



2019

Richard and Hinda Rosenthal Symposium

Behaviour change to improve health for all



Key messages

17 January 2019

The Academy of Medical Sciences

The Academy of Medical Sciences is the independent body in the UK representing the diversity of medical science. Our mission is to promote medical science and its translation into benefits for society. The Academy's elected Fellows are the United Kingdom's leading medical scientists from hospitals, academia, industry and the public service. We work with them to promote excellence, influence policy to improve health and wealth, nurture the next generation of medical researchers, link academia, industry and the NHS, seize international opportunities and encourage dialogue about the medical sciences.

Opinions expressed in this report do not necessarily represent the views of all participants at the event, the Academy of Medical Sciences, or its Fellows.

All web references were accessed in March 2019.

This work is © Academy of Medical Sciences and is licensed under Creative Commons Attribution 4.0 International.

2019 Richard & Hinda Rosenthal Symposium

Behaviour change to improve health for all
17 January 2019

Contents

Welcome from the co-Chairs	4
Key messages.....	6
Behaviour and health: keynote reflections.....	15
Event summary.....	17

Welcome from the co-Chairs

The underlying drivers and solutions for some of the most intractable public health challenges are not only biological in nature but also have a behavioural component - examples include overconsumption of food and alcohol, obesity, and tobacco and drug use.



During the last few decades, we have advanced our understanding of brain neurobiology and the epidemiology of behaviour-related morbidity and mortality. We have progressed in what we know about the mechanisms of potential risk and protective factors that underly various health behaviours, and the social, economic, cultural and environmental conditions that influence these behaviours.

Despite these advances, it often remains a challenge to translate emerging knowledge and evidence into complex, real-life settings— particularly at the scale needed to change behaviour across entire populations. Health disparities between people with different socioeconomic, ethnic and racial backgrounds remain common and a cause for concern. Many nations still struggle with increased rates of obesity and poor health that stem from health-related behaviours, such as smoking. Many of these behaviours, and their associated consequences, remain socially patterned.

It is therefore vital that we continue to ask why we have not observed more significant progress towards tackling public health challenges, and how we can better reduce health inequalities.

We are delighted to have co-Chaired this event on '*Behaviour change to improve health for all*' to address these questions, organised by the UK Academy of Medical Sciences and the U.S. National Academy of Medicine under the banner of the 2019 Richard and Hinda Rosenthal Symposium. Through the generosity of the Richard & Hinda Rosenthal Foundation, the National Academy of Medicine hosts an annual discussion series to bring greater attention to critical health policy issues.

Through the day's presentations and discussions, we heard from a diverse range of scientists about cutting-edge research on the neurobiology of behaviour and decision-making. We are delighted that participants acknowledged the immense potential of basic research to inform the development and implementation of effective interventions to improve health and health equity.

We were encouraged that, by reflecting on examples of successful interventions, participants identified key principles to guide the implementation and evaluation of emerging research in a more effective manner. The potential for emerging technologies and complex system approaches to more efficiently harness health data and better inform policy also indicate an exciting future for the science of behaviour change.

It is our ambition that this key messages report, and other associated outputs, will help foster greater discussions and collaborations between scientists and policymakers interested in behaviour change. We believe that by working together, we can positively influence behaviour-related health challenges and improve health for all.



Dr Alan Leshner
Chief Executive Officer Emeritus
American Association for the Advancement of Science (AAAS)

Professor Dame Theresa Marteau DBE FMedSci
Director of Behaviour and Health Research Unit
University of Cambridge

Key messages

"The single most important intervention for changing behaviour is to understand that there is no single most important intervention¹"

The symposium provided an opportunity for participants to consider a wide array of evidence, examples and perspectives about the potential for future research and interventions to influence dynamic and sustained behavioural change. In particular, it explored how this may be applied to critical public health challenges such as smoking, obesity and substance abuse—and the acute and chronic conditions that may result. During the course of the workshop, certain key ideas were often referenced in different ways. Some of these guiding principles and important take home messages are summarised below.

- **Advances in neurobiology can unlock new approaches to behaviour change**
- **Altering our environment can improve population health and reduce health inequalities**
- **A stronger evidence base and novel research models are key for future interventions**
- **Understanding how systems might respond to population-level interventions can help us predict their impact**
- **Emerging technology paves the way for future approaches in behavioural science**



Speakers and co-Chairs at the symposium

¹ Professor Dame Theresa Marteau paraphrases Professor Harry Rutter. Rutter H, et al (2012). *The single most important intervention to tackle obesity...*, Int J Public Health, 57(4): 657-658. DOI: 10.1007/s00038-012-0385-6

Exploring the symposium's key messages

We know that lifestyle change can have an enormous impact on organic disease processes. The US Diabetes Prevention Programme has shown that a weight loss intervention involving diet changes and physical activity is more effective at preventing the development of type 2 diabetes than the drug metformin. Overall, lifestyle interventions can reduce type 2 diabetes by 58% or more².

Typically, people are aware of the principles of healthy behaviour, including being mindful of their diet, getting enough exercise and avoiding harmful habits such as smoking. Understanding how their thoughts, attitudes and environments influence the way they put this knowledge into practice can support us to develop interventions that work. Importantly, it can also support public health and healthcare professionals to deliver interventions in more effective and equitable ways.

Advances in neurobiology can unlock new approaches to behaviour change

Complex connections coordinate related brain functions to shape each of our actions or decisions. To improve existing and develop new interventions, it is key to understand specific neurobiological mechanisms and how these pathways function as a network in the brain.

New research is demonstrating how conscious processes can influence wide aspects of our decision-making, including our health choices. If we reflect on the healthiness of foods before making a food choice, it becomes more likely that we will pick a healthier option³. However we know, as addressed by Professor Dame Theresa Marteau in her keynote speech, that it can be problematic to rely on conscious processes to change behaviour in a meaningful way over time.



Panel discussion. Left to right: Professor Huda Akil, Professor Todd Hare and Professor Marcus Munafò

Stress disrupts connections between the emotion and self-control centres of the brain³, making it harder to make healthy choices, while addiction and dependency can detrimentally affect how we process the emotional content of health warnings⁴. This not only reminds us that the brain operates as a network, but shows that people with different lived experiences make health decisions under different internal conditions. Research and interventions must account for this to develop effective interventions.

Providing simpler instructions for conscious processes, such as making diet or lifestyle improvements, can equip people for higher rates of success in behaviour change. So can seizing the moment – signing patients up to weight loss classes during a GP appointment can support them to lose twice as much weight as providing passive health advice⁵. Helping patients to make different choices *right now* is more likely to put them on a path to tangible lifestyle change.

² Diabetes Prevention Program Research Group (2002). *Reduction in the Incidence of Type 2 Diabetes with Lifestyle Intervention or Metformin*, NEJM, 346:393-403. DOI: 10.1056/NEJMoa012512

³ Maier SU et al (2015). *Acute Stress Impairs Self-Control in Goal-Directed Choice by Altering Multiple Functional Connections within the Brain's Decision Circuits*, Neuron, 87(3): 621-631. DOI: 10.1016/j.neuron.2015.07.005

⁴ Stothart G et al (2016). *Neural correlates of cigarette health warning avoidance among smokers*, Drug and Alcohol Dependence, 161: 155-62. DOI: 10.1016/j.drugalcdep.2016.01.025

⁵ Aveyard P et al (2016). *Screening and brief intervention for obesity in primary care: a parallel, two-arm, randomised trial*, Lancet, 388(10059):2492-2500. DOI: 10.1016/S0140-6736(16)31893-1

As well as showing that immediate, practical steps to initiate behaviour change can reap great benefits, this also shows the value of interventions that lift the onus placed on individuals to manage their own health choices. Conscious behaviour change processes rely on motivation, whereas interventions that skew the choices available to people so that they are supported to make healthier decisions – known as ‘low-agency’ interventions – are often more effective.

Altering our environment can improve population health and reduce health inequalities

When making decisions, we are unconsciously influenced by social and environmental cues that we absorb from our surroundings. The price of unhealthy foods affect how likely we are to buy them and even the shape of our glass can influence how quickly we will consume alcoholic drinks⁶. This extends to our formative development. A person’s health decisions are affected and reinforced by their surroundings, available resources and support, which may compound existing health inequalities. For example, we see that children living in neighbourhoods with higher violent crime rates show lower functional connectivity in the brain’s central executive network (which controls our behaviour) than children living in less violent neighbourhoods of the same city⁷.

Recognising the impact of a person’s environment on their brain biology also reveals opportunities for individual interventions. For example, programmes to support central executive network functions in at-risk young people have been shown to improve their physical health over the long-term⁸. People’s decision-making environment can also be changed through policies that target behaviour on a population-level, which aim to equitably improve health for everyone in an area regardless of their individual risk of developing a health problem.



Audience questions. Centre: Dr Victor Dzau.

Changing environments at the population level can improve health equity as it does not rely on individuals’ ability to engage with an intervention for them reap its benefits. People’s health behaviours are shaped by commercial influences, such as advertising, and their social circumstances including their cultural background and friendship circle. Some people do not have easy access to health systems, are subject to financial constraints, or have not had the educational opportunities to support informed health choices.

Interventions delivered to whole populations help to alleviate the impact of these factors. The symposium discussed key principles to cultivate behaviour change

at the population level. This demands a systems approach incorporating policy, economics, environment, social influences, behaviour and physiology. In addition to addressing the risks with a high population burden first (i.e. the causes of chronic disease) and favouring low-agency interventions, policies should act on upstream levers with the potential to reset the whole system.

Examples of this include supplementing common necessities for health benefit, such as adding fluoride to water to prevent tooth decay or fortifying flour with folic acid. Interventions may also restrict risk behaviours, such as bans on smoking in public spaces, or indirectly discourage them

⁶ Attwood AS et al (2012). *Glass Shape Influences Consumption Rate for Alcoholic Beverages*, PLOS One, 7(8): e43007. DOI: 10.1371/journal.pone.0043007

⁷ Miller GE et al (2018). *Functional connectivity in central executive network protects youth against cardiometabolic risks linked with neighborhood violence*, PNAS, 115(47): 12063-12068. DOI: 10.1073/pnas.1810067115

⁸ Chen E et al (2018). *Unsupportive parenting moderates the effects of family psychosocial intervention on metabolic syndrome in African American youth*, Intl Obesity, 42: 634-630. DOI: 10.1038/ijo.2017.246

by placing conditions on the sale, price or advertising of unhealthy products. This can be seen in measures like minimum alcohol unit pricing and taxes on unhealthy food like sugary drinks.

A stronger evidence base and novel research models are key for future interventions

Currently, many behaviour change interventions do not benefit from a strong empirical evidence base. Fewer still have been proven to be cost-effective. Assessing the impact of population-level interventions is a challenge in the experimental setting due to the scale of these initiatives. Often, there is a preference to conduct research that involves a conservative time and resource commitment, meaning the evidence base tends towards individual-level interventions. Fast, familiar research models are attractive, but may not produce the best solutions.



Panel discussion. Left to right: Professor Martin White, Professor Felicia Hill Briggs, Professor Paul Aveyard, Professor Marlene Schwartz

Acknowledging the complexity of behaviour-driven public health problems and collaborating with public and private partners for population research will be key to expanding the available evidence. Carefully considering what real-world questions a study might address and using research methods that will produce results that are relevant to policymakers can also help scientists to maximise the impact of their research. Models for 'strategic science' have been developed to support this approach, such as Roberto and Brownwell have developed for eating disorders research⁹.

Understanding how systems might respond to population-level interventions can help us predict their impact

Effective behavioural interventions are frequently not complicated in their design. However, these interventions aim to address highly complex problems. Health issues like obesity and excessive drug and alcohol use are impacted by a sophisticated interplay of socioeconomic, cultural, behavioural, biological and environmental factors. Since these health issues are multifactorial, a 'single cause-single effect' approach is not sufficient to develop successful policy.

These health problems also exist in a complex system. In the real world, economies and communities adapt to public health policies. This may lead to the desired outcome, but may equally cause a complex response that could undermine the intended impact of the new policy and make it difficult to measure. For example, a tax on unhealthy foodstuffs might lead to the positive outcome of manufacturers reformulating their products. However, conversely retailers may increase their marketing investment or there may be resistance from public interest groups.

Co-design approaches to policy can solve part of this problem. Engaging interested public and private sector organisations in research can help develop sustainable incentives, financial and business models for delivering public health benefits. Collaboration can also create public health learning systems for the future. Through partnering across sectors, policies may be underpinned by stronger infrastructures, supported through implementation and robustly evaluated to facilitate future improvements.

⁹ Roberto C, Brownwell KD (2017). *Strategic science for eating disorders research and policy impact*, Int J Eat Disord, 50: 312-214. DOI: 10.1002/eat.22678

Emerging technology paves the way for future approaches in behavioural science

Technology offers a new and rapidly developing world of treatment options across medicine, including in behavioural science. For example, wearable technology can increase individual user awareness of their health behaviours through digital feedback, while gamified therapies increase patient adherence through boosting motivation. Adaptable digital interventions promise global reach and access as they may be delivered remotely. The internet also makes an enormous amount of information and advice about health behaviours widely available across many resource settings. However, this may vary in quality and reliability, making it a challenge for the public to access and use effectively.

In a fast-changing digital landscape, it will be important to keep health technologies up-to-date through iterative design, revisiting and refining them with close collaboration between researchers, health services, digital developers and end-users. Involving end-users will help to ensure outputs are accessible, attractive and meaningful to the population intended to benefit from them.

Technology is also revolutionising how we gather, analyse and interpret health data and even test new public health strategies. There are data that could help us to design better interventions and predict the real-world impacts of different interventions. However, often these are difficult to analyse effectively and so poorly utilised. With advances in artificial intelligence (AI), researchers are developing means to better access the learning these data can provide. Through machine learning and rule-based algorithms, ontological programmes can identify connections between diverse data to not only extract and synthesise, but also interpret relevant information – as seen in the Human Behaviour-Change Project¹⁰. This can be applied on such a scale as to identify and answer new questions for research through data analysis, potentially changing the face of behavioural science research and policy design.



Computer simulations can also allow us to test proposed policies before investing time and resources in bringing them to fruition. Modelling systems such as the Virtual Population Obesity Prevention^{11, 12, 13, 14} tool (VPOP) now allow us to run impact simulations in major U.S. cities. Such tools are likely to become crucial to our understanding of factors that underpin public health epidemics, and how we can resolve them.

Panel discussion. Left to right: Professor Susan Michie and Professor Lucy Yardley

¹⁰ www.humanbehaviourchange.org

¹¹ <http://www.globalobesity.org/our-projects/virtual-population-obesity-prevention/index.html>

¹² Lee BY et al (2018). *Simulating the Impact of Sugar-Sweetened Beverage Warning Labels in Three Cities*, Am J Prev Med, 54(2): 197-204. DOI: 10.1016/j.amepre.2017.11.003

¹³ Lee BY et al (2017). *Modeling The Economic And Health Impact Of Increasing Children's Physical Activity In The United States*, Health Aff (Millwood), 36(5): 902-908. 10.1377/hlthaff.2016.1315.

¹⁴ <https://www.forbes.com/sites/brucelee/2019/05/15/what-is-multi-scale-modeling-how-can-it-help-your-health/#4453fadf4e48>

Behaviour and health: keynote reflections

The four behaviours that contribute most to poor health, health inequalities, and premature – and preventable – deaths across the globe are smoking, excessive food consumption, alcohol, and a lack of physical activity^{15,16}.

Efforts to shift these behaviours across entire populations aim to improve health and narrow health inequalities seen between people of different socioeconomic and cultural backgrounds.

Yet, changing behaviour at the population level is not a simple endeavour. A myriad of factors influence individual decisions about personal behaviours, as well as how populations will respond at a system-level. Moreover, the prevalence of health-related behaviours and their associated poor health outcomes continue to vary by demography and geography. Despite growing evidence for and understanding of behaviour change interventions, substantial questions remain around why we have not observed more significant improvements in behaviour-related public health challenges.

Broadly, interventions to change behaviour can target two overlapping processes involved in the regulation of behaviours: (1) a conscious, or thinking, process, and (2) a non-conscious process that is based factors including routine, habits, emotions and influence from our environment.

Approaches that aim to influence conscious processes commonly rely on educating people about the risks of engaging in a particular activity to persuade a person to change their behaviours to reduce that particular risk. Specific examples include providing personalised risk profiles based on genetics or using other biological biomarkers to help people prevent specific health conditions through behaviour change.

However, such approaches in isolation typically do not produce the type of sustained behaviour change necessary to improve health over the lifespan, especially at the population level.

This may be because the risk information does not communicate an immediate, certain, and severe outcome. The risks associated with unhealthy behaviours, such as smoking and overeating, are less certain. Their impacts vary from person to person and can develop over time. Interventions that provide information about these types risks ask people to weigh immediate pleasure against the 'threat' of an uncertain risk, which may not be sufficient to substantially modify their behaviour.

In addition to our conscious decision-making processes, numerous cues in our physical, social, digital, and economic environments also help shape our behaviours by influencing non-conscious processes.

¹⁵ Steel N, et al (2018). *Changes in health in the countries of the UK and 150 English Local Authority areas 1990–2016: a systematic analysis for the Global Burden of Disease Study 2016*, The Lancet, 392: 1647-61. DOI: 10.1016/S0140-6736(18)32207-4

¹⁶ Chetty R, et al (2016). The Association Between Income and Life Expectancy in the United States, 2001–2014, JAMA, 315(12): 1750-66. DOI: 10.1001/jama.2016.4226



Professor Dame Theresa Marteau

"This is an opportunity for all involved to consider new collaborations across disciplines"

Interventions targeting these external cues are, on average, more successful in changing health-related behaviour than those that rely on eliciting a conscious effort.

For example, altering aspects of the physical environment, such as reducing the sizes of pre-packaged food and changing where unhealthy products are positioned in a supermarket, can help change health-related behaviour at the population-level. A 2015 Cochrane Review of 72 randomised controlled trials (RCTs) found that efforts to reduce the size of larger portions, packaging, and tableware could reduce the consumption of a UK adult by 12 – 16%, or by 279 calories a day¹⁷.

If interventions and policy continue to build on our growing understanding of the basic mechanisms and neurobiological processes that underlie decision making, we can continue to optimise beneficial behaviour change at the individual- and population-level.

The 2019 Richard and Hinda Rosenthal Symposium allowed participants to explore these areas through three interactive sessions.

Session 1 provided an opportunity to explore emerging evidence about how the basic neurobiology of behaviour might reveal new targets for interventions to improve health.

Session 2 focused on the different ways in which such evidence can be in real-world settings and at scale. Importantly, this session also focused on how this can be done in a way that promotes health equity, and which recognises the potentially competing priorities of commercial organisations and industry.

Session 3, the final session, was concerned with the potential value, and limitations, of innovative approaches to tackling public health concerns through complex system approaches and emerging technologies.

¹⁷ Hollands GJ, et al (2015). *Portion, package or tableware size for changing selection and consumption of food, alcohol and tobacco*. Cochrane Database of Systematic Reviews, 9. DOI: 10.1002/14651858.CD011045.pub2

Event summary

Over three sessions, the symposium focused on how cutting-edge science and expanding knowledge about the factors that influence decision-making can lead to more effective interventions and policies to improve health and health equity across diverse populations.



This document provides an overview of the key messages to emerge from the event. Short summaries of each of the sessions and videos of the presentations are also available online¹⁸.

*The audience at the symposium.
Left to right: Dr Victor Dzau, Sir
Professor Robert Lechler and Professor
Barbara Sahakian.*

The full agenda is provided in **Annex 1**.

The Academy of Medical Sciences and the U.S National Academy of Medicine are most grateful to the Steering Committee for their work towards the development of this symposium. Details of the Steering Committee members are provided in **Annex 2**.

This document reflects the views expressed by participants at the meeting but does not necessarily represent the views of all participants, all members of the Steering Committee, the Academy of Medical Sciences or the U.S. National Academy of Medicine.

¹⁸ www.acmedsci.ac.uk/LINKTOROSENTHAL

Annex 1: Agenda

09.15 – 09.45	Registration
09.45 – 10.00	Welcome <ul style="list-style-type: none"> • Professor Sir Robert Lechler PMedSci, President, UK Academy of Medical Sciences • Professor Victor J. Dzau, President, US National Academy of Medicine
10.00 – 10.15	Introduction and keynote <ul style="list-style-type: none"> • Chair: Professor Alan Leshner, Chief Executive Officer Emeritus, American Association for the Advancement of Science (AAAS) • Keynote: Professor Dame Theresa Marteau DBE FMedSci, Director of the Behaviour and Health Research Unit, University of Cambridge
Session 1: The neurobiology of behaviour, and what drives individual choices Chair: Professor Huda Akil , Gardner Quarten Distinguished University Professor of Neuroscience and Psychiatry and Co-Director, The Molecular & Behavioral Neuroscience Institute, University of Michigan <ul style="list-style-type: none"> • How can an understanding of the basic neural mechanisms of behaviour (drawing on both animal and human studies) reveal targets for interventions to improve health? • Can experiments that examine the neural circuitry that underlies existing interventions explain their efficacy and suggest ways to improve them? • Do different unhealthy behaviours, such as overconsumption of ultra-processed foods and smoking, involve different neural circuits in a way that suggest different types of interventions? 	
10.15 – 10.35	Keynote presentation <ul style="list-style-type: none"> • Professor Todd Hare, Associate Professor of Neuroeconomics and Human Development, University of Zurich
10.35 – 10.45	Targeting neurobiological mechanisms of tobacco and alcohol use <ul style="list-style-type: none"> • Professor Marcus Munafò, Professor of Biological Psychology, University of Bristol
10.45 – 10.55	Leveraging the neural basis of cognitive, emotional, and behavioural dysfunction <ul style="list-style-type: none"> • Professor Barbara Sahakian FBA FMedSci, Professor of Clinical Neuropsychology, University of Cambridge
10.55 – 11.05	Healthy development for children, and policy opportunities for intervention <ul style="list-style-type: none"> • Professor Greg Miller, Louis W. Menk Professor, Institute for Policy Research and Department of Psychology, and co-Director of Foundations of Health Research Center, Northwestern University
11.05 - 12.00	Discussion
12.00 - 13.00	Lunch break
Session 2: Behavioural science approaches to effective population-level interventions that improve health equity Chair: Dr Robb Rutledge , Principal Research Associate, Max Planck UCL Centre for Computational Psychiatry and Ageing Research, University College London <ul style="list-style-type: none"> • Where have interventions and policies in the physical, social, and/or economic environments had the most success in changing behaviour across populations to reduce health inequity? • What are the biggest challenges and research gaps? • Are there lessons from effective interventions that can be applied to tackle public health challenges like obesity, alcohol and drug use? 	

13.00 – 13.10	Population approaches to equitable behaviour change intervention <ul style="list-style-type: none"> • Professor Martin White, Programme Lead for Dietary Public Health Research, Centre for Diet and Activity Research (CEDAR), MRC Epidemiology Unit, University of Cambridge
13.10 – 13.20	Behavioural interventions for smoking and obesity <ul style="list-style-type: none"> • Professor Paul Aveyard, Professor of Behavioural Medicine, University of Oxford
13.20 - 13.30	Improving health and equity in diabetes and cardiovascular disease <ul style="list-style-type: none"> • Professor Felicia Hill-Briggs, Professor of Medicine and Senior Director of Population Health Research and Development, Johns Hopkins University and Medicine; Immediate Past President, American Diabetes Association
13.30 – 13.40	Translating evidence into policy <ul style="list-style-type: none"> • Professor Marlene Schwartz, Professor of Human Development and Family Studies, University of Connecticut; Director, Rudd Center for Food Policy & Obesity
13.40 – 14.30	Discussion
14.30 – 15.00	Refreshment break
Session 3: Complex System Approaches and Emerging Technologies to improve health through behaviour change Chair: Professor Harry Rutter , Professor of Global Public Health, University of Bath An opportunity to discuss the potential value, and limitations, of innovative approaches to tackling public health concerns through complex system approaches and emerging technologies.	
15.00 – 15.10	Introduction to complex system approaches <ul style="list-style-type: none"> • Professor Harry Rutter, Professor of Global Public Health, University of Bath
15.10 – 15.20	Application of digital technologies to change behaviour (<i>Presentation not given as speaker unable to attend</i>) <ul style="list-style-type: none"> • Dr Wendy Nilsen, Program Director, Smart and Connected Health, National Science Foundation
15.20 – 15.30	Mathematical and computational modelling of complex systems and the potential to change behaviour around obesity (or other public health challenges) and outcomes in the future <ul style="list-style-type: none"> • Professor Bruce Y. Lee, Associate Professor of International Health, Johns Hopkins Bloomberg School of Public Health; Executive Director, Global Obesity Prevention Center, Johns Hopkins
15.30 – 15.40	Revolutionising evidence synthesis and use: the Human Behaviour-Change Project <ul style="list-style-type: none"> • Professor Susan Michie FMedSci, Professor of Health Psychology, Director of the Centre for Behaviour Change, University College London
15.40 – 15.50	The future of digital public health <ul style="list-style-type: none"> • Professor Lucy Yardley, Professor of Health Psychology, Centre for Applications of Health Psychology, University of Southampton and School of Experimental Psychology, University of Bristol
15.50 – 16.30	Discussion
16.30 – 16.50	Conclusions <ul style="list-style-type: none"> • Professor Alan Leshner, Chief Executive Officer Emeritus, American Association for the advancement of Science (AAAS) • Professor Dame Theresa Marteau DBE FMedSci, Director of the Behaviour and Health Research Unit, University of Cambridge
16.50 – 17.00	Close <ul style="list-style-type: none"> • Professor Dame Anne Johnson FMedSci, Vice-President International, UK Academy of Medical Sciences

Annex 2: Steering committee

The U.S. National Academy of Medicine and the UK Academy of Medical Sciences are most grateful to The Hinda and Richard Rosenthal Foundation for its continued support of this symposium, and to the steering committee who have guided its aims and agenda:

- **Dr Alan I. Leshner** (Co-Chair), CEO Emeritus, American Association for the Advancement of Science (AAAS)
- **Professor Dame Theresa Marteau DBE FMedSci** (Co-Chair), Director of Behaviour and Health Research Unit, University of Cambridge and Director of Studies for Psychological and Behavioural Science, Christ's College, University of Cambridge
- **Professor Nancy E. Adler**, Professor of Medical Psychology, Departments of Psychiatry and Pediatrics, and Director, Center for Health and Community, University of California
- **Professor Huda Akil**, Gardner Quarten Distinguished University Professor of Neuroscience and Psychiatry and Co-Director, The Molecular & Behavioral Neuroscience Institute, University of Michigan
- **Dr Robb Rutledge**, Principal Research Associate, Max Planck UCL Centre for Computational Psychiatry and Ageing Research, University College London
- **Professor Harry Rutter**, Professor of Global Public Health, University of Bath