International Journal of Development and Economic Sustainability
Vol.4, No.6, pp.45-53, December 2016
Published by European Centre for Research Training and Development UK (www.eajournals.org)

THE RELATIONSHIP BETWEEN LIFE EXPECTANCY AND HEALTH SPENDING

Miniar Ben Ammar Sghari
Doctor in Economics, Faculty of management and economics, Sfax University, Tunisia.

Pr. Sami Hammami
Economics Professor, Faculty of management and economics, Sfax University, Tunisia

ABSTRACT: *This article shows the relationship between health spending per capita and life expectancy in the OECD. Most countries are grouped around a 45 degree line with life expectancy duly rising with spending. Health care expenditures and life expectancy have both been rising in many countries, including in the Netherlands. However, it is unclear to what extent increased health care spending caused the increase in life expectancy. Establishing a causal link between health care expenditures and mortality is difficult for several reasons.*

KEYWORDS: health spending, life expectancy, OECD, GDP, relationship

INTRODUCTION

Life expectancy at birth measures how long on average a newborn can expect to live, if current death rates do not change. However, the actual age-specific death rate of any particular birth cohort cannot be known in advance. If rates are falling, as has been the case over the past decades in OECD countries, actual life spans will be higher than life expectancy calculated using current death rates.The methodology used to calculate life expectancy can vary slightly between countries. This can change a country's estimates by a fraction of a year.In OECD countries, life expectancy at age 65 has increased significantly for both men and women during the past 50 years. Some of the factors explaining the gains in life expectancy at age 65 include advances in medical care combined with greater access to health care, healthierlife styles and improved living conditions before and after people reach age 65. A growing share of the population is now age 65 and older.longer life expectancy is accompanied by good health among ageing populations has important implications for health and long-term care systems.
In 2013, people at age 65 in OECD countries could expect to live for another 20.5 years on average for women and 17.2 years for men. Life expectancy at age 65 in the OECD was the highest in Japan for women (24.0 years) and Switzerland for men (19.0 years). Life expectancy at age 65 is lower in Turkey as well as in some of the major emerging economies such as South Africa and the Russian Federation.

On average across OECD countries, life expectancy at age 65 has increased by 5.6 years for women and 4.4 years for men since 1960. While the gender gap in life expectancy at age 65 widened in many countries in the 1960s and the 1970s, it has slightly narrowed over the past 30 years. In some countries such as the United States, New Zealand and the United Kingdom, the overall gains in life expectancy at age 65 since 1960 have been greater for men than for women.

Japan has achieved the highest gains in life expectancy at age 65 since 1960, with an increase of almost ten years for women and over seven years for men. The gains in life expectancy have

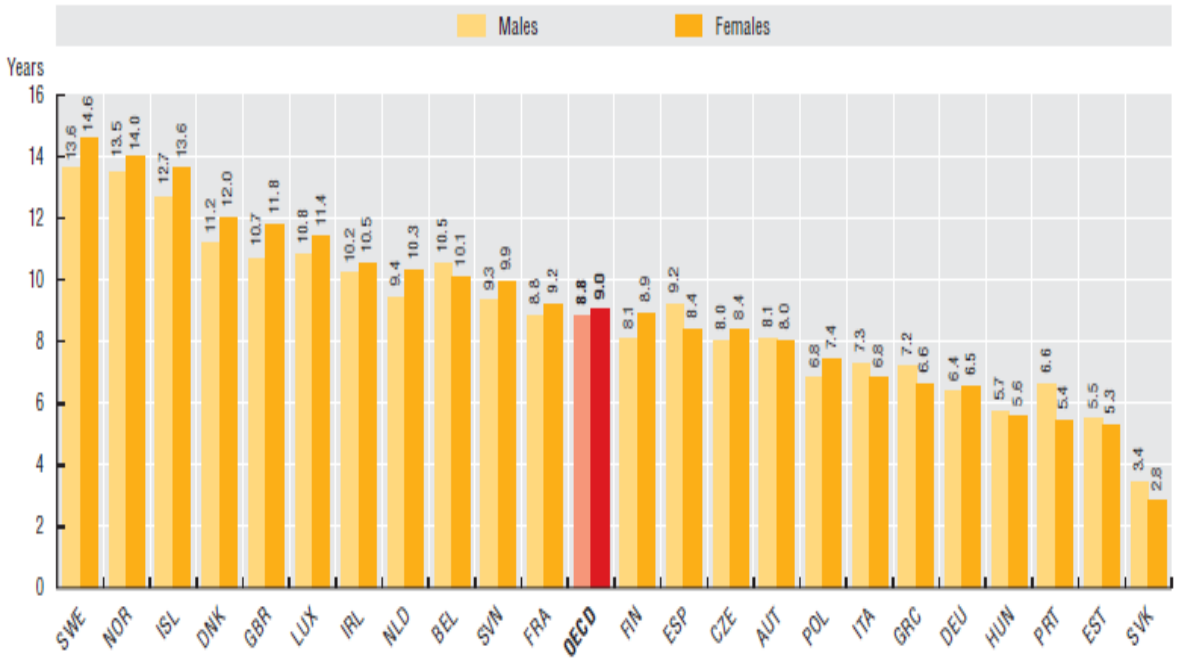
been more modest in some central and eastern European countries, such as the Slovak Republic and Hungary, particularly for men. (Figure1)

Increased life expectancy at age 65 does not necessarily mean that the extra years lived are in good health. In Europe, an indicator of disability-free life expectancy known as healthy life years has recently been developed and is calculated regularly, based on a general question about disability in the European Survey of Income and Living Conditions (EU-SILC). Given that this indicator has only recently been developed, long time series are not yet available.

In 2013, among European countries participating in the survey, the average number of healthy life years at age 65 was almost the same for women and men, at 9.0 years for women and 8.8 years for men. The absence of any significant gender gap in healthy life years means that women are more likely to live with some type of activity limitation after age 65 than men. Sweden and Norway had the highest number of healthy life years at age 65 in 2013, with 14 years or more for women and 13.5 years for men. The Slovak Republic had the lowest number of healthy life years at less than five for both women and men.(Figure1)

Other OECD countries also calculate similar indicators of disability-free life expectancy, although the survey instru-ments to measure disability may vary slightly. In Japan, disability-free life expectancy at aged 65 was estimated to be 15.6 years for women and 12.6 years for men in 2004(Cabinet Office, Government of Japan, 2006). In the United States, females born in 2001-02 can expect to live 66.9 years free from activity limitation, and males 63.6 years (USD department of Health and Human Services, 2006).

Figure 1: Healthy life years at age 65, European countries, 2013



Source: European Health and Life Expectancy Information System (EHLEIS); Eurostat Statistics Database

Life expectancy at birth

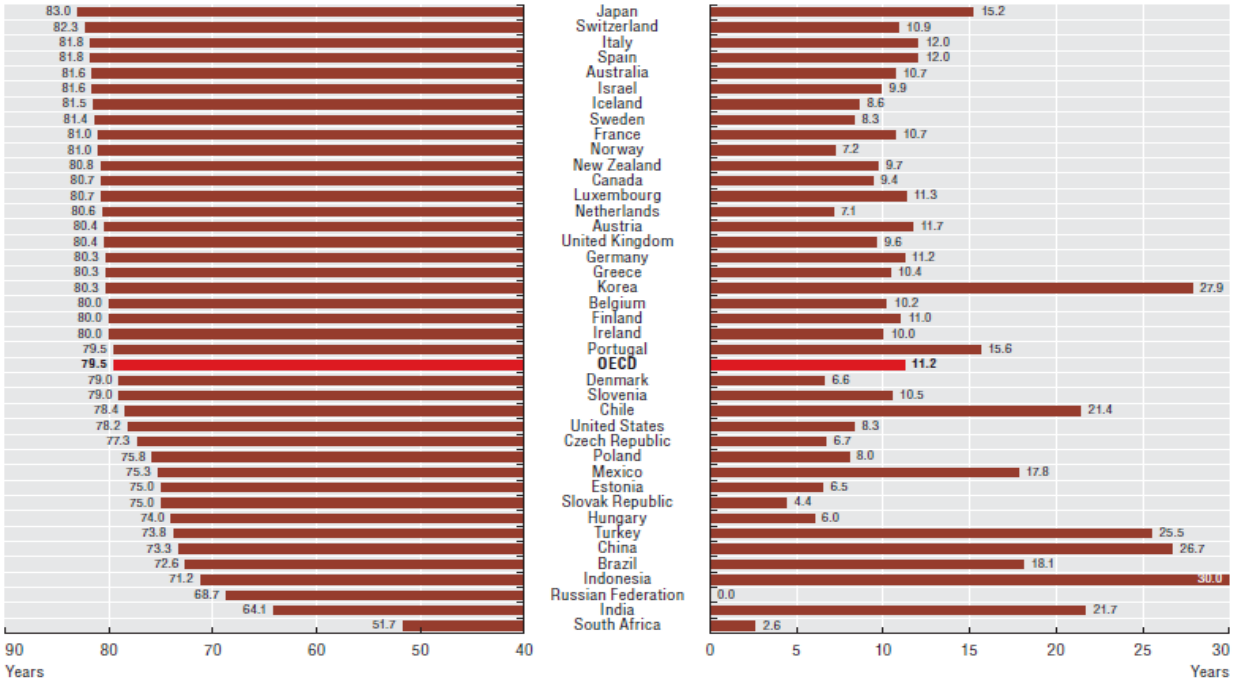
Life expectancy at birth continues to increase remarkably in OECD countries, reflecting sharp reductions in mortality rates at all ages. These gains in longevity can be attributed to a number of factors including rising living standards, improved lifestyle and better education, and greater access to quality health services. Other factors such as better nutrition, sanitation and housing also play a role, particularly in countries with emerging economies.

On average across OECD countries, life expectancy at birth for the whole population reached 79.5 years in 2014, a gain of more than 11 years since 1960. Japan leads a large group (including almost two-thirds of the 34 OECD countries) in which life expectancy at birth is currently 80 years or more. A second group, including Portugal, the United States and a number of central and eastern European countries has a life expectancy of between 75 and 80 years. Life expectancy among OECD countries was lowest in Turkey and Hungary. (Figure 1)

However, while life expectancy in Hungary has increased only modestly since 1960, it has increased rapidly in Turkey, so that it is quickly approaching the OECD average (OECD and World Bank, 2008).

The gender gap in life expectancy stood at 5.5 years on average across OECD countries in 2014, with life expec-tancy reaching 76.7 years among men and 82.2 years among women. While the gender gaps in life expectancy increased substantially in many countries during the 1960sand the 1970s, it narrowed during the past 30 years, reflect-ing higher gains in life expectancy among men than among women. (Figure 2)

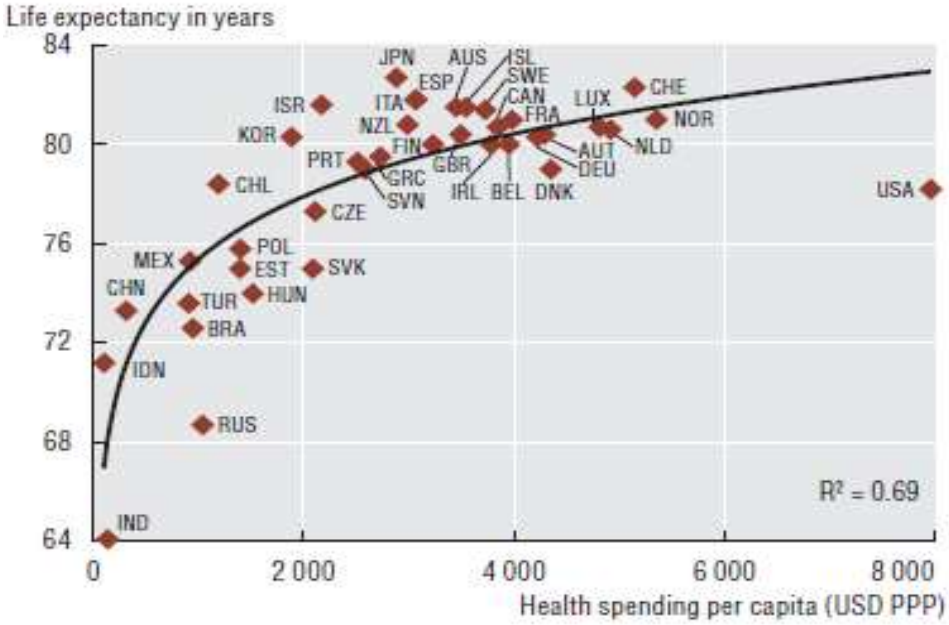
Life expectancy at birth 2014, and years gained since 1960



Source: OECD Health Data ,World Bank and national sources for non-OECD countries.

Higher health spending per capita is generally associated with higher life expectancy at birth, although this relationship tends to be less pronounced in countries with the highest health spending per capita. Japan and Spain stand out as having relatively high life expectancies, and the United States, Denmark and Hungary relatively low life expectancies, given their levels of health spending. (Figure 3)

Figure3: Life expectancy at birth and health spending per capita, 2014



Source: OECD Health Data ; World Bank and national sources for non-OECD countries

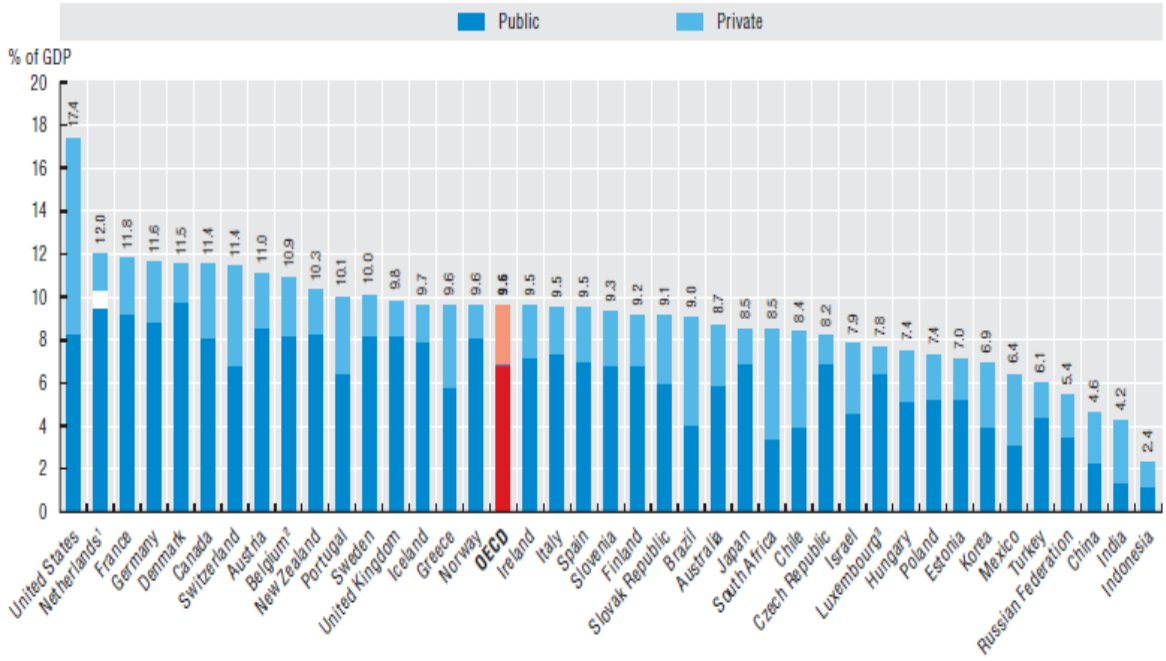
The steady growth in health spending

A third important trend observed over the past 50 years among health systems in OECD countries has been the steady rise in health spending, which has tended to grow faster than GDP. In 1960, health spending accounted for under 4% of GDP on average across OECD countries. By 2013, this had risen to 9.6%, and in a dozen countries health spending accounted for over 10% of GDP. The health spending share of GDP grew particularly rapidlyin the United States, rising from about 5% in 1960 to over 17% in 2013, which is 5 percentage points more than in the next two highest countries, the Netherlands and France, which allocated 12% and 11.8% respectively.(Figure4)

Health spending per capita has also grown rapidly over the past few decades, at a rate of 6.1% per year in real terms on average across OECD countries during the 1970s, falling to 3.3% per year in the 1980s, then up to 3.7% in the 1990s, and 4.0% between 2000 and 2013. The rate of growth of health spending has consistently exceeded GDP growth in each and every decade. But it has varied across countries. (Figure4)

In the United States, health expenditure has increased faster than in all other high-income OECD countries since 1970, increasing five-fold in real terms, even taking account population growth. In many countries, the health spending share of GDP has tended to rise strongly during economic recessions, and then to stabilise or decline only slightly during periods of economic expansion. Looking back at the recession of the early 1990s, some countries such as Canada and Finland substantially reduced public expenditure on health in order to reduce their budgetary deficits, leading to a noticeable reduction in the health spending share of GDP for a few years. But these reductions in public spending on health often proved to be short-lived and after a short period of cost-containment, growing supply and demand of health services led to a revival of health expenditure growth which exceeded GDP growth.

Figure 4: Total health expenditure as a share of GDP, 2013



Source: OECD Health Data

The public sector is the main source of health financing in all OECD countries, except in Chile, Mexico and the United States. The public share of health spending was 72% of total health expenditure on average across OECD countries in 2013, a share that has been relatively stable over the past 20 years. However, there has been a convergence of the public share of health spending among OECD countries in recent decades. Many of those countries that had a relatively high public share in the early 1990s, such as Poland and Hungary, have decreased their share, while other countries which historically had a relatively low level (e.g.Portugal, Turkey) have increased their public share, reflecting health system reforms and the expansion of public health insurance coverage.

As shown in this edition of Health at a Glance, while there is some relationship between higher health spending per capita and higher life expectancy, the relationship tends to be less pronounced as countries spend more on health. This indicates that many other factors beyond health spending affect life expectancy. The weak correlation at high levels of health expenditure suggests that there is room to improve the efficiency of health systems to ensure that the additional money spent on health brings about measurable benefits in terms of health outcomes.

4The influence of health care spending on life expectancy: related literature

Life expectancy has been on the rise in most Western countries since the nineteenth century. The question whether medical care has played an important role in this rise has been a topic of intense scientific debate (Nolte and McKee 2004). Until the 1950s it was assumed that medical care has contributed substantially to the observed mortality decrease, mainly through effective combating of infectious diseases. However, Thomas McKeown challenged this common wisdom. He published several studies in which he demonstrated that the decline in mortality of infectious diseases preceded the introduction of effective medical therapies for these diseases.

From this, McKeown concluded that medical care has not made a substantial contribution to the mortality decline since the middle of the nineteenth century until the 1950s. Although some of the conclusions drawn by McKeown have been questioned (especially his conclusion that improvements in longevity were mainly the result of improved living standards leading to better nutrition), the importance of his work should not be underestimated (Mackenbach 1996; Bunker 2001).

An important lesson from the work of McKeown is that it cannot be automatically assumed that more medical care always leads to an increase in life expectancy. Since the 1950s causes of death have changed from mainly infectious diseases to chronic diseases, and medical care has changed in response to this epidemiological transition (Cutler et al. 2006).

The main conclusion from this line of research is that medical care has contributed to the increase in life expectancy in Western countries since the 1950s. Some studies have gone a step further. They have argued not only that medical care is an important cause of increased life expectancy, but also that the investments in medical care were good value for money (Meerding et al. 2007; Cutler et al. 2006; Cutler and McClellan 2001). Using published evidence on the effectiveness of specific preventive and curative interventions within the health care sector, these studies have tried to construct a counterfactual to estimate life expectancy in the absence of these interventions. This counterfactual situation involves the absence of medical curative care and/or of various forms of prevention, such as medication to lower blood pressure and cholesterol levels, vaccinations, and early detection of diseases (screening).

Differences between observed life expectancy and counterfactual life expectancy were then related to the costs of the various interventions in order to assess whether the interventions offered value for money.

Cutler and McClellan (Cutler et al. 2006) estimated the costs and benefits of medical technology for five health conditions in the US by combining data from several sources. They concluded that 'the benefits from lower infant mortality and better treatment of heart attacks have been sufficiently great that they alone are about equal to the entire cost increase for medical care over time'. For the Netherlands, Meerding et al. (2007) combined historical data on incidence and mortality for infectious diseases, cancer, and cardiovascular disease with information about the year in which specific medical innovations were introduced to construct counterfactuals. Based on their analyses, they concluded that medical care has contributed to approximately 50% of the seven-year increase in life expectancy since the 1950s. The yield per euro spent on health care, however, varied substantially from one disease group to another (from €3,100 spent per life year gained for cardiovascular diseases to €15,000 per life year gained for cancer).

Against the backdrop of this literature, it is very likely that medical care on balance has contributed to the high levels of life expectancy witnessed today in many countries. However, this in itself does not imply that marginal increases in health care spending will further increase life expectancy.

CONCLUSION

Health care spending has increased in the Netherlands, a part of this increase has probably resulted in higher life expectancy, which in turn may have had its repercussions on public finance. However, the exact impact of health care spending on life expectancy growth in the Netherlands is difficult to pinpoint. Applying the estimates from published studies to the observed increase in health care spending in the Netherlands between 2000 and 2010 would imply that 0.3% to almost 50% (1.6 years) of the increase in life expectancy is caused by increasing health care spending. If the influence of health care spending on life expectancy is at the higher end of these estimates, increased health care spending will have had a clear impact on pension funds. After all, a one-year increase in life expectancy at retirement age increases pension liabilities by 3 to 4 percent.

If we extrapolate these findings into the future, this would imply that additional investments in the health care sector may cause further increases in life expectancy. As the strength of the effect of health care expenditures on life expectancy is rather uncertain, strong policy recommendations are difficult to give. Given the age profile of mortality risk, gains in life expectancy through increased health care spending will probably be reached through decreasing mortality rates at higher ages. Increases in life expectancy at higher ages may create an additional demand for health care but also imply an increase in pension liabilities. Based on these consequences within and outside the health care sector, it is important that, when evaluating new medical technologies that are known to extend life, costs of increased life expectancy are included, but that is currently not done. If further research allows better quantification of the strength of the effect of health care spending on life expectancy, the role of such spending as a determinant of mortality could be acknowledged when making forecasts of life expectancy.

REFERENCES

ADA – American Diabetes Association (2008), "Economic Costs of Diabetes in the US in 2007", Diabetes Care, Vol. 31, No. 3, pp. 596-615.

AHRQ – Agency for Health Research and Quality (2006), Patient Safety Indicators Overview: AHRQ Quality Indicators, AHRQ, February, Rockville, MD.

AHRQ (2009), Preventable Hospitalizations: Overview, www.ahrq.gov/data/hcup/factbk5/factbk5b.htm .

AHRQ (2011a), 2010 National Healthcare Quality Report , AHRQ, Rockville, MD. AHRQ (2011b), 2010 National Healthcare Disparities Report , AHRQ, Rockville, MD.

AIHW – Australian Institute of Health and Welfare (2010a), Mental Health Services in Australia 2007-08, Cat. No. HSE 88, AIHW, Canberra.

AIHW (2010b), "Medical Labour Force 2008", AIHW Bulletin , No. 82, AIHW, Canberra.

AIHW (2010c), Breast Screen Australia Monitoring Report 2006-2007 and 2007-2008, AIHW, Canberra. Aiken, L. and R. Cheung (2008), "Nurse Workforce Challenges in the United States: Implications for Policy", OECD Health Working Paper, No. 35, OECD Publishing, Paris.

Allin, S., M. Grignon and J. Le Grand (2010), "Subjective Unmet Need and Utilization of Health Care Services in Canada: What are the Equity Implications?", Social Science and Medicine, Vol. 70, No. 3, pp. 465-472.

Alzheimer's Australia (2009), "Keeping Dementia Front of Mind: Incidence and Prevalence 2009-2050",Access Economics Reports, www.alzheimers.org.au/research-publications/access-economics-reports.aspx

American Academy of Family Physicians, American College of Physicians and American OsteopathicAssociation (2009), "Call for Primary Care Reform", 2009/primarycarereform-aafp-acp-aoa.html

American Cancer Society (2010), Cancer Facts and Figures 2010, American Cancer Society, Inc., Atlanta.

Arah, O. et al. (2006), "A Conceptual Framework for the OECD Health Care Quality Indicators Project", International Journal for Quality in Health Care, Vol. 18, Supplement No. 1, pp. 5-13.

Baert, K. and B. de Norre (2009), "Perception of Health and Access to Health Care in the EU-25 in 2007", Eurostat Statistics in Focus 24/2009, European Commission

Luxembourg. Baker, L., S.W. Atlas and C.C. Afendulis (2008),"Expanded Use of Imaging Technology and the Challenge of Measuring Value", Health Affairs, Vol. 27, No. 6, pp. 1467-1478.

Banthin, J.S., P. Cunningham and D.M. Bernard (2008), "Financial Burden of Health Care, 2001-2004",Health Affairs, Vol. 27, pp. 188-195.

Belizán, J.M. et al.(1999), "Rates and Implications of Caesarean Sections in Latin America: Ecological Analysis", British Medical Journal, Vol. 319, pp. 1397-1400.

Bellanger, M. and Z. Or (2008), "What Can We LearnFrom a Cross-Country Comparison of the Costs of Child Delivery?", Health Economics , Vol. 17, pp. S47-S57.

Bennett, J. (2003), "Investment in Population Health in Five OECD Countries", OECD Health Working Paper, No. 2, OECD Publishing, Paris.

Bewley, S. and J. Cockburn (2002), "The Unethics of 'Request' Caesarean Section", British Journal of Obstetrics and Gynaecology, Vol. 109, pp. 593-596.

Blendon, R. et al. (2002), "Inequalities in Health Care: A Five-Country Survey", Health Affairs, Vol. 21, pp. 182-191.

Cutler, D., Deaton, A., and Lleras-Muney, A. The determinants of mortality. The Journal of Economic Perspectives 2006; 20; pp. 97-120.

Cutler, D.M. The lifetime costs and benefits of medical technology. Journal of Health Economics 2007; 26; pp. 1081-1100.

Cutler, D.M. and McClellan, M. Is technological change in medicine worth it? Health Affairs 2001; 20; pp. 11-29.

Cutler, D.M., Rosen, A.B., and Vijan, S. The value of medical spending in the United States, 1960-2000. New England Journal of Medicine 2006; 355; p. 920.

De Waegenaere, A., Melenberg, B., Boonen, T. Het koppelen van pensioenleeftijd en pensioenaanspraken aan de levensverwachting. Netspar Tilburg 2012

Drummond, M.F., Sculpher, M.J., Torrance, G.W., O'Brien, B.J., and Stoddart, G.L. Methods for the Economic Evaluation of Health Care Programmes, 2005.

Elola, J., Daponte, A., and Navarro, V. Health indicators and the organization of health care systems in western Europe. American Journal of Public Health 1995; 85; pp. 1397-1401.

Felder, S., Werblow, A., and Zweifel, P. Do red herrings swim in circles? Controlling for the endogeneity of time to death. Journal of Health Economics 2009.

Flather, M., Delahunty, N., and Collinson, J. Generalizing results of randomized trials to clinical practice: reliability and cautions. Clinical Trials 2006; 3; pp. 508-512.

Getzen, T.E. Aging and health care expenditures: A comment on Zweifel, Felder and Meiers. Health Economics 2001; 10; pp. 175-177.

Gravelle, H. and Backhouse, M. International cross-section analysis of the determination of mortality. Social Science & Medicine 1987; 25; pp. 427-441.

Grootendorst, P., Piérard, E., and Shim, M. Life-expectancy gains from pharmaceutical drugs: a critical appraisal of the literature. Expert Review of Pharmacoeconomics and Outcomes Research 2009; 9; pp. 353-364.

Heijink, R., Koolman, X., and Westert, G.P. Spending more money, saving more lives? The relationship between avoidable mortality and healthcare spending in 14 countries. The European Journal of Health Economics 2012; pp. 1-12.

Hitiris, T. and Posnett, J. The determinants and effects of health expenditure in developed countries. Journal of Health Economics 1992; 11; pp. 173-181.

Koopmanschap, M., de Meijer, C., Wouterse, B., and Polder, J. Determinants of health care expenditures in an aging society. Netspar panel paper, Tilburg 2010.

Mackenbach, J.P., Looman, C.W.N., Kunst, A.E., Habbema, J.D.F., and Van Der Maas, P.J. Post-1950 mortality trends and medical care: gains in life expectancy due to declines in mortality from conditions amenable to medical intervention in The Netherlands. Social Science & Medicine 1988; 27; pp. 889-894.

Mackenbach, J.P., Slobbe, L., Looman, C.W.N., Van der Heide, A., Polder, J., and Garssen, J. Sharp upturn of life expectancy in the Netherlands: effect of more health care for the elderly? European Journal of Epidemiology 2011; pp. 1-12.

Mackenbach, J.P. The contribution of medical care to mortality decline: McKeown revisited. Journal of Clinical Epidemiology 1996; 49; pp. 1207-1213.

Malmberg, K. Prospective randomised study of intensive insulin treatment on long term survival after acute myocardial infarction in patients with diabetes mellitus. Bmj 1997; 314; p. 1512.

Martin, S., Rice, N., and Smith, P.C. Comparing costs and outcomes across programmes of health care. Health Economics 2012; 21; pp. 316-337.

Martin, S., Rice, N., and Smith, P.C. Does health care spending improve health outcomes? Evidence from English programme budgeting data. Journal of Health Economics 2008; 27; pp. 826-842.

McCabe, C., Claxton, K., and Culyer, A.J. The NICE cost-effectiveness threshold: what it is and what that means. PharmacoEconomics 2008; 26; pp. 733-744.

McKeown, T. The Role of Medicine. Dream, Mirage or Nemesis? 1979.

Meerding, W., Polder, J., De Hollander, A., and Mackenbach, J. Hoe gezond zijn de zorguitgaven? De Kosten en Opbrengsten van Gezondheidszorg bij Infectie ziekten, Kankers, en Hart- en Vaatziekten. Zorg Voor euro's–6.Bilthoven: RIVM 2007.