

— CLAY'S —
HANDBOOK OF
**ENVIRONMENTAL
HEALTH**

TWENTY-SECOND
EDITION

EDITED BY
STEPHEN BATTERSBY

“Clay’s is an essential part of the environmental health profession and this update is essential for an everchanging subject presenting new challenges and new legislation. Its contribution informs the profession and its practitioners and helps to raise the standards of health across the world.”

– *Tim Deveaux, EH Consultant, UK*



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Clay's Handbook of Environmental Health

Since its first publication in 1933, *Clay's Handbook of Environmental Health* (under its different names) has provided a definitive guide for the environmental health practitioner (EHP), and an essential reference for the consultant and student. This 22nd edition continues with its more recent successful structure, reviewing the core principles, techniques, competencies and skills required of an EHP, and then outlining the specialist subjects without getting too bogged down in a legalistic approach, seeking to broaden the content for a more global audience.

This new edition seeks to educate the EHP on the public health impacts of global heating and the climate emergency and also reflects the COVID-19 pandemic, as might be expected. Although seeking to have global appeal, the impact of the UK leaving the EU is also addressed. The book examines environmental health in different settings, including in the military, working in both conflict and natural disaster settings, and environmental health at sea and in airports. In line with previous editions, case studies are used to illustrate how EH problems have been resolved. This new edition includes information on key issues in public and environmental health including air pollution, contaminated land, housing and health, noise, water, food safety, pests and vector control, chemicals in the environment and radiation, as well as sustainability and public health and humanitarian crises.

This handbook aims to give a basic understanding of the philosophical basis of environmental health, as well as the required technical aspects and an understanding of environmental health in different settings. All chapters have sections on further reading and sources of information. *Clay's Handbook* is essential reading for all practitioners, students and researchers in environmental and public health wherever they are working.

Stephen Battersby is a chartered environmental health practitioner and has been an independent environmental health and housing consultant for 32 years. His first degree was in chemistry and applied zoology, before he trained as a public health inspector, qualifying in 1974. He was awarded his PhD from the University of Surrey in 2002. After working for a number of local authorities in England, he was employed by the environmental health professional body (now the CIEH) from 1980 to 1988. Since then, he has been associated with both Warwick and Surrey Universities. As a freelance consultant, he has also been an expert witness in housing litigation. At Warwick University, among other research projects he was part of the team that developed the Housing Health and Safety Rating System, the basis for assessing housing conditions under the Housing Act 2004. He has undertaken research (including on the public health implications of urban rat infestations) and lectured on environmental health at the University of Surrey. He has also been a visiting lecturer at King's College London and Kingston University. He also helped establish RHE Global as a resource for those working in housing. He remains a visiting senior research fellow in the Centre for Environment and Sustainability at the University of Surrey. He chaired the CIEH Council in 2005 and was President from 2008 to 2011 and is currently Vice President. He was awarded an MBE for services to environmental health in the 2014 Queen's Birthday Honours List. He is the series editor of Routledge's Focus on Environmental Health series and has also contributed to publications in the series. He has written and spoken extensively on environmental health and housing matters.



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Clay's Handbook of Environmental Health

Twenty-Second Edition

*Edited by
Stephen Battersby*

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Foreword

It is a considerable honour to be asked to write a foreword to a publication, and particularly one as esteemed as *Clay's Handbook of Environmental Health*. While considering what to say in my foreword to this, the 22nd edition, I looked back to see what the author of the foreword of the previous 21st edition had said. In his foreword, Tim Everett commented on emerging challenges, such as diabetes and climate change whilst noting that the old scourges of public health still held sway in many parts of the globe. He noted almost in passing the threat that new pathogenic strains of viruses might pose and commented that inequalities in health remained an issue that had to be addressed.

In the seven years since his foreword and this one, much of what he said has been proved to be correct. There can be no doubt, despite what those who protest would say, that climate change is real, and its catastrophic effects are being felt across the globe. Temperature records are broken on a regular basis. Wildfires, floods and droughts are a common occurrence. The damage that humans have done and continue to do to the planet is clear, and there is a very real concern that we may have left it too late to reverse it. It is indicative of the lack of environmental justice that while the developed world scrambles to

reverse the damage that industrialisation and our modern lifestyle has done to the planet, populations in large parts of the world lack the basic amenities for life and the possibility of them levelling up seems as remote as it ever did. The 'Think Global, Act Local' mantra is one that environmental health practitioners know well. Our day-to-day activities contribute to helping to reduce the impact of climate change on individuals and communities, our lobbying and research work helps to inform the national and global debate and to drive change at government and inter-government levels.

Despite our access to modern technology, health surveillance and tracking systems and sophisticated modern medicine, the COVID-19 pandemic that started in early 2020 has demonstrated clearly that public and environmental health are as relevant and essential as they ever were. We have long argued that prevention is better than cure, but the truth of this was starkly demonstrated at the beginning of the pandemic when no effective vaccines were available and preventing the spread of the virus was the only defence we had at our disposal. It is sobering that the first line of defence against a disease that has killed over 150,000 people in the UK was, and remains, proper and effective handwashing, wearing a mask to prevent

inhalation of viruses, social distancing and effective ventilation. All of these most basic of public health interventions were all we had to deal with a previously unknown virus that decimated populations. These are interventions that doubtless featured in the first edition of *Clay's Handbook of Environmental Health* over 80 years ago but remain as relevant today.

The new challenges of addressing climate change and the COVID-19 pandemic focused environmental health practitioners' attention but the traditional challenges have not gone away. Poor housing conditions continue to detrimentally impact on the health of their occupants, with the poorest and least able to advocate for themselves being most affected. Food safety and integrity remains a huge issue, with investigations showing food fraud becoming the crime of choice for professional criminals and being a multi-million-pound global business. The issue of allergens as a public health issue sits alongside food contamination as a potent risk to those vulnerable individuals exposed to them. Many of the traditional heavy industries have declined, but the move to a gig economy presents new health and safety challenges and the growth of remote and home working has highlighted mental health and well-being as a new health and safety challenge. Pest control remains as important as ever, as the species of pest change due to the warming climate, and the spread of traditional pests is facilitated by international travel and trade. The COVID-19 pandemic proves we lose sight of traditional solutions to public health issues at our peril, and the new edition of *Clay's* recognises this. The new sits alongside the old; both are of equal value to practitioners.

When I started out on my environmental health career 40 years ago, *Clay's Handbook of Environmental Health* was the go-to source of reference. As students, we referred to it on an almost daily basis, and it informed and underpinned much of my early practice. Our research methods were largely paper based, with further reliance on microfiche indexes, and were slow and very often frustrating to pursue. The rise of the internet where a huge

amount of information is just a click away has changed the way we search for information. Everything you need to know about whatever you are researching is accessible immediately. The internet, however, for all its convenience and almost limitless information, needs to be treated with caution. In addition to good, authoritative information, it harbours baseless ideas presented as fact and conspiracy theories dressed up as authoritative sources. Mark Twain is reputed to have said that a lie can be halfway round the world and back again while the truth is lacing up its boots. It is certainly true that a conspiracy theory promoted on the internet can undermine an evidence-based public health message, can make baseless or dangerous solutions and misguided or deluded individuals appear credible and can be very difficult to counter. In addition to our practical problem-solving skills, advocacy has always been one of the tools in the environmental health practitioners' toolbox; new ways of promoting public health messages though social media is a necessary refinement of that skill. In an age where faceless communication is becoming the norm our practice must embrace the change to ensure that our messages are clear and unequivocal and are heard and understood. The need to be the calm voice of reason and persuasion and where necessary of authority has never been greater.

The practice of environmental health has many new challenges in addition to the old ones. We need to address them all. The way in which we tackle them has new tools in addition to the old ones. They all have their place. This edition of *Clay's Handbook of Environmental Health* follows the long tradition of its predecessors in being a comprehensive and reliable exposition of environmental health theory and practice, and it continues to be of value to practitioners for that reason.

Julie Barratt
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Preface

This, the 22nd edition of *Clay's Handbook*, is the third I have edited and is also the last that I will be editing. There comes a time when it is right to step aside and let someone else take on the challenge of preparing this pillar of the environmental health world. Indeed, the time has perhaps come to consider the format so as to make the work more widely accessible.

Preparing this edition has been particularly difficult having been delayed by the 2020–21 COVID-19 pandemic. Indeed, since early 2020 many of the contributors have been working tirelessly in their various organisations, trying to protect public health during the pandemic and also supporting businesses to operate safely – there should not be any dichotomy between the economy and public health; one cannot thrive without the other. These colleagues continue to do so, having also, in the case of colleagues in Public Health England, had to endure (my word) reorganisation into the UK Health Security Agency (UKHSA) or the Office for Health Improvement and Disparities (OHID) (it seems “inequalities” is not politically acceptable). I am grateful to all contributors for their efforts.

Clay's Handbook of Environmental Health reflects the diversity of environmental health work not only in the British Isles but around

the world. I have continued to try and make this textbook relevant to colleagues wherever they practise and most importantly to those embarking on their careers in environmental health (and related professions). My attempts to include an increasing number of contributors from countries beyond the British Isles has not been as successful as I hoped originally and I trust that future editors will be more successful because as we are seeing, so many environmental health issues are global. The COVID-19 pandemic has shown, and is illustrated in the book on the subject in the companion Focus on Environmental Health series, that EHPs around the world are playing an important role in protecting and improving public health whether they are working for government or commercial enterprises. It is just unfortunate, to put it mildly, that EHPs, certainly in England, were not involved in tackling the pandemic from the outset, but then as has been concluded by House of Commons Committees, a number of unnecessary mistakes were made.

As ever there are some new contributors to this edition and some who have contributed previously. Some chapters have been completely re-written while some are very much updates of what was written six years ago and there are some wholly new chapters

given the UK's exit from the EU and the climate emergency. The approach is in part the consequence of time constraints caused by the pressures of the pandemic, but I hope that should not detract from the value of the work. Anyway, is some continuity not a good thing?

There are a number of chapters that have been written in sections, in some cases each section has different authors. Particularly in larger chapters and where there are different authors, the notes (indicated by a superscript number) are at the end of the relevant section in the hope that this will be more helpful to readers and easier to find. In most cases the list of references are included at the end of the chapter (except again in the largest or multi-author chapters). I hope readers find the organisation of the chapters helpful but any feedback to the publishers will, I am sure, help the next editor.

This book is intended as a first point of reference – a starting point. It is impossible in one volume to cover every aspect of environmental health in the minutest detail. Quite obviously the world has changed enormously since the first edition, when our predecessors' work was narrower in scope and there were very few other sources of information. This is one of the reasons for creating the "Focus on Environmental Health" series.

As is apparent from early in the book and becomes more evident looking at the later chapters, as a concept environmental health is both simple and complex. The chapters on the climate emergency and air pollution highlight this, but also the inter-connectedness of all the areas of environmental health work. The work of EHPs is crucial in facing the challenge of global heating effectively. We can only hope that the COP 26, held as this book is being completed, is successful. If not, while the planet itself might survive in some form or other, the human race might not.

Environmental health practitioners or environmental health officers are very much part of the public health workforce undertaking work from the prosaic to the exciting and ground-breaking, so as to tackle

threats to health. Yet too often EHPs have allowed themselves to be put into silos (and in England subsumed into "regulatory services", and important as effective regulation is, this can also be very limiting). Such an approach will not help the profession nor more importantly the public. Firstly, regulations can often reflect political priorities which can be short-term, rather than matching public health needs in the longer term. Secondly this approach can then be conveniently reduced to a "tick box approach" that can be easily measured but requires little training or education. It certainly reduces the need for professional judgement which in turn may lead to greater problems or risks being overlooked or ignored with efforts (and resources) misdirected. Whatever else this book does, it provides information on which rational professional judgement can be made. It also provides information that can be used to help educate the lay person (including politicians) who again have failed too often in recent years to understand the value of properly educated and trained EHPs.

Of the three issues that occur throughout the book – Global Heating (the Climate Emergency), the COVID-19 pandemic and Brexit – two are global so it is hoped that this book has global relevance. However, it has to be acknowledged that the primary audience has always been in the UK, and so the impact of the UK leaving the European Union (and particularly leaving the Single Market and Customs Union) cannot be ignored. It has major implications for public health and as the justifiable furore over the discharge of raw sewage into rivers and coastal waters showed in October 2021, there is a risk of the UK becoming once more the "dirty man of Europe", with standards to protect public health reduced. Worse, the prevailing attitude at government level seems to be that anything "European" is to be avoided and the UK's closest neighbours antagonised – this cannot help in tackling the climate crisis nor future pandemics, and the SARS-CoV-2 pandemic

Preface

will not be the last and note too that most emerging diseases are zoonotic.

What editing this book has shown me is that it is time for EHPs to break free from the shackles imposed by others and to assert themselves and advocate better not in their own cause but to demonstrate just how they can make even greater contributions to protecting and improving public health, and address health inequalities within and between countries (or disparities if one wants to use the term). It is telling that in the

UK, EHPs would be equally at home in the UKHSA or OHID. The CIEH has argued for a Chief Environmental Health Officer at national level, and with the right person in post and with the right backing, that would make a lot of sense in either or both organisations. When one looks at the content of this book and the important areas it covers, one might ask why no such a post exists?

Stephen Battersby MBE
November 2021

Historical context, philosophy and principles of environmental health

Stephen Battersby

SECTION 1: A HISTORICAL PERSPECTIVE

Introduction

The history and development in Britain and Ireland of what we now call environmental health is long and complex, reflecting the changing nature of societies and differences between countries, from the localised challenges faced in the 19th century to those of global heating and the COVID-19 pandemic of 2020–21. Some of these challenges are new and some persist and in one form or another have always existed.

Even the term ‘environmental health’ is interpreted differently in different parts of the world and those professionals called ‘environmental health officers’ (EHOs) or ‘environmental health practitioners’ (EHPs) carry out different functions reflecting this. The term EHO and EHP are used interchangeably in this book, recognising that not all members of the profession are officers of a local authority or municipality.

As so-called Western or now high-income societies developed, so the stressors on human health increased despite economic growth and increasing levels of income. There were both environmental and health impacts from the moment that fire was discovered, and wherever

on this planet humans gathered. Historically many of the concerns were with the effects of waste on health and as Mellanby [1] said, quoting archaeologist Jacquetta Hawkes,

waste disposal by human beings may be said to have begun when hunters of the earliest stone age tossed their gnawed bones over their shoulders’ to such an extent that caves became so reduced in size that they could no longer be occupied, and were certainly not “cave proud”.

Until the 19th century systems of waste disposal, the sewerage and sewage treatment in the cities of Britain were very ineffective although through the centuries the great houses and monasteries may have had better organised (and healthier) systems for dealing with waste. In many towns refuse was allowed to rot in the streets, and there was no concern with contamination of water supplies. In some low-income countries municipal solid waste management remains a problem. According to the World Bank 90% of waste is openly dumped or burned in low-income countries, and it is the poor and most vulnerable who are disproportionately affected [2].

The history of what we in this book consider to be ‘environmental health’ has been closely allied to the social history of the UK since the 18th century. In the British Isles there were great economic social and environmental changes in the 18th and 19th centuries, not least of which was the first industrial revolution that started in Britain and spread to the rest of the world. Urbanisation and industrialisation brought millions of people together in crowded, sprawling and insanitary settlements. In response, society underwent a period of rapid change particularly motivated when the effects of the insanitary conditions spread to the middle and upper classes and the causes of cholera and typhoid were identified.

New forms of public services were introduced aimed at protecting public health and maintaining both a healthier workforce and reducing the strain on the Poor Law Commission (and later Board) and parishes, which are discussed later. The municipal corporations of the 1830s and the new Boards of Health were largely conceived to deal with outbreaks of communicable disease and to afford basic measures of health protection. Subsequently, a new concept of health arose: the idea of public health. New philosophies for the delivery of education and other public services began to take shape, and a new form of democracy evolved – extended suffrage, which only became universal in the early 20th century. The nature of a country’s governance has an impact on public health.

In 1780 the electorate in England and Wales consisted of just 214,000 people – less than 3% of the total population. Change came gradually and often only as a response to campaigns for extended suffrage which included threats of violence and even revolution such as that which had occurred in France. The second Reform Act (1867) described by Lord Derby as *a leap in the dark* still only meant two in every five Englishmen had the vote in 1870. The third Reform Act enfranchised all male house owners in both urban and rural areas but only added 6 million people to the voting

registers and Britain was probably by then less democratic than many other countries in Europe. For many people, 19th-century parliamentary reform was a disappointment because political power was still left in the hands of the aristocracy and the middle classes. Universal suffrage, with voting rights for women (though not for those under 30), did not arrive in Britain until 1918.¹ Only in 1928 were women given the vote on the same terms as men when all adults over 21 could then vote. In a democracy the extent of the vote reflects political decisions and how threats to public health will be tackled. Why does this matter?

It can be argued that the wider the franchise the greater the chance that those elected to govern will respond positively to calls for measures to improve, or at least protect public health. It could be argued that even those in the UK who voted to leave the EU in the 2016 Referendum did so thinking it was a way to improve the health of communities. As Cicero wrote as a principle in *De Legibus*, *Salus populi suprema lex esto* (the welfare of the people shall be the supreme law). John Locke (1632–1704) the English philosopher and physician used it as an epigraph in his treatises² in which he said this was a fundamental rule for government.

Gostin [3] argued,

while countries without democracy are capable of securing some level of public health, the level of commitment to public health goals is dictated by the government (which may place a greater value on remaining in power) instead of being determined by the people. The collective efforts of the body politic to protect and promote the population’s health represent a central theoretical tenet of what we call public health ethics.

Considering the COVID-19 pandemic it is worth pointing out that Alan Maryon-Davis³ [4] some years prior had said *denial and lack of information about Ebola caused hundreds of*

avoidable deaths in west Africa. From Spanish flu to AIDS to SARS, cover-ups and misinformation have fuelled epidemics. A number of commentators have argued that in the UK mixed and inconsistent messaging (or attempts to transfer responsibility to individuals) and indecision have been the reasons why there have been so many COVID-19 cases in the UK (England in particular). Furthermore, some suggest that reliance on medical rather than public health expertise has led to an approach that is only concerned with preventing hospitals and medical practitioners from being overwhelmed rather than preventing illness in the population in general.⁴

Moving along from the influence of societal/political organisation; environmental health is about focussing on threats to public health including public mental health, from different stressors rather than concern for the environment alone. This is particularly true if we consider the ‘environment’ to be limited to what are interpreted as ‘green’ or ‘conservation’ issues (though these too can have a public health dimension). We should recognise that such distinctions mislead. As Einstein said, *the environment is everything that is not me*. The concern for environmental health practitioners is with the impact of stressors (that are the consequence of human activity) on human health rather than what might be called ‘behavioural’ or ‘medical’ aspects of public health. What this means is that EHOs or EHPs (whatever term is used) are very much part of the public health workforce in any country and should be seen as such.

Impacts are not always the same as issues, and too often whether an adverse health impact becomes an issue depends on the public response and perception. This is often linked to how and where it is reported in the media. Whether something is perceived as a public health issue can be a reflection of public or political pressure.

Although this book is not law-led (the law can often lag behind public opinion or understanding of risks) the development of environmental health as considered here can

be demonstrated by the development of the legal framework for ‘environmental health’. However environmental health is more than just a subject that relies on legislation and the implementation of those laws for its existence. Environmental health could exist without any legislation, which provides only one means of addressing problems – law is only a tool and should not constrain or limit the work of environmental health practitioners.

That said, if EHOs (EHPs) are part of the public health workforce then environmental health law is an element of public health law and Gostin [3] suggested five essential characteristics of the latter. At the government level public health is a special responsibility in collaboration with partners in the community, business, the media and academia. Then at the population level public health focusses on the health of populations rather than the individual. There is then the relationships between the state and the population (or between the state and individuals who place themselves or the community at risk) that public health addresses. Public health then deals with the provision of population-based services that are underpinned on the scientific methodologies of public health such as epidemiology. Finally, public health authorities possess the power to regulate individuals and businesses to secure safeguarding or protection of the community – active intervention rather than reliance on ‘voluntarism’ or ethical voluntary action.

From the outset with ‘inspectors of nuisances’ environmental health was concerned with those factors easily identifiable as affecting human health, but as the interaction of the environment with human health became better understood the role of environmental health expanded. In some cases, this was also accidental as environmental health included a cadre of people able to deal with issues (and legislation) for which there was no obvious body to implement control measures – for example licensing of animal boarding establishments or other licensable activities involving animals. Earlier editions of this book

sought to divide the evolution of environmental health into eras. The historical perspective follows from the 21st edition and provides some pointers and key issues in this evolution that have helped to define environmental health.

This assumes that development continues in one direction only – continuously positive – but there is always the possibility that the mistakes and tragedies of the past will be repeated, and not necessarily as farce, to misquote Karl Marx. For example, should the UK move to become a low regulation society while at the same time the economic impact of leaving the EU is negative, then there could be serious ramifications for environmental health.

The agricultural revolution

The period from 1700 to the early 19th century led to movement from the country into towns as improvements in husbandry and arable farming reduced the need for labour. The Enclosure Acts allowed those with the wealth to purchase public fields and push out small-scale farmers, causing a migration of men looking for wage labour in cities and urban areas.

Changes in agriculture did mean that although workers' diets improved this gave rise to only a slow decline in the rural death rate. Those who remained as farm workers had a low living standard often in damp and crowded housing.

Social changes and growth of towns made it increasingly difficult to provide a consistent and satisfactory food supply for those on low incomes who had moved into the urban areas. The increased productivity of the rural economy did not lead to improved food quality; indeed, the conditions were ripe for fraudulent substitution, and for food to be adulterated.

The industrial revolution

The industrial revolution did not follow directly on the agricultural revolution; they overlapped considerably, for example Abram

Darby first smelted local iron ore with coke made from Coalbrookdale coal in 1709, and in the coming decades Shropshire became a centre for industry due to the low price of fuel from local mines. The Iron Bridge over the River Severn used a major transport system, opened in 1781.

Waterpower was essential for increasing mechanisation. The Derwent Valley, upstream from Derby on the southern edge of the Pennines, contains a series of 18th and 19th century cotton mills and an industrial landscape of high historical and technological significance. It began with the construction of the Silk Mill in Derby in 1721. The scale, output and numbers of workers employed were without precedent. However, it was not until Richard Arkwright constructed a water-powered cotton spinning mill at Cromford in 1771, and a second, larger mill in 1776–77 that the 'Arkwright System' was established. In terms of industrial buildings, the Derwent Valley mills can be considered to be the first of what was to become the model for factories throughout the world in subsequent centuries.

Changes to the rural economy and the development of industry with more opportunity for paid work (often in small towns and villages in relatively rural areas) contributed further to the movement of people away from rural areas. The pace of industrialisation quickened with the development of the steam engine, which enabled more factories, and especially textile mills, to be set up in favourable locations, where there were ample supplies of coal and water. These developments were accompanied by adverse environmental impacts as the amount of waste increased, the environment was seen as a 'free good' and waste also became increasingly complex.

Machinery enabled production to be vastly increased with advantage taken of economies of scale. Increasingly large factories meant a need for more workers. These had to be housed nearby because, in the absence of public transport, they had to be able to walk to work. The need for houses near to

the factories resulted in street after street of small, poorly constructed houses. There was little provision for drainage or refuse disposal; water supplies were inadequate and usually grossly polluted. To add to these unfavourable conditions, ever larger factories overshadowed the houses where the factory workers lived. They were polluted by smoke, grit and dust from both the factory furnaces and domestic fires emitting smoke at low levels, as chimney heights were only sufficient for combustion.

For many workers, factory practices involved working with dangerous machinery, and fatal or disabling accidents to workers were common. If the adult workers suffered from bad working conditions, children had it worse. Child labour was often considered an essential factor in production. Children started to work at an early age and, in the textile industry particularly, they formed part of a team cleaning under looms and spinning machines for example. Adults who could not take a child with them might find work hard to get and, where the shortage of children was acute, mill owners imported children from poor-law institutions as apprentices. The general social and economic conditions in the early 19th century have to be viewed against a background of, initially, an unreformed Parliament, an inadequate local government system and a political philosophy that permitted almost anything in the name of individual liberty.

While this was true of the industrial towns and cities, Liverpool was an exception as it was a mercantile city – the port from which many of the manufactured goods were exported or raw material such as cotton and sugar were imported. It was the rapid growth of the city with the construction by manual labour of the docks⁵ that led to the squalid living conditions for the relatively unskilled labour that either built the docks or loaded and unloaded the ships.⁶ This is discussed later with the sanitary movement.

The political and economic views current at the time meant there was no political will to ameliorate the conditions endured by most urban workers and their families. The French

Revolution and the end of the Napoleonic Wars however did bring pressure for political change, although this was rarely successful. The social changes brought about by the agricultural and industrial revolutions did bring working people together, and along with their recognition of their exploitation by the political, factory- and farm-owning classes, led to growing pressure for change in employment practices and everyday life.

Not all those in the upper classes were immune to the plight of the working classes. Some politicians and philanthropists adopted causes with which they sympathised and fought for changes using their social and political connections. In the more urban areas, groups of people emerged who became interested in the welfare of their fellow city dwellers, and supported inquiries and investigations. Physicians, such as Thomas Perceval of Manchester and James Currie of Liverpool, visited slum areas and reported what they had found. Environmental disadvantage was not uniformly spread. Some districts were comparatively pleasant, even though few adequate sanitary amenities were available. Some more prosperous boroughs spent money to improve parts of their areas. In many instances these improvements were carried out by improvement commissioners appointed to implement environmental improvements in particular localities and specifically authorised by a private act of Parliament. The cost of the works was then being recouped by a 'rate' levied on the householders in that area. In 1795, a contagious disease swept through children working at a mill near Manchester, and the local justices of the peace took what action they could to prevent a recurrence. Early in the 19th century there was the first move towards improving the conditions of some juvenile workers. Sir Robert Peel, himself a mill owner, introduced a bill that became the Health and Morals of Apprentices Act 1802.

With industrialisation came increasing air pollution. Although the workers in those factories were earning a living they were also living in close proximity and were the

worst affected by the pollution that grounded close by. Eventually the Alkali Inspectorate was established in January 1864 following Parliament's approval of the Alkali Act in 1863.⁷ The Inspectorate's role was to control the release of damaging acid gas (hydrogen chloride) from alkali works. The legislation marked a change from the existing *laissez faire* approach to industry. By the 1850s, it was estimated that some 250,000 tons of salt were being decomposed annually in alkali works in the UK, resulting in the release of about 115,000 tons of acid gas. Legal proceedings against these works had been unsuccessful because it had been difficult to attribute damage from the gas to a particular work and to conclusively attribute any damage to acid gas. Serious lobbying began only when the landed gentry and wealthy landowners experienced reductions in their land values and extensive damage to their woodlands resulting from this air pollution and any action taken. It had little to do with the health effects on those living close to the factories. Nevertheless, the main approach was to have tall chimneys so that the emissions were dispersed and diluted.

Chartism

Chartism was a working-class national protest movement for political reform in Britain active from 1838 to 1858. It took its name from the People's Charter of 1838 with particular strongholds of support in the North of England, the east Midlands, the Potteries, the Black Country and South Wales. Support for the movement was greatest in 1839, 1842 and 1848 when petitions signed by millions of working people were presented to the House of Commons. The strategy adopted was to use the massive scale of support to put pressure on politicians to concede manhood suffrage.

The People's Charter called for six reforms to make the political system more democratic:

- A vote for every man 21 years of age;
- The Secret Ballot – to protect the elector in the exercise of his vote;

- No property qualification for Members of Parliament – thus enabling the constituencies to return the man of their choice, *be he rich or poor*;
- Payment of members, which would enable a trades person or others to serve a constituency and not lose out financially by having to give up from his business;
- Equal constituencies, securing the same amount of representation for the same number of electors, instead of allowing small constituencies to swamp the votes of large ones;
- Annual Parliament elections, as a means of stopping bribery and intimidation (a constituency might be bought once in seven years, but no one could buy a constituency under a system of universal suffrage every year). A Member elected annually would be less able to betray their constituents.

Chartism can be interpreted as a continuation of the 18th-century fight against corruption and for democracy in an industrial society but attracted considerably more support than some more radical groups because of wage cuts and unemployment.

Trades unions and the Tolpuddle martyrs

Skilled workers in Britain had begun organising themselves into trade unions in the 17th century following on the model of the medieval guilds. During the 18th century, when the industrial revolution prompted a wave of new trade disputes, the government introduced measures to prevent collective action on the part of workers. The Combination Acts, passed in 1799 and 1800, during the Napoleonic wars, made any sort of strike action illegal – and workmen could receive up to three months' imprisonment or two months' hard labour if they broke these new laws. Unions in Britain were subject to severe repression until 1824, but despite this were widespread in cities such as London. After violent Luddite protests in 1811 and 1812,

Parliament repealed the Combination Acts in 1824 and 1825. Trade unions were legalised in 1824, where growing numbers of factory workers joined these associations in their efforts to achieve better wages and working conditions.

In the 1830s life in villages like Tolpuddle in Dorset was hard and deteriorating. Farm workers could not bear yet more cuts to their pay. Some fought back by smashing the new threshing machines, but this brought harsh punishments. In 1834, farm workers in west Dorset formed a trade union so that by combining together they could be more effective at pressurising employers to act reasonably. Unions were actually lawful and growing fast, but six leaders of the union were arrested and sentenced to seven years' transportation (to Australia) for taking an oath of secrecy. Their real crime in the eyes of the establishment was to have formed a trade union to protest about their meagre pay of six shillings (30p) a week.

The French Revolution and the Swing Rebellion were fresh in the minds of the British establishment. The latter started in 1830, in East Kent, when angry labourers destroyed a threshing machine. This was the start of a revolt that spread across the south. Incidents in Dorset villages probably involved farm workers who were later to join the Tolpuddle union, so landowners were determined to stamp out any form of organised protests.

Poor laws

From its beginnings in the 14th century, up to the inauguration of the National Health Service in 1948, England's poor laws evolved in such a way as to make significant impacts on the health of the population. It also is important in the context of the development of local government, as local authorities eventually replaced the 'Vestrys', the governing body of the parishes. The parish had been the basic unit of local government since at least the 14th century, although Parliament imposed few if any civic functions on parishes before the 16th century.

The history of the poor laws has two elements: the 'Old Poor Law' primarily in the 1601 Act for the Relief of the Poor, and the New Poor Law brought in by the Poor Law Amendment Act of 1834.

The Old Poor Law is characterised as being parish-centred, haphazardly implemented, locally enforced, and with, one of its more notorious aspects, the operation of workhouses being completely voluntary. The New Poor Law, based on a new administrative unit of the Poor Law Union, aimed to introduce a rigorously implemented, centrally enforced, standard system that was to be imposed on all and was centred on the workhouse. The underpinning idea was that life in the workhouse should be so bad that it would provide an incentive to do anything to avoid it.

The new system introduced in 1834 was very similar to that before except for the way in which poor law relief was administered. The grouping of parishes into unions, the deterrent workhouse and the workhouse test had all existed under the Old Poor Law. The New Poor Law saw a fundamental change in the way that the poor were viewed by many of their 'betters'. The traditional attitude had been one of poverty being inevitable (exemplified by the oft-quoted biblical text *For the poor always ye have with you*), the poor essentially were victims of their situation, and their relief a Christian duty. The 1834 Act was guided by a growing view that the poor were largely responsible for their own situation and which they could change if they chose to do so. The concept of the deserving and undeserving poor now existed (and still survives in some quarters).

The 1834 Act was welcomed by some thinking it would reduce the cost of looking after the poor, take beggars off the streets and encourage poor people to work hard to support themselves. The new Poor Law ensured that the poor were housed in workhouses, clothed and fed. Children who entered the workhouse would receive some schooling. In return for this care, all workhouse residents would have to work for several hours each day.

Not all Victorians supported this approach, and some spoke out against the new Poor Law, calling the workhouses ‘Prisons for the Poor’. The poor themselves hated and feared the threat of the workhouse so much that there were riots in northern towns.

One important and complex piece of poor law legislation which had originated in 1662, and which did not finally disappear until 1948, was the Settlement Act (otherwise the Poor Relief Act of 1662). It gave a newcomer to a parish the right to a ‘settlement’ and the right to poor relief in any place where they had lived unchallenged for 40 days. During this period, following complaint to the churchwardens, that person could be ordered back to his place of last settlement, unless he was renting a property worth £10 a year. It may be difficult to believe, but parts of the 1601 Poor Law Act were not finally repealed until 1967. However, some of the same attitudes can be seen in more recent approaches by governments.

Under the Poor Laws the poor were divided into three groups: able-bodied adults, children and the old or non-able-bodied (impotent). Overseers were instructed to put the able-bodied to work, to give apprenticeships to poor children and to provide ‘competent sums of money’ to relieve the ‘impotent’.

The Poor Law Commissioners

The increase in spending on poor relief in the late 18th and early 19th centuries, combined with the attacks on the Poor Laws by Thomas Malthus and other political economists as well as riots, led the government in 1832 to appoint the Royal Commission to investigate the Poor Laws. The Commission published its report, written by Nassau Senior and Edwin Chadwick, in March 1834. The report, described by the historian R. H. Tawney [5] as *brilliant, influential and wildly unhistorical*, called for sweeping reforms of the Poor Law, including the grouping of parishes into Poor Law Unions, the abolition of outdoor relief for the able-bodied and their

families, and the appointment of a centralised Poor Law Commission to direct the administration of poor relief. It was soon after the report was published that Parliament adopted the Poor Law Amendment Act of 1834. The Act implemented some of the report’s recommendations and left others, like the regulation of outdoor relief, to the three newly appointed Poor Law Commissioners. Edwin Chadwick had hoped to be one of them but was appointed Secretary to the Commission.

Relief expenditure was financed by a tax levied on all parishioners whose property value exceeded a minimum level. A rural parish’s taxpayers could be divided into two groups, the labour-hiring farmers and the non-labour-hiring taxpayers such as family farmers (landed gentry), shopkeepers and artisans. In grain-producing areas, where there were large seasonal variations in the demand for labour, labour-hiring farmers were able to reduce costs by laying off unneeded workers during quiet seasons (during the winter and between sowing and harvest) and having them collect poor relief. Large farmers used their political power to tailor the administration of poor relief so as to lower their labour costs. In the early 19th century poor relief represented a subsidy to labour-hiring farmers rather than a transfer from farmers and other taxpayers to agricultural labourers. It seems the increase in relief spending in the late 18th and early 19th centuries was partly a result of politically dominant farmers taking advantage of the poor relief system to shift some of their labour costs onto other taxpayers [6]. Most rural parish vestries were dominated by labour-hiring farmers as a result of *the principle of weighting the right to vote according to the amount of property occupied*.

In livestock farming areas, where demand for labour was constant, it had not been in farmers’ interests to shed labour during the winter, and the number of able-bodied labourers receiving casual relief was smaller. The Poor Law Amendment Act of 1834 reduced the political power of labour-hiring farmers.

Even today the social security and tax credit system in Britain could be seen as subsidising employers who pay low wages or flexible (zero-hours) contracts. As figures from the Department of Work and Pensions have shown⁸ in 2017/18, 57% of all working-age adults on low income were in working families, and as of April 2019 HMRC figures showed that 2.26 million in-work families were claiming tax credits. Cash benefits have been shown to have the largest effect on reducing income inequality.⁹

The Economic History Association (USA)¹⁰ has provided an insight in a paper by George Boyer of Cornell University [6] where he points out that what was interesting was the increase in the number of able-bodied males on relief during the late 17th and 18th centuries. In the second half of the 18th century, a large share of rural households in southern England suffered significant declines in real income. Farm-level data has shown real wages in the south-east declined by 13% from 1770–79 to 1800–09, and remained low until the 1820s [7]. Boyer suggests the effect of late 18th-century enclosures on agricultural labourers' living standards might have been overstated, although those labourers who had common rights must have been hurt by enclosures.

In some parts of the South and East, women and children were employed in wool spinning, lace making, straw plaiting and other cottage industries. Employment opportunities in wool spinning, the largest cottage industry, declined in the late 18th century, and employment in the other cottage industries declined in the early 19th century [6, 8–9]. The decline of cottage industry reduced the ability of women and children to contribute to household income. This, in combination with the decline in agricultural labourers' wage rates and, in some villages, the loss of common rights, caused many rural households' incomes in southern England to fall dangerously close to subsistence by 1795.

The situation was different in the north and midlands. The real wages of day labourers in

agriculture remained roughly constant from 1770 to 1810, and then increased sharply, so that by the 1820s wages were about 50% higher than they were in 1770 [7]. Moreover, while some parts of the north and midlands experienced a decline in cottage industry, in Lancashire and the West Riding of Yorkshire the concentration of textile production and the industrial revolution led to increased employment opportunities for women and children.

A comparison of English poor relief with poor relief on the European continent reveals that from 1795 to 1834 relief expenditures per capita, and expenditure as a share of national product, were significantly higher in England than on the continent. However, differences in spending between England and the continent were relatively small before 1795 and after 1834 [10]. It has been argued that simple economic explanations cannot account for the different patterns of English and continental relief.

The Poor Law Commissioners were not popular with the parishes. The Commission had the power to issue directives but there was no way to make parishes do what the Commission wanted them to do. It did have powers over workhouse diets and could veto appointments to the Boards of Guardians. Chadwick had wanted the 1834 Act to be implemented in the North of England first where, at that time, there were fewer economic problems, there was high employment and food was plentiful.

It is interesting to read quotes from the Poor Law Commissioners Report of 1834.

The Out-door Relief of the Able-bodied, when given in kind, consists rarely of food, rather less unfrequently of fuel, and still less unfrequently of clothes, particularly shoes; but its most usual form is that of relieving the applicants, either wholly or partially, from the expense of obtaining house-room.

In-doors Relief, that which is given within the walls of the Poor-house, or

as it is usually, but very seldom, properly denominated the Workhouse, is also subject to great mal-administration.

But it will be seen that the process of dispauperizing the able-bodied is in its ultimate effects a process which elevates the condition of the great mass of society.

The principle adopted in the parish of Cookham, Berks, is thus stated:

As regards the able-bodied labourers who apply for relief, giving them hard work at low wages by the piece, and exacting more work at a lower price than is paid for any other labour in the parish. In short, to adopt the maxim of Mr. Whately, to let the labourer find that the parish is the hardest taskmaster and the worst paymaster he can find, and thus induce him to make his application to the parish his last and not his first resource.

By 1839 the vast majority of rural parishes had been grouped into Poor Law Unions, and most of these had built or were building workhouses. On the other hand, the Commission met with strong opposition when it attempted in 1837 to set up Poor Law Unions in the industrial north, and the implementation of the New Poor Law was delayed in several industrial cities. In an attempt to regulate the granting of relief to able-bodied males, the Commission, and its replacement in 1847, the Poor Law Board, issued several orders to selected Poor Law Unions. The Outdoor Labour Test Order of 1842, sent to unions without workhouses or where the workhouse test was deemed unenforceable, said that able-bodied males could be given outdoor relief only if they were set to work by the Union. The Outdoor Relief Prohibitory Order of 1844 prohibited outdoor relief for both able-bodied males and females except on account of sickness or 'sudden and urgent necessity'. The Outdoor Relief Regulation Order of 1852 extended the labour test for those receiving relief outside of workhouses.

The share of the population on relief fell sharply from 1871 to 1876, and then continued to decline, until 1914. Real per capita relief expenditure increased from 1876 to 1914, largely because the Poor Law provided increasing amounts of medical care for the poor. The role played by the Poor Law declined due to an increase in the availability of alternative sources of assistance. There was a sharp increase in the second half of the 19th century in philanthropy, increased membership of friendly societies (mutual help associations), the co-operative movement,¹¹ and of trade unions providing mutual insurance policies. The benefits provided workers and their families with some protection against income loss, and few who belonged to friendly societies or unions providing 'friendly' benefits ever needed to apply to the Poor Law for assistance.

Between 1906 and 1911 Parliament passed several pieces of social welfare legislation collectively known as the Liberal welfare reforms. These laws provided free meals and medical inspections (later treatment) for needy school children (1906, 1907, 1912) and weekly pensions for poor persons over age 70 (1908) and established national sickness and unemployment insurance (1911). The Liberal reforms purposely reduced the role played by poor relief and paved the way for the abolition of the Poor Law.

Sanitary movement

Towards the end of the 18th century the phrase *cleanliness is next to Godliness* came into common use and can be found in a sermon by John Wesley. Into the 19th century that concept seems to have been taken literally by Christian activists and the more socially progressive or liberal Christians seem to have made bathing one of their causes and allied themselves with the new soap companies. It was probably seen as a part of the Victorian idea of self-improvement and the notion of the deserving and undeserving poor but bathing and keeping clean was not easy for

those in poverty and towards the bottom of society.

Parkinson [11] refers to the period that began in 1834 with the Poor Law Commission's Report and ended with the passing of the 1848 Public Health Act as being the period of 'the Public Health Agitation'. It was the start of the era of 'sanitary reform' that shaped the genesis and evolution of the EHO/EHP. The 'agitators' were influential individuals and voluntary movements that helped to change the prevailing attitude and approach to public health from 'laissez faire' to 'interventionist', and furthered the social and political acceptance of the institution and ideology of 'inspection'. Edwin Chadwick was the most celebrated individual within the movement (he was not knighted until 1889). Chadwick's best-known work, *The Sanitary Condition of the Labouring Population of Great Britain*, published in 1842, followed the failure to reform the Poor Laws. Due to political pressures, he had been instructed to drop his work. With a change of political control, he was required to complete it but again there was political interference and, on the grounds that it would cause offence, the government refused to publish it as a government report. Chadwick was allowed to print it under his own name as his personal view and at his own expense.

Chadwick had looked at the causes of poverty, and from his investigations into the living conditions of the working population in England and Wales he along with others such as Duncan in Liverpool, recognised the connection between poverty and ill health and an insanitary environment.

Chadwick was also a follower of Jeremy Bentham (he was his secretary for a time from 1830), the man who founded the theory of utilitarianism and leader of a group known as the Philosophical Radicals. The basis of this philosophy was that actions were right if they tended to produce *the greatest happiness for the greatest number of people*. Bentham argued that the idea of rights was 'nonsense', and the idea of natural rights was 'nonsense on stilts'.

Bentham wanted to abolish all legislation that did not bring about the *greatest happiness for the greatest number of people*. Bentham's ideas were applied to the 1834 Act but at this time 'people' were considered to be only those who had the vote. To give the *greatest happiness to the greatest number of people* meant cutting the poor rates. Consequently, the poor actually suffered, and his ideas of utilitarianism were called 'Brutitarianism' by the working classes. Bentham was also a law reformer and his followers in stages brought about penal reform, extension of suffrage and an improvement in the sanitary conditions of the poor.

The most celebrated voluntary organisation was the Health of Towns Association. Indeed, Parkinson [11] has argued that *after 1844, agitation was mainly carried on through the medium of the Health of Towns Association* and the inaugural meeting of the Health of Towns Association (HTA) organised by Dr Thomas Southwood Smith, a friend and colleague of Chadwick's, took place in December 1844 at Exeter Hall, in the Strand, London. This venue was strongly associated with reform movements such as the Anti-Slavery Society, the Reformation Society, the Royal Humane Society and the Anti-Corn Law League, which all met there. This was an age of radicals, evangelists and reform. For more on the Health of Towns Association see [11].

Their efforts produced an improvement in the public health. One of the recommendations in *The Sanitary Condition of the Labouring Population of Great Britain* was that for the prevention of disease it would be 'good economy' to appoint a district medical officer of health independent of private practice. Chadwick was also of the view that it made more economic sense to have a healthier workforce that would be more productive. His thinking was not based on altruism or human rights.

As can be the case, and arguably a ruse to delay action, a Royal Commission was established to examine the problem. The Royal Commission on the Health of Towns was appointed in 1843 to investigate the sanitary arrangements of 50 English towns. Its

findings confirmed the findings of Chadwick and it recognised and insisted that the state must take responsibility for public health and so resulted in the Public Health Act in 1848.

To consider the development of the sanitary movement in practice, it is useful to consider what happened in Liverpool was then reflected across the country. Liverpool as a mercantile port grew rapidly in the early part of the 18th century and into the 19th century. The growth of global trade involved construction of many new docks and buildings and the city population increased with unskilled labour as well as more prosperous business and merchant (including ship-owning) classes. For example, many of the best-known British insurance companies were founded in the city and unlike many European countries that went the route of mutual insurers, the expansion of the UK insurance sector was privately funded, usually by local merchants and manufacturers. Unlike other industrial towns there was little or no skilled working class and no control over construction until 1842. Liverpool, with a large proportion of casual labourers, suffered even more from a low standard of living and insanitary housing than other major cities.

Unusually even for then, Liverpool had a large proportion of people living in cellars. Until the Liverpool Improvement Act 1842 there was no control over these cellar dwellings. The local Council however was active and wanted to improve conditions further. In 1845 the Mayor convened a meeting to establish a Health of Towns Association, and under the Liverpool Sanitary Act 1846 Dr William Duncan was appointed Liverpool's (and Britain's) first Medical Officer of Health (MOH). The Health of Towns Committee appointed Thomas Fresh as the Inspector of Nuisances in September 1844 [12] before Duncan's appointment. In 1847 he was appointed the Inspector of Nuisances under the 1846 Liverpool Act. Of all the officers in charge of separate departments it is said that the one most closely in touch with Dr Duncan was the Inspector of Nuisances [12].

Fresh not only acted under the Liverpool Sanitary Act 1847, but subsequently the Nuisances Removal and Diseases Prevention Act 1848 and the Nuisances Removal and Diseases Prevention Amendment Act 1849. Frazer [13] also records how there was daily communication and co-operation among the Town Clerk, MOH, Borough Engineer, Building Surveyor, Water Engineer, the Head Constable and the Inspector of Nuisances. The aim was to promote *unity of action in all departments under the Health Committee*.

The office of 'inspector of nuisances' and then 'sanitary inspector' featured nationally for the first time in the Town Improvement Clauses Act of 1847 and was subsequently confirmed by the more comprehensive, though still permissive, Public Health Act 1848 which also established the General Board of Health. The office was made compulsory, as was that of the MOH by the Public Health Act 1872 [14].

Hamlin [14] reports that by the end of the 1880s the inspector of nuisances was a fixture in every town, a member of a subordinate profession whose domain, skills and responsibilities were exactly demarcated. Towards the end of the 19th century inspectors were identifying and abating hundreds, even thousands of nuisances per year even in towns of modest size. There are however a number of parallels with the present situation. Crook [15] has said *inspection is widely recognised as a defining feature of the modern British state and the 19th Century is really where it started with the establishment of a range of inspectorates*.

Crook has also argued that

it is surprising, in fact, that sanitary inspectors should have received relatively scant attention. Not only were they more numerous than central inspectors, they were also more engaged with members of the public, and at a point of intense sensitivity: private property.

By the start of the 20th century hundreds of thousands of sanitary inspections were taking

place each year in Britain's towns and cities. Furthermore, it is recorded that other contemporaries were impressed by the powers they possessed.

Hamlin [14] also argues that in the domain of nuisances, inspection is important in a number of contexts. Firstly, it is the history of urban public health. Then, however the inspector of nuisances was the bottom layer of local public health administration. Too often historians encounter their work only through the filter of the MOH who digests mundane detection and remediation into columns in an annual report. The 1872 Public Health Act made inspectors underlings to medical officers, not least because the notion of health was based on the 'medical model'. While sanitary inspectors exercised professional discretion, they were not part of a professional class. In letters to complainants or offenders, inspectors did not discuss standards, agendas or the greater good. They merely set out what they had found, dictated remedies and set deadlines. By the 1970s it was argued that Public Health Inspectors should be known as environmental health officers and should not be subservient to MOHs, as they were a profession (by education, role and to some extent the ability to use discretion) and members of such a profession should not play second fiddle to medically qualified practitioners. This view took a lead in the World Health Organization's definition of health in the preamble to its constitution. Here health is *a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity* – a much broader definition than the *medical model*.

Inspectors of nuisances also reflected the growth of a comprehensive and sometimes intrusive state in response to the growth of nuisances – or did the growth of the inspectorate increase the number of identified nuisances? Hamlin [14] argues that while town dwellers might wish to avoid the police, they did not avoid the inspector. By the 1880s many towns had instituted systematic inspections of dwellings. Nuisance inspection may

be seen as, in part, the creating and maintaining of bourgeois communities and providing a means of mediating local conflict. It was (and is now) a hybrid inspectorate belonging both to the local sphere and to the central state.

The sanitary movement, as has been pointed out [14], also brought 'nuisances' into the realm of policing and transferred it from an allegation that could be contested, and subject to civil action, to summary judgement and the criminal. It also represented the ascendancy of public nuisance, that is those affecting the population in general over private. Public nuisance as a Common Law tort and related to property rights was largely replaced by Statutory Nuisances as set out in Acts of Parliament and addressed defined circumstances.¹²

Crook [15] has also said that sanitary inspection was a means of surveillance and a means of intervention. That said, sanitary inspection is better understood as a mode of liberal surveillance and as part of a liberal culture of governance. That is, it is a broad culture of governance committed to both actively securing a moralised, pluralistic and healthy society and respecting society's capacity to govern itself, free of intervention. Liberal governance must also have inherent tensions and antagonisms, such as those between state and society, local and central. In the modern context, this can be seen in the tension between having control of certain activities and also a desire to remove 'red-tape' (deregulatory environment). This has perhaps led to the so-called 'better regulation' agenda in England. It has been made apparent during the COVID-19 pandemic that many (usually on the political extremes) are opposed to state intervention even when it comes to protecting public health, whether 'lock-downs', the mandatory wearing of masks or vaccination programmes. Crook suggests that these antagonisms are internal to the practice of liberal governance, which does not resolve or overcome these tensions and antagonisms, but rather keeps them in play, as a recurrent

form of political struggle and critique. Public diplomacy was crucial to the work of the inspectors of nuisances and sanitary inspectors. The public had to be worked with (the educational role) and through, sometimes making the job relatively easy, at other times slow and confrontational. This public dimension it is argued made sanitary inspection a political and an ethical art [15].

This is again illustrated when coming to the present time and considering the COVID-19 pandemic, when in the UK after years of criticism of the ‘nanny state’ and policies of deregulation, there had to be a concerted educational campaign on how to wash hands correctly. Reluctance to follow government advice during the pandemic may reflect cynicism of government at all levels as the result of previous experience of the state which has increased inequality and exacerbated disadvantage or used language that increases social tensions and divisions. Why should one follow government advice when that government has previously made one’s life harder? Requiring action to prevent the spread of the SARS-CoV-2 virus such as mandating a ‘COVID Vaccination Pass’ or (‘Pass Sanitaire’) in closed spaces is also seen by some as an infringement of personal liberty. Yet this fails to recognise that others equally have a right to protection from infection (or at least risks reduced).

In the 19th century public health as a matter of intervention, was a reflection of an interventionist state even when economically and politically it had a *laissez faire* approach. That state (at the local and national level) was also publicly accountable, and the tension meant the job of the inspector of nuisances or sanitary inspector could be fraught when employed by a local authority, the elected members of which could have vested interests.

A good example of inspector-as-social-worker was the issue of ‘overcrowding’ – or too many people living in cramped and crowded conditions, as the term ‘overcrowding’ implies that some ‘crowding’ is acceptable. Originally

it had been a matter for medieval courts, more for economic than health-related reasons, as refugees and beggars would lower local wages and demand alms. Lodging-house inspection had been an important part of the early sanitary law. Although ostensibly the prime concern was disease, there was also political motivation (Chartist subversives could be found) and moral (against promiscuous bed-sharing). The 1855 Nuisances Removal Act allowed action against overcrowding (and gave rise to much discussion of the minimum volume for healthy living). Hamlin [14] reports that the figure settled on in the Sanitary Act of 1866 was 300 cubic feet per person, with children counting as half persons and cows as five person-equivalents. Interestingly, Dr Duncan had referred to the Inspectors of Prisons who had recommended not less than 1000 cubic feet for every prisoner, that is 28.3 m³. For comparison a room of 6.5 m² with an average ceiling height of 2.4 m would have 15.6 m³ (551 cubic feet). It was ‘overcrowding’ that led to night inspections, which caused considerable problems. Many also saw concentration of bodies and breath as the most proximate cause of typhus. Crowding remains an issue and again the COVID-19 pandemic highlights this, but before the pandemic the WHO¹³ had reported that studies were consistent in showing that crowding is associated with increased risks of TB and it seems highly plausible that this will also be true for COVID-19, and indeed there is some evidence to support this¹⁴ (see also Chapter 12).

There were moral concerns in the Victorian age, but many insisted that morals were not the business of sanitary inspection. Inspectors faced overcrowding because of public outrage at this common problem, but it was not an issue they could solve at the individual level. For some in authority when individual cases were used to highlight the wider issue, the view was taken that it was failure of the Nuisance Inspector to exercise their duty properly. Reference has been made [14] to how an inspector of nuisance might often identify overcrowding but rarely acted. It was

obvious to them that chasing persons into the street did not increase housing stock or augment the ability to afford more space. Those evicted from one place would then crowd another, so it was a continuing dilemma. The same dilemma exists today. While it might be difficult to argue for a better solution at the local level (rather than treating a symptom of the underlying problem) one justification for any professional association to exist is that by using evidence from the local inspector (practising EHPs) it is possible to formulate arguments for change at the national level.

As well as and overlapping with complaint-based regulation enforcement by inspectors, they also had to inspect problematic industries such as public slaughtering and other offensive trades, bakeries and food markets. They had to enforce other legislative initiatives, like child labour laws, wharfs and canal boat-dwellers, which occupied other inspectors. Such programmes of inspection involved their own paperwork, *by the end of century one senses that, for many inspectors, form, particularly the filling out of forms, has overtaken substance* [14].

When it came to professional development, Inspectors of Nuisances (and Sanitary Inspectors) were often drawn from trades (which in itself could cause conflict) and indeed some of the elected members of the local authorities could have vested interests as they would be drawn from both business and landlords. The pecuniary interests of elected councillors could be at odds with public health. Councils and the Local Government Board could limit the actions of inspectors by requiring enforcement of by-laws and statutes, which then limited discretionary freedom or judgement (professionalism) and could overwhelm them with work. Endless filling up of returns drove out flexibility and bureaucratic transparency displaced discretion [14].

More subtle, but perhaps more profound according to Hamlin [14], was the introduction of form (standard) letters for the conduct of routine business. By the 1870s, Knight and Company, publishers for the Local Government Board, had cornered the market both

for commentaries on local government law with towns buying multiple copies to educate their staff and form letters for particular purposes. These included for all types of nuisances and might be customised but often cited the act or by-law authorising the inspector's involvement. One needed only to fill in name, address, nuisance and deadline. Earlier, enforcement had often been seen as a delicate dance, involving power, deference, cajoling and negotiation. It could be said inspectors 'wait on' landowners whose consent they seek. Form letters (and busy work) made officials officious. Interestingly in modern times officers often want standard forms or *pro-formas* even when there are no 'prescribed forms'.

Hamlin [14] refers to the professionalisation of sanitary inspectors but still with subordination to medical officers. This expansion in the number of sanitary inspectors was accompanied by a growing sense of professional identity and collective interest. The first national gathering of sanitary inspectors was held in 1876 as part of the inaugural congress of the Sanitary Institute of Great Britain. As career paths became national rather than local, inspectors began their own professional organisation, the Association of Public Sanitary Inspectors in 1883.¹⁵ Hamlin argues the enterprise flourished only through acknowledgement of its subordinate status to the newly professionalising medical officers of the British Institute of Public Health (eligible only to those with both medical and public health qualifications) who had overall control. Yet they also encouraged and supported the inspectors too.

Crook [15] has suggested that sanitary inspection was only in part about the bureaucratic application of scientific reasoning. In practice, the situation was more nuanced and complex and the inspectors' worked taking account of science, elements of probability, interpersonal relationships and civility (in effect what seemed decent). As such, sanitary inspections turned upon a rationality that was flexible and could vary with particular

circumstances. Its nature was partly a product of the constraints intrinsic to practice, but it was also a product of the fact that sanitary inspection was based on the notion of what he calls the *liberal culture of governance*. Central to this was the maintenance of a civilised, respectable public sphere, free of sources of disgust and disquiet and committed to the integrity and enjoyment of property – in truth a reflection of the value system and norms of the time. It is suggested that in the role of an inspector, while science played a part, the task involved a commitment to empiricism. This is why it can be argued that sanitary inspection was both a political and ethical task and the work of the EHP remains so. Interestingly he suggests that sanitary inspectors were encouraged even then to develop a ‘habit of close observation’ in the manner of the natural scientist. The Medical Officer of Health for Birkenhead [16] urged inspectors to simulate a meticulous attention to detail, the sort of which had informed the work of Lyell, Darwin and Pasteur. Any given inspection involved a thoroughgoing examination of any potential ‘nuisance’. In the case of private houses, it was said that every *facet of design should be carefully scrutinized, including pipes, joints, traps and chimneys, and even features like wallpaper*. This empiricism required the use of all the senses in carrying out an inspection, and this remains true today. Empirical observation and publication of findings can be the basis of research, something that is intrinsic to a ‘profession’, and yet something that even today, with inspectors who are ever better educated can be problematic to achieve. It can be difficult to get practitioners to publish papers or reports on their work and findings from empirical observation. This is evidenced by the apparent reluctance of EHPs to contribute to the Routledge Focus on Environmental Health series,¹⁶ a vehicle that exists, at least in part, to promote their work.

The main function of the meetings of the Association of Public Sanitary Inspectors appears to have been to reflect on precisely the ways in which this independence was

thwarted in practice. Although other matters such as pay and pensions, to qualifications and tenure were part of the deliberations. Inspectors had to negotiate a number of tensions. On the one hand, they were empowered in the name of the public: they were public servants charged with promoting public well-being. On the other hand, they were accountable to the public and its representatives, both locally and nationally. In essence inspectors inspected the public and in turn the inspectors were accountable to the public and its representatives on the Council and in Parliament. As now, there were also complaints about rulings in the Courts and how the interpretation of the law by lawyers which could limit the inspectors’ ability to deal with problems that may have been highlighted by the public.

The birth of epidemiology and a more scientific approach

Cholera first reached Britain from continental Europe in October 1831 and during the subsequent year resulted in over 30,000 deaths. This had a major impact and caused concerns to society not least because it could affect those other than the poor. It caused considerable consternation to the authorities as to what were the causes. It is often thought Dr John Snow solved the problem and frequent mention is made of his removal of the Broad Street pump handle. Snow’s 1855 book, *On The Mode of Communication of Cholera*, is held up as a demonstration of ‘the epidemiological imagination’. Snow’s contribution, and the context in which he worked is covered in detail in a paper by Smith [17]. As is usually the case with any discovery the person making the discovery has built on the work of others and also to counter alternative theories. In this case it was the ‘miasma theory’, which held that transmission was airborne and associated with bad smells. As Smith [17] points out, Snow’s work *appeared amidst a veritable spate of speculation, experiment, investigation and recommendations regarding*

cholera, and some of these less celebrated (at least now) contributions remain instructive. Dr John Sutherland's report for the General Board of Health on the 1848–1849 British cholera epidemic included his investigation of the effect of water source on cholera risk in Salford, Manchester. Smith [17] says that Sutherland found a strong association between household water supply and the occurrence of cholera. Diarrhoea showed a similar, but less marked, association with water supply. Sutherland concluded that with respect to water obtained from wells into which the contents of sewers or privies had escaped, the *predisposition occasioned by the continued use of such water is perhaps the most fatal of all.* Duncan in Liverpool had also taken an epidemiological approach in that city that had some of the worst conditions.

In his work Snow demonstrated an attack rate many times higher in those receiving water from the Southwark and Vauxhall company than those receiving it from the Lambeth Company. Others pointed out that those parts of London which had high overall mortality in the years before the cholera epidemic tended to have high death rates from cholera during the epidemic and attributed this to environmental factors which increased the risk of both cholera and other causes of death. By tracking the cases Snow was also able to identify a focus of infection.

When considering the cholera outbreak in Golden Square, Broad Street, London 1854, the Reverend Henry Whitehead who tracked the cases over time, formed the view that when Snow removed the pump handle the epidemic was already waning and he argued that appeared to have had no effect, although he did concede that the closure of the pump may have prevented recurrence of the epidemic. Snow accepted that the mortality rate was diminished. He had not been able to identify the causative organism via microscopic examination or any chemical pollutant so was not able to prove the water's danger conclusively. However, he indicated that the reduction in cases might have been

because much of the population moved away, which started soon after the outbreak. He conceded that it was impossible to decide whether the well still contained the cholera poison in an active state, or whether for whatever reason the water had become free from the cause.

Something that helped Snow and his investigation were several unexplained deaths from cholera that did not at first appear to be linked to the Broad Street pump water. In particular a widow living in Hampstead had died of cholera in early September, and her niece, who lived in Islington, had succumbed with the same symptoms the following day. Neither of these women had been near Broad Street for a long time. Snow was intrigued so visited and interviewed the widow's son. He discovered from him that she had once lived in Broad Street and liked the taste of the water from the pump in Broad Street so much that she sent her servant down every day to bring back a large bottle of it for her by cart. The last bottle of water, which her niece had also drunk from, had been brought from Broad Street in late August at the very start of the epidemic.

It was discovered later that the public well serving the pump had been dug only 0.9 m from an old cesspit that had begun to leak faecal bacteria. A baby who had contracted cholera from another source had its nappies washed in this cesspit, the opening of which was under a nearby house.¹⁷

Smith [17] refers also to Snow's criticism of Chadwick's policy of flushing the sewers and draining cesspools. Snow maintained that this increased the contamination of drinking water. Chadwick defended his action, on the basis that a small increase in the pollution of the Thames was better than allowing the sewers to continue giving off the pestilent exhalations into the atmosphere as he was a supporter of the miasma theory.

It was also common to blame not only poverty but drunkenness for cholera. Snow attributed the lack of cholera in brewery workers near Broad Street to the fact that

they drank only beer. The brewery actually had a different water source.

The work of Duncan in Liverpool should not be overlooked when considering the development of the epidemiology. This is discussed in the first publication of the Routledge Focus on Environmental Health series (see Note 5).

In mid-19th century Britain, cholera was seen to be a disease of the poor. This attitude was shared by those who thought cholera caused by a specific agent, and those who saw it as a consequence of more general environmental causes. Smith [17] says that it was also common to think that that cholera in poor communities represented a threat to the health of the wealthier classes. The thought was that the disease could spread from epicentres in poor areas to the better-off areas and led to a fear of the poor, and to calls that something must be done to improve their circumstances.

Interestingly Smith [17] refers to these concerns having some similarities with current thinking and the role of income inequality in health. He highlights the work of Wilkinson [18] who has argued that higher levels of inequality within societies are not just associated with worse health amongst the poor, but with overall worse health, affecting the poor and rich alike in highly unequal societies.

In this instance it was argued that where the needs of the poor were ignored this translated into worse health for the rich for psychosocial reasons. In the Victorian era there were more material reasons for these concerns. Yet the descriptions of miasmas from the 19th century share some similarities with modern accounts of adverse psychosocial environments. Smith [17] gives an example of how unfairness to one's fellows could be rewarded by ill health reported by Snow. He documented the case of a landlord whose tenants complained that drainage from cesspools was entering their water supply. The landlord's agent maintained there was no problem, but the tenants still complained. So, the landlord went himself, and said he could not see anything wrong and drank a glass of

it. This was a Wednesday, on returning home he was taken ill with cholera and died the following Saturday. There was no cholera in the vicinity of where the landlord lived.

Crook [15] has also argued that the greater significance assumed by epidemiological science and detailed legal norms led in time to the formal provision of vocational qualifications for sanitary inspectors. Initially drawn from the ranks of tradesmen, police officers and even soldiers, by the late Victorian period there was a growing consensus that inspectors required technical instruction. The first exams were carried out in 1877 under the auspices of the Sanitary Institute of Great Britain. Only those appointed in London were required to have any certification. In 1899 a Local Government Board approved the formation of the Sanitary Inspectors' Examination Board to regulate the provision of training. In order for a candidate to pass they were required to have a basic grasp of the various facets of 'sanitary science'. Most exams covered four topics: elementary physics and chemistry; elementary statistical methods; practices of municipal hygiene [15].

Sanitary inspection was seen as an observational, fact-based exercise incorporating a scientific ethos. Its relation to the science of epidemiology and evolving theories of disease transmission was more complex. However, there were many professional journals. Crook [15] refers to *The Sanitary Record*, *Public Health* and the *Journal of State Medicine* to ensure that sanitary inspectors could be informed of all the latest innovations in the theory and practice of disease prevention. Then as now, it was seen as important for practitioners to be well-informed and up to date. This is what became known as continuing professional development, and indeed any professional including EHPs should undertake sufficient research or study to ensure they are properly informed so as to be able to make valid judgements and assessments. Something that for example was referred to in the original 2006 Housing Health and Safety Rating System Operating Guidance.¹⁸

As we will see in the next chapter when considering the attributes of an environmental health practitioner or officer (and subsequent chapters), it is apparent that they are part of the public health workforce. It is generally accepted that the three pillars of public health are:

- Protection;
- Prevention of disease;
- Promotion of well-being;

and through this book the role of EHPs in each pillar will become apparent.

Public health actions under these pillars should be based upon evidence-based knowledge and enabled by good governance, advocacy and the capacity to ensure fair, secure and sustainable health and well-being for all and public health is the art and science of organising collective efforts to achieve this [19].

This section, while taking a historical perspective has to some extent also conjured up different images of ‘public health’ (some not necessarily coinciding with the modern image of environmental health practitioners) and this will be of further relevance in the remainder of the chapter (and this publication). These images are well summarised by Geoff Rayner and Tim Lang [20] as:

- 1 People constructing knowledge-based interventions
- 2 Public health as state intervention – uniformed officers
- 3 Public health as responding to pandemic disease
- 4 Public health as rescue, saving individual lives
- 5 Focussing on individuals shaped by wider determinants
- 6 Health as the operation of systems
- 7 Public health as interactions and transitions
- 8 Public health as social movements and causes
- 9 Public health as nanny or Big Brother

In addition, it can be argued that environmental health is about preventative (upstream) interventions to reduce the need for greater medical action downstream whether to treat an individual or population.

The fact that EHPs are part of the public health workforce can be easily forgotten, despite the history. This is particularly true when public health responsibilities are split between a range of agencies at different levels of government. This has been further illustrated in the UK during the COVID-19 pandemic when it took some time for EHPs to be deployed effectively and best use made of their skills and knowledge.¹⁹

Public and environmental health has changed many times since the Second World War and although the many Public Health Inspectors and environmental health officers in the UK were glad when no longer directly under the control of the Medical Officer of Health, one must wonder whether the changes since 1974 and into the 21st century have been wholly beneficial. As Gorsky [21] said back in 2007 the NHS is about curative rather than preventive medicine and the *economic constraints on local authority health service expansion limited their room for manoeuvre* while the monitoring of local population health remained essential. The question is, have the structures and funding in England and other countries allowed this? Although outside the scope of this book, it is also right to question continually whether in any country the legal and administrative structures and funding are appropriate for protecting public and environmental health and preventing ill health and unintentional injuries.

Legislative history of environmental health

One way to consider or to visualise the historical development of environmental health is to consider key pieces of legislation to address some of the social ills that arose in the 18th and 19th centuries and continued from then. See Table 1.1. Table 1.1 sets out

Table 1.1 A legislative history of environmental health in England and Wales

<i>Year</i>	<i>Legislation</i>	<i>Purpose</i>
1846	Nuisances Removal and Diseases Prevention Act	Temporary legislation to help address the spread of cholera, setting out procedures for the removal of 'nuisances'. The Privy Council given power to make regulations for the prevention of infectious disease
1848	Public Health Act	Provisions of a sanitary code and administrative machine to give it effect, the General Board of Health, plus a permissive power to establish local boards of health (local boards) who would have responsibility for all sewers
1848	Nuisances Removal and Diseases Prevention Act	A further response to the threat of cholera and providing for the speedier removal of certain nuisances and the 'revention of contagious and epidemic diseases'
1851	Common Lodging Houses Act	Control over common lodging houses used by the poor where many families shared
1851	Labouring Classes Lodging Act	Gave local boards (local authorities) powers to establish lodging houses for the homeless
1855	Nuisances Removal Act	For the first time included 'statutory nuisances' such as 'premises in such a state as to be a nuisance or injurious to health' and a number of others still existing.
1858	Local Government Act	Made changes to the procedure for constituting a local board and gave them some additional powers. There was also a change in nomenclature: the authorities created by the 1858 Act were simply titled 'Local Boards' and their areas as 'Local Government Districts'
1860	Adulteration of Food Act	Limited responses to the increasing problem of food adulteration; allowed for the appointment of public analysts but no sampling powers
1863	Alkali Act	Created the Alkali Inspectorate to control emissions to air (noxious vapours) from certain processes
1866	Sanitary Act	Local authorities to supply water and sewerage system and also to control smoke
1866	Labouring Classes Dwellings Act	Empowered Public Works Loan Commissioners to lend money to councils for the provision of housing
1867	Factory Act	This brought any workplace employing more than 50 persons in manufacture under the factory acts
1867	Workshop Regulation Act	Workplaces with less than 50 persons were prevented from employing children under 8 years old. Children aged 8 to 13 were restricted to half time working
1868	Artisans and Labourers' Dwellings Improvement Act (Torrens Act)	Provided for the demolition or improvement of unsanitary dwellings
1871	Factories Act	A reaction to the failure of local authorities to enforce the law and creating duties to enforce on the inspectors of factories
1872	Public Health Act	Local government board made a series of orders prescribing qualifications, appointment, salaries, and tenure of office of medical officers of health and inspectors of nuisances and also created sanitary authorities. Local government board could approve the establishment of Port Sanitary Authorities

Table 1.1 (continued)

<i>Year</i>	<i>Legislation</i>	<i>Purpose</i>
1872	Adulteration of Food, Drink, and Drugs Act	Made it an offence to sell food, drink or drugs that were not of the 'nature, substance or quality' demanded by the purchaser
1875	Sale of Food and Drugs Act	Extended and amended the 1872 Act
1875	Public Health Act	Gave wide ranging powers to local authorities (created urban and rural sanitary authorities), from dealing with unfit food, to sewers, from statutory nuisances, to building by-laws
1875	Artisans and Labourers' Dwellings Improvement Act (Cross Act)	Allowed councils to deal with unhealthy houses by buying the land and buildings for the purpose of improvement. Councils were allowed to build houses. Named after Richard Cross, Home Secretary
1879	Artisans and Labourers Dwellings Improvement Act	Changes that enabled local authorities to deal with individual insanitary houses. Useful powers, but they did not permit authorities to deal with areas of bad housing
1882	Artisans Dwellings Act	Extended provisions in earlier Acts to all urban sanitary districts and insofar as it allowed demolition of obstructive buildings when dealing with unhealthy or unfit housing
1882	Municipal Corporations Act	Created a modernised form of municipal borough
1885	Housing of the Working Classes Act	Required local authorities to use the powers they already had with regard to insanitary housing and amended the Artisans and Labourers Dwellings Improvement Acts and Artisans Dwellings Acts
1886	Shop Hours Act	Limited the working hours of young people to 74 per week including meal times.
1888	Local Government Act	Established county councils and county boroughs and also created the London County Council and metropolitan boroughs replaced a mixture of local authorities
1889	Infectious Diseases Notification Act	Allowed local authorities to adopt powers to require notification
1890	Housing of the Working Classes Act	A consolidation Act but which was also the first that based rehabilitation legislation with provisions for gradual renewal and environmental improvements
1891	Factory Act	Local authorities made responsible for sanitary conveniences in factories, and for cleanliness, ventilation, overcrowding and lime washing in workshops
1894	Local Government Act	Urban District and Rural District Councils replaced urban and rural sanitary districts
1892	Shops Act	To control the hours, young persons can be employed in shops and warehouse
1899	Infectious Diseases Act (Extension) Act	Required all sanitary authorities to adopt the 1889 Act (it had been a power not a duty)
1901	Factory and Workshops Act	Consolidation and extension of previous provisions
1909	Housing and Town Planning Act	Provided permissive powers to control land use
1912	Shops Act	Extension of protection to shop workers

(Continued on next page)

Table 1.1 (continued)

<i>Year</i>	<i>Legislation</i>	<i>Purpose</i>
1919	Housing and Town Planning Act (Addison Act)	Followed the 1917 Tudor Walters Committee Report and stimulated house building with subsidies to local authorities to build
1921	Public Health (Officers) Act	Set conditions of office and tenure of medical officers and sanitary inspectors and required that their dismissal could only be with the consent of the minister, and it also required that the term 'inspector of nuisances' be replaced with the designation 'sanitary inspector'
1924	Housing Act (Wheatley Act)	Consolidation of Acts to stimulate house building and to deal with repair, maintenance and sanitary condition of housing, including subsidy for the clearance of unhealthy housing
1925	Public Health Act	First powers to deal with food premises and extended to water and washing facilities and cleanliness
1926	Housing (Rural Workers) Act	The first national legislation to provide discretionary improvement grants in rural areas (maximum £100) and half the grant provided by the Exchequer
1926	Public Health (Smoke Abatement) Act	Was the first attempt to deal with visible air pollution, after many years of campaigning
1928	Food and Drugs (Adulteration) Act 1928	Requiring that foods and drugs sold shall be of the nature, substance, and quality demanded. It was an offence under that Act to sell articles which do not conform to standards
1930	Housing Act (Greenwood Act)	Reformed 19th century legislation and provision for the clearance of insanitary housing (slum clearance) with compulsory purchase and clearance area procedures with subsidies for re-housing displaced families. There was little scope for authorities to ignore the provisions as five-year programmes were required
1934	Shops Act	Controlled hours of work for those under 18 years of age and introduced health and welfare provisions for shop and office workers
1935	Housing Act	Amended procedures for slum clearance and introduced new powers to deal with overcrowding including a statutory definition of overcrowding (still in force in 2015)
1936	Public Health Act	Consolidated previous provisions, extended statutory nuisance powers and required compulsory notification of specified communicable diseases and was the basis of many environmental health interventions until replaced by specific later legislation
1937	Public Health (Drainage of Trade Premises) Act	Sought to control non-domestic discharges to public sewers
1938	Food and Drugs Act	Provision on protection of food supplies, control of certain foods, on inspection of food and control of some food premises, also included provisions on infectious diseases
1949	Housing Act	Extended the grant provisions in the 1926 Act to urban areas particularly for the installation of the basic amenities. Local authorities could acquire housing for improvement
1949	Prevention of Damage by Pests Act	Provisions on the control of rats and mice primarily to protect food from damage

Table 1.1 (continued)

Year	Legislation	Purpose
1950	Shops Act	A consolidating measure
1951	Factory Act	A consolidating measure
1954	Housing Rents and Repairs Act	Required local authorities to survey all houses in their district to determine which were unfit (for the first time a fitness standard was defined); included provision for the clearance and redevelopment of areas of unfit housing, for securing or promoting the reconditioning and maintenance of houses via improvement grants, and amended the law relating to housing and the exercise of certain powers relating to land, and rent control
1955	Sanitary Inspectors (Change of Designation) Act	Sanitary Inspectors were designated Public Health Inspectors
1955	Food and Drugs Act	Updating of controls on food and food premises including regulation making powers, such as food hygiene regulations
1956	Agriculture (Safety, Health and Welfare Provisions) Act	Enforcement was entrusted mainly to the Agricultural Inspectorate and not to local authorities, whose role was equated with their, then, limited duties under factory legislation
1956	Clean Air Act	Following the killer London smogs and the Beaver Committee, led to action to reduce domestic smoke emissions via smoke control areas and increased monitoring and action to reduce smoke emissions
1957	Housing Act	Fundamental restatement of housing law with changes to the law on repair and clearance
1959	House Purchase and Housing Act	Introduced the first mandatory grant aid (standard grant) for owners of eligible housing (including landlords) and relaxed discretionary grant conditions
1961	Clean Air Act	Extended to provisions on smoke control including controls on chimney heights
1963	Offices Shops and Railway Premises Act	Applied occupational health and safety matters to largely non-industrial workers such as those in offices in wholesale and retail premises. Under this Act, regulations were made prescribing health and safety standards. Most enforcement duties were assigned to local authorities and whose role was entrusted to EHPs. Inspectors of Factories had oversight over local authority work
1964	Housing Act	Dealt with grant aid for water supply and provision of the standard amenities as well as area improvement
1969	Housing Act	Followed the Dennington Committee Report (Older Homes – a call for action) and introduced provisions to support housing renewal, taking account of bad external arrangement
1972	Local Government Act	Reformed local government structures in England and Wales, created two-tier structure. The 1300+ councils in England and Wales were reduced to about 400 shire districts. (Scotland had its own Act in 1973 to restructure local government)

(Continued on next page)

Table 1.1 (continued)

<i>Year</i>	<i>Legislation</i>	<i>Purpose</i>
1973	Water Act	Created ten Regional Water Authorities that took over water functions from local authorities, with regulation based on river basin management
1974	Health and Safety at Work etc. Act	Following on from the Robens Committee it provided new duties on employers and employees to protect health and safety at work. Created Health and Safety Executive and new powers for local authorities, enforcement provisions same for local authorities and HSE but applied to different classes of different premises. Powers to make Regulations and for HSE to issue Codes of Practice
1974	Housing Act	Introduced Housing Action Areas and changes to grant provisions with a new range of grants to secure a 30-year life
1974	Control of Pollution Act	Included provisions on smoke pollution, noise
1976	Food and Drugs (Amendment) Act	Introduced powers to close insanitary food premises
1984	Food Act	Consolidation Act
1984	Public Health (Control of Disease) Act	Established Port Health Authorities, made provisions on control of disease and to regulate common lodging houses and canal boats
1985	Housing Act	Consolidation Act
1989	Water Act	Privatised the water industry; until 1974 public water supplies had been a local authority function then passed to Regional Water Authorities. Also created National Rivers Authority to deal with water pollution
1991	Water Resources Act	Introduced new provisions to control discharges to water and also allowed for water quality standards
1991	Water Industry Act	Among other things sought to update regulation of industrial discharges to sewers previously covered by the 1937 Act
1989	Local Government and Housing Act	Introduced first update of the Fitness Standard since 1957 (included the basic amenities for the first time) and mandatory grants for owner occupiers of unfit houses and no upper limit to grant but subject to means testing, Group Repair, Minor Works Assistance and Disabled Facilities Grants introduced
1990	Food Safety Act	Updating of the law and increasing powers to deal with unsafe food and unhygienic premises
1990	Environmental Protection Act	Introduced new powers to deal with industrial emissions, not just visible pollutants giving local authorities powers similar to that of the central inspectorate, new regulation of waste, and updated statutory nuisance provisions and later included provisions on contaminated land
1995	Environment Act	Created the Environment Agency which became the central pollution control agency among other functions, dealing with waste, water and air emissions as well as flood control and environmental protection. Revised provisions in the 1990 Act including on contaminated land
1996	Housing Grants, Construction and Regeneration Act	Limits to renovation grants for unfit houses

Table 1.1 (continued)

Year	Legislation	Purpose
1996	Housing Act	Introduced new provisions on registration schemes for HMOs
2000	Local Government Act	Power of local authorities to promote well-being (as defined in the Act)
2000	Regulation of Investigatory Powers Act	Regulates the powers of public bodies to carry out surveillance and investigation, covering the interception of communications.
2003	Water Act	Included provisions on contaminated land and water pollution and on changes to drainage law
2004	Housing Act	Introduced powers to deal with hazards (the Housing Health and Safety Rating System introduced by Regulations made under the Act) plus HMO and Selective licensing introduced
2005	Clean Neighbourhoods and Environment Act	Added to the list of statutory nuisances, and provisions on litter, noise, waste management and control of dogs
2006	Wales Act	Relating to devolution of powers to the Welsh Assembly
2007	Local Government and Public Involvement in Health Act	Introduced local area agreements and community strategies
2007	Sustainable Communities Act (Amended 2010)	Provisions to promote the sustainability of local communities
2010	Flood and Water Management Act	Includes provisions on sustainable drainage
2011	Localism Act	Introduced changes to planning, repealed requirement for regional strategies and some changes to housing law
2015	Deregulation Act	Repealed a number of provisions, such as duty to prepare sustainable community strategies and local area agreements; decriminalised some offences (e.g. on household waste); made changes to health and safety at work legislation and also changes to licensing law
2015	Modern Slavery Act	Consolidated the existing slavery and human trafficking offences and introduction of two new civil orders to enable the courts to place restrictions on those convicted of modern slavery offences
2016	Housing and Planning Act	Included provisions about housing supply, estate agents, rent charges, planning and compulsory purchase and provisions on banning orders for 'rogue landlords'
2016	Investigatory Powers Act	Legislation on interception of communications, equipment interference and the acquisition and retention of communications data, bulk personal datasets and other information; and the treatment of material held as a result of such interception, or acquisition or retention
2016	Immigration Act	Part 2 related to landlords in England knowingly leasing premises to a person who is disqualified by reason of their immigration status
2017	Homelessness Reduction Act	Duty on local housing authority to provide advice to prevent homelessness
2017	Neighbourhood Planning Act	Revised provisions on land-use planning and compulsory purchase by amending previous legislation

(Continued on next page)

Table 1.1 (continued)

Year	Legislation	Purpose
2017	Wales Act	Amending previous devolution legislation
2018	Homes (Fitness for Human Habitation) Act	Introduced Housing Health and Safety Rating System hazards into fitness criteria for the Landlord and Tenant Act 1985 and landlord's obligation for rented property to be 'fit' (tenants able to take own legal action where dwelling not suitable for occupation)
2019	Wild Animals in Circuses Act	Prohibiting the use of wild animals in travelling circuses in England
2019	Tenant Fees Act	Act to prevent landlords and letting agents in England from charging certain fees
2020	European Union (Withdrawal Agreement) Act	Act to set out terms of UK's withdrawal from the EU
2020	Coronavirus Act	Emergency measures to deal with the COVID-19 pandemic including measures on the food supply chain
2021	Fire Safety Act	Amending application of the Regulatory Reform (Fire Safety) Order 2005 where a building contains two or more sets of domestic premises
2021	Environment Act	Requires statements and reports about environmental protection and establishes the Office for Environmental Protection; Requires Secretary of State to set long-term legally binding targets on air quality, biodiversity, water, resource efficiency and waste reduction. Duty on government to reduce discharges from storm overflows. Includes provisions on the regulation of chemicals and on biodiversity

a chronology of some key provisions since the 1848 Public Health Act relevant to England and Wales. Other countries, particularly those in the former Commonwealth may have started from a similar point but will no doubt have diverged as different problems and issues have emerged.

Table 1.1 sets out Acts only and is included for illustrative purposes only, setting out primary legislation relevant to environmental health practitioners particularly in the 20th century. Relevant law is often contained in secondary legislation made under the primary legislation. Legislation is often a reaction to campaigns by individuals or organisations or particular events and may lag behind public concerns. Indeed, legislation may be seen as the minimum action Parliament (and the government as the Executive) think they can do in the circumstances and is often the result

of negotiation and trade-offs so that legislative standards tend to be the minimum not the optimum for public health.

Section 1 notes

- 1 http://www.nationalarchives.gov.uk/pathways/citizenship/struggle_democracy/getting_vote.htm
- 2 Locke J. 1690 *Two Treatise of Government* available via The Project Gutenberg. <https://english.hku.hk/staff/kjohnson/PDF/LockeJohnSEC-ONDTRATISE1690.pdf>
- 3 Honorary professor of public health at Kings College London and former director of public health for the London Borough of Southwark.
- 4 See for example Dr Gabriel Scally in the *Observer* newspaper 12 September 2021, The winter Covid plan will be marked by delay, confusion and ignorance. Sound familiar? <https://www.theguardian.com/commentisfree/2021/sep/12/the-winter-covid-plan-will-be-marked-by-delay-confusion-and-ignorance-sound-familiar>

- 5 Liverpool's first dock was the world's first enclosed commercial dock, built in 1715 and at one time Liverpool's docks stretched along 7.5 miles of the banks of the River Mersey.
- 6 See Battersby S. (2017) Duncan of Liverpool – The first medical officer of health. In *Pioneers in Public Health – Lessons from History*, Stewart J (Ed.), Routledge, Abingdon.
- 7 See 150th anniversary of the establishment of the Alkali Inspectorate at <https://www.envchemgroup.com/150th-anniversary-of-the-establishment-of-the-alkali-inspectorate.html>
- 8 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/789997/households-below-average-income-1994-1995-2017-2018.pdf
- 9 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/821693/CWTC_Commentary_April_2019.pdf
- 10 See <http://eh.net/>
- 11 In 1844 the Rochdale Pioneers founded the modern Co-operative Movement, to provide an affordable alternative to poor-quality and adulterated food and provisions, using any surplus to benefit the community.
- 12 Interestingly, criminal public nuisance is an either-way offence, and as a common law and not a statutory offence there is no limit to the sentence that can be imposed provided it is not 'inordinate'. Police therefore have the power to arrest for the crime of public nuisance using their general arrest powers in s24(1)(b) Police and Criminal Evidence Act 1984. Conspiracy to commit a public nuisance is also an offence contrary to section 1(1) of the Criminal Law Act 1977.
- 13 https://www.ncbi.nlm.nih.gov/books/NBK535293/pdf/Bookshelf_NBK535293.pdf
- 14 Rader B, Nande A, et al. (2020) *Crowding and the Epidemic Intensity of COVID-19 Transmission*, a pre-print paper. <https://www.medrxiv.org/content/10.1101/2020.04.15.20064980v2>; See also <https://www.bmj.com/content/370/bmj.m3181> where a study is reported as saying contact within households is thought to be responsible for roughly 70% of SARS-CoV-2 transmission when widespread community control measures are in place.
- 15 For one review of the historical development of environmental health in the UK, and the professional body see Johnson R. (1983) *A Century of Progress – History of the Institution of Environmental Health Officers, 1883–1983*, CIEH, London.
- 16 <https://www.routledge.com/Routledge-Focus-on-Environmental-Health/book-series/CONENHE>
- 17 In light of the COVID-19 pandemic the issue of testing, contact-tracing and isolation, basic and traditional public health response dating from the 19th century has become a real debate. Those countries that took this approach appear to have dealt with the disease better. Infectious disease contact tracing and investigation is something that EHOs have been trained to do in the past. See https://www.ecdc.europa.eu/sites/default/files/documents/Contact-tracing-Public-health-management-persons-including-healthcare-workers-having-had-contact-with-COVID-19-cases-in-the-European-Union%E2%80%93second-update_0.pdf and https://apps.who.int/iris/bitstream/handle/10665/185258/WHO_EVD_Guidance_Contact_15.1_eng.pdf;jsessionid=768915DE811CCC1D7883827BB073107C?sequence=1
- 18 See https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/15810/142631.pdf
- 19 See for example Day C. (2021) *COVID-19: The Global Environmental Health Experience*, Routledge Focus on Environmental Health Series, Routledge, Abingdon, Oxon. <https://www.routledge.com/COVID-19-The-Global-Environmental-Health-Experience/Day/p/book/9780367743161>

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SECTION 2: THE 21ST CENTURY; THE PRINCIPLES AND PHILOSOPHY OF ENVIRONMENTAL HEALTH

Introduction and context

Having looked at some of the history – where environmental health came from with some reference to current issues and practice – we now turn to the second decade of the 21st century. Many challenges facing environmental health and societies generally around the globe are not always so different in nature from those in the past. These challenges are both economic and environmental (and there remain parallels with the 19th century given the widespread acceptance of neoliberal economics at least until the COVID-19 pandemic). It can be argued that unless solutions to economic problems take account fully of the environmental imperative presented by the climate crisis and global heating (and the

fundamental risks to public health), then the responses will be inadequate. It might be thought that economic policies and structures have nothing to do with environmental health or EHOs. However, looking back at the history of environmental health it is apparent that many of the problems that EHOs have had to face have been a consequence of society's approach to economics and indeed the economic and political philosophies of governments. As Kate Raworth has said [1], *economics is the mother tongue of public policy, the language of public life, and the mindset that shapes society*.

The COVID-19 pandemic has shown the fallacy of the belief that economic progress and unprecedented prosperity around the world means humans are not part of the

natural world. For too many there has been the view that somehow humans have created an autonomous ecosystem. The events of 2020–21 have shown this to be both dangerous and wrong.

It has been shown that more unequal societies are also unhealthier, and in any pandemic and in extremes of weather as the result of global heating, everyone will be affected but the poorest will suffer most. The issue of climate change should actually dictate how economic problems are resolved. Such challenges are fundamental to the philosophy underpinning environmental health as also is the notion of equity or fairness, and in particular equity in health.

Michael Marmot said in 2010 [2] and reiterated in 2020 [3], *Health inequalities are not inevitable and can be significantly reduced . . . avoidable health inequalities are unfair and putting them right is a matter of social justice*. In answer to the frequent response that the recommendations of the 2010 report could not be afforded because of the economic climate, he said *it is inaction that cannot be afforded, for the human and economic costs are too high*.

Equity in health means that there should be no disparities in health as the result of social systems between social groups that have an underlying social advantage or disadvantage (as the result of economic wealth or power). Equally there should be no disparities as the result of the major social determinants of health. Inequities in health come about when society puts groups of people who are already disadvantaged, as the result of poverty, gender, race or sexual orientation or are otherwise disenfranchised, at further disadvantage with respect to their health. Equity is an ethical principle; it also reflects and is closely related to human rights principles. So it should be recognised that global heating, pandemics and economic crises could increase inequity, and that the further down the social ladder one is (that is the less wealth one has), the greater will be the adverse effects, and this applies as much between countries as within countries.

One problem is however that the main indicator of a country's economic performance remains the Gross Domestic Product (GDP) and this is used to measure 'progress'. This is a crude measure of total economic activity, and as such is a poor reflection of health and well-being. So that for example expenditure on tobacco appears in GDP, as would money spent on food that has little nutritional benefit, never mind in the UK and some other countries the sale of illegal drugs and prostitution. One might ask for example in such an economic situation where should the effort be put to achieve more in environmental health terms; more food safety inspections or actions to achieve healthier eating and better diets for those on lower incomes which could also reduce obesity. Or, should we spend money on drugs and treatment for those living in damp and cold homes or in improving those unhealthy and unsafe homes? From a public health rather than merely consumer protection or 'service' perspective, in both cases the upstream intervention (prevention) would be the obvious course.

The reality is that the effects of economic growth have made us worse off in terms of our health. Using GDP as a measure takes no account of increasing inequality pollution or damage to people's health and the environment. Indeed, it also treats crime, divorce and other elements of social breakdown as economic gains. This model will always undermine the notion of sustainable development (considered in the Annex to this chapter), and as such it cheats other countries, future generations and ourselves. We do need to redefine progress, and replace GDP with new indicators of progress; however it will be brave politicians that take this on as there are so many vested interests. There are two problems. First more government finance departments (Treasuries) take a short-term approach and don't want to lead. Secondly despite the science, there are too many 'climate change deniers' (or sceptics) in positions of power who it seems are linked to vested interests

in the form of business who do not have a long-term vision. It seems change and a new approach will come about only when catastrophe as the result of global heating is at the door and the general population are directly and adversely affected. There is maybe a hope that the COVID-19 pandemic will lead to a change in attitudes and a recognition that the economic paradigms are not the way to achieve healthy societies.

Jackson [4] considered what prosperity should look like in a finite world with limited resources and asked whether prosperity is possible without ‘growth’. He undermines the notion that prosperity is the same as conventional economic growth as measured by GDP. Prosperity *isn’t obviously synonymous with income or wealth* and *rising prosperity isn’t self-evidently the same thing as economic growth*. An alternative such as an Index of Sustainable Economic Welfare (ISEW) takes account of damage to the environment and public health and would be a better way of reflecting economic performance, but that is not for this book. However, this does put into context the issues facing environmental health and why inequality is such an important issue in environmental health.

The emergence of the concept of Doughnut Economics [1] should therefore be of interest to EHOs/EHPs. Kate Raworth argues that we should move away from the use of GDP as a measure, as she points out as an example of how we have got it wrong the G20 leaders in 2014 pledged to increase the GDP of their countries by 2.1% just days after the Intergovernmental Panel on Climate Change (IPCC) warned of the severe and irreversible damage from rising greenhouse gas emissions. The argument is that GDP growth should be put aside, and we should start afresh, asking *what enables human beings to thrive*. The concept can be demonstrated by the diagram of the ring doughnut (see Figure 1.1). This is a concept that has already been adopted by one city, Amsterdam, to plot how it will rebuild after COVID-19.

Figure 1.1 is the ‘doughnut’ which has been described as a 21st-century compass,

and between its social foundation of human well-being and ecological ceiling of planetary pressure lies the safe and just place for humanity. The inner ring of her doughnut sets out the minimum needed to ‘lead a good life’, derived from the UN’s Sustainable Development Goals (discussed later). It ranges from food and clean water to a certain level of housing, sanitation, energy, education, health-care, gender equality, income and political voice. Anyone not attaining such minimum standards is living in the doughnut’s hole. The outer ring of the doughnut, where you might find the sprinkles, represents the ecological ceiling drawn up by earth-system scientists. It highlights the boundaries across which humankind should not go to avoid damaging the climate, soils, oceans, the ozone layer, freshwater and abundant biodiversity.

As the earlier part of this chapter has shown, environmental health (even if we did not always call it that) has seen similar momentous changes and crucial moments in history to those we now face. In the first quarter of the 21st century, we are at a comparable watershed. For many countries, particularly in the Northern Hemisphere (or ‘the West’), urbanisation and industrialisation are largely behind us; we live in post-industrial economies but that does not protect us from catastrophes be it the result of global heating or pandemics.

Despite the UK leaving the EU the horizons, including those of EHOs, are increasingly global, not merely national. Manufacturing industries employ fewer people, and much of the economy is driven by ideas and as we have seen financial markets can impact on a country’s economic health almost by the touch of a computer key. It is apparent that engineered or technological solutions in themselves can no longer be the answer to the earth’s problems and where they have a role to play they need to be managed and those affected need to be involved in the solutions. The problems themselves have assumed less tractable, more qualitative dimensions to do with ‘lifestyles’, quality of

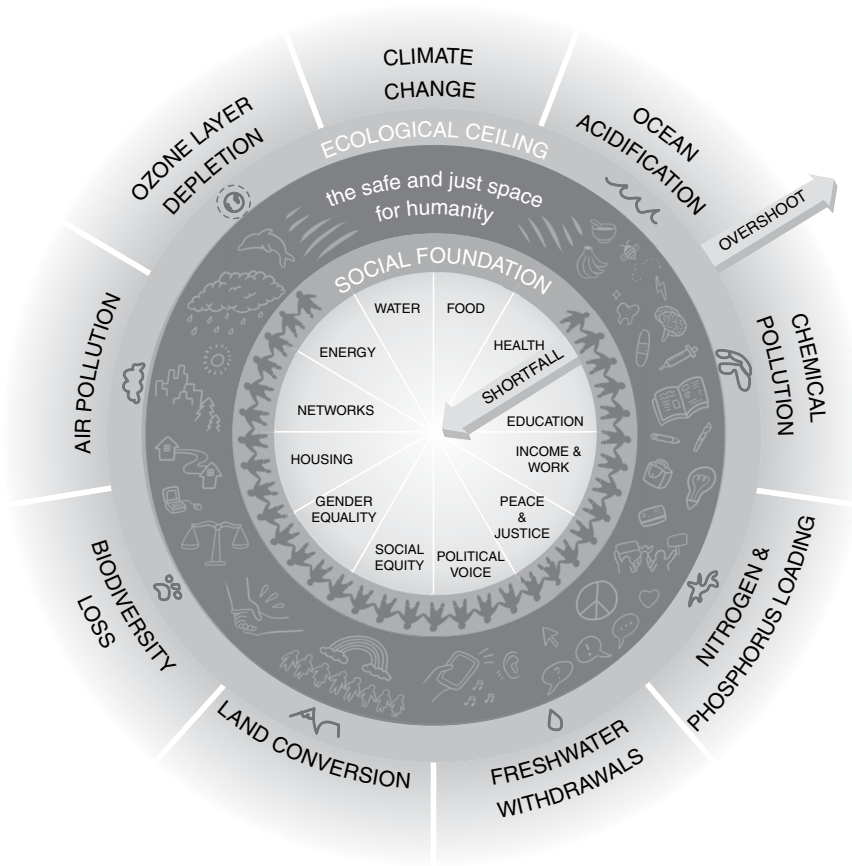


Figure 1.1 The principle of doughnut economics – a fun version developed by DEAL²⁰ – was created in conjunction with an animation that also shows the significance of Universal Basic Income in doughnut economics

Source: This was presented at the 2021 Basic Income Earth Network Congress in 2021. This tool is licensed under a Creative Commons BY SA 4.0 license

life and psychological (mental) health and well-being. More importantly, perhaps, the manageable, predominantly urban concept of public health that was developed in the 19th century has been replaced by a much bigger concept, that of the global biosphere. As a result, we are grappling with the much bigger issue of the future of life and health on earth, a question that rarely occurred to the Victorians.

As has been shown earlier environmental health came about as part of the sanitary movement in the 19th century but needs

always to be reinvented or at least to be reassessed. The work by the WHO Commission on Social Determinants of Health in its final report *Closing the Gap in a Generation: Health Equity through Action on the Social Determinants of Health* [5] highlighted the inequalities or inequity that exists within and between countries and indeed between generations (an issue that was in part recognised in the 18th century by some more enlightened thinkers). These inequities in health, avoidable health inequalities, arise because of the circumstances in which people grow, live,

work and age, and the systems put in place to deal with illness. The issue of inequities in health were further highlighted in the *Marmot Review* undertaken for the Department of Health by the Commission chaired by Michael Marmot [2]. This has not led to the changes required for a healthier society in the UK (or at least in England).

Marmot's ten-year review of the 2010 report [3] showed that government spending as a percentage of gross domestic product (GDP) declined by seven percentage points between 2009/10 and 2018/19, from 42% to 35% and the health spending was reduced accordingly. Cuts to local authorities over the decade have *been hugely significant; local government allocations from the Ministry of Housing, Communities and Local Government declined by 77 percent between 2009/10 and 2018/19*.

As the 2020 report highlights it is not just the impact of overall cuts but where they have fallen which has impacted most on inequalities. Reporting analysis from the Institute for Fiscal Studies, the report shows that the more deprived areas, those with greatest need, had the greatest reductions in per person spending. Yet, while there has been limited action on health inequalities nationally, many local authorities have taken forward the recommendations and approaches outlined in the 2010 *Marmot Review*.

A survey by the King's Fund conducted in 2011 found that over 75% of local authorities had incorporated the approach directly into their health and well-being strategies and local government continues to see this as important,²¹ using Marmot principles to tackle health inequalities. The social determinants are highly relevant to local authorities, particularly given the strong focus on place, well-being and cross-sectoral working by local governments, which social determinants approaches require, and which local government is well set up to deliver. Community empowerment is central to efforts to reduce health inequalities and was one of the key features of the original *Marmot Review*. What Marmot has also shown is that the problems

associated with pandemics, the climate emergency and other 'environmental health' issues have caused those lower down the social gradient to be more likely to suffer the worst consequences.

Though many of the new health threats are global, the problems and the responses will often be regional or local and reflect cultural differences. They may also be experienced at the individual level. Without change and political leadership there will be increased inequity in health, continuing environmental degradation, a decaying family and community fabric, increasing stress and the deterioration of the state into a kind of reactive, coping mechanism. Against such a background, the emphasis within environmental health has largely become curative (a sticking plaster approach) or enforcement of Regulations to address an issue rather than prevention, hard technological solutions rather than a 'softer' people-based response. There is a risk of too much measuring of outputs rather than health outcomes of the work. This approach leads to professional compartmentalisation and marginalisation rather than integration, since the former may appear to offer more certain career gains to individuals. This is reflected in the purely mechanical regulatory non-strategic approach to soften the edges of adverse health impacts from activities and policies. Yet advocates of environmental health emphasise the preventive approach as fundamental to the environmental health work, and that environmental health practitioners have a strong overview of the risks to public health as the result of their breadth of knowledge (if not always depth).

Many diseases of the modern way of life, such as cardiovascular disease, obesity and cancer, will take much longer to conquer if prevention, or upstream intervention, remains a low priority and integrated planning and delivery of services are compromised by demands for quick fixes. For example, the research needed to understand them will be slower to materialise

and this provides an opportunity for powerful rear-guard actions by well-organised vested interests including industrial lobbies. There is, however, a further complexity to consider; when prevention does become a higher priority, it is often in the context of finite or limited resources. This is where some hard decisions may have to be made about the shifting of resources from treatment and care to prevention and all the ethical issues that this entails. A review of National Health Service expenditure in 2002 [6] highlighted the economic benefits of upstream investment and the potential contribution of public health measures in reducing the burden of disease. However, there has often been a lack of solid evidence on which measures to use and indeed on outcomes of those measures. Environmental health practitioners who are the most likely readership of this book have not been good at providing this evidence and reporting on issues of concern, unlike other professions of publishing research and findings.

Success requires ‘full engagement’, that is, increased, or better directed, spending and high public engagement to achieve improved health status and increased healthy life expectancy across the whole of society. In recent years, while those lower on the social scale have barely seen an increase in healthy life expectancy, at the top there has been a marked increase. This also has economic implications with an increase in the age for eligibility for state pension, if those on lower incomes are unfit to work from their early fifties. Disability-Free Life Expectancy (DFLE) was found to be about 15 years between those in the most deprived neighbourhoods and those in the least deprived [2] who on average have a DFLE of 70 years (see also Annex 1.1).

The social determinants of health are the conditions in which people are born, grow, live, work and age, including the health system. These circumstances are shaped by the distribution of money, power and resources at global, national and local levels, which

are themselves influenced by policy choices. The social determinants of health are mostly responsible for health inequities – the unfair and avoidable differences in health status seen within and between countries.

The environmental impact on health is an inevitable by-product of human activity, and it is therefore the nature of that activity, and the attitudes that go with it, that hold the key. It will be to the soft technologies – the technologies of mind, reason and social organisation – that we should look for solutions. Hard ‘engineered’ technologies are at best a partial answer, at worst a diversion. The answers offered are much more difficult. They require vision, ambition and leadership; they also require debate, consensus and agreement. In the worst-case scenarios described, these solutions will be more, not less, difficult to realise and they will need a new kind of environmental health practitioner to tackle them. The World Health Organization (WHO) has contextualised environmental health into human rights and human rights cannot be secured in a degraded or polluted environment. The fundamental right to life is threatened by soil degradation and deforestation and by exposures to toxic chemicals, hazardous wastes and contaminated drinking water.

This is because social and environmental conditions determine the extent to which people enjoy their basic rights to life, health, adequate food and housing, and traditional livelihood and culture. It is time to recognize that those who pollute or destroy the natural environment (and indeed those who provide financial backing for such activities whether as investors or customers) are not just committing a crime against nature but are violating human rights as well.

So said Klaus Toepfer, Executive Director of the United Nations Environment Programme at the 57th Session of the Commission on Human Rights, Geneva, 2001.

To fulfil their future role, professional environmental health practitioners should have an understanding of the following:

- The *definitions and principles* of environmental health;
- The *agenda* with which they need to be engaged;
- The *skills and expertise* required of their professional practice;
- The *objective* of their environmental health activities.

The matters of skills, expertise and competencies are addressed in detail in Chapter 2, but as we will see this points to the environmental health practitioner being more than a 'sanitary police officer'. However, some of the problems facing the modern EHP are a consequence of the difficulties in securing recognition and how the profession is perceived by administrators or legislators is considered later in this chapter with a contribution from Australia. This issue also overlaps with the next section on seeking to define environmental health.

What is environmental health?

In 1991 Dahlgren and Whitehead set out a famous and influential model on the social determinants of health [5] (see Figure 1.2). It can be seen that what we consider to be environmental health and areas of environmental health practice, feature strongly. Environmental health practitioners are therefore part of the public health workforce. From this perspective then, 'environmental health' is also a component of the public health movement and this becomes more apparent on the following pages.

Figure 1.3 reflects the wider concerns with global and economic issues affecting health and demonstrates even more fully how environmental health fits within society.

The term environmental health in many respects is a catch-all that creates unease and misunderstanding. By separating the two dimensions of *environment* and *health* we can illustrate the all-encompassing nature of the combined term. Albert Einstein noted that environment was *everything that's not me*, and WHO in its constitution considers health to

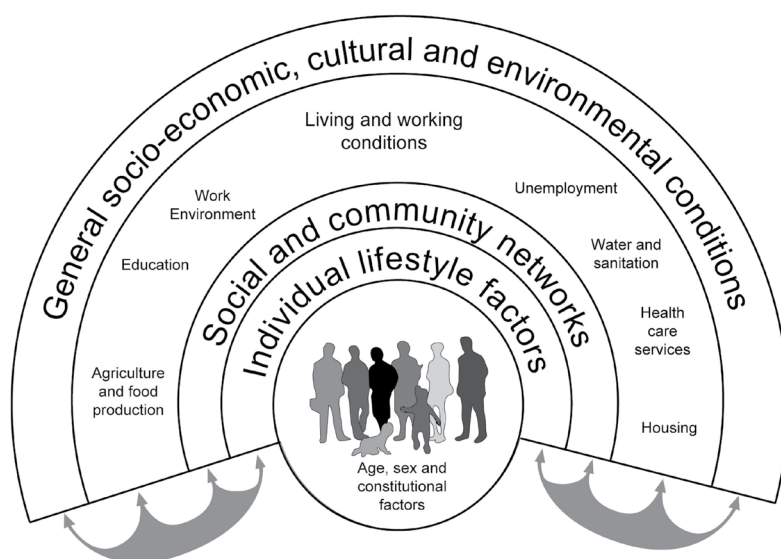


Figure 1.2 The main determinants of health
Source: Dahlgren & Whitehead²² [7]

be a state of complete physical, mental and social well-being.

Despite the broad challenge of these concepts, several definitions exist for environmental health. In 1989,²³ the WHO defined it *as comprising of those aspects of human health and disease that are determined by factors in the environment. It also refers to the theory and practice of assessing and controlling factors in the environment that can potentially affect health* [9]. A further attempt at defining the term emerged from a meeting of WHO European Member States in 1993 in Sofia. The proposed definition was:

Environmental health comprises of those aspects of human health, including

quality of life, that are determined by physical, biological, social and psycho-social factors in the environment. It also refers to the theory and practice of assessing, correcting and preventing those factors in the environment that can potentially affect adversely the health of present and future generations.

[10]

This definition concludes that environmental health is in fact two things: first, certain aspects of human health; and second, a means by which to address these issues. This was finalised by a conference in Vilnius, Lithuania in 1994.

The Sixth Ministerial Conference on Environment and Health was held in Ostrava,

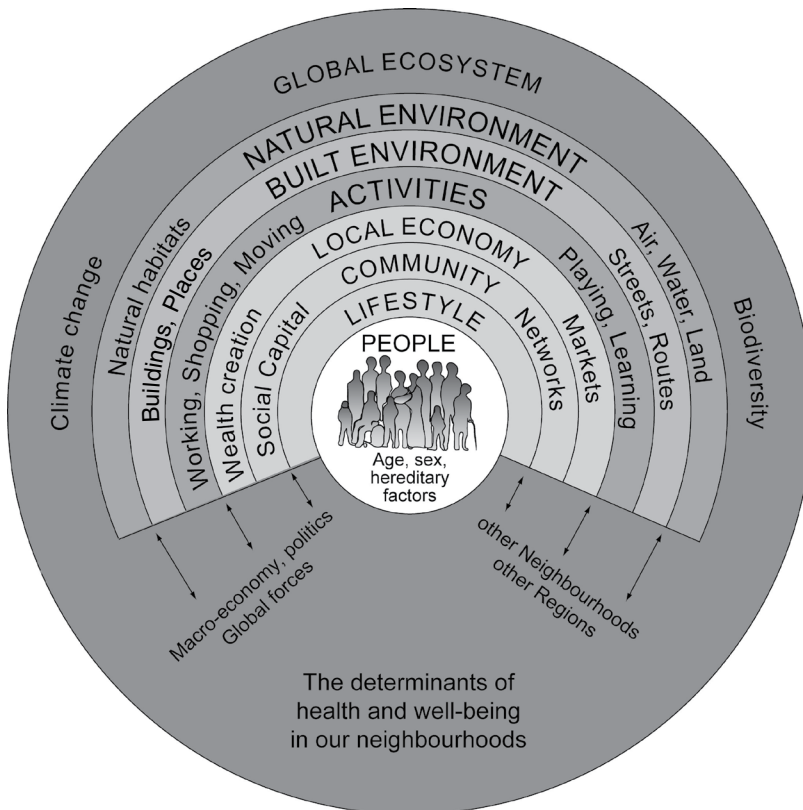


Figure 1.3 The settlement health map: a tool for investigating the impacts of the natural and built environment on public health

Source: Barton & Grant (2006) [8]. Based on the public health concept by Dahlgren & Whitehead [7]

Czech Republic in 2017²⁴ to review developments since the previous ministerial conference, held in Parma, Italy in 2010. The declaration from that conference included *inter alia* a call to strengthen the public health functions of the health systems, and expand capacities across all sectors, levels of government and stakeholders to reduce environment-related health risks.

The WHO has also made clear *healthier environments could prevent almost one quarter of the global burden of disease*. It has said

the COVID-19 pandemic is a further reminder of the delicate relationship between people and our planet. Clean air, stable climate, adequate water, sanitation and hygiene, safe use of chemicals, protection from radiation, healthy and safe workplaces, sound agricultural practices, health-supportive cities and built environments, and a preserved nature are all prerequisites for good health.²⁵

Figure 1.4 demonstrates the interface of environmental health. It shows that it is a discipline concerned primarily with human health, noting that humans operate in different environments such as the living environment, the home environment, the work environment and the recreational environment. It is from this perspective that a holistic view can be taken of human health and

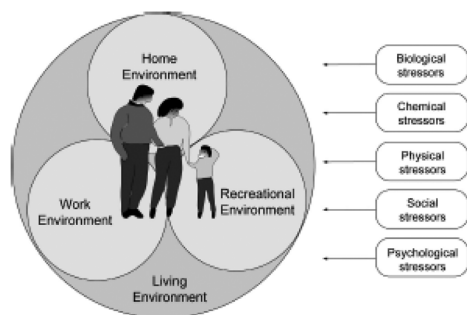


Figure 1.4 The interface of environment health

Source: MacArthur & Bonnefoy (1998) [12]

the environments in which people live. As a concept and as a means of delivering practical solutions, environmental health provides a strong basis upon which decision-makers can work towards sustainable development – if attention is paid to the experiences of EHOs/EHPs and this requires those professionals to be more effective advocates for change. That said, it has also been clearly recognised that environmental health is a wide-ranging discipline that relies upon inter-sectoral co-operation and action. It is therefore essential that all the potential contributors to the development and implementation of environmental health programmes can recognise their role. EHPs/EHOs and other ‘environmental health’ professionals cannot deal with all aspects of environmental health. As a concept it is far larger than the roles traditionally played by EHOs employed in local authorities.

More recently in the USA in the *Environmental Health Playbook*, the National Environmental Health Partnership Council²⁶ has said Environmental Health [11] is the

branch of public health that focuses on the interrelationships between people and their environment, promotes human health and well-being, and fosters healthy and safe communities. As a fundamental component of a comprehensive public health system, environmental health works to advance policies and programs to reduce chemical and other environmental exposures in air, water, soil, and food to protect residents and provide communities with healthier environments. Environmental health protects the public by tracking environmental exposures in communities across the United States and potential links with disease outcomes.

The Playbook says that to achieve a healthy community, homes should be safe, affordable and healthy places for families to gather. Workplaces, schools and child-care centres

should be free of exposures that negatively impact the health of workers or children. Nutritious, affordable foods should be safe for all community members. Access to safe and affordable multimodal transportation options, including biking and public transit, improves the environment and drives down obesity and other chronic illnesses. Outdoor and indoor air quality in all communities should be healthy and safe to breathe for everyone. Children and adults alike should have access to safe and clean public spaces, such as parks. In the case of a disaster or some traumatic event, a community needs to be prepared; it should have the tools and resources to be resilient against physical (infrastructure and human) and emotional damage. All these activities require the participation of federal, state, local and tribal governments, the Partnership Council has argued.

This publication makes it clear that many practitioners in the public and private sectors make invaluable contributions towards environmental health and protection or improvement of public health; they may not perceive themselves as environmental health professionals, but they nevertheless perform tasks that contribute to the whole. It is wholly consistent with this approach that socially responsible commercial enterprises might want to employ their own cadre of EHPs. There are many people, for example public health specialists, health visitors, practice nurses, general practitioners, occupational health and safety staff and technical specialists, who work within the broader public health movement and who can, and do, work with EHOs in a way that maximises the human resources available (a point made clear by the WHO in the context of the profile of the EHO). Professionals, whose work is on the periphery of traditional environmental health activities, for example urban planners, would also greatly benefit the system if they also understood the role of environmental health and could relate its principles to their work. It is important that they understand the principles of environmental health and how

their diagnosis and subsequent action can assist in developing effective environmental health interventions. Furthermore, building capacities in environmental health should not be restricted to the public sector workforce. There is an ever-increasing number of practitioners employed in the private sector, not just those in mainstream environmental management positions or where public services have been ‘contracted out’. These practitioners recognise and build the preventative approach of environmental health management into everyday business practices. In the same way EHPs can help build capacity within community groups.

The principles of environmental health

The development of the environmental health approach has grown organically in response to societal changes and pressures rather than by design. However, it has demonstrated that it can bring rhetoric to life and adds considerable value to the process of improving human health and quality of life.

In a world that is subject to constant and turbulent change, it is important to retain some sense of core values or principles as touchstones for environmental health work. Environmental health and the mechanisms to deliver it are founded upon such fundamental principles. They do not apply simply to environmental health at the community level, where in the UK the main focus has been on local government. These principles apply to all levels of government and all sectors that contribute to environmental health. They relate to many government issues and depend upon the way in which governments at all levels relate and interact among themselves and with communities. This is a major challenge as many governments still fail to understand the true nature of environmental health, and therefore the significance and value of its approach.

Environmental health is relevant in three different time phases. It must work to repair historical damage – damage that has already

occurred – to identify and manage current risks and finally to prevent future problems (prevention being better – and usually cheaper – than cure). The emphasis given to each phase is determined by a complex formula of factors, depending largely on an assessment of the risks and resources available. It is of course important and correct to address the most pressing issues relating to environmental health urgently, but emphasis should also be given to addressing, and so avoiding, future problems. That is, prevention is better and usually cheaper than cure and this is the basis of the precautionary principle, which has become widely accepted in many policies and programmes but has been threatened by ‘neoliberal’ economic thinking and the pressure to ‘deregulate’ and cut ‘red tape’. Adhering to the principle should however ensure that environmental health action remains at the leading edge of improving the quality of life. The boxed text (overpage) sets out the six principles.

In the context of Principle 3, the Nuffield Council on Bioethics²⁸ (and in the context of COVID-19) has considered the issues of how the government deals with both the pandemic and how to move from the lockdown. There are ethical questions about how we balance different interests (e.g. individual and collective; economic and social) and different risks (e.g. of COVID infection, and of poor health associated with poverty and isolation). Furthermore, what and who should be prioritised when it comes to the hard decisions (e.g. COVID-19 over other health needs; the young, the elderly or key workers)? Who bears responsibilities for supporting those in need and about whether a country has not only national but also international responsibilities? There is the issue about how privacy will be protected with contact-tracing apps and about the implications of mass testing for disease or immunity. There are issues around the validity of tests; who gets an ‘immunity certificate’, and where does that leave the rest of us? These are seen as critically important issues for the Council and ones that affect

everybody so there is a need for openness and public discussions.

Yet, in England at least, the Westminster Government does not seem to want to engage or take on board other views on any of these issues; nor is it evident that they are thinking about them. ‘We are following the science’ was the supposedly reassuring message. However, following the science is not politically or morally neutral. Every scientist knows (or should) that science does not provide certainty and is usually subject to debate or argument; it does not deliver policy answers which involve values and judgements for which people are responsible and should be scrutinised, and accountable, thus requiring transparency. This requires that the public know which values are in play and what judgements are being made, by whom and on what advice.

Decisions are being made that go to the very heart of what governments are there to do. However, they must do so openly, transparently and accountably, especially where those decisions impinge on precisely that freedom or aspects of well-being.

Democratic governments must be subjected to public debate and challenge. The existence of an emergency or crisis makes things difficult but is no justification for closing down on public discourse. On the contrary, if the whole of society is at risk, all society needs to know and to have a voice according to the Nuffield Council on Bioethics.

Reports on these issues and environmental health

There have been a number of reports relevant to the development of environmental health and its principles, philosophical basis and the environmental health profession in the 21st century.

Environmental Health 2012 – In 2002 it was felt that for a variety of reasons, environmental health had become disconnected from the public health agenda and other

Principle 1

The maintenance and improvement of the human condition, and prevention of ill health is at the centre of all environmental health action.

A similar principle was contained in *Agenda 21* [13] and in 2012 the UN Conference on Sustainable Development (Rio+20) reaffirmed the commitment to Agenda 21 in 'The Future We Want'.²⁷ The principle is recognition that the main target of environmental action is the well-being of the human race and those factors in the environment, however wide, that may affect it. This also implies that prevention (upstream interventions) is better than cure (treatment). The failure to prevent avoidable ill health leads to greater pressures on systems for the treatment of ill health. So that prevention is often cheaper than cure.

Principle 2

The groups within society whose health is most at risk are often those who have least control over their own lives and have little economic power, living in the worst housing with poor environmental conditions, working in the most dangerous or insecure occupations, and with limited access to a wholesome and varied food supply.

Those lower down the social scale, and those with less economic power bear a disproportionate share of the global burden of ill health and suffering. They often live in unsafe and overcrowded housing, in under-served rural areas or peri-urban slums. They are more likely than the well-off to be exposed to pollution and other health risks at home, at work and in their communities. They are also more likely to consume insufficient food, and food of poor quality, to smoke tobacco, and to be exposed to other risks harmful to health. This undermines their ability to lead socially and economically productive lives [14]. Those who are disadvantaged do not form a single homogeneous group: different people are at a disadvantage in different contexts. For example, low-income households in northern European countries may be at risk of poor health because of damp and cold housing conditions, fuel poverty and/or inadequate nutrition; in parts of Africa it may be a lack of safe water and sanitation, or indoor pollution because of the fuel used for cooking and heating in the home.

This phenomenon has been recognised by the WHO, which acknowledges that access to the appropriate medical technology cannot in itself offset the adverse effects of environmental derogation and that good health will remain unobtainable unless the environments in which people live are health promoting. A reduction in inequality or inequity requires equal access to environmental health services and an uptake of services that relates to need. The provision of high technology services should not be restricted to certain sections of the population because of social or economic disadvantage in the others, and services should be sensitive to the needs of minority groups. Equity is a core and primary element that underpins any action on environmental health. To achieve this, the more disadvantaged within the population will require particular assistance and attention to redress the imbalance.

Marmot's conclusions on the social gradient in health [2–3] – the lower a person's social position, the worse his or her health – are relevant. Action should focus on reducing the gradient in health. Health inequalities (or health inequity) result from social inequalities. Action has to be universal to reduce the steepness of the social gradient in health but with a scale and intensity that is proportionate to the level of disadvantage. This has been described as 'proportionate universalism'.

As Wilkinson and Picket [15] have pointed out also the health of a society (and almost everything else) is not affected by how wealthy that society is, but how equal. The bigger the gap between rich and poor the worse it is for everyone in that society including the well-off.

Principle 3

A range of governance issues that can be described as the conditions for civic engagement must be in place.

As seen in the first section of this chapter adoption of the democratic principles of government is the cornerstone to the effective management of environmental health. For example, the European Charter of Environment and Health [9] sets out the basic entitlements of individuals, including the rights of full information, active consultation and genuine participation in environmental health decisions. The traditional approach is no longer appropriate and times are changing and demands have increased for greater public participation in all aspects of society.

Democratic principles also require a two-way exchange and the involvement of non-governmental organisations and an informed public in the decision-making process is both necessary and practicable. Recent developments in information technology including social networking make this easier. It is therefore important that decision-makers are not only held accountable, but that they owe their accountability to the public. Modernisation of local services requires that people are not merely represented but actively participate in the development and delivery of local policies, services and projects and in doing so they can ensure that these meet their priorities and needs. This power-sharing agenda can feel challenging and there are a variety of skills that people working in environmental health need to develop to ensure that a broad cross-section of the community is engaged and not only the 'usual suspects'. It is therefore important to join up and to communicate with others within a locality and ensure that partner agencies work together to plan for and focus on community engagement.

Many of the environmental and public health problems facing society can only be solved by communities acting together in concert, rather than as individuals. This is one of the key areas to challenge the traditional approach to solving environmental health problems. Environmental health practitioners do need to consider how well equipped they are for helping with the development of communities and indeed developing an advocacy role.

Over-centralisation and reduction of local services can lead to slow or inappropriate responses as was illustrated by the different responses around the world to COVID-19 with inadequate use of local level government and the workforce as part of a testing and tracing strategy.

Principle 4

Co-operation and partnership.

Isolated decisions and actions cannot normally solve problems in environmental health: an inter-sectoral approach is needed. The practice of co-operation and partnership in pursuit of improvements in environmental health, not only between the health and environment sectors, but also with economic sectors and with all social partners, is a crucial element. This is the principle that lies at the heart of effective environmental health management.

If properly interpreted and applied, inter-sectoral co-operation and co-ordination means that:

- The problems tackled are common ones in which all participants have a stake;
- All the public and private sector organisations and interests active in the sector are involved, not just government;
- Policy makers, technical and service staff and volunteers at both national and local levels have actual or potential functions to perform;
- Various participants may play leading and supporting roles with respect to specific issues
- Co-operation consists not only of ratifying proposals, but also of participation in defining issues, prioritising needs, collecting and interpreting information, shaping and evaluating alternatives and building the capabilities necessary for implementation;
- Stable co-operative mechanisms are established, nurtured and revised according to experience.

Principle 5

Sustainable development or sustainability (see also Annex 1.1).

In a similar way to the term environmental health, this concept does not just encompass certain issues, but also requires particular ways of managing them. In the policy-making process relating to environmental health three particularly important threads serve to confirm the overlapping nature of environmental health and sustainable development. This obviously links with Principle 1 and prevention being better than cure.

Principle 6

Environmental health issues are truly international in their character.

The ease of international communication and travel is making the world seem an ever-smaller place. Environmental health professionals have long recognised the fragility of the planet, and that the contaminants in our environment do not respect national boundaries. The world of environmental health is also small. The worldwide community of professionals who dedicate their working lives to improving and protecting the places we live in to safeguard health are tiny compared with those who work to exploit and deplete the world's resources in pursuit of 'wealth creation' but which might be both short term and short sighted. However, the diminutive character of the world's environmental health community brings advantages. Communication at the international level is crucial. Although languages may be different and the heritage and culture places EHPs in different systems, environmental health problems and approaches are mutual. The common wealth of knowledge can provide an irresistible resource for solving many of the perplexing dichotomies facing practitioners in their daily work. International co-operation and collaboration, such as through the International Federation of Environmental Health, is therefore a key principle for environmental health and is one that should not be overlooked, despite the distraction of our immediate surroundings and problems.

public health organisations. The CIEH and then Health Education Authority²⁹ looked at this, recognising that there had to be multidisciplinary delivery of public health of which environmental health is a part. The Environmental Health 2012 vision [16] captured the challenges, constraints and ideas from environmental health, public health and health improvement professionals from the various sectors and it incorporated the advice of key practitioners, professionals and academics from environmental health, local authorities, health services, voluntary and community groups.

Participants in that project reported that the mainstream practice of environmental health had become fixed on the delivery of a narrow agenda (and that may well have gotten worse as the result of financial cuts to local government). A number of factors were identified as preventing it from achieving its traditional involvement in addressing the wider determinants of health. They expressed concern about the fragmentation of environmental health services (more marked since the report was published), and lack of clarity on the nature of future environmental health roles and their contribution to health improvement and tackling health inequalities.

A previous edition of the book included that this group had said

there was a reported lack of available resources to deliver the new approaches and initiatives called for by the modern public health agenda, or to participate fully in the new organizational structures for public health. In particular, the culture of performance management of specific enforcement targets has resulted in environmental health officers having to take on predominantly technical and enforcement roles.

This report is considered further in the next chapter.

This trend has continued and at the expense of the effective practice of the wider principles of environmental health

protection, and has had, and continues to have, the effect of deskilling many in the profession, leading to dissatisfaction among many environmental health practitioners. This has perhaps also been reflected in the difficulties in securing placements for environmental health students and as an example, the problem of both lack of skills and absence from the ‘top tables’ of policy and strategy development was highlighted in the report of the CIEH Commission on Housing Renewal and Public Health [17]. The Environmental Health 2012 project was carried out in England, but the findings have been relevant to all the countries within the United Kingdom and may have wider international application because similar issues have also been reported in other parts of the world, from America [18] to Australia [19] (also see later in this chapter).

An understanding of the role of environmental health in public health is important. If public health is the *science and art of preventing disease, prolonging health through organised efforts and informed choices of society, organisations, public and private, communities and individuals*³⁰ then environmental health is a major part of public health and environmental health practitioners are part of the wider public health workforce. Addressing the wider determinants of health, including food, housing standards, occupational health and safety, air quality, noise and environmental issues generally (upstream interventions), should mean that environmental health makes a fundamental contribution to the maintenance and improvement of public health, improving the quality of life and well-being of individuals and communities.

In order to demonstrate the importance of these contributions it was necessary to describe the sphere of environmental health. Figure 1.5 takes as its starting point the interface of environmental health as shown in Figure 1.4 [12]. The original interface has been developed and extended so as to include the main areas of activity of environmental health in food, water, air, land and buildings. The

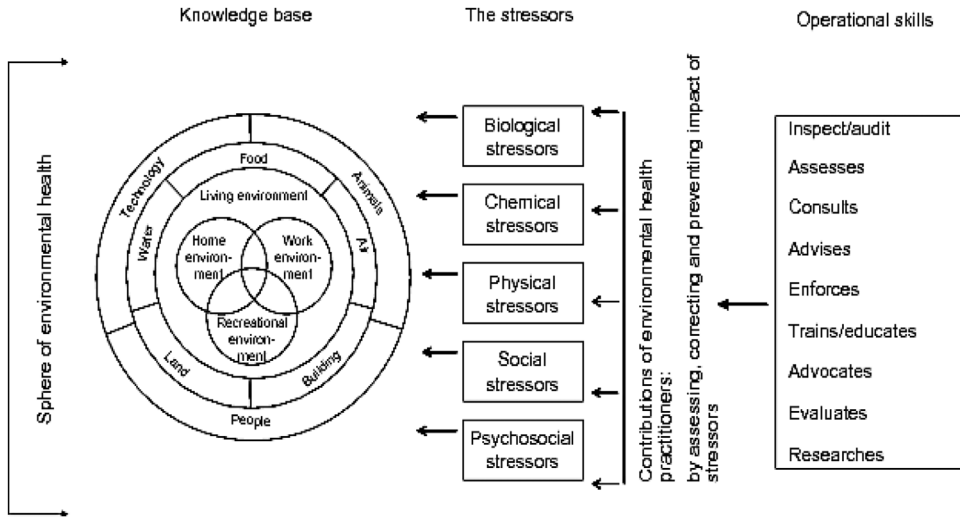


Figure 1.5 The 2012 vision model of environmental health

Source: Developed from Burke et al. [16]

Environmental health stressors

Environmental health stressors are features of the environment that may induce harm in or damaging responses to a living system or organism.

Biological stressors

Those biological elements of the natural and human-made world which present a direct risk to human health through ingestion, inhalation, inoculation or physical contact, and those miscellaneous elements that may influence biological systems to the detriment of humans and their environments.

Chemical stressors

Those chemical entities (or their intermediates) which, through their presence in a particular environment, expose the human to risk through ingestion, inhalation, inoculation or absorption and/or which interfere in biological systems to the detriment of humans and their environments.

Physical stressors

Those measurable physical manifestations induced naturally or through human activity that may impact unfavourably on human health through their damaging effects on cells, tissues, organs and homeostatic systems, as well as their impact on mental and social well-being.

Social stressors

Those behaviours associated with human life that are a consequence of settlement in communities and habitation and which have impacts on health and well-being.

Psychosocial stressors

Those attitudes of mind and mental processes that may have an adverse impact on the health of a person or community.

stressors have also been extended and specified (see boxed text on stressors).

A further explanation of the environmental stressors is given in the boxed text.

It is interesting to note that in the context of housing (the home environment) and the Housing Health and Safety Rating System (HHSRS) that the hazards in the home environment have been grouped into Physiological Requirements, Psychological Requirements, Protection against Infection and Protection against Accidents, reflecting work of the American Public Health Association from before the Second World War.³¹

The contributions of the environmental health practitioner to public health have been defined as assessing, correcting and preventing the impact of the stressors on the living environment. The operational skills required by the environmental health practitioner have been identified as assessing, consulting, advising, enforcing, training/educating, advocating, evaluating and researching and these are considered in more detail in Chapter 2.

Agendas for Change [20] had preceded the 2012 Vision [16] and was a further influence on the subject of environmental health and was carried out by the UK Commission on Environmental Health. The Commission was established by the Chartered Institute of Environmental Health (CIEH) in 1996 and recognised that the famous names of public health had all reacted to the conditions of the industrial revolution, and the accompanying physical, economic and social changes, as well as increased pressures on the environment,

but times had changed. While society still bore some physical hallmarks of the Victorian age it operated in a completely different, and more complex manner and one that changed more rapidly than any before it.

The Commission's thinking recognised that many of the environmental health problems that face society today are created by society and can only be tackled by the whole of society taking action. Figure 1.6 is indicative of this thinking (although coming from another source). It is relatively easy to get individuals to take action when it is a matter of individual health and self-interest. However, the new challenge is how to get whole communities to act, not for individual benefit but for the advantage of society as a whole or even a community. The example of road transport and air quality illustrates this point well, as it is only when a complete modal shift

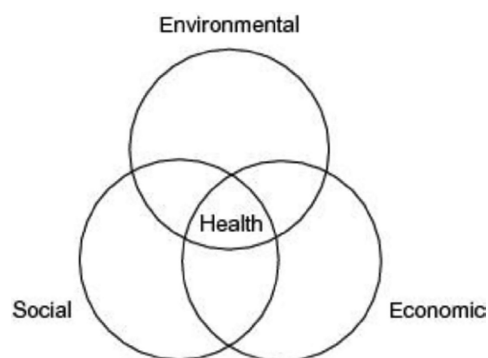


Figure 1.6 The social, economic and environmental axis

Source: Reproduced from WHO Europe [14]

in transport patterns occurs that air quality has a chance of improving. Individuals acting in isolation and not using their cars will not make a significant difference to air quality and will ultimately simply mean greater inconvenience for those people.

The Commission recognised, in particular, that there was a strong need for the integration of public and environmental health. Although since that time ‘public health’ has returned to local government in England, whether this integration has been achieved is open to question and is certainly variable. Firstly, in two-tier areas public health is an upper-tier function while environmental health is a lower-tier function. Furthermore, an independent assessment [21] published in 2020 conclude that the reforms, *coincided with austerity where local government funding, in the specific public health grant and more widely, was not prioritised by the government compared to NHS funding, receiving real-terms cuts from central government.*

The report also concluded that there is a need for clear local accountability in service delivery, and sustainable development processes provide many of the elements of good environmental health and these elements need to be nurtured to ensure sustainable change.

The CIEH Commission [20] identified five major principles as key components of environmental health, and these informed the Commission’s approach:

- Precautionary approach (already touched upon);
- Inter-sectoral collaboration;
- Addressing inequalities and inequities;
- Community participation;
- Sustainable development.

It was recognised that equality and efficiency go together. Even if lip service is being paid to inequalities being a problem for all,³² an unequal and divided society is a malfunctioning society, and malfunction carries a heavy and measurable penalty, in ill health, in deteriorating environment and in the resulting

social and financial burden. In this context the reader is referred to Wilkinson and Pickett [15] where an epidemiological approach has been taken and similar conclusions reached.

There has to be a question whether we can rely on the assumption that the inclusion of health and the ‘green’ dimension in our planning, as well as managing our lifestyles better, will be effective in securing the changes required.

The fundamental message of the Commission’s report was that as human beings we can only be truly healthy in a healthy environment [20]. It recognised that we cannot insulate ourselves from our surroundings – the air we breathe, the water we drink, the food we eat, the buildings and the landscapes we inhabit. Directly or indirectly, they will affect our health and well-being. These may seem to be unexceptional statements, yet they carry implications for the development of policy at the national and international level that are far from understood. They mean, for example, that we need a far more integrated and comprehensive approach to policy formulation, one that embraces health impacts even where they may not be obvious. The problem – and one of the reasons why this integrated approach does not yet exist – is that the target seems to be constantly shifting.

A new terminology evolved, speaking of interdependence and interconnectedness, of the importance of a holistic perspective and has been recognised for some time and as the LGMB set out [22] in the context of sustainable development and Local Agenda 21.³³ From professionals, this demands a flexibility of response that may run counter to specialisms. For the public, it can mean that patience with established procedures is lower and expectations much higher. It was argued that people not only expect their environment not to damage their health, but expect that it should promote their health and well-being, and that remains the case more than ever.

A number of studies have also shown that people feel better – less stressed, more content, less aggressive – in the presence of natural

landscape features: greenery, trees, water (not all issues that traditionally EHOs address). Their mental performance improves, they feel refreshed, relaxed and reinvigorated, and with these feelings comes improved physical health. These elusive, qualitative issues probably underpin the movement of people from the cities in search of better health and quality of life. Of course, many more people do not have such choices.

In this context the environmental health practitioner should also consider the work of the Department of Health on public mental health; see for example *Confident Communities Brighter Futures – A Framework for Developing Well-Being* [23], which built on the evidence base for public mental health. It is no coincidence either that in the Housing Act 2004 health in the context of housing hazards and the Housing Health and Safety Rating System, health is defined as to include mental health.

Although often referred to as inequality, to a large extent what we are talking about is inequity, which is ‘a want of (social) justice’ and the fact or quality of being unfair. So unlike the term inequality it is clear that differences in health outcomes are not wholly a matter of some immutable law of nature. The equality issue – the gap between the haves, the have-less and the have-nots – emerged as one of the dominant themes of the 1990s. This is a gap that matters in human terms, and many examples exist of real health differentials³⁴ and this is highlighted by the work of Michael Marmot and the Institute of Health Equity. By and large, those on lowest incomes and the most vulnerable live in the unhealthiest housing, suffer the most degraded living environments, work in the worst jobs, have the lowest level of educational attainment and eat the least wholesome food (and pay proportionally more for it). Those higher up the social gradient will also have worse health than those further up the social gradient from themselves as Marmot has demonstrated. To say that poor environments and unhealthy lifestyles go together is not to say

that they always go together and that individuals, through effort or initiative, cannot transcend them; but people born into such circumstances have the dice loaded against them. Growing social and environmental inequality exact a great toll on health and life prospects. Resolving these issues requires political commitment.

The Commission considered lifestyle and the two main components to the lifestyle agenda, both of which depended on the idea that there is such a thing as an identifiable Western lifestyle and that this carries implications for the health of individuals, society and the global environment. The first is that such lifestyles are unhealthy, and that they tend to reinforce social and environment inequality. The second is that they are unsustainable – that the Western oil-based lifestyle cannot be transferred wholesale to the rest of the world without enormous damage to the biosphere.

Yet, healthy and sustainable lifestyles, like green consumerism, require knowledge and empowerment that comes with financial security as well as an understanding of the consequences of choices made. It is not just a matter of being ‘energy efficient’ but overall of using and consuming less by those higher up the social scale. However, in an highly unequal society it is also very difficult for individuals to ‘make healthy choices’ when the economic pressures mean that keeping a cold house warm could increase personal indebtedness.

The matter of democracy has already been considered. Several factors prompted the search for a new democratic model, including the loss of local control to the new global economy and global trade with global businesses being richer than many countries; the difficulty of reconciling long-term issues of sustainable development with short-term political preoccupations; and the development of local action around specifically local environmental or health issues [24–25].

A widespread cynicism also attaches to politics and politicians. Local government has been emasculated: its powers and

competencies have been undermined and funding reduced. At the same time there is an impatience with established procedures. Over the past three decades there has been a rapid expansion of civil society – the network of charities, voluntary organisations and campaigning and pressure groups through which much political activity is focussed and directed. Cumulatively, such pressures point towards a new model for devolving power and involving people, perhaps a new model of community ownership. Whether that comes about remains to be seen, again the influence of the COVID-19 pandemic might bring about a ‘new normal’.

When looking at the history of environmental or public health, in addition to the images of public health set out in the first section referring to Rayner and Lang [26] there are probably four eras reflected in this chapter. The first could be typified as the

‘miasma period’ when disease was thought to be caused by malodours and air pollution (which did at least lead to improved sanitation). Then the period when ‘germ theory’ held sway – the era of infectious disease and individual action including vaccination as well as improved sanitation and living conditions. The third and more recent period can be typified as concerned with chronic disease so that poor health was linked to individual behaviour and choices and was considered as the ‘black box’ era.³⁵ The final and more current era is the era of ‘ecological public health’, when public health is seen as the result of complex interactions of social, behavioural and physical factors. Health services have tended to be ‘medical services’ treating the effects of disease and ill health rather than trying to prevent ill health in the first place.

Figure 1.7 sets out what Rayner and Lang [26] have called the complex model of

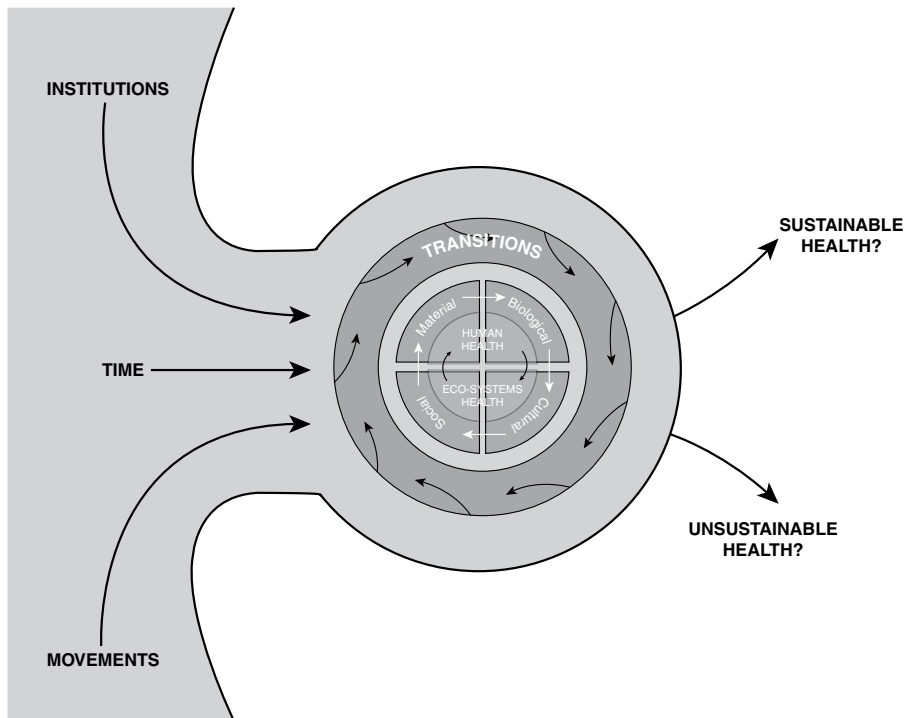


Figure 1.7 The model within the flow of events leading to different health outcomes
Source: Rayner & Lang [26], at page 326 and reproduced by kind permission of Taylor and Francis

ecological public health and in this chapter an attempt has been made to show how EHPs can contribute to ecological public health (and be equipped to do so). The figure represents how the flow of events can contribute to sustainable or unsustainable health outcomes. In that sense anything that does not address, and redress health inequalities must be an unsustainable health outcome. Environmental health practitioners are indeed part of a movement that seeks to improve public health by addressing those stressors that adversely impact on public health.

Readers can themselves consider the areas of work that can contribute to addressing these issues. This handbook provides pointers on how those contributions can be made. A wish to make a positive difference in people's lives, to improve their health and to prevent exploitation by those with economic or other power that prejudices that, is a common motive of environmental health practitioners. The authors hope that readers will accord with that view and rise to the challenges that this presents.

An objective for environmental health

The aim of this first chapter is to consider the history, philosophy, purpose and practice of environmental health. It is clearly the case that environmental health, whilst firmly rooted in the history of public health, needs to adapt and modernise in order to meet the demands and expectations of changing societies and new generations. It is more than the application of technical expertise whether as a generalist or specialist. Fundamentally and regardless of governments, or government policies, the modern practice of environmental health must be embedded within sustainable development in order to deliver the long-term and long-lasting improvements in both our public health and our environment.

The WHO's Global Strategy on Health Environment and Climate Change [27] aims to provide a vision and way forward on how

the world and its health community *need to respond to environmental health risks and challenges until 2030, and to ensure safe, enabling and equitable environments for health by transforming our way of living, working, producing, consuming and governing*. In this context, environmental risks to health are defined as all the environmental physical, chemical, biological and work-related factors external to a person, and all related behaviours. The strategy focusses especially on the part of the environment that can reasonably be modified. Avoidable environmental risks are said to cause about one quarter of all deaths and disease burden worldwide, amounting to some 13 million deaths each year. A healthy environment is vital for human health and development. The sustainability of health systems is put at risk if the upstream determinants of disease and ill health are not seriously tackled. The WHO argues that *approaches that focus on treatment of individual diseases rather than reducing the adverse impact of determinants of health will be insufficient to tackle modern environmental health challenges*. In order to address the challenges in health, environment and climate change, governments and society, including professions and individuals, will all need to continue to rethink the way we live, work, produce, consume and govern. There needs to be effective and equitable action on the drivers of environmental risks to health.

The acceptance of this and the incorporation of previous definitions offers a challenging objective for future environmental health practice. For example, until recently the role of environmental health in improving public mental health had hardly been considered but the report and underlying evidence base published by the Department of Health in 2010 demonstrates that mental health and well-being is as much a part of environmental health as accident prevention [23]. Social and health inequalities can both result in and be caused by mental ill health. One in six of the adult population in the UK experiences mental ill health at any one time, often as the result of, or exacerbated by, those factors

and social determinants where the EHP can intervene.

Sometime EHPs fail to see their role in improving mental well-being which can be defined as

a dynamic state, in which the individual is able to develop their potential, work productively and creatively, build strong and positive relationships with others, and contribute to their community. It is enhanced when an individual is able to fulfil their personal and social goals and achieve a sense of purpose in society.
[28]

Taking account of what has been written thus far and also such matters as the WHO Ostrava and Helsinki Declarations,³⁶ and starting from what has been written in previous editions of this book the objective for environmental health can be set out as to:

Achieve strategies and equitable action to intervene between people and the environments in which they live, work and take leisure while at the same time reconciling personal choice and social responsibilities in health so as to prevent premature death, reduce disease and ill health, disability, disfunction, harm, discomfort, stigma, disadvantage and prejudice and to create supportive and sustainable environments that allow and help people to live healthy lives.

Remembering, as has already been said, prevention is better (and usually cheaper) than

cure, and as the NEHPC [11] has argued, *for every \$1 spent on national and state-level programs, \$71 in asthma-related expenditure is saved.*

In England outside the clinical arena the key responsibility for improving the health of local populations, including reducing health inequalities, now rests with upper (county) tier and unitary local authorities. In this context it is unfortunate that environmental health is a lower-tier function in two-tier authorities. The Health and Social Care Act 2012 gave each unitary and upper-tier local authority in England the duty to *take such steps as it considers appropriate for improving the health of the people in its area.* Local authorities set up statutory health and well-being boards to drive local commissioning and integration of all health services, based upon local needs, giving new opportunities to improve the health and well-being of local communities right across the life course. This arrangement provides an opportunity for EHPs to contribute ever more to improving public health, given their skills, knowledge and expertise. Public Health Outcomes Framework consists of two overarching outcomes that set the vision for the whole public health system. These outcomes are increased healthy life expectancy, which takes account of the health quality as well as the length of life and reduced differences in life expectancy and healthy life expectancy between communities (through greater improvements in more disadvantaged communities). In essence the Public Health Outcomes Framework sets out a vision for public health, to improve and protect the nation's health, and improve the health of the poorest fastest.

Table 1.2 Setting out the main headings of the Public Health Outcomes Framework and it highlights some areas as examples where it is envisaged EHPs can contribute

1 Improving the wider determinants of health
Objective: Improvements against wider factors which affect health and well-being and health inequalities
The percentage of the population affected by transport noise;
Fuel poverty.

(Continued on next page)

Table 1.2 (continued)

2 Health improvement

Objective: People are helped to live healthy lifestyles, make healthy choices and reduce health inequalities

The percentage of those 18+ who are overweight or obese;

Diet;

Smoking prevalence – adults (over 15);

Falls and injuries in people aged 65 and over.

3 Health protection

Objective: The population's health is protected from major incidents and other threats whilst reducing health inequalities

Fraction of mortality attributable to particulate air pollution;

Population vaccination coverage;

NHS organisations with board-approved sustainable development management plan;

Comprehensive, agreed inter-agency plans for responding to health protection incidents and emergencies;

Anti-microbial resistance.

4 Healthcare public health and preventing premature mortality

Objective: Reduced numbers of people living with preventable ill health and people dying prematurely, while reducing the gap between communities.

Infant mortality;

Mortality rate from causes considered preventable;

Mortality from communicable diseases;

Hip fractures in people aged 65 and over;

Excess winter deaths.

Source: Public Health Outcomes Framework at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/862264/At_a_glance_document2.pdf (Accessed 26 July 2021)

Overarching indicators

<i>Wider determinants</i>	<i>Health improvement</i>	<i>Health protection</i>	<i>Healthcare and premature mortality</i>
Rate of complaints about noise	Smoking prevalence (a number of specific indicators)	Fraction of mortality attributable to particulate air pollution	Infant mortality rate
Percentage of the population exposed to road, rail and air transport noise of 65dB(A) or more during the daytime	Self-reported well-being (a number of specific indicators)	TB incidence	Mortality rate from causes considered preventable
Percentage of the population exposed to road, rail and air transport noise of 55dB(A) or more during the night-time	Emergency hospital admissions due to falls in people aged 65 and over (for EHPs the home is the area of concern)	NHS organisations with a board-approved sustainable development plan	Under 75 mortality rate from respiratory disease considered preventable
Fuel poverty			Excess winter deaths Hip fractures in older people (a number of age-related indicators)

Source: Derived from <https://fingertips.phe.org.uk/profile/public-health-outcomes-framework>

The framework focusses on the two high level outcomes we want to achieve across the public health system and beyond:

- 1 Increased healthy life expectancy
- 2 Reduced differences in life expectancy and healthy life expectancy between communities

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Section 2 notes

- 20 See [https://doughnuteconomics.org/tools-and-stories/111- Doughnut Economics Action Lab \(DEAL\)](https://doughnuteconomics.org/tools-and-stories/111- Doughnut Economics Action Lab (DEAL)) is part of the emerging global movement of new economic thinking and doing that is rising to this challenge. Our aim is to help create 21st-century economies that are regenerative and distributive by design, so that they can meet the needs of all people within the means of the living planet.
- 21 See for example <https://www.local.gov.uk/using-marmot-principles-tackle-health-inequalities-and-covid-19-23-june-2020>
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- 25 https://www.who.int/health-topics/environmental-health#tab=tab_1; Environment and Health for European Cities in the 21st Century, WHO 2017. https://www.euro.who.int/__data/assets/pdf_file/0020/341615/book-letdef.pdf
- 26 APHA is a champion and founding partner of the National Environmental Health Partnership Council. The Council strives to support healthy people by working for healthier environments. And the Council brings together diverse stakeholders to help expand and sustain awareness, education, policies and practices related to environmental health, available at <https://apha.org/topics-and-issues/environmental-health/partners/national-environmental-health-partnership-council>
- 27 http://www.un.org/disabilities/documents/rio20_outcome_document_complete.pdf
- 28 <https://www.nuffieldbioethics.org/news/ten-questions-on-the-next-phase-of-the-uks-covid-19-response>; Statement of 25 April 2020 at <https://www.nuffieldbioethics.org/news/statement-covid-19-and-the-basics-of-democratic-governance>
- 29 The Health Education Authority, established in 1987 as a special health authority to encourage

health education and health promotion, and largely funded by the UK government's Department of Health. It was subsequently replaced by the Health Development Agency, which became part of the National Institute for Health and Clinical Excellence (NICE) which in turn became the National Institute for Health and Care Excellence.

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- 32 See for example <http://www.oecd.org/health/inequalities-in-health.htm>
- 33 Local Agenda 21 is conceptualised in chapter 28 of Agenda 21, which was adopted by

178 governments at the 1992 Rio Conference. Agenda 21 recognised that many environmental problems can be traced back to local communities and that local governments have an important role to play in implementing environmental programmes and gathering community support.

- 34 For example, see the Acheson Report (*An Independent Inquiry into Inequalities in Health in England*) https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/265503/ih.pdf
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SECTION 3: FURTHER THOUGHTS ON ENVIRONMENTAL HEALTH

This section includes two essays that consider different aspects of the issues facing environmental health practitioners. The first looks at environmental health in Australia and how EHPs are viewed. The second essay looks at the precautionary principle and ethics looking particularly at e-cigarettes and 'vaping'.

Environmental health in Australia

Harriet Whiley

Environmental health

The Australia Department of Health subscribes to the World Health Organization definition of Environmental Health (considered earlier in this chapter) and goes on to state:

Environmental health involves those aspects of public health concerned with factors, circumstances, and conditions in the environment or surroundings of

humans that can exert an influence on health and well-being.

Environmental health provides the basis of public health. Improvements in sanitation, drinking water quality, food safety, disease control, and housing conditions have been central to the significant improvement in quality of life and longevity experienced over the last hundred years.

Environmental health practice addresses emerging health risk arising from the pressures that human development places on the environment.

[1–2]

This definition of environmental health represents a broader, more holistic, approach and understanding. It acknowledges that environmental health covers a range of complex and multidisciplinary issues and moves away from the traditional perspective that environmental health practice is primarily focussed on regulation and enforcement.

In Australia, the peak environmental health advisory group is the National Environmental

Health Standing Committee (enHealth), which is part of the Australian Health Protection Principal Committee under the Australian Health Ministers' Advisory Council. This enHealth is responsible for providing nationally agreed policy advice, co-ordination and support needed to respond to environmental health issues. Presently, enHealth consists of representatives from Commonwealth, state and territory health departments; the New Zealand Ministry of Health; and the National Health and Medical Research Council (NHMRC) and provides advice to the Australian Health Protection Principal Committee.

Environmental health practice

Australia is a federation of six states and two territories. There is both Commonwealth legislation that covers the whole federation, and state legislation created by each state or territory. The federal government can only pass laws under the powers granted to it under the Constitution of Australia. If there is a discrepancy between two pieces of legislation, then federal law overrides state and territory law [3]. Each state and territory create local governments/councils and these take primary responsibility for delivering environmental health services.

In Australia the term Environmental Health Officer (EHO) refers to an Environmental Health Practitioner (EHP) with an appropriate tertiary degree level qualification recognised by the relevant state or territory authority. EHOs work in federal, state and local government, in the defence forces and within private practice; however, the majority are employed by local governments (sometimes referred to as municipal governments or councils) [4–5]. The term EHP refers to any individual employed in the environmental health space and encompasses Indigenous Environmental Health Workers (IEHW) and can refer to any person with or without environmental health qualifications including Environmental Health Coordinators,

Environmental Health Supervisors, Environmental Health Technicians, Healthy Housing Workers and Animal Welfare Workers [6–7].

In Australia, EHOs are authorised officers responsible for the regulation of environment-related activities that can impact human health. This requires them to undertake investigations, assess health hazards and risks, determine and direct remedial action, enforce legal requirements, prosecute legal cases, educate and develop public health and emergency management policy and plans. The specific functional areas EHOs are involved in include food safety, infection control, water management, environmental protection, planning development, buildings and accommodation, tobacco and control of drugs and poisons [2]. One interesting difference between Australian EHOs and UK EHPs is that Australian EHOs have limited involvement in housing. Australian EHOs deal with environmental health issues related to supported residential facilities and different types of accommodation. However, they would only get involved with government or private housing if the risks are perceived to be a public health threat that affects neighbouring environments (e.g. rats or mosquitoes that are entering a neighbouring property or garden). Australian EHOs do not regulate housing conditions that only affect the health and safety of the occupier, such as mould, lack of personal hygiene facilities, fire hazards or indoor pollutants. An exception to this is methamphetamine contamination. If the police alert local government that a house has been used to manufacture illicit drugs, EHOs will place a notice on the house that it should not be inhabited until assessment and remediation has been conducted. This notice will serve to warn any potential buyers if the house is sold before remediation is completed.

EHOs in Australia overlooked and underrated

In Australia, environmental health is under-recognised and undervalued. It is the invisible profession, and no one knows about the

essential work of EHOs. In part this is due to the preventative nature of environmental health which means that it only receives attention when things go wrong and all the barriers and defences that have been put in place fail. Environmental health is also misunderstood by the general public. This was illustrated by a survey of university students who were given a series of roles and activities and asked to indicate which were the responsibility of an EHO. The students answered wrong more times than if they had just guessed the answer for every single question [8].

Furthermore, EHOs are invisible within their own workplaces. Municipal councils have a key role in planning and delivering environmental health services and enHealth stipulates that a risk-based approach is needed to achieve this.

A risk based approach underpins management of health protection in Australia. This means a standardised approach to the classification, identification and management of environmental health risks, with clear delineation of risk mitigation responsibilities.

[2]

However, due to the increasing pressure placed on local government to increase productivity and efficiency with diminishing resources (a consequence of capping of local government rates) [9] the description of EHO roles and responsibilities have been condensed to focus on regulatory responsibilities. For example, current key performance indicators for EHOs include the total number of inspections rather than the quality of the preventive measures put in place. This is further evidenced by a survey of councils' annual reports, and websites, which found the environmental health profession was considered to have a specific focus on securing minimum levels of compliance required by legislation. The skills and knowledge of the profession and their capability utilise a risk-based approach to ensure public health protection was not conveyed in these documents

[10]. This issue has been further compounded by the increasing scope and breadth of environmental health due to emerging issues. As a consequence, EHOs have increasingly limited time to become involved in important but non-regulatory responsibilities, such as planning and emergency management (Psarras, pers comm. 2018 in [8]).

The lack of recognition by their own organisations often results in experienced EHOs leaving the profession. A workforce survey conducted in South Australia in 2010 found that 36.5% of EHOs were looking to move organisations within the next year or two and 16.2% were looking to leave soon [6]. This supported the findings of a previous workforce review conducted in Victoria that found one in three EHOs were looking to leave their job in the next five years. In the Victorian workforce review, lack of support was identified as a factor that really impacted on job satisfaction, with a number of EHOs voicing their frustration about their capacity to effectively fulfil their role due to an overwhelming workload [7].

Limited opportunities for career progression is another issue that impacts on job satisfaction, with just under a third of Victorian EHOs identifying career opportunities as an issue of high or very high importance and only 13% identifying that they were satisfied with current prospects [7]. One possible reason for the lack of progression within an organisation is the absence of a formalised national professional development scheme. This differs from the current Chartered Institute of Environmental Health (CIEH) accreditation scheme in the UK. Another reason might be the invisibility of the profession and the lack of advocacy at the higher levels within organisations. In both the UK and in Australia, this often results in EHOs/EHPs being managed by non-environmental health professionals who do not appreciate the importance, responsibilities and complexities involved in environmental health practice. This has a snowball effect; EHOs/EHPs are overworked and too time poor to make

advocacy a priority and as a consequence are under-resourced and overworked [4, 6–7].

EHOs and the COVID-19 pandemic

The COVID-19 pandemic has shown the world that environmental health is one of the most important professions for public health protection [11–12]. It has also highlighted the importance of ensuring that the environments we live in are safe. In Australia, EHOs were assigned with a range of COVID-19 tasks that varied between states and locations. Responsibilities included, but were not limited to, isolation and quarantine compliance checks, contract tracing, new food safety inspections for take-away options, and advising social distancing restrictions for public spaces [13] (under review). Despite this increase in workload, the role of Australian EHOs in the pandemic response has been successful in raising the profile [14]. This was particularly evident within some municipal councils, where EHOs were considered the ‘go-to people’ for infection control advice [15].

The future

The role of the environmental health profession in today’s society is complex and constantly evolving to address emerging health risks. These new risks are arising from the pressures that human development places on the environment, climate change and the increasing vulnerabilities of local communities. Currently the environmental health workforce in Australia is limited. It is insufficient to cover current environmental health problems and therefore has limited capability to tackle emerging issues. It is essential that the profile of environmental health is raised and the future workforce needs are secured to protect public health now and into the future [8]. To achieve this, environmental health in Australia, and perhaps globally, needs to proactively engage with the media and develop

a marketing and communication strategy to raise the profile of the profession [16].

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MORAL FOUNDATIONS OF THE PRECAUTIONARY PRINCIPLE: JUUL AND THE HAZARDS OF VAPING

Levente Szentkirályi

Consider the ongoing prescription opioid crisis, involving companies like Purdue Pharma, which claims the lives of thousands of Americans each year³⁷ [1–3], or the preventable incidences of various cancers over several decades that have been attributed to Johnson and Johnson’s ‘asbestos-tainted’ talc body products [4], or the disquieting cases of non-Hodgkin’s lymphoma associated with exposure to Monsanto’s *Roundup* herbicide products [5–7] or the growing rates of nicotine addiction and lung-related illness among our youth caused by e-cigarettes, such as JUUL and its iconic, sleek vaping devices. American environmental history is replete with examples of corporations deliberately falsifying or withholding scientific data that verifies risks to human health, misleading the public with embellished or false public-relations campaigns about the actual health threats their business practices

create, manufacturing products and emitting substances without adequately testing their potentially harmful health effects, delaying the implementation of policies that could prevent harm to public health and using their political clout to influence business-friendly environmental policies.³⁸ The case of JUUL and vaping, which this brief discussion highlights, is no exception, and illustrates the sort of corporate irresponsibility and lack of regulatory oversight we should strive to avoid.

The challenge, however, with such cases that involve novel technologies or substances, like aerosol nicotine delivery mechanisms, is that the potential adverse health effects are often uncertain or scientifically unverified. Also, within the dominant framework for environmental risk management in the United States – grounded in the cold, consequentialist calculus of quantitative risk assessment and risk-benefit balancing – until a preponderance of scientific evidence corroborates actual risks of harm, environmental

health issues are not ripe for resolution. In other words, prevailing uncertainty is alleged to undermine the basis for preventative measures that may mitigate the possibility for harm. Yet, paralleling this approach to managing environmental health risk, where the onus is squarely on public health scientists and regulatory agencies to prove the existence of unreasonable risks to the public, are policies that protect the intellectual property rights of industry, such as patents and trade secrets. These protections create incentives for industry to withhold proprietary data about the actual health risks that their products and business practices may entail, which undermine *both* the ability of regulatory agencies to effectively monitor industry and hold corporations accountable, as well as the ability of legislative bodies to implement laws and regulations that can effectively safeguard our communities from potential health hazards.

Indeed, these dynamics defined our high-profile experiences, with tetraethyl lead (fuel additive) in tailpipe emissions in the 1930s, DDT in the 1950s, DES (synthetic estrogen administered to pregnant women) in the 1970s, traditional tobacco products in the 1990s, and they currently define the myriad current challenges we face with poorly understood substances like e-cigarette aerosols – which I have defined elsewhere as *uncertain environmental threats* [8]. By creating the *de facto* implication that under conditions of uncertainty – when we neither know the outcome of exposure, nor the probability that exposure will beget some harm – an abundant sum of actual cases of illness or death is a necessary condition for justifying health regulations, this risk management framework allows industry to gamble with public welfare by exposing our communities to uncertain threats that may well prove to be harmful or fatal. Expressed differently, under conditions of uncertainty, the standard that this framework endorses would have us accept that before we can be protected from environmental harms, we must first become victims

of the very harm that environmental safeguards aim to prevent.

As I have argued in detail in *The Ethics of Precaution*,³⁹ such a standard is entirely untenable, and is founded on the faulty assumption – both among policy analysts and ethicists – that when we lack the evidence to ascertain credible risks to human health, industry has no obligation to take reasonable strides to nevertheless protect the public against uncertain possibilities of harm. Uncertainty does *not* give industry license to act in ways that may prove injurious to others, and it does not attenuate industry's culpability for failing to exercise precaution or engendering actual harm. In briefly noting some of the questionable actions that JUUL Labs, Inc. took in helping to bring about what the Food and Drug Administration has termed an *epidemic* of youth vaping [11], this discussion cursorily introduces the Kantian-inspired ethics of precaution that I have argued should guide environmental health regulations whenever uncertainty prevails – which I hope will help analysts and practitioners who utilise this edited volume hold industry accountable to the public as socially responsible members of our communities.

As others have written in great detail about the public health controversy that JUUL Labs, Inc. has created [12] in utilising a *proprietary nicotine salt-based e-liquid formula* [13], JUUL framed its new aerosol nicotine delivery system as a safe alternative to traditional, *combustible* tobacco products, with the potential of mitigating the lung-related illnesses and death associated with smoking [14]. Yet, while little was known about the short- and long-term health effects of inhaling nicotine aerosols, JUUL's vaping products were rushed to mass production without substantive toxicological testing to ascertain its health safety [15]. Even now, more than a decade after e-cigarettes were introduced on the market, the Johns Hopkins Ciccarone Center for the Prevention of Heart Disease admits that vaping exposes users to various chemicals *that we don't yet understand and that are probably not*

safe [16] – aerosols that the Surgeon General underscores may

contain harmful and potentially harmful chemicals, including nicotine; ultrafine particles that can be inhaled deep into the lungs; flavoring such as diacetyl, a chemical linked to a serious lung disease; volatile organic compounds such as benzene, which is found in car exhaust; and heavy metals, such as nickel, tin, and lead.⁴⁰

[17–21]

What is well understood, however, is the addictive nature of nicotine, which poses unique and lasting developmental problems in adolescents (which also makes them more vulnerable to other forms of substance abuse) [22–23], and which has compounded growing concerns over lung-related illnesses [24–25]. And instead of heeding the unique health risks that adolescents face, JUUL targeted this vulnerable group with its innovative marketing campaigns [26] and product designs, not the least of which included an assortment of flavoured aerosols (including Mango, Creme, Fruit, and Cucumber) [27–28] that entice our youth [29], and a sleek, concealable design and unobtrusive smell that *has led to students vaping in places where cigarette smoking would normally be prohibited, including classrooms and school bathrooms* [30].

Indeed, JUUL quickly proved to dominate the e-cigarette market, accounting for nearly three-fourths of all sales by 2019 [31] (falling since to controlling 40% of the market [32]) during which time the rate of teen vaping has ballooned. For instance, according to the National Institutes of Health (NIH), the average population of 8th graders who reported to have vaped nicotine in the past month increased from 3.5% in 2017 to 10.5% in 2020; this figure more than doubled among 10th graders from 8.2% in 2017 to 19.3% in 2020, and that while only one in ten 12th graders reported to have vaped nicotine in the past month in 2017, by 2020 this figure

had increased 25% [33]. Moreover, the percent of adolescents in this NIH study who self-reported vaping nicotine at some point in their lives is also on the rise: as of 2020, 22.7% of 8th graders, 38.7% of 10th graders and 44.3% of 12th graders have experimented with nicotine e-cigarettes – with 16.9% of 8th graders, 30.7% of 10th graders, and 36.2% of 12th graders reporting to have used JUUL products at some point in their young lives [34]. These trends parallel the FDA’s recent findings that

almost 40 percent of high school students using e-cigarettes were using them on 20 or more days out of the month and almost a quarter of them used e-cigarettes every single day, indicating a strong dependence on nicotine among youth [35].⁴¹

Beyond intentionally targeting adolescents [36], taking advantage of the Food and Drug Administration’s limited purview over the manufacture and sale of e-cigarettes until 2016 – when the regulatory authority of the FDA finally extended to the vaping industry [37] – JUUL has also withheld proprietary toxicological data on likely health effects of its products, undermining *the public’s right to know* ([38] at p. 122), and it has tried to influence the scientific community and the discourse over the potential dangers of vaping by publishing privately funded studies that offer favourable analyses of the public health benefit of its products (as offering an alternative to traditional tobacco or combustible cigarettes).

Coupled to these considerations are ostensible conflicts of interest between JUUL’s business practices and public health priorities, not the least of which include the following:

- Hiring as its new CEO K.C. Crosthwaite, an executive from leading tobacco corporation, Altria (maker of Marlboro) – shortly after Altria had invested \$12.8 billion in JUUL and assumed 35% ownership in the company [39–41];

- Suspending the manufacture of its flavoured vaping products (in October 2019) only after the Trump Administration had announced its intentions (in September 2019) to prohibit the sale of flavoured e-cigarettes [42–43];
- Hurrying the \$40 million settlement in the high-profile lawsuit with North Carolina in late June 2020, in order to *avoid courtroom testimony from parents and teenagers while the [Food and Drug Administration] is reviewing its vaping products* [44]; and
- Neglecting to release to the public its colossal 125,000-page application to the FDA, which aims to sway the regulatory agency to allow the company to continue the sale of its electronic nicotine delivery system (ENDS) products – by demonstrating the public benefit of ENDS alternatives to traditional tobacco cigarettes [45].

As *The Ethics of Precaution* argues, industry cannot rationalise the uncertain public health threats it creates by appealing to the inherent limitations of toxicological sciences and complexities of quantitative risk assessment, cannot excuse these uncertain threats by appealing to arguments from moral luck and claiming ignorance of the potential for harm, cannot validate these uncertain threats with good intentions and foreseeable benefits, and cannot dismiss substantive obligations to exercise due care under conditions of uncertainty by appealing to the well-worn (and nevertheless misplaced) objections against the precautionary principle. By failing to take reasonable measures to preventatively safeguard the public against uncorroborated possibilities of harm, industry wrongfully gambles with the welfare of our community members and violates their equal moral standing, by projecting its own risk perceptions and tolerances on others and ignoring the rights and interests of others not to be put in potential harm's way.

In this spirit, before and as JUUL began to manufacture and sell e-cigarettes, and before we began to better understand the actual

adverse health effects of exposure to vaping aerosols – which followed actual illnesses, addictions and deaths – on the industrial standard of due care that I defend in *The Ethics of Precaution*, JUUL at least had the following moral obligations:

- 1 To perform more rigorous toxicological tests to try to ascertain the actual effects of exposure to its aerosols, the costs of which are nominal relative to the profits JUUL customarily enjoys;
- 2 To fully and truthfully disclose its safety assessment data to regulatory agencies so they may more effectively mitigate the possibility of harm associated with vaping nicotine;
- 3 To proactively provide details to the public on the potentially adverse health effects, even if they remain uncertain, in easily accessible and understandable ways for individuals to be able to make more informed choices and to better insulate themselves from potential harm;
- 4 To strive to find feasible substitute substances whose health effects are known and which do not entail unreasonable risks of harm; and
- 5 To ensure that vulnerable populations (such as infants and children, the elderly, pregnant women, racial and ethnic minorities, the poor, and so forth) are neither targeted nor unintentionally affected by its business practices.

And in neglecting to heed such duties of due care, beyond its liability for the actual injuries that its ENDS products created, JUUL is also culpable to blame and punishment for the uncertain threats it failed to preventatively strive to mitigate.

Uncertain threats of environmental harm are pervasive and pose a unique and exigent moral problem in large measure because of the complex nature of environmental harms. The effects of long-term low-dose exposure are difficult to measure, in part because epidemiological and toxicity testing capabilities

are limited and extrapolation from controlled animal studies are problematic. Diverse intervening causal factors, cumulative exposures, deferred effects, different pathways and timings and lengths of exposure, and varying physiological dispositions (vulnerabilities) to being harmed upon exposure, all serve to alter the kind, magnitude, consistency and observability of demonstrable harm. Yet, these challenges and prevailing uncertainty should not give industry license to gamble with human health. It is both naïve to ground regulatory decisions about environmental health exclusively or even chiefly in the imperfect toxicological sciences when uncertainty prevails, and it is also immoral for us to tolerate a system of environmental risk management that would have us delay regulation under uncertainty until the imperfect toxicological sciences can yield preponderances of evidence to verify actual risks to public health. As others have aptly insisted, *justice delayed is justice denied* [46], and it is imperative that we hold industry to higher standards of corporate social responsibility. We must acknowledge that what is at stake is not the deterrence of statistical illnesses and deaths, but rather the safeguard of the welfare and equality of particular people, and that what should shape decisions about whether to regulate uncertain threats (as well as quantifiable environmental risks) is what we deserve and owe each other as moral equals – obligations of mutual respect that are not diminished by prevailing uncertainty and economic and political costs.

‘Moral foundations’ notes

- 37 According to the National Institutes of Health (2021), more than 14,000 deaths were associated with prescription opioids in 2019.
- 38 See [46] Shrader-Frechette (2007), Chapters 1–5.
- 39 See Szentkirályi (2019) [8], Chapters 2–5; see also Szentkirályi (2018) [9] and Szentkirályi (2020) [10].
- 40 And this says nothing of the vitamin E acetate in THC vaping products, which have caused dozens of deaths and thousands of hospitalisations. See Blount (2020) and Centers for Disease Control and Prevention (3 August 2021).

- 41 The FDA notes that “While we are seeing some progress in youth prevalence rates, the fact that there are still 3.6 million youth e-cigarettes users in 2020 is deeply concerning” (FDA, 23 June 2021).

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ANNEX 1.1 KEY CONCEPTS AND TERMS

Sustainable development and environmental health

The World Commission on Environment and Development (WCED) (the Brundtland Commission) was convened by the United Nations in 1983 to address growing concern *about the accelerating deterioration of the human environment and natural resources and the consequences of that deterioration for economic and social development*. In its 1987 Report (*Our Common Future*) it defined Sustainable Development (SD) as *development that meets the needs of the present without compromising the ability of future generations to meet their own needs*. It introduced the notion of generational equity as well as equity within society being an issue. This also recognises that economic growth and consumption cannot continue at the present rate as planet earth has finite resources.

There has been slow progress since then. In June 1992, at the Earth Summit in Rio de Janeiro, more than 178 countries adopted Agenda 21, a comprehensive plan of action to build a global partnership for sustainable development to improve human lives and protect the environment. Member States of the UN unanimously adopted the Millennium Declaration at the Summit in September 2000. The Summit led to the elaboration of eight Millennium Development Goals to reduce extreme poverty by 2015. The Johannesburg Declaration on Sustainable Development and the Plan of Implementation, adopted at the Summit on Sustainable

Development in South Africa in 2002, reaffirmed the global community's commitments to poverty eradication and the environment, and built on Agenda 21 and the Millennium Declaration by including more emphasis on multilateral partnerships.

At the UN Conference Rio+20⁴² in June 2012, Member States adopted the outcome document 'The Future We Want' in which they decided to launch a process to develop a set of SDGs to build upon the MDGs and to establish the UN High Level Political Forum. The Rio+20 outcome also contained other measures for implementing sustainable development, including mandates for future programmes of work in development financing, small island developing states and more. In 2013, the General Assembly set up a working group to develop a proposal on the SDGs. In January 2015, the General Assembly began the negotiation process on the post-2015 agenda.

The 2030 Agenda for Sustainable Development was adopted by all United Nations Member States in 2015, and was intended to provide a shared blueprint for people and the planet. At its heart are the 17 Sustainable Development Goals (SDGs), which are a call for action by all countries in a global partnership. They recognise that ending poverty and other deprivations must go hand in hand with strategies that improve health and education, reduce inequality and spur economic growth – all while tackling climate change and working to preserve our oceans and forests.

The 17 SDGs⁴³ are:

- 1 No poverty – end poverty in all its forms everywhere
- 2 Zero hunger – end hunger, achieve food security and improved nutrition and promote sustainable agriculture
- 3 Good health and well-being – ensure healthy lives and promote well-being for all at all ages
- 4 Quality education – ensure inclusive and equitable quality education and promote life-long learning opportunities for all
- 5 Gender equality – achieve gender equality and empower all women and girls
- 6 Clean water and sanitation – ensure availability and sustainable management of water and sanitation for all
- 7 Affordable and clean energy – ensure access to affordable, reliable, sustainable and modern energy for all
- 8 Decent work and economic growth – promote sustained inclusive and sustainable economic growth, full and productive employment and decent work for all
- 9 Industry innovation and infrastructure – build resilient infrastructure, promote inclusive and sustainable industrialisation and foster innovation
- 10 Reduced inequalities – reduce inequalities within and among countries
- 11 Sustainable cities and communities – make cities and human settlements, inclusive, safe resilient and sustainable
- 12 Responsible consumption and production – ensure sustainable consumption and production patterns
- 13 Climate action – take urgent action to combat climate change and its impacts
- 14 Life below water – conserve and sustainably use the oceans, seas and marine resources for sustainable development
- 15 Life on land – protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification and halt and reverse land degradation
- 16 Peace, justice and strong institutions – promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels
- 17 Partnerships for the goals – strengthen the means of implementation and revitalise the global partnership for sustainable development

It can be seen from this list that the work of EHPs contributes to a number of the SDGs as also illustrated by Figure 1.8 giving



Figure 1.8 Overview of the Sustainable Development Goals 2015–2030

From Commonwealth Secretariat (2016) *A Systems Framework for Healthy Policy – Advancing Global Health Security and Sustainable Well-being for All – Implementation Tool for the ‘Global Charter for the Public’s Health’*. Commonwealth. Secretariat, London, UK, *A systems framework for Healthy Policy*

an overview of the SDGs, and Figure 1.9 is another idea of the components of sustainable development.

The UK Commission on Sustainable Development (which had its funding withdrawn by the Coalition Government after 2010) said that climate change (global heating) resulting from carbon and greenhouse gas emissions posed (and poses) potentially catastrophic risks to human health and threatened to widen health inequalities between rich and poor populations in the UK. It would impact on insurance and other material resources such infrastructure and the ability to cope with the effects of climate change. Thus, sustainable development, health equity and the climate emergency are all interconnected.

Matters that contribute to SD such as active travel, promoting green spaces and healthy eating (including consumption of

less, but better-quality meat), will yield co-benefits for both health and carbon emissions given that many crops are grown merely to feed animals.⁴⁴ The provision of opportunities for healthy, low-carbon living distributed in ways that favour people with low incomes and so helps to reduce their vulnerability to ill health is therefore clearly part of sustainable development and is inherent to the idea of sustainable communities.

In common with other notions of ‘development’, sustainable development is concerned with the improvement of the human condition, but the difference is that the emphasis is less on economic growth or production; rather it considers both environmental and social capital. This reflects the thinking behind ‘doughnut economics’ mentioned previously. Thus sustainable development is means that whatever

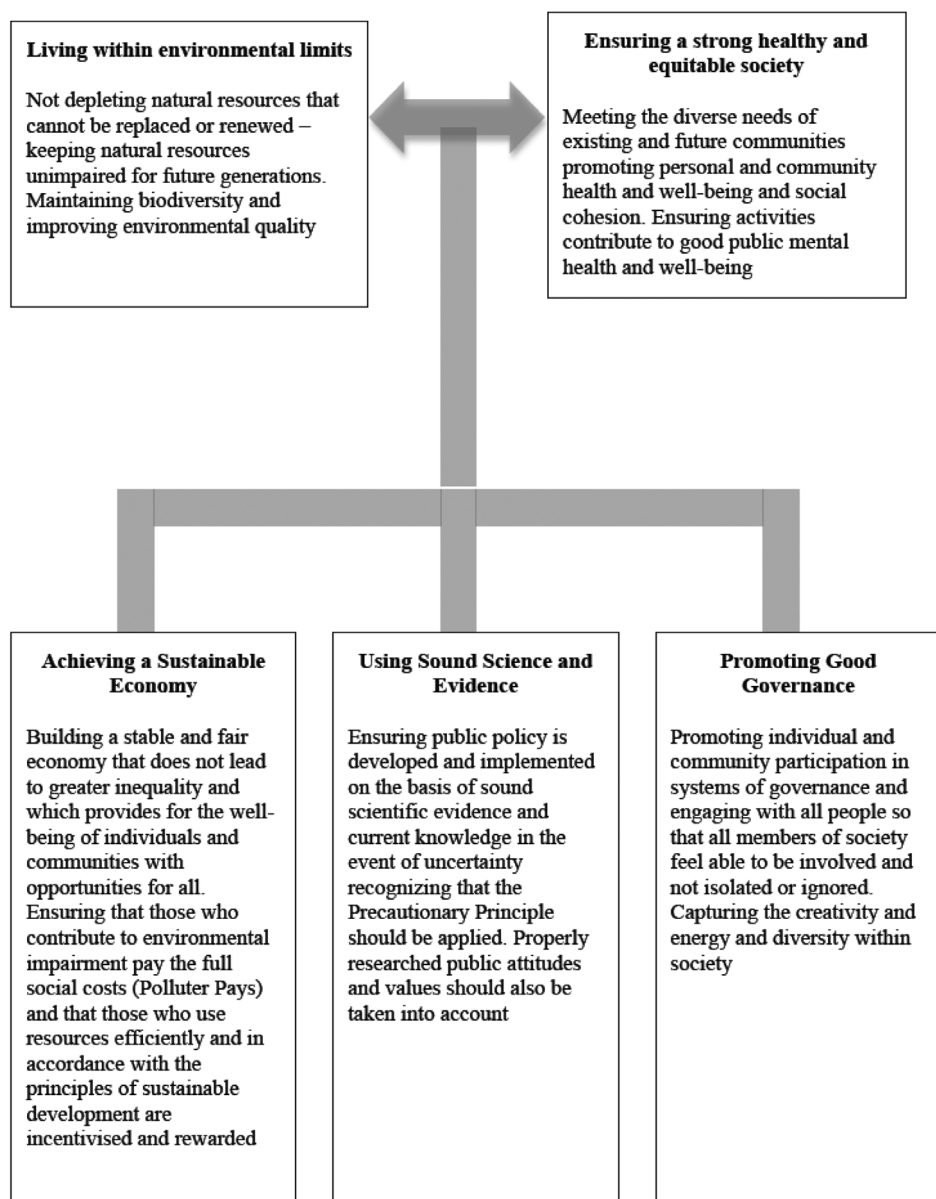


Figure 1.9 One idea of the components of sustainable development

is done to improve the quality of life of people should not lead to a degradation of the environment. The environment itself should be interpreted in both the bio-physical sense and the socio-economic sense (see Bell and Morse 2003⁴⁵ for more information).

The notion of sustainable development relies on no longer treating the environment as a ‘free good’. A proper value has to be placed on the ‘services’ provided by the natural environment. There has also to be economic transformation and sustainable development provides an opportunity to lift

people out of poverty, advance social justice and protect the natural environment. There is a considerable amount of information on the related websites.⁴⁶ For public health it is worth noting that deforestation to permit the growing of foodstuffs for livestock also increases the risks of pandemics as destroying habitats makes viruses and other pathogens more likely to infect humans according to a paper in 2020 in the *Scientific American*.⁴⁷

The 2020 annual UN report on progress on sustainable development made for disappointing reading, perhaps not surprising with the pandemic as the website says, *Now, in only a short period of time, the COVID-19 pandemic has unleashed an unprecedented crisis, causing further disruption to SDG progress, with the world's poorest and most vulnerable affected the most.*

An estimated⁴⁸ 71 million people are expected to be pushed back into extreme poverty in 2020, the first rise in global poverty since 1998. Lost incomes, limited social protection and rising prices mean even those who were previously secure could find themselves at risk of poverty and hunger. Under-employment and unemployment due to the crisis mean some 1.6 billion already vulnerable workers in the informal economy – half the global workforce – may be significantly affected, with their incomes estimated to have fallen by 60% in the first month of the crisis.

More than 1 billion slum dwellers worldwide are acutely at risk from the effects of COVID-19, suffering from a lack of adequate housing, no running water at home, shared toilets, little or no waste management systems, overcrowded public transport and limited access to formal healthcare facilities. Women and children are also among those bearing the heaviest brunt of the pandemic's effects. Disruption to health and vaccination services and limited access to diet and nutrition services have the potential to cause hundreds of thousands of additional under-5 deaths and tens of thousands of additional maternal deaths in 2020. Many countries have seen a surge in reports of domestic violence against women and children.

If education is one means of lifting children out of poverty and reducing health inequity, then school closures as the result of the pandemic have kept 90% of students worldwide (1.57 billion) out of school and caused over 370 million children to miss out on school meals they depend on. Lack of access to computers and the internet at home means remote learning is out of reach of many. About 70 countries reported moderate to severe disruptions or a total suspension of childhood vaccination services during March and April of 2020.

The UN report suggests that as more families fall into extreme poverty, children in poor and disadvantaged communities are at much greater risk of child labour, child marriage and child trafficking. In fact, the global gains in reducing child labour are likely to be reversed for the first time in 20 years. The report also shows that climate change is still occurring much faster than anticipated.

It is worth noting that the Commonwealth Secretariat also produced a framework (The Systems Framework for Healthy Policy)⁴⁹ to advance global health security and sustainable well-being for all, recognising that sustainable development and health go hand in hand (see Figure 1.10).

The objectives of the framework are

- To strengthen health systems' ability to implement universal health coverage (UHC) by facilitating global health security and sustainable, fair health outcomes;
- To support wider economic growth and the post-2015 Sustainable Development Goals (SDGs);
- To provide a flexible policy framework for tools that can be applied to different countries and settings to strengthen health systems, including for assessment, planning, training, evaluation and accreditation;
- To strengthen leadership and governance, scale up workforce planning and public health capacity-building, standardise assessment and improve the quality of health systems.

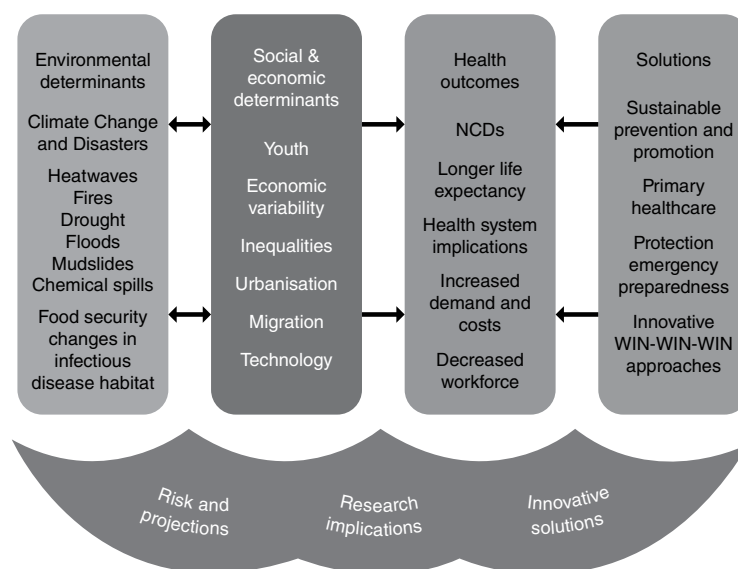


Figure 1.10 Summary of public health challenges and solutions for 2050

Adopted from WHO EURO (2012), 'Gastein presentation', available at <http://www.euro.who.int/en/what-we-do/health-topics/noncommunicable-diseases> in Commonwealth Secretariat (2016) *A Systems Framework for Healthy Policy – Advancing Global Health Security and Sustainable Well-being for All* Commonwealth. Secretariat London, UK

Health systems are already struggling to meet current demands and the challenges facing society over the next 40 years will only add further stress. As a result, solutions may require more innovative approaches that address the wider determinants of health and require multidisciplinary partnerships, which are traditionally outside the remit of health policy makers.

The policy framework under the health protection component has included environmental health (along with communicable disease control and emergency preparedness). The environmental health component is seen as assessing, monitoring, planning and delivering action to mitigate harm and to increase the benefits to health from environmental determinants including:

- Air, soil, food, water and sanitation, for which safety, security and quality are concerns;

- Built environment, including housing, urban and rural planning, noise and transport;
- Occupational health;
- Port health;
- Chemical, biological, physical and radiation hazards;
- A 'One Health' approach, including human, animal and plant health as part of a planetary health approach.

Underlying all of the protection components is climate change and sustainability – adaptation and mitigation, which make clear that health policy should assess the health impacts and provide advocacy and policy advice on risks to health and strengthen relevant public health functions to support:

- Adaptation planning and strengthening of health resilience;
- Cross-sector sustainability and mitigation plans that benefit health, the economy and

the environment, including safe roads and green spaces that promote active transport, insulation of buildings, reduction of unhealthy food, clean cookstoves;

- Link environmental health determinants and benefits with health promotion.

Risk, Risk Assessment and Risk Management

Much in this book in later chapters will consider the idea of risk and risk management in the different contexts. Here is merely an introduction. No human activity is risk free, and hazards are all around whether at home or at work or travelling between the two.

Risk – is a combination of the probability or frequency of an occurrence of a defined hazard and the magnitude of the consequences of the occurrence. Thus risk can depend upon:

- The frequency of exposure;
- Precautions taken;
- Other relevant factors that affect the magnitude of the consequences.

The risk may depend upon the number potentially affected, or the severity of the harm. Thus the harm may be relatively minor but could potentially affect a large number of people. On the other hand the potential harm could be very severe such as death, but potentially there may only be a very small number of people affected.

Risk assessment – in the workplace (and in general) risk assessment is nothing more than a careful examination of what, in the particular location or occupation, could cause harm to you or others and is a means of helping you to weigh up whether adequate precautions are in place or should more be done to prevent harm. An accident is an unplanned and uncontrolled event leading to injury damage or loss or error. Accidents do not always result in injury or damage; there can be near misses or dangerous occurrences. If

these are reported then steps can be taken to prevent those near misses becoming real accidents, and the information provided will inform future risk assessments. At its simplest a five-step process is involved.

- 1 Look for the hazards (a situation that could occur or some aspect of an operation that has the potential for harm, that is, human injury, damage to property or the environment)
- 2 Decide who might be harmed and how
- 3 Evaluate the risks and decide whether the existing precautions are adequate or whether more should be done (which is merging into risk management)
- 4 Record the findings
- 5 Review the assessment and revise it if necessary, in the light of experience or more information

The assessment can produce a rating of the severity of risk which can be represented as

$\text{Risk rating} = \text{likelihood} \times \text{severity of harm}$

This formula assumes that the person undertaking the assessment is competent to do so. Indeed an assessor if not competent is unlikely to produce an assessment that is suitable and sufficient. This means that the assessor should be familiar with the environment being assessed and the operations there.

It is possible to assign a number from 1–3 to indicate the severity of harm or consequences of the hazard (this could also be a letter from A–C). A number from 1–3 can also be assigned to indicate the likelihood of the event causing the hazard to actually occur.

Using the following chart it is possible to produce a score and link it to action criteria. Thus

Severity of hazard outcome or consequence
1 = death, major injury, major damage or loss to equipment or property
2 = >3-day injury, damage to property or equipment
3 = Minor injury, minor damage to property or equipment

Likelihood of the event occurring
1 = extremely likely to occur
2 = Frequent, often or likely to occur
3 = Slight chance of occurrence

The allocation of likelihood and severity will then produce a score using the formula. See the following chart and Figure 1.11.

	Severity of harm reducing →		
Risk – likelihood of event	1	2	3
1	1	2	3
2	2	4	6
3	3	6	9

Implications

Score

- 1 Unacceptable: must receive immediate attention to remove or reduce risk
- 2 Urgent: must receive attention as soon as possible to reduce likelihood or hazard
- 3 Must receive attention to verify how hazard or likelihood can be reduced. Are satisfactory systems in place?
- 4 Should be given attention to ascertain if likelihood or hazard can be reduced and to check if adequate procedures are in place
- 6 Low priority
- 9 Low priority

Figure 1.11 Risk rating chart

A simpler but similar method is shown in Figure 1.12.

Where risk here is used to mean chance or probability.

Implications: A1 Unacceptable; A2/B1 Urgent; A3/C1 Must receive attention; B2 Should receive attention; B3/C2 Low priority; C3 Very low priority

Risk management – although the whole process including the assessment can be seen as risk management, it is also the arrangements, works or precautions or other steps taken to reduce the likelihood of an occurrence that could cause harm. In some instances, the management process might be designed to minimise the harm outcomes as well as prevent the occurrence. There may already some precautions or arrangement in place, but the assessment may have deemed them inadequate and so the precautions may be enhanced on the basis of that evaluation. These arrangements or precautions can be preventative measures, such as the use of mechanical lifting rather than manual handling of materials or they can be protective measures, so that any harm is minimised, for example the use of smoke detection and alarm systems and protected escape routes or the use of domestic sprinkler systems in multi-occupied housing where the likelihood of a fire might be high (and remain high) but the harm can be minimised. This in the context of environmental health will often reflect how well the business is run. A well-run business will have identified the risks, and then assessed and managed them.

	Hazard/severity		
Risk	A	B	C
1	A1	B2	C3
2	A2	B4	C6
3	A3	B6	C9

Where risk here is used to mean chance or probability

Figure 1.12 Risk assessment matrix

Joint Strategic Needs Assessments (JSNA)

Unlike the other concepts that are generic and largely applicable globally, Joint Strategic Needs Assessments are more specific to Britain. It does represent an important concept as despite the substantial changes to public health structures. The Health and Social Care Act of 2012 placed a statutory duty on both upper-tier local authorities and Clinical Commissioning Groups (CCGs) in England and Wales to prepare a JSNA together; to commission with regard to the JSNA; and refer to the JSNA in the development of the local Joint Health and Wellbeing Strategy. The purpose of JSNAs and Joint Health and Wellbeing Strategies (JHWSs) is to improve the health and well-being results of the local community and reduce inequalities for all ages. Local authorities and CCGs have a joint and equal statutory responsibility. In 2013 the government issued statutory guidance on these.⁵⁰

In Scotland the integration of health and social care is a key Scottish government initiative that will bring together the planning of adult social care services, NHS community services and some NHS hospital-based services under a single body known as an 'integration authority'. The legislation relating to the integration of health and social care is set out in the Public Bodies (Joint Working) (Scotland) Act 2014 and a set of linked regulations. A key requirement of the legislation is that each integration authority must produce a strategic plan that:

- Divides the local authority area for which the integration authority is responsible into at least two localities;
- Sets out how the functions and services that the integration authority is responsible for will be delivered and how the related budget will be used;
- Explains how the integration authority intends to achieve a set of outcomes known as the national health and well-being outcome.

A Joint Strategic Needs Assessment (JSNA) is a key element of the process of preparing a strategic plan, providing an assessment and forecast of needs to enable investment to be linked to all agreed desired outcomes, considering options, planning the nature, range and quality of future services and working in partnership to put these in place. The JSNA is part of a cycle, which will inform strategic planning, which in turn will be used to develop a monitoring and performance framework.

Thus, a JSNA is a tool intended to enable local partners to co-ordinate in understanding the future health, care and well-being needs of the local community. Environmental health practitioners should seek to be involved (if not already) as much of their work can make a significant contribution to health improvement and they should also have relevant data. An understanding of JSNAs is therefore essential to EHOs and it is apparent that until recently knowledge and involvement has been highly variable.

Health and well-being boards reconstituted as a partnership forum rather than an executive decision-making body were established under the Health and Social Care Act 2012 to act as a forum in which key leaders from the local health and care systems could work together to improve the health and well-being of their local population. They became fully operational on 1 April 2013 in all 152 local authorities with adult social care and public health responsibilities.

The 'responsible local authority' and the CCGs in England Wales have to prepare the JSNAs and JHWSs and these functions have to be exercised by the health and well-being board established by the local authority. The responsibility falls on the health and well-being board⁵¹ as a whole to ensure its quality and effectiveness. This will in turn depend upon all members working together throughout the process. Two or more health and well-being boards could choose to work together to produce JSNAs and JHWSs, covering their combined geographical area. Some health

and well-being boards may collaborate with neighbouring areas where they share common problems as this can prove to be more cost effective than working in isolation. Local authorities and health and well-being boards can also decide to include additional members on the board beyond the core members. These additional members could be other service providers (NHS, private or voluntary and the community sector), health and care professionals, representatives of criminal justice agencies, fire and rescue services, local voluntary and community sector organisations, universities, or representatives of military populations, who can bring expertise and knowledge of the local community to enhance JSNAs and JHWSs.

The policy intention is for health and well-being boards to also consider wider factors that impact on their communities' health and well-being, and local assets that can help to improve outcomes and reduce inequalities. Local areas are free to undertake JSNAs in a way best suited to their local circumstances – there is no template or format that must be used and no mandatory data set to be included.

A range of quantitative and qualitative evidence should be used in JSNAs. There is a range of data sources and tools that health and well-being boards may find useful for obtaining quantitative data. Qualitative information can be gained via a number of avenues, including but not limited to views collected by the local Healthwatch organisation or by local voluntary sector organisations, feedback given to local providers by service users; and views fed in as part of community participation within the JSNA and JHWS process. JSNAs can also be informed by more detailed local needs assessments such as at a district or ward level; looking at specific groups (such as those likely to have poor health outcomes); or on wider issues that affect health such as employment, crime, community safety, transport, planning or housing. Boards will need to ensure that the staff who are supporting JSNAs have easy access to the evidence they

need to undertake any analysis they needed to support the board's decisions.

Public Health England (PHE) was expected to support local authorities to deliver locally appropriate interventions and services. It was intended that PHE would provide data, interpretation and evidence to enable local public health teams in England to improve the public's health. It should be noted that the regional Public Health Observatories (PHOs) transferred along with the specialist observatories and the National Cancer Intelligence Network into PHE in 2013 and so at the time of writing, with the demise of PHE, it is not known how JSNAs will be supported but it is anticipated that this will fall within the remit of the Office for Health Improvement and Disparities.

An early study found that NHS managers were more aware of the health implications of local authorities' work than local authority top managers were themselves. This seemed to indicate that managers within local authorities were not highlighting impacts of their work on the health of the local community as well as they could.

As JSNAs set out the health and well-being needs of the local population, they should identify the groups whose needs are not being met whether by their own means or the statutory and voluntary agencies. This will enable these needs to be considered when setting priorities and commissioning services. For example, this will include the housing needs of people living in poor-condition private sector housing, whether owner occupiers or renters on low incomes whose needs have often been overlooked. Environmental health practitioners will hold information on housing conditions and actions, and also on other environmental health matters such as poor air quality and other environmental factors. Data should be included for existing needs and projected needs for up to ten years ahead, recognising the impact of changing demographics with an increase in older people and the effects of climate change.

JSNAs should be seen as providing a framework within which to examine all factors that impact on health and well-being of local communities, including employment (and issues on occupational health and safety), education, housing and other environmental factors. Evidence on local housing conditions and their effect on health also need to be included.

The JSNA should also involve a mapping exercise to map local services relating to health and well-being and how they are used. This will facilitate a gap analysis for service and identify barriers to people accessing them to be highlighted and considered in commissioning decisions.

Local people and agencies including advice agencies and those who work with them can also provide information to support the quantitative data in the JSNA and they should be consulted throughout the process on the findings. Consultees need to include service users, carers, voluntary organisations and service providers, which can include private sector providers, and in the housing context this would include landlords. The following questions are examples that could be used in the consultation. What health inequalities or inequities need to be addressed? What client groups have unmet needs? What services need to be changed?

The final output of the JSNA is a high-level strategic assessment of qualitative and quantitative data on the major health and well-being needs of an area. It is good practice for the findings to be made available in an accessible format that can be readily understood by the community affected and should include a list of key priorities or recommendations.

Early in the existence of JSNAs, a survey by a Local Government Association agency, the IDeA, to assess the progress with JSNAs found that the process and the output varied considerably. Some two-tier authorities were found to suffer from arguments about relative need in their areas, which hampered their development. It remains a concern that the lower-tier authorities (or at least their EHPs) are not adequately engaged.

The LGA produced further guidance,⁵² remarking that the emphasis in JSNAs initially had been largely about producing a statement of need which could drive commissioning across local government, the NHS and other local partners. National guidance had recommended that JSNAs needed to acknowledge local people as an important source of information; in practice they tended to be more quantifiable than qualitative. In truth, community engagement in JSNAs had been variable. ‘A Glass Half Full’ (guidance prepared by IDeA in 2010)⁵³ had outlined the case for balancing the needs/‘deficits’-based approach with an approach based on community assets/strengths and detailed some techniques for discovering and mobilising community assets. The argument being that when practitioners begin with what communities have – their assets – as opposed to what they don’t have – their needs – a community’s ability to address those needs increases and the LGA’s later guidance built on that experience in one local authority.

Quantifying the burden of disease from mortality and morbidity

There are a number of ways of quantifying the burden of disease or metrics used in health economics two commonly seen are:

Disability-Adjusted Life Year (DALY) – The DALY was developed originally as an input into the World Bank’s “World Development Report 1993: Investing in Health” and has subsequently been adopted by the WHO as a measure of the “burden of disease”.⁵⁴

The WHO says one DALY can be thought of as one lost year of ‘healthy’ life. The sum of these DALYs across the population, or the burden of disease, can be thought of as a measurement of the gap between current health status and an ideal health situation where the entire population lives to an advanced age, free of disease and disability.

DALYs for a disease or health condition are calculated as the sum of the Years of Life Lost (YLL) due to premature mortality in the population and the Years Lost due to Disability (YLD) for people living with the health condition or its consequences:

This is calculated by:

$$\text{DALY} = \text{YLL} + \text{YLD}$$

The YLL basically correspond to the number of deaths multiplied by the standard life expectancy at the age at which death occurs. The basic formula for YLL (without yet including other social preferences considered), is the following for a given cause, age and sex:

$$\text{YLL} = N \times L$$

where:

N = number of deaths

L = standard life expectancy at age of death in years

YLL measures the incident stream of lost years of life due to deaths; an incidence perspective has also been taken for the calculation of YLD in the original Global Burden of Disease Study for year 1990 and in subsequent WHO updates for years 2000 to 2004.⁵⁵

To estimate YLD for a particular cause in a particular time period, the number of incident cases in that period is multiplied by the average duration of the disease and a weight factor that reflects the severity of the disease on a scale from 0 (perfect health) to 1 (dead). The basic formula for YLD is the following (again, without applying social preferences):

$$\text{YLD} = I \times \text{DW} \times L$$

where:

I = number of incident cases

DW = disability weight

L = average duration of the case until remission or death (years)

This approach is not without its critics however⁵⁶ as it attempts both to measure the global burden of disease and to guide the allocation of resources. The DALY also fails at its other goal: that of measurement of disease burden, for both statistical and ethical reasons.

The Global Burden of Disease analysis for WHO is intended to provide a comprehensive and comparable assessment of mortality and loss of health due to diseases, injuries and risk factors for all regions of the world. The overall burden of disease is assessed using the DALY which is a time-based measure that combines years of life lost due to premature mortality and years of life lost due to time lived in states of less than full health. One DALY can be thought of as one lost year of 'healthy' life. The sum of the DALYs across the population, or the burden of disease, can be thought of as a measurement of the gap between current health status and an ideal health situation where the entire population lives to an advanced age, free of disease and disability. The DALY measures the gap between the actual health status of a population and some 'ideal' or reference status, using time as the measure.

The WHO has said that 'egalitarian principles' are explicit in the DALY metric, and the global burden of disease studies apply these to all regions of the world. This is because the studies use the same 'ideal' life expectancy for all population subgroups and exclude all non-health characteristics (such as race, socio-economic status or occupation) apart from age and sex from consideration in calculating lost years of healthy life. They use the same 'disability weight' for everyone living a year in a specified health state. The disability weight is a weighting factor that reflects the severity of the disease on a scale from 0 (perfect health) to 1 (equivalent to death). Years Lost due to Disability (YLD) are calculated by multiplying the incident cases by duration and disability weight for the condition. The disability weights used for the WHO Global Burden of Disease are on the WHO website.⁵⁷ It is possible to use the same approach

for example to assess the burden of disease attributable to poor housing conditions.

Quality-Adjusted Life Year – The Quality-Adjusted Life Year (QALY) has been an approach used to measure the health outcomes associated with different healthcare interventions. It is a relatively crude measure to provide an indication of the benefits gained from a variety of medical procedures in terms of quality and life and survival for the patient. It is obviously relevant in making decisions on the allocation of resources. The assessment of outcomes from treatment and other influences on health have two essential elements: the quantity (time) and quality of life. Life expectancy is a traditional measure with few problems of comparison – people are either alive or dead so this approach takes account of the quality of life.

The QALY is therefore a measure of the state of health of a person or group in which the benefits, in terms of length of life, are adjusted to reflect the quality of life. One QALY is equal to one year of life in perfect health.

QALYs are calculated by estimating the years of life remaining for a patient following a particular treatment or intervention and weighting each year with a quality-of-life score (on a zero to 1 scale). It is often measured in terms of the person's ability to perform the activities of daily life, freedom from pain and mental disturbance.

Disability-Free Life Expectancy (DFLE) – DFLE is the average number of years an individual is expected to live free of disability if current patterns of mortality and disability continue to apply. This indicator has been developed in a number of OECD countries since the 1970s.

It is the average number of years a person aged 'x' would live disability-free (no limiting long-term illness) if he or she experienced the particular area's age-specific mortality and health rates for 2001 throughout their life. They are estimates and are calculated by combining age and sex-specific mortality rates, with age and sex-specific rates on

general health and limiting long-term illness from census data.

Healthy Life Expectancy – The Office for National Statistics (ONS) in the UK uses 'healthy life expectancy' (HLE) which estimates a lifetime spent in 'very good' or 'good' health and is based on how individuals perceive their general health. So it is given as the average number of years a person aged 'x' would live in good/fairly good health. ONS also uses Disability-Free Life Expectancy (DFLE) estimates for lifetime free from a limiting persistent illness or disability; this is based upon a self-rated assessment of how health conditions and illnesses reduce an individual's ability to carry out day-to-day activities.

Health expectancies add a quality-of-life dimension to estimates of life expectancy (LE) by dividing expected lifespan into time spent in different states of health. The ONS routinely publish two types of health expectancies. The first is the HLE and DFLE.

Both health expectancies are summary measures of population health and important indicators of the well-being of society.

In 2019 it was reported by ONS⁵⁸ that for the UK healthy life expectancy in 2016 to 2018 was 63.1 years but disability-free life expectancy was 62.6 years. This did, however, vary by regions so that for North-East England the figures were 59.4 and 58.3 years respectively. While for males in London the healthy life expectancy was 64.2 years and disability-free life expectancy was 65.0 years and the figures for Wales were 61.4 years and 59.9 and for Scotland 61.9 and 61.2.

For women, healthy life expectancy in the UK was 63.6 and a disability-free life expectancy was 61.6 years. For Wales the figures were 62.0 and 59.3 and in Scotland 62.2 and 60.7.

The ONS reported that changes in life expectancy and healthy life expectancy, the proportion of life spent in good health in the UK has decreased, from 79.9% to 79.5% for males, and from 77.4% to 76.7% for females. This is because actual life expectancy has increased slightly but the size of these

increases was substantially smaller than those observed during the first decade of the 21st century. Changes to healthy life expectancy at birth were smaller than life expectancy in the UK between 2009 to 2011 and 2016 to 2018, causing the years lived in poorer health to increase more than the years lived in good health.

An English male could expect to live 79.6 years in 2016–18, but the average healthy life expectancy was only 63.4 years meaning 16.2 of those years (20%) would be spent in ‘not good’ health. In 2016–18 an English woman could expect to live 83.2 years, of which 19.3 years (23%) would have been spent in ‘not good’ health. Although females live an average of 3.6 years longer than males, much of that time is spent in poor health.

As a comparison in Australia a boy born between 2014 and 2016 has a life of 80.4 years and female life expectancy is 84.6 years, according to the Australian Institute of Health and Welfare.⁵⁹ Australia also publishes a burden of disease study and the latest reported 4.8 million years of healthy life was lost in 2015 equivalent to 199 DALY per 1,000 population and 38% of the burden of disease was preventable.⁶⁰

Notes

- 42 UN. The Future We Want at <https://sustainabledevelopment.un.org/content/documents/733FutureWeWant.pdf>
- 43 Progress on the goals is reported at <https://sustainabledevelopment.un.org/?menu=1300>
- 44 26% of the planet’s ice-free land is used for livestock grazing and 33% of croplands are used for livestock feed production. Livestock contributes to 7% of the total greenhouse gas emissions through enteric fermentation and manure according to the Food and Agriculture Organization of the UN – <http://www.fao.org/nr/sustainability/sustainability-and-livestock>; The UK National Food Strategy Independent Review – The Plan published in 2021 says more than 75% of the world’s farmland and 85% of the farmland in the UK and abroad is used to graze animals or to produce crops to feed animals; see <https://www.nationalfoodstrategy.org>
- 45 Bell S, Morse S. (2003) *Measuring Sustainability – Learning from Doing*, Earthscan, London.
- 46 <http://www.un.org/en/sustainablefuture/>; <http://www.uncsd2012.org/content/documents/814UNCSD%20REPORT%20final%20revs.pdf>; and <https://sustainabledevelopment.un.org/>
- 47 <https://www.scientificamerican.com/article/stopping-deforestation-can-prevent-pandemics1/>
- 48 <https://www.un.org/sustainabledevelopment/progress-report/>
- 49 See <https://drive.google.com/file/d/0B8wr6920su0aeXNVR01eHdTYmc/view>
- 50 See https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/223842/Statutory-Guidance-on-Joint-Strategic-Needs-Assessments-and-Joint-Health-and-Wellbeing-Strategies-March-2013.pdf
- 51 For an explanation of these see <https://www.kingsfund.org.uk/publications/health-wellbeing-boards-explained>
- 52 <https://www.local.gov.uk/sites/default/files/documents/developing-rich-and-vibra-308.pdf>
- 53 <http://www.assetbasedconsulting.net/uploads/publications/A%20glass%20half%20full.pdf>
- 54 See http://www-wds.worldbank.org/external/default/WDSPContentServer/WDSP/IB/1996/07/01/000009265_3970311114344/Rendered/PDF/multi0page.pdf
- 55 https://www.who.int/healthinfo/global_burden_disease/metrics_daly/en/
- 56 See Anand S, Hanson K. (1997) Disability-adjusted life years: A critical review. *Journal of Health Economics*, 16: 685–702, for example.
- 57 https://www.who.int/healthinfo/global_burden_disease/daly_disability_weight/en/
- 58 See <https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/healthandlifeexpectancies/bulletins/healthstatelifeexpectanciesuk/2016to2018#healthy-and-disability-free-life-expectancy-in-the-uk>
- 59 <https://www.aihw.gov.au/reports/life-expectancy-death/deaths-in-australia/contents/life-expectancy>
- 60 <https://www.aihw.gov.au/getmedia/08eb5dd0-a7c0-429a-b35f-c8275e7a1dbf/aihw-bod-21.pdf.aspx?inline=true>

The environmental health practitioner

Stephen Battersby

Introduction

One of the purposes of this book is to provide the basic information that an environmental health practitioner (EHP) or officer (EHO)¹ anywhere in the world can use to develop their competencies. Chapter 1 included a section that set out what is understood by the term ‘environmental health’ and also what can be considered ‘an objective of environmental health’. As hopefully was made apparent, ‘environmental health’ is something more than that which an EHP ‘does’ as is well illustrated by World Health Organization (WHO) documents on the topic.²

In this chapter the aim is to be a little more focussed on what makes a competent environmental health practitioner whether they work for governmental agencies (central or local government) or in private practice. Reference is made to a number of documents that have been published over the years, but readers will be able to discern some common themes.

The personal skills and requirements needed for a competent EHP, taking account of that set out for Australia³ can be summarised by the following:

- Have good communication and interview skills;
- Have good negotiation skills;
- Be tactful and courteous;
- Be able to be firm and impartial when making decisions;
- Be resourceful;
- Be able to take initiative;
- Have good problem-solving skills;
- Be able to work independently or as a part of a team;
- Be able to investigate, observe and inspect (including of high-rise buildings), then identify problems and record findings accurately;
- Be able to identify risks objectively, analyse the risk and manage risk;
- Be able to solve a problem or establish the most appropriate response.

Given this list, it can be seen why EHPs should be involved in tracing and advising contacts of COVID-19 cases and these skills have been utilised by many countries when tackling the COVID-19 pandemic. After all, throughout the centuries one of the fundamental tasks of the EHO/EHP has been sampling and tracing contacts of those suspected

of or confirmed as having infectious diseases and ensuring the necessary precautions are taken.

As was set out in the 21st edition [1] environmental health is a

discipline that recognises the need for its practitioners to see things ‘in the round’, and where it is no longer acceptable to work or act without regard to the impact on all who might be affected by their actions or inactions.

This means that while seeking to protect and improve the health and well-being of others, practitioners need to seek a point of common understanding with those that may be responsible for compromising the health of others. So *there can be little doubt that this raises questions about the skills-set demanded of an EHP performing regulatory work today, even more so the practitioner who will be working in this field in five- or ten-years’ time.* As the President of NEHA said in 2016, *being an environmental health professional is a difficult and complicated career that has its rewards and satisfactions* [2].

This touches on the ethical dimension of environmental health practice and it cannot be ignored that any competent EHP must have regard to professional ethics, and this includes human rights.

The rest of the chapter looks at these matters in a little more detail, but it will be seen that ethics arise throughout, as that dictates how the skills, knowledge and competencies are used.

Ethics and environmental health

Ethics can be defined as the study of what is morally right and wrong or a set of beliefs about what is morally right and wrong. In the context of this book ethics is more the principle of moral conduct that makes a distinction between good and bad/evil, right and wrong, virtue and non-virtue. The word

ethics is derived from a Greek word ‘ethos’ meaning character. So as a general point it is a branch of knowledge that governs right and wrong conduct and behaviours of an individual, profession, group or organisation.

Environmental health practitioners, unlike medical practitioners with the Hippocratic Oath, do not have a universal code; however their professional bodies will or should have such codes (for example that of the CIEH Code of Ethics for members and fitness to practise⁴ and NEHA Code of Ethics for NEHA credentialed professionals⁵), yet their work has an ethical dimension, but practitioners are not always required to be a member of such professional bodies. Environmental health practitioners, whether members of professional bodies or not, do however have to make ethical decisions. For example, what should they do should Parliament pass a law that they are required to enforce but which will actually harm public health – say that smoking bans were reversed, or steps to improve air quality were reversed, or the government (local or national) has policies that condemn people to live in housing that harms their health? What if a policy to improve human health harms or depletes the natural environment with habitat or species loss? Korthals [3] has highlighted how many think that fast food outlets on the streets of cities and the advertising of and sponsorship by these chains contributes to increasing obesity and other diseases such as type two diabetes, cardiovascular disease and cancer of the intestines. *However, one of the most powerful food companies, thinks other-wise and acts accordingly.* As he says, *environmental risks to health are for the most part not equally distributed, so that rich people tend to live in healthier environments than do poor people.* So how should EHPs respond? Should they focus only on food hygiene, their traditional area of work, in such premises?

David E Riggs [2] has suggested that ethics is a set of values that guide the decisions of EHPs, influence actions and give purpose to the lives of EHPs. Professional and personal

ethics in environmental health practice are the cornerstones that help good decisions to be made on a daily basis which protect public health and promote the public's trust in our profession. Ethics not only guide *our decisions*, but they also help us navigate complex situations that have no easy or clear answers. So it is that the ethical professional should recognise that every decision or action might have significant consequences further down the line. In an *ever-changing profession, along with technical expertise, ethical behaviour is arguably the foundation of success personally and professionally*. Professional bodies should not only provide an ethical code (which should be applied as part of regulating membership) but also provide a means whereby members of the profession can raise issues particularly where there is concern that there is a conflict between an employer's or client's demands and their professional ethics.

The CIEH Code says it is based on four ethical principles, which constitute the main domains of responsibility within which ethical issues are considered; these are integrity, competence, responsibility and respect. As the Faculty of Public Health has said, *Public health is grounded in values and moral norms that guide decisions, behaviours, policy and practice. Ethics and law are accordingly core public health competencies for professional practice.*⁶ The Health Professions Council of South Africa⁷ says that the fundamental duty of EHPs is to serve humankind, to safeguard public health and to protect them against diseases.

This invariably affects the rights and interests of all the citizens. As a result, this compels them to conform to the basic principles of ethics such as honesty, trust, courtesy, fairness, transparency, promise keeping, respect for others and maintaining high integrity which serves as a moral compass.

This is also reflected in the 'objective' set out in the previous chapter.

It is perhaps also appropriate at this stage to consider some parts of the Universal Declaration of Human Rights as this provides a starting point for any EHPs, particularly those working for the state (nationally or locally) in a regulatory capacity.

The preamble says that *recognition of the inherent dignity and of the equal and inalienable rights of all members of the human family is the foundation of freedom, justice and peace in the world*. The preamble also says that it is essential, if man is not to be compelled to have recourse, as a last resort, to rebellion against tyranny and oppression, that human rights should be protected by the rule of law. Some relevant articles out of the 30 are set out next.

Article 1 says that *all human beings are born free and equal in dignity and rights. They are endowed with reason and conscience and should act towards one another in a spirit of brotherhood*.

Under Article 2 everyone is

entitled to all the rights and freedoms set forth in this Declaration, without distinction of any kind, such as race, colour, sex, language, religion, political or other opinion, national or social origin, property, birth or other status. Furthermore, no distinction shall be made on the basis of the political, jurisdictional or international status of the country or territory to which a person belongs, whether it be independent, trust, non-self-governing or under any other limitation of sovereignty.

Under Article 3 everyone has the right to life, liberty and the security of person, while Article 4 bans slavery. Under Article 5 no one should be subjected to torture or to cruel, inhuman or degrading treatment or punishment. Article 7 says that all are equal before the law and are entitled without any discrimination to equal protection of the law. All are entitled to equal protection against any discrimination in violation of this Declaration and against any incitement to such discrimination.

Article 10 requires that everyone is entitled *in full equality to a fair and public hearing by an independent and impartial tribunal, in the determination of his rights and obligations and of any criminal charge against him*. While Article 11 says that *everyone charged with an offence has the right to be presumed innocent until proved guilty according to law in a public trial at which he has had all the guarantees necessary for his defence*. Nor should anyone be held guilty of an offence on account of any act or omission which was not an offence when it was committed.

Under Article 12 no one shall be subjected to *arbitrary interference with their privacy, family, home or correspondence, nor to attacks upon their honour and reputation* and there is a right to the protection of the law against such interference or attacks.

Everyone has the right to freedom of movement and residence within the borders of each state as well as the right to leave any country including their own, and to return to their country under Article 13. While under Article 14 everyone has the right to seek and to enjoy in other countries asylum from persecution. Everyone has the right to a nationality, and no one shall be arbitrarily deprived of their nationality nor denied the right to change their nationality under Article 15.

Among other things Article 16 says the family is the natural and fundamental group unit of society and is entitled to protection by society and the state and in Article 17 along with the right to own property, no one shall be arbitrarily deprived of their property. Article 18 is about the right to freedom of thought, conscience and religion. While under Article 19 everyone has the right to freedom of opinion and expression.

Article 21 provides also that everyone has the right to equal access to public service in their country. Article 23 provides that everyone has the right to work, to free choice of employment, to just and favourable conditions of work and to protection against unemployment, to equal pay for equal work.

Article 25 provides that everyone has the right to a standard of living adequate for the health and well-being of themselves and of their family, including food, clothing, housing and medical care and necessary social services, and the right to security in the event of unemployment, sickness, disability, widowhood, old age or other lack of livelihood in circumstances beyond their control. While Article 26 provides that everyone has a right to education.

Resnick [4] has suggested not unreasonably that environmental health ethics issues range from local concerns, such as waste management and urban development and housing, to national ones, such as air and water quality, to global concerns, such as climate change and pandemics [4]. So the moral dilemmas related to environmental health ethics go beyond conflicts involving public health and protection of species, habitats or ecosystems. Furthermore, other values are in play, including respect for autonomy and human rights, social justice, economic development, animal welfare, sustainability and obligations to future generations.

This book aims to provide information relevant to the technical competence of EHPs as well as highlight policy and ethical issues. The rest of the chapter focusses on what various sources suggest makes a competent EHP.

The requirements for the environmental health practitioner

Although written some years ago the CIEH and then Health Development Agency prepared a strategic vision for environmental health in 2002 [5] and identified environmental health officers (practitioners) as having their prime focus on improving and maintaining health rather than curing illness, and as having a unique contribution to make to public health. This remains true and there are certain operational skills required and this book provides some pointers.

The use of problem-solving skills, supported by legal powers, to intervene in the causes of ill health in the home, workplace and community placed them in this unique role. There will inevitably be trade-offs between different risks and EHPs will have to reconcile different demands. The actions of EHPs can directly influence health determinants and maintain healthy environments for the benefit of both individuals and communities, while also extending to the protection of the environment for future generations. The functions and activities of a professional cadre of environmental health practitioners should not be dependent on or be dictated to by the legislation. Rather the starting point should be predominantly about identifying problems at the local level and using their powers available (both persuasive and legislative) to secure remedies and resolve issues. Although written in 2002 the vision for 2012 remains relevant in that EHPs should *also contribute to tackling public health issues at regional, national and international levels.*

Given the pressures on societies from infectious diseases, global heating and other risks to public health, the aim must be for environmental health practitioners to:

- Play lead roles in local government community health and well-being strategies and actively contribute to the public health agenda;
- Be key partners in protecting and improving the health and quality of life of individuals and communities and reducing health inequalities;
- Tackle the wider determinants of population health by identifying, controlling and preventing current and future risks from environmental stressors.

The personal characteristics of a competent EHP are summarised in Figure 2.1.

The introduction and Figure 2.1 set out the personal skills required of EHPs (EHOs). In the boxed text are the necessary operational skills.

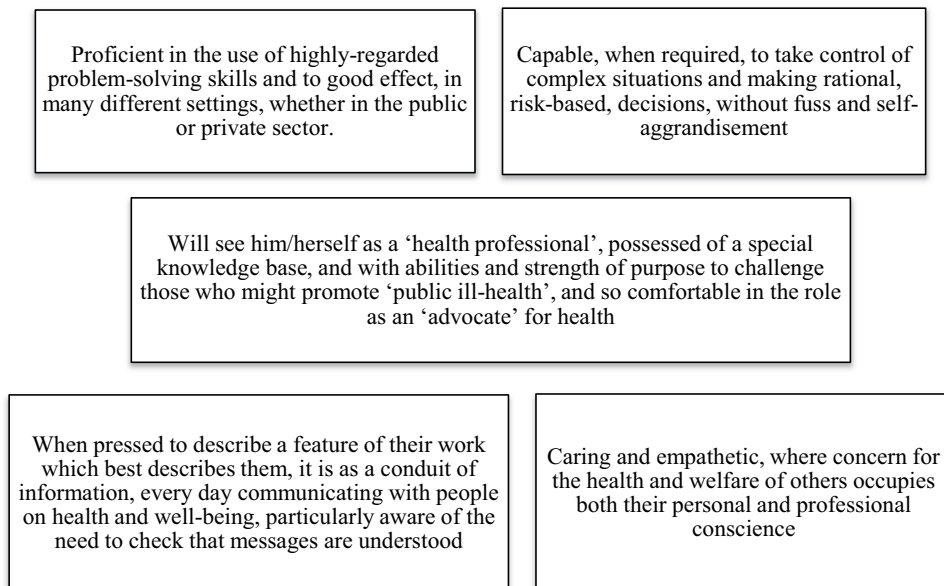


Figure 2.1 Personal characteristics of an EHP

The operational skills of environmental health practitioners can be set out as an ability to:

Assess – be aware of, and able to practise, those analytical skills that form the basis of professional judgement based on available evidence.

Consult – be aware of, and able to practise, the full range of techniques for giving and receiving information.

Advise – be able to communicate technically correct information for the purpose of informing colleagues, clients, communities and others of the most appropriate course of action to be taken in a wide range of circumstances.

Enforce effectively (be ‘smart’⁸ about enforcement) – be aware of, and be able to use, the full range of mechanisms available for securing compliance with legislative provisions, statutory requirements and standards and good practice, commensurate with the perceived level of risk – that include sorting the well-intentioned but ignorant non-compliant operation from the wilfully (whether knowledgeable or ignorant) non-compliant individual or organisation and be less concerned with the knowledgeable compliant.

Train/educate – be aware of and able to use a range of practical skills associated with education in an environmental health context for the purpose of:

Acquiring knowledge;

Raising public awareness (including with employers); and

Modifying behaviour to meet changing public health needs (including for example understanding and utilising the concept of social marketing).

Advocate – be able to support, promote and campaign on a range of issues to highlight environmental health issues and to address inequity in health.

Evaluate – be able to consider all aspects of an environmental health issue and be able to apportion values which can be supported and defended.

Research – be able to:

Discover, identify and use appropriate sources of information;

Critically assess options in day-to-day practice; and

Undertake a research exercise from planning to report stages.

Report – be willing to and able to write up and publish reports and reviewed papers on experiences, successes and failures from which other environmental health practitioners can learn.

The competent EHO can use the operational skills and competencies to assess and monitor environments; to identify and quantify risks; to determine the most appropriate intervention to be exercised in order to secure improvements in public health and address issues of health equity. As has been made clear enforcement of legislation is but one way of identifying and dealing with issues of public

health. The law can also underpin the power and authority of the environmental health practitioner, but it has to be understood and interpreted correctly in the light of reputable advice and cases. In order to undertake these tasks, the practitioner operates within a framework of professional attributes, ethics and an evidence base. The practitioner should also engage in ‘dynamic updating’ by taking

account of and working within relevant policies, current strategies and standards and be aware of current topics or issues and new health risks. Legislation can change as the result of political thinking and changes in political priorities, and indeed environmental stressors can change and additional stressors identified yet the need for good public health will remain. This requires the professional to read relevant journals and papers.

Competencies

As has been indicated already, practitioners contributing to environmental health can include more than those qualified as environmental practitioners. A report to the International Federation of Environmental Health Council, September 2010 [6] set out details

of more broadly drawn baseline competencies to be displayed and maintained by those working within environmental health practice, irrespective of their professional background. It argued that the issue was *competence* not *qualifications* is what matters and *competencies are the small building blocks of professional practice that contribute to the development of the capability in a practitioner to become competent*.

It endeavoured to reconcile the requirements for those with environmental health practitioner qualifications and those who are qualified in related fields but operate in the broader spectrum of environmental health practice. It also provided a set of higher-level discretionary competencies which could, additionally, be displayed as part of the environmental health professional profile. These remain valid.

Baseline competencies

Be able to identify and articulate the range of actual and potential biological, chemical, physical, social and psychosocial stressors that may adversely impact upon human health and the environment.

Be able to identify and articulate the points at which practitioners may intervene to prevent, control or mitigate the impact by applying the principles of risk management.

Be able to identify and articulate the most appropriate interventions, having regard to the evidence available, and taking into account such other political, financial and technological factors that are likely to influence the decision-making process.

Be able to communicate and engage with partner organisations, agencies, fellow professionals and others with whom appropriate intervention strategies might need to be formulated.

Be able to design and manage the implementation of appropriate interventions.

Be able to monitor, review and evaluate the effectiveness of the intervention strategy; altering or adapting it, where necessary, according to the actual or predicted outcome.

Be able to display transferable skills such as personal and organisational management, communication skills, project management and critical thinking.

Discretionary competencies

Design, develop and implement continuing education sessions for peers and other stakeholders on the success and challenges in delivering environmental health-related programmes.

Design, implement and evaluate quality assurance processes for all programmes, policies and best practice.

Advocate and implement practice policies, legislation and standards designed to improve current levels of protection to human health and the environment.

Be able to apply regulatory tools and enforcement options when non-compliance is observed.

Gather evidence for publication of novel research, and disseminate good practice.

Contribute to the development and actions of integrated multidisciplinary teams in pursuits of environmental health goals.

Support the integration of environmental health practice goals within other areas of related professional practice.

Monitor and review the effectiveness of the intervention strategy; altering or adapting it, where necessary, according to the actual or predicted outcome.

Be able to advise on the strategic consequences of the interventions that are proposed.

Provide direction and leadership to support individuals and teams to achieve their goals and work collaboratively.

All professionals working within environmental health practice should exhibit basic competencies. Discretionary competencies are more likely to be demonstrated by those who are working at a high level within the environmental health field. They are not essential to be recognised as working with an environmental health profile. Additional competencies can be included which relate to specific local, regional or national circumstances and these may be very different in differing countries and continents (e.g. interventions dealing with impact of extreme heat or cold). These are summarised in the following boxed text.

At the risk of further repetition, it should be recognised that EHPs/EHOs are part of the public health workforce. This was highlighted in England in what Public Health England set out in the Public Health Skills and Knowledge Framework⁹ and [7]. The framework provides an architecture to describe generic activities undertaken by the public health workforce and is presented as a hierarchy of functions. Public health functions are described in areas of activities: A – Technical; B – Contextual; and C – Delivery. The Function level of the

framework describes a group of skills, for example C1 provides leadership to drive improvement in health outcomes and the reduction of health inequalities and then has sub-functions carried out across the public health workforce. The sub-functions describe the activity that is attributable to an individual in their role (e.g. A2.5 – design and/or implement sustainable and multi-faceted programmes interventions or services to address complex problems; or B3.3 – commission and/or provide services and interventions in ways that involve end users and support community interests to achieve equitable person-centred delivery). Those sub-functions relevant to EHOs are set out in Figure 2.2.

That EHPs or EHOs are part of the public health workforce is also exemplified by the WHO-ASPHER Competency Framework for the Public Health Workforce in the European Region. The WHO-ASPHER Competency Framework is intended to support the implementation of the European Programme of Work 2020–2025 (EPW) – United action for better health in Europe and the pursuit of Sustainable Development Goals, in particular Sustainable Development Goal Three on

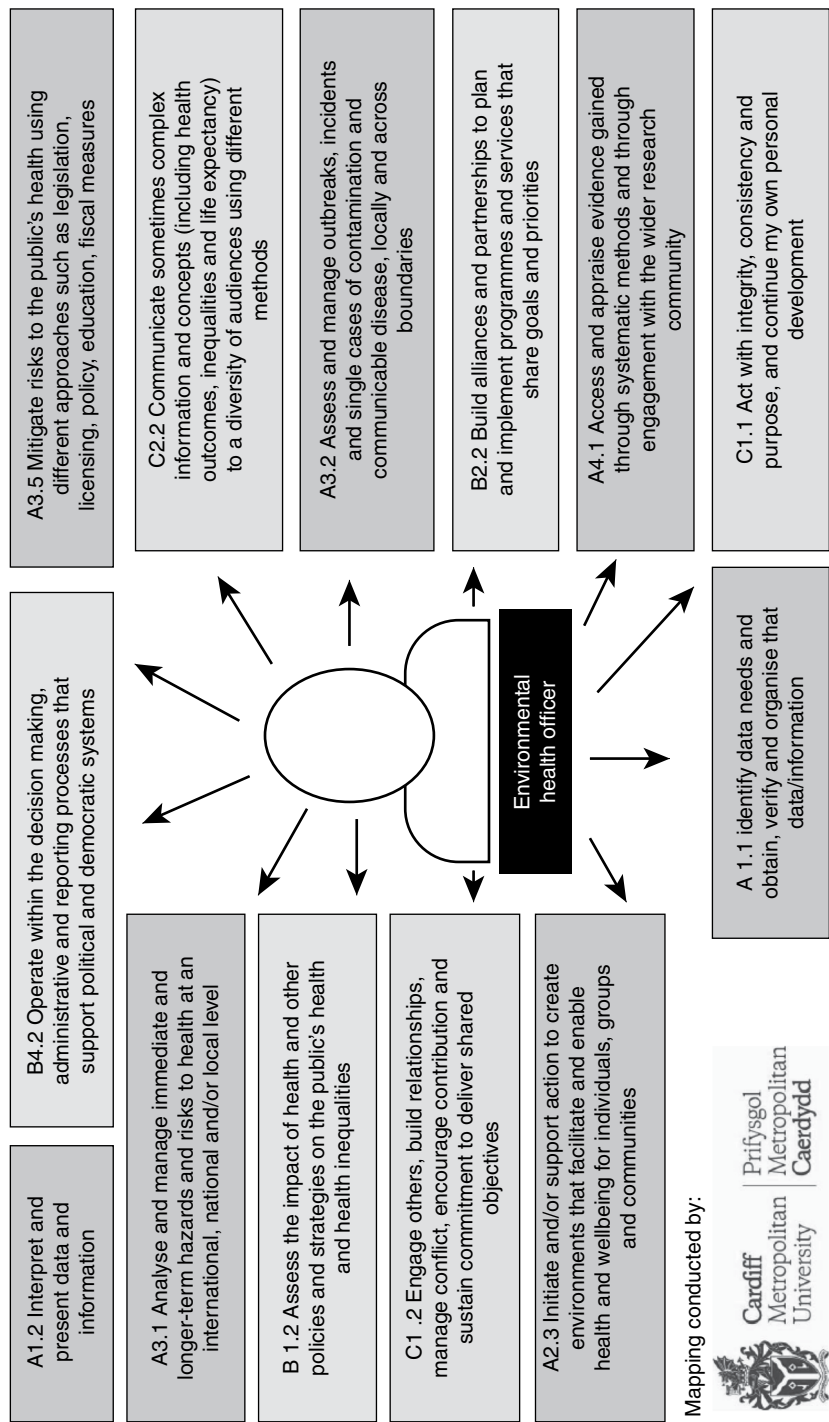


Figure 2.2 The requirements of the EHO as set out in the Good Public Health Practice Framework Use Guide [7]

universal health coverage [8]. Interestingly this framework

responds to a need to move beyond professional silos and adopt a broader understanding of public health professionals based on inclusive knowledge and shared experience. The health needs of the population, not the interests of the profession, form the point of departure for all the efforts to professionalize public health.

It refers also to the Essential Public Health Operations (EPHOs) to deliver public health services [8–9] (see Figure 2.3).

The EPHOs are as follows:

- EPHO 1 Surveillance of population health and well-being
- EPHO 2 Monitoring and response to health hazards and emergencies

- EPHO 3 Health protection including environmental occupation, food safety and others
- EPHO 4 Health promotion including action to address social determinants and health inequity
- EPHO 5 Disease prevention including early detection of illness
- EPHO 6 Assuring governance for health and well-being
- EPHO 7 Assuring a sufficient and competent public health workforce
- EPHO 8 Assuring sustainable organisational structures and financing
- EPHO 9 Advocacy, communication and social mobilisation for health
- EPHO 10 Advancing public health research to inform policy and practice

It is also worth reiterating what was quoted in the 21st edition from Professor George Morris and Ruth Robertson who said in their report commissioned by the Royal

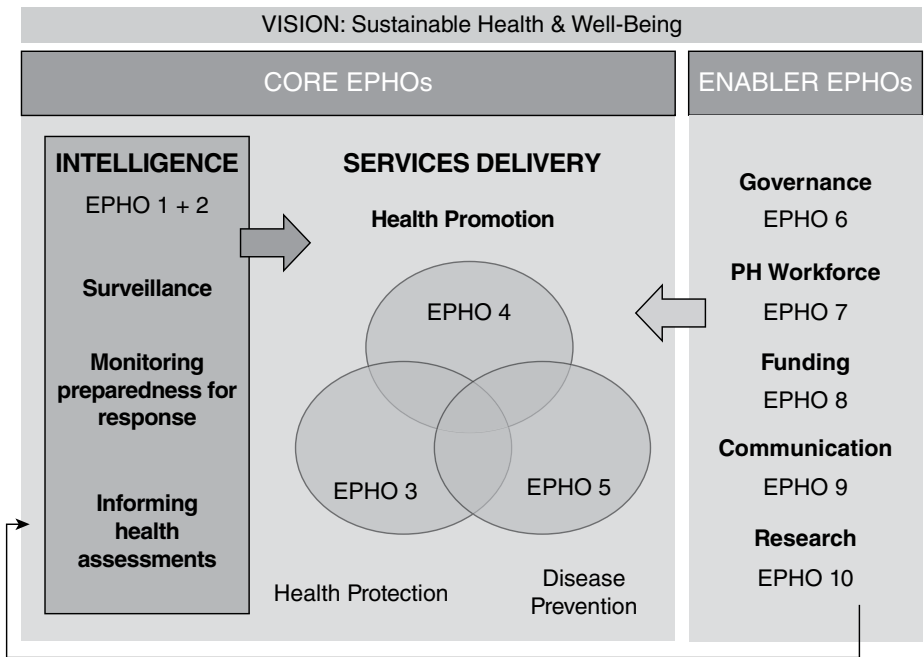


Figure 2.3 Clustering of Essential Public Health Operations (EPHOs) – to deliver public health services [9]

Environmental Health Institute of Scotland as long ago as November 2003:

the profession undoubtedly faces its own challenge, which can be seen as having two primary elements. One is about the need to re-energize a beleaguered profession, to propel it from its current dependent, reactive state to rival the most effective of modern professions. The second, and inter-related element is about rediscovering effectiveness as a force in public health. Much of the profession's task is about seeing the world in a quite different way. There is a need to create a clear statement of identity and to nurture the skills and maturity to work effectively in the new networks forming at local level to address the Health Improvement Challenge.

[10]

These challenges remain as can be illustrated by the varied deployment and work of EHPs in the COVID-19 pandemic around the world.

The challenges of both resources and identity are forcing both academic organisations and professional bodies alike to fundamentally rethink how to plan to produce the next generation of practitioners and support the development of the existing cadre. However, it has to be said that EHPs, as individuals, have to demonstrate their essential contribution to both safeguarding and improving public health. It may be that they act at the individual case level, such as an individual business, or dwelling but collectively they can contribute effectively when forming alliances and networks. As a joint report from a number of agencies said in 2020 in the context of the COVID-19 pandemic a good Local Outbreak Plan and contact tracing system will be led by public health, working as a *system within the local system* and in particular *the local environmental health function will be an equally crucial part of the public health core capability in the application of their capabilities and expertise* [11].

In Australia in 2009 the final report of enHealth, 'Environmental Health Officer Skills, Knowledge and Experience Workforce Project' [12], was published and shows many similarities with what has already been considered earlier.¹⁰ This project was established and managed by the Victorian Department of Human Services (DHS) on behalf of the Environmental Health Committee and already introduced to the reader in the essay at the end of Chapter 1. Its purpose was to develop a skills and knowledge matrix that could underpin a national approach to managing environmental health workforce issues. Identifying the skills and knowledge to undertake environmental health roles was seen as a first step towards delivering a sustainable level of environmental workforce capability. It includes a description of the whole EHO role, not a specific EHO job; a statement of common EHO skills and knowledge; a statement of a minimum level of EHO skills and knowledge to perform the role competently; a statement of skills and knowledge required regardless of whether this is attained through formal education, training and/or experience; a description of skills and knowledge directly related to the environmental health role; and support for emerging roles based on reported developments in the field (anticipating developments in the role in the short to medium term). The document sets out in some detail the necessary underpinning skills and knowledge required of an EHP (EHO). A separate part then sets out in further detail the applied skills and knowledge required of EHPs (EHOs). Readers interested in the full document should use the web address given. As an example, Figure 2.4 sets out the applied skills and knowledge in the context of prevention and control of notifiable and communicable conditions. The document recognises that requirements can vary slightly between different states and in this example the optional skills relate to Queensland (Qld) and the ability to conduct facility audits.

Communication	Risk management	Administering and reporting
• Provide information and advice to businesses and the public on public and environmental health issues, preventative strategies, risk management and outbreak management • Communicate information on nature and level of public and environmental health risk • Apply interpersonal skills to interview people about issues which may be personal and sensitive • Develop and implement health promotion campaigns • Provide information, advice and training to a range of stakeholder groups on the prevention and control of communicable diseases • Apply mediation skills to facilitate agreements and resolve conflict (e.g. with neighbouring properties)	• Apply research skills (e.g. to assess public and environmental health status, identify health trends and establish priorities) • Design studies to investigate public and environmental health risk levels and conduct investigations associated with notifiable and communicable conditions • Identify common types, symptoms and control measures for diseases that are: – Waterborne – Blood borne – Zoonotic – Vectors – Other infectious diseases • Apply understanding of typical facilities, equipment and processes or procedures to identify public and environmental health risks (e.g. associated with cooling towers, personal service businesses, brothels, cemeteries, crematoriums and mortuaries, human parasites, pests, animals and birds) • Apply general principles of disinfection, sterilisation, sanitation and infection control to assess or determine action required to eliminate, reduce or control public health risks related to communicable disease • Assess options and adequacy of mitigation measures • Design and implement studies, policies and programs to minimise risk (e.g. immunisation programmes) • Identify, assess and manage personal OHS and safety of others	• Contribute to/lead planning processes (e.g. disease control, environmental health plans, environmental impact plans) • Develop quality assurance plans to ensure delivery of quality service (e.g. to manage quality assurance related to vaccination programmes) • Maintain and evaluate public and environmental health records and databases • Administer issuing of licences, legal notices, orders and fines • Liaise with and report to partner agencies/ departments involved in communicable disease control and management to improve and protect public and environmental health • Manage/participate in investigations and related processes associated with notifiable diseases (e.g. contact tracing)

Optional

Specific to EHOs in some jurisdictions:

- Conduct facility audits (specific to Qld EHOs)

Figure 2.4 Applied skills and knowledge: prevention and control of notifiable and communicable conditions [12]

A profile of the environmental health officer as set out by the World Health Organization

We have considered the skills and competencies necessary and later will discuss some routes to qualification, but here the profile of an environmental health practitioner is considered, setting out what can be expected of a competent environmental health officer wherever in the world they are working. Some years back the CIEH designed a profile in order to produce practitioners capable of applying their core knowledge, skills and competencies; although this has been supplanted by a new approach (the professional standards framework) this profile of the EHP as set out in Figure 2.5 has some relevance, and it is useful to compare this with what was produced previously by the WHO.

A consultation by the WHO on the Role, Functions and Training Requirements of

Environmental Health Officers (Sanitarians) in Europe in 1978, concluded:

Experience of those countries in the Region which have officers with specialized training in environmental health who are recognized as constituting a specific profession clearly demonstrates their value. Thus, it would be to the advantage of all Member states to introduce into their environmental health service staff of this kind whom the consultation called in English, environmental health officers.

That conclusion was followed by a further series of considerations by the WHO, one of which looked at the development of environmental health ‘manpower’ [13], and as well as addressing governments, it contained a professional profile of the environmental health officer and given the nature of environmental health still has relevance in the 21st century.

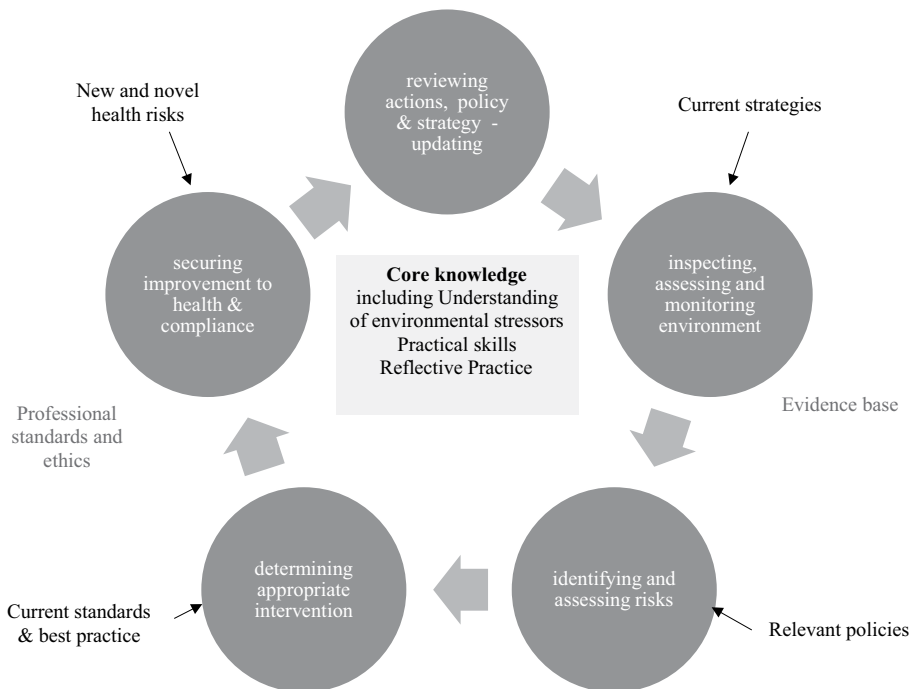


Figure 2.5 Profile of the EHP (as adapted from CIEH)

- 1 The EHO is concerned with administration, inspection, education and regulations in respect of environmental health (as defined in Chapter 1).
- 2 The numbers of EHOs should be sufficient to exercise adequate surveillance over health-related environmental conditions and monitoring activities. They must have a close association with the people in their area and be accessible to them. They should be members of multidisciplinary primary healthcare teams delivering comprehensive healthcare at community level.
- 3 EHOs act as public arbiters of environmental health standards, maintaining close contact with the community. They must at all times be aware of the general environmental circumstances in the areas or districts in which they work, and must know what industrial hazards to health may arise there and what resources are available in the event of an emergency.
- 4 These are professional officers capable of developing professional standards and applying them to their own work in relation to that of non-professionals involved in environmental health linking with a range of other professionals such as physicians, veterinarians, toxicologists, engineers, nurses and other specialists.
- 5 A vital function is to maintain effective liaisons with other professional officers who have a contribution to make in the promotion of environmental health in the different settings.
- 6 EHOs carry out the well-established duties of sanitarians/sanitary inspectors, including inspection of housing and food hygiene, and monitoring and controlling new hazards which could harm the health of a community.
- 7 Greater emphasis should be placed on the preventive role of EHOs in relation to environmental hazards to health.
- 8 While not having expertise of other specialists such as veterinarians, toxicologists and microbiologists they will have sufficient background and practical knowledge to understand the principles underlying the work of these others and may develop some specialist expertise. They will be able to work easily with the other professionals. Their wider experience should enable them to formulate an approach on a broader base, to contribute to the decisions to be made, or to make these decisions alone in cases where they have the necessary authority.
- 9 They should be able to plan and co-ordinate activities between different professional disciplines, official agencies and authorities. They need to have continuing links with other professionals involved in environmental and health-related work. The other professionals with whom liaisons will be appropriate include physicians, physicists, microbiologists, chemists, civil/building/sanitary engineers, veterinarians and lawyers.
- 10 In some countries and situations, the environmental health officers will initiate the collaboration; in others, they will provide the information and advice that are sought. This liaison role will extend beyond the other professionals to technicians and a range of other specialists, including those concerned with the public health laboratory services. While being able to act independently in both advisory and enforcement capacities, exercising self-reliance and initiative, they should also be able to function as members of a team with other professionals in implementing environmental health programmes.
- 11 In industry and commerce, environmental control specialists interpret legislation, promote and maintain standards, and solve the problems that may come to light through,

for example, a system of internal control or 'self-inspection' (e.g. via self-regulation or earned autonomy).

- 12 An important part of their functions must be to acquaint themselves with actual or potential environmental hazards and to ensure that appropriate action is taken to deal with them, for example, to safeguard the public from the hazards associated with microbiological contamination of food and with chemical residues in food substances, and to monitor and control potential and existing environmental hazards, with the backing of strong legislation.
- 13 A combination of training in public health and toxicology should enable them to cope with such problems as soil pollution due to degradation-resistant agricultural pesticides, leachates from industrial wastes, fallout from the plumes of chemical works, liquid radioactive wastes from industry and research; chemical pollution of the work environment from solvents and from dust arising from processes using silica, asbestos and lead; pollution of the home environment due to such products as cosmetics, detergents, paints, pesticides and gas used as fuel; heavy contamination of water resources by mercury, antimony, barium, cobalt and other metals due to industrial wastes, pesticides used in agriculture, etc.; and new problems in food safety such as the irradiation of food.
- 14 Environmental health officers in the public service should have the following basic functions:
 - a Improving human health and protecting it from environmental hazards
 - b Enforcing environmental legislation
 - c Developing liaisons between the inhabitants and the local authority, and between the local and higher levels of administration
 - d Acting independently to provide advice on environmental matters
 - e Initiating and implementing health education programmes to promote an understanding of environmental principles
- 15 Because of the range of functions, EHOs may operate in a managerial capacity and in collaboration with other environmental agencies and services. Increasing complexities of environmental health problems require a continuing development of expertise and an updating of knowledge. EHOs must be in a position to respond to challenges presented by new hazards in the environment, and exercise influence in promoting and regulating environmental health activities. Their training should equip them with the necessary expertise to act at any level – national, provincial (or intermediate) or local – or within any sector, private or public.

EHOs/EHPs are usually trained as generalists across the range of basic environmental health activities. This means they should be able to see problems in context and utilise that breadth of knowledge to resolve the problems identified. There will be occasions when they will need to consult other professional officers, and to make use of laboratory and other expert scientific services. A vital part of their functions will, therefore, be to maintain effective liaisons with other relevant professional officers who have a contribution to make in the promotion of environmental health. Environmental health is very much a team concept, and this must be recognised in any organisational arrangement.

The professional profile of the environmental health officer in the above boxed text summarises what was in that WHO document [13] and also addresses issues that governments should take into account.

Point 2 in the boxed text on the numbers of EHOs does not define what would be sufficient. It is hard to find any recommendation on the number per 1000 population but the World Bank reported in 2019 that the UK had 7.86 nurses per 1000 population, Ireland had 11.61, and Australia 11.64.¹¹ WHO reported that in 1997 the UK had 14,439 Environmental and Occupational Health and Hygiene Personnel (not just EHOs) – for a population of 58.24 million a ratio of 24.8 per 100,000 population.¹²

In a rare example of the availability of data in 2020, in South Australia with a population of 1.677 million according to Data SA, local councils had 97 full-time and 85 part-time EHO posts (although some might be working for more than one council so could be double counted). This equates to more than ten EHOs per 100,000 population). This perhaps reflects the geography of the state but is probably a greater ratio than in England where the workforce survey of 2014/15 [14] indicated a ratio of about eight per 100,000. The most recent CIEH survey covering England [15] indicates that at 2020 the ratio was six fully qualified EHO/EHP employed for every 100,000 population¹³ (assuming the upper figure for the estimated FTEs) and four out of five local authorities are using agency staff to cover environmental health work. These figures are indicative only as the two reports used different methods. It does also have to be recognised that there are now a substantial number of environmental health practitioners in practise outside local government and who are working to protect public health.

It is not only a matter of numbers but how competent EHPs and their skills are utilised. In the context of the COVID-19 pandemic this was considered by Day [16]. It has also been reported that in England some local

authorities had few if any qualified EHPs undertaking housing inspections, what should be one of the core areas of work of the EHP [17]. As the CIEH reports also [15] around eight out of ten local authority EHPs were redeployed in response to the pandemic.

This issue of the professional profile was further explored in a subsequent WHO document in the Environmental Health Services in Europe series [18]. This publication also points out that in a survey of professions involved in ‘environmental health services’ they had found 31 categories of professionals involved in environmental health-related areas from a sample of 26 countries, although not all categories were found in every state. At the same time, it is said that many of the professionals listed might not consider themselves as environmental health professionals nor would they describe the organisations in which they work as ‘environmental health services’. This does show the inter-sectoral and interdisciplinary nature of environmental health and just why environmental health practitioners at whom this book is aimed need to be able to work with other professionals (as pointed out in 8 in the boxed text earlier).

Qualifying and appointment as an EHO or EHP

Around the world the route to qualification varies although there are great similarities too and no doubt changes will continue in response to the needs of different societies. We look briefly at the approaches to qualifying in a number of different countries. For more detail readers should consult the relevant professional bodies.

England, Wales and Northern Ireland

The Environmental Health Registration Board (EHRB) issued Certificates of Registration to those persons who had successfully completed an approved course of study in the

subject of environmental health that includes an accredited academic course of study, work-based experiential learning and professional examinations. The EHRB and the CIEH agreed on changes to the way that qualification as an Environmental Health Practitioner (EHP) will be recognised in future (and the following paragraphs reflect that) and it was proposed to close the EHRB. However, in view of the general response to this proposal further changes are likely, and this closure was put on hold pending an announcement in autumn 2021. The main argument with the Chartered Programme (the initial alternative to EHRB registration) was that it was too long at two years and that people could choose to demonstrate their competence in the workplace in a minimum of two subdisciplines, rather than all five of them. There was also an argument that there needed to be some independent registration system outside the membership structures of the CIEH as the EHRB had originally included other 'non-institution' stakeholders.

As a result, the stated aim of the CIEH has been firstly to produce an accessible learning Portfolio that can be completed in an environmental health workplace context in 6–12 months. So that completing an accredited environmental health degree, the EHP Portfolio and the Professional Discussion (a face-to-face oral assessment carried out by two assessors via teleconference) will lead to Registration as an Environmental Health Practitioner with CIEH.

It has been announced¹⁴ that a candidate who completes this pathway will become a Registered EHP with CIEH. This means a person would have to complete an accredited BSc or MSc in Environmental Health (including the practical food ID exam), demonstrate their knowledge in practice through an approved assessment such as the EHP Portfolio and Professional Discussion and commit to maintaining their competence through CPD and adhering to the CIEH Code of Ethics and fitness to practise rules. A criticism of the EHRB was the lack of a mechanism

to remove a practitioner from the EHRB register for any reason, including serious misconduct even if they could be removed from CIEH membership for breaching the Code of Ethics.

Continuing professional registration under the new system will be tied to CIEH membership. From September 2021 there will be three registers on the CIEH website:

- A Register of Chartered Environmental Health Practitioners;
- A Register of Environmental Health Practitioners;
- A Register of Food Safety Practitioners.

These registers will be linked to the CIEH membership database that can be updated automatically. Practitioners will be added to the registers on qualification and removed as appropriate. When the closure of EHRB has been completed, the CIEH will be publishing its registers on their website as a permanent record. These Registers will be open to the public, updated in real time, and therefore dynamic, as status changes, determined by completion of CPD and adherence to the Code of Ethics. This is a departure from (improvement upon) the EHRB Register which was an unchanging 'permanent record', and therefore not a reliable way of verifying someone's currency and suitability to practise as an EHP. Existing EHRB registrants will not be required to join the CIEH registers, but there will be a simple process for this should they wish to do so.

At the time of writing the different membership grades (see later) have different requirements, and the recent focus has been on the Chartered Environmental Health Practitioner Programme, a two-year, practice-based route to Chartered Status built on the CIEH Professional Standards. This may well be changing with the move towards registration and the Chartered Programme may well be reviewed.

The CIEH Professional Standards which define what is expected of environmental

health practitioners who exist *to improve and protect people's health, safety and well-being by securing safer, cleaner and healthier environments (or aspire to do so)*. The Standards apply to EHPs, Chartered EHPs and others and include commitments, behaviours, skills and technical expertise. The Standards reflect the CIEHs' desire to capture the common attributes of a diverse group of professionals, working in different disciplines, roles and sectors, showcasing what it means to be an environmental health professional (as opposed to the traditional EHO-only organisation). The Standards facilitate professional development, learning and progression and ultimately uphold and improve standards within environmental health for public protection.

Thus, the aspiring Chartered practitioner has to hold either the Member (MCIEH) or Fellowship (FCEIH) grade; hold a CIEH accredited qualification in environmental health at a minimum of level 6; be practising in an environmental health setting; and have a statement of employer support when applying to join the two-year programme. For those environmental health practitioners who have held the Environmental Health Registration Board (EHRB) Certification of Registration there is a one-year conversion programme enabling practitioners to achieve Chartered Status through the completion of specific elements of the full programme. Applicants have to pay a fee to join either programme.

All members have to meet the requirements on Continuous Professional Development (CPD). There are four grades of membership: Affiliate, Associate (who has Level 3 [or higher] qualification related to environmental health; or a minimum of two years' relevant practice in an associated role), Member (who has a Level 4 qualification and at least five years' experience in environmental health; or a Level 6 qualification and is currently working in environmental health; or ten years' relevant practice in any area of environmental health) and Fellow (who has at least five years' practice in the Member grade plus a CIEH accredited

degree [or the diploma which preceded it]; or at least ten years' practice in the Member grade plus a relevant Level 6 qualification). At least 20 hours a year of CPD is required for all grades apart from Associates where that is ten hours (there is no CPD requirement for Affiliates). However, for 'Chartered' practitioners there is a requirement for 30 hours CPD to be completed annually.

The CIEH Professional Standards define what is expected of EHPs who improve and protect people's health, safety and well-being by securing safer, cleaner and healthier environments (or aspire to do so). See Figure 2.6 [19] for how the CIEH saw the requirements for an EHP.¹⁵ It can be seen how it reflects some of the matters discussed previously.

The CIEH has also supported a group of employers who with some academics have developed an apprenticeship standard as a route to qualification.¹⁶ This is being actively promoted. An apprenticeship in environmental health is seen as an alternative route towards becoming a competent and qualified Environmental Health Practitioner (EHP). Unlike a traditional degree course, an apprenticeship works by combining study and work to provide both practical experience and academic knowledge of the subject. The Environmental Health Practitioners BSc Apprenticeship (currently only available in England) lasts for four years, and on completion the apprentice will gain a degree-level qualification and the Environmental Health apprenticeship certificate from the Institute for Apprenticeships and Technical Education.¹⁷ For apprentices this provides a more accessible pathway into the profession and ideal for those who would not be able to afford university fees. The academic fees are covered by government funding, while apprentices are also paid a salary by their employer for the duration of their apprenticeship.

Scotland

Here the Royal Environmental Health Institute of Scotland (REHIS) has a system more

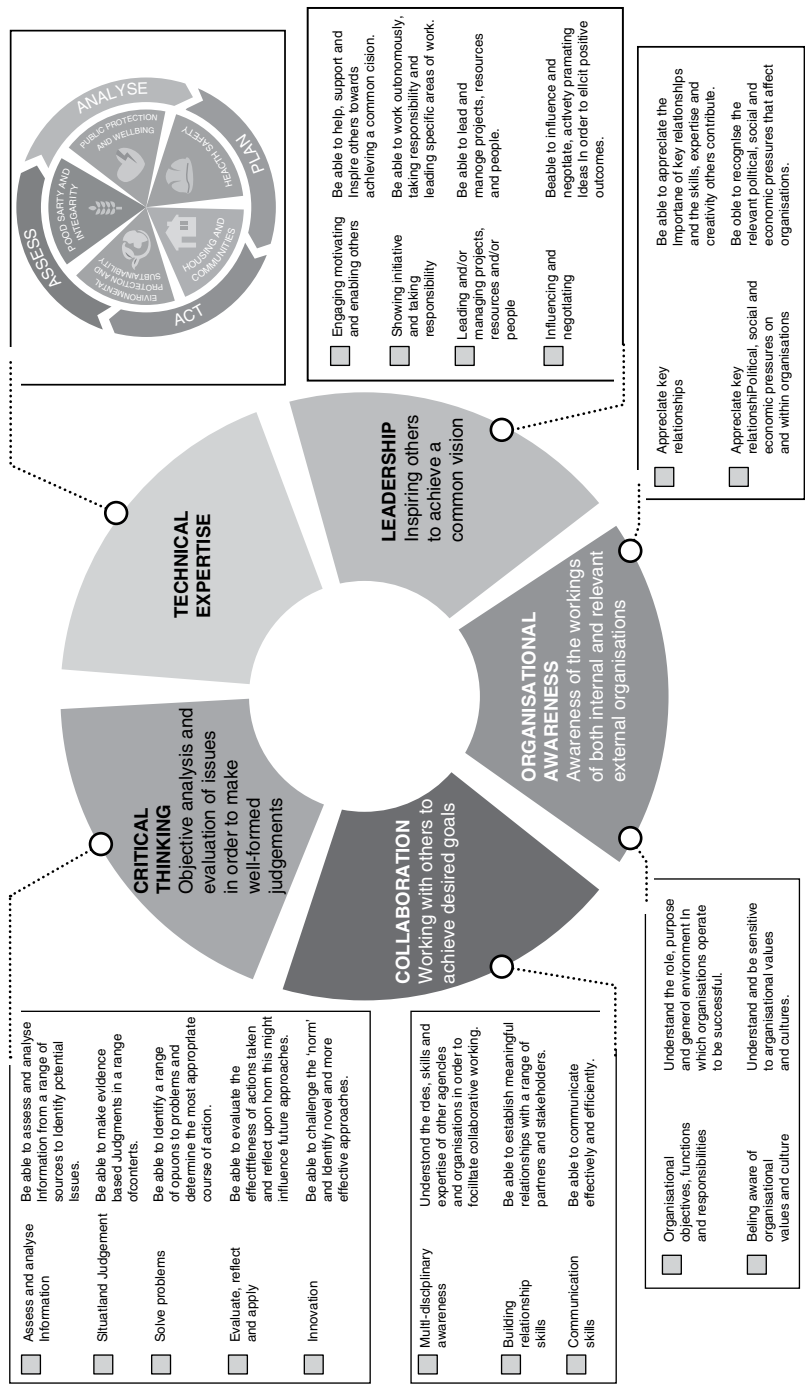


Figure 2.6 Professional commitment and professional behaviours (CIEH) [19]

like it used to be previously in other parts of the UK (and is not related to membership status). It says that qualifying as an EHO in Scotland requires academic study and structured professional practice training. The academic study involves acceptance onto a REHIS-accredited MSc or BSc (Hons) Environmental Health degree course and satisfactory completion. Structured professional practice training must also be undertaken. The REHIS Scheme of Professional Practice requires the completion of a Portfolio through learning in a relevant work environment. This can be undertaken through a formal training placement with a local authority or by gaining experience learning from a number of relevant organisations. It may be possible to carry out the training in vacation periods throughout the course of academic study (integrated training) or defer all training until the completion of academic study (end-on training).

Candidates must register with REHIS at the commencement of the professional practice and a Portfolio has to be developed in accordance with the requirements set out in the Scheme of Professional Practice. The Portfolio will be assessed prior to the Professional Examination. After obtaining the degree in environmental health and successfully completing the Portfolio candidates are required to pass the Professional Examination which assesses professional competence in each of the programme areas. On passing the Professional Examination, the REHIS Diploma in Environmental Health, the qualification required to become an Environmental Health Officer, will be awarded.

REHIS says it is the only organisation in the world which can confer the title 'Chartered Environmental Health Officer'. Chartered Status is the highest possible professional status and recognises an individual's professional qualifications, training, experience within, and commitment to, environmental health practice. For comparison members of the CIEH can attain *Chartered Status* and use the post-nominals of *CEnvH* as they will not necessarily be 'officers'.

All members of REHIS can achieve and maintain Chartered Status subject to complying with the Institute's Scheme of CPD for a minimum continuous three-year period. In addition, members must also comply with the Institute's regulations governing professional conduct and discipline.

All applications from EHOs who qualified outside Scotland will be assessed on an individual basis. The Institute provides advice for EHOs who qualified:

- In England, Wales and Northern Ireland;
- In the European Union or in Norway, Iceland, Liechtenstein and Switzerland;
- Overseas (other than in the European Union or in Norway, Iceland, Liechtenstein and Switzerland).

The Institute has had a reciprocal agreement with the Chartered Institute of Environmental Health (CIEH), and any EHO who holds the CIEH/EHRB Certificate of Registration may automatically and without assessment work in that capacity in Scotland. The Institute currently also has mutual recognition with the Republic of Ireland and recognises the Irish Environmental Health Officer qualification. EHOs from countries outside the UK, and this includes the Republic of Ireland, are required to have their qualifications assessed by this Institute before they can work as an EHO in Scotland. However, as Tom Bell, then Secretary of REHIS wrote in the Spring 2020 edition of *Environmental Health Scotland* (the REHIS Journal)¹⁸ the system now in England, Wales and Northern Ireland is for aspiring environmental health practitioners to meet the membership-based criteria of the CIEH's Chartered Environmental Health Practitioner Programme/Professional Standards Framework (as set out previously). He wrote the *Environmental Health Registration Board's (EHRB's) Certificate of Registration and the Institute's Diploma in Environmental Health* have long been the point at which broad equivalence and reciprocity have been established. The

difficulty for REHIS was that the proposal to abolish the EHRB by the CIEH meant an 'on qualification' reciprocity could no longer be established. At the time of writing the CIEH has announced that its Board took the decision in September 2020 to delay the closure of EHRB, pending a review. The CIEH set up a project which will see the introduction of *a new modernised registration process replacing the existing EHRB registration scheme and underpinning Chartered Status as the ultimate symbol of professionalism*. The project announced a new system from September 2021 (see above).

REHIS is a UK Competent Authority under Regulation 4 of the European Communities (Recognition of Professional Qualifications) Regulations 2007 for the professional titles 'Environmental Health Officer' and 'Chartered Environmental Health Officer'. The situation after the end of the transition period when the UK has left the EU is unclear. At the time of writing anyone wishing to have their qualifications assessed with the intention of working in Scotland will have to submit the following documentation to allow an evaluation of the qualification to be undertaken.

- A copy of the applicant's birth certificate;
- A copy of any degree (or equivalent) certificate from the relevant educational institute along with full details of the syllabus of the course of education and training which has been undertaken;
- A copy of any professional qualification certificate and/or any documentation which indicates the qualification entitles the applicant to practise as an environmental health officer in the country where they qualified including details of the type of training practice undertaken;
- Details of which organisation, if any, provided and supervised any training practice;
- Evidence of post-qualification professional experience;
- Documentation which provides evidence of nationality/citizenship.

Ireland

Ireland is somewhat different in that an Environmental Health Officer is a regulated profession, one where access to or practice of a profession is restricted to those who meet the professional qualifications required by law and the Department of Health is the Competent Authority for the validation of qualifications for EHOs. The minimum approved academic qualifications necessary for appointment as an Environmental Health Officer in the publicly funded health sector are a BSc. (Environmental Health) Level 8 – Dublin Institute of Technology; or a BSc. degree Level 8 – University of Dublin and a Diploma in Environmental Health – Dublin Institute of Technology; or a Diploma in Health Inspection awarded prior to 10th December 1982 and recognised by the Minister for Health or a non-Irish professional qualification in Environmental Health, recognised by the Minister for Health. Becoming qualified as an Environmental Health Officer in Ireland involves both the academic study and practical training.

Healthcare professionals including EHOs with foreign qualifications who have not completed the validation process may not work in the Irish publicly funded health sector. If a person has EHO qualification from outside the Republic of Ireland, it must be recognised under Directive 2005/36/EC for eligibility to be employed as an Environmental Health Officer in Ireland. Directive 2005/36/EC applies to European Economic Area (EEA) nationals with EEA qualifications who wish to practise a regulated profession in an EEA member state other than that in which they obtained their professional qualifications, on either a self-employed or employed basis.

Its intention is to make it easier for qualified professionals to practise their professions in European countries other than their own. Public health and safety and consumer protection are seen as being safeguarded through the qualification recognition process.