

Age Related Disabilities in Italy: evidence from the Smart Cities project ADAPT

Stefano Campostrini, Domenico De Stefano¹

SOMMARIO

The present work aims at forecast age-related disability in the Italian regions integrating the data available from various sources. The present analysis stems from a specific operative objective of the Smart Cities project ADAPT (Accessible Data for Accessible Proto-Types in Social Sector), which aims to create supporting integrated tools for healthcare and social inclusion policies with a specific focus on elderly people affected by physical disabilities and high rate of dependencies. We show how, according to different scenarios (pessimistic, central and optimistic) and using different forecasting tools, disability prevalence among elderly people is decreasing whereas the number of people aged 65 and older is rapidly increasing.

¹ Dipartimento di Economia, Università Ca' Foscari di Venezia, Cannaregio 873, 30121, Venezia, Italia, e-mail: stefano.campostrini@unive.it; domenico.destefano@unive.it.

Introduction

Physical disability in elderly people is one of the main outcome of diseases and physiologic alterations with ageing. Individual diseases, comorbid impairments, and frailty are identified risk factors for physical disability. Disability in itself is also a risk factor for other adverse events. For instance, mobility disability predicts subsequent difficulty in both ADL (Activities of Daily Living) and/or IADL (Instrumental Activities of Daily Living), as well as difficulty in these tasks is predictive of future dependency.

In a scenario of a substantial increase in the size of the older population in the future decades, combined with the still ongoing effects of the current economic crisis, disability will have noticeable social and economic costs for both local and national governments. In order to plan reliable and focused interventions, health policy makers need accurate indications of the demand on future long-term care. Therefore, it becomes fundamental to have accurate “predictions” on several aspects related to the incidence of elderly people on the overall population and on the prevalence of those affected by some forms of disability.

In the majority of these studies, especially at regional level and in Italy, the frequently used assumptions for forward trends are oversimplified and rather unreliable. Moreover, forecasting trend on this kind of phenomenon is rather difficult because of two main problems: *i*) operative aspects, mainly related to the heterogeneous definitions of (elder people) “disabilities”; *ii*) obtaining reliable estimates of the trend over a reasonable time-frame, using available data from different sources (and often covering more general or disability-related phenomena, such as ageing, psycho-physical disabilities, dependencies, etc.).

In the present work we aim at forecast the trend and the possible growth of the elder people disability in the Italian regions, addressing both issues *i* and *ii*. In particular, the present analysis stems from a specific operative objective of the Smart Cities project ADAPT (Accessible Data for Accessible Proto-Types in Social Sector), which aims to create supporting integrated tools (informative, software, home automation devices) for healthcare and social inclusion policies with a specific focus on elderly people affected by physical disabilities and high rate of dependencies.

The paper is organized as follows: in Section 2, we briefly described the ADAPT project and the research its line; in Section 3 we review the possible definitions of disability in elderly people according the existing medical and social literature; in Section 4 we report the main results also describing the used statistical methodology; in Section 5 some concluding remarks are presented.

1. ADAPT project

ADAPT project aims at developing integrated tools (informative, software, home automation devices) for the healthcare of elder people affected by physical disabilities². ADAPT focuses on welfare technology and social inclusion with special attention to data analysis for health policy programming and public intervention. One of the main objective of the project is in fact the realization of a complete data infrastructure, based on the integration of the available social and health databases at the regional level, for supporting the introduction of the so-called Electronic Health Record (EHR).

The project is made up of seven, ideally sequential, research lines (RL). The present paper stems from the RL1 which is centered on the analysis of the social context through the available official data. In this research line one of the main objective is the analysis of the possible “definitions” of disability in elderly people as reported in the international literature (medical, sociological and statistical) and also from an operative viewpoint, i.e. how disability is measured and which scales are adopted at both national and regional levels. Based on the results of the definition phase, we integrate the possible sources of data, in a longitudinal perspective, and we carry out a statistical analysis with a special aim in forecasting and projection. The main results on both definition and data analysis phases are described in the following sections.

2. Definition of disability in elderly people

Disability is a complex, dynamic and multidimensional concept. Combined with ageing it becomes even more difficult to disentangle incoming health related factors with those specifically related to physical disability and dependency. In fact, higher disability prevalence among older people reflects an accumulation of health risks across a lifespan of disease, injury, and chronic illness (NDA and NCAOP, 2006; Fried et al., 2004). Furthermore, usually physical disability (and the consequent dependency) is highly related with the concepts of both *frailty* and *comorbidity*.

Moreover, it is difficult to define disability without taking into consideration the *contexts* which the “potential” disable person are in.

Many studies enhanced the huge overlapping among disability, frailty and comorbidity (see for instance Topinkova, 2008), but they are rather different phenomena. Following Fried et al. (2004), frailty is a state of high vulnerability for health outcomes, such as disability, dependency, falls, need for long-term care, and mortality; while comorbidity is the concurrent presence of two or more chronic diseases in the same individual.

For what concerns disability, especially in medical literature, is defined as the difficulty or the dependency in carrying out activities essential to independent living, where both frailty and comorbidity predict disability, adjusting for each other.

From an official viewpoint, the first attempt to define disability has been provided by the International Classification of Impairments, Disabilities, and Handicaps (ICIDH) proposed in 1980 by the World Health Organization (WHO, 1980).

ICIDH provides a conceptual framework for disability along three dimensions:

1. Impairment: any loss or abnormality of psychological, physiological or anatomical structure or function.
2. Disability: any restriction or lack (resulting from an impairment) of ability to perform an activity in the manner or within the range considered normal for a human being.
3. Handicap: individual disadvantage resulting from an impairment or a disability, that limits or prevents the fulfilment of a role that is normal (depending on age, sex, and social and cultural factors) for a given individual

The most important conceptualization operating within ICIDH is that these three dimensions represent an ordered sequence: impairment produces disability that leads to handicap. A substantial body of literature criticized ICIDH classification (for instance, WCC and Dutch Classification and Terminology Committee for Health 1994) and recognized the need to revise it.

The revision process leads to the International Classification of Functioning, Disability and Health (ICF) in 2001 (WHO, 2001), which represents the most updated official definition of disability. ICF advanced the understanding of the disability concept developing a classification instrument through a long scientific process involving academics, clinicians, as well as people with disabilities (Bickenbach, 2006). The ICF emphasizes contextual factors in creating disability, which is the main difference between this new classification and the previous. In the ICF, problems with human functioning are categorized in three interconnected areas:

- impairments are problems in body function or alterations in body structure – for example, paralysis or blindness;
- activity limitations are difficulties in executing activities – for example, walking or eating;
- participation restrictions are problems with involvement in any area of life – for example, facing discrimination in transportation

The main difference between ICF and ICIDH is that the ICF emphasizes environmental factors in creating disability. ICIDH, instead, emphasizes individual and health aspects. In a nutshell ICIDH defines disability as any restriction or lack (resulting from an impairment) of ability to perform an activity in the manner or within the range considered normal for a human being. More in details, ICIDH classification of disabilities is based on the effects on

individual health domains and health-related domains. These domains are described from body, individual and societal perspectives by two basic lists: (1) Body Functions and Structures; (2) Activities and Participation. As operational instruments based on ICIDH classification, the most adopted for measuring physical disability, especially in elderly people, is a 6-point scale of difficulty in accomplish simple tasks named ADL (Activities of Daily Living) and IADL (Instrumental Activities of Daily Living)³.

Despite ICF definition represents a great advance in understanding and measuring disability, in many countries, national-based surveys still adopt other operative, relatively older, definitions of disability. For instance in Italy, ISTAT adopts the previous ICIDH. Moreover, usually in the Italian surveys, the ADL and IADL scales are simplified in order to have a single indicator on disability (ISTAT, 2013b).

3. Data and methodology

Taking into account the complexity of the concept and the scarce availability of data corresponding to the proper definition of disability, we use information from several sources. Specifically, Istat multipurposes survey “Condizioni di salute e ricorso ai servizi sanitari” (ISTAT, 2013b); “Presidi residenziali socio-assistenziali” (ISTAT, 2013c); and the Istat report “La disabilità in Italia” (not updated since 2005, see: ISTAT, 2009). For ageing trend we use official demographic data on the population and social indicators trends (ISTAT, 2013a).

Based on previous studies (Network per la Non Autosufficienza 2009, 2010, 2011, 2013; Campostrini, 2008; Bhattacharya et al., 2004) the trend of ageing and the related proportion of disability will be considered according to different scenarios. Following Campostrini (2008), we specify three scenarios:

1. *pessimistic* (disability rates will remain stable in the future);
2. *central* (or realistic: there will be some decrease in disability rates);
3. *optimistic* (disability rates will drop thanks to better living situation and better aging).

Considering each scenario, we use well-known methods for time-series forecasting, such as Exponential Smoothing State Space model (ETS) and the slightly complex ARIMA.

The results for the number of people with disabilities among the 65 years old and older according to the central scenario are reported in figure 1.

³ See Katz (1983) for details.

Here the two forecasting methods produce rather different results. On the one hand, ETS is not able to reproduce a clear trend while ARIMA predicts an increasing trend, even in a scenario of decreasing disability rates.

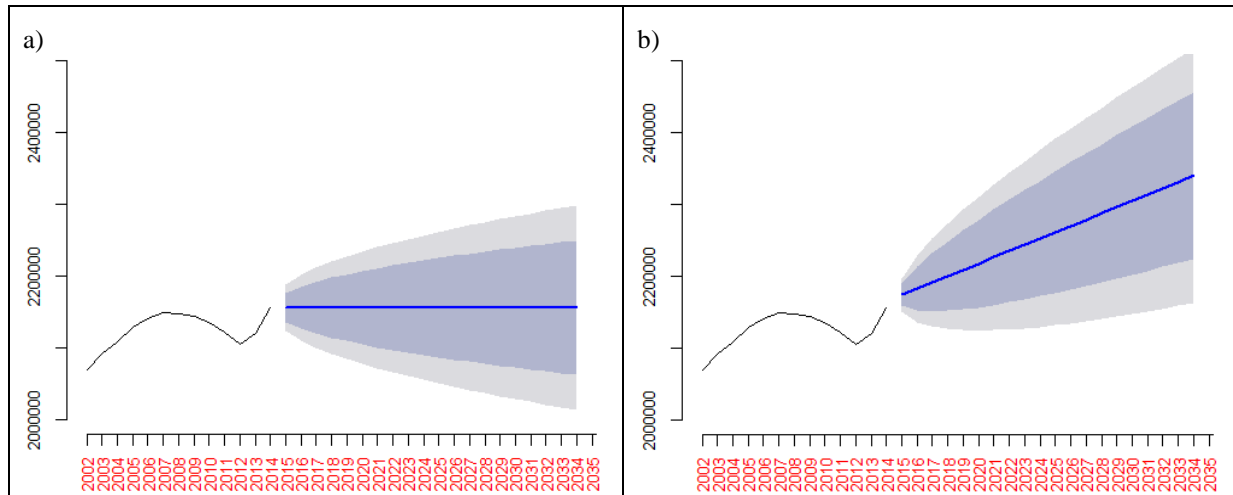


Figure 1 Number of people with disabilities among the 65 years old and older according to the “central” (realistic) scenario, observed and predicted by the a) ETS(A,N,N) model and b) ARIMA(0,1,1) with drift model.

4. Conclusion

The figures for the most recent years offered by official statistics are in many ways odd, not showing a clear trend (and this justify the substantial difference when applying different forecasting methods). Particularly if a new increase is confirmed the situation could be really worrying (right figure) and, given the well-known economic limitation, new policy should be taken as soon as possible to deal with the future increase of disable person. Completely different is the scenario of a stabilization of the number of disabled persons in Italy. Still policies are needed to offer better life for such a relevant number of citizens, but the sustainability issue should address more efficiency and effectiveness (quality) aspects rather than re-organize and re-thinking all the social service world as should happen if the first scenario would have been proved as more realistic.

There are some issues to face in this kind of analysis. The first is the need for better data. The phenomenon is too important and the policy consequences too relevant to rely on few and seldom collected data. If data on ageing are certainly of very good quality (and allow for quite reliable forecasting), data on disability, particularly among the older population are needed. As future line of research we will try to improve our results adapting, in a suitable way, the information contained in more frequently updated sources of data on disability-related outcomes. In particular, we could use the Istat multipurposes survey “Aspetti della vita quotidiana” (ISTAT, 2014) that even if contains some indicators on the overall disability rate

(without distinguishing among the different forms of disabilities), can give us a series of valuable data for more accurate predictions.

References

- Bhattacharya J., Cutler D.M., Goldman D.P., Hurd M.D., Joyce G.F., Lakdawalla D.N., Panis C.W.A., Shang B. (2004) Disability Forecasts and Future Medicare Costs. *Forum for Health Economics & Policy* 7(1), 1558-9544.
- Bickenbach, J. (2006) International Classification of Functioning, Disability, and Health (ICF/ICIDH). In G. Albrecht (Ed.), *Encyclopedia of disability*. (pp. 967-971). Thousand Oaks, CA: SAGE Publications, Inc.
- Campostrini S. (2008) Necessariamente sani: alcuni scenari sull'evoluzione della non autosufficienza in Veneto e in Italia. In: Bertin, G. (Ed.), *Invecchiamento e politiche per la non autosufficienza*, Trento: Erikson. 127-147.
- Fried L.P., Ferrucci L., Darer J., Hurd M.D., Williamson J.D., Anderson G. (2004) Untangling the Concepts of Disability, Frailty, and Comorbidity: Implications for Improved Targeting and Care. *Journal of Gerontology: MEDICAL SCIENCES* 59(3), 255-263.
- ISTAT (2014) *Aspetti della vita quotidiana*. Roma: Istituto Nazionale di Statistica.
- ISTAT (2013a) *Demografia in cifre*, Roma: Istituto Nazionale di Statistica, Available at: www.demo.istat.it
- ISTAT (2013b) *Condizioni di salute e ricorso ai servizi sanitari*. Roma: Istituto Nazionale di Statistica.
- ISTAT (2013c) *Presidi residenziali socioassistenziali e sociosanitari*. Roma: Istituto Nazionale di Statistica.
- ISTAT (2009) *La disabilità in Italia: il quadro della statistica ufficiale*. Roma: Istituto Nazionale di Statistica.
- Katz S. (1983) Assessing self-maintenance: Activities of daily living, mobility, and instrumental activities of daily living. *Journal of the American Geriatrics Society* 31(12), 721-727
- National Disability Authority NDA, National Council on Ageing and Older People NCAOP (2006) *Ageing & Disability: A Discussion Paper*. Available at: <http://www.nda.ie/cntmgmtnew.nsf/0/FBE570D7C6D435C28025710D004594B9?OpenDocument>
- Network Non Autosufficienza (2013) *L'assistenza agli anziani non autosufficienti in Italia. 4° Rapporto sulla non autosufficienza in Italia, promosso dall'IRCCS-INRCA per l'Agenzia nazionale per l'invecchiamento*. Available at: <http://www.maggioli.it/rna/2012/index.htm>

- Network Non Autosufficienza (2011) L'assistenza agli anziani non autosufficienti in Italia. 3° Rapporto sulla non autosufficienza in Italia, promosso dall'IRCCS-INRCA per l'Agenzia nazionale per l'invecchiamento. Available at: <http://www.maggioli.it/rna/2011/index.htm>
- Network Non Autosufficienza (2010) L'assistenza agli anziani non autosufficienti in Italia. 2° Rapporto sulla non autosufficienza in Italia, promosso dall'IRCCS-INRCA per l'Agenzia nazionale per l'invecchiamento. Available at: <http://www.maggioli.it/rna/2010/index.htm>
- Network Non Autosufficienza (2009) L'assistenza agli anziani non autosufficienti in Italia. 1° Rapporto sulla non autosufficienza in Italia, promosso dall'IRCCS-INRCA per l'Agenzia nazionale per l'invecchiamento. Available at: <http://www.maggioli.it/rna/2009/index.htm>
- Topinkova E. (2008) Aging, Disability, and Frailty. Ann Nutr Metab 52(suppl 1), 6–11.
- World Health Organization (1980) International classification of impairments, disabilities, and handicaps. Geneva: World Health Organization.
- World Health Organization (2001) International Classification of Functioning, Disability and Health (ICF). Geneva: World Health Organization.