

**Success and failure in reducing adult mortality risks since 1970:  
Institutionalist approaches could help understanding of  
the diverse experience of developed countries**

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**Abstract (as submitted, February, 2014)**

Since 1970 trends in adult mortality in developed countries have varied markedly, with several being worse off in 2010 than in 1970. Among 37 developed countries, the 10 subject to communist rule until around 1990 generally exhibit the least favourable trajectories but show substantial heterogeneity. The Adult Mortality Risk (AMR, probability for a 15 year old of dying before 60) for Hungarian males fell to 20% by 1970, ahead of the USA (24%), but then surged upwards reaching 30% in 1990. Trends became favourable with the end of communist rule, but levels in 2010 (22%) were still higher than 40 years earlier and were equivalent to those achieved 70 years earlier by Swedish men. The performance of the USA has also been poor relative to expectations based on income, expenditure on professional medicine and strength in relevant science. US women fell from 19 calendar years behind Sweden in 1970 to 29 years behind in 2010. These variations in premature adult mortality have mostly resulted from variation in risks of noncommunicable disease (NCD) and injury arising from variable success in reducing health damaging consumption (tobacco, diet, alcohol, motor vehicle use). Institutional approaches: 1. Reject exclusive methodological individualism. This allows recognition of the collective and habitual dimensions of consumption rather than seeing it as the result of solitary, recurrent assessments of relative utility. These collective dimensions include interaction between scientific, professional, advocacy and state institutions - as illustrated by the histories of tobacco control and traffic injury reduction. 2. Emphasise the evolution of institutions including their differential survival. East European responses to chronic disease risks, for example, were blocked early by a deliberate policy not to develop the relevant science; Anglophone and Scandinavian countries invested in chronic disease epidemiology on which consensus for action was built. 3. Direct attention to institutional specifics. Reliance on simple ecological regression models with 'black box' terms (e.g. 'inequality') is avoided by focusing instead on institutional responses to specific non-communicable disease and injury risks. The divergent mortality trajectories of the USA and Australia, for example, are more plausibly related to the greater effectiveness of risk reduction activity in Australia than to the high levels of economic inequality common to both countries. Institutional approaches can thus provide fuller insight into the means by which health protective patterns of consumption have been achieved, thus optimizing gains in well-being from rising incomes.

## **Introduction**

Economic development increases the supply and the appeal of commodities available for consumption. To gain long term advantage from increased consumption opportunities, consumers need to take account not only of the immediate attractiveness of commodities but also of their delayed effects – including effects on chronic disease risks. One approach to understanding how this happens focusses on individual decision making, for example how present enjoyment is ‘traded off’ against the risk of future disease. But variation between individuals cannot account for the large variation in consumption-related disease risks observable –as we shall see – between countries and over time. Population and temporal variation in disease incidence implies systematic population variation in disease determinants. The challenge is to improve understanding of the social processes by means of which disease determinants have been changed.

This paper suggests that several ideas now coming together under the banner of ‘institutionalism’ might help to throw light on these processes. The paper proceeds as follows:

First, some salient features of adult mortality trends in an inclusive sample of 37 developed countries are reviewed.

Then, some of the main approaches that have been taken to understand these trends and the limitations of these approaches are noted.

Two case studies follow: the evolution of attempts to reduce tobacco-caused disease and to reduce traffic injuries.

I conclude that ‘institutionalist’ interpretations promise a more realistic understanding of these complex processes but remain to be developed.

### **An overview of adult mortality trends in developed countries.**

For these analyses I have classified as ‘developed’ 37 countries that in 2010 were either high income members of the Organisation for Economic Cooperation and Development (n=31)<sup>1</sup> or member states of the European Union but not members of the OECD (n=6). They fall into 3 groups: 21 countries of western Europe, 10 countries of eastern Europe (all subject to rule by communist parties until around 1990) and 6 ‘others’ from north America, Australasia and eastern Asia (Table 1). Countries have been defined by their borders in 2010 and, in the sources I have used, earlier mortality data for populations within these recent borders have been reconstructed from official sources. Adult mortality levels have been summarised as the risk, on the fifteenth birthday, of dying before the 60<sup>th</sup> birthday, assuming that mortality rates were to remain constant ( $_{45}q_{15}$  in lifetable terminology). This is referred to here as the Adult Mortality Risk (AMR) and expressed as a percentage.

Unlike the rather uniform and very substantial declines in mortality risks in children, mortality risks in adults have followed highly variable national trajectories (Figure A.1). From 1950 to the mid-1960s, adult mortality in the countries of communist Europe generally improved rapidly often reaching lower overall levels than in western countries. Then matters went seriously wrong in the socialist east, with mortality risks for chronic diseases, especially in men, surging to higher levels than elsewhere. Declines in adult mortality did not resume in eastern Europe until the 1980s or 90s and, although they have been rapid in some countries over periods of several years, they have mostly not been sufficient to close the gap with western countries.<sup>2</sup> For 6 of the 10 countries in the eastern group, adult male mortality risks were higher in 2010 than they had been 40 years earlier; this was also true, in the case of mortality risks in women in 2 of the 10 countries. Hungarian men experienced a particularly severe mortality setback – from an AMR of 19.9% in 1970 (below that of the USA at 22.8%) to over 30% in the 1990s. At their peak in the mid-1990s mortality risks in Hungarian men were closer to those estimated for sub-Saharan Africa (30-45%<sup>3</sup>) than to those typical of western European countries (10-15%). Figure 1 illustrates the overall trends with lines for Hungary and the Czech Republic – between which have fallen most of the other countries of eastern Europe group (at least for recent decades) - and for the USA and Australia – between which fall many of the west European and ‘other’ countries. Although none of the west European or ‘other’ countries had higher AMRs in 2010 than the USA, several had risks lower than Australia. The reason Australia is selected as a comparator for the USA is that it shares some historical characteristics along with relatively high levels of economic inequality

and low levels of social security provision:<sup>4</sup> yet, in contrast to the USA, has achieved declines in adult mortality risks that are among the most rapid in developed countries.

That the control of chronic disease (and injury) risks in adults depends on societal characteristics that differ from those influencing other dimensions of population health is suggested by:

1. The east European countries failing in this domain but not in adult health before the mid-1960s nor (to any substantial extent) in child health (Figures 1, 2 and A.1);
2. The relatively weak association, from 1970 to 2010, between success in reducing adult and child mortality (Figure 1).

#### *Composition, nature and variation of adult mortality risks*

So far it has been asserted but not demonstrated that the leading causes of variation in adult mortality risks are ‘consumption related’. Figure 3 shows the contributions of six leading causes to the years of life lost from deaths occurring between 15 and 60 in Hungary, the Czech Republic, the USA and Australia for 1990 and 2010.

Apart from self-harm (which is included for interest), the other specific causes – ischaemic heart disease, stroke, lung cancer, (alcoholic) liver cirrhosis and road injury are all known to vary with such components of lifestyle as dietary composition, physical activity level, use of tobacco and alcohol and the way cars are used. The variation in rates of lost life years from these causes varies markedly within and between countries. Between Hungary in 1990 and Australia in 2010 there are greater than 10 fold differences for alcoholic liver disease and stroke and 4 to 6 fold differences for lung cancer and ischaemic heart disease. Decomposition of Australia’s increased advantage relative to the USA shows, for 2010, a greater than 2 fold difference in (alcoholic) liver cirrhosis, an approximately 2 fold difference in ischaemic heart disease and stroke, and a 1.65 ratio for road injury. All four countries show gains from 1990 to 2010, but they are proportionally greater in the Czech Republic and Australia than in Hungary and the USA.

It is important to acknowledge here that lifestyle related disease and injury relate both to culturally inherited dietary and drinking customs – for example ‘Mediterranean’ dietary practices or northern and eastern European tendencies to drink alcohol in binges - as well as to deliberate efforts to modify these in the light of new knowledge. These culturally related differences in mortality were noted in the 1950s and 1960s<sup>5</sup> but have tended to become less

salient as mortality risks have apparently responded to deliberate changes to their determinants.

### **Scientific assessments of differences in national trends in adult mortality**

International differences in adult mortality risks have long been of interest. Four recent approaches to scientific understanding will be briefly noted here. My purpose is simply to note the range of approaches taken; not to attempt a critical synthesis.

#### ***1. Modelling effects of risk factor levels and changes on disease risks***

As understanding of the relationship between risk factors and disease risk has become more systematic and comprehensive and as the quantity of published evidence on risk factor levels has increased, the possibility of assessing the contribution of risk factor trends to disease incidence has improved. Early work on mortality attributable to tobacco<sup>6</sup> has been followed by ‘comparative risk assessment’ in the evolving Global Burden of Disease project<sup>7</sup> and, closer to the theme of this paper, analyses of the contribution of risk factor changes to changes in cardiometabolic mortality (heart disease, stroke and diabetes) in a sample of 26 ‘industrialised’ countries that, somewhat oddly, includes Mexico, Chile and Argentina but not a single country from eastern Europe.<sup>8</sup> The latter study found that the estimated changes in mean levels of adiposity, blood pressure, blood cholesterol concentration and tobacco exposure could account for about 50% of the observed mortality decline in men and 40% in women between 1980 and 2009.

#### ***2. Comparing the effects of risk factor changes with the effects of clinical medicine***

In a series of papers using the IMPACT model, Capewell and colleagues have allocated the beneficial changes in coronary heart disease mortality in a number of countries either to changes in risk factors or to improvements in ‘treatments’ – where the latter includes long-term medication to reduce blood pressure and blood cholesterol concentrations. Results turn out to be sensitive to the outcome measure used: when ‘life years gained’ was used rather than ‘deaths prevented or postponed’, a substantial majority of the secular improvement was found to come from risk factor changes. This makes intuitive sense: in persons who fail to die following a heart attack because treatments have improved, the underlying disease process will, in general, have progressed further and their life expectancy will be less than in persons who, for example, don’t experience a heart attack in the first place because they have previously given up smoking.<sup>9</sup>

### ***3. Regression models including social and economic characteristics (for European countries)***

In a series of publications, Mackenbach and colleagues have assessed correlates of success and failure in the diverse experience of 42 countries of the WHO European Region - most comprehensively reported in the volume *Successes and failures of health policy in Europe* (2013).<sup>10</sup> Chapters in this volume cover a wide range of health determinants and outcomes, including years of life lost in 2009 from 11 leading causes that are in excess of the rates for Sweden. Countries are also scored using ‘performance indicators’ across a wide range of policy areas, and these are then distilled into a single ‘health policy performance score’. This score is, interestingly, uncorrelated with the political composition of governments (aggregated over the period ‘since the 1980s’). The strongest association is with score on the survival/self-realization dimension of the World Values Survey i.e. countries where self-realisation is valued more than job and economic security (manifest, for example, as a preference for job autonomy) do better. Countries with high degrees of ‘ethnic fractionalisation’ do worse. Other correlates (income, democracy) drop out of the multiple regression model.<sup>11</sup>

### ***4. Multi-author evidence syntheses (focussed on USA)***

Unsurprisingly, the relatively poor performance of the USA has focussed attention there on potential explanations. The National Research Council published a collection of commissioned papers dealing with international differences in mortality beyond age 50 in 2010<sup>12</sup> and synthesised their findings in 2011.<sup>13</sup> A follow-on report in conjunction with the Institute of Medicine in 2013 covered all ages and moved towards its end to a consideration of the role of ‘policies and social values’.<sup>14</sup> These reports showed that important contributions to the relatively poor performance of the USA come from higher levels of past cigarette smoking (especially in women) and higher levels of adiposity but they also note that US under-achievement extends to causes unrelated to these 2 causes. They further show that the contributions of the exuberantly funded US clinical services to disease prevention appears to be superior to that in comparator countries: e.g. high blood pressure and high blood cholesterol concentrations are more commonly identified and controlled by medication and breast and prostate cancer are, on average, detected earlier and have better 5 year survival.<sup>15</sup> What is referred to tendentiously as the ‘health care system’ may care for the sick and for those ‘at risk’ but is not able to care for health. Inequalities in mortality by education level do not appear to be appreciably greater in the USA than in west European countries (and to be

substantially less than in the Czech Republic and Hungary), implying that all social strata in the USA are worse off than their counterparts in western Europe.<sup>16</sup>

In an interesting discussion towards the end of the third volume, the authors draw attention to a detailed report on the control of road traffic injuries: they find that the weaknesses identified in the US response to traffic injury mirror those they have identified for other health problems.

***Summary: what has been learned and what is left unexplained***

These various approaches are informative but often provide limited insight into the ‘causes of the causes’ i.e. why health-damaging consumption habits were slower to change in the USA or why they were able to increase with such devastating effects in communist eastern Europe.

The question can now be put: Could ‘institutionalist’ approaches help to further illuminate these processes? One first needs to clarify what it is that might distinguish an ‘institutionalist’ approach. Drawing particularly on Hodgson’s *From pleasure machines to moral communities: an evolutionary economics without homo economicus*.<sup>17</sup> I have identified the following three salient themes.

***1. Institutions matter***

This assertion entails a rejection - epistemologically and ontologically - of an exclusive methodological individualism. For institutionalists, the societal landscape is populated by a variety of institutional forms, and these make a good deal of difference to the lives of individuals.

***2. Institutions evolve***

Institutions, considered as ‘systems of rules’<sup>18</sup>, may be regarded as provisional solutions to collectively experienced problems. Over time, some are recognised as more successful than others. These processes of variation and differential survival can be understood within the framework of ‘generalised Darwinism’<sup>19</sup> (not to be confused with ‘sociobiology’). The link between ‘institutionalist’ and ‘evolutionary’ perspectives is especially strong within economics.<sup>20</sup>

***3. Humans are morally sentient***

Within an orthodox, individualist, framework, social life is seen as proceeding, above all, by a self-regarding pursuit of pleasure (‘utility’). Many institutionalists, notably among them Hodgson<sup>21</sup>, emphasise – as an important qualification to the priority of self-regarding

behaviour - the human capacity to respond to the perceived needs of others, a capacity shared with our closest primate relatives.<sup>22</sup>

### **Can ‘institutionalist’ approaches aid understanding of adult mortality trends?**

The potential contribution of institutionalist approaches will be assessed using two brief case studies of hazards to adult health that have mostly been successfully countered – but to extents that have changed over time and varied between jurisdictions.

#### ***1. The control of tobacco caused disease***

The first English language scientific demonstrations of the quantitative relationships between smoking and lung cancer risk were reported in 1950. Sixty years later, in 2010, all of the 37 developed countries in our sample, except the USA and Switzerland, had ratified an international treaty on tobacco control, committing themselves to a full repertoire of ‘evidence based’ measures to reduce tobacco smoking.<sup>23</sup> Over this 60 year interval, the currently established set of means for tobacco control were invented, tried and tested - ultimately gaining political support at the highest level.

The early 1950s to the 1970s was a period of gradual clarification at a scientific, professional, political and public level of the nature and meaning of the health risks arising from tobacco use. The epistemology of professional medicine was still pre-quantitative. As reports from epidemiological studies accumulated, high level policy debates continued to revolve around a largely illusory search for ‘proof of causation’.<sup>24</sup> Many physicians remained unconvinced of the hazards. In the USA a 1960 poll found that only one third of physicians were convinced that smoking was a ‘major cause’ of lung cancer and 43 per cent were still regular smokers.<sup>25</sup> Those physicians who appreciated the magnitude of the risks and felt morally impelled to act struggled to find a way forward.

In the late 1950s, George Godber was Deputy Chief Medical Officer in Britain and was very keen to help reduce harm from cigarette smoking. But his superior, the Chief Medical Officer, did not want to take the matter forward with the Minister of Health who was known to be unenthusiastic about taking on the Chancellor of the Exchequer (Treasurer). The Treasury was keen to protect the 15 or so per cent of central government revenue provided by tobacco tax.<sup>26</sup> Godber visited Charles Fletcher, a respiratory physician, at a London teaching hospital and invited him to his club for lunch so that they could discuss strategies. They decided on working through the Royal College of Physicians in order to by-pass the Chief

Medical Officer. The College took up the matter energetically and decided to produce a report aimed at a large audience. In 1962, *Smoking and Health* appeared and quickly sold out.<sup>27</sup> The United States followed suit and in 1964 the Surgeon General's report on *The Health Effects of Smoking* appeared. The mass media covered these reports extensively and Pierce and colleagues have shown that smoking cessation rates in US middle-aged adults were, in turn, responsive to the extent of news coverage.<sup>28</sup> Coverage of the Surgeon-General's report was not the beginning of mass media coverage of smoking and health in the USA – as early as 1946 a news magazine story 'Cigarettes cause cancer?', based on experimental work on the carcinogenicity of cigarette tar was 'widely read' and in 1954 the Readers Digest documented the evidence on smoking and lung cancer in an article on the 'cigarette controversy'<sup>29,30</sup> – but there is good reason to see it as a turning point in increasing public awareness of the hazards of smoking.

A major difficulty, in the 1950s, was that public health authorities were reluctant to tell adult men how they should behave. Reluctance of this kind had not previously inhibited anti-spitting campaigns to reduce risks of transmitting a communicable disease (tuberculosis). Nor had it inhibited strong and detailed directions to mothers, early in the 20<sup>th</sup> century on how they should care for their children.<sup>31</sup>

But advising adult men to abandon a widely accepted habit was seen as different. Crossing this frontier would ultimately change 'the discourse of public health' in Britain and legitimise government activity to promote health favouring lifestyles.<sup>32</sup>

Early tobacco control activists in the UK set out to build political constituencies in support of action by parliament. This turned out to be a slow process. Kenneth Robinson who was health minister through the mid-1960s said that lack of public support had prevented him acting<sup>31</sup>. In 1971 the Royal College of Physicians established a pressure group - Action on Smoking and Health - 'to make non-smoking the norm in society and to inform and educate the public about the death and disease caused by smoking'.<sup>33</sup> Most of the early office holders were activist physicians. Major developments in the institutional evolution of tobacco control came in the mid to late 1980s in Victoria, Australia and in California.

### *Victoria*

The 1987 Victorian Tobacco Act was the first to secure an hypothecated tax to be allocated to health promotion – in this case to the Victorian Health Promotion Foundation (Vichealth).<sup>34</sup> Vichealth then used this money (AUD 23m per year - about USD 7 per person per year) to buy out tobacco sponsorship of sporting and arts events and to fund health promotion

programmes. The narrowly won vote in favour of the Act in the Victorian parliament was the outcome of careful planning, initially conducted in strict secrecy in order to catch the tobacco industry off-guard and prevent it deploying its enormous resources to defeat the Act. Once the campaign was public, the large contributor base of the Anti-Cancer Council of Victoria was mobilised. Newspaper coverage was sympathetic – the main morning paper reported more correspondence on the topic than any other in the paper’s history.<sup>35</sup> Over 150,000 letters of support were sent to state politicians and church leaders were engaged in the campaign. Political engagement of a wide range of actors brought forth a new institutional form: a ‘health promotion foundation’, funded by a hypothecated tax on tobacco, charged with the task of promoting healthier patterns of living, concentrating especially on especially on the modifiable causes of chronic disease in adults. Board members were drawn from the 3 political parties represented in state parliament, medical research, sport, the arts and business and marketing, creating a robust organization, deliberately placed at ‘arm’s length’ from day to day government.<sup>36</sup>

### *California*

The idea of an hypothecated tax was also taken up in California and included in Proposition 99. This won voter approval in November 1988 and brought into being the California Tobacco Control Program, the first such state-wide programme in the USA. Twenty per cent of the 25 cents per pack hypothecated tax was to be allocated to education and prevention.

The history of tobacco control in California, however, began much earlier. In April 1977 the Berkeley City Council passed a ‘clean air ordinance’ (to restrict smoking in enclosed public spaces) after a year-long campaign organized by the local Group Against Smoking Pollution (GASP). Attempts to interest the state legislature in this issue were not successful. ‘State-wide initiatives’ (referenda) provided an alternative path to enact ‘clean air ordinances’.<sup>37</sup> The tobacco industry fought strongly to defeat these referenda, setting up front organisations for each contest: ‘Californians for Common Sense’ outspent proponents of ‘Proposition 5’ (November, 1978) by \$6.4m to \$633,000 and won the vote. In November 1980, another attempt (‘Proposition 10’) was defeated after a campaign in which the tobacco industry outspent its opponents fourfold.

Advocates of tobacco control concluded that local contests were more winnable. By May 1983 21 cities or counties had enacted clean air ordinances. In the same month the San Francisco Board of Supervisors passed a ‘Workplace smoking ordinance’ by 10 to 1. The tobacco industry sensed danger and formed ‘San Franciscans Against Government Intrusion’

to campaign for repeal. In November the vote to uphold the ordinance was narrowly won – an outcome widely seen as the first big electoral defeat for the tobacco industry.

In 1967 California had raised taxes on cigarettes, increasing their prices above the national mean. From that time til the mid-1980s they had declined (in relative terms) to below the national mean.<sup>38</sup> During 1987 a new coalition of state voluntary and professional health organisations – including state branches of the American Lung Association, the American Heart Association, the American Cancer Society and the California Medical Association – formed to press for a tax increase with a specified proportion of the proceeds to be allocated for ‘education and prevention’ (in relation to tobacco). Although the tobacco industry outspent the proponents more than 10-fold (\$21.4m to \$1.6m) during the campaign on ‘Proposition 99’, it lost the vote in November. Proponents had compensated for their limited finances by mobilizing a large volunteer base – for example, they sought free publicity by holding press conferences throughout the state using local volunteers.

When the California Tobacco Control Program began operations the following year its media component made strong direct attacks on the tobacco industry. There followed protracted political and legal battles with funding for the prevention component being diverted for some years to fund clinical services. Initially well-funded support for local tobacco control activities was also withdrawn until, in January 1996, full funding was restored to the education and research accounts. Other legislation required all workplaces to be smoke free by January 1995 – 8 years before any other US state – and Californian bars to be smoke free in January 1998.

Time trends in tobacco consumption and in lung cancer in California compared to the rest of the USA are of special interest. In the 1960s Californians smoked more than in the rest of the USA, but from the 1970s smoking declined more rapidly there.<sup>39</sup> The rate of decline doubled after the Tobacco Control Program was introduced. The proportion of adults smoking more than 20 cigarettes per day fell from over 20% in the 1960s to less than 3% in 2007 – compared to 7% for the rest of the USA. Mortality from lung cancer (at all ages) started to fall sooner and has fallen further.<sup>40</sup> Mortality in those born since mid-century is a more sensitive indicator of the effects of recent smoking trends: unpublished data show that for men born in the late 1950s those living in California now have only half the risk of lung cancer death of men living elsewhere in the USA.<sup>41</sup> This major success is all the more remarkable for occurring in a country that has generally been an underachiever in the primary

prevention of chronic disease. Curiously, this success was overlooked in *Shorter lives, poorer health*.

That California's initial divergence from national smoking trends coincided with the rise of anti-tobacco activism – and occurred well before the implementation of the formal programme – suggests complex, and presumptively reciprocal, relationships between rising public awareness of the health effects of smoking and organized anti-smoking activity with the latter apparently acting as a spur to smoking reduction. (If true, this effect of political contests around tobacco replicates the experience of Norway when it became the first country to ban tobacco advertising on television. The change in the rising trend of tobacco consumption in Norway came in 1970, the year of intense public debate about the legislation, well ahead of the enforcement of the ban on advertising in 1975 (Figure 4).<sup>42</sup> In California, the interplay between activity in civil organizations and in local and state governments was complex and reciprocal. Over time much was learned by those seeking to reduce harm from tobacco, including political lessons on how to defeat powerful commercial interests. Norms relating to the acceptability of smoking have changed markedly over the last half century. By 1999, 73% of Californians were living in homes that had decided to make themselves smoke free – though adoption of this 'household policy' had not been initiated by the formal programme.<sup>43</sup>

In 2006 Philip Morris was convicted by a US federal court under legislation designed to counter organised crime (the Racketeer Influenced and Corrupt Organizations Act) for having: falsely denied that they market to youth, falsely denied that they manipulated cigarette design, falsely represented that light and low tar cigarettes deliver less nicotine and tar, falsely denied that ETS [second-hand smoke] causes disease and suppressed documents, information, and research.<sup>44</sup> In November 2012 they were ordered to make public statements admitting that they had lied to the public.<sup>45</sup> Elsewhere, the closing off of marketing opportunities in high income countries was taken one step further when, in December 2012, Australia enacted a law requiring that all cigarettes be sold in standardised packaging with the manufacturer's identity only declared in standardized 10 pt ariel lettering. (See Figure 5 for an Australian cigarette pack collected in April, 2014.)

The institutions of tobacco control have evolved internationally, a process fostered by international conferences on smoking and health (the first was in New York in 1967) and dedicated scientific journals (*Tobacco Control*, founded in 1992, now has an impact factor

over 5). In 2008 the World Health Organization summarized current ‘best practice’ in anti-tobacco policy under the acronym MPOWER:

**M**onitor tobacco use and prevention policies

**P**rotect people from tobacco use

**O**ffer help to quit tobacco use

**W**arn about the dangers of tobacco

**E**nforce bans on tobacco advertising, promotion and sponsorship

**R**aise taxes on tobacco.

Detailed country profiles are available on the WHO website tracking implementation within this framework. The most robust indicator of success in reducing cumulative tobacco exposure is lung cancer mortality - preferably at younger ages so as to reflect the recent experience of young adults. For males, lung cancer mortality under the age of 50 peaked in nearly all developed countries (including those in eastern Europe) before the year 2000, implying a peaking of smoking uptake in adolescents before about 1980. The epidemic in females has lagged relative to that in males, with 6 of the 37 countries (Portugal, Spain, Italy, Greece, Ireland and Germany) showing rates still rising between 2005 and 2010.

The century long epidemics of cigarette smoking and its consequent disease burdens illustrate well the long time frame over which chronic disease determinants may rise and fall, making campaigns to reduce them into long wars of attrition (and recalling Max Weber’s definition of politics as ‘a strong and slow boring of hard boards’ which ‘takes both passion and perspective’<sup>46</sup>). Tobacco control also illustrates the interplay between evolving scientific methodologies and policy responses. With increased acceptance of quantitative (epidemiological) reasoning and its transmission to political and wider publics (for example<sup>47</sup>), quantitative assessments have become more central to policy deliberations, facilitating effective institutional responses, nationally and globally.

Persuasion requires shared standards of evidence, chains of authority, networks of trust, and accepted rules of logic and evidence. Changes in the rules of discourse and communication, no less than the knowledge unearthed by science, are the background to the changes in health and longevity that are the mark of the ‘modern’ age.<sup>48</sup>

### *Illustrative explorations: 2. The reduction of road injuries*

Figure 3 includes road injuries among the causes of years of life lost illustrated for Hungary, the Czech Republic, the USA and Australia. The tendency for loss of life from road injuries to fall in parallel with the leading non-communicable diseases is somewhat blunted by the higher exposure (greater car use) in more recent periods and in the USA and Australia compared to Hungary and the Czech Republic. When expressed per unit of exposure (e.g. per 10000 registered vehicles per year) the difference between Hungary and Australia in 2010 is about 3 fold.

Deaths from traffic injury per unit of exposure have fallen around 10 fold in many developed countries over the past half century or so. Despite this outstanding public health success, road injuries still ranked 5<sup>th</sup> as a cause of lost life years in developed countries in 2010.<sup>49</sup> The USA's pattern of underperformance has extended to traffic injury reduction and an official report into the reasons for this attracted the attention of the authors of the 2013 report on *Shorter lives, poorer health*.

the panel was struck by how closely the TRB [Transportation Research Board] committee's overall findings parallel those documented in Part I of this report. Indeed, the TRB report's opening paragraph could have been used (with only minor changes) for this report<sup>50</sup>

Because of the relative identifiability of the causes of traffic injury and of the short time lags between control measures and their effects, traffic injury control provides a sensitive field in which to explore the relationship between problem identification, policy proposals, policy adoption, programme implementation and health effects.

First, it is appropriate to note that success has not flowed exclusively from centrally initiated policies, especially in the early decades of motorization. Smeed writing in the early 1970s showed that deaths from traffic crashes in relation to the number of registered vehicles had followed a general, and pronounced, downward trend as the number of motor vehicles increased in relation to population.<sup>51</sup> This implies that, up until the 1970s, societies had generally learnt how to use motor vehicles more safely as familiarity with them and the resources available for safety measures both increased. Because the overall tendency was general, it is unlikely to have depended on the specifics of policies variably adopted. However, over the last 4 or 5 decades, organized policy responses have clearly made a bigger contribution to injury reduction.

The Australian state of Victoria has been a pioneer in traffic injury control and its experience will be briefly reviewed here before noting some of the TRB's findings for the USA.

Consistent with Smeed's prediction, deaths per 10000 vehicle years fell in Victoria as the number of vehicles increased in relation to population - from over 20 in the 1930s to about 9 in the early 1960s. During these early decades, Victoria generally had rates in excess of Smeed's prediction and from the late 1940s onward, the 'road toll' was increasingly seen to be unacceptable. Early policy responses relied on exhortation – for example, encouraging motorists to sign a pledge to abstain from 'careless and discourteous behaviour' on the roads. Unsurprisingly, this approach was not successful. A campaigning young police surgeon engaged journalists in the cause by taking them to the scenes of alcohol related accidents on Friday and Saturday nights. A committee of the Royal Australasian College of Surgeons made a case before the parliamentary committee on road safety for more rigorous surveillance and for compulsion. In 1970, these submissions convinced the main political parties to support legislation, the first in the world, compelling Victorians to fit and wear seat belts.<sup>52</sup> Compliance with the new law was high and road deaths fell. In 1976, the Victorian parliament was the first in the world to legislate for random breath alcohol testing, responding again to advice from professionals. Deaths declined over the following decade. In 1986 a Transport Accident Commission was established, with secure funding from a levy on motorists. It paid no-fault compensation to those injured, which gave it a financial incentive to reduce injuries. A specified proportion of its spending on injury prevention was required to be spent on programme evaluation – thus supporting the development of an independent accident research institution. In late 1989, after traffic deaths had begun to rise again, it launched one of the most intensive mass media campaigns ever run in Australia - combined with intensified police enforcement. This combination of intensive mass communication, enforcement and evaluative research has continued. For example in 2009 police performed 1.24 million random breath tests in a total population of 5.4 million persons<sup>18</sup>. A local historian commented in 2004:

Probably nowhere else in the world was the conduct of the individual motorist more closely monitored or more rigorously controlled. Yet, with only occasional grumblings, motorists overwhelmingly accepted these measures.<sup>53</sup>

These strategies of education and enforcement were combined with those of engineering. In 1965, Ralph Nader had denounced US cars as 'unsafe at any speed'.<sup>54</sup> In Australia, the national government negotiated against the resistance of the international automobile industry

for ‘design rules’ to make cars safer – e.g. collapsible steering columns, shatter-proof windshield glass and the removal of dangerous protrusions from the passenger cabin (personal communication: Tony Ryan, 2013). For the US, Robertson has documented the continuing resistance of the motor industry to manufacturing safer cars.<sup>55</sup>

By 2010, across developed countries as a whole, transport fatality rates (per 10000 vehicle years) varied more than 5 fold from less than 0.6 in Switzerland, Sweden, Finland, Malta and Iceland to more than 3.0 in Latvia, South Korea and Romania.<sup>56</sup> The USA (1.37) was some 60% above the rate for Australia (0.85) though rates for the 2 countries had been similar 30 years earlier.

Globally, the success of traffic injury control has depended on institutional evolution over several decades. Pioneer jurisdictions moved from considering traffic injury as a moral issue to a public health one and acted on the advice of professionals – whose knowledge at that time typically reflected its early stage of development. Emergent control measures have been multifaceted, extending from modifying driver behaviour (including drink driving and speeding) to the redesign of cars and roads. Sustained reduction of injury rates has depended on the concurrent discovery of what to do — by programme supported research bodies such as the Monash University Accident Research Centre (in Victoria), the Insurance Institute for Highway Safety (in the United States), and the Transport Research Laboratory (in the United Kingdom). A body of experience now exists to guide the intensification of control measures. The UN has declared 2011 to 2020 as a Decade of Action for Road Safety resting on 5 pillars: 1. Road safety management; 2. Safer roads and mobility; 3. Safer vehicles; 4. Safer road users and 5. Improved post-crash responses. Illustrating the potential for rapid gains from the application of knowledge built up over previous decades – the ‘late-comer benefit’ - Spain managed to halve fatality rates in just 5 years (from 1.61 per 10000 vehicle years in 2005 to 0.80 in 2010).<sup>57</sup>

The TRB report analyses in some detail why progress has been slower in the USA than in comparator nations. Political support has not been mobilized:

The cases of seat belts and of motorcycle helmets . . . provide clear illustrations of how public and political attitudes can restrain risk-reducing measures despite the availability of effective and well-managed countermeasure programs in many states. The effectiveness of seat belts in reducing casualties and of specific interventions (primary laws and high-visibility enforcement) in increasing usage are well established by research and by the experience of many states. The interventions are

not complex or expensive compared with the efforts required for speed control or impaired-driving control. Nonetheless, some jurisdictions have chosen not to apply these measures.<sup>58</sup>

Speed control measures also lack commitment and the needed institutional resources:

Successful speed management initiatives in other countries are of high visibility (through publicity and endorsement of elected officials), are long term (sustained for periods of years), target major portions of the road system, use intensive enforcement (e.g., automated enforcement and high penalties), sometimes use traffic-calming road features (such as narrow lanes and traffic circles that cause drivers to reduce speed), and monitor progress toward publicly declared speed and crash reduction objectives. No U.S. speed management program today is comparable in scale, visibility, and political commitment to the most ambitious programs in other countries. (p 223)

To summarise: These two case-studies suggest that international differences in chronic disease and injury rates may, in substantial measure, be related to the effects of collective actions intended to reduce them.

### **Political economies and chronic disease trends**

This is a suitable point to return to the most dramatic failure in chronic disease control noted so far: that in communist eastern Europe between about 1970 and 1990. This failure will come as no surprise to neo-liberals – especially those who have read their Hayek. Hayek placed his trust, above all, in decentralized exchanges of knowledge through markets. This he saw as the foundation for ‘spontaneous’ social order because markets allowed “the mutual adjustment of many individual economies” by a process of ‘catallaxis’. Hayek considered it a ‘fatal conceit’ to believe that sufficient relevant knowledge could be assembled together in the minds of a small group of individuals – be they socialist planners or ‘constructivist’ scientists or social reformers – to permit centralized guidance of societal affairs without risk of unintended adverse consequences.<sup>59,60,61</sup> Hayek’s negative prognosis for socialist economies has been vindicated.<sup>62</sup> The catastrophic failure of the political leaders of the socialist countries to respond appropriately to rising chronic disease illustrates the vulnerability of highly centralized societies when their leaders fail to ‘get it right’. Whereas these countries had no problem importing and using the knowledge needed to protect and enhance child health, or to deal with ‘traditional’ threats to adult health that the Semashko system had been designed to contain<sup>63</sup>, they deliberately blocked the local development of chronic disease epidemiology - the science being developed internationally to understand and

contain chronic disease risks. These discipline specific weaknesses were compounded by a hierarchical, institute based organization of research that was ill-suited to fostering self-critical and creative science, capable of dealing with unforeseen social problems.<sup>64,65</sup> These institutional weaknesses persist. A bibliometric search for research papers published in 2001–2010 and indexed in PubMed with MESH terms relating to the epidemiology and control of heart disease and stroke showed that the median for the post-communist group of countries was only 15 per million mid-period population, compared with five times that rate in the United States and the United Kingdom and more than ten times that rate in Sweden, Denmark, and Israel (personal analyses).

Although Hayek seems to have got it right about the vulnerability of highly centralized political economies to ‘unintended consequences’ he does not seem to have anticipated that beneficial uses of knowledge could also be hindered in at the other pole, in decentralized political economies such as the United States.

### **Concluding reflections: Institutionalism and contemporary viewpoints on public health**

There is no shortage of viewpoints about how avoidable disease might best be averted. But most suffer, each in their own way, from different distractions and from a failure to fully recognize the centrality of institutional evolution to the successful reduction of chronic disease and injury risks.

#### *Scientific and professional viewpoints*

Public health scientists are generally well aware of the extent to which chronic disease and injury risks have varied over time and between populations. But a common ‘distraction’ in this group is the idea that knowledge can be put to work among free-living citizens in a way which mirrors the conduct of a controlled experiment – that is, by ‘interventions’. In such experimental trials, which provide the most robust test of causal and therapeutic hypotheses, agency is emphatically with the ‘intervener’. The question arises as to the closeness of the analogy between the conduct of experiments and the diffusion and use of knowledge to prevent disease. In many cases, where agency rests with a clinician or a programme director, the analogy is not inappropriate. Clinicians may aim to replicate trial findings by prescribing medications to reduce blood pressure; public health administrators may seek to replicate trial results on the effectiveness of papilloma virus vaccination to prevent cervical cancer. Where ‘intervention’ becomes seriously misleading is when it is used to describe complex social

processes such as those discussed above in relation to tobacco control and traffic injury reduction. The implication is often that government agencies are the potential ‘interveners’ and that what is missing is simply the ‘political will’ to act. But such will cannot be invoked merely by exhortation. It usually assumes a supportive political constituency. Building such a constituency may be a harder and longer task.

#### *‘Social determinants’ viewpoints*

Following the publication of the World Health Organization Commission on the Social Determinants of Health<sup>66</sup> expressions such as ‘social determinants’ and ‘wider determinants’ of health have been taken to refer to ‘determinants of health inequalities’ – and thus not to include the social determinants of average levels of population health.<sup>67</sup> This distraction is unfortunate, not least because gains that could benefit all social strata are probably more likely to attract political attention than those only affecting the disadvantaged. Furthermore there is evidence that average levels of health are more tractable than their dispersion (levels of inequality) – for example Figure 3.

#### *‘Left wing’ viewpoints*

The main left wing distraction is that inequality in economic and political power is blocking health gains for the whole population.<sup>68</sup> But it has proved possible to defeat corporations that profit from health damaging consumption. And, overall, left of centre governments don’t seem to have done any better at securing health gains for adults. Nor is it easy to explain why Australia has done so much better than the USA, given that both are bastions of liberal capitalism.

#### *‘Right wing’ viewpoints*

Writers on the right, including the curiously named school of ‘libertarian paternalism’<sup>69</sup> are preoccupied with the dangers of government coercion. Their narrative relates to individual choice and offers few insights into how and why consumption norms change at a population level, or why the USA is doing worse than its comparators.

## **Conclusion**

The best explanation of why some developed countries (and states within countries) have been more successful in reducing burdens of chronic disease and injury is the most obvious one: they have addressed the causes of these diseases more effectively. The case studies of tobacco control and traffic injury control showed that profoundly beneficial change is

possible but that it may not come easy or quickly – especially for pathfinder jurisdictions. The complex underlying social processes do not declare themselves unambiguously and are open to multiple interpretations. They may resist quantitative analysis and the formulation of falsifiable hypotheses. Institutional insights can help us avoid the traps of methodological individualism, enabling recognition that forms of social organization above that of the individual (that is institutions) have been critical as has their evolution through time. And much of this has happened because of activities conducted out of regard for the interests of others.

Table 1: Adult mortality risks\* (%) for men and women in 37 developed countries in 1970, 1990 and 2010 (median values for each period shown **thus**).

Country	Men						Women					
	1970		1990		2010		1970		1990		2010	
	AMR	Rank	AMR	Rank	AMR	Rank	AMR	Rank	AMR	Rank	AMR	Rank
<b>Western Europe and Israel (n=21)</b>												
Austria	20.6%	26	15.6%	20	9.8%	16	10.7%	20	7.4%	17	4.8%	13
Belgium	19.4%	21	14.0%	16	10.4%	21	10.5%	18	7.6%	18	6.0%	26
Cyprus	15.1%	3	10.9%	3	8.5%	13	9.7%	9	5.8%	3	3.8%	1
Denmark	15.8%	6	<b>15.1%</b>	<b>19</b>	10.8%	22	10.4%	15	9.8%	29	6.5%	28
Finland	25.9%	34	18.2%	26	12.4%	26	10.1%	11	7.0%	15	5.4%	20
France	19.9%	23	16.2%	23	11.6%	24	9.8%	10	6.7%	10	<b>5.3%</b>	<b>19</b>
Germany	<b>19.2%</b>	<b>19</b>	15.7%	21	10.2%	20	10.9%	23	<b>7.7%</b>	<b>19</b>	5.4%	21
Greece	13.3%	1	11.8%	8	10.1%	17	7.9%	2	5.6%	2	4.1%	3
Iceland	17.2%	12	11.1%	4	6.5%	1	9.4%	7	6.8%	12	4.4%	10
Ireland	18.1%	15	13.4%	15	8.5%	14	12.0%	33	7.9%	21	5.2%	18
Israel	16.1%	7	11.6%	7	8.3%	9	11.2%	27	7.3%	16	4.6%	12
Italy	17.6%	13	13.1%	14	7.9%	8	9.5%	8	6.1%	5	4.1%	5
Luxembourg	22.7%	30	16.2%	22	<b>10.2%</b>	<b>19</b>	11.5%	31	8.0%	23	5.1%	16
Malta	18.4%	16	10.8%	1	7.3%	3	11.0%	26	6.4%	7	4.5%	11
Netherlands	15.7%	5	11.6%	6	7.4%	4	8.6%	4	6.8%	13	5.5%	22
Norway	15.6%	4	12.8%	12	7.7%	7	7.7%	1	6.6%	9	5.1%	15
Portugal	20.9%	27	17.6%	25	12.1%	25	10.9%	22	7.9%	22	4.9%	14
Spain	16.6%	10	14.7%	18	10.2%	18	9.4%	6	6.0%	4	4.3%	6
Sweden	14.3%	2	11.5%	5	7.1%	2	8.4%	3	6.5%	8	4.4%	9
Switzerland	16.5%	9	12.8%	11	7.4%	5	8.8%	5	6.3%	6	4.3%	7
United Kingdom	18.0%	14	12.9%	13	9.3%	15	10.7%	21	7.8%	20	5.8%	25
<b>Eastern Europe (n=10)</b>												
Bulgaria	16.4%	8	21.8%	27	21.1%	32	10.1%	12	9.7%	28	8.7%	33
Czech Republic**	22.2%	29	22.0%	28	13.9%	29	10.9%	25	9.4%	27	6.3%	27
Estonia	25.6%	33	29.7%	35	25.3%	35	10.4%	16	11.0%	34	8.7%	32
Hungary	19.9%	22	30.4%	36	24.5%	34	11.4%	30	13.3%	37	10.3%	35
Latvia	26.2%	35	30.8%	37	32.5%	37	11.3%	28	11.7%	36	12.1%	37
Lithuania	24.7%	32	28.9%	34	31.6%	36	<b>10.5%</b>	<b>19</b>	10.8%	33	11.5%	36
Poland	20.6%	25	26.3%	32	20.7%	31	10.5%	17	10.2%	31	7.8%	31
Romania	18.8%	18	23.8%	31	21.7%	33	12.1%	34	11.4%	35	9.1%	34
Slovakia**	21.4%	28	26.8%	33	19.2%	30	10.9%	24	10.2%	32	7.4%	29
Slovenia***	28.7%	36	22.3%	29	13.8%	28	14.0%	36	9.1%	26	5.6%	23
<b>Other (n=6)</b>												
Australia	20.2%	24	12.4%	9	7.6%	6	11.4%	29	6.7%	11	4.4%	8
Canada	18.5%	17	12.7%	10	8.4%	10	10.1%	13	7.0%	14	5.2%	17
Japan	17.1%	11	10.9%	2	8.4%	11	10.3%	14	5.3%	1	4.1%	4
Korea, South	37.9%	37	23.3%	30	11.2%	23	22.1%	37	9.9%	30	4.1%	2
New Zealand	19.3%	20	14.2%	17	8.4%	12	11.6%	32	8.8%	24	5.6%	24
United States	22.8%	31	16.7%	24	13.0%	27	12.6%	35	8.9%	25	7.8%	30

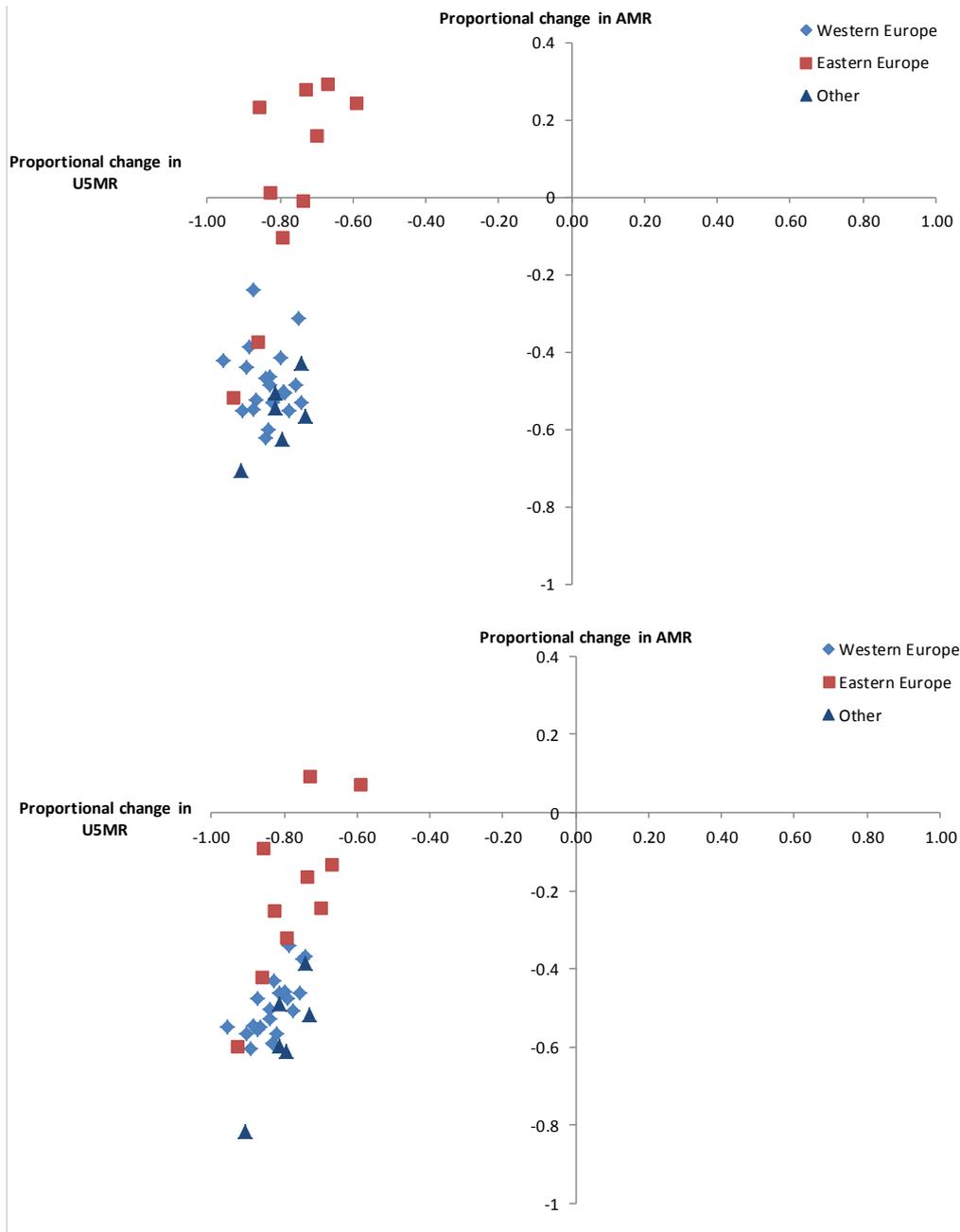
\* probability at exact age 15 of dying before exact age 60 (%) if period death rates remained constant

\*\* estimated for post-independence boundaries using official records for the earlier period

\*\*\* estimate for 1970 imputed

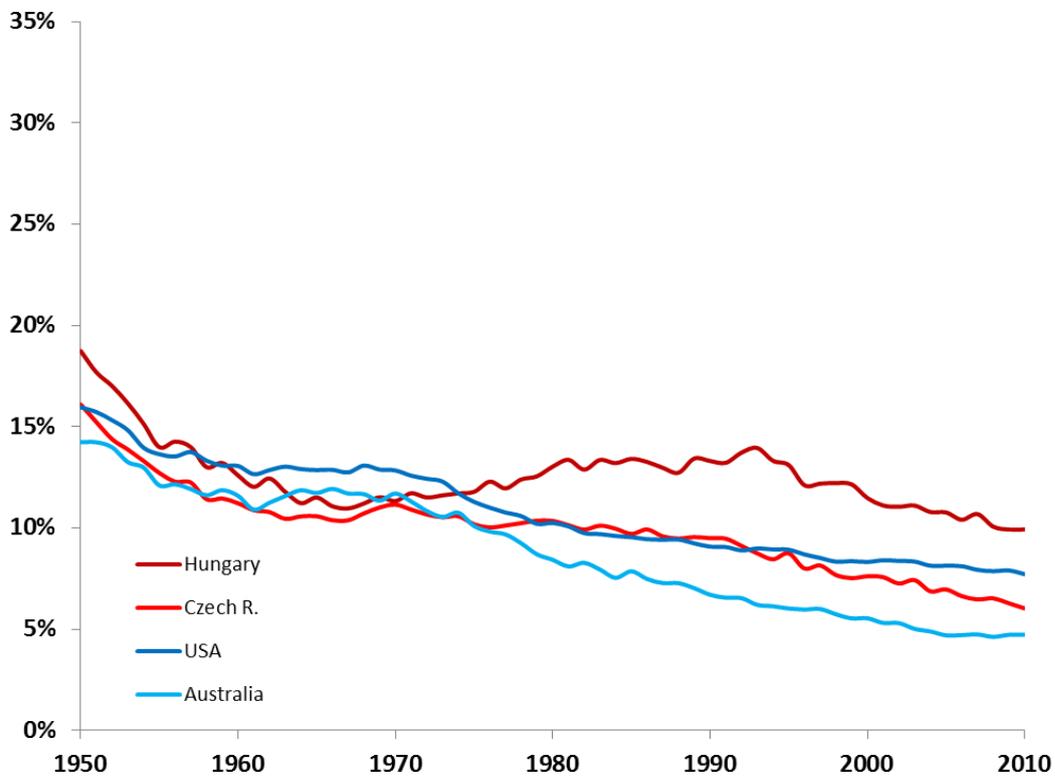
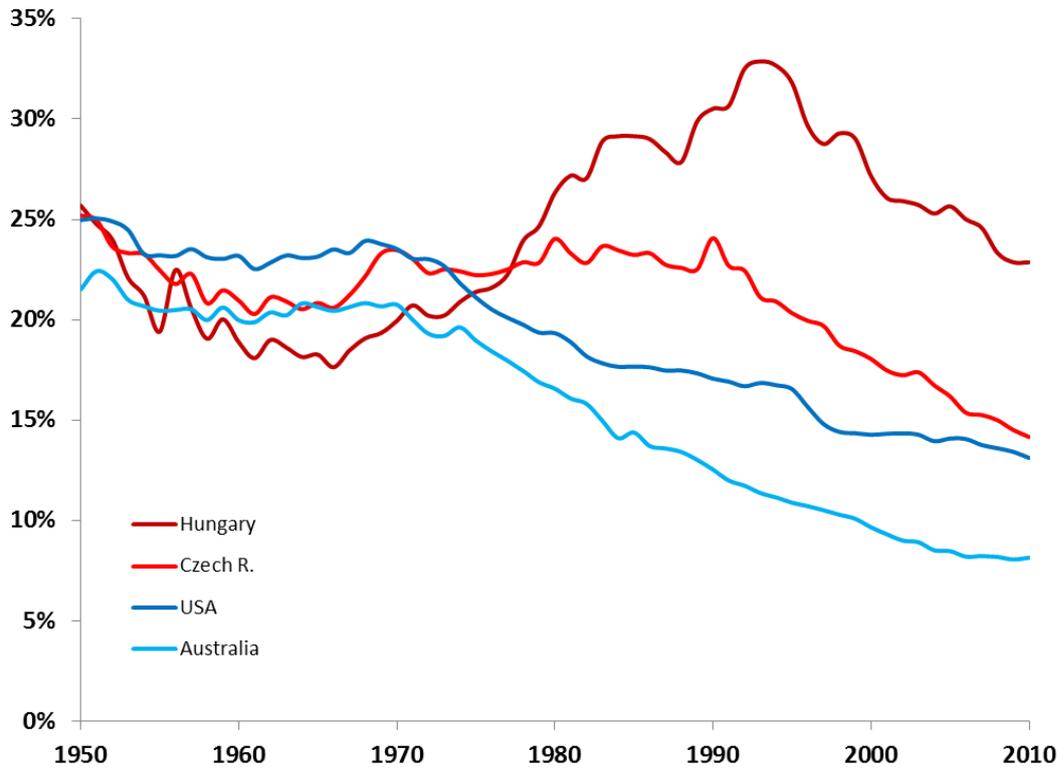
Source of data<sup>70</sup>

Figure 1: Proportional changes, 1970 to 2010, in child and adult male (above) and adult female (below) mortality risks, 37 developed countries



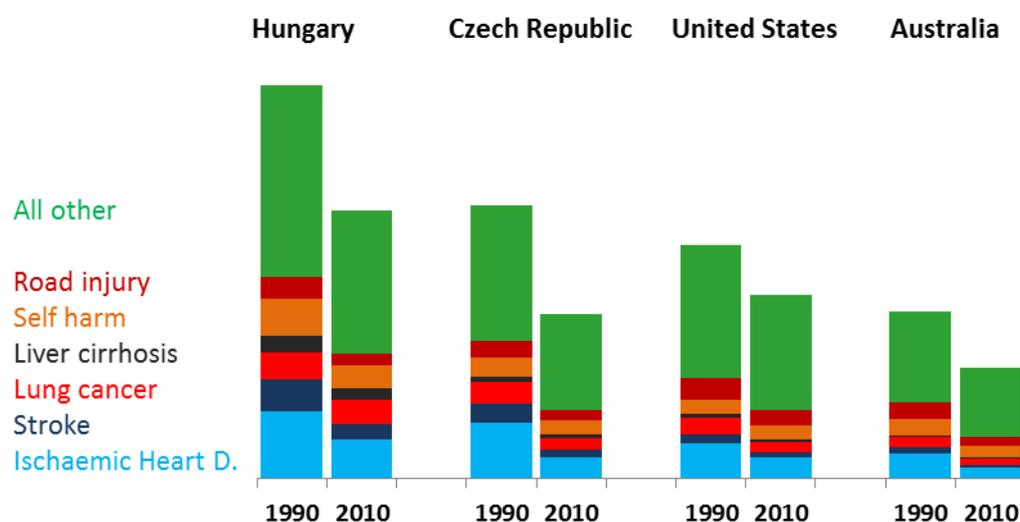
Source of data<sup>71</sup>

Figure 2: Trends since 1950 in the risk on the 15<sup>th</sup> birthday of dying before the 60<sup>th</sup> birthday, assuming mortality rates were to remain constant, Hungary, Czech Republic, USA and Australia, men (above) and women (below)



Calculated using data from<sup>72</sup>

Figure 3: Years of life lost from 6 leading causes from deaths occurring between exact ages 15 and 60 for both sexes combined, age standardized, 1990 and 2010, Hungary, Czech Republic, USA and Australia.

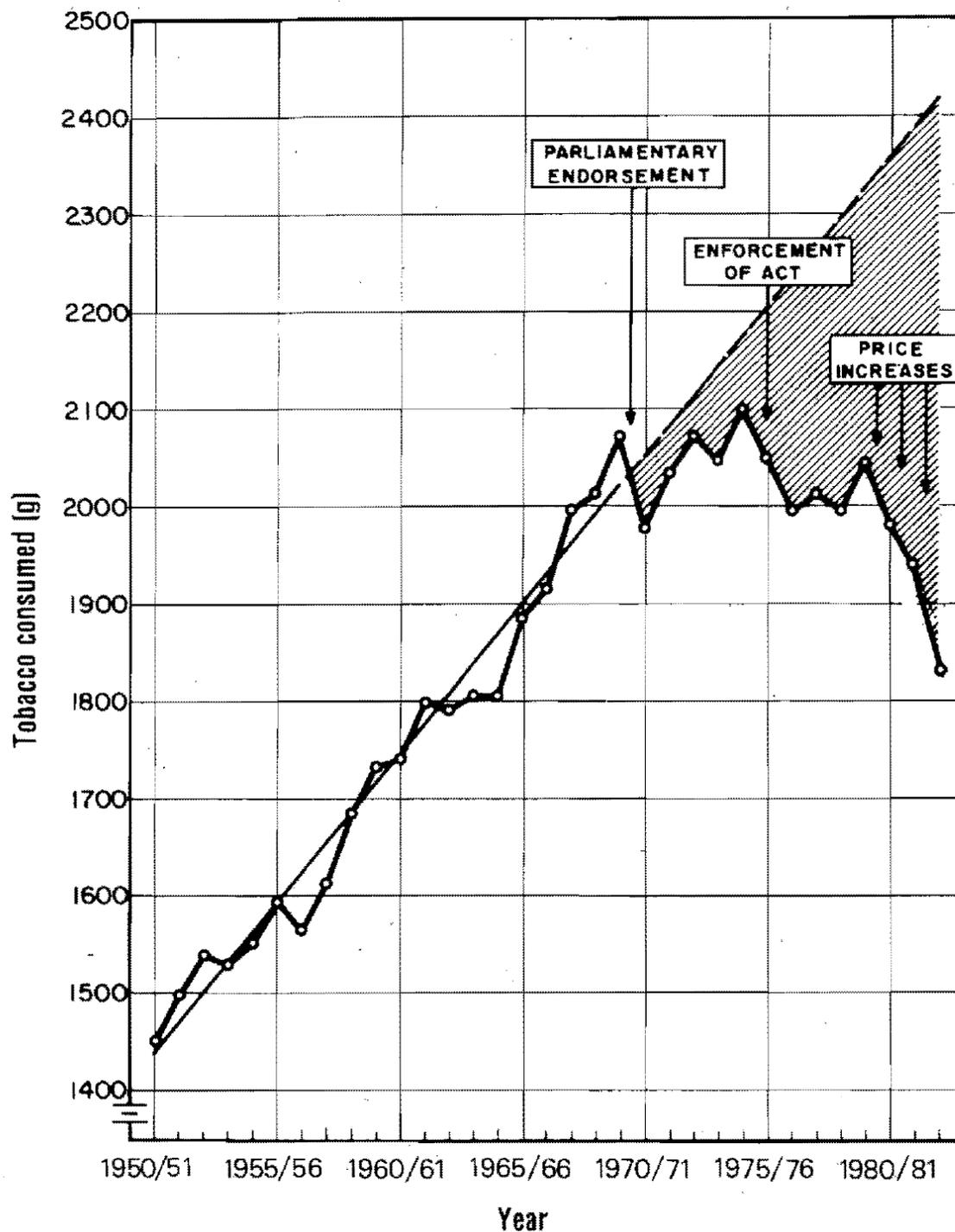


Notes: Cause specific mortality rates are from the Global Burden of Disease project, which are based on official national statistics but have been adjusted to enhance validity and comparability - mainly by redistributing deaths attributed to causes which are inappropriate as underlying causes of death ('garbage codes'). Years of life lost are calculated using the life expectancy at the age of death under a reference life table with a life expectancy at birth of 86 years.<sup>73</sup> This metric weights more premature deaths (e.g. those from road injuries) more heavily. Mortality from liver cirrhosis is that attributable to alcoholic beverages.

Calculated using data from<sup>74</sup>

### Figure 4: Trends in tobacco consumption around the time of legislation to ban advertising on television

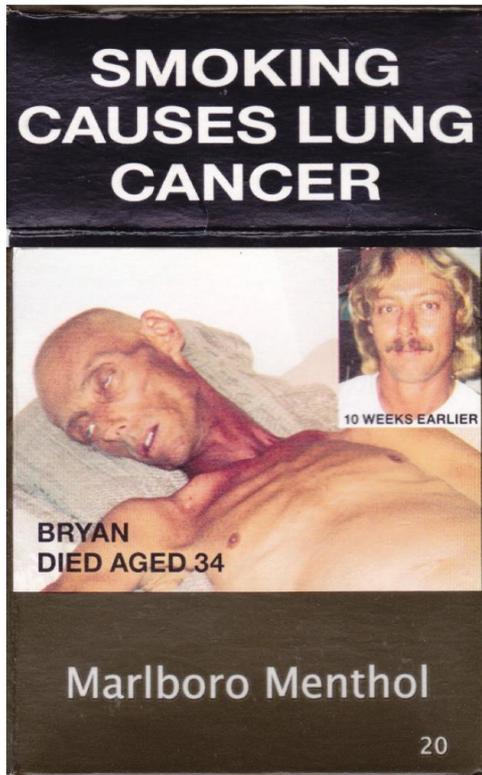
Fig. 2. Consumption per adult (aged 15+) of manufactured cigarettes plus smoking tobacco, Norway, 1950/1951–1982/1983. The dotted line is an extension of the regression line for the years 1950/1951 to 1969/1970. The arrows indicate points of time for parliamentary endorsement of the governmental control programme, for enforcement of the Tobacco Act and for recent price increases due to taxation. (Data for sales figures from Reports from the Directorate of Customs and Excise, Oslo, and for population figures from Reports from the Central Bureau of Statistics, Oslo, unpublished data).



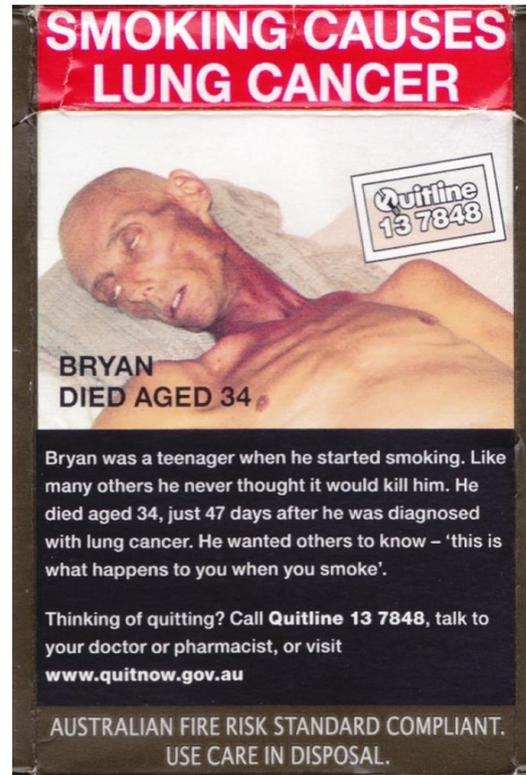
Source<sup>75</sup>

Figure 5: Australian cigarette packaging under the 'plain' packaging legislation of 2012

## Front

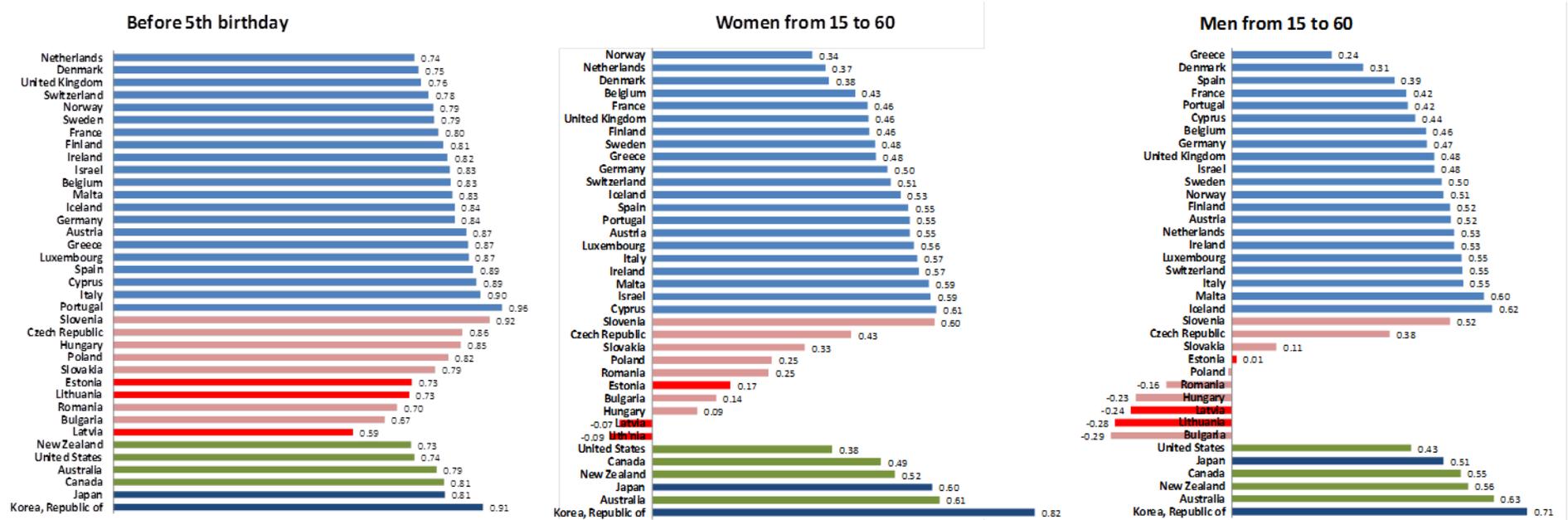


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APPENDIX

Figure A1: Proportional reductions in risk of dying, children and adults, 37 developed countries grouped by region, 1970 -> 2010



Guide to the figure

Each bar represents the proportional change in the mortality index for a country from 1970 to 2010. Countries are sorted in 3 groups by their values on each index. The West European countries (mid blue) are sorted from low to high; below them the central (pink) and east European countries (red) are sorted from high to low. The bottom group, sorted low to high includes north America, Australasia (both green) and east Asia (dark blue). Source of data<sup>76</sup>

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