Outlook

Population health has improved enormously over the last centuries, and substantial further gains are certainly possible. Some further increases in life expectancy are even likely, whether we want them or not, as a result of on-going advances in the treatment of currently fatal conditions like cancer. If we do our best, we can undoubtedly also make progress against non-fatal diseases which cause a lot of illness and disability, particularly among elderly people. In addition to diabetes mellitus, depression and dementia, dealt with in this book, this includes musculoskeletal diseases and sensory disorders for which we have unfortunately found no space. This short final chapter, however, will not focus on the possibilities of further progress, but on the more fundamental question whether what has been achieved so far is sustainable in the longer run. This will also force us to have a closer look at some of the darker sides of progress.

Feathers of Icarus

“Feathers of Icarus,” the title of this section, refers to a small book I wrote many years ago, in which I compared the rise of Dutch life expectancy to the flight of Icarus, and then asked how sustainable this rise is. A Greek myth tells us the story of Daedalus, who used wax to attach feathers to his own body and that of his son Icarus, in order to escape from his enemies. He warned his son not to fly too high, because the sun would melt the wax, but Icarus did not pay heed. He flew too high, his wings fell off, and he crashed into the part of the Mediterranean Sea that would later be named after him. We, Europeans, are flying high with our average life expectancies, often exceeding 80 years. To what extent are the conditions which have allowed us to live so long, and to live in such good health, sustainable?¹

In this book I have argued that human health depends on whether we have ‘favourable exchanges with the natural environment’, and that effective ‘human agency’ against disease and premature death is dependent on economic,

1 For a summary, see, e.g., www.britannica.com/topic/Daedalus-Greek-mythology. The book I refer to analysed the epidemiologic transition in the Netherlands: Johan P. Mackenbach, *De Veren van Icarus* (Utrecht: Bunge, 1992).

political and sociocultural conditions. This suggests that, in the future, at least three factors may threaten the sustainability of today's high levels of population health: geopolitical instability, increasing inequality, and global environmental change. Closer scrutiny of these factors reveals that – without knowing it – Europe may have passed a tipping-point ushering in a new era with less rosy prospects for population health.²

Geopolitical Instability

Europe's early rise, both in terms of prosperity and population health, was partly based on its favourable geography. We may now, in the age of the internet, no longer be as strongly hindered by distance as our ancestors, but geography may well become important again in a different way. Europe is no longer the centre of the world, which is now dominated by two superpowers, the United States and China, and a few mighty competitors including Russia. With military, financial and technological support from the US, the Western part of the subcontinent built its post-World War II miracle. A prosperous peace provided the background to high and increasing levels of human welfare. The Eastern part of the subcontinent at first benefitted from the support of the Soviet Union but then fell back, and has only recently joined the world of liberal democracy, capitalism and modern health care, struggling in the transition.

The geopolitical situation in which Europe finds itself today does no longer look particularly stable. Even war is not completely unthinkable anymore. As the memories of World War II have begun to fade, the threshold to war may become lower again, and recent small-scale conventional wars between Russia and its neighbours (e.g., with Ukraine and Georgia) indeed illustrate that war is a real possibility. The inner core of the European Union probably has become too well integrated for war between its members ever to break out again, but the short period of intra-European *détente* after the collapse of the Soviet Union has reversed into renewed hostility which may over time develop into something more serious. If this happens it will hamper further progress in

2 The idea of such a “tipping-point” has been developed in Bayly, *Remaking the Modern World*, Chapter 9. It refers to a combination of economic, political and sociocultural changes occurring between the late 1970s and early 1990s, radically altering the relative stability after World War II which provided the background to the rapid improvement of living conditions (and population health). Slowing down of life expectancy increases since 2010 in some European countries (e.g., the United Kingdom) suggests that stability of the economic and social forces that facilitated these increases is not a given; see David A. Leon, Dmitry A. Jdanov, and Vladimir M. Shkolnikov, “Trends in Life Expectancy and Age-Specific Mortality in England and Wales, 1970–2016,” *Lancet Public Health* 4, no. 11 (2019): e575–e82.

population health, or even cause outright deterioration, for example in the vulnerable Baltic states.

Another and more immediately important aspect of Europe's geographical position is, that its nearest neighbours to the South and South-east are the politically and economically unstable countries in North Africa and the Middle East. The involvement of European countries in the US-led war in Iraq has brought Islamic terrorism to Madrid, Paris, London and other European cities. The devastating war in Syria has sent millions of refugees into neighbouring countries and, through Turkey and North Africa, into a not-too-welcoming European Union. Lack of employment opportunities in countries with high fertility has created large migration streams from Africa and Asia into Europe, which has much lower fertility and – as a result – shrinking population numbers. All this has contributed to the rise of nationalist-populist political parties in many European countries, which reject many of the premises on which post-World War II national and international politics were built.

Finally, what to think of the rise of China? China is extending its influence around the world, not only to find markets for its increasingly sophisticated products, but also to get access to the mineral and agricultural resources that it needs for its economic growth and for the nutritional demands of its immense population. While China's moves have been peaceful so far, and may continue to be based on wielding 'soft power', in the long run there could well be negative effects on Europe's welfare. In a future world of 11 billion people, competition for minerals, food and other resources will be fierce. The uncertainty inherent in the rise of a new world power, together with the other two geopolitical uncertainties, warn against the assumption that – in a few decades from now – we will still live in a world in which we can quietly devote ourselves to improving population health.³

Increasing Inequality

High levels of average population health can only be attained, if health inequalities within populations are kept small. People with a higher income or level of education always manage to have good health, even if the conditions in their country are not conducive to health. They do so, e.g., by copying the behaviour of their likes in better-off countries, or by buying private health care if the publicly funded system does not offer what they want. As a consequence,

3 On geopolitical risks in Europe's future, see, e.g., Bruno Maçães, *The Dawn of Eurasia* (London: Allen Lane, 2018).

differences between countries in average population health are mainly determined by what happens to people with a lower income or level of education.⁴

Historically, the rise of the European welfare state has therefore been crucial for improvements in population health. The welfare state has created collective arrangements for financing public health and health care services, often subsidised or directly paid from taxes, which have ensured reasonably equal access regardless of individual financial means. The welfare state has also redistributed money from the rich to the poor, by social security arrangements and progressive taxation, which has helped to keep the prevalence of poverty low so that people at the bottom of the social hierarchy could at least partly share in the post-World War II improvements in living conditions.⁵

Since the 1970s, however, the welfare state has come under attack, initially because of the perceived necessity of reducing public expenditure and improving economic competitiveness, and later also because of the rise of neoliberalism with its preference for *laissez-faire* economics and free markets. Since the 1980s, many North-western European countries have reduced the scope of their welfare arrangements, sometimes substantially.

Also, income inequality has been rising again, partly as a result of globalization, partly as a result of the neoliberal distaste for income redistribution. The tendency for economic inequality to rise is inherent in market economies – a system of economic production that has been hugely successful in raising over-all living standards – and is another example of the flipside of progress. Inequalities in wealth are now startlingly high again all over Europe – as high as in the years immediately preceding World War I.

Even hard-core economists who believe in the societal benefits of some degree of economic inequality, regard this recent widening as dangerous. Too large inequalities may have major negative side-effects, such as reduced social mobility, higher rates of crime, and political instability, and may ultimately threaten the functioning of democracy. They may also and more directly threaten population health, when the increased social distance between groups in society erodes the solidarity underpinning the welfare state. More simply, when new medical treatments become increasingly unaffordable for publicly financed health care systems, we may reach a point at which only the rich can pay for them.⁶

4 See Mackenbach et al., "Socioeconomic Inequalities" for an empirical illustration.

5 Huber and Stephens, *Development and Crisis*; Kees van Kersbergen and Barbara Vis, *Comparative Welfare State Politics* (Cambridge etc.: Cambridge University Press, 2014).

6 On the rise of economic inequality, see Thomas Piketty, *Capital in the Twenty-First Century* (Cambridge (Mass): Harvard University Press, 2014); Branko Milanovic, *Global Inequality*

Global Environmental Change

Advances in population health have, unfortunately, gone hand-in-hand with degradation of the natural environment. As the Lancet Commission on Planetary Health wrote a few years ago,

Far-reaching changes to the structure and function of the Earth's natural systems represent a growing threat to human health. And yet, global health has mainly improved as these changes have gathered pace. What is the explanation? As a Commission, we are deeply concerned that the explanation is straightforward and sobering: we have been mortgaging the health of future generations to realise economic and development gains in the present. By unsustainably exploiting nature's resources, human civilisation has flourished but now risks substantial health effects from the degradation of nature's life support.⁷

One example may suffice: the agricultural and industrial revolutions which unleashed modern economic growth, would have been impossible without the use of fossil fuels. Burning fossil fuels, in steam-machines and all the other technologies that followed, was necessary for tilling the fields, transporting food around the world, producing goods, building and warming houses, conducting public health programs, exchanging scientific information, and everything else that was necessary for population health improvement. The release into the atmosphere of massive amounts of carbon dioxide and other greenhouse gases is now creating world-wide climate change that threatens population health in geographical zones sensitive to, for example, flooding, drought or vector-borne diseases.

Climate change is just one of the environmental changes that are going on globally, and that risk to undermine human population health. Other dangerous changes include ocean acidification (due to absorption of atmospheric carbon dioxide, threatening marine life), freshwater depletion (due to extraction of groundwater, leading to shortages of water for human consumption and agriculture), land degradation (due to erosion and overexploitation, threatening food security), and biodiversity loss (due to habitat destruction, climate change and other factors, threatening ecosystem services such as pollination and climate control). Recent reports by international agencies and

(Cambridge & London: Belknap Press, 2016). On the dangers of rising economic inequality, see Joseph E. Stiglitz, *The Price of Inequality* (New York etc.: W.W. Norton & Co., 2012).

7 Sarah Whitmee et al., "Safeguarding Human Health in the Anthropocene Epoch," *Lancet* 386, no. 10007 (2015): 1973–2028. The quote is from p. 1973.

commissions have made alarming (and depressing) lists of all that is going wrong.⁸

One way to look at this, from an historical point of view, is to see this as an 'environmental risk transition'. This concept complements the 'demographic transition' and the 'epidemiologic transition', and focuses on the underlying transition in disease risks. According to this framework, over time a shift has occurred from risks at the household level (e.g., poor water, sanitation, indoor air pollution, food quality) to risks at the community level (e.g., outdoor air pollution, occupational hazards, traffic injury risks), and then from risks at the community level to risks at the global scale (e.g., climate change, freshwater depletion, ...). It is as if humans have put their environmental risks farther and farther away – but without losing their fundamental dependence on the natural environment.⁹

Pessimists have pointed out that this man-made degradation of the global environment may be inherent to the philosophy underlying our progress. In their reasoning, it is not just an unfortunate side-effect of our use of the Earth's resources, but reflects a deeper problem in the way we think. The Enlightenment and the scientific, economic and social advances that followed, may not only have given us the instruments to take better care of ourselves, but may also have reinforced our tendency to make human welfare our primary focus – if necessary, at the expense of everything else.¹⁰

The Way Ahead

The Public Health Paradigm

Needless, to say, public health is in a much better position to help humanity cope with the challenges of the future than medical care. Medical care may be able to treat the 'symptoms', but public health can deal with the 'causes'. Medical care offers solutions for when we are sick, and may be able to offer increasingly effective solutions for treating disease in the future, but what we really

8 In addition to Whitmee et al., "Safeguarding Human Health" this includes reports of the Intergovernmental Panel on Climate Change (IPCC) (Alistair Woodward et al., "Climate Change and Health: On the Latest IPCC Report," *Lancet* 383, no. 9924 (2014): 1185–189), and the World Health Organization (www.who.int/globalchange/environment/en/). On biodiversity loss, see also Stuart H.M. Butchart et al., "Global Biodiversity: Indicators of Recent Declines," *Science* 328, no. 5982 (2010): 1164–168.

9 See Kirk R. Smith and Majid Ezzati, "How Environmental Health Risks Change with Development," *Annual Review Environmental Resources* 30 (2005): 291–333.

10 For this and related 'dialectics', see Chapter 3, note 55.

need is not falling sick in the first place. In the past, public health has developed a powerful arsenal to bring prevention to the people, but how can it continue to be effective in the future?

Public health is a fuzzy area, with boundaries that are much less clear than those of medical care. It emerged in the form of public hygiene in the 19th century, morphed into social hygiene in the first half of the 20th century, and then took on the cloak of 'new public health' in the second half of the 20th century. To a large extent, these were adaptations to the most pressing health problems of their historical periods – suggesting that some degree of 'fuzziness' can be an advantage.

Today, like in the past, public health exists in the form of dedicated institutions delivering interventions (e.g., local and national institutes of public health), dedicated professions providing the manpower (e.g., 'public health specialists', health scientists), and a knowledge base from which institutions and professions draw their expertise (and which can be found in the expanding textbooks of the field). What keeps the field together, however, is something that could be called the 'public health paradigm'.¹¹

This was shaped in the era of 'public hygiene', and can be characterized as follows: (a) The causes of disease are primarily sought in environmental factors. (b) These causes of disease are addressed proactively, preferably through measures protecting the entire population. (c) Taking these measures is seen as a collective responsibility, which requires intervention by local and national governments. It is this set of core ideas that lies at the basis of successes like compulsory smallpox vaccination, municipal sanitation, outreaching facilities for the prevention and treatment of tuberculosis and syphilis, alcohol and tobacco control strategies, breast cancer screening programs, and much more.¹²

It is not difficult to see that – although institutions, professions and knowledge base may need to be adapted – this paradigm will continue to be useful.

11 I am using this term, loosely, in the sense of Thomas S. Kuhn, *The Structure of Scientific Revolutions* (Chicago: University of Chicago Press, 1962). It refers to an all-encompassing collection of beliefs and assumptions that result in the organization of scientific world-views and practices. Michel Foucault coined a somewhat similar concept, '*épistème*', for the "a priori which grounds knowledge"; see Michel Foucault, "Les Mots et les Choses," (Paris: Gallimard, 1966).

12 These ideas are still very much alive within the discipline of public health, as is clear from the popularity of Geoffrey Rose's (1926–1993) *The strategy of preventive medicine* which provides a modern incarnation of this paradigm. In this book, Rose argued that a 'population approach' to prevention had not only worked best against infectious diseases in the past, but would also be most effective in the struggle with cardiovascular diseases now (Geoffrey Rose, *The Strategy of Preventive Medicine* (Oxford etc.: Oxford University Press, 1992)).

'Endogenous' causes of disease may slowly gain more importance in the future, but there continues to be enormous scope for preventing disease by addressing 'exogenous' causes. High-risk approaches should be considered if population approaches are less effective, but health protection measures continue to be the fundamentally correct way of preventing disease.¹³

It is on the third point, collective responsibility, that the public health paradigm is suffering from a certain loss of credibility – or perhaps better: acceptability. There can be no doubt that the health challenges of today and the future can only be addressed collectively, because individual behaviour change or uptake of preventive interventions can only go a short way in keeping disease away. This applies to personal hygiene, smoking and obesity, and even more strongly to global environmental change. However, the acceptability of government intervention has been eroded by neoliberalism, and the rationale for collective intervention therefore needs to be re-articulated. Also, we need supra-national intervention to complement intervention by national and local governments, but we are currently lacking the international institutions that can deliver this.¹⁴

An Expanding Circle of Concern

In his book *The Expanding Circle*, Australian-American bioethicist Peter Singer describes how altruism began as a drive to protect one's kin and community members, but has since developed into a consciously chosen ethic with a gradually widening circle of moral concern. In the distant past, we were only concerned with the well-being of our family and fellow villagers, but in more recent times this developed into a concern for all our countrymen, and then from a concern with white people only, into a concern including people of colour. It is not so long ago that black Africans were not even considered human beings. Singer argues that there is no rational argument for limiting our altruistic concerns to the human species, and that we should also be concerned with the well-being of other living beings, particularly sentient species.¹⁵

If we accept this argument, we have a very big problem. The demographic transition, including the increase in human life expectancy, has been an important factor in the population explosion of the last centuries. Rising human

13 It has been estimated that approximately three quarters of the health gains due to prevention since 1970 were achieved by a population approach and approximately a quarter by a high-risk approach; see Johan P. Mackenbach et al., "The Population and High-Risk Approaches to Prevention," *European Journal of Public Health* 23, no. 6 (2012): 909–15.

14 Robert Beaglehole and Ruth Bonita, *Global Public Health: A New Era* (Oxford etc.: Oxford University Press, 2009).

15 Peter Singer, *The Expanding Circle* (Princeton: Princeton University Press, 1981).

population numbers, and the increase in resource use per human, have in their turn played an important role in the loss of biodiversity on Earth. While human life expectancy rose, whole species of other living beings have become extinct. The extinction rate of other living species is now 100 times higher than before humans rose to prominence on this planet, and many remaining species are rapidly decreasing in number.¹⁶

Is further lengthening of human life, and more generally, further improvement in human health, a priority now that we see other species being completely erased? I think that we should re-consider our goals if analyses show that human health goals are in conflict with the goal of preserving biodiversity. Some analysts have suggested that we can stop biodiversity loss and conserve at least 80% of preindustrial species richness, by protecting the remaining 50% of the Earth as intact ecosystems. A recently published analysis shows that it will still be possible to feed the future world population in such a “Half-Earth” strategy, but that a “Great Food Transformation” will be needed, in which all of us switch to a largely plant-based diet.¹⁷

Much more than switching to a vegan diet will be necessary to keep the other half of the Earth intact, and even then this will only save 80% of living species ... Whether such large transitions can and will be made on a voluntary basis remains to be seen. Democracy may have been an effective way of sharing population health improvements among humans, but can we realistically expect it to be effective in creating more equality between species?¹⁸

Re-thinking Utopia

We started this book by referring to Thomas More's 16th century Utopia, and its 19th century sequel written by Étienne Cabet. These utopian visions have served as a source of inspiration for all those who believed that a better world

16 Stuart L. Pimm et al., “The Biodiversity of Species and Their Rates of Extinction, Distribution, and Protection,” *Science* 344, no. 6187 (2014): 1246752-1-10.

17 The “Half-Earth” strategy was proposed by American biologist Edward O. Wilson; see Edward O. Wilson, *Half-Earth: Our Planet's Fight for Life* (New York & London: W.W. Norton & Co., 2016). The implications for humanity's feeding patterns were outlined in Walter C. Willett et al., “Food in the Anthropocene,” *Lancet* 393, no. 10170 (2019): 447–92.

18 For further reflection, readers are referred to the growing literature on the challenges to democracy of climate change. Even leaving non-human interests aside, it is unclear whether liberal democracies can effectively create the collective action necessary to mitigate climate change; see Marcello Di Paola and Dale Jamieson, “Climate Change and the Challenges to Democracy,” *University of Miami Law Review* 72 (2017): 369–424. However, autocracies will not necessarily perform better, as argued in Daniel J. Fiorino, *Can Democracy Handle Climate Change* (Cambridge: Polity, 2018).

could be created, in which human welfare would be infinitely better than in the 16th or 19th centuries. Today, at the beginning of the 21st century, we do live in such a world, with longer lives spent in much better material conditions and in considerably better health. In North-western Europe, this has even been achieved without the restrictions on personal freedom that More believed to be necessary for realising Utopia. Nevertheless, when we allow ourselves to look at the price that other living species have paid for our development, it is difficult to suppress a feeling of guilt.

Did the Utopias that inspired our actions, perhaps guide us in the wrong direction? Well, actually, Utopias have come in all sorts, and while some Utopias described an ideal state of abundance, in which advances in technology would provide humans with incredible levels of luxury, other Utopias described an ideal state in which maximum satisfaction would be reached by moderation and self-restraint. As a matter of fact, Thomas More's Utopia is an example of the latter. It has no private property, and its inhabitants achieve happiness and spiritual fulfilment through harmony with nature.¹⁹

One wonders whether it is possible to imagine a modern version of Utopia, in which reasonable levels of human welfare, including high levels of health and personal freedom, are combined with a sufficient level of ecological sustainability. Writing Utopias has gone out of fashion, perhaps because utopian visions have become associated with lack of realism, or because attempts to realize utopian visions have often ended in authoritarianism. Yet, utopian visions may still be able to guide us, as illustrated by the popularity of Ernest Callenbach's book *Ecotopia* when it was published in 1975. This describes a small country on the West Coast of North America whose people live an egalitarian life close to nature. Ecological sustainability is achieved through local production and endless recycling, and marijuana is used on a large scale to achieve the higher states of consciousness required for complete ecological 'attunement'.²⁰

While this solution may not sound 100% convincing, there is an urgent need for re-thinking our goals, and for developing a concrete vision of what an ecologically responsible 'Utopia' would look like. In any case, continuing in a 'business-as-usual' mode seems unwise, even if human health is all we care for.

19 Marius de Geus, *Ecological Utopias* (Utrecht: International Books, 1999).

20 For an analysis of the end of utopia-writing, see Krishan Kumar, "The Ends of Utopia," *New Literary History* 41, no. 3 (2010): 549–69. Full reference for *Ecotopia*: Ernest Callenbach, *Ecotopia* (Indore: Banyan Tree Books, 1975).

By Way of Conclusion

Through the Telescope of History

The history of population health sketched in this book spans more than three centuries: it starts in the early 1700s, when the first quantitative data begin to flow, and it ends just before today, several decades after other histories of population health have closed their pages. What have we seen through this very long 'telescope of history', that we would not have seen in a more myopic time-frame?

The most important thing we have seen – perhaps already over-emphasized in the preceding pages – is that most diseases have followed a trajectory of 'rise-and-fall'. When we go back far enough in time, we see smallpox, malaria, tuberculosis, the infectious diseases of childhood and many other 'diseases of pre-industrial and industrializing societies' rise to their 17th, 18th or 19th century highs, before they started their better-documented declines.

Similarly, when we study the health conditions that replaced these diseases, and dominated population health in the second half of the 20th century, we see almost all of them starting to fall, sometimes as recently as the 1990s. This does not only apply to the well-known examples of ischaemic heart disease and road traffic injury, but also to cancers of the breast, lung and other organs, liver cirrhosis, suicide and many other 'diseases of affluence' (for want of a better name).

These 'rises-and-falls' were experienced by Europeans whose structural and functional 'design' has not changed: the genes that determined the build-up and workings of their ancestors' bodies and minds are almost 100% the same as theirs. The only reasonable explanation for these striking changes in disease patterns is that something has changed in the interaction with their environment.

These changes have not happened once, but many times. Dozens of times there were negative trends first, but positive outcomes in the end. The implications of this regularity in our historical experience are many, and some of these have already been highlighted earlier. Here we will try to dig a bit deeper still, highlighting some of the profounder implications.

A theoretical implication of the fact that diseases had to 'rise' from low levels to become frequent at a later point in time, is that most diseases are, in a sense, 'man-made'. In the course of history, humans have actively produced their own diseases, or, in the case of diseases that already afflicted their distant ancestors, they have themselves raised the frequency with which they occurred. Most diseases do not originate in the inner workings of our cells, but in how we interact with the outside world. This also implies that medicine should – to

repeat the famous words of Rudolf Virchow – be a social science as much as it is a branch of biology.²¹

A closely related implication is that most diseases are avoidable. The historical experience proves this empirically for the diseases of the 19th and 20th centuries which have since declined, or even disappeared. It must also be true for the diseases whose incidence has risen more recently but not yet declined, or not yet declined much. Even at the start of the 21st century, the theoretical scope for prevention is enormous. Most of today's cardiovascular disease, cancer, injury and other health problems would simply not occur, if we had eliminated their well-known behavioural or environmental determinants.

However, we do not sufficiently exploit this avoidability of disease. This starts when new health problems arise: is it really necessary for new diseases to reach epidemic proportions, before we start to tackle them? It is perhaps inevitable that we do not immediately recognize new health risks when we embark on new activities, and that we need a bit of time to develop an effective counter-strategy. Nevertheless, it usually takes far longer than strictly necessary before a 'rise' is reversed into a 'fall'. AIDS is the exception (at least in North-western Europe) that confirms the rule.

Powerful counterforces, in the form of commercial interests, cultural barriers, political inertia or simple silliness, often cause substantial delays. It was not necessary for cholera to still cause so many European deaths during the fifth pandemic (1881–96), or for lung cancer to rise until the 1980s, 1990s or even later in so many European countries.

Furthermore – and this should temper our enthusiasm about recent advances in population health – it has become much easier to control the health outcomes of our interactions with the environment, than to change these interactions themselves. The recent 'falls' of cardiovascular disease and cancer were to a large extent due to medical interventions, such as antihypertensive and cholesterol-lowering drugs and advanced cancer treatments. While the declines in mortality from these conditions are more than welcome, it would have been preferable if these had mainly been achieved by controlling the well-known behavioural and environmental risk factors of these diseases.

Finally, the 'telescope of history' also makes us see the 'epidemiologic transition' in a different perspective. The last decades of the 19th century and the first half of the 20th century were certainly special, in the sense that many important causes of mortality declined rapidly and simultaneously. Yet, the absence of natural dividing-lines with earlier and later periods, and the virtually continuous succession of diseases starting to fall in the 17th, 18th, 19th and

21 See Chapter 3 for the full quote, and what made Virchow say this.

20th centuries, suggest that the concept of one or even a few 'epidemiologic transitions' has limited usefulness.

The European Experience

It has been difficult to find a satisfactory explanation for the spectacular increase in life expectancy, and the somewhat less spectacular but still substantial improvements in other aspects of population health. Many authors, including this one, have found it easier to criticize McKeown's conclusion that improvements in living standards did the trick, than to come up with an explanation that better fits the facts, but can still be summarized in a few sentences.

Although recent scholarship has been able to demonstrate a neat causal relationship here, and another one there, the many interlinkages between the factors underlying population health improvement have made it impossible to empirically identify which factor was the most important. Logically, however, when one sees so many diseases 'fall', one after the other, it is impossible to escape the conclusion that some form of goal-directed 'human agency' played a crucial role. What this exactly was has been better documented for the more recent 'falls', but the consistency in the time-pattern clearly suggests that the same factor – human intervention in one form or another – was at work throughout.

This can be in the form of public health and medical care, but also in the form of less intentional changes in individual or collective behaviour that are – often implicitly – guided by concerns for human welfare. Everything in the European experience confirms this, and it is by studying variations between European countries' health trajectories that we can sometimes put a finger on what the necessary ingredients of this 'human agency' were.

One important conclusion is that – even if we include the most recent health improvements – the contribution of public health has been greater than that of medical care. The contribution of public health measures has also been greater than suggested by studies done in North-western Europe. In the first decades of the 20th century, mortality from the 'diseases of industrializing societies' was still high in Southern, Central-eastern, South-eastern and Eastern Europe. Introduction of public health measures therefore had a much larger impact on mortality decline there than it had in North-western Europe.

Another important conclusion is that the contribution of medical care has increased over time, and has become far greater than suggested by studies done up to the 1970s. It may be true that much of the mortality decline (in North-western Europe) until the 1970s antedated the introduction of effective medical treatments. However, this is not true for the mortality decline during

and after the 1970s. Over the last decades, improvements in medical care have become a major driver of improvements in population health.

The European experience also shows that changes in economic conditions were undoubtedly important as a background factor, but also that these were not the direct or even the ultimate cause of population health improvements. There are just too many exceptions to the rule that economic development should have positive health consequences, and that health improvements should follow economic growth. Many advances in health have also preceded or coincided with countries' economic development.

The European experience suggests that changes in sociocultural conditions have been at least as important. For example, differences between countries in the penetration of the 'Enlightenment' made them front-runners or laggards in population health improvement. Sociocultural change is also the more plausible 'prime mover' of population health improvement. The development of a more rational way of thinking was the result of an autonomous process that some European countries had been following for centuries, and that probably set in motion all the other changes.

Through the rise of science and technology, it led to a better understanding of health and disease and the development of effective public health and medical interventions. Through the agricultural and industrial revolutions, it led to a rise in living standards. And through gradual political reforms and abrupt revolutions it led to the rise of the modern state, more democratic government, and the adoption of 'enlightened' social and health policies.

The Role of Politics

It has also been striking to see how closely population health followed European countries' political trajectories, and how effective some countries' political determination has been to get rid of infectious and other diseases. From malaria to tobacco, and from syphilis to air pollution, creating conditions for health improvement was a profoundly political enterprise. Usually, the state played a crucial role by providing the necessary infrastructure, legislation or funding. Decisions for and against were often hotly debated in parliaments, municipal councils, politburos and other political arenas. At first sight, therefore, the European experience also confirms the other part of Rudolf Virchow's famous one-liner: "politics is nothing else than medicine at a larger scale."

In terms of importance for population health, political conditions do not trump economic and sociocultural conditions, but politics has always had the special attention of public health professionals. It is not for nothing that Virchow's one-liner is one of the most widely quoted statements in public health. It summarises public health's biggest idea: human health and disease are the

embodiment of the successes and failures of society as a whole, and the only way to radically improve health and reduce disease is by changing society, which – if it does not happen spontaneously – can only be achieved by political action. In milder form, modern textbooks of public health have come to see influencing government policy as a standard ingredient of public health practice.

However, throughout European history politics has not only been a benevolent but also a malicious force. Politics has not only been medicine at a larger scale, but also violence, exploitation and injustice at a larger scale. The apparatus of the modern state can be used for good and for bad things, and pursuing health improvement sometimes went hand-in-hand with brutal oppression. Stalin's ruthless reforms of Russian society ultimately saved the lives of millions of people, but cost the lives of millions of other people. *In extremis*, this is where Virchow's idea can lead to, if there are no moral restraints on the means that can be used to attain otherwise legitimate ends.

Another qualification of Virchow's idea – often ignored by public health professionals – is that it is not 'left' vs. 'right' that makes the difference. Throughout the 19th and 20th centuries, the most important cleavage in European politics was that between the 'left' (mainly represented by social-democratic and communist parties) and the 'right' (represented by conservative and fascist parties), with Christian-democratic parties and their predecessors often occupying the 'centre'. Which of these parties dominated government certainly did have an impact, for example on income distribution and social security, but on the whole was not decisive for population health.

What does make a difference is the relative importance given to health improvement as compared to other political objectives, steadfast resistance to commercial and other interests which detract from prioritizing health, and the use of effective policies to achieve good health outcomes. Although the track record of left-wing parties is somewhat better than that of right-wing parties, health policies and health outcomes have over time gradually converged, probably because 'health' has become an almost universally accepted touchstone of government policy. Nevertheless, engaging with politics was, is, and will remain necessary for attaining high levels of population health.

The Future

When non-historians write history, they often have a 'hidden agenda'. McKeown wanted to demonstrate that the more important role of medicine was to care, not to cure. When I started writing this book, I hoped that it would demonstrate that "we can": just like we create our own diseases, we have the power

to get rid of them. Yet, while such a positive vision is certainly defensible in light of the European experience, a more pessimistic vision is also possible.

This book is a story of tremendous progress, but we can no longer close our eyes to the darker sides of this history. First of all, and continuing in the mode of human self-interest, it is uncertain whether our current levels of population health can be sustained. To a large extent, they have been mortgaged on the health of future generations, by ruthlessly exploiting and – if we do not stop this very soon – destroying our habitat. We have to a large extent controlled the health threats in our immediate environment, but have created new health threats at the planetary level that may turn out to be fatal flaws in our survival strategy.

While this alone already makes it difficult to end this book on a 100% positive note, there is more bad news. We can also no longer look away when other species disappear from the earth as a result of human expansion. It is a bitter irony that proving McKeown wrong proves him right at another level. McKeown argued that we should not think too highly of medicine's capacity to save lives, and that we should place our trust in low-tech solutions, like a full stomach and good nursing care. We now believe that we can trust public health and medical technologies to really save lives, but we are no longer fully convinced that we have done well to – in this way – help multiply humanity's ecological footprint.

We must therefore re-think the role of public health and medical care, making sure that whatever we do to further improve population health in the future, fits within ecologically sustainable boundaries. Most of all, in order to save the large majority of other living species on this planet, we may need to scale down our activities and consumption substantially. Less humans, or less health per human, may be the price to pay for preserving biodiversity. Achieving this is a tall order, but – in a final leap of the imagination – I am inclined to believe that the historical experience shows that “we can.”