rising for 50- and 60-year-olds. From 1993 to 2002, the change was positive, and almost equal, for every generation. In the same period, amongst thirty- and forty-year-olds, there was stagnation in the prevalence of those who had an employment contract, with an inversion of that trend for fifty- and sixty-year-olds. Consistent trends are reflected in the

The generation of the Millennials has experienced the most difficult economic conditions during a period of the lifecycle, around 20-30 years of age, which usually coincides with the achievement of economic independence.

prevalence of the 30-, 40- and 60-year-old cohorts maintained by their families: their number rose drastically during the analysis period, which includes the start of the financial crisis.

In terms of economic satisfaction, all cohorts followed a similar time trend, where the degree of satisfaction dropped sharply between 2002 and 2012, with the most significant reductions for the younger cohorts (30- and 40-year-olds). Aside from economic satisfaction, we can see how job satisfaction, with age being the same, has declined only for 30-year-olds, with the largest increase of satisfaction amongst 60-year-olds.

Figure 7a. Changes in economic conditions by cohort and generation between 1993 and 2012

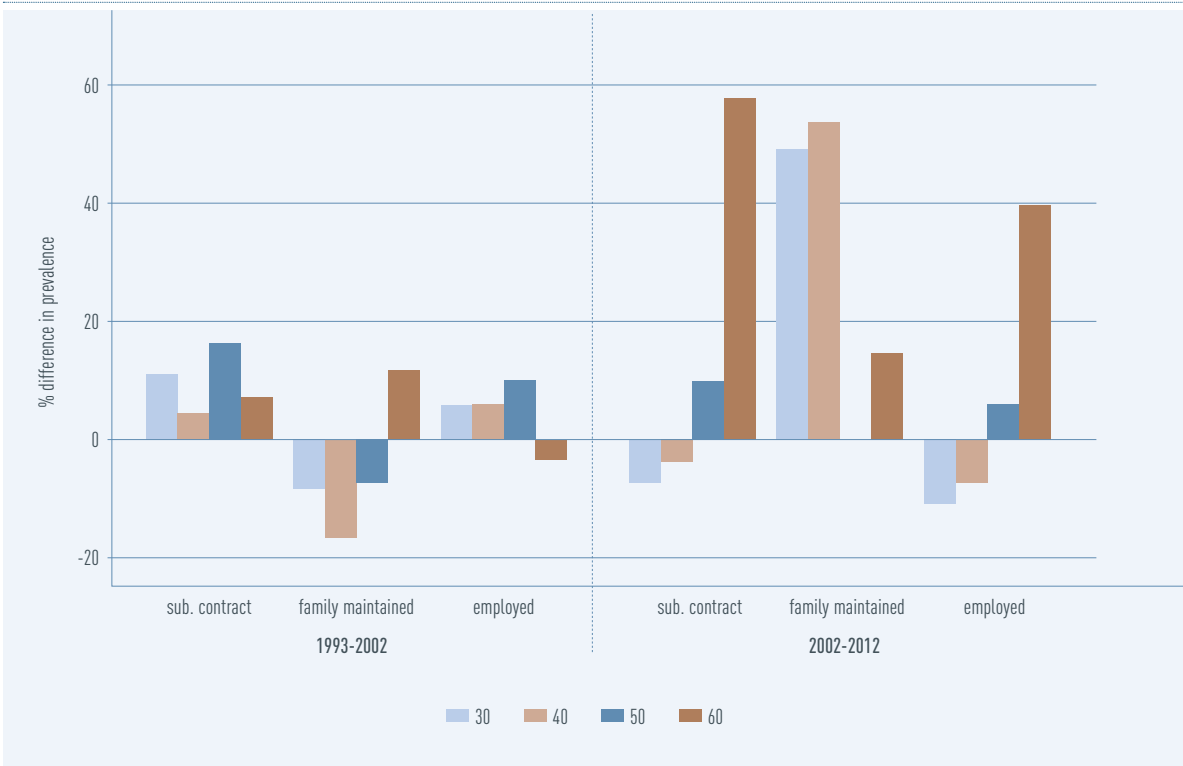


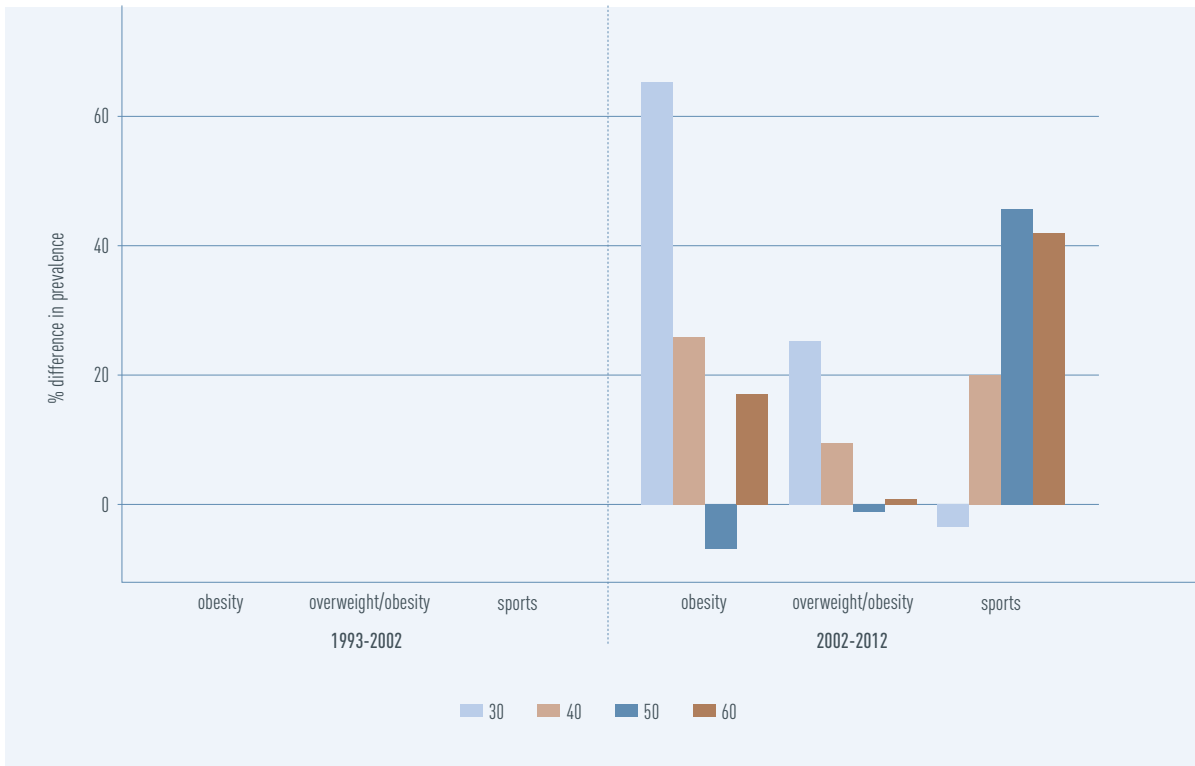
Figure 7b. Changes in economic conditions by cohort and generation between 1993 and 2012



Source: Our processing of ISTAT - Aspects of Daily Life Survey data (1993-2012)

With respect to health, the generation of young people today, the *Millennials*, has grown up in a particularly polluted environment, concentrated in urban and industrial areas, with a lack of green space. According to the European Environment Agency (EEA), in 1997-2008, from 13 to 62% of the European urban population was potentially exposed to concentrations of particulate matter in the air (PM10) above the limit established by the EU for the protection of human health (EEA, 2014). Furthermore, since their birth the cohorts born after 1980 have been more exposed to chemical agents and highly processed food, which along with lifestyle changes, may cause substantial increases in the rates of prevalence of several chronic diseases, such as diabetes, hypertension, cardiovascular diseases, obesity or various types of cancer, which already constitute the greatest causes of mortality in developed countries. According to Blumenthal and Warren (2014), in the US today's thirty-somethings seem to have worse health status than previous generations when they were that age, and the trends appear to be deteriorating.

Figure 8a. Changes in health conditions by cohort and generation between 1993 and 2012 (*)



(*) Due to the lack of data relating to body weight and physical activity for the first analysis sub-period, the figure shows data only for the 2002-2012 period.

Figure 8b.



Source: Our processing of ISTAT - Aspects of Daily Life Survey data (1993-2012)

Figure 8 shows the results based on “self-reported” aggregate data of a series of analyses conducted on some important health condition indicators, which show how they changed between 1993 and 2014 and how this change was different between sub-periods and generations. The most notable element, which is shared by nearly all the indicators, is the visible worsening in health status in the 2002-12 sub-period, observed more markedly for 30- and 40-year-olds.

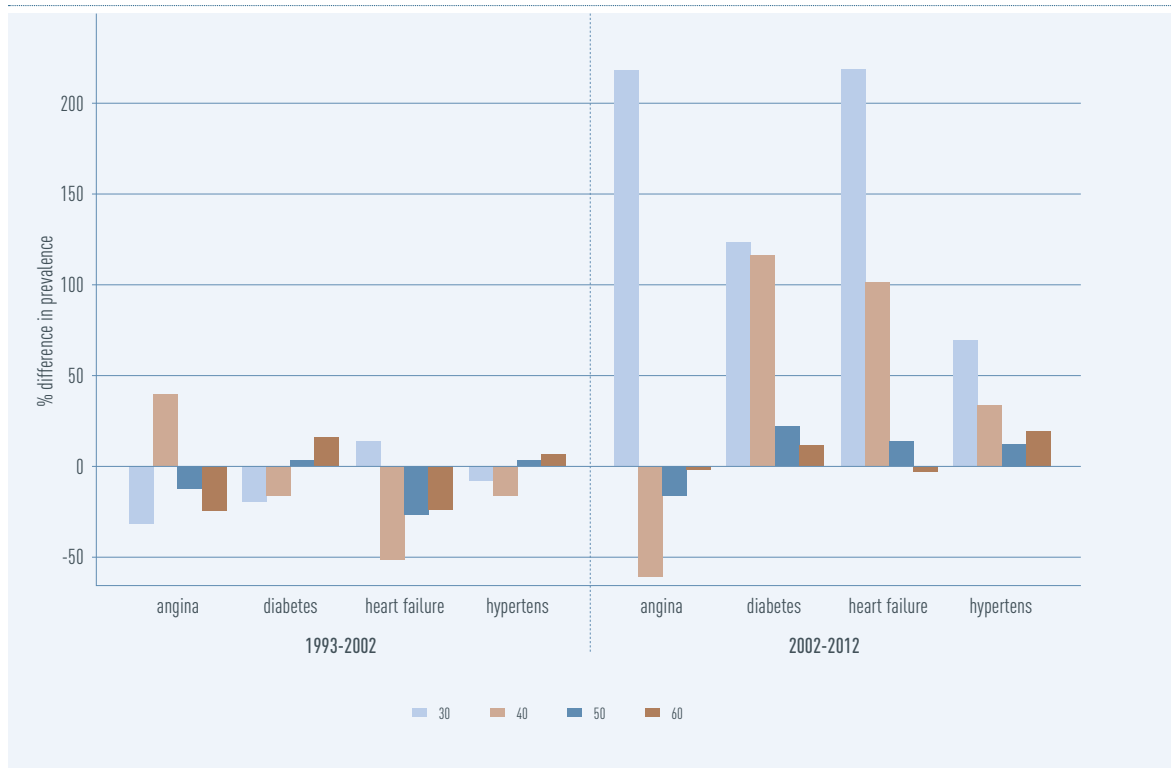
Indeed, in Figure 8a, these are the two cohorts which show the most significant increase in obesity and overweight rates, with a decline in physical activity precisely for the younger age ranges. Figure 8b shows a similar relationship for individuals with cardiovascular diseases (hypertension, heart failure and angina) and diabetes: also in this case, the greatest increases were recorded for those in their thirties and forties in the second sub-period. Lastly, Figure 8c shows that for the same people, there was a concerning increase in problems with

asthma and cancer. Allergies instead had the same trend for all ages, with the most significant changes in prevalence for all of the oldest generations.

The evidence presented until this point is based on sample surveys conducted by ISTAT and is based on “*self-reported*” information by individuals. Therefore, the data may be subject to a significant dose of measurement error, especially due to general changes in behaviour and attention with respect to certain topics, like those that accompany socio-economic change. To validate these results, in this paragraph the analyses are replicated using data contained in the HS-SiSSI database. These data are “objective”, as they were gathered by general practitioners. The SiSSI database was obtained based on a joint project between the CEIS at the University of Tor Vergata and the Italian Society of General Medicine (SIMG).⁵ Therefore, in the following pages, *Figures 9a-9c* present data on the prevalence of several chronic diseases, based on data objectively gathered by general practitioners.

[5] A network of more than 1,000 GPs, located throughout the country, participated in the project to digitise their patients' medical records, creating the possibility to construct a general medicine database starting from 1998 with clinical information relating to more than 1 and a half million patients. Within this group, in 2014, the 900 “best” GPs selected from the entire country were identified on the basis of the best information quality. The territorial distribution of the possible patients of these physicians is analogous to that of the Italian adult population surveyed by ISTAT. This analysis is based on data gathered in the HS-SiSSI database, consisting of the anonymised medical records of more than 1.2 million patients treated by general practitioners [Sessa et al., 2004]. The information recorded includes demographic information, clinical information [e.g., diagnoses, laboratory testing with results, hospital stays, etc.], prescription data, risk factors and factors impacting health [e.g., blood pressure, BMI, smoking, etc.]. The quality and consistency of the information has been demonstrated by numerous studies comparing it with current data sources or transversal investigations [e.g., multi-scope investigation, OSMED [National Observatory on the Use of Medicines] conducted on a national basis.

Figure 8c. Health conditions through cohorts and generations between 1993 and 2012



Source: Our processing of ISTAT - Aspects of Daily Life Survey data (1993-2012)

For the period between 2002 and 2014, *Figures 9a-9c* show the percentage differences in the change in the prevalence of some chronic diseases for different patient cohorts. An analysis of the data clearly shows how for nearly all types of diseases considered, 30- and 40-year-olds today, compared to people of that same age in 2002, have seen greater increases in prevalence than the 50- and 60-year-old cohorts. As can be seen in *Figure 9a*, the Charlson index (which describes the overall risk in terms of health deriving from the presence of co-morbidity) has increased in percentage more for 30-year-olds than other cohorts/generations, thus showing that a 30-year-old in 2002 had a lower Charlson index than in 2014 and, therefore, in relative terms, his level of health was compromised more than that of older people. A similar result can also be seen when looking at the prevalence of individuals with at least one chronic disease. To the contrary, with regard to disability, the changes do not seem to be different between generations, although there have been very high growth rates. On the other hand, important differences were found

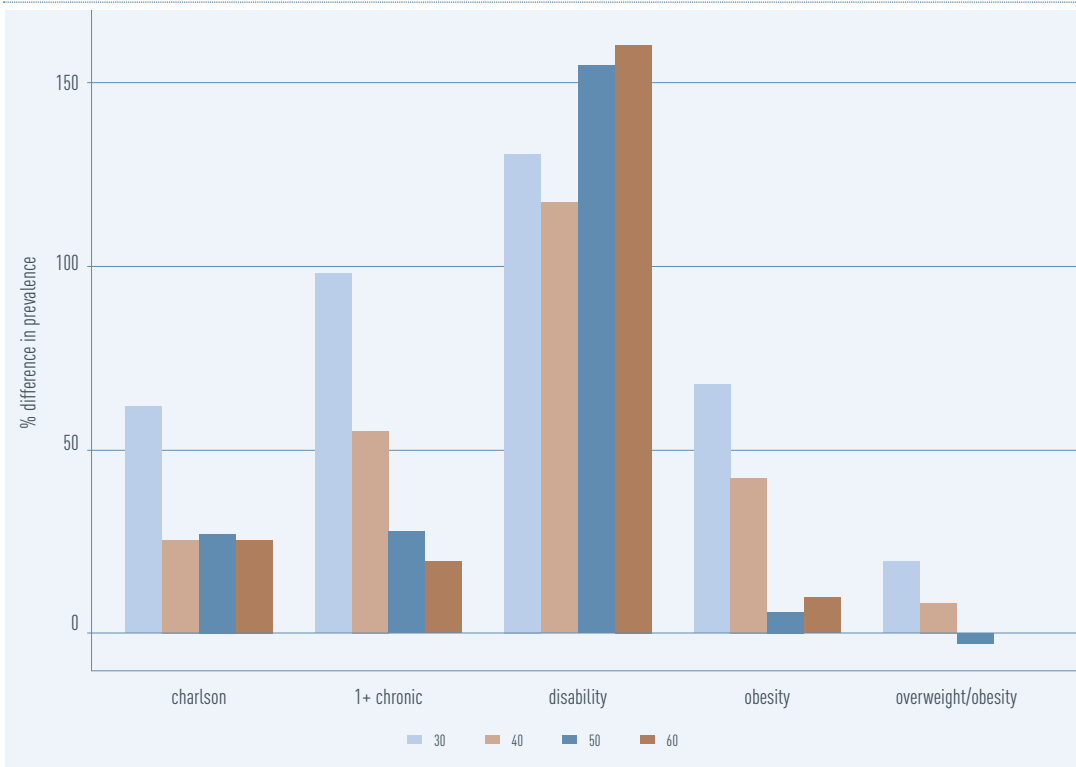
between the generations in obesity and overweight rates, confirming the trend already highlighted in the ISTAT data, with the prevalence of obesity rising by 60% in 30-year-olds and 40% in 40-year-olds.

Figure 9b shows the same type of information for a series of cardiovascular diseases and diabetes. Also in these cases, it is evident that the most consistent increases were found in 30-year-olds, particularly for very common diseases like diabetes, hypertension and coronary heart disease. There were also significant increases for strokes and dyslipidaemia.

Lastly, *Figure 9c* shows how the greatest increases in the prevalence of thyroid disease and cancer were recorded for 30-year-olds and, in part, 40-year-olds. The opposite results were found for depression and asthma.

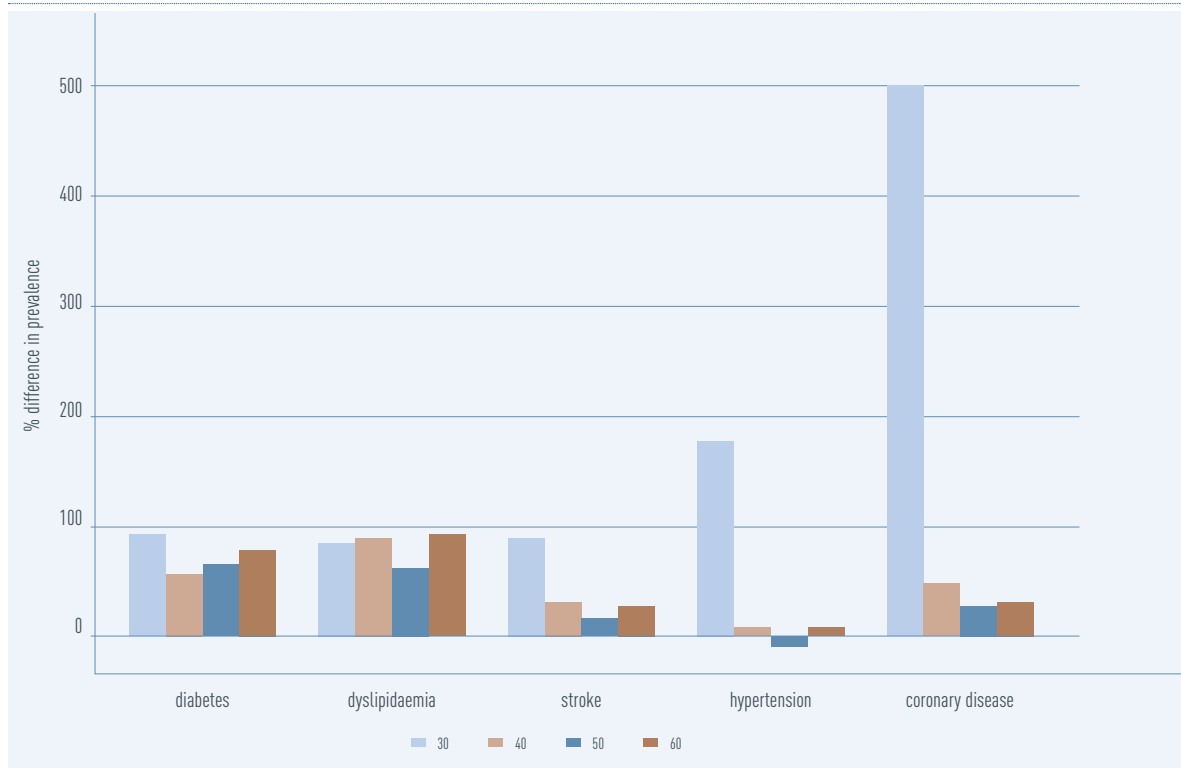
An analysis of the data clearly shows how for nearly all types of diseases considered, 30- and 40-year-olds today, compared to people of that same age in the early 2000s, have seen greater increases in prevalence than the cohorts of 50- and 60-year-olds.

Figure 9a. Prevalence of diseases by cohort and generation (2002–2014)



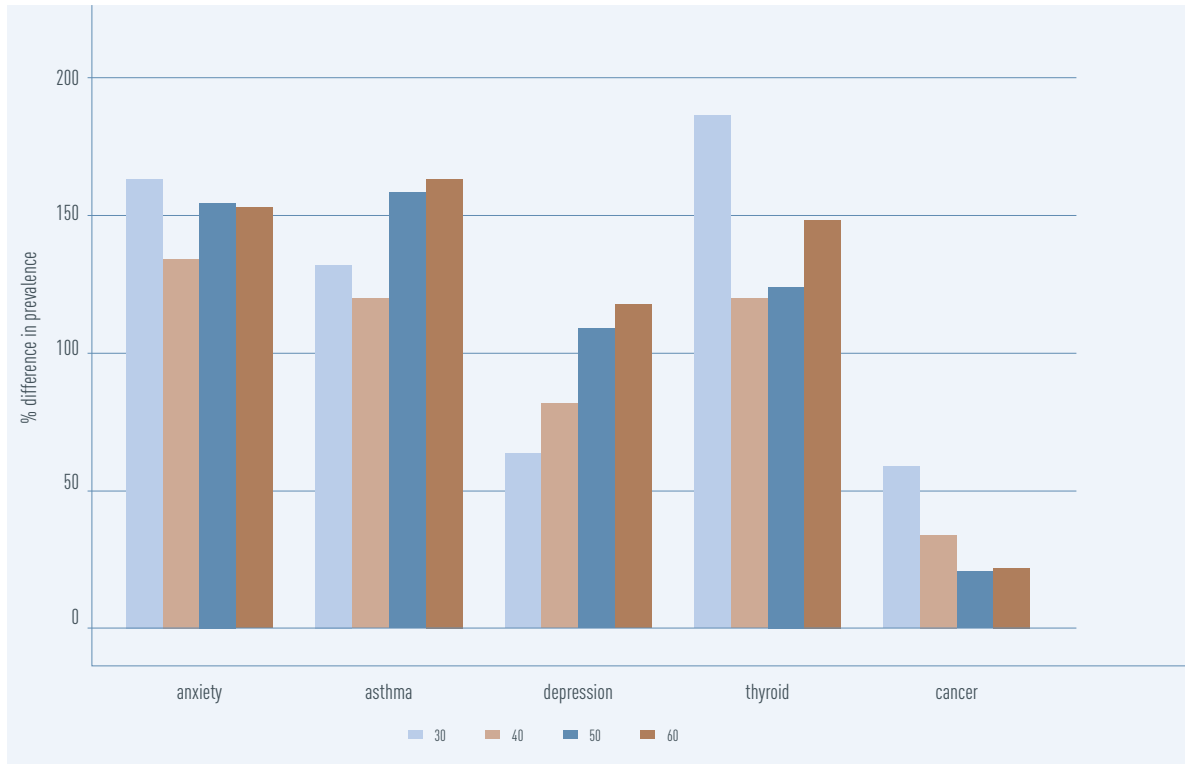
Source: Our processing of HS-SiSSI data

Figure 9b. Prevalence of diseases by cohort and generation (2002–2014)



Source: Our processing of HS-SiSSI data

Figure 9c. Prevalence of diseases by cohort and generation (2002–2014)



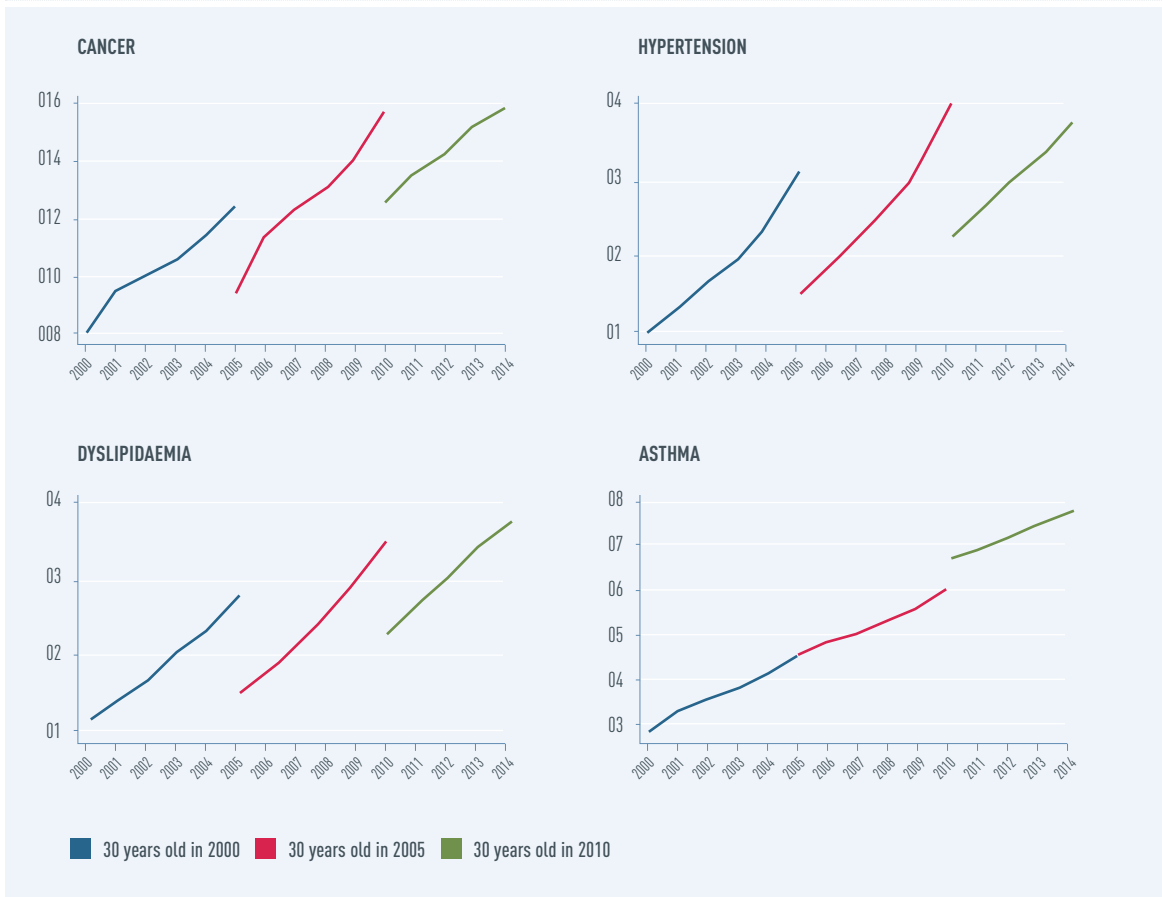
Source: Our processing of HS-SiSSI data

Figure 10 presents longitudinal information for certain diseases and only for the cohort of thirty-year-olds. In this case, it is possible to see how the prevalence of a particular disease evolves in a cohort of thirty-year-olds followed for 5 years and observed for the first time in 2000, 2005 and 2010.⁶

Exploiting the longitudinal dimension of the HS-SiSSI data, unlike in the previous graphs, the 5-year observation is always obtained for the same cohort. As we can see, the average prevalence of cancer in 30-year-olds doubles from just over 0.008% in 2000 to nearly 0.014% in 2010. For all cohorts, a trend that rises with age is observed, with a concerning rise in the speed of growth in younger cohorts (those who were 30 years old in 2010 saw the prevalence increase faster over the next five years than those who were 30 years old in 2000).

[6] For the cohort of 30-year-olds in 2010 the observation period is only 4 years.

Figure 10. Prevalence of some chronic diseases in thirty-year-olds in 2000, 2005 and 2010



Source: Our processing of HS-SiSSI data

An even more alarming trend is observed for dyslipidaemia, hypertension and asthma. Hypertension rose from 1% amongst thirty-year-olds in 2000 to 2.2% amongst thirty-year-olds in 2010. For dyslipidaemia, the values and trends are quite similar. Lastly, for asthma it can be seen how new 30-year-olds are beginning from prevalence levels that are higher than those of the old thirty-year-olds at 35 years of age.

All of these factors play a key role for the *Millennial* generation, which in the near future will become one of the generations with the highest population impact (see figure 6), which could translate into further problems in terms of the general health of the population as well as health expenditure.

1.5. The DEM hypothesis and healthcare outcomes

In order to estimate future healthcare demand and life expectancy with or without illnesses as precisely as possible, it is necessary to apply adequate econometric instruments. Furthermore, the models used must make it possible to develop reliable scenarios on the evolution of health expenditure and anticipate the effects connected to the introduction of specific policies. As highlighted by Przywara (2010), the complexity of systems and the multiplicity of factors influencing healthcare demand, in both the public and private sector, make this exercise quite complicated, generating results that must be carefully analysed.

Ideally, the model should provide a range of information that helps policymakers to predict the potential effect of a new strategy/intervention in the healthcare sector. It is evident that a model's capacity to analyse "*what if*" scenarios depends to a significant extent on the quality and level of detail of accessible information.

This analysis is based on a dynamic micro-simulation model of healthcare demand in Italy. With its dynamic structure, the model enables individuals to evolve or change over time the state of their various characteristics. As a primary objective, the model is capable of analysing "*what if*" scenarios. In the particular case of this Report, the key question the model will answer is: by how many years has the average age of onset of chronic diseases fallen by type of disease and by patient age/cohort.

1.5.1 Simulation results

Although the micro-simulation model makes it possible to obtain a vast range of results, as we are interested in testing the DEM hypothesis, in this case the comments will be limited solely to the analysis of the age of onset of chronic diseases and how this has changed over time and by disease and patient cohort.

The age of onset of chronic diseases is a very interesting indicator from the epidemiological as well as economic perspective. For a fatal outcome, the difference in the time of occurrence corresponds to the number of additional years lived when a certain risk factor is absent, compared to when it is present, and is linked to potential years of life lost before a certain age (due to a particular cause of death) or potential years of life lived without any disease or disability.

Ideally, the model should provide a range of information that helps policymakers to predict the potential effect of a new strategy/intervention in the healthcare sector.

Figure 12. Average age of disease onset



Source: Our processing of HS-SiSSI (AO and DEM) and EUROSTAT (LE) data

On the basis of the data available to us, it was possible to calculate the indicator of the average age of onset of any chronic disease in the Italian population over 18 years of age between 2000 and 2014. That indicator is shown in [Figure 12](#) along with the trend of life expectancy at birth and the difference between the two. As can be seen, in the 14 years considered, the life expectancy of Italians rose from 79.8 years in 2000 to 83.2 in 2014, an increase of 3.4 years. At the same time, the average age at which diseases emerged declined from 56.5 to 53.5 years old, with an absolute reduction of 3 years (just under 3 months per year). The differential between these two indicators is measured by the DEM (*Double Expansion of Morbidity*) indicator, which obviously rose over the years, reaching 6.4 years in 2014. What is interesting to note is that the increase in years of life spent with diseases (from 23.3 years in 2000 to 29.2 in 2014) is due almost equally to the increase in life expectancy (53%) and the lower age of disease onset (47%).

In the first graph of *Figure 13*, the bars on the graph show the higher number of people who were exposed to greater use of healthcare system resources between 2000 and 2014 due to the increase in life expectancy and the reduced age of onset of chronic diseases. In addition, the graph shows the distributions of the population in 2000 and in 2014, and the number of patients (people who used at least one healthcare service during the year). It is clear that the number of patients increases with age and with the size of the population per year of age, and varies between 2000 and 2014 on the basis of the (empirical) likelihood of seeking out healthcare (according to what is reported in the HS-SiSSI database). The correct estimate of the effect of the DEM on the national health service is ensured by the fact that the differential between the probabilities of getting sick (empirical distributions) makes it possible to estimate the reduction in the age of onset of diseases for each year of age, while the spread in the size of the population by year of age makes it possible to take into account the change in LE. Indeed, the increase in life expectancy means that for each age over time the population still living increases. Therefore, the product between the probability of having a chronic disease diagnosed and the number of individuals within each age manages to capture both effects of the increase in LE and the reduction in AON.

In the 14 years considered, the life expectancy of Italians rose from 79.8 years in 2000 to 83.2 in 2014, an increase of 3.4 years, while the average age of disease onset declined from 56.5 to 53.5 years old, an absolute reduction of 3 years.

Figure 13a. Additional healthcare costs for the national health service due to the DEM

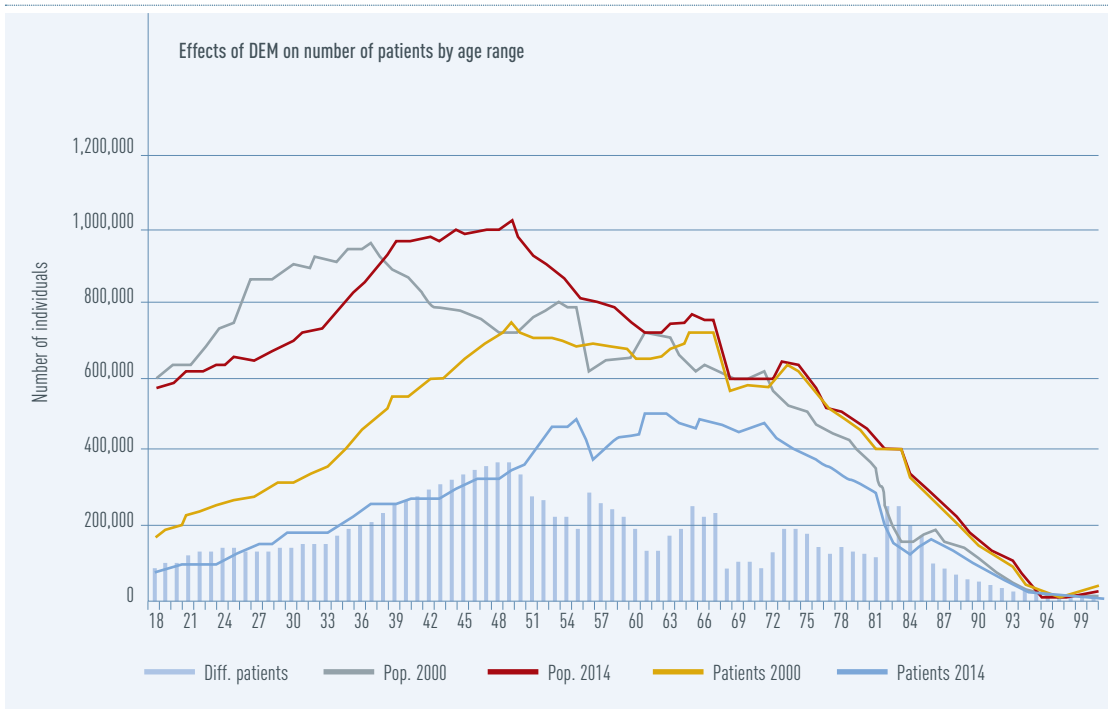
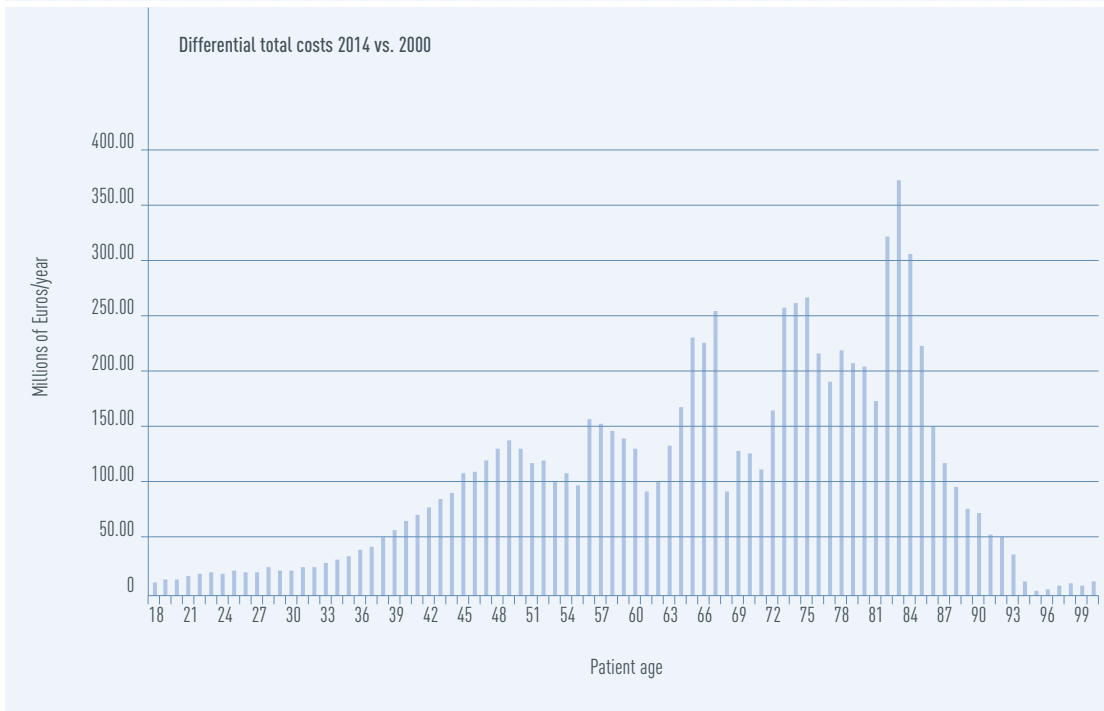


Figure 13b.



Source: Our processing of HS-SiSSI (AO and DEM) and ISTAT (Pop) data

As is evident, there will be relatively few people involved in the phenomenon of the increase in life expectancy (primarily individuals more than 79 years old) and many more people involved in the phenomenon of the reduction in AO (all new incident patients with an early onset, primarily individuals between 18 and 48 years of age). Overall, we are looking at roughly 14 million more patients between 2000 and 2014.

Using the average per capita costs by age for only medical services (drugs, specialist visits, diagnostic testing and hospital visits) available in the HS-SiSSI database, we can easily obtain an estimate of the additional costs generated by this phenomenon. Overall, in 2014 the national health service spent roughly 8.7 billion more euros than in 2000, of which roughly 75% can be attributed to the early onset of diseases.

Lastly, chart b) of *Figure 13* shows the differentials in cost between 2000 and 2014 by year of patient age (the sum is equal to 8.7 billion euros).

The elderly generation⁷

The context of social crisis and economic stagnation in which public systems have been obliged to work in recent years has rendered imperative and fuelled the debate on the health status of our welfare system and its ability to respond to the growing needs of citizens in terms of both number and complexity. Indeed, we are witnessing the development of an ambivalent pressure which is painfully burdening the system, due to the juxtaposition of two opposing forces in play: on one hand, the need to increase welfare support to cover increasing fragility; on the other, the need to streamline and boost the efficiency of interventions in order to limit public expenditure. In particular, interventions for those who are not self-sufficient, in relation to well established phenomena like the progressive ageing of the population and the increase in the incidence of chronic diseases amongst the adult and elderly population, are subject to demand for improved service management and more intense care management. In this scenario, the report provides an analysis of social service and public health assistance with a view to providing an updated snapshot of the activities and level of care management for non-self-sufficient elderly people in Italy. In addition to this, there is an attempt to look at interventions traditionally linked to non-self-sufficiency in relation to others which complement the care management chain, in order to provide a complete overview of the care offered to the elderly.

2.1 Current state of the public health supply and care management for the elderly over 65

Conventionally defined, people are elderly if they are at least 65 years old (Orimo, 2006), but it is more difficult to find a universally valid and accepted definition of non-self-sufficiency. Indeed, it seems to be necessary to make a discretionary decision which establishes a “degree” of dependence beyond which a person is no longer considered self-sufficient. The condition of non-self-sufficiency is considered similar to that of people with functional limitations, according to the definition of disability proposed by the *International classification of functioning, disability and health* (ICF), the reference interpretative framework used by the World Health Organisation to measure levels of health and disability (and therefore also non-self-sufficiency). This measurement does not conceive of disability as simply a reduction in functional capacity caused by a disease or impairment, as was the case in the past, but instead as the result of the interaction between an individual’s health conditions and contextual factors (both personal and environmental) representing the circumstances in which the person lives (WHO, 2002). This classification has thus shifted the paradigm, also introducing into the assessment of disability the environmental factors that influence it, and was favourably accepted by the Ministry of Health as well as ISTAT. Specifically, ISTAT (2014) considers people with functional limitations to be those who have difficulties with respect to several specific aspects⁸. There are also some articles (such as

Conventionally defined, people are elderly if they are at least 65 years old.

(7) This section of the working paper was edited by Giovanni Fosti, Alessandro Furnari, Francesca Lecci, Francesco Longo and Elisabetta Notarnicola. All of the data provided in the Working Paper are based on information available at 15 December 2016, when it was completed.

ISTAT, 2015c) that provide additional specifications and which classify functional limitations as "severe". Elderly people with the set of these limitations were subject to the study. This definition was maintained for all analyses presented below.

Therefore, the priority is to define the breadth of the phenomenon and explain the breakdown of the network of social and public health services meant to meet the health needs deriving from this issue.

Observing the degree of dissemination, the potential need, or the total number of individuals potentially belonging to the category of "non-self-sufficient elderly", is estimated to reach 2,713,406 in Italy based on 2012 data, or roughly 5% of the entire population. Although this is a particularly significant figure, it is possible that the number of non-self-sufficient elderly people is slightly underestimated, as this figure does not include in the population observed people who are permanent residents of facilities, and instead refers exclusively to people who live at home; in addition, the investigation considered for the estimate (ISTAT, 2014) only partially encompasses functional limitations linked to psychiatric diseases and mental health issues.

There are different methods of response by the network of public health and social services. The mapping done looks particularly at real services, also referred to as *in kind*, and thus limits the analysis to services actually provided in response to healthcare requirements. In the public health realm, there are residential services (such as residential care institutions and nursing homes or rehabilitation facilities for the elderly - referred to as "RSA" in Italian), semi-residential services and in-home services (integrated home care). In terms of social services, there are instead residential services that reproduce or facilitate the living conditions typical of a family environment (housing community, assisted living community, apartment blocks, housing intermediation and/or housing assignments, housing the elderly with families); semi-residential services to promote and coordinate recreational, social, educational, cultural, sports and socialisation activities; home care services run by the municipalities.

[8] In particular, (i) confinement in bed, in a chair or at home; (ii) limitations in the functions of daily life, including activities of daily living (ADL); (iii) problems with walking, using stairs and picking things up from the floor (movement limitations); (iv) difficulties with communication (sight, hearing and speaking limitations).

Table 1. Overview of supply system capacity by user target

Target	Service type	Overall System Capacity	
		PUB. HEALTH	SOCIAL
NON-SELF-SUFFICIENCY elderly over 65	Residential	218,965 ⁽¹⁾	21,004
	Semi-residential	14,352	n.d.
	In-home (IHC and HCS)	11,126,598*	n.d.

* hours provided

(1) "Low", "average" and "high" level of healthcare, as already anticipated in note no. 5; the "absent" level is counted as social (ISTAT, 2015a)

Sources: (a) Ministry of Health (2015b) National Health Services Statistical Yearbook; (b) ISTAT (2015)

Residential social service and public health facilities; (c) Ministry of Health (2015a) Hospital Discharge Form Report 2014; (d) ISTAT (2015b) Social Spending of the Municipalities

Looking at the actual capacity that a system thus defined is capable of reaching, it was found that when the network of services dedicated to non-self-sufficient elderly people is observed within the overall network, it represents roughly 68.8% of the availability of the (369,739 total places) services of the broader public health and social services network⁹ inclusive of all social targets. In particular, [Table 1](#) offers a snapshot of capacity at nationwide level. In addition to the places available in residential and semi-residential facilities, hours provided for in-home services were also included. It can be seen that the supply system capacity (254,321 places) appears to be more oriented towards providing public health type services than social services; the former indeed represent 91.7% [233,317] of the total available places taken into consideration. In addition, only a small share of the services are semi-residential (14,352; 5.6% of the total) and, amongst residential services (239,969), 91.2% [218,965] is represented by facilities that include a healthcare component in their care services¹⁰, for the most part nursing homes.

To complete the snapshot, the aspect relating to the users care-managed was also analysed. Similar to what was just described with respect to capacity, analysing the public health and social services network as a whole, the number of elderly non-self-sufficient users managed by the services represents the most significant portion (1,323,865; 48.0%) of all users managed by the services (2,756,831)¹¹. In particular, [Table 2](#) shows the users managed based on type of service used. Also in this case, it is confirmed that services for the elderly appear to be more focused on the public health area (57.4% of total services for the elderly analysed) than the social services area

(9) Inclusive, therefore, of the capacity dedicated to the care management of the disabled, disadvantaged minors, individuals suffering from mental health disorders and pathological addiction.

(10) The number of beds relating to residential public health and social services was identified with reference to the level of healthcare required: beds with "low", "average" and "high" healthcare levels were assigned to the residential public health services; beds with an "absent" healthcare level were assigned to the residential social services (ISTAT, 2015a). This breakdown was also adopted for the targets subsequently analysed.

(11) Also in this case, reference is made to the care management of the disabled, disadvantaged minors, individuals suffering from mental health disorders and pathological addiction.

(42.6%). This prevalence is linked to residential services, where 98.1% of users are placed in facilities with a healthcare component (206,636 users), and in-home services, where integrated home care involves 77.1% of users (529,838; home care services instead are provided for 157,364 people, or the remaining 22.9%). The elderly users managed by semi-residential services are instead differentiated from the previous ones in that only 5.5% (23,233) of them attend day centres which provide public health type services, while the remaining 94.5% (402,710) attend social centres for socialisation and recreational, social, educational, cultural and sports activities.

Knowing the potential need, mapping the supply network and users managed has therefore made it possible to estimate the rate of coverage of needs, calculated as the ratio between the number of users managed by the services considered and the estimate of potential needs¹². This indicator makes it possible (i) to view the aspects covered in relation to each other and (ii) to provide an indication of the effective capacity of the system to manage care and meet needs. Overall, the rate of coverage relating to non-self-sufficient elderly people is 28.0% of the potential need for public health services and 20.8% as concerns the use of social services (Table 3). In light of these values, the natural question arises if these can be considered acceptable levels of coverage, considering the limited resources available and the complexity of the reference environment and target or, considering the universalistic approach that the Italian welfare system has historically sought to promote, if these are extremely limited values on which to reflect with a view to institutional repositioning and the reorganisation of resources. A third possibility could then regard the fact that the coverage of needs through the services examined until now should be integrated by recourse to the hospital network or the informal care market, a possibility which was studied in the analyses on the overall chain presented in the following paragraphs.

[12] When possible, the rate of coverage was separated between public health and social services, a breakdown applied in an attempt to reduce the risk of natural overlapping in some areas and which does not make it possible to calculate the overall rate of coverage.

Table 2. Users managed by the supply network by user target

Target	Service type	Users managed	
		PUB. HEALTH	SOCIAL
NON-SELF-SUFFICIENCY elderly	Residential	206,636	4,084
	Semi-residential	23,233	402,710
	In-home (IHC and HCS)	529,838	157,364

Sources: (a) Ministry of Health (2015b) National Health Services Statistical Yearbook; (b) ISTAT (2015a) Residential social service and public health facilities; (c) Ministry of Health (2015a) Hospital Discharge Form Report 2014; (d) ISTAT (2015b) Social Spending of the Municipalities

Table 3. Rates of coverage of needs by reference target

Target	Target description	Reference pop.	Estimated potential need	Users managed by the services	Public health service coverage rate	Social service coverage rate
NON-SELF-SUFFICIENCY elderly	Elderly (> 65 years) with functional limitations	12,639,829	2,713,406	1,323,865	28.0%	20.8%

Sources: (a) Ministry of Health (2015b) National Health Services Statistical Yearbook; (b) ISTAT (2015a) Residential social service and public health facilities; (c) Ministry of Health (2015a) Hospital Discharge Form Report 2014; (d) ISTAT (2015b) Social Spending of the Municipalities

Pushing the analysis beyond the confines of public health and social services and including income support and ageing in place, 1,362,867 users are reached by personal support services to help them stay at home¹³, for a total value of € 310,254,509, while the economic measures provided by the municipalities¹⁴ reach 222,549 non-self-sufficient elderly people, for a total value of € 351,990,348. In addition to these transfers we would also do well to recall that INPS contributions for non-pension and care interventions are another part of the disbursements in favour of the target of non-self-sufficient and disabled elderly people, which in 2012 reached a total value of € 41,116,000; of this, the attendance allowance plays a fundamental role (INPS, 2013).

(13) This includes professional social services, housing intermediation, social integration services, local monitoring, personal alarm and telecare services, vouchers, home care funding, public health vouchers and other support services.

(14) This includes all transfers in cash from the municipalities for payment for interventions and services. For the details, consult the ISTAT Glossary relating to the Investigation on interventions and social services of the individual or associated municipalities (ISTAT, 2015b).

2.2 Service chain analyses: can we speak of a care management network for the elderly?

Given the premises and the evidence emerging from the limited analysis of only the social and public health services sector, the observation of the care network used by the elderly was extended to also include other types of services and offerings in order to reconstruct a veritable care management chain. The question which naturally arose as a result of this exercise was: if the level of coverage of needs guaranteed by the social and public health services network, what are the actual aspects of the care management chain for the elderly in our country? We speak of a care management chain to highlight how the response to the needs of households who need to manage an elderly family member moves through multiple services, places and institutions based on evolving needs, complementary in their characteristics, but also “supplementary” in potential supply gaps in the public system. Indeed, it is not sufficient to limit the analysis to the social and public health services sector: experience and the literature both tell us that, when we speak of elderly and non-self-sufficient citizens, this chain begins from the hospital for acute care, then moves on to the hospital with the function of rehabilitation or long term care post-acute care, it enters the local realm through the local intermediate care network and the network of residential and semi-residential public health and social service facilities (above all, nursing homes), to reach the individual’s own home with in-home assistance through public services (home care services or integrated home care), or even informal assistance provided by family assistants, more or less formalised and more or less specialised (“caregivers”). These service settings are also joined by the spread of the attendance allowance as a universal measure to support the non-self-sufficient.

The entirety of these healthcare settings ideally represents a network available to families and the elderly, the nodes of which should be activated depending on the evolution of requirements, alternating over time depending on the intensity and duration of the need. But are we really currently dealing with a network? How do the elderly access the various nodes of this network? Is it possible to pinpoint regional patterns which show how this network functions and the relationships between the various settings?

To answer these questions, detailed analyses were carried out to reconstruct in the Italian regions the overall volumes of recourse to the various healthcare settings cited above by non-self-sufficient elderly people. This part of the analysis was developed by restricting the population subject to analysis to those over 75 who are non-self-sufficient: we wanted to restrict the field of analysis to limit our observations to the part of the population which uses the services considered with the greatest frequency and intensity. The younger

Overall, the rate of coverage relating to non-self-sufficient elderly people is 28.0% of the potential need for public health services and 20.8% as concerns the use of social services.

population (between 65 and 74 years of age) has a much lower non-self-sufficiency rate and characteristics which place it closer to the world of *active ageing*, as is clearly represented in other parts of this report.

2.3 The elderly and hospital use

The literature and international data confirm the general tendency which sees an increase in the incidence of hospitalisations as the population ages, which can be intuitively explained in light of a progressive deterioration of general health conditions as age increases and the onset of some diseases and disorders typical of old age. This phenomenon is true also in Italy where, against an overall volume of hospitalisations subsequent to ordinary admission of 7,262,813 in 2012, those regarding people over 65 and over 75 represented 45.3% (3,287,676) and 27.8% (2,017,670), respectively. Given the relevance of the phenomenon, we decided to cover certain aspects to highlight its main specificities, going into detail in three distinct and progressive levels of analysis capable of increasing degrees of granularity:

- Incidence of ordinary admission hospitalisations for those over 65 and over 75 by type of service provided, obtained by looking at total hospitalisations for the two targets considered compared to the regional total.
- Proportion of hospitalisations with medical DRG compared to ordinary admission hospitalisations with surgical DRG for patients over 65 and over 75, comparing that distribution between the different regions.
- Distribution of hospitalisations with medical DRG for those over 65 and over 75, looking at the type of activity carried out and the individual regional aspects.

The general tendency sees an increase in the incidence of hospitalisations as the population ages, which can be intuitively explained in light of a progressive deterioration of general health conditions as age increases and the onset of some diseases and disorders typical of old age.

Figure 14. Incidence of ordinary admission hospitalisations of patients over 75 by Region and by individual type of activity out of total ordinary admission hospitalisations (2012)



Source: processing by the authors of Hospital Discharge Form data, Ministry of Health

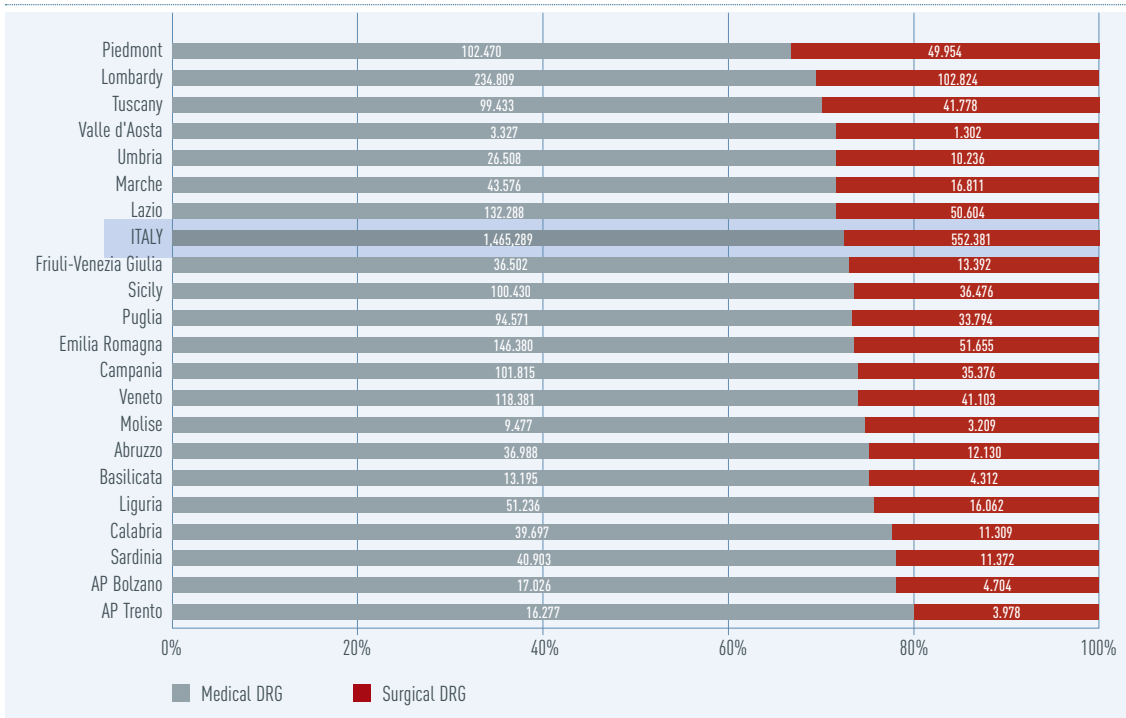
Below is some evidence specifically referring to patients over 75 and the first two aspects considered. In particular, *Figure 14* summarises the first level of analysis. In the case of activities for acute care, ordinary admission hospitalisations for patients over 75 at national level represent a significant share of the total, but in any event not the majority (26.6%). The percentage incidences recorded in Liguria (34.2%) and Friuli-Venezia Giulia (32.6%) particularly stand out; the lowest values are instead in Campania (21.1%) and Puglia (23.8%). With respect to rehabilitation activities, hospitalisations for patients over 75 represent nearly 2/5 of all of the country's hospital rehabilitation care (national average: 38.8%). There are significant differences between the regions, with values exceeding 50% in the Autonomous Province of Bolzano (50.7%) and Basilicata (50.3%) and around 30% in Emilia Romagna (27.5%) and Puglia (30.0%). Looking at long term care, considering the fragile condition of individuals in the target considered, it is not surprising that for this type of activity,

hospitalisations for patients over 75 represent a particularly significant share of the total hospitalisations for long term care in the country (national average of 68.3%). In particular, the value for Lazio (81.5%) exceeded the threshold of 80%, while four Regions had a value lower than the national figure [Campania: 20.8%; Basilicata: 61.5%; Calabria: 64.2%; Piedmont: 66.8%].

The second level of analysis instead looks at the breakdown of activities provided for ordinary admission for the target considered, using as a determining factor whether the service is attributed to the medical or surgical DRG (see Figure 15). In particular, it can be seen that at national level, 72.6% (1,465,289) of ordinary admission hospitalisations that involve patients over 75 relate to the medical branch. Also in this segment, there is a certain difference between the regions in terms of percentage: the indicator marks values ranging from 67.2% in Piedmont to 80.3% in the Autonomous Province of Trento.

Therefore, alongside fragile conditions and the emergence of various types of disorders deriving from progressive physical ageing, there may also be increasing difficulty in understanding whether the need expressed has a healthcare type response or not.

Figure 15. Distribution of ordinary admission hospitalisations over 75 by DRG of the services provided



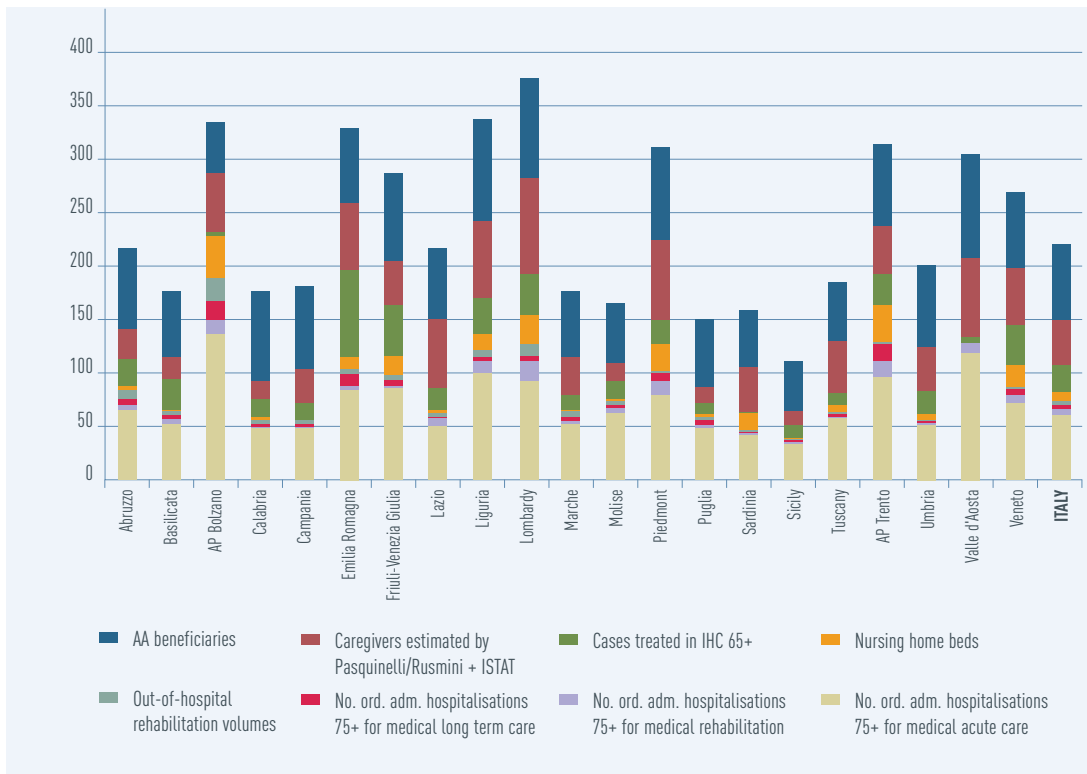
Then, the decision to limit the analysis only to medical DRG hospitalisations was based on (i) the awareness that with respect to the surgical branch, there is more space and margin in which to “hide” phenomena of inappropriate hospitalisation and (ii) although on a residual basis, the greater relative incidence that they have been shown to have. Therefore, alongside fragile conditions and the emergence of various types of disorders deriving from progressive physical ageing, there may also be increasing difficulty in understanding whether the need expressed has a healthcare type response or not. Indeed, as age increases, it becomes increasingly difficult to distinguish, amongst the reasons for hospitalisation, those which express a pure healthcare need (for example in relation to specific treatments or surgeries) and those which actually underlie a more general need for care. For example, it is typical that the elderly suffering from diabetes may be hospitalised if they have acute manifestations of the disease and go to the hospital. Typically, if the patient has adequate pharmacological treatment and a proper lifestyle, diabetes is not a disease that requires care in the hospital, but it can often be the case that the elderly living alone do not take their medicine when they should or do not follow diet and physical activity guidelines, therefore triggering a crisis resulting in hospitalisation. In situations like this, it is very difficult to understand what the reason for the hospitalisation was, if it was the disease in and of itself or the fact that these individuals are generally alone and not integrated within an active network or group, generating confusion and overlapping between the healthcare and public health networks.

2.4 The care supply chain in the various Italian regions and the estimated level of coverage of needs

In order to reconstruct the chain as a whole, the data already presented regarding the public health services were added to those regarding hospitalisations (as already seen above, they represent a very significant portion of the annual work of the national health service as a whole) and the other *settings* mentioned. The analyses performed and presented below show first of all the internal breakdown of the supply network of the various Regions. There are some recurring characteristics and some peculiarities. Imagining that the overall chain of each Region is equal to 100 (the individual bars on the graph), two phenomena are evident: (i) in all Regions, attendance allowance corresponds to roughly 30% of the overall supply, as does ordinary admission hospitalisation (in the three versions considered) and (ii) in the public health network (represented in the central part of the bars) and the informal care network (given by INPS and an estimate of caregivers), the differences are more significant.

For example, it is typical that the elderly suffering from diabetes may be hospitalised if they have acute manifestations of the disease and go to the hospital.

Figure 16. Care management of non-self-sufficiency in the Italian Regions: supply capacity for every 100 non-self-sufficient inhabitants over 75, 2012 data



Source: processing by the authors of Hospital Discharge Form data, Ministry of Health

Looking instead at the absolute values in terms of the supply for every 100 non-self-sufficient inhabitants over 75, the regional differences are easier to identify (Figure 16). While the number of attendance allowances seems to be sufficiently uniform across the various Regions, significant variability appears if all of the other dimensions are considered. Certain Regions (Lombardy, Bolzano, Trento, Val d'Aosta, Liguria, Piedmont) have ordinary admission medical hospitalisation rates close to or higher than 100 for every 100 non-self-sufficient inhabitants over 75. The breakdown of the public health network is also quite variable: in some Regions, it is almost irrelevant (Val d'Aosta, Lazio, Puglia, Sardinia, Sicily, Tuscany); in others there is a clear prevalence of residential facilities (beds in nursing homes) (Bolzano, Trento, Lombardy, Piedmont); in yet others, there is a clear prevalence of in-home care (Emilia Romagna, Friuli-Venezia Giulia, Veneto, Abruzzo, Basilicata).

Table 4. Rates of coverage of needs through public or informal long-term care

For the non-self-sufficient population over 75:	Rate of coverage of needs through public services (nursing homes)	Rate of coverage of needs through informal services (caregivers)	Rate of coverage of needs through public + informal services
Sicily	0.45%	13.49%	13.94%
Molise	0.29%	16.08%	16.37%
Basilicata	0.95%	16.89%	17.84%
Puglia	2.21%	16.43%	18.64%
Calabria	1.92%	19.54%	21.47%
Abruzzo	3.30%	27.94%	31.24%
Campania	0.44%	33.49%	33.92%
Marche	2.11%	35.90%	38.01%
Sardinia	0.13%	42.49%	42.62%
Umbria	4.17%	41.75%	45.92%
Tuscany	7.36%	48.46%	55.82%
Friuli-Venezia Giulia	20.38%	40.51%	60.88%
Lazio	2.33%	66.03%	68.36%
Veneto	19.35%	52.65%	72.00%
Emilia - Romagna	11.25%	61.85%	73.10%
Valle d'Aosta	0.19%	74.64%	74.83%
Trento	34.78%	43.98%	78.75%
Liguria	14.89%	71.03%	85.92%
Bolzano/Bozen	39.31%	54.82%	94.13%
Piedmont	24.22%	75.51%	99.73%
Lombardy	27.83%	89.20%	117.03% ¹⁵

After observing the breakdown of the various regional care management chains, the same data were used to estimate the rate of coverage of needs referring to non-self-sufficient citizens over 75 of the Regions and considering only two settings amongst those mentioned: residential facilities for the elderly (nursing homes) and the estimate of caregivers¹⁶ present in the various areas. These two care paradigms were isolated from the others because they represent the two most appropriate long-term care alternatives, as they are the two most directly linked to the condition of non-self-sufficiency.

Although we have considered the non-self-sufficient population over 75 as a very stringent criterion compared to the traditional demographic figure (in Italy, it is estimated that there are 2,131,570 non-self-sufficient people over 75, while the purely demographic figure is 6,305,738), the rate of coverage of needs through long-term public care services (nursing homes) is between 0 and 30% for majority of the Regions. This value rises if we consider the coverage of needs using caregivers. In any case, the entire country has significant “uncovered” areas presumably managed through the self-organisation of families, or through recourse to other healthcare settings, or which instead have a complete lack of care.

2.4.1 Relationships between the various healthcare settings: regional models and patterns

To understand if there are recurring patterns or models of recourse to the service chain, aside from the existence of relationships between them, and thus answer the questions posed with respect to how people make recourse to the various healthcare settings, four pairs of aspects were compared, which are typically considered as alternatives in meeting needs:

1. Ordinary admission hospitalisation vs. Entry into a nursing home:

positioning of the Regions with respect to the mix between long-term care services (nursing home type facilities) in relation to recourse to ordinary admission medical hospitalisations by citizens over 75.

2. Ordinary admission hospitalisation in intermediate facilities (long term care and rehabilitation) vs Ordinary admission hospitalisation for acute care: comparison based on the phenomenon of hospitalisation of citizens over 75. Considering only ordinary admission medical hospitalisations, as they are those which can be most easily considered a possible care response to the needs deriving from non-self-sufficiency, we sought to investigate if there are differences between recourse to hospitalisation for acute care or for rehabilitation or long term care.

(15) Having calculated the coverage of needs for the non-self-sufficient population over 75 and not for that over 65 (as above), the rates of coverage presented in this table are higher than those commented on previously. In particular values very close to or even higher than 100% must be interpreted while keeping in mind that although the reference population is restricted to that over 75, the supply network capacity as well as recourse to caregivers may also take place for those over 65.

(16) The estimated number of caregivers was obtained by following the method presented by Pasquinelli and Rusmini (2013). The estimation method involves adding the figure on registered domestic workers present in the various Italian regions and assumed to be dedicated to the care of the elderly, to the estimate of unregistered “caregivers” present in the various regions. The number of registered domestic workers dedicated to the care of the elderly is deducted from the total of domestic workers and estimated at 50%. On the basis of the Pasquinelli and Rusmini calculation procedure adopted for 2012, the number of registered workers was considered to be equal to 40% of the family caregivers in each region. The total of family caregivers and the unregistered component were then calculated indirectly.

3. Long-term care network (long term care + rehabilitation + nursing home) vs Ordinary admission hospitalisation for acute care: comparison between hospitalisations for acute care and those regarding long-term care and the post-acute care chain overall (recourse to nursing homes, out-of-hospital and hospital rehabilitation and hospital long term care)

4. Informal care vs Entry into a nursing home: relationship between recourse to a “caregiver” and the public health facility supply network for the elderly.

The assumption underlying the analyses was that, in the absence or with little presence of long-term care service networks (as is the case throughout Italy), it is possible to imagine greater recourse to the hospital network and other healthcare settings as a replacement for care management (“communicating vessels” theory).

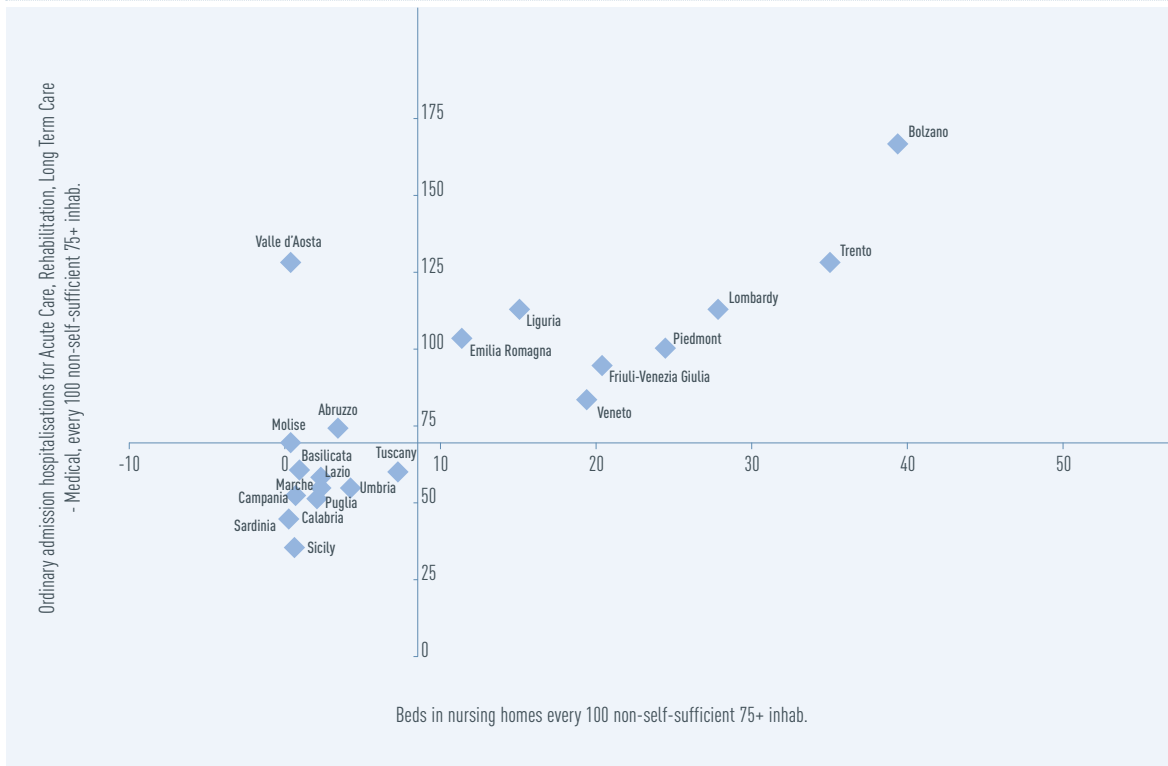
However, the data show that in these contexts where the rate of coverage of needs for non-self-sufficient elderly people is lower, recourse to hospitalisations, local care networks and informal care is also lower. In those contexts where the rate of coverage of needs through public health *settings* is higher, recourse to other *settings* is higher as well.

For example, one of the figures created to support the results just described is shown below: the graph identifies a trend (also confirmed by the other comparisons proposed) demonstrating a clear dichotomy between the Regions with a positioning in the 1st quadrant (which has higher values on both axes) and the 3rd quadrant (which has lower values for both axes).

The Regions with more beds in nursing homes (therefore those with a higher rate of coverage of needs) are those which also have higher recourse by those over 75 to ordinary admission hospitalisations, be they for acute care, rehabilitation or long term care.

However, the data show that in these contexts where the rate of coverage of needs for non-self-sufficient elderly people is lower, recourse to hospitalisations, local care networks and informal care is also lower.

Figure 17. Ordinary admission hospitalisations vs Entry into a nursing home: positioning of the Regions with respect to the total ordinary admission medical hospitalisations and beds in nursing homes - every 100 non-self-sufficient inhabitants over 75



Source: processing by the authors of Hospital Discharge Form data, Ministry of Health

With respect to the other analyses carried out, the same results are confirmed:

- there are no substantial differences between the different types of hospitalisations. Indeed, in the Regions where the number of hospitalisations for acute care is higher and where the coverage of needs is broader, recourse to hospitalisations for rehabilitation or long term care is also higher;
- also with respect to the relationship between hospitalisations for acute care and long-term care and the post-acute care chain overall (recourse to nursing homes, out-of-hospital and hospital rehabilitation and hospital long term care), there is a clear combined and incremental effect which positions the Regions with greater capacity and use of the long-term care and post-acute care network amongst those with the highest recourse to hospitalisations for acute care;

- also with respect to recourse to “caregivers” compared to the public health facility supply network for the elderly, it is evident that the local contexts in which the service network is more developed are also those where recourse to informal care by caregivers and similar figures is higher.

The objective of the analyses carried out was to verify and analyse the possible existence of different regional models with regard to the overall volumes of supply and services provided to the non-self-sufficient elderly (be they over 65 or over 75). While it was reasonable to expect that in the regions where the public health supply was more limited, recourse by the elderly to hospitals or local networks or, alternatively, to informal care, would be higher, the data instead show a direct relationship between the use of all of the different services considered, from hospitalisation to the presence of caregivers.

How can such a phenomenon be explained? A range of alternatives were considered. Out of all of them, the “classic” theme of “supply which generates demand” or, alternatively, the identification of a steady gap between the north and south in the overall service supply capacity, offset by the continuing existence of various family and cultural based models for managing the care of the elderly. These are also joined by the relevance of the theme of planning and public governance.

2.4.2 How can we interpret these phenomena?

In order to collect the point of view of public planners and develop possible interpretations, further analyses were conducted using *focus groups*. The data and evidence generated with respect to relationships between the various healthcare *settings* were discussed with experts and healthcare and social service specialists, with a view to understanding the phenomenon described here better and in more detail and put forward possible interpretations. Public officials and top system experts participated in the discussion.

The possible interpretations considered revolve around four different sets of considerations:

1. The intermediate care node: one possible interpretation discussed regarded the characteristics and specificities of intermediate and local care services. Given the results presented, we could suppose that the junction that is not working properly is precisely that of intermediate care, which is currently insufficient to meet the needs of those over 75, who therefore make recourse to hospitals or informal care in addition to and not as a replacement for other hospital *settings*.

In the Regions where the number of hospitalisations for acute care is higher and where the coverage of needs is broader, recourse to hospitalisations for rehabilitation or long term care is also higher.

2. Different degrees of attention in care management: the direct relationship between the use of the different healthcare settings could be justified by the fact noted in the literature that entering any type of healthcare setting increases the level of attention and monitoring of user health and conditions by the *caregiver*, whomever that may be. This ensures that self-induced demand is generated which is higher than for the elderly who are alone or outside any healthcare setting.

3. Supply creates demand: an additional reason considered is that which recognises how in regional contexts where supply types alternative to the hospital have been developed more, these intermediate/local care services did not replace hospitals as hoped, but rather generated higher volumes of activity (phenomenon of the supply creating demand), even lacking overall steering by public planners.

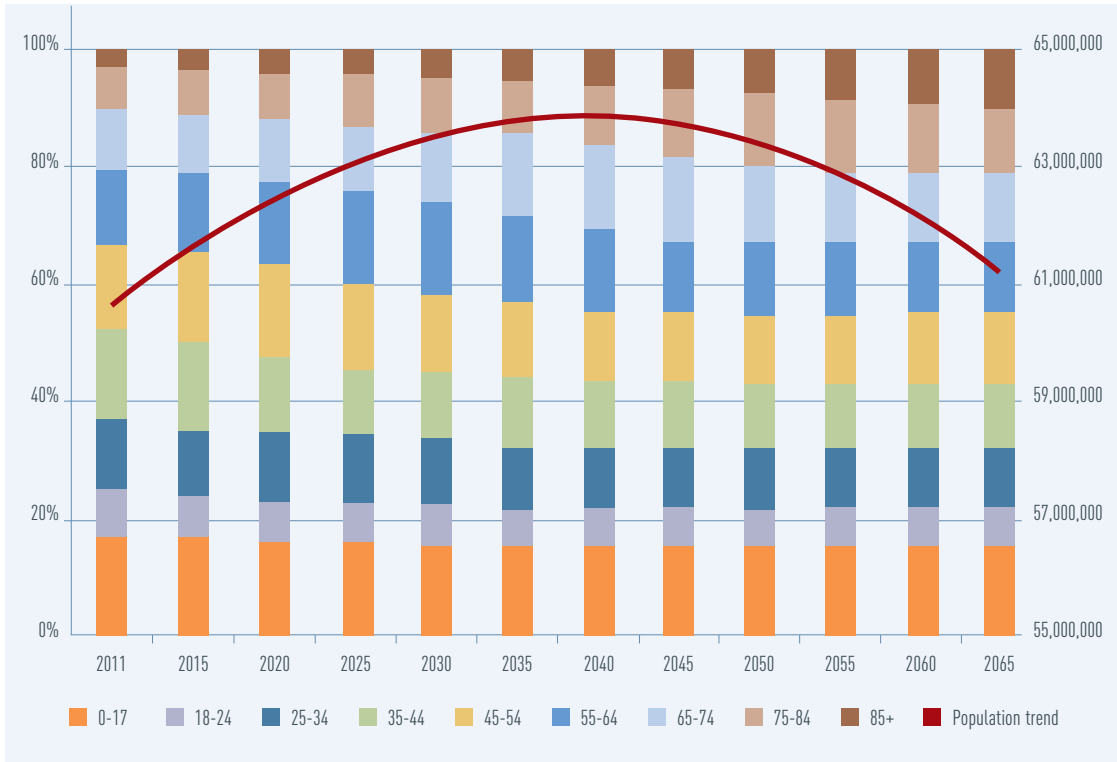
4. Insufficiency of the supply network: large-scale recourse to any healthcare *setting* available can also be justified considering that, in the final analysis, in any regional context the quantitative level of elderly care management is lower than the overall need. Therefore, any healthcare *setting* available is saturated by users over 75.

2.4.3 Future trends, possible outlooks and points of attention

The framework that emerges from the analysis conducted is particularly interesting and offers various points for reflection and for reconceptualising the role of the public health segment in the economy of the Italian welfare system. Especially looking to the future, with a medium/long-term time horizon, it is interesting to wonder if and how such a system can be sustainable over time, as it runs up against increasing pressure deriving from the progressive ageing of the population and the resulting rise in potential demand. From this perspective, we sought to conduct an investigation that went beyond a snapshot of the current condition, attempting to imagine how the system could potentially evolve as a whole.

The data show a direct relationship between the use of all of the different services considered, from hospitalisation to the presence of caregivers.

Figure 18. Population trends in absolute terms and percentage distribution by age groups (2011-2065)



Source: reprocessing of ISTAT data

Based on an initial survey of the context based on estimated demographic trends over the next fifty years promoted by ISTAT, [Figure 18](#) summarises two extremely relevant aspects: (i) the estimated trend, in absolute terms, of the total population level (trend line) and (ii) its distribution amongst the various age ranges (bars). With respect to these aspects, it is possible to underscore two important phenomena: (i) the population level will tend to increase until roughly 2040 (albeit not much: 3.6%), to then begin a more accelerated reduction trend; (ii) the over 65 population segment, which currently makes up just over 20% of the total population, seems it will surpass the threshold of 30% by 2040. This evidence highlights the need to begin seriously reflecting on how the supply is organised for a problem, that of the non-self-sufficiency of the more elderly population, which is inevitably destined to grow.

Starting from these premises, an analysis was conducted to seek to respond to two similar, yet quite distinct, research questions:

- With the rate of prevalence remaining the same and the nursing home supply remaining the same, how would the rate of coverage of needs change as potential demand changes?
- With the rate of prevalence remaining the same and the rate of current coverage of needs remaining the same, how should the supply capacity change as potential demand changes?

These two questions are based on a very strong and objectionable working hypothesis, i.e., that of considering only the residential facility supply network. This hypothesis, which works against the concept of the chain and the modularity of the services presented above and followed in all other analyses, was necessary to make projections possible and simplify the results as much as possible. In presenting these analyses, we are aware of their limitations and the critical issues intrinsic in this type of approach. Therefore, the goal of the analyses presented is not to represent exhaustive scenarios, but rather to begin a discussion based on concrete data that can fuel the current debate.

This being said, the possible future development of the coverage of needs was evaluated on the assumption of an unchanged supply network. [Table 5](#) highlights that with the nursing home supply remaining the same and a significant increase in the population concerned, as can be expected, the coverage of needs would reduce considerably (especially if we observe the phenomenon in relative terms), dropping at national level from the current 7.3% to 4.7% in 2040 for those over 65 and from the current 8.5% to 5.1% in 2040 for those over 75. With respect to both population clusters considered, the Autonomous Provinces of Trento and Bolzano would see the greatest repercussions: looking at those over 65, there would be a reduction of roughly 12-13 percentage points; with respect to those over 75, the reduction would be significantly more relevant, of roughly 17 and 20 percentage points, respectively.

Table 5. Estimated rate of coverage for over 65 and over 75: current (2012) and outlook (2025 and 2040) situation

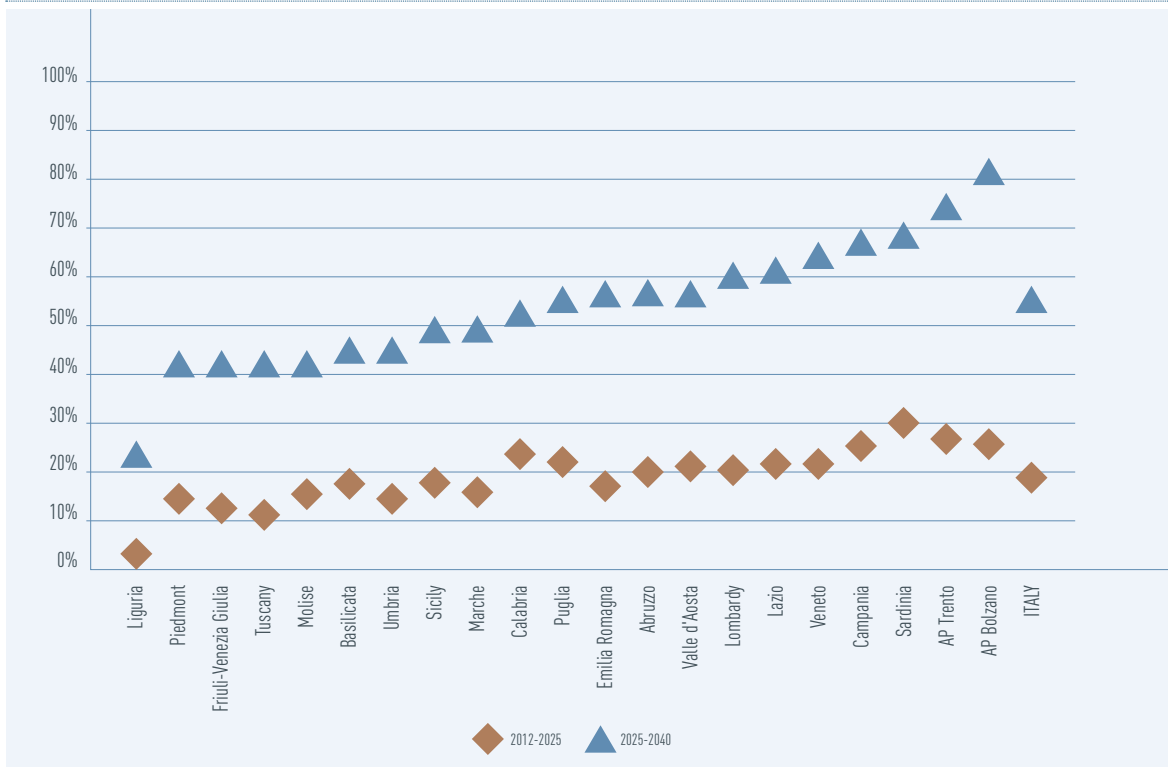
REGION	OVER 65			OVER 75		
	Rate of coverage of needs through public health services (nursing homes) -2012	Rate of coverage 2025 with equal nursing home supply	Rate of coverage 2040 with equal nursing home supply	Rate of coverage of needs through public health services (nursing homes) -2012	Rate of coverage 2025 with equal nursing home supply	Rate of coverage 2040 with equal nursing home supply
Abruzzo	2.98%	2.49%	1.88%	3.30%	2.84%	2.09%
Basilicata	0.88%	0.75%	0.60%	0.95%	0.86%	0.64%
Calabria	1.69%	1.38%	1.09%	1.92%	1.61%	1.18%
Campania	0.35%	0.28%	0.21%	0.44%	0.34%	0.23%
Emilia Romagna	8.98%	7.73%	5.68%	11.25%	9.35%	7.11%
Friuli-Venezia Giulia	15.27%	13.40%	10.59%	20.38%	15.87%	12.86%
Lazio	2.37%	1.94%	1.44%	2.33%	1.80%	1.35%
Liguria	10.40%	9.83%	8.28%	14.89%	13.07%	11.37%
Lombardy	17.90%	14.88%	10.97%	27.83%	20.98%	15.84%
Marche	2.32%	2.00%	1.53%	2.11%	1.81%	1.38%
Molise	0.27%	0.24%	0.19%	0.29%	0.27%	0.20%
Piedmont	16.25%	14.14%	11.28%	24.22%	19.74%	15.89%
Puglia	1.83%	1.48%	1.15%	2.21%	1.68%	1.26%
Sardinia	0.14%	0.11%	0.08%	0.13%	0.09%	0.07%
Sicily	0.51%	0.43%	0.34%	0.45%	0.38%	0.28%
Tuscany	7.79%	6.89%	5.40%	7.36%	6.11%	4.96%
AP Bolzano	28.70%	22.91%	15.58%	39.31%	28.51%	19.52%
AP Trento	26.49%	21.01%	14.99%	34.78%	26.67%	18.25%
Umbria	4.54%	3.96%	3.09%	4.17%	3.55%	2.81%
Valle d'Aosta	0.13%	0.10%	0.08%	0.19%	0.15%	0.11%
Veneto	14.50%	11.91%	8.70%	19.35%	14.72%	10.77%
ITALY	7.32%	6.14%	4.66%	8.47%	6.74%	5.09%

In terms of the second research question, or that which assumes that the current coverage rate would remain stable and evaluates the nursing home supply delta that would arise, it is extremely interesting to observe how, in order to maintain today's modest coverage rate unchanged, a particularly considerable adjustment in the supply would be required. Indeed, at country system level, beds in nursing homes would need to increase compared to 2012 by nearly 20% by 2025 and by 57% by 2040.

In practice, every region should increase its supply, from now until 2040, by at least 40% (with the exception of Liguria).

This would require increasing beds in nursing homes by roughly 2% per year on average, which should however be accompanied by a steering committee that guides the system towards a clear and defined direction.

Figure 19. Percentage increase in the supply network (considering only residential facilities - nursing homes) needed to maintain the current rate of coverage (2012-2025 and 2012-2040 delta)



Source: processing by the authors on Ministry of Health data

This exercise is meant to include in the public debate the topic of planning the chain of interventions for non-self-sufficient elderly people, with data that can underscore its prospective relevance: within a context of constant public resources in play (or in any event destined not to increase significantly in the near future) and increasing complexity in the methods required to respond to the care needs of the population, simply maintaining the existing status quo is unsustainable, in terms of appropriateness, as well as equity and economic balance.

It is therefore necessary to initiate a system-wide reflection on the care management chain and models.

To maintain today's modest rate of coverage, beds in nursing homes would need to increase compared to 2012 by nearly 20% by 2025 and by 57% by 2040.

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