



Political conditions and life expectancy in Europe, 1900–2008

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ABSTRACT

The rise of life expectancy in Europe has been a very uneven process, both in time and space. This paper aims to identify instances in which major political conditions are likely to have influenced the rise of life expectancy, focusing on formation and dissolution of states and supranational blocs and on differences between political regimes (democratic vs. authoritarian non-communist and communist rule). Data on life expectancy, cause-specific mortality and political conditions were compiled from existing data sources. Possible relations between political conditions and life expectancy were studied by direct comparisons of changes in life expectancy in countries with different political conditions but similar starting levels of life expectancy. We found that formation and dissolution of states often went together with convergence and divergence of life expectancy, respectively, and that otherwise similar countries that did or did not become part of the Soviet bloc had distinctly different life expectancy trajectories. Democratically governed states had higher life expectancies than authoritarian states throughout the 20th century. The gap narrowed between 1920 and 1960 due to rapid catching up of infectious disease control in both non-communist and communist authoritarian states. It widened again after 1960 due to earlier and more rapid progress in democratic states against cardiovascular disease, breast cancer, motor vehicle accidents and other causes of death that have become amenable to intervention. We conclude that the history of life expectancy in Europe contains many instances in which political conditions are likely to have had a temporary or more lasting impact on population health. This suggests that there is scope for further in-depth studies of the impact of specific political determinants on the development of population health in Europe.

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Introduction

The idea that public health needs politics to improve population health is more popular than ever. Politics, loosely defined as the process of making and executing collective decisions (Hague & Harrop, 2010), may affect risks of mortality in various ways. It may have an impact on levels of prosperity, by fostering economic growth, and thereby influence living conditions that are essential for population health (e.g. nutrition). Political decisions on the collective provision of education, social security, housing etc. may influence population health by providing protection against health hazards and increasing resilience. Finally, politics may influence population health directly through decisions on public health measures (safe drinking water, vaccinations, road traffic safety, air pollution control, etc.) and on health care provision (Bambra, Fox, & Scott-Samuel, 2005). On the other hand, politics may also have negative impacts on population health, for example by creating major disruptions of social life, such as armed conflicts, or by oppression of certain population groups.

During the past decades, the idea that health needs to be brought into the political arena has become part of mainstream public health, often with a reference to famous antecedents like Virchow (“Politics is nothing but medicine at a larger scale”) (Mackenbach, 2009) and Rose (“Medicine and politics cannot and should not be kept apart”) (Rose, Khaw, & Marmot, 2008). Empirical evidence of the impact of politics on population health is, however, scarce, partly because it is difficult to find empirical data which are comparable and cover a sufficiently broad range of variation in political conditions. In this paper we will explore the role of major political conditions in moderating life expectancy growth in Europe during the 20th century. Europe, with its divisive political history and relatively good historical record of vital events, offers good opportunities for such an analysis.

Table 1 summarizes these conditions during the 20th century, and first of all shows that this was a period of emergence and dissolution of nation-states. In 1900, Finland was still part of the Russian Empire, Ireland of the United Kingdom, most of Central Europe of the Austro-Hungarian Monarchy, and parts of the Western Balkans still belonged to the crumbling Ottoman Empire. Two World Wars and the rise and fall of the Soviet Union have

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Table 1
Political conditions in Europe, by country and period, 1900–2008.

Independent states	ca. 1900	ca. '10	ca. '20	ca. '30	ca. '39	ca. '50	ca. '60	ca. '70	ca. '80	ca. '90	ca. 2000	ca. '08
Nordic												
Finland	Russ	Russ	Indep ('17)	Indep	Indep	Indep	Indep	Indep	Indep	Indep	EU ('95)	EU
Sweden	Indep	Indep	Indep	Indep	Indep	Indep	Indep	Indep	Indep	Indep	EU ('95)	EU
Norway	Sweden	Indep (1905)	Indep	Indep	Indep	Indep	Indep	Indep	Indep	Indep	Indep	Indep
Iceland	Denmark	Denmark	Indep ('18)	Indep	Indep	Indep	Indep	Indep	Indep	Indep	Indep	Indep
Denmark	Indep	Indep	Indep	Indep	Indep	Indep	Indep	Indep	EU ('73)	EU	EU	EU
Britain & Ireland												
England and Wales	UK	UK	UK	UK	UK	UK	UK	UK	EU ('73)	EU	EU	EU
Scotland	UK	UK	UK	UK	UK	UK	UK	UK	EU ('73)	EU	EU	EU
Northern Ireland	UK	UK	UK	UK	UK	UK	UK	UK	EU ('73)	EU	EU	EU
Ireland	UK	UK	UK	Indep ('21)	Indep	Indep	Indep	Indep	EU ('73)	EU	EU	EU
Continental												
Netherlands	Indep	Indep	Indep	Indep	Indep	Indep	EU ('57)	EU	EU	EU	EU	EU
Belgium	Indep	Indep	Indep	Indep	Indep	Indep	EU ('57)	EU	EU	EU	EU	EU
Luxembourg	Indep	Indep	Indep	Indep	Indep	Indep	EU ('57)	EU	EU	EU	EU	EU
Germany	Indep	Indep	Indep	Indep	Indep	Indep	EU ('57)	EU	EU	EU	EU	EU
							(FRG)					
Switzerland	Indep	Indep	Indep	Indep	Indep	Indep	Indep	Indep	Indep	Indep	Indep	Indep
Austria	A-H	A-H	Indep ('18)	Indep	Germ	Indep	Indep	Indep	Indep	Indep	EU ('95)	EU
Mediterranean												
France	Indep	Indep	Indep	Indep	Indep	Indep	EU ('57)	EU	EU	EU	EU	EU
Spain	Indep	Indep	Indep	Indep	Indep	Indep	Indep	Indep	Indep	EU ('86)	EU	EU
Portugal	Indep	Indep	Indep	Indep	Indep	Indep	Indep	Indep	Indep	EU ('86)	EU	EU
Italy	Indep	Indep	Indep	Indep	Indep	Indep	EU ('57)	EU	EU	EU	EU	EU
Malta	UK	UK	UK	UK	UK	UK	UK	Indep ('64)	Indep	Indep	Indep	EU ('04)
Greece	Indep	Indep	Indep	Indep	Indep	Indep	Indep	Indep	Indep	EU ('81)	EU	EU
Cyprus	UK	UK	UK	UK	UK	UK	Indep ('60)	Indep	Indep	Indep	Indep	EU ('04)
Western Balkans												
Slovenia	A-H	A-H	Yugo	Yugo	Yugo	Yugo	Yugo	Yugo	Yugo	Indep ('90)	Indep	EU ('04)
Croatia	A-H	A-H	Yugo	Yugo	Yugo	Yugo	Yugo	Yugo	Yugo	Yugo	Indep ('91)	Indep
Bosnia-Herzegovina	A-H	A-H	Yugo	Yugo	Yugo	Yugo	Yugo	Yugo	Yugo	Yugo	Indep ('92)	Indep
Serbia	Indep	Indep	Yugo	Yugo	Yugo	Yugo	Yugo	Yugo	Yugo	Yugo	Indep ('91)	Indep
Montenegro	Indep	Indep	Yugo	Yugo	Yugo	Yugo	Yugo	Yugo	Yugo	Yugo	with Serbia	Indep ('06)
TFYR Macedonia	Turk	Turk	Yugo	Yugo	Yugo	Yugo	Yugo	Yugo	Yugo	Yugo	Indep ('91)	Indep
Albania	Turk	Turk	Indep ('12)	Indep	Indep	CoBl	CoBl	CoBl	CoBl	Indep ('89)	Indep	Indep
Centre & East												
Germany (DDR)	n.a.	n.a.	n.a.	n.a.	n.a.	CoBl	CoBl	CoBl	CoBl	Germ/EU	Germ/EU	Germ/EU
Poland	Russ, A-H, Germ	Russ, A-H, Germ	Indep ('18)	Indep	Indep	CoBl	CoBl	CoBl	CoBl	Indep ('89)	Indep	EU ('04)
Czech Republic	A-H	A-H	CzSl ('18)	CzSl	CzSl	CzSl/CoBl	CzSl/CoBl	CzSl/CoBl	CzSl/CoBl	CzSl/Indep	Indep ('93)	EU ('04)
Slovakia	A-H	A-H	CzSl ('18)	CzSl	CzSl	CzSl/CoBl	CzSl/CoBl	CzSl/CoBl	CzSl/CoBl	CzSl/Indep	Indep ('93)	EU ('04)
Hungary	A-H	A-H	Indep ('18)	Indep	Indep	CoBl	CoBl	CoBl	CoBl	Indep ('89)	Indep	EU ('04)
Romania	Indep	Indep	Indep	Indep	Indep	CoBl	CoBl	CoBl	CoBl	Indep ('89)	Indep	EU ('07)
Bulgaria	Indep	Indep	Indep	Indep	Indep	CoBl	CoBl	CoBl	CoBl	Indep ('89)	Indep	EU ('07)
(f) Soviet Union												
Estonia	Russ	Russ	Indep ('18)	Indep	Indep	USSR	USSR	USSR	USSR	Indep ('89)	Indep	EU ('04)
Latvia	Russ	Russ	Indep ('18)	Indep	Indep	USSR	USSR	USSR	USSR	Indep ('89)	Indep	EU ('04)
Lithuania	Russ	Russ	Indep ('18)	Indep	Indep	USSR	USSR	USSR	USSR	Indep ('89)	Indep	EU ('04)
Belarus	Russ	Russ	USSR	USSR	USSR	USSR	USSR	USSR	USSR	Indep ('90)	Indep	Indep
Ukraine	Russ, A-H	Russ, A-H	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	Indep ('91)	Indep
Republic of Moldova	Russ	Russ	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	Indep ('91)	Indep
Russian Federation	Indep	Indep	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	Indep ('91)	Indep
Georgia	Russ	Russ	Indep ('17)	USSR	USSR	USSR	USSR	USSR	USSR	USSR	Indep ('91)	Indep
Armenia	Turk	Turk	Indep ('18)	USSR	USSR	USSR	USSR	USSR	USSR	Indep ('90)	Indep	Indep
Azerbaijan	Russ	Russ	Indep ('18)	USSR	USSR	USSR	USSR	USSR	USSR	USSR	Indep ('91)	Indep

Notes: A-H, Part of Austro-Hungarian empire; CzSl, Part of Czechoslovakia; Germ, Part of Germany; Russ, Part of Russian empire; UK, Part of United Kingdom; USSR, Part of Union of Soviet Socialist Republics; Yugo, Part of Yugoslavia; Indep, Independent (with year of independence if during 20th century); CoBl, Independent, but part of Communist bloc; EU, Independent, but member of European Union (with year of accession); Normal, Democratic political regime (in 1930 or later only); **Bold**, Autocratic non-communist political regime (in 1930 or later only); **Bold, italics**, Autocratic communist political regime (in 1930 or later only).

completely changed the political map of Europe, and the net effect has been a substantial rise in the number of independent nation-states. In the process, some countries have merged but many more have split up. Recently, this fragmentation was partly balanced by a slow process of European integration within an expanding European Union (Daniels, 1996). Because the state is the main unit of political decision-making, if politics make a difference at all one would expect dissolution of supranational or national entities to increase disparities in life expectancy, and unification to reduce them, as happened when the German Democratic Republic merged with the German Federal Republic in 1991 (Nolte, Shkolnikov, & McKee, 2000a, 2000b).

The 20th century has also been a period of struggle between democracy and autocracy. Most countries in the North and West of Europe have long democratic traditions, but as indicated in Table 1, during the 20th century many countries in Continental Europe, the Mediterranean, the Western Balkans, Central and Eastern Europe and the former Soviet Union have had shorter or longer periods of autocratic government, either communist or non-communist (often fascism in inspiration) (Daniels, 1996; Judd, 2005). It is still an open question whether democracy as such is good for population health. Elected representatives are accountable to voters and vulnerable to public criticism, so that health resources may reach larger sections of the population in democratically than in autocratically governed

countries (Klomp & de Haan, 2009; Wigley & Akkoyunlu-Wigley, 2011). Democracies have public media that effectively transmit health-related information (Wigley & Akkoyunlu-Wigley, 2011) and may have stronger mechanisms for selecting competent and honest people (Besley & Kudamatsu, 2006). Many studies do find a positive association between democratic government and life expectancy, even after controlling for a range of confounding variables (Alvarez-Dardet & Franco-Giraldo, 2006; Besley & Kudamatsu, 2006; Klomp & de Haan, 2009), but the evidence is not entirely consistent. For example, one analysis found that three European countries which had autocratic government in part of the period 1950–2000 (Spain, Portugal and Greece) experienced faster increases in life expectancy than democratically governed countries (Tapia Granados, 2010).

In order to get a balanced view we will therefore try to cover the whole of the 20th century. We do not pretend to establish causality: differences between countries in political conditions are likely to depend on many other characteristics or circumstances (e.g. economic or cultural factors) that may have independent effects on health, thereby confounding the politics–health relation. Less ambitiously, we aim at finding the main instances in which political conditions may plausibly have influenced the rise of life expectancy in Europe, in order to identify suitable areas for further in-depth study. We will focus on two major political conditions: formation and dissolution of states and supranational blocs, and different political regimes (democratic vs. authoritarian non-communist and communist rule).

We will do this against the backdrop of the epidemiologic transition that Europe has gone through during the 20th century (Omran, 1971; Riley, 2001). During the second stage of this transition (the so-called age of ‘receding pandemics’), which lasted until about 1950–1970, infectious disease mortality declined and life expectancy rose rapidly. This was followed by a few decades of stagnation, corresponding to the third stage of the epidemiologic transition (the age of ‘degenerative and man-made diseases’), due to rising mortality from cardiovascular diseases, cancers and road traffic injuries. In the period 1970–1990, however, life expectancy started to rise again in many European countries. Some observers have called this a ‘fourth stage’ of the epidemiologic transition (Olshansky & Ault, 1986), while others regard this as an entirely new transition in which mortality from cardiovascular disease and cancer is replaced by mortality from certain diseases of old age, such as mental and neurological disorders (Meslé & Vallin, 2006).

In Europe this growth of life expectancy has been very uneven, not only in time but also in space. In Western Europe, life expectancy already started to rise strongly in the 19th century, and many countries had completed the third stage of the epidemiologic transition by 1950 (Riley, 2001). In Central and Eastern Europe, on the other hand, life expectancy started to rise much later, but then rose more steeply during the 1940s and 1950s, so that by 1965 male life expectancy at birth in European countries clustered in a narrow range around the age of 70. This has been described as an ‘accelerated model’ of epidemiologic transition, as opposed to the ‘classical model’ seen in Western Europe (Omran, 1983). However, the stagnation of life expectancy during the third stage of the epidemiologic transition was more severe and lasted longer in Central and Eastern Europe, causing the gap in life expectancy with Western Europe to widen again (Zatonski, 2008).

After a short description of data and methods, this paper consists of two parts: a narrative part based on a graphical exploration of life expectancy trends in countries with different political conditions, and a quantitative analysis of differences in life expectancy growth by political regime in four different periods (1920–1939, 1939–1960, 1960–1990, and 1990–2008).

Data and methods

The analysis deals with all currently existing states in Europe (the WHO European region, minus Central Asia and Turkey, minus mini-states like Monaco, and with the United Kingdom divided in its constituent parts). A complete listing of these states is given in Table 1. Some of the analyses refer to selected points in time (1920, 1939, 1960, 1990, 2008) which were chosen to reflect certain turning-points in the political or epidemiological history of Europe.

For each of the territorial units, and for their predecessors in earlier times, we have collected data on life expectancy at birth, by gender, for the period 1900–2008. The primary source of this information has been the Human Lifetable Database (www.lifetable.de), supplemented by the World Health Organization Health for All Database (<http://data.euro.who.int/hfad/>), the United Nations Demographic Yearbook Historical Supplement, 1948–1997 (<http://unstats.un.org/unsd/demographic/products/dyb/DYBHist/HistTab09a.pdf>), the Meslé Vallin Data Base (Vallin & Meslé, 2009) and various other sources (Duthé, Badurashvili, Kuyumjian, Meslé, & Vallin, 2010; Meslé, Shkolnikov, & Vallin, 1992; Vallin, Meslé, Adamets, & Pyrozkhov, 2002). All life expectancy values refer to period life expectancy, not cohort life expectancy, and to total national populations.

In order to obtain explanatory clues we also collected data on mortality by cause of death. For the analysis of the 1920–1939 and 1939–1960 periods age-standardized mortality data were extracted from a compendium of International Mortality Statistics, from which we used the data as presented for 1921–25, 1936–1940 and 1961–65 (Alderson, 1981). For the analysis of the 1960–1990 period age-standardized mortality data were extracted from the International Mortality Data Base of the National Center for Health Statistics of the Centers for Disease Control (<http://www.cdc.gov/nchs/data/dvs/intmort95.pdf>). For the 1990–2008 period age-standardized mortality data were extracted from the World Health Organization Health for All Database (<http://data.euro.who.int/hfad/>). For succinctness we only present results for four characteristic causes of death for each period.

Data on political conditions were collected from European history monographs (Black, English, Helmreich, Helmreich, & McAdams, 2000; Daniels, 1996; Judt, 2005). Democracy vs. autocracy status after World War II was determined with data from the independent Polity IV project (<http://www.systemicpeace.org/polity/polity4.htm>), as summarized in the Quality of Government dataset (Teorell, Samanni, Holmberg, & Rothstein, 2011) (<http://www.qog.pol.gu.se/data/>). We used each country’s combined polity score or Polity2 index (ranging from +10 (strongly democratic) to –10 (strongly autocratic)) to classify countries into democratic (score >6) or autocratic (score ≤ 6). The Polity2 index is based on measurements of the competitiveness of political participation, the openness and competitiveness of executive recruitment, and constraints on the chief executive (Marshall, Jaggers, & Maryland, 2002), and has become the standard measure of democracy in the literature (Wigley & Akkoyunlu-Wigley, 2011).

A graphical exploration of life expectancy trends in different political conditions

Nordic countries and Britain and Ireland

Fig. 1 presents male life expectancy trends during the 20th century in all European countries with available data. Female life expectancy trends are similar but often somewhat less dramatic and are available upon request. Most countries in the North and West of Europe have long and uninterrupted democratic traditions, and many have had very high levels of life expectancy throughout the 20th century (Fig. 1a).

Finland, however, started the 20th century as part of the Russian empire with a life expectancy around 40 years. It became independent in 1917 and has since then gradually closed the gap in life expectancy with Sweden (Fig. 2a and b). Estonia provides a possible counterfactual of what could have happened to Finnish life expectancy if it had stayed within the Russian sphere of influence. Estonia became independent from Russia in 1918, but was re-occupied by the Soviet Union in 1940 and became independent again only in 1989. Fig. 2a and b shows that while life expectancy in Finland still equaled that in Estonia in the 1930s, the trends strongly diverged in the 1970s and 1980s, with Estonia staying behind at levels similar to those in other parts of the Soviet Union. It is only since independence that Estonian life expectancy trends started to break away from Russia's again (Jasilionis, Meslé, Shkolnikov, & Vallin, 2011).

Trends in life expectancy in Britain and Ireland were largely similar to those in the Nordic countries, but levels were consistently lower by a few years (Fig. 1b). Ireland became independent from the United Kingdom in 1921, and during the 1930s and

1940s its life expectancy gradually dropped below that of England and Wales, creating a gap that lasted until the 1950s for men (and even later for women, not shown in Fig. 1). Despite its being part of the same United Kingdom, Scotland has had a mortality disadvantage as compared to England and Wales throughout the 20th century.

Continental and Mediterranean countries

Most countries in the Continental group have equally long democratic traditions as the Nordic countries and the United Kingdom, but during the 1920s and 1930s Germany and Austria came temporarily under autocratic fascist rule. During these years, life expectancy rose steeply in all these countries, without a visible impact of the rise of fascism in Austria (Fig. 1c). German life expectancy data are patchy during this period, but were higher than those in Belgium and Austria, and lower than those in the Netherlands and Switzerland (Imhof, 1994). An analysis of year-by-year mortality data for Germany has found a rise in mortality rates during the early years of the Nazi regime, perhaps

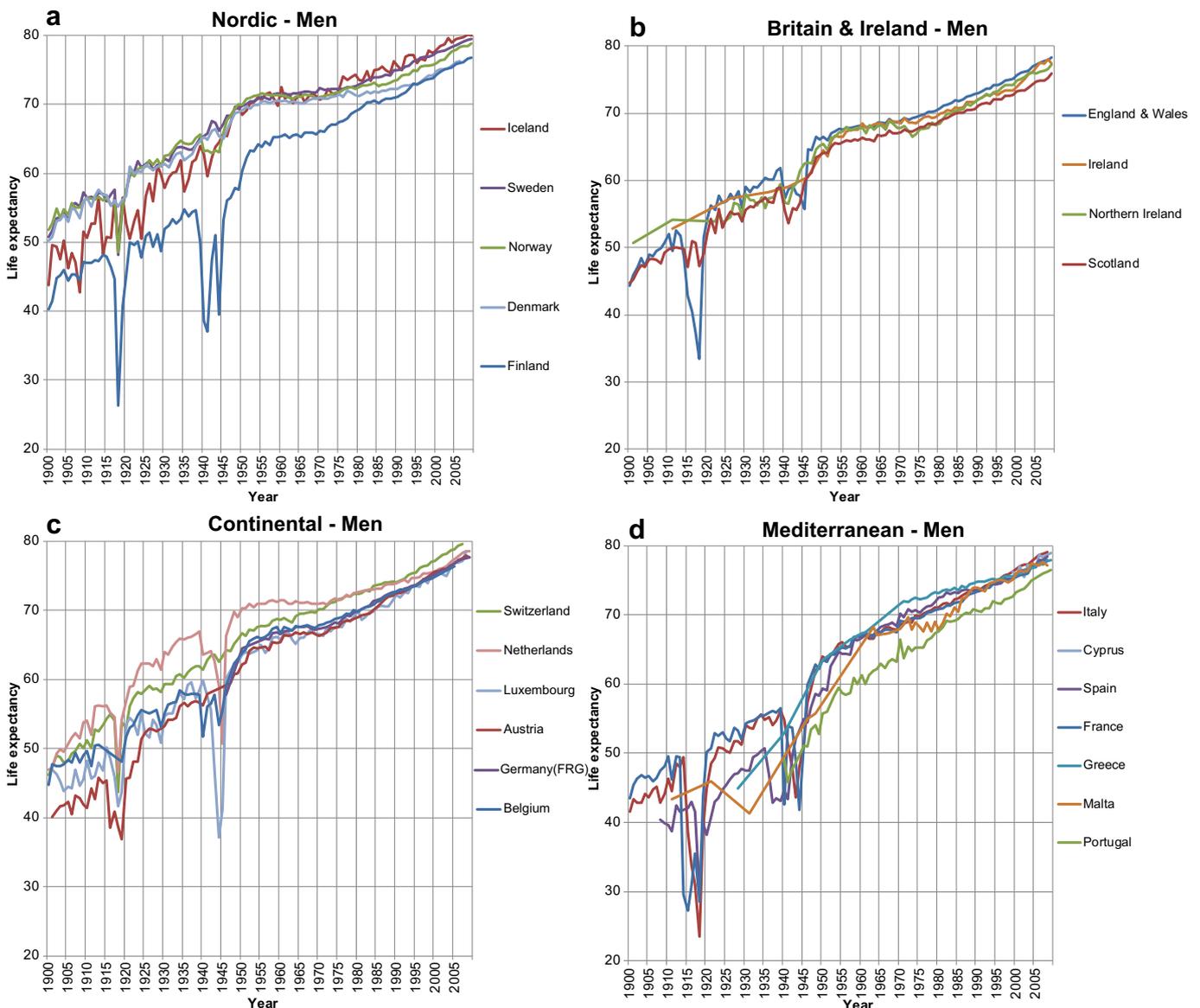


Fig. 1. Trends in life expectancy in Europe, men 1900–2008. a. Nordic countries. b. Britain and Ireland. c. Continental countries. d. Mediterranean countries. e. Western Balkans. f. Central and Eastern countries g. (former) Soviet Union. Sources: see text.

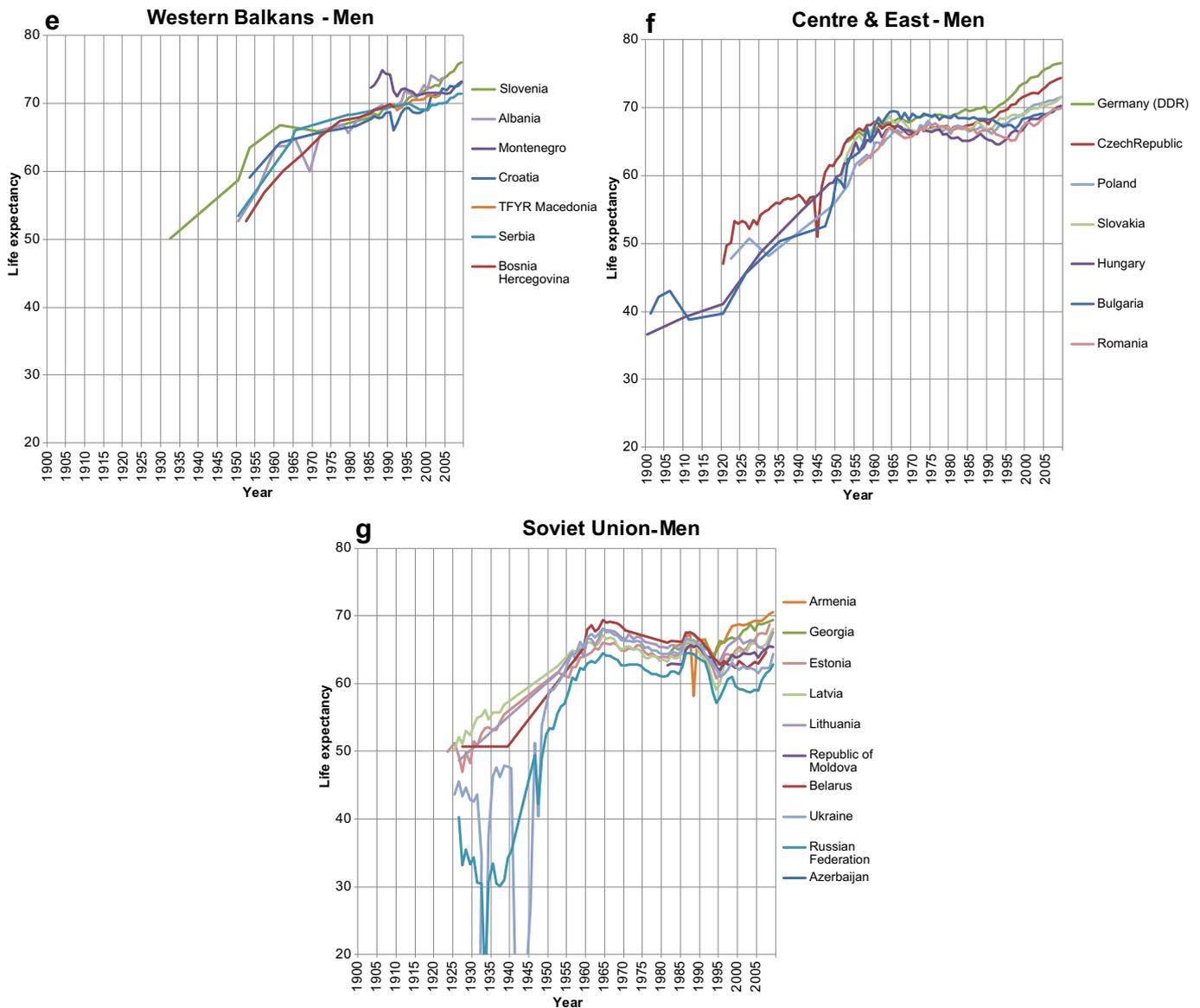


Fig. 1. (continued).

due to growing expenditures on rearmament at the expense of food imports and public health measures (Baten & Wagner, 2003).

The life expectancy of most of these countries lagged behind the record holding countries in the Nordic group during the whole of the 20th century, with two exceptions. The Netherlands did extremely well during the first half of the century, and actually was the record holding country in some single calendar-years up to the early 1960s (Oeppen & Vaupel, 2002), but later fell back to second rank, due to a much stronger stagnation of life expectancy among both men and women (Janssen, Mackenbach, & Kunst, 2004). The other exception is Switzerland: life expectancy in this country rose almost uninterrupted during the 20th century, and suffered much less stagnation than that in the Netherlands, to reach European record levels at the end of the century.

In the Mediterranean region too, several countries (Spain, Portugal, Italy) switched to autocratic rule during the 1920s and 1930s. In Italy, a fascist government led by Mussolini came in power in the early 1920s, but democracy was restored immediately after the Second World War. In Spain and Portugal, autocratic regimes came in power in the 1930s, and stayed on until the mid-1970s.

Greece has long had a malfunctioning democracy, and full democracy was only established after the end of the Colonel's regime in 1974. The development of life expectancy in the Mediterranean region is characterized by rapid growth around the middle of the century, the almost complete absence of stagnation during the 1950s, 1960s and 1970s, and a rise to very high life expectancies at the end of the century (Fig. 1d).

It is only in Spain that the authoritarian regime has left a visible imprint on the life expectancy record. Political struggle ended in a bloody Civil War (1936–1939) causing a temporary decline of life expectancy (Fig. 1d). In Italy, however, life expectancy improved almost continuously during the 1920s and 1930s. During the first half of the century, Spain, Portugal and Greece lagged considerably behind the other two countries in the Mediterranean group, but after the 1930s Greece and Spain started to catch up, with Portugal following considerably later. Malta went through a short period of life expectancy decline in the late 1970s, coinciding with a period of political upheaval and shortages of essential items ("Black Monday", as documented in [http://en.wikipedia.org/wiki/Black_Monday_\(Malta\)](http://en.wikipedia.org/wiki/Black_Monday_(Malta))).

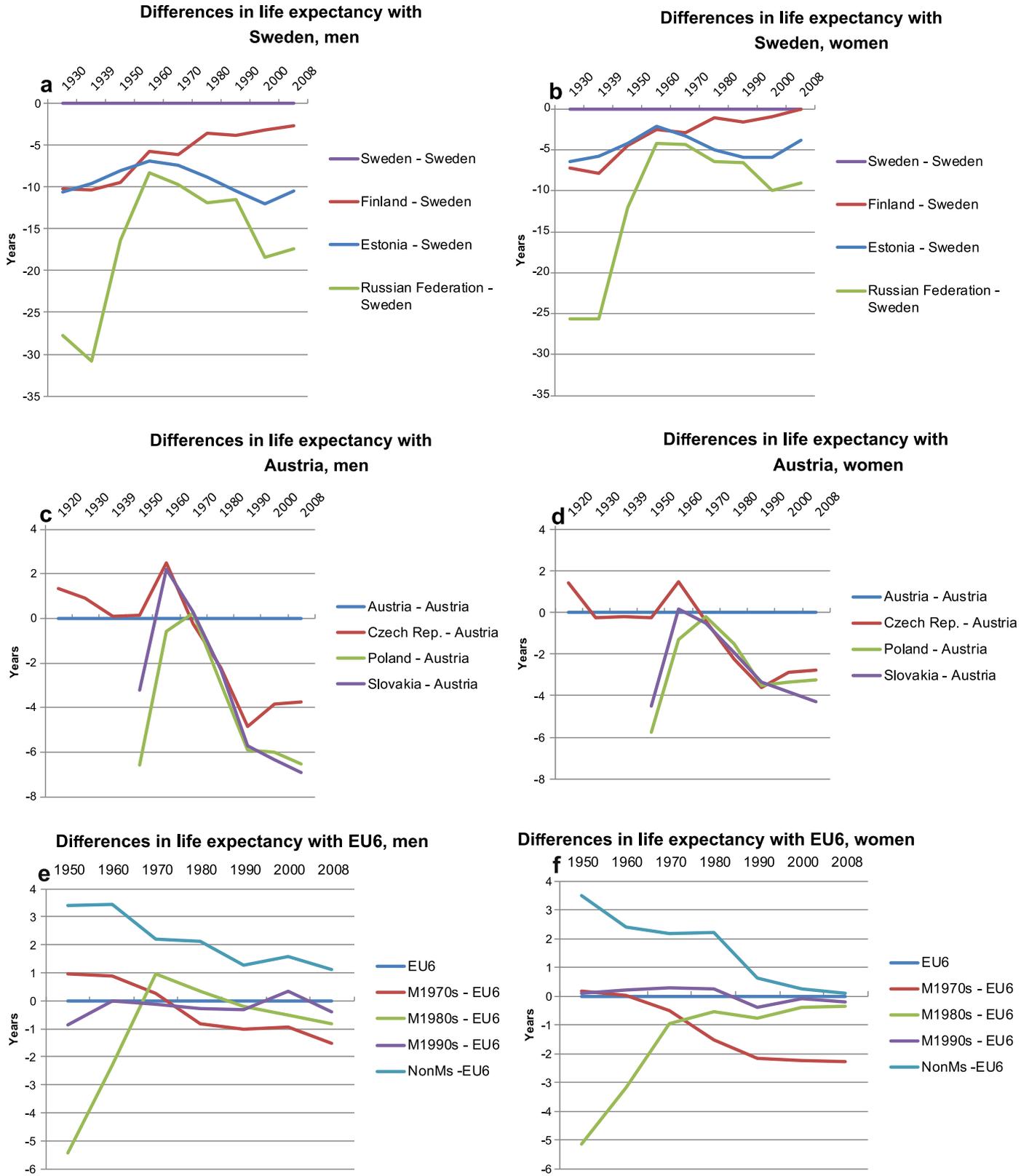


Fig. 2. Differences in life expectancy (in years) between European countries, men and women. a. Finland, Estonia and Russian Federation as compared to Sweden, men, 1930–2008. b. Finland, Estonia and Russian Federation as compared to Sweden, women, 1930–2008. c. Czech Republic, Slovakia and Poland as compared to Austria, men, 1920–2008. d. Czech Republic, Slovakia and Poland as compared to Austria, women, 1920–2008. e. Countries which joined the European Union at different points in time as compared to the original core of the EU, men, 1950–2008. Notes: EU6 = The 6 founding members of the European Union. M1970s = Current member states joining in the 1970s. M1980s = Current member states joining in the 1980s. M1990s = Current member states joining in the 1990s. NonMs = 3 Non-member states (Norway, Iceland and Switzerland). f. Countries which joined the European Union at different points in time as compared to the original core of the EU, women, 1950–2008. Notes: see Fig. 2e.

During the First and Second World Wars, mortality data collection was interrupted in many European countries, but several Continental and Mediterranean countries, despite being heavily afflicted by these wars, managed to keep their vital registration systems running allowing us to see the steep temporary declines in life expectancy during these wars (Fig. 1c and d). The mortality crisis of the First World War (1914–1918, followed without a clear separation in time by the pandemic of Spanish influenza in 1918–1919) caused temporary declines in male life expectancy sometimes exceeding 20 years (France, Italy). The impact of the Second World War on male life expectancy often exceeded 10 years, and in some cases even 20 years (Luxembourg).

These mortality crises and what caused them may also have had more long-lasting negative effects. Most of the record-holding countries for life expectancy during the 20th century stayed out of the First and/or Second World War. This applies to Sweden and Switzerland (which managed to stay neutral on both occasions, and even made money out of their intensified trade with Germany), and also to Norway (which stayed out of the First World War and was relatively mildly affected by the Second) and the Netherlands (which reached record levels of life expectancy in the decades after the First World War, during which it had stayed neutral) (Daniels, 1996). Perhaps it was the absence of destruction of human and physical capital that allowed these countries to derive maximal benefit from the opportunities for mortality reduction (through economic growth, better nutrition, public health programs, better health care, etc.) of those periods.

Western Balkans, Central and Eastern Europe, (former) Soviet Union

Further East the political history of Europe has been even more eventful. On the Western Balkans, Albania became independent from Turkey in 1912, and Yugoslavia was created in the aftermath of the First World War. Both went through a period of autocratic rule in the 1920s and 1930s, and emerged from the Second World War under autocratic communist rule (Table 1). After the collapse of communism, Albania became a malfunctioning democracy (although this has recently improved) and Yugoslavia went through several civil wars to finally break apart in six different countries, most of which now have reasonably functioning democracies.

Data on life expectancy are only available from 1950 onwards (Fig. 1e). They suggest a clear upward trend and a certain convergence of life expectancy within Yugoslavia until the end of the 1980s. After the break-up of Yugoslavia, life expectancy in the newly independent countries had a slightly erratic development, with a tendency toward divergence and with Slovenia emerging as the country with the most favorable life expectancy trends (Kunitz, 2004). Because of the circumstances of the civil war, with large flows of refugees across the borders of the newly formed states, there is uncertainty about the precise population numbers and, consequently, about death rates during the 1990s (Bozicevic et al., 2001). Nevertheless, a decline in life expectancy in Croatia during the war in 1991, particularly among men, seems certain (Fig. 1e). Data collection in Bosnia-Herzegovina, however, where the death toll of civil war (1992–1996) was many times higher than in Croatia (<http://necrometrics.com/index.htm>), was interrupted after 1991, so that the impact on life expectancy cannot be determined. Albania, which had always had high life expectancy relative to its level of economic development, continued to do fairly well with rising life expectancies among both men and women throughout the 1990s (Gjonca, Wilson, & Falkingham, 1997).

During the 1920s and 1930s, all countries in Central and Eastern Europe except Czechoslovakia went through a period of autocratic rule. After the Second World War all came under autocratic communist rule and in the Soviet sphere of influence, until the

Soviet Union collapsed in 1989. Since then, they have reasonably well functioning democracies, and all have joined the European Union. The development of life expectancy in Central and Eastern Europe is characterized, like that in the Mediterranean group, by low starting levels and late, but rapid growth during the 1940s, 1950s and 1960s (Fig. 1f). Around 1960 levels of life expectancy were similar to those in Western Europe, but after 1960 life expectancy in Central and Eastern Europe stagnated much more dramatically than in Western Europe, and even declined in several countries among men (Zatonski, 2008).

Fig. 2c and d shows what could have happened to life expectancy in the Czech Republic if it would not have come under autocratic communist rule. Austria and the Czech Republic had similar economic and cultural conditions in the 1920s and 1930s, and their life expectancy in that period was almost identical. After the Second World War, however, the Czech Republic was forced into the Soviet bloc, and from about 1970 their life expectancies started to diverge, with life expectancy in the Czech Republic becoming similar to the much lower life expectancy in Poland.

It was only after 1990 that life expectancy started to rise again, often after a temporary decline, particularly in Hungary, Romania and Bulgaria. In the former German Democratic Republic (GDR), the Czech Republic, Poland and Slovakia the rise started almost simultaneously in 1991 or 1992. In Hungary, Romania and Bulgaria the rise started a few years later (Dolea, Nolte, & McKee, 2002; Meslé, 2004). The former GDR, now merged with the former Federal Republic of Germany (FRG), emerged as the country with the steepest rise in life expectancy (Fig. 1f). The splitting up of Czechoslovakia into a Czech and a Slovak Republic in 1993 was followed by divergence of their life expectancies (Fig. 2c and d).

The development of life expectancy in the (former) Soviet Union followed the most dramatic trajectory of all European regions (Fig. 1f). Russia had the lowest life expectancy of all European countries at the start of the century, but caught up with an almost incredible speed during the 1930s and 1950s. After 1960, however, life expectancy declined among men, and stagnated among women, with a short-lived improvement in the late 1980s that was due to Gorbachev's anti-alcohol campaign (Leon et al., 1997). After the collapse of the Soviet Union in 1989, Russia's life expectancy trends were erratic, with two steep declines and some improvement in recent years (Shkolnikov, Meslé, & Vallin, 1996a, 1996b). The formation and dissolution of the Soviet Union has been accompanied by convergence and divergence of the life expectancies of its constituent parts. The Baltic republics (still independent at that time) did relatively well during the 1920s and 1930s, as did perhaps Armenia and Azerbaijan (already part of the Soviet Union), but around 1960 life expectancy varied only within a narrow range (Fig. 1f). After that, life expectancy trends went very much in parallel. It was only after the breaking up of the Soviet Union that life expectancies started to diverge.

Fig. 1f also shows the temporary but dramatic setbacks in life expectancy in the Soviet Union during the 20th century. The direct impact of the October revolution in Russia in 1917, and the Civil War (1917–1922) that followed, cannot be observed in the life expectancy record for Russia and its satellites, because mortality data were not routinely collected at the time. Fifteen years later the devastating effects of Stalin's forced collectivization of agriculture can be observed, thanks to the painstaking reconstruction of mortality data by a French team of demographers (Meslé et al., 1992; Vallin et al., 2002). Through severe food shortages and the deportation of farmers this led to unprecedented declines in life expectancy in both Russia and Ukraine, but particularly in the second where life expectancy fell to a record low of 7 years among men in 1933 (Vallin et al., 2002) (Fig. 1f). Other setbacks which can be seen in Fig. 1f are due to the Second World War (1939–1945),

another man-made famine in Ukraine (1948), an earthquake in Armenia (1988), and the governance and economic crisis following the dissolution of the Soviet Union (1990–1995), which was accompanied by mass privatization, large-scale business failure and huge unemployment (Stuckler, King, & McKee, 2009).

The impact of the formation of the European Union

The core of the European Union (EU) was formed in 1957 (with 6 countries entering the newly formed European Community for Coal and Steel). Successive waves of enlargement followed in the 1970s (Denmark and the United Kingdom), the 1980s (Spain, Portugal and Greece), the 1990s (Finland, Sweden and Austria) and the 2000s (Malta, Cyprus and a number of Central and Eastern European countries) (Table 1). While the latest enlargement is unlikely to have led to any convergence in life expectancy yet, one would expect the effect of the earlier enlargements on life expectancy, if any, to already have become apparent. Fig. 2e and f, however, shows no signs of life expectancy convergence following entry into the EU although some convergence may have occurred before entry (Beckfield, 2006; Happich & Lengerke, 2007).

Average life expectancy in the two countries which joined the EU in the 1970s, Denmark and the United Kingdom, gradually dropped below that in the original core of the EU, particularly among women. Average life expectancy in the three countries which joined in the 1980s, Spain, Portugal and Greece, had already converged before they joined, and did not converge further after that. Finland, Sweden and Austria, joining in the 1990s, were already very similar in life expectancy to the original core before they joined, and no further convergence occurred. By contrast, European countries which have not joined the European Union so far (Norway, Iceland and Switzerland) have had higher life expectancies than the original core throughout the period of study, but their life expectancies have gradually converged with that of the core of the EU (or vice versa), suggesting that whatever convergence has taken place has not necessarily been the result of EU integration (Fig. 2e and f).

A quantitative comparison of political conditions and life expectancy in four periods

Political conditions and life expectancy in the 1920s and 1930s

As described above, the 1920s and 1930s were a period of intense political struggle in Europe, dominated by the rise of both communist and non-communist autocratic regimes. Table 2 summarizes trends in life expectancy in countries with continuously democratic political regimes, and countries which went through a transition to an autocratic/noncommunist and an autocratic/communist regime.

Data for autocratic/communist regimes are not available for 1920 but show that these countries in 1939 had considerably lower life expectancies than the other two groups of countries. Countries which developed an autocratic/noncommunist regime had lower average life expectancies in 1939 than countries with democratic political regimes, but this was already the case in 1920, before the rise of autocracy. During the 1920s and 1930s the latter gap narrowed, because autocratically governed countries experienced a steeper rise in life expectancy (Table 2).

Because a lower starting level implies a greater growth potential, Table 2 also shows life expectancy data for four countries with similar levels of life expectancy in 1920: two continuously democratic countries (Finland and Czech Republic) and two countries which developed autocratic/noncommunist rule (Austria and Italy). All four countries experienced steep increases in life expectancy, although these were a little bit stronger in the two countries which developed an autocratic regime.

For a number of countries with democratic and autocratic/non-communist rule we were also able to analyze cause-specific mortality data (Table 3). These show that democratically governed countries had steeper declines in mortality from tuberculosis, diphtheria, typhoid/paratyphoid and pneumonia – infectious diseases which declined strongly in this period and contributed importantly to the rise of life expectancy. Nevertheless, autocratically governed countries also enjoyed strong relative declines in mortality from three of these four diseases. Although these relative declines were smaller than those in countries with continuously democratic regimes, absolute declines were larger in countries with autocratic/non-communist rule (not shown in Table 3), causing life expectancy to increase faster in these countries.

Political conditions and life expectancy in the 1940s and 1950s

Leaving aside the Second World War, the main political development during this period was the extension of autocratic communist government to the Baltic countries (following their incorporation in the Soviet Union), to Central and Eastern Europe, and to the Western Balkans. After the Second World War the countries under autocratic communist rule succeeded in improving life expectancy drastically. No other country has seen such a rapid growth of life expectancy as Russia did during the 1940s: 18 years of life expectancy gain in little more than a decade. Large gains in life expectancy were also seen in other Soviet republics, as well as in Central and Eastern European countries under Soviet influence (Fig. 1e and f).

In Western Europe, most countries retained or regained democratic rule, with the exceptions of Spain, Portugal and Greece. Despite their rather different political orientation, these autocratically governed countries saw equally large gains in life expectancy as the countries that had come under autocratic/communist rule (Table 2). The gain in life expectancy between 1939 and 1960 was almost twice as large in autocratically than in democratically governed countries, and as a result the advantage of democracies in life expectancy which still clearly existed in 1939, had become much smaller in 1960.

Developments in autocratically governed countries should, however, be interpreted as a form of catch-up growth: fascist and communist regimes got a foothold in countries with severe economic problems in the pre-war period, mostly on the periphery of Europe (Daniels, 1996), and these countries had a larger potential to benefit from advances in public health. This idea is confirmed when we compare countries with a similarly low level of life expectancy in 1939: two continuously democratic countries (France and Austria) and two countries which came under autocratic/communist rule (the Czech Republic and Latvia). All four countries experienced roughly equally steep increases in life expectancy (Table 2).

For this period, we also have data on cause-specific mortality (Table 3). Declines of mortality from infectious diseases continued at a rapid speed, now also because of the advent of modern antibiotics (Mackenbach & Looman, 1988; McKeown, 1976). Several other diseases joined the group of rapidly declining causes, including appendicitis and diseases of the newborn, which had both become amenable to medical intervention (results not shown). Mortality from heart disease, however, rose in democratically governed countries, contributing to the narrowing of the gap in life expectancy.

Political conditions and life expectancy in the 1960s, 1970s and 1980s

In Western Europe, the 1960s, 1970s and 1980s were a period of relative political stability and economic growth that allowed a rapid expansion of the welfare state. Around 1975, the autocratic regimes

Table 2
Life expectancy and life expectancy change in Europe, by political regime, 1920–2008.

	Countries	Men	Women	Countries	Men	Women	Countries	Men	Women
	1920			1920–1939			1939		
<i>Life expectancy (years and rise in years)</i>									
Democratic	15	52.4	55.3	14	7.9	8.7	15	60.8	64.4
Autocratic/Noncommunist	6	42.9	44.4	4	10.2	12.6	8	53.1	57.5
Autocratic/Communist	0	n.a.	n.a.	0	n.a.	n.a.	5	48.9	53.7
<i>Life expectancy (years and rise in years)</i>									
Finland (Dem.)	1	45.2	49.9	1	9.5	9.9	1	54.7	59.8
Czech Rep. (Dem.)	1	47.1	49.6	1	9.7	11.0	1	56.7	60.6
Austria (Aut./Nonc.)	1	45.7	45.7	1	10.9	10.9	1	56.6	56.6
Italy (Aut./Nonc.)	1	44.9	46.0	1	11.2	13.0	1	56.2	59.0
	1939			1939–1960			1960		
<i>Life expectancy (years and rise in years)</i>									
Democratic	15	60.8	64.4	16	8.2	9.6	17	68.2	73.3
Autocratic/Noncommunist	8	53.1	57.5	3	16.7	15.9	3	65.1	69.7
Autocratic/Communist	9	48.9	53.7	7	15.0	17.0	19	65.0	70.2
<i>Life expectancy (years and rise in years)</i>									
France (Democr.)	1	56.5	62.6	1	10.5	11.0	1	67.0	73.6
Austria (Democr.)	1	56.6	56.6	1	8.8	15.3	1	65.4	71.9
Czech Republic (Aut/Comm)	1	56.7	60.6	1	11.2	12.9	1	67.9	73.4
Latvia (Aut/Comm)	1	56.9	62.7	1	9.2	10.6	1	66.0	73.3
	1960			1960–90			1990		
<i>Life expectancy (years and rise in years)</i>									
Democratic	19	68.2	73.1	19	4.9	9.6	19	73.1	79.3
Autocratic/Noncommunist	3	65.1	69.7	3	7.9	9.6	3	72.9	79.3
Autocratic/Communist	19	65.0	70.2	19	2.0	4.4	22	67.3	74.7
<i>Life expectancy (years and rise in years)</i>									
Italy (Democr.)	1	66.7	71.7	1	7.1	8.8	1	73.8	80.5
Spain (Aut/Noncomm.)	1	66.7	71.7	1	6.8	8.9	1	73.4	80.6
Germany (FRG)(Democr.)	1	66.5	71.9	1	6.1	7.1	1	72.6	79.0
Germany (DDR)(Aut/Comm)	1	66.5	71.3	1	2.8	5.0	1	69.2	76.3
	1990			1990–2008			2008		
<i>Life expectancy (years and rise in years)</i>									
Democratic	22	73.1	79.3	21	4.8	3.6	22	77.9	82.9
Democr/Formcomm	12	66.7	74.9	11	3.5	3.6	11	69.9	78.5
Autocr/Formcomm	9	67.8	75.4	7	0.5	1.5	9	68.5	76.7
<i>Life expectancy (years and rise in years)</i>									
Slovenia (Dem/Formcomm)	1	69.9	77.9	1	5.9	4.8	1	75.7	82.7
Croatia (Aut/Formcomm)	1	68.7	76.4	1	3.8	3.4	1	72.5	79.7
Rep. Moldova (Dem/Formcomm)	1	65.1	72.0	1	0.5	1.3	1	65.5	73.3
Belarus (Aut/Formcomm)	1	66.3	75.8	1	–1.7	0.4	1	64.6	76.3

Sources: see text. Figures presented for groups of countries are arithmetic averages of country-specific figures.

Table 3
Change in cause-specific mortality in Europe, by political regime, 1920–2008.

	Countries	Men	Women	Countries	Men	Women	Countries	Men	Women	Countries	Men	Women
	Tuberculosis			Diphtheria			Typhoid/paratyphoid			Pneumonia		
<i>1920–1939</i>												
<i>Change in cause-specific mortality (%)</i>												
Democratic	12	–40	–49	11	–38	–34	10	–69	–70	9	–15	–16
Autocratic/Noncommunist	5	–27	–36	5	–21	–18	4	–30	–44	5	22	19
Autocratic/Communist	0	n.a.	n.a.	0	n.a.	n.a.	0	n.a.	n.a.	0	n.a.	n.a.
	Tuberculosis			Diphtheria			Pneumonia			Heart disease		
<i>1939–1960</i>												
<i>Change in cause-specific mortality (%)</i>												
Democratic	12	–88	–94	12	–98	–99	9	–68	–61	12	51	8
Autocratic/Noncommunist	3	–80	–90	3	–86	–85	3	–70	–71	3	–11	–25
Autocratic/Communist	3	–83	–91	3	–98	–98	3	–81	–80	3	–13	–28
	Lung cancer			Ischemic heart disease			Liver cirrhosis			Motor vehicle accidents		
<i>1960–90</i>												
<i>Change in cause-specific mortality (%)</i>												
Democratic	13	26	10	13	–77	–86	13	1	0	13	–11	–1
Autocratic/Noncommunist	3	37	2	3	–4	–41	3	–2	–3	3	23	7
Autocratic/Communist	6	49	6	6	92	8	6	27	8	6	21	6
	Breast cancer			Ischemic heart disease			Cerebrovascular disease			Motor vehicle accidents		
<i>1990–2008</i>												
<i>Change in cause-specific mortality (%)</i>												
Democratic	18	n.a.	–25	18	–48	–46	18	–52	–51	18	–54	–63
Democr/Formcomm	12	n.a.	–1	12	–16	–7	12	–27	–32	12	–57	–55
Autocr/Formcomm	6	n.a.	5	5	3	–6	6	–3	–8	0	n.a.	n.a.

Sources: see text. Figures presented for groups of countries are arithmetic averages of country-specific figures.

of Spain, Portugal and Greece finally gave way to liberal democracy. In Eastern Europe, on the other hand, after several failed attempts at liberalization (Poland and Hungary (1956), Czechoslovakia (1968)) this was a period of increasing stagnation characterized by political repression, stalling economic growth and an emphasis on consumer satisfaction (Judt, 2005). During this period, life expectancy started to diverge again between Western and Eastern Europe (Fig. 1).

Table 3 summarizes life expectancy and life expectancy change in democratic, autocratic/non-communist and autocratic/communist countries in this period. In 1990, the three (then previously) autocratic/non-communist countries had caught up completely with the democratically governed countries, thanks to a much stronger increase in life expectancy over this 30 year period. The autocratic/communist countries, however, saw their average life expectancy increase by a modest amount only, so that by 1990 the gap with democratically governed countries had risen again. While life expectancy and life expectancy growth were very similar between Italy (continuously democratic) and Spain (autocratic during part of this period), the difference between West and East Germany is striking: despite an identical starting point in 1960, both had grown apart in 1990 (Table 2).

This divergence in life expectancy between democratic Western Europe and autocratic/communist Central and Eastern Europe is partly due to much greater success of the former in reducing mortality from ischemic heart disease and motor vehicle accidents and preventing a rise in mortality from liver cirrhosis (Table 3). This has been ascribed to progress in prevention and treatment of cardiovascular disease, improved road traffic safety, and other advances in health policy (Mackenbach and McKee (2013)). Stagnation of life expectancy in Central and Eastern Europe and the Soviet Union during the 1970s and 1980s has been ascribed to the failure of communism to deliver adequate health promotion (Zatonski, 2008). As in Western Europe, prosperity brought diseases of affluence to the East, but unlike in the West, the communist states were unable or unwilling to control tobacco and alcohol consumption, to change dietary behaviors, and to implement new treatments for cardiovascular disease and its risk factors (Zatonski, 2008).

Political conditions and life expectancy in the 1990s and 2000s

Around 1990, the Soviet Union collapsed, and autocratic communist government in the Western Balkans, Central and Eastern Europe and the former Soviet Union itself was replaced by various degrees of democratic government. At the same time, planned economies were replaced by market economies, and painful economic adaptations were undertaken. As a result of these disruptive changes, life expectancy went down in many countries. But some countries emerged quickly from this painful phase with a renewed increase of life expectancy. This mainly applies to the Baltic countries and countries in Central and Eastern Europe, which have linked up with Western Europe (and become members of NATO and the EU) (Fig. 1).

Table 2 shows that during this period, former communist countries which developed reasonably functioning democracies had much stronger life expectancy growth than those which remained under autocratic (now non-communist) rule. This was independent of starting positions, as shown by the comparison of Slovenia with Croatia, and of Moldova with Belarus. Slovenia, which immediately upon independence in 1990 had a fully functional democracy, had a stronger rise in life expectancy than Croatia, which started independence with autocratic rule. More democratic Moldova, which still had lower life expectancy in 1990 than more autocratic Belarus, had higher life expectancy in 2008. In 2008, differences between the three regimes were

substantial: long-standing democracies had substantially higher life expectancy than former communist countries that had developed into democracies, which had higher life expectancy than former communist countries which remained under autocratic rule. It is, however, important to note that the transition to democracy often coincided with temporary declines in life expectancy that cannot be seen in Table 2 (but can be seen in Fig. 1f and g).

Table 3 shows that these differences in life expectancy change were partly due to different trends in mortality from conditions which had become amenable to intervention. Breast cancer, ischemic heart disease and cerebrovascular disease mortality declined stronger in democratic/former communist countries than in autocratic/former communist countries. Democratic/former communist countries also had remarkably strong declines in mortality from motor vehicle accidents. After a temporary rise in motor vehicle accident mortality in the early 1990s many of these countries achieved strong reductions following implementation of European Union road safety recommendations (European Traffic Safety Council, 2011). Unfortunately, data on motor vehicle traffic accident mortality are unavailable for autocratic/former communist countries.

Discussion and conclusions

Summary of main findings

Based on a unique dataset covering a very long historical period we were able to systematically explore the relation between major political conditions and life expectancy in Europe during the 20th and early 21st century. Our results show that the political history of Europe has left deep traces in the life expectancy records of its nations. Some of these effects were temporary (such as the major interruptions caused by war, oppression and man-induced famine), some were more permanent (such as the persistent albeit decreasing disadvantage in life expectancy of Central and Eastern Europe and the Western Balkans).

Formation and dissolution of states often went together with convergence and divergence of life expectancy, and the contrasting life expectancy histories of Finland and Estonia, and Austria and the Czech Republic suggest a profound and long-lasting impact of Western vs. Soviet bloc affiliation on population health. On the other hand, European Union membership does not appear to have had a converging effect on life expectancy.

Life expectancy was higher in democratically governed states than in authoritarian states throughout the 20th century. This gap narrowed between 1920 and 1960 due to catching up of infectious disease control in non-communist and communist authoritarian states, and due to an earlier rise of heart disease in democratically governed states. Authoritarian regimes also made great costs in human lives in this period, during wars, civil wars, oppression and man-made famines. The gap widened again after 1960 due to more rapid progress in democratic states against cardiovascular disease, breast cancer, motor vehicle accidents and other causes of death that have become amenable to intervention. The transition to democracy in former communist countries often went together with temporary declines in life expectancy, but countries which developed reasonably functioning democracies had much stronger life expectancy growth than those which remained under autocratic (now non-communist) rule.

Limitations

Although we have brought together all European life expectancy data with documented validity, some uncertainties about the

validity of the data remain. These uncertainties are mainly restricted to the data for the Western Balkans and some Soviet Republics (Belarus, Moldova) between the Second World War and the break-up of Yugoslavia and the Soviet Union, for which we had to use data as compiled by the United Nations on the basis of national reports of uncertain validity (<http://unstats.un.org/unsd/demographic/products/dyb/DYBHist/HistTab09a.pdf>). However, all our substantive conclusions are based on countries or aggregates of countries whose data are likely to be robust.

A more important limitation relates to the gaps in available data. Long-standing democracies have more complete data than countries which developed democratic rule more recently, and this may have biased some of our comparisons. For example, data on life expectancy and cause-specific mortality were incomplete for the 1920s and 1930s, particularly for Central and Eastern Europe, the Western Balkans, and the Soviet Union, and our conclusions are based on a subgroup of countries which are not necessarily representative of all countries in this region.

As stated in the introduction, our study has a descriptive character and does not pretend to establish causality. The differences in life expectancy and life expectancy growth coinciding with the formation and dissolution of larger political units, and seen between different political regimes, do not necessarily represent causal effects of these conditions. The groupings that we used, e.g. lumping together all non-communist autocratic regimes (Nazi or otherwise) under one label, are quite crude. Also, even more than other social contexts, political conditions are “endogenous”, in the sense that they are the result of human agency and may reflect cultural, economic and other conditions that also affect life expectancy through other mechanisms.

For example, historical statistics show that countries which developed autocratic political regimes during the 1920s and 1930s had a lower national income in 1920 than countries which were continuously democratic, and this may have contributed to their greater growth potential. The same applies to countries which developed autocratic political regimes during the 1940s: they had lower national incomes in 1939 than countries which were continuously democratic (Maddison, 2001). This is one of the reasons why we presented stratified analyses in Table 3, and these show that countries with similar life expectancies in 1920 and 1939, had similar life expectancy growth in 1920–1939 and 1939–1960, respectively, regardless of their political regime. For later periods, after stratification by starting level of life expectancy countries with democratic political regimes had stronger life expectancy growth than countries with autocratic communist government, but not than countries with autocratic non-communist government (Table 2). One should also be aware of the fact that national income can be a mediator of the politics – life expectancy relation, because politics may create better or worse conditions for economic activity (Melzyg, Pleva, & Sprout, 2005).

Cultural conditions provide another alternative explanation. Analyses of World Values Survey data show that economic modernization tends to be followed by cultural change, in the sense that with increasing economic security “traditional values” are replaced by “secular-rational values”, and “survival values” by “self-expression values” (Inglehart, 1997). These changes in value systems often precede and are associated with democratization, suggesting that they create a demand for democracy (Inglehart & Welzel, 2005). If modern values would also promote health conscious behavior, or create a greater demand for preventive and curative health services, this could potentially explain the higher life expectancy in democratically governed countries. This and other alternative explanations should be taken into account in further in-depth studies trying to identify

the specific determinants underlying the patterns we have identified in this study.

Interpretation

Our results strongly suggest that political conditions have influenced life expectancy growth in Europe. National units that merge into one state, as in the case of the Soviet Union around the middle of the 20th century, and in the case of Germany after 1990, see their life expectancies converge. Similarly, dissolution of states is followed by divergence of life expectancy of newly independent units, as illustrated by the cases of Finland, Germany, Czechoslovakia, Yugoslavia and the Soviet Union at various points in the 20th century.

The best documented of these cases is the rapid convergence of life expectancy between West and East Germany after re-unification in 1990, which has been ascribed to an increase in access to effective health care as well as to other factors (Nolte et al., 2000a, 2000b). Divergent trends in life expectancy in the former Soviet Union have also been relatively well studied, and have been ascribed to varying approaches to economic transition, to health care factors, and to alcohol control policies (Andreev, Nolte, Shkolnikov, Varavikova, & McKee, 2003; Leon, Shkolnikov, & McKee, 2009; Stuckler et al., 2009). The other cases of state formation and dissolution have been less well researched, and further study may provide important clues about the specific conditions which have caused divergence and convergence of life expectancy.

We did not see clear signs of convergence of life expectancy after entry into the European Union (despite the fact that economic indicators have converged between countries (Beckfield, 2006)). In view of the fact that the European Union has never had the political, economic and cultural integration of the United States this should perhaps not surprise us. The convergence between current member states mostly preceded entry, which could perhaps be interpreted as indicating that preparing for membership was the more important factor. The convergence with non-member states could either indicate that European integration does not affect life expectancy, or that the benefits of the European Union extend to its immediate neighbors, for example through trade treaties, adoption of the same regulations (e.g. for vehicle safety or air pollution control), or participation in European programs.

Our results have also shown great differences in life expectancy trends between democratically and autocratically governed countries, particularly after 1960 when democratically governed countries are compared with countries that were under autocratic communist or former communist rule. Democracy has been found to be associated with life expectancy in previous studies (Klomp & de Haan, 2009; Muntaner et al., 2011), including studies which have controlled for potential confounders. This association may therefore represent a causal effect, although no studies have accounted for the fact that some of the progress in European democracies may have come at the expense of the exploitation of less democratically governed colonies. As mentioned above, communist governments were less able to or willing to implement modern forms of health promotion, perhaps because they were not held accountable for the devastating health consequences of the consumption patterns which they subsidized, or because they were insufficiently credible as sources of health information (Zatonski, 2008).

On the other hand, the remarkable progress of countries that came under fascist and communist rule in the 1920s, 1930s and 1940s shows that autocratic governments were able to successfully implement advances in infectious disease control that had already been available for some time in democratically governed countries (Tapia Granados, 2010). Perhaps these contrasting experiences show that autocratic governments are equally or more effective in reducing mortality from conditions which can be controlled

technically through the deployment of the state apparatus (e.g. infectious diseases). Vice versa, democratically elected governments may be more effective in reducing mortality from conditions which can only be controlled with the active participation of the citizens (e.g. cardiovascular disease) (Vallin & Meslé, 2004).

However, the effective deployment of the state apparatus also allowed some of these authoritarian regimes to kill their citizens on a large scale during civil war, political oppression and man-made famines as we have noted above for Spain and the Soviet Union. Germany's fascist regime started World War II and almost exterminated the European Jews. Table 4 lists the death toll of episodes of war and oppression in Europe during the 20th century, ranked by the estimated total number of deaths. According to these estimates, World War II (including the Holocaust) was, by far, the most severe European mortality crisis of the 20th century, because it was a war that affected the whole of Europe and (contrary to World War I) affected civilians as well as military personnel. The death toll of Stalin's regime came second, followed by that of World War I. A detailed analysis of all these conflicts is beyond the scope of this paper, but it is easy to see that they all represent, in one way or other, a failure of politics.

The explanations suggested in this paper all point to the need for further study, and to the opportunities that European history offers for investigating the political determinants of population health. Detailed case-studies of contrasting pairs of countries (as illustrated in this paper by Finland and Estonia, Austria and the Czech Republic, Belarus and Moldova, ...) may shed light on the institutions, decisions, processes and policies that directly or indirectly generated such large differences in life expectancy. Comparative studies of larger numbers of countries using quantitative data may also be feasible. These could provide evidence

on the role of democratic institutions, government effectiveness, party-political composition of government, and other specific political determinants in fostering life expectancy growth. The sudden rise in life expectancy in Central and Eastern Europe in the 1990s, coinciding with rapid democratization and other political changes, seems a particularly interesting topic for further explanatory studies.

Conclusions

The history of life expectancy in Europe provides a powerful illustration of the importance of political conditions for population health. If, as Virchow said, "politics is nothing but medicine at a larger scale" (Mackenbach, 2009), it continues to face great challenges in the 21st century, including the closure of the gap in life expectancy between European countries. While this should encourage public health practitioners to visit the political arena to help improve population health, they should not forget that it is equally important to prevent such major setbacks in population health as have occurred during the 20th century as a result of war and political oppression.

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Table 4

Estimated number of deaths due to war and oppression during the 20th century in Europe.

Event	Number of deaths
World War II (incl. genocide of Jews)	47,000,000
Soviet Union, Stalin's regime (1924–1953)	20,000,000
World War I (incl. Armenian genocide)	15,000,000
Russian Civil War (1917–1922)	9,000,000
German expulsion from Eastern Europe (1945–47)	2,100,000
Greco-Turkish War (1919–1922)	400,000
Spanish Civil War (1936–39)	365,000
Yugoslavia, Tito's regime (1944–80)	200,000
Bosnia-Herzegovina, Civil war (1992–95)	175,000
Greek Civil War (1943–49)	158,000
Russo-Finnish War (1939–40)	150,000
Romania, Communist regime (1948–89)	150,000
Balkan Wars (1912–13)	140,000
Franco regime (1939–75)	100,000
Russo-Polish War (1918–20)	100,000
East Germany, Communist regime (1949–89)	100,000
Russia, Romanov regime (1900–18)	95,000
Russia, War in Chechnya (1994–...)	80,000
Finnish Civil war (1918)	30,000
Bulgaria, Communist regime (1948–89)	30,000
Poland, Communist regime (1948–89)	30,000
Italo-Turkish war (1911–1912)	20,000
Azerbaijan, Nagorno-Karabach war (1991–1995)	20,000
Kosovo, ethnic cleansing and NATO war (1998–1999)	15,000
Romania, Peasant revolt (1907)	10,000
Hungary, war and civil war (1919–1920)	10,000
Czechoslovakia, communist regime (1948–1991)	10,000
Hungarian uprising (1956)	10,000
Croatia, War of independence (1991–1992)	10,000
Albania, political executions (1945–1991)	5000
Georgia, Abkhazia and Ossetia wars (1992–1995)	5000

Source: Matthew White, Historical Atlas of the Twentieth Century (<http://necrometrics.com/index.htm>). Figure for World War II from Daniels (1996).

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