Original Article

The regulatory gap in chronic disease prevention: A historical perspective

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Abstract Experience shows that regulatory intervention can lead to substantial improvement in population health. The history of regulatory intervention in public health suggests that 'tipping points' necessary to catalyse regulatory change may be identified. We examine three areas in which governments have legislated to protect public health: sanitation, building standards, and vehicle emissions. We apply the lessons to regulatory reform addressing obesity and the chronic disease it causes.
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> The wealthy, the easy, classes can build themselves commodious houses; they can select healthy situations, they can in most instances command unfailing supplies of pure water and fresh air; if health fails them in one place, they may pursue it in a thousand others; but for the children of poverty and toil, if legislation does not interfere to bring it to them, it will become as unattainable a blessing as the rarest gifts of fortune.
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> First Public Health Act 1848 (Britain), Second Reading Speech 386.[1]

Introduction

Public health experience – from smoking to infectious disease control – shows that legislative reform measures can be potent, equitable, and cost-effective. Law enables structural reform, creating shifts in culture, attitudes, and behaviours. Law, focused on populations, is a central aspect of public health practice.

Food regulation, except for 'fortification' requirements, has addressed acute food safety rather than obesity and nutrition-related chronic disease. Serious consequences of poor nutrition and over-consumption are not immediately evident and have been characterised as amenable to individual choice. Paradoxically nutrition-related chronic disease is more common and creates more ill health than acute food poisoning.[2–5]

Obesity contributes to many chronic diseases,[6] that account for 60 per cent of preventable deaths in developed countries,[3] and by 2020 will account for 70 per cent of deaths in developing countries.[7,8] Current interventions are unlikely to improve population body weight or reach government targets.[9]

Environmental or structural changes are needed[10,11] as education and treatment strategies are ill-suited to control obesity and will benefit most those with higher socio-economic backgrounds.[12–16] Yet public health officials in developed and developing countries favour these strategies. But increasingly we hear calls for regulatory approaches to address obesity and chronic disease.[17]

Legislative Interventions in Public Health

Laws to protect public health have existed for millennia. Building standards date back to Babylon's *Code of Hammurabi*, 1790 BC.[18] We consider legislative interventions in sanitation, building standards, and vehicle emissions.

Sanitation

Britain enacted the first public health laws during the nineteenth century.[19] They governed sanitation – piped drinking water and disposal of human wastes.[20] This 'sanitary reform' is believed to have had a significant public health effect.[21] (Modern readers of the *British Medical Journal* voted these reforms the most important medical milestone since 1840.[20])

Reform followed the *Report on the sanitary condition of the labouring population of Great Britain (1842)*, known as the '*Sanitary Report*',[22] compiled by Sir Edwin Chadwick, a lawyer, following his work in 1832 for a Royal Commission on *Poor Laws*.[19,23] With increasing population, towns' sanitary arrangements could no longer suffice.[24] The *Sanitary Report* noted that average life expectancy in Rutland (an agricultural area) was 52 years for a 'gentleman' and 38 years for a 'working man'. In the towns, it was 38 years for a 'gentleman' and 17 years for a 'working man'.[24]

Disease, the Report said, was spread by airborne impurities from decomposing animal and vegetable substances, damp and filth, close and overcrowded dwellings, and the lifestyle of the lower classes with their 'habitual avidity for sensual gratifications',[25] suggesting a general lack of dignity and morality. The Report recommended that municipalities improve drainage, ventilation, water systems, and street cleaning to prevent further disease.[24]

The new sanitary law generated suspicion and outrage at the lack of transparency in public expenditure. Reportedly, 'plans, estimates, budgets, accounts, audits, solicitation forbids and supervision of contractors were foreign to many local governments'.[23] It was an audacious government act. One opponent complained that it would 'pass a roller over England, destroying any vestige of local pre-eminence, and reducing all to one dull and level monotony'.[23] In a culture with pervasive class distinctions, equality appeared in one aspect of life. People, unfamiliar with the rationale, were asked to accept comprehensive sanitary improvement.

The Health of Towns Association, formed in London in 1844, became an important lobby group, supporting sanitary reforms, that culminated in the *Public Health Act 1848*.[24] The Act, a modest piece of legislation, gave towns the authority to undertake sanitary improvements and established a General Board of Health to facilitate and loosely supervise improvements.[23] Local authorities had power to control hazards in the built environment:

- building standards and town planning;
- control of noxious trades;
- water supply;
- sewage disposal;
- management of burials and mortuaries; and
- vermin control.[26]

The Act, though narrow, forced improvements in public health.[24] It marked a commitment to proactive, rather than reactive, public health. The State became guarantor of health and environmental quality standards and provided means for local government to meet them.[27,28] The inspectors appointed under these powers encouraged towns to spend a large share of their local taxes for the next three decades on something that might fail.[23] Not all towns acted quickly or cooperated with the inspectors.[27] Building regulation, previously independent of larger regulatory framework, was now subsumed into public health.

Building standards

In the thirteenth century, London enacted building laws titled *Recommendations made by the council of reputable men for the purpose of calming and pacifying an angry citizenry, and to protect against fires, with God's help*. This was precipitated by a 1212 fire that destroyed much of London and killed about 1000 residents.[29] London banned thatched roofs and mandated thick partition walls between properties.[29,30]

A neighbour could complain about nuisances originating from neighbouring buildings.[31] A 'nuisance' action allowed persons to demand a remedy from a neighbour, for emissions that caused offence or interfered with peaceful enjoyment of their property. 'Nuisance' covered areas subsequently subsumed in other law, including building regulation. A neighbour's building could be considered a 'nuisance', as could offensive rubbish heaps, smoking chimneys, loud noises, and objectionable odours.[31]

Other British cities gradually followed London's lead on building laws. In 1391, Bristol had a 'viewer' who inspected buildings for encroachments onto streets.[32] Worcester's ordinances of 1467 showed concern for fire danger. Thatched roofs and timber chimneys were not allowed within the city walls.[33]

In the Middle Ages, buildings overhung narrow urban streets. Although stone was safest, builders used timber framing. Structures became taller and closer together.[34] Most London houses, of wood and pitch construction, were dangerously flammable. In 1666, this fuelled the Great Fire of London.[34] Unchecked for three days, it wiped out 80 per cent of London,[34] highlighting the need to limit fires spreading between properties. The first building construction law, the London Building Act of 1667,[34] covered the walled City of London.[35] By the eighteenth century many British cities had building control.[36–38]

The British Public Health Act of 1875 was the first national law regulating buildings.[34] In 1868, Parliament required local authorities to act on dwellings 'in a Condition or State dangerous to Health so as to be unfit for Human Habitation'.[39] Foul smells were thought to be linked to disease that spread by miasma. By removing the source of smells – rubbish and raw sewage – and assuring fresh air and light, the authors expected the incidence of disease would decline.[40,41] Not until 1919 did the Ministry of Health define what was meant by 'unfit for human habitation'.[42] In 1959, Scotland became the first country in the United Kingdom to adopt national regulations.[34]

Vehicle emissions control

In the twentieth century, vehicle emissions were distinguished from emissions previously regulated under nuisance law. Los Angeles first raised concerns about automobile emissions.[43] In 1943, California's Air Resource Board blamed respiratory problems on Los Angeles' smog.[44] In 1959, on 187 days in Los Angeles County, eye irritation was observed. The region became a laboratory to study causes and effects of smog.[43]

California Institute of Technology chemists discovered that nitrogen oxides and hydrocarbons exposed to sunlight generated secondary pollutants that reduced visibility and caused eye and throat irritation. Tracing the pollutants to automobiles led to the development of emissions-control technologies. California tested control devices and air pollution legislation.[43]

Not wishing to invest to redesign cars or fuel, the automobile and petroleum industries refused to address the problem. Citizens, however, demanded legislative action to combat air pollution, and state legislators responded. First, California established emission standards.[43] In 1955, the US Congress passed the Federal Air Quality Control Act[44] and industry began to retrofit cars with emission-control devices. Beginning with 1963 models, such devices became mandatory on cars sold in California.[43] By 1966, motor vehicles were responsible for more than 60 per cent of atmospheric pollutants. State and Federal governments gradually replaced local rules with more comprehensive ones.[43] Under the Air Quality Act of 1967, California created the California Air Resources Board.[43,44] In January of 1970, the US Congress enacted the National Environmental Protection Act, creating by the end of the year, the Environmental Protection Agency.[43,44]

Other countries passed and implemented similar laws, including Australia, Japan, and Western European countries. Most countries now control vehicle emissions,[43] and continue to adopt ever stricter standards.[44]

Why Legislate?

Historical context may help elucidate factors that compel governments to legislate.

Crisis-driven law

Physical catastrophes have repeatedly catalysed regulation. Building codes have been reactive, and adopted to avoid future damage, such as following London's Great Fire. Earthquakes, too, have precipitated changes to building codes. Japan issued the first formal code for seismic design after the 1923 Great Kanto earthquake. In the United States, mandatory seismic design followed the 1933 Long Beach earthquake[45]; and in New Zealand after the 1931 Hawke's Bay earthquake. The Hawke's Bay earthquake 'literally shook things up on the ground and in the minds of politicians, earth scientists, relief organisers and engineers' according to a history of the New Zealand Society for Earthquake Engineering.[46]

Crises can cause regions or countries to 'catch up' with modern regulation. The Great Baltimore Fire of 1904 catalysed changes in the local building code to come in line with other US cities.[47] Wenchuan's 2009 earthquake has had a modernising impact on building codes in China.[48] The Canterbury earthquakes of 2010 and 2011 evoked an immediate response by New Zealand's government.

Public concern about smog in Los Angeles might be called a 'crisis' to which legislators had to respond. Similarly, cholera outbreaks and political instability in nineteenth-century England catalysed sanitation reform. But there was another crisis, growing political dissent.

Law to control dissent (and preserve capital)

When Chadwick's Britain faced economic depression, it seemed to be on the verge of revolution.[50] Regulation has often protected the elite, as sanitary law did, addressing the poor's problems, but, in doing so, protecting the political interests of the wealthy.

The *Sanitary Report* addressed problems only incidentally related to living conditions, with surprisingly little attention to disease. Disease outbreaks, sewers, and water were mentioned, but morality and 'character'–illegitimacy, crime, labour unions, sedition, family values, dress, and vagrancy – were as well.[23] In a liberal industrial society, government was concerned about class relations, the survival of the state, and warding off possible revolution.[23] Underlying Chadwick's work were appalling conditions among the poor and uprisings, such as the Peterloo Massacre of 1819.

Arguably, sanitary reform was more about civil discipline than health risks. A class of people were considered dangerous. Government wanted to keep them under control. In-house water, for example, was seen as a way to dispense with the community pump that encouraged socialisation unacceptable to the elite. Queuing for water was an important theme in the reports.[23]

Britain's poor faced unsanitary conditions, hunger, unemployment, and chronic disease. Public health, concerned with filth-borne diseases, could address food, work, and chronic disease, and also build public works. To admit that poverty could cause disease was incompatible with liberal principles favouring the elite.[23] Although hunger and overpopulation were recognised, belief in the need to intervene did not follow.

'Public health', which might have taken many paths, became equated with 'sanitary improvement'. 'Sanitary' referred to municipal and household technologies that protected from decomposing matter.[23] Chadwick's ability to tie sanitation to political stability was more important in the mid-1840s than epidemiological data he may have offered.[23] Enactment of sanitary reform, the 1848 Public Health Act, was a response in industrial centres to detrimental effects on health of new market ideology.[51] The reform fit comfortably with the use of law to control the behaviour of the working classes.

Apparently linked to increasing economic exploitation of the poor between 1775 and 1850, the standard of living for the working class in

Britain deteriorated. Life expectancies declined markedly despite increased economic growth.[49] In the *Sanitary Report*, Chadwick said health conditions were helping radicalise the working class.[50]

Scientifically informed law

Scientific evidence was relatively unimportant in early public health regulation. More recently science has precipitated regulation, such as vehicle emission limits in the 1950s and 1960s. Studies attributed air pollution to the automobile.[23] Rachel Carson's book *Silent Spring* (1962)[51] also awakened the informed public to the dangers of pollution and catalysed the environmental movement.[44] Science, as then understood, had also been a factor behind sanitary reform in nineteenth-century Britain, responding to overcrowding, cholera outbreaks, and filthy living conditions.[19]

In the 1800s, germ theory of disease gradually supplanted the miasma theory. Without identifying the cholera pathogen, John Snow contributed to germ theory when he identified the source of London's 1854 outbreak, by showing that cases occurred in houses that obtained their drinking water from the Broad Street Pump, a finding not consistent with prevalent miasma theory.

Science, however incomplete, has been used to support change. Parties appeal to science when they seek authority,[23] but science is only a partial explanation for public health regulation. Change requires a more compelling case. As science grows more important, industry has often tried to undermine and distort scientific inquiry.

Judicial activism

Nineteenth century courts created exceptions to the rule that only a person party to a contract with a manufacturer had standing to sue for harm caused by faulty goods. The 1916 American case of *MacPherson v. Buick Motor Co*[52] allowed the plaintiff to make a claim against the manufacturer of a vehicle with a faulty wheel, rather than limiting liability to the dealer. *In Donoghue v. Stevenson* (1932), a consumer in Britain purchased and partially consumed a bottle of ginger beer before discovering it contained a snail's remains. Donoghue developed gastroenteritis[53] and was permitted to sue the manufacturer in the absence of a contractual relationship. Tort law has contributed to laws governing consumers' rights.[54]

Political philosophies

Political philosophies shape law reform, be it a belief in free markets or in welfare governance. Chadwick was influenced by nascent utilitarianism. Utilitarian morality holds that government is to ensure the 'common good'. One role of a legislator is to produce harmony between public and private interests.[24] Thus, where private interests impinge on wellbeing, the legislature should create laws to protect citizens.

Contemporary Regulation of Chronic Disease

Changes in food supply have altered food accessibility and availability, contributing to today's adverse nutrition patterns and to the global 'obesity epidemic', where evidence suggests over- and mal-consumption is the main cause,[55] although reduced physical activity may contribute.[56,57]

In developed countries, poor nutrition and obesity now rival tobacco as public health problems, overtaking smoking's contribution to disease burden.[58,59] In the United States, more than two-thirds of adults are overweight or obese.[60–62] Controlling obesity is a public health priority and governments are increasingly aware of the problem.[17]

Obesity, malnutrition, and nutrition-related chronic disease have a class dimension – the wealthy are, at least in developed countries, less afflicted. The food system conveys both health benefits and harms through availability, quality, and affordability of food,[63] with vast inequalities, even within the same city.[64] In developed countries, obesity and chronic disease disproportionately afflict people of lower socio-economic status, ethnic minorities, and indigenous peoples.

Reports often urge physical activity and promote better health information. Doctors, dieticians, and drug companies promote treatment-based strategies – pharmaceutical and surgical. Yet these are unlikely to affect the population's body weight.[55,65] They primarily benefit people from higher socio-economic backgrounds.[3]

Food, long subject to food safety regulation, is rarely regulated to protect against chronic nutrition-related disease.[3] Australia's *Adulteration of Food and Drink Act (1861)*[17] addressed 'adulteration'[17] – the cheapening of products through the addition of impure or inferior ingredients[66] – and gave government authority to test foods, penalising those who sold food or drink knowing it to be injurious to health. The *Sale of Food and Drugs Act* replaced it in 1875.[17] The *Pure Food and Drug Act of 1906* helped create the US Food and Drug Administration (FDA) that now controls product entry, how food and drugs are marketed, and manufacturing practices.[66]

Since *Donoghue v. Stevenson*, regulation to assure food quality is complemented by civil law. But expensive litigation, unless prospects for a large judgment are good, remains out of reach of the poor. Food safety standards are in place in many countries, but *short-term* food safety remains the prime public health objective.[17]

Recently, many have proposed regulatory reform to address obesity and harmful eating patterns.[67,68] Law that does not directly affect food may contribute to obesity prevention: for example, bans on television advertisements targeting children and nutrition labels on food. Choosing the targets for regulation remains at a very early stage.

How can the regulatory environment support healthy nutrition and physical activity? The World Health Organization's *Global Strategy on Diet, Physical Activity and Health* offers a framework.[69]

Frieden *et al* (2010) suggest a three-pronged strategy:

1. food pricing adjustments: subsidies on fruit and vegetables and taxation of energy-dense nutrient-poor food;
2. zoning and restrictions on food displays in supermarkets and elsewhere to increase exposure to healthy food and decrease it to unhealthy food; and
3. restricting advertising and requiring disclosure of caloric content of restaurant meals to improve the image of healthy food (and make unhealthy food less attractive).[70]

Similar measures have been echoed in other suggestions,[71–73] but progress is slow.[74,75] In the face of the need, why is government so slow to regulate in this area?

Lessons from tobacco control

Tobacco products and junk food are similar in terms of addictiveness, health impacts, costs to the community, and the powerful industries (where company profitability depends on creating demand) behind each.[17,76–78] As a legislative target, tobacco, an addictive carcinogen, has advantages over obesity. Unsafe when used as intended, tobacco regulation has a simple goal. For addictiveness, junk foods and tobacco may be similar.[79] Yet food is necessary for survival. Diseases associated with nutrition are multi-causal, often tied to a balance of energy consumption and energy expenditure.[17] While there is compelling evidence of a direct cause-and-effect relationship between cigarette smoking and poor health, there is less evidence to link particular foods and their over-consumption to nutrition-related disease causation.

In Australia, the Henry tax review (a report on taxation in Australia)[80] recommended increasing taxes on tobacco and alcohol as the best way to reduce social harm caused by these substances. No similar scheme was recommended for junk food, despite similar patterns of misuse and equally great social costs.[58] For tobacco control, a strong evidence base, effectively communicated to the public, had catalysed a 'crisis', leading to government action.

Pressure on government to respond to obesity and chronic disease will surely grow as scientific evidence links obesity and poor nutrition to disease. Despite recent media attention the public remains poorly informed, often considering obesity to be an individual problem, requiring only diet restrictions and self-control.

The food industry has strongly opposed legislative and regulatory approaches, as these may restrict profitability.[17,77] Industry opposition to legislation remains an obstacle, following the historical pattern of tobacco control,[76] where the tobacco industry tried to generate controversy about the health risks of tobacco by fostering a debate about 'sound science'. Lawsuits against the industry unearthed internal industry documents showing how, for years, it deceived policy makers and the public. The industry controlled information about addiction, product design and chemistry, adverse health effects, and marketing. Similar industry documents obtained through litigation against the asbestos and lead industries reveal tactics like the tobacco industry's.[76]

The food industry tries to create similar confusion about links between nutrition, obesity, and chronic disease, by emphasising that lower levels of physical activity increase obesity, minimising food's role.[81–83] Industry supports health promotion measures likely to increase consumer confusion rather than promoting healthy eating.[10]

How much more evidence and public awareness will be needed to catalyse regulation of obesogenic practices? Will there be a 'tipping point' for obesity where governments realise they must legislate?

Discussion

Law can play an important role in promoting health and wellbeing. Public health laws are enacted for many reasons, some not immediately obvious, nor necessarily health-related or evidence-based.[23] Science consistent with reform policy helps, but science alone does not cause governments to act.

Government actions may reflect priorities that are not congruent with public health evidence. Acute health problems often come ahead of chronic disease because of their immediacy. Contemporary public health regulatory frameworks in developed countries reflect the paradigm of acute illness, except in the presence of overwhelming evidence of damage from identifiable poisons – tobacco or lead in petrol.[26]

As public recognition of a 'crisis' often precedes regulatory intervention, better communication about the 'crisis' of obesity, demonstrating the environment's influence on individual attitudes and behaviours, may help generate requisite public support. As long as obesity and the chronic disease it causes are perceived as matters of personal choice, legislative action will wait. As with climate change, legislation to control chronic disease may run counter to government's usual interests – increasing productivity and employment.

The political context of regulatory change must be considered and integrated into strategic planning to promote public health. We hope that evidence regarding the reasons for and impact of socio-economic and health inequalities on obesity among those least well-off may create social concern sufficient to advance regulatory reform.[84] The 'individual choice' motif must be challenged regularly, if society is to reduce obesity.

Conclusion

Regulation in public health can improve the health of populations. The British *Public Health Act 1848* was revolutionary. It constructed principles for improving public health, enshrined the state's role, and organised public health services.[28] Regulatory intervention was controversial in the 1830s and 1840s, yet it made a sanitary transformation of cities possible.[27]

We face chronic health and environmental crises today – epidemics of obesity and nutrition-related disease, and environmental challenges, such as climate change – rivalling problems in early industrial Britain. Will we reach the 'tipping point' at which governments realise regulation is necessary? If we are to tackle nutrition-related chronic diseases successfully and address other social and environmental health challenges, the *status quo* is not an option.

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