Health Policy

For debate: a new wave in public health improvement

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The rising burden of chronic disease poses a challenge for all public health systems and requires innovative approaches to effectively improve population health. Persisting inequalities in health are of particular concern. Disadvantage because of education, income, or social position is associated with a larger burden of disease and, in particular, multimorbidity. Although much has been achieved to enhance population health, challenges remain, and approaches need to be revisited. In this paper, we join the debate about how a new wave of public health improvement might look. We start from the premise that population health improvement is conditional on a health-promoting societal context. It is characterised by a culture in which healthy behaviours are the norm, and in which the institutional, social, and physical environment support this mindset. Achievement of this ambition will require a positive, holistic, eclectic, and collaborative effort, involving a broad range of stakeholders. We emphasise three mechanisms: maximisation of factors that create a culture and environment which promote unhealthy behaviour. We give examples of how these mechanisms might be achieved.

Introduction

One of the greatest challenges facing societies in the 21st century is the changing burden of disease, with a shift from communicable to non-communicable diseases affecting countries at all levels of development.1 Chronic diseases pose a particular challenge to public health systems because of their multifactorial nature and frequently strong links to lifestyle-related factors such as smoking, diet, alcohol use, and physical activity. Persisting health inequalities are of particular concern, with people disadvantaged because of education, income, or social position less likely to participate in healthy behaviours.² In the UK, the annual report (volume one) of the Chief Medical Officer (CMO), published in 2012,³ highlighted the co-occurrence of health risk factors, with people living in deprived areas tending to have higher rates of multiple risk factors than those living in more affluent areas. Deprivation is also associated with a larger burden of chronic disease and, in particular, multimorbidity, including mental health disorders.4 This pattern of health inequality is noted internationally.⁵

Against this background, the approach to improving the public's health needs to be revisited. We reassessed the framework proposed by Hanlon and colleagues,^{6,7} who have argued that it is time for a new wave in public health, and have called for others to join the debate about the form that this next wave might take. They have traced the evolution of public health improvement in the UK from the industrial revolution to the present. To illustrate this evolution, they used the metaphor of a series of waves, reflecting major shifts in thinking about the nature of society and health (panel).

In the UK context, debate about the form of the next wave is particularly timely in view of the changing public health system, with the formation of Public Health England and the movement of many public health functions to local government. Public Health England is an executive agency of the Department of Health that is tasked with the protection and improvement of the nation's health and with addressing inequalities. In this paper, we aim to contribute to the debate encouraged by Hanlon and colleagues.⁷ We begin by briefly outlining our interpretation of the evolution of public health practice in the UK, drawing on what we believe to be a useful conceptualisation of public health development as a series of waves. We should note that we will not provide a comprehensive account of the very rich history of public health development in the UK (or indeed elsewhere). Instead, we will touch on major observations that we believe to be characteristic of each of the waves, and then focus on outlining our vision of a new fifth wave. This paper, we hope, will provide stimulus for further active debate.

Waves of public health development: the story so far

We conceptualise four waves of public health development according to the focus of approach taken, and which we describe as structural, biomedical, clinical, and social. These labels we take to be indicative of the broad areas of activity characterising each wave. We also describe how they interact with and coexist alongside the preceding

Panel: Four waves of public health

The first wave (approximately 1830-1900)

- Classic public health interventions, such as water and sanitation, etc
- Concerns with civil and social order

The second wave (approximately 1890-1950)

Scientific rationalism provides breakthroughs in many fields including manufacturing, medicine, engineering, transport, and communications, etc

The third wave (approximately 1940-1980)

Emergence of the welfare state and the post-war consensus: the National Health Service, social security, social housing, and universal education, etc

The fourth wave (approximately 1960-present)

- Effective health-care interventions help to prolong life
- Risk factors and lifestyle become of central concern to public health
- Emergence of nascent concerns with social inequalities in health



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Correspondence to: Dr Ellen Nolte, RAND Europe, Westbrook Centre, Milton Road, Cambridge CB4 1YG, UK enolte@rand.org wave(s), so building to an emerging portfolio of public health development in its broadest sense (figure 1).

As Rosen⁸ highlighted as early as in the 1950s, changes in public health can be seen to mirror changes in the modern state. Thus, in the UK (as indeed in other European countries), the first wave of public health, emerging in the wake of the industrial revolution, can be described as structural in nature. By this description we refer to a development that led to a series of structural changes that were based on the recognition of the effect of the wider physical and economic environment on individuals, in combination with greater understanding of mechanisms of disease transmission (eg, the finding by John Snow that diseases such as cholera could spread through water). Public health action was concerned with enhancing environmental conditions, such as through the provision of clean drinking water, safe sewage disposal, and improved food safety, alongside legislation aimed at improvement of working conditions and protection of children such as through the 1833 Factory Act. The 1842 Chadwick report on sanitary conditions of the working population was highly influential in informing public health policies, with the 1848 Public Health Act acknowledging the core role of national and local government in improving the population's health.9 The Act included provisions for the organisation of public health, addressing issues such as sewerage, drainage, water supply, safety, and the environment more widely.¹⁰

This structural, top-down approach to addressing public health challenges emerging in the 19th century was greatly affected by advances in scientific discovery, notably the enhanced understanding of transmission of infectious disease. Understanding of the causation of infectious disease (the germ theory), guided by the work of Pasteur in France and Koch in Germany, who identified Mycobacterium tuberculosis as the cause of tuberculosis.¹¹ led to the identification of measures to reduce disease transmission such as vaccination,12 and to treat infection such as the discovery of penicillin by Fleming in 1928.13 This new understanding led to the emergence of what we would consider the second wave of public health development, which, although overlapping with the first structural wave, was characterised by a focus on a biomedical approach centring on disease prevention and treatment. The 1853 Vaccination Act, which made



Figure 1: Four waves of public health improvement

vaccination against smallpox compulsory for all infants by 3 months of age, can be regarded as illustrative of how the second wave interlinked with the first. It brought together insights from the biomedical field with the more structural approach of legislation.

Growing understanding of biological processes, alongside the wider use of observational methods (now underpinning modern epidemiology) that also had their origins in the discoveries of the 19th century, led to the emergence of a third wave. We have conceptualised this wave as clinical in its approach. It refers to our enhanced understanding of the causes of many of the leading chronic diseases such as cardiovascular disease, diabetes, or cancer. The Framingham Heart Study, for example, identified some of the leading risk factors for heart disease such as smoking, high blood pressure, and high cholesterol;14-16 and the British Doctor's Study provided evidence for a causal association between smoking and lung cancer.^{17,18} The identification of such risk factors informed preventive efforts, with changes in individual lifestyles particularly advocated to reduce the incidence of disease. This approach, which Rose described as the high-risk approach to prevention because it targets individuals at high risk,19 has tended to dominate preventive efforts in developed countries over past decades.²⁰ This domination is despite recognition that the population strategy to prevention, which seeks to control the determinants of incidence in a population as a whole, is seen to hold large potential in terms of health promotion overall.¹⁹

The ongoing legacy of this wave is likely to be most important in the area of genetics and genomics. The implications of personalised medicine are already being explored for public health interventions such as the potential for risk stratification and screening.²¹

Drawing on the many lessons learned from earlier waves, such as the aforementioned work by Chadwick on poverty and the environment, and on increasing understanding of the social distribution and social determinants of states of health,²² a fourth wave can be seen to have emerged that we conceptualise to be social in its focus. It can be summarised in ethos by Rose's observation that "the primary determinants of disease are mainly economic and social, and therefore its remedies must also be economic and social".23 Evidence underpinning this wave includes the UK Whitehall studies, beginning in 1967, which showed a clear inverse relationship between grade of employment and coronary heart disease mortality.24 With acknowledgment of the role of social and physical environments, including housing, employment, and working conditions, as prerequisites for health, the 1986 Ottawa Charter for Health Promotion set out a commitment to the development of healthy public policy with a focus on intersectoral action.25 The importance of coherent, intersectoral action to enhance population health and reduce inequalities was confirmed by the Commission on Social Determinants of Health in 2008,²⁶ and, in the UK, the 2010 Marmot review Fair Society, Healthy Lives, which set out six policy objectives to reduce health inequalities.²

Taken together, public health development as conceptualised by the four waves can be seen to have made considerable contributions to enhancing population health, in terms of improved disease control and increased health and longevity over the past century. The effects of each wave in isolation are difficult to disentangle, in view of their interlinked nature. However, the effects of the latter waves to effectively control chronic disease and reduce health inequalities have been less successful than hoped for, despite improved understanding of the proximal and distal determinants of health. It is against this background that we believe, alongside Hanlon and colleagues,⁶ that we need to revisit our approaches to effectively improve the public's health.

Time for a fifth wave: why and why now?

A fifth wave of public health development is needed, and needed now, as a consequence of shifts in the burden of disease and persisting health inequalities, but also against the background of emergent features of modern society. In consideration of the previous waves, there has been a shift from the top-down approach involving structural changes (such as the public works of the 19th century), towards a positing of shared responsibility for health. This shift mirrors changing political ideology and increasing understanding of the contribution of individual behaviours and lifestyle choices to health outcomes. Commitment to strengthen community action as promoted by the Ottawa Charter can be seen to be countered by a rise in individualism in modern society, undermining health and wellbeing at individual and social levels.7 The core tenets of a fifth wave of public health development are therefore: to promote the active participation of the population as a whole; and to renew focus on working together towards health as a common good.

In our conceptualisation of such a fifth wave we suggest some practical ways in which it could seek to address challenges to the public's health. Our proposed fifth wave draws on arguments articulated in the Ottawa Charter,²⁵ the Commission on Social Determinants of Health.²⁶ and others, in that it acknowledges the key role of social cohesion and collaboration in health improvement.27 However, our conceptualisation of a fifth wave is seeking to take these arguments further by working towards achieving a cultural shift that emphasises a society characterised by individual dependence and social interdependence, and which embeds engagement so that personal and social goals can be achieved justly.28 The term culture is commonly defined as a shared system of learned norms, beliefs, values, and behaviours, and while recognising its use in epidemiological research to explain population differences in health,²⁹ we use it in this paper as an overarching term to describe the context within which the proposed fifth wave is set.

We start from the premise that population health improvement is conditional on a health-promoting societal context. This context is characterised by a culture in which healthy behaviours are the norm, and in which the institutional, social, and physical environment support this mindset. Achievement of this ambition will require a positive, holistic, eclectic, and collaborative effort, involving a broad range of stakeholders (figure 2). We emphasise three mechanisms: maximisation of the value of health and incentives for healthy behaviour; promotion of healthy choices as default; and minimisation of factors that create a culture and environment which promote unhealthy behaviour.

Value of health

One consideration when seeking to encourage individuals to make healthy choices is whether health is held as a valued commodity by them. There are, at least, two levels at which maximisation of the value of health can be achieved: first, through an increase in the intrinsic value that individuals attach to health and, second, by increasing the value of factors associated with good health-eg, through the reward of healthy behaviours. Achievement of the former requires changes in culture and attitudes, with respect to both the value placed on health by the individual and the prioritisation of effort for the common good by society through shaping an institutional and social environment that supports individuals in the choices that they make. Evidence of the role of social networks in individuals' adoption of behaviours suggests that social networks could be used as messengers, to help to set norms and create local feedback conducive to healthy behaviours.³⁰

Incentives to encourage healthy behaviours—eg, through making healthier products cheaper, or taxing unhealthy products—can be effective to elicit behaviour change.³¹ Examples include the effect of increasing the price of cigarettes on consumption,³² or evidence of the use of pricing policies to address hazardous alcohol consumption.³³ In the context of food, findings from a systematic review of US interventions suggest that subsidies that reduce the cost of fruits and vegetables for lower-socioeconomic populations might be effective in



Figure 2: A culture for health as the fifth wave of public health improvement

reducing obesity.³⁴ Nnoaham and colleagues' model³⁵ predicted that taxing of unhealthy foods combined with subsidies on fruits and vegetables could reduce mortality from cardiovascular disease and cancer. These findings are supported by a systematic review of simulation studies, which highlighted that taxes on carbonated drinks and saturated fat and subsidies on fruits and vegetables have the potential to improve health and to reduce inequalities in health.³⁶ Taxing of less healthy foods enhances the value of healthy foods, thus incentivising purchases of healthy alternatives and acting as a barrier to unhealthy behaviour.

Evidence of the effectiveness of paying individuals directly to improve health-related behaviours is less clear, as has been shown in relation to smoking, both to prevent uptake or encourage quitting.^{37,38} The functioning of personal financial incentives in health promotion needs to be better understood.^{39,40} Interventions focusing on group-level structures, rather than individualised incentives, could have greater efficacy.³¹ For example, findings from a randomised controlled trial showed that a workplace or group-based financial incentive was more effective than was an individual incentive for promotion of weight loss among obese employees, at least in the short term.⁴¹ Other work has pointed to the effects of incentive-based health promotion programmes offered by health insurance.⁴²

Changes in the funding model of preventive health interventions and activities towards one that emphasises outcomes could assist efforts seeking to increase the value placed on health.⁴³ One such method is the Social Impact Bond model that has been trialled in the field of social services; for example, such an outcome-based funding model is being trialled at Peterborough prison in England.⁴⁴

Healthy choices as default

Not only is it important that health is valued, but also that choosing healthy options is relatively easy. This tenet was articulated in the Ottawa Charter by the term "making the healthy choice the easier choice".²⁵ This aim requires an environment that allows healthy choices to more readily become the default. The presentation of choices could shape people's decision making,45 following several key principles, including Tolman's law of least effort that if healthy choices are made easier then they become more likely.46 Examples include community-wide efforts such as reduction of the density or proximity of alcohol and tobacco outlets to help to reduce consumption or promote non-use of products.47,48 Furthermore, the likelihood of healthy choices increases with increasing availability of healthy options, and principles of product design can be used to shape behaviour and encourage healthier choices.49

However, the introduction of such changes on their own is unlikely to encourage behaviour change; such changes need to be embedded in the wider context within which people live. For example, interventions involving the creation of green and recreational spaces seek to support healthy lifestyle choices, but the association between the built environment and health-related behaviours such as physical activity or outcomes is complex.⁵⁰ Some evidence suggests that provision of green space on its own is unlikely to encourage physical activity, without complementary strategies that address determinants of health-related behaviour.⁵¹ The North Karelia project⁵² has shown the power of a community approach. Involvement of multiple stakeholders, including employers and the local private sector, contributed to favourable and sustained population health outcomes.⁵²

Harrison and colleagues³⁰ have drawn attention to the importance of effective communication of the health effects of choices to address the burden of chronic disease. They propose the use of so-called health footprints, which were defined as interventions that "bring the health consequences of a particular decision to the individual at the point of decision",30 helping to steer health-related choices. This approach seeks to address the tendency for people to apply future discounting-when future outcomes are discounted relative to present outcomes-to their decisions related to health behaviour.53,54 Evidence for the effectiveness of health warning messages on tobacco packages seems to support this approach, with one review suggesting that prominent health warnings on the front of packages can increase health knowledge and perceptions of risk, promote smoking cessation, and prevent smoking initiation among young people.55 Emerging evidence for the effectiveness of food labelling points to potential benefits of nutrient profiling using traffic-light signalling on consumer choices.⁵⁶

Minimise influences towards unhealthy behaviour

We further argue that promotion of a culture encouraging healthy behaviour requires minimisation of factors that promote a culture of unhealthy behaviour, such as the marketing of unhealthy products or products that might promote unhealthy behaviours. Available evidence suggests that the 2003 ban on tobacco promotion in the UK substantially reduced exposure to pro-tobacco marketing effects.⁵⁷ Other work highlights that a comprehensive set of tobacco advertising bans can reduce tobacco consumption,⁵⁸ and signatories to the Framework Convention on Tobacco Control have committed to comprehensive bans on tobacco advertising and promotion. Recent evidence suggests that plain packaging has the potential to reduce further the attractiveness and appeal of tobacco products.⁵⁹

For other products, such as alcohol or unhealthy foods, restrictions on marketing are less advanced, and tend to focus on concerns around children's exposure to marketing efforts.⁶⁰ There are good reasons for these concerns. Exposure to alcohol marketing has been

associated with the likelihood of the initiation of alcohol use in adolescents, and increased consumption in those already drinking.⁶¹ A study of primary school children in Wales showed high recognition of alcohol brands, emphasising how even young children develop brand awareness for unhealthy products.⁶² Similar findings were noted for children and food marketing,⁶³ and for teenagers in relation to cigarette brands.⁵⁹ Therefore, to promote a society in which healthy choices are the default, further effort is needed to limit the effects that encourage unhealthy behaviours.

Contributions and barriers to sustaining the fifth wave

Cultural values are shaped by all members of society, and realisation of the fifth wave involves individuals, the community, institutions, local and national government, and the private sector. The fifth wave considers the role of individuals as members of communities with a shared responsibility for putting processes in place to encourage healthier behaviour as the default, and supporting others to live healthy lives.

Different groups are likely to contribute in different ways. Governments need to ensure that public health policy is informed by evidence and rigorously assessed, and coordinated between government ministries. Doing so would facilitate a health-in-all policies approach that involves intersectoral working on issues that affect health.⁶⁴ Examples of areas in which this approach could occur (or is already occurring) include: climate change; agricultural policies; transport; housing; infrastructure planning; and food standards.

In England, the transfer of some public health functions to local government and the establishment of Health and Wellbeing Boards provide opportunities for cross-sector coordination locally.65 These Boards are fora in which key leaders from the health and social care system work together to improve the health and wellbeing of their local population and reduce health inequalities. In view of the wide remit of local government, including local infrastructure planning, waste and recycling, leisure and tourism, social care, and others, there are several opportunities to promote healthy environments. Action could include reduction of the density and proximity of alcohol, tobacco, and fast food outlets through incorporation of a form of health impact assessment into approval processes for planning. In an attempt to curb obesity levels, the London borough of Croydon is considering use of planning powers to limit the density of fast food shops.66 The private sector can also play a part, as employers, as building and land owners, and through their effect on consumers. In particular, as employers, industry has a role in the promotion of the health and wellbeing of their present and potential workforce.67

Health-care professionals can influence at an individual level, supporting individuals to adopt healthier lifestyles and so improve health outcomes. At the same time, integrated public health services are needed to address multiple lifestyle factors.⁶⁸ Such services could take the form of what has been described as wellness services, with use of whole-person approaches to improving health and integrating mental and physical health and wellbeing (as distinct from diagnosis and treatment of illness).⁶⁹

Collaboration between different groups will require alignment of motivations, attitudes, and trust to respond in innovative ways. We do not advocate the abandonment of the knowledge and methods of previous waves, but rather their synthesis into the new wave. Collaborative efforts are needed to address contemporary and emerging public health challenges, while remaining alert to reemergent challenges. For example, evidence is growing of the effect of lifestyle factors on immune response and health protection, such as the increased risk in smokers of becoming infected when exposed to tuberculosis. New challenges, such as the growth in antimicrobial resistance,⁷⁰ and growing numbers of people with chronic diseases leading to increased numbers of people who are immunosuppressed, require the adoption of health improvement strategies to effectively address these health protection challenges. Tuberculosis outbreaks that involve smoking cessation as part of the response will need to become the norm, and empowered communities taking control of their own lives will help us to move towards this aim.

Leadership: the role of the CMO

In the UK, the creation of the post of Medical Officer to the General Board of Health in 1855 was in response to the 19th century cholera epidemics,⁷¹ so forming part of the first wave of public health described in this paper. The CMO role is unique in government because it involves a high-level civil service appointment combined with a statutory duty to act as independent adviser to government. With a remit extending across all ministries, there is clear responsibility for leadership in public health across government.⁷² As we embark on the new fifth wave of public health, the CMO's role will be one of leadership, garnering multilevel approaches from all the waves to address pressing challenges such as the burden of chronic disease, and emergent challenges such as that of antimicrobial resistance. Working across government, as well as internationally, the role of the CMO presents great opportunity to ensure that health effect and public health improvement are considered at all levels of policy making.

Contributors

SCD is the Chief Medical Officer for England and the UK Government's senior medical adviser. All authors contributed to the conceptualisation of the arguments, the drafting of the paper, and the interpretation of the data, and approved the final version of the manuscript.

Declaration of interests

We declare that we have no competing interests.

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