

EDITORIAL



Transdisciplinary health economics for 2050: the challenge of preventing the adverse health effects of obesity, inequalities, and climate change

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Looking back over my 35-year career, I reflect on an early publication from 2001 which was published in the journal *Health Economics* [1]. The paper reviewed Thomas Kuhn's [2] theory of paradigm shift and Imre Lakatos' [3] theory of scientific research programs in the natural sciences, favoring the latter as an explanation of the evolution of the subdiscipline of health economics. The paper critiqued four influential visions of the future of health economics at the time by Alan Williams [4] and Alan Maynard and Panos Kanavos [5] in the UK, and Charles Phelps [6] and Victor Fuchs [7] in the US. These were admittedly visions from the Global North perspective. I now marvel at my confidence in those early days of my career, but it turns out that I was, to some extent, correct in arguing that their visions to a man, and they were all men, were of health economics predominantly as a subdiscipline of economics that could be better described as 'health services economics.' This paradigm has adopted a very 'medical' model of health, in which the predominant production function for health is health care. I argued that health economics would need to evolve to embrace a more socioeconomic model of health in light of the government's stated commitment, at that time, to tackle inequalities in health. I also questioned whether the magnitude and the magnetism of health care policy issues would continue to prove too strong to allow health economists, should they wish, to steer their research and educational programs more directly toward 'health' rather than 'health care' [1]. What I did not know then was that my career as a health economist would be shaped by a year spent in the US studying the economic case for prevention in US health delivery and insurance organizations [8].

In 2012 a group of interested health economists met in Glasgow, UK to debate and shape how the methods of economic evaluation that were by then well established [9], could be applied to the economic evaluation of public health interventions. By 2019 this led to Professor Emma McIntosh at the University of Glasgow and myself at Bangor University publishing the first textbook on *Applied Health Economics for Public Health Practice and Research* [10]. Across Europe it is estimated that health systems spend only 6 percent of their health budget on prevention [11]. The focus continues to be on curative medicine and a willingness to embrace and roll out

the availability of new drugs, surgery techniques and genomic treatments. We know that 80 percent of chronic diseases leading to ill-health, disability and premature mortality are preventable [12]. We also know that housing, transport, access to greenspace, and socioeconomic status have a formative impact on upstream prevention of conditions, such as heart disease, diabetes, stroke, and some mental health conditions [13].

The work of Professor Richard Cookson at the University of York on distributional cost-effectiveness analysis methods are a response to widening inequalities in many developed countries [14]. The work of Professor Sir Michael Marmot over 20 years has made stark the relationship between socioeconomic gradient and quality-adjusted life expectancy [13,15].

I recently co-edited a book called *Health economics of well-being and well-becoming across the life-course* [16], which draws on the work of Professor Sir Michael Marmot. Our book advocates the concept of 'well-becoming.' Even from pre-conception, this is how we create good life-course health and well-being opportunity architecture in society. The life-style choices we make in our earlier years determine how we age. In this book we illustrate how health economics of prevention is fundamental to improving our health and well-being across the life-course, and opens the discussion for where we should be investing in cost-effective interventions to support the prevention of chronic disease, disability, and premature death.

For structural availability of finance reasons, in part, in the Global North, the work of many health economists has been on micro-economic analyses, concentrating on health technology assessment (HTA) to meet the needs of the National Institute for Health and Care Excellence (NICE) [17]. Though a notable whole system approach is that of the UK Foresight Obesity System Map [18] and there are examples from the Global South of whole system modeling of health systems which begin to reflect the interdependency and feedback loops of prevention, and its impact on the demand and supply of health care [19]. There is a growing need for health economists to shift their focus toward macro-level analyses, using big data to gain broader

insights. By examining population-level patterns and trends, we can better assess large-scale interventions and public health policies [20]. This shift includes approaches such as causal inference, which helps make sense of regional disparities and spatial relationships in health outcomes [21], and the use of population attributable fractions (PAFs) to estimate the proportion of disease burden attributable to modifiable risk factors across different population groups. For example, in 2020 a *Lancet* Commission reported on 12 modifiable risk factors across the life-course that had a PAF for dementia worldwide of 40% [22]. These factors were low educational attainment in early life (age <45 years); hearing loss, traumatic brain injury, hypertension, increased alcohol intake, and obesity in midlife (age 45–65 years); and smoking, depression, social isolation, physical inactivity, diabetes, and air pollution in later life (age >65 years). Increasingly it is inequalities in socioeconomic status and vulnerability to the threats of climate change that are having a differential impact on the health of the population. By adopting macro-level approaches we can design interventions that address systemic health challenges on a larger scale and provide robust, evidence-based recommendations for policymakers. The natural corollary of expanding research in prevention is to broaden this to issues of climate change and population health. Governments need to take a cross-sectoral approach to designing policies that meet these challenges. This has been long recognized and is still slow to happen, in part due to siloed budgets and the fact that benefits from changes in one sector may accrue to a different sector to that with bore the initial costs. For example, benefits to the NHS of reduced respiratory problems through changes in legislation and city planning limiting vehicular emissions.

In a report from the *Lancet* Commission on Investing in Health, Jamison et al. [23] provides a roadmap for countries at all income levels for achieving '50 by 50,' that is, a 50 percent reduction in the probability of premature death (defined as the probability of dying before age 70 years) by 2050. This 50 by 50 goal can be reached by focusing on 15 priority conditions, eight related to infectious diseases and maternal health, and seven related to non-communicable diseases and injuries. These 15 conditions contribute significantly to the life expectancy gaps between the highest-performing regions and other regions [23]. The *Lancet* Commission on Investing in Health is still a very medical model of health which I would like to challenge. Taking a broader systemic vision of challenges to population health, what will the health economics of prevention look like in 2050? I would argue, based on my reading over the last 10 years and an increasing realization of the interconnectedness of these challenges, that socioeconomic inequalities, commercialized food systems and obesity, and climate change are the three most pressing challenges facing population health, other than potential future pandemics, in developed countries, and hence should be a key focus for health economists interested in the economics of prevention in these regions. I do not feel qualified to speak on behalf of health economists who have worked on health challenges in

the Global South, but suspect that inequalities and climate change, and related impact on population health, are equally pressing.

Working in the UK as I do, I recognize that over the past 60 years, spending on the UK NHS has increased from 3.4 percent to 11.3 percent of gross domestic product (GDP) [24,25]. Although the UK Government have promised £22 billion of additional NHS spending for the next two years, inflation, staff pay increases and other rising costs mean that the 2025/2026 fiscal year will be challenging for the health service [26]. If the government is serious about restructuring the NHS and improving social care, trade-offs are inevitable, and may lead to reductions in some treatments and services offered. A focus on prevention, community care, and digital solutions will need to be made [26].

Many of us have seen the language of health services and medical research trend from multidisciplinary research to interdisciplinary research. Now, the term transdisciplinary research is becoming increasingly more visible. It is a term that health economists need to listen to and take up. Transdisciplinary research integrates expertise and methodologies from multiple disciplines to create a hybrid discipline with new conceptual frameworks, methodologies, and theories [27,28]. A transdisciplinary approach can enable a systematic, comprehensive theoretical framework for the definition and analysis of the economic, social, political, environmental, and institutional factors influencing human, animal and planetary health [28].

In order to address the public health and prevention challenges of socioeconomic inequalities, and the resultant demands upon health and social care systems, we are going to have to find sources of funding to address the upstream causes of inequalities in life-course opportunity architecture [15]. I am currently fortunate to be a research partner on a Horizon Europe funded research study seeking smart capacitating investment for prevention [29]. Where there is no fiscal space in economies with low or no economic growth, the challenge will be to encourage private investors, social enterprise investors, and philanthropic or charitable investors to support prevention services and innovations. As health economists in this project spanning eight European countries, we are working with colleagues from disciplines of finance, engineering, business studies, epidemiology, health services research, geography, public policy, and public health. Together, we are creating a sum of outputs that are far greater than we could individually create as distinct academic disciplines in a truly transdisciplinary spirit.

When it comes to research on commercial food systems and the resultant obesogenic culture and environment we now live in across most developed countries, we really do need to work in a transdisciplinary way. As a health economist, I am currently working with researchers in public health, behavioral science, linguistics and place-based research on a study of the economic costs of obesity across the life-course in one of the poorest areas of South Wales, UK. Even in a small country like Wales, with a population of just over 3 million people, such social inequalities are, if anything, growing.

Finally, on my vision list for health economics as an increasingly transdisciplinary discipline, I, along with one of my early career researchers, took part in a World Health Organization (WHO) international webinar collecting evidence on climate change and health for COP19 in Azerbaijan [30]. On that call, we were the only two health economists internationally to be offering evidence [31,32]. The UK Health Security Agency [33] has produced a list of 12 ways in which climate change is harmful to population health. These health threats include: extremes of heat and cold; flooding; air pollution; indoor environmental quality; aeroallergens; infectious diseases; vector-borne diseases; food security; wildfires; drought; chemicals, and solar radiation. In a Winter where we have seen terrifying wildfires in California, floods in Spain, and storms across the UK, climate change is a reality [34]. Transdisciplinarity is at the core of One Health, as a movement to address animal, human and planetary health within one overarching transdiscipline. Leandri and Dalmas [35] recently argued that health economics could contribute to “design [of] efficient schemes for prevention and disease control. In return, adapting Economics to the challenges of One Health issues could pave the way for exciting developments in the Economics discipline itself, across many subfields.”

I fully acknowledge a continued need for HTA of new drugs and devices, including genomics, to contain costs across public and social insurance health care systems. By 2050, we have an opportunity to contribute to transdisciplinary research to tackle, amongst other things, the three very pressing challenges to population health, which are potentially largely preventable, discussed above (i.e. socioeconomic inequalities, commercialized food systems and obesity, and climate change). Effective prevention of avoidable ill-health, disability and premature mortality will require: a paradigm shift in our international fixation with economic growth and a refocusing on acknowledging the impact of upstream wider inequalities in society; a new look at social contracts, i.e. the role of government and also what we as members of the population of any given country owe each other [36,37], and co-production of our individual health trajectory through life, if and where we have the locus of control to be able to do this as individuals. Recognizing that research funding landscapes shape research priorities, I foresee the research funding panels being far less siloed, expecting research from transdisciplinary teams who together produce evidence-based policy strategies for these three huge challenges to population health.

We are already seeing some challenges arising out of the need for transdisciplinarity, for example if and how environmental factors could and should be internalized into incremental cost-effectiveness ratios in HTA to be compared with funder thresholds. A whole new debate is happening as we speak about how carbon reduction and the need for circular economy consideration can be brought into existing methodologies at a time when governments and public sector bodies are required to meet international net zero commitments. I do not foresee that the shift from a micro to macro perspective is necessarily an insurmountable challenge, but it may require the weighing up of alternative societal goals and the need for greater use of methods such as program budgeting and marginal analysis and multi-criteria decision analysis.

In this editorial I have argued that health economics will need to become more of a transdisciplinary contributor to addressing three major challenges to population health: socioeconomic inequalities, commercialized food systems and obesity, and climate change. I have drawn on examples of my own transdisciplinary collaboration on these three topics, as well as recognizing major developments in health economics by others. I argue here that we need to move away, at least in part, from micro-level analysis of HTA, which will still be important to budget control, toward more macro-level econometric modeling and causal inference at a population level. In 2001 I argued for a paradigm shift from health services economics to health economics and now thinking about what health economics could and should look like by 2050 I propose a further paradigm shift with a vision of transdisciplinary health economics for the future.

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