



Improving mortality forecasts

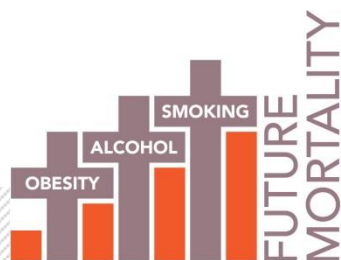
Workshop of the EAPS Health, Morbidity and Mortality Working Group



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Research project "Smoking, alcohol and obesity - ingredients for improved and robust mortality projections" funded by Netherlands Organisation for Scientific Research (NWO)(grant no. 452-13-001)



Workshop: Improving mortality forecasts

- › Part of the project “Smoking, alcohol and obesity – ingredients for improved and robust mortality projections” funded by Netherlands Organisation for Scientific Research
- › Jointly organized with EAPS (Jon Anson)
- › Short introduction to the project
- › Short introduction to the programme
- › Short introduction to the team



“Smoking, alcohol and obesity – ingredients for improved and robust mortality projections”

- › To improve future mortality estimates in Europe by developing a novel mortality projection methodology which integrates new insights regarding past mortality trends:
 - Impact of ‘epidemics’ of smoking, obesity and alcohol
 - Patterns in the age-at-death distribution



Mortality forecasts often extrapolation of past trends in age-specific mortality (e.g. Lee-Carter)

Country	Type of method	Historical period	Forecasted period
Austria	Direct extrapolation	1970-2008	2010-2050 4
Belgium	Direct extrapolation	1970-2007	1990-2060
Denmark	Lee-Carter	1990-2009	2010-2100
France	Direct extrapolation, Expert opinion	1988-2002	2007-2060
Italy	Lee-Carter	Unknown	2001-2051
Ireland	Target value, Expert opinion	1926-2005	2011-2041
Luxembourg	Target value	1962-2005	2005-2055
Netherlands	Cause of death, Direct extrapolation, Lee-Carter, Expert opinion	1970-2009	2010-2060
Norway	Lee-Carter	1900-2008	2010-2060
Poland	Target value	1950-2005	2008-2035
Portugal	Lee-Carter, Expert opinion	1980-2007	2008-2060
Spain	Direct extrapolation	1991-2007	2009-2049
Sweden	Lee-Carter	1990-2002	2003-2050
United Kingdom	Target value, Expert opinion	1900-2008	2008-2083



Shortcomings current (extrapolative) mortality forecasts

- › Not robust
- › Highly dependent on historical period
- › Unrealistically large future differences btwn countries



Past mortality forecasts have repeatedly proven too pessimistic

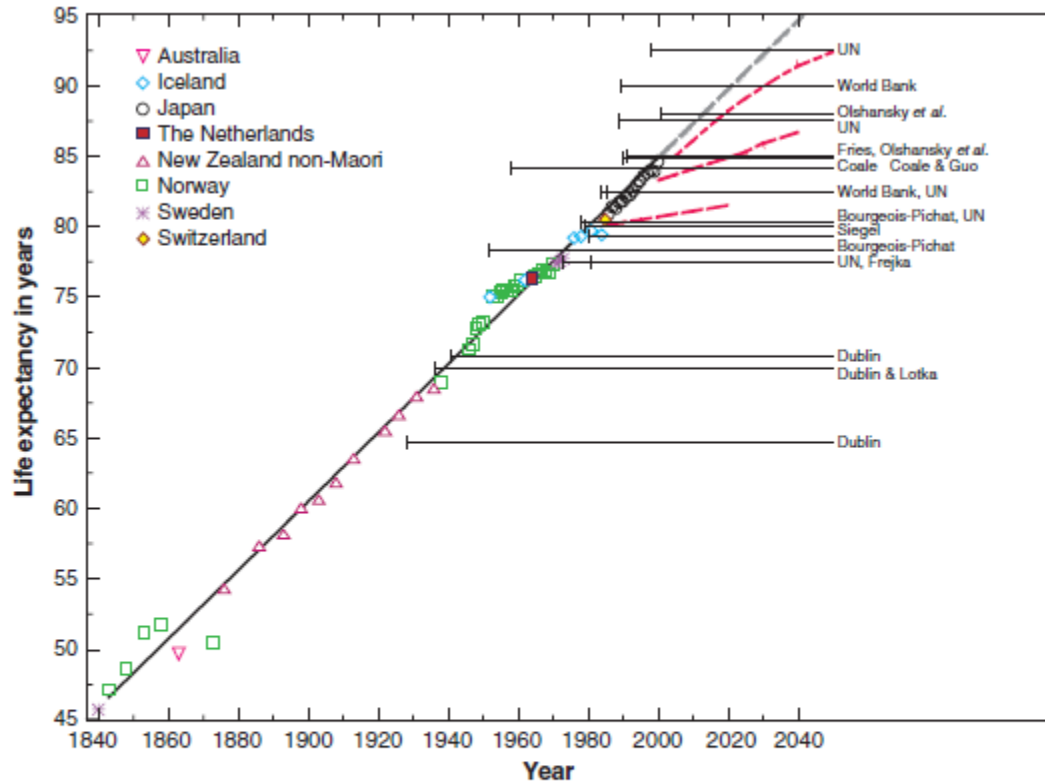
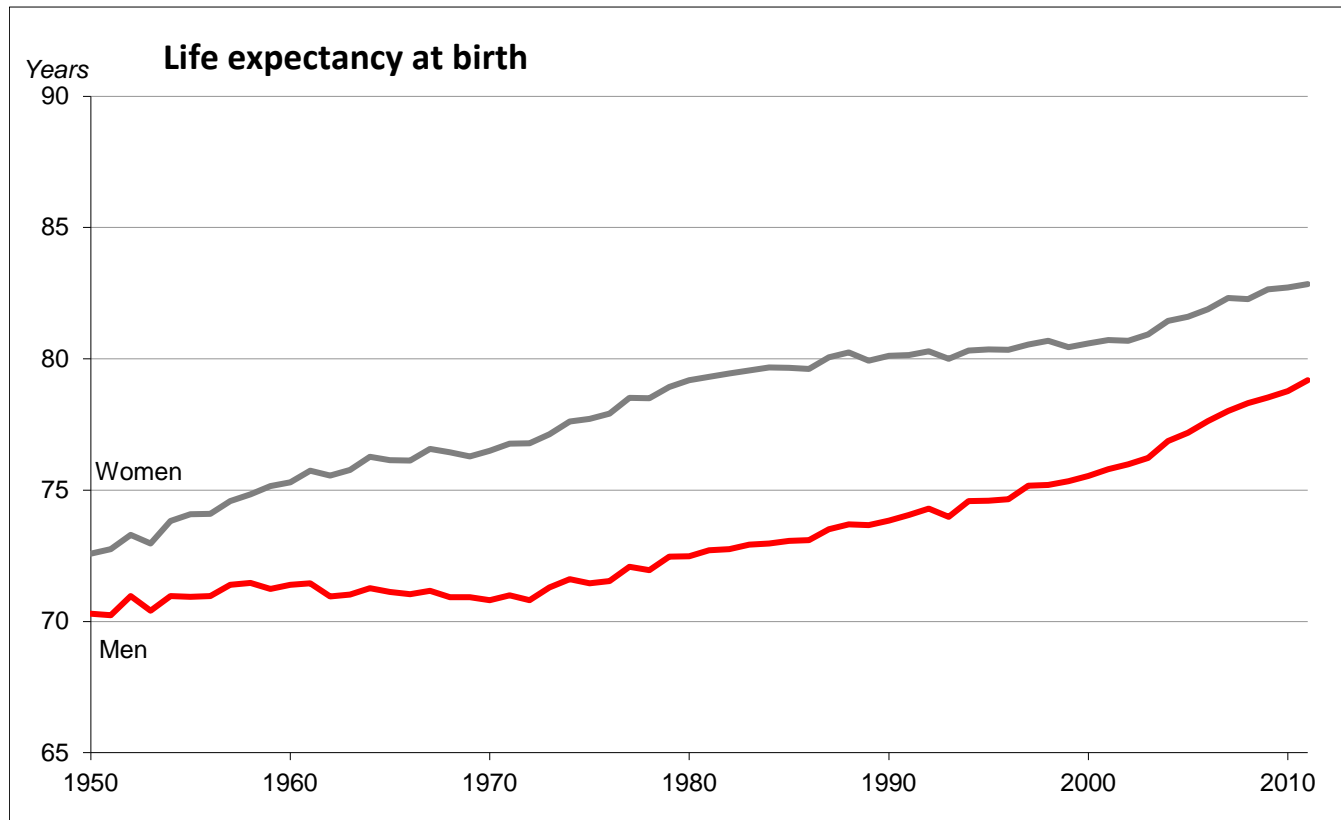


Fig. 1. Record female life expectancy from 1840 to the present [suppl. table 2 (7)]. The linear-regression trend is depicted by a bold black line (slope = 0.243) and the extrapolated trend by a dashed gray line. The horizontal black lines show asserted ceilings on life expectancy, with a short vertical line indicating the year of publication (suppl. table 1). The dashed red lines denote projections of female life expectancy in Japan published by the United Nations in 1986, 1999, and 2001 (7): It is encouraging that the U.N. altered its projection so radically between 1999 and 2001.



Highly dependent on historical period

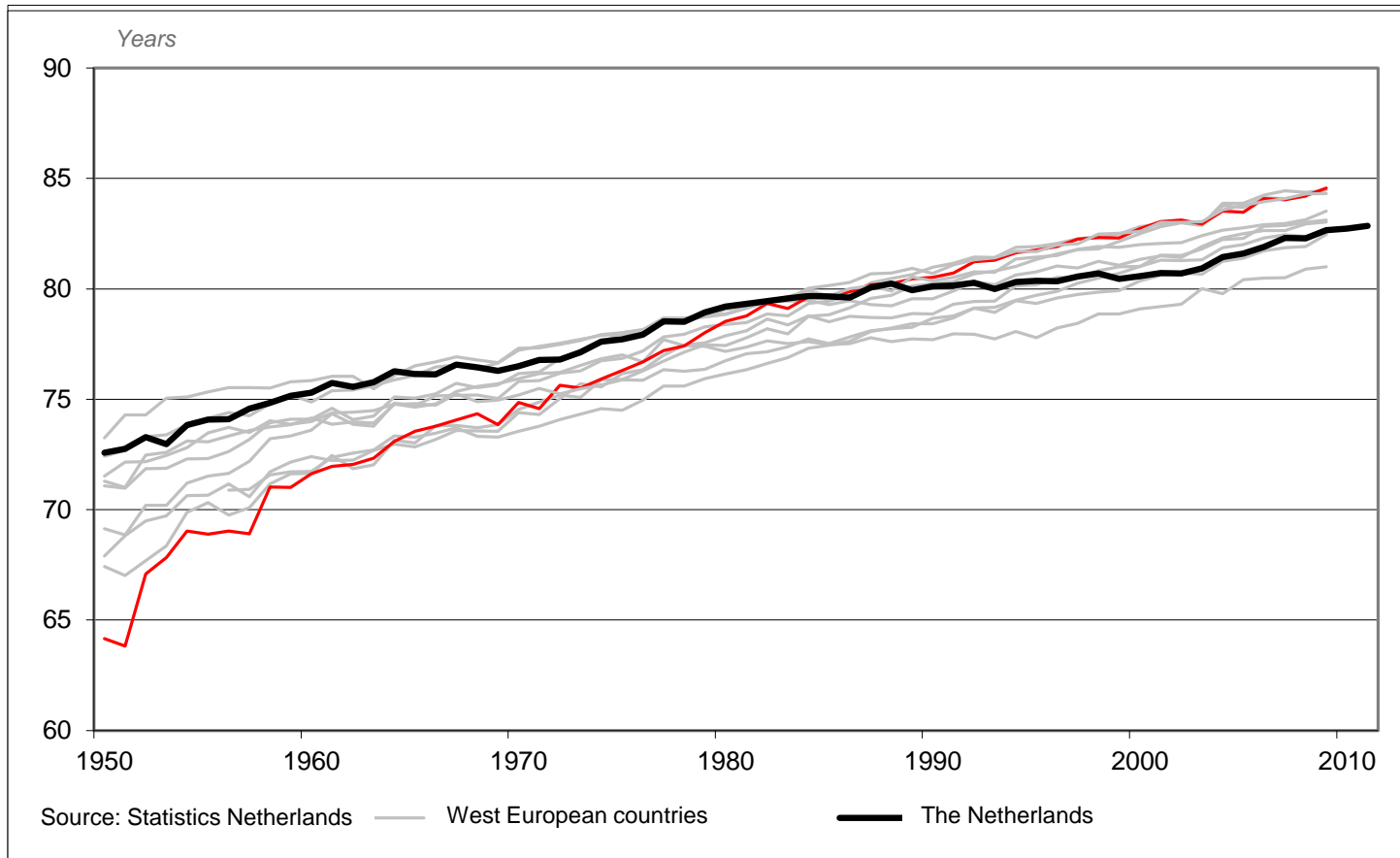
E0 1950-2011 NL





Unrealistically large future differences between countries

Eo 1950-2011 NL + other countries - women





Important distinction

Gradual mortality decline	Deviations / variations
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- › Medical improvements; socio-economic developments
- › Lifestyle ‘epidemics’

Predict separately

Wider geographical context

Delay of ageing

Use of epidemiologic evidence



Smoking =>

- › Largest preventable cause of death EU (WHO, 2009)
- › Large differences btwn countries, sexes
- › Wave pattern

Excessive alcohol consumption =>

- › Third preventable cause of death EU (WHO, 2009)
- › Large differences btwn Eastern and Western European countries
- › Esp men in Eastern Europe

Overweight & obesity =>

- › New epidemic
- › “Over 50% of the adult population in the EU are overweight or obese. Obesity prevalence has tripled in the last two decades.” (WHO, 2009)
- › Continued increase => effect on future mortality levels & trends



Changes age at death distribution

Compression of mortality scenario (Fries, 1980)

- Rectangularization
 - declining variability in the age of dying
- › Shifting mortality regime / **delay of ageing** (e.g. Vaupel 2010)
- Increase in modal age at dying
 - No changes in shape
- › Delay currently more important than compression; new summary measure of gradual mortality decline



Objective

- › To improve future mortality estimates in Europe by developing a novel mortality projection methodology which integrates new insights regarding past mortality trends:
 - Impact of ‘epidemics’ of smoking, obesity and alcohol
 - Patterns in the age-at-death distribution



Specific objectives

- 1) To assess the past and anticipated future trends in smoking-, alcohol- and obesity- attributable mortality; and the differences in these trends across countries, sexes and birth cohorts.
- 2) To assess the roles of both the delay in ageing and mortality compression in the gradual long-term mortality trend, and the changes in these roles over time.
- 3) To develop a mortality projection technique that integrates future lifestyle-related mortality trends and future patterns in the age-at-death distribution, and to apply this technique to European populations.



Today's programme

- › 09.30-10.30 Roland Rau: Current advances in mortality forecasting (Keynote address)
- › Coffee break
- › 11.00-11.45 Fanny Janssen, Sergi Trias-Llimós and Nikoletta Vidra: smoking, alcohol and obesity attributable mortality trends in Europe
- › 11.45-12.30 Fanny Janssen & Joop de Beer: projecting mortality including shifts in the age-at-death distribution, the smoking epidemic and trends from other countries
- › Lunch
- › 13.30-16.00 Discussion and brainstorm session
- › 16.00-16.15 Some final words



Discussion and brainstorm session

Topics discussions (each 30 minutes)

› Including additional (epidemiologic) evidence when forecasting (reporter: Nikoletta Vidra)

› Coherent forecasting (reporter: Lenny Stoeldraijer)

› Forecasts using the age at death distribution or other measures instead of (log) age-specific mortality rates (reporter: Sergi Trias Llimos)

› Probabilistic forecasting (reporter: Anastasios Bardoutsos)

15.30-16.00 Summary of the discussion based on reports



Our team



Fanny Janssen

Demography,
Epidemiology
Geography



Sergi Trias Llimos

Demography
Economics



Anastasios Bardoutsos

Statistics
Actuarial & Financial
Mathematics



Nikoletta Vidra

Nutritional epidemiology
Human Nutrition



Research collaboration

- › NIDI: Joop de Beer, Leo van Wissen, Frans van Poppel
- › Statistics Netherlands: Coen van Duin, Lenny Stoeldraijer
- › MPIDR: Maarten Bijlsma, Domantas Yasilionis, Roland Rau, Pekka Martikainen
- › Anton Kunst, Magdalena Muszyńska, Valentin Rousson, Fred Paccaud
- › Max Planck Odense Center on the Biodemography of Ageing



Advisory board members

- › Eurostat: Giampaolo Lanzieri
- › The Netherlands: Lenny Stoeldraijer, Coen van Duin, Tim Schulteis, Henk van Broekhoven
- › Denmark: Marianne Frank Hansen & Knud Juel
- › Finland: Juha Alho
- › France: Giancarlo Camarda, Aline Desesquelles
- › Germany: Roland Rau
- › Italy: Gustavo de Santis & Silvana Salvini & Daniele Vignoli
- › Norway: Nico Keilman & Astri Syse
- › Sweden: Edward Palmer, Tommy Bengtsson, Orjan Hemstrom
- › Switzerland: Fred Paccaud
- › UK: Julie Mills



Enjoy the workshop!



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