

Sustained behaviour change is key to preventing and tackling future pandemics

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Investment in research and programmes to discover and apply principles underpinning sustained behaviour change are needed to address the continuing threat from COVID-19 and future pandemics and will require collaboration between behavioural, social, biomedical, public health and clinical scientists.

Main:

Human behaviour was instrumental in causing Covid-19, and changing it has been vital to tackling the pandemic. Countries that have done best in mitigating Covid-19's harms to health and to their economies have rapidly and successfully persuaded their populations to enact large-scale behaviour change. Some of these interventions have been highly effective; others less so, and some have produced substantial social and financial harm. In particular, national 'lockdowns' have been effective in keeping people from interacting to reduce the spread of disease¹, but they have been highly damaging to people's lives and to national economies. Therefore, lockdowns should ideally only be used to bring transmission levels low enough to be controllable using other policies. These policies include adequate 'Find, Test, Trace, Isolate and Support' (FTTIS) systems², borders controls and quarantine to prevent reseeding infections, creating safe working, domestic and transport spaces, and promoting personal protective behaviours such as use of face coverings³.

Capability, opportunity and motivation

Large-scale, sustained behaviour change is required to reduce the risk of, and prepare for, future pandemics⁴. The pandemic has shown that populations will adopt at least some of the required behaviours under certain conditions⁵. However, adoption has been variable across countries, over time and across social groups⁵.

Achieving sustained behaviour change requires a sound understanding by policymakers and intervention designers of what underpins the behaviours concerned. For example, what does it take in all cultures to ensure that, where appropriate, people keep safe physical distances from each other, wear face coverings masks and disinfect their hands? What is needed to ensure that adequate ventilation is provided in enclosed spaces, and that people in high-risk settings use personal protective equipment effectively?

Important behavioural targets for prevention and mitigation of pandemics such as Covid-19 are listed in table 1. The behaviours vary in what is required to enact them and the contextual influences on them.

A simple, comprehensive way of understanding behaviour is through the Capability-Opportunity-Motivation-Behaviour model (COM-B; Figure 1).^{6,7} This model takes as premise that for any behaviour to occur, people have to have: the relevant physical and psychological capabilities; the opportunity; and to be more motivated to perform that behaviour than anything else they could be doing at the time. Capability and opportunity feed into motivation so that having greater capability and opportunity can increase motivation (Figure 1). Behaviour then feeds back, and so changing behaviour can, in turn, influence capability, opportunity and/or motivation. Thus, behaviour is part of an evolving and interacting system. Creating sustained behaviour change requires changes to capability, opportunity and motivation that are mutually reinforcing.

Physical capabilities include strength, stamina, and physical and psychomotor skills while psychological capabilities include knowledge, resilience, and mental skills. Motivation comprises both reflective processes such as self-conscious decision making as well as automatic processes involving emotions and habits. Opportunity involves having the resources, time, and physical space to enact a behaviour. It also involves having social structures, norms and cues that make the behaviour possible or promote it. The World Health Organization has used the COM-B model to make recommendations for improving adherence to rules and guidance on Covid-19 protective behaviours⁸.

Requirements for behaviour change

Developing effective interventions requires an understanding of what changes in capability, motivation or opportunity, or their combination will drive behaviour change. Getting the balance wrong can be disastrous. For example, in 2020 the UK Government largely failed in its attempts to get people with Covid-19 to self-isolate when needed in part because it did not heed this lesson. Survey data showed that fewer than 50% of people with Covid-19 symptoms reported staying at home for the required isolation period.⁹ Failure to self-isolate appeared largely to be driven by financial need or domestic or caring responsibilities, i.e., a lack of opportunity.⁹ People on low incomes were just as motivated to self-isolate when needed as those with more financial resources but did so less¹⁰. Those who found it easiest to isolate were those who could work from large homes and had the funds to order in meals and other services. Adequate financial and practical support should have been a key part of the solution and it has been a cornerstone of effective pandemic control in many countries, with up to 100% of lost wages being reimbursed and free alternative accommodation and daily visits. In the US, introduction in some jurisdictions of emergency statutory entitlement to sick leave for people with symptoms or who had to quarantine was found to be effective in reducing cases.¹¹

The UK Government appeared to have erroneously assumed that the primary reason for people not isolating was a lack of motivation, whereas it was instead a lack of opportunity. It threatened a £10,000 fine for individuals for failing to comply with isolation mandates. An evaluation of free, mass testing in the city of Liverpool found take up of tests amongst disadvantaged groups to be as low as 4% in some areas¹² and a £36 billion Test-Trace-Isolate system was estimated only to reach as few as 3% of contacts of people who had tested positive for Covid-19.¹³ It seems that the threat of a large monetary fine did have a motivational influence, but the opposite of that intended with the best way of avoiding a fine being to avoid a test.

The Behaviour Change Wheel

The UK case study described above illustrates the fact that in order for mass behavioral changes to achieve their intended outcome, systematic approaches to move from an understanding of

behaviour in its context will be critical to identifying interventions and policies that can change it. One such framework is the Behaviour Change Wheel, developed by integrating 19 frameworks identified in a literature review.^{7,14,15} The Behaviour Change Wheel can be used to link the COM-B model with nine possible types of intervention and seven policy options for implementation. Intervention designers can use the Behaviour Change Wheel to identify intervention types most likely to achieve the desired change and can then choose the most appropriate mix of implementation options given whatever constraints may be operating.

Use of the Behaviour Change Wheel framework can be illustrated by the challenge of getting healthcare staff to adhere to infection prevention and control guidelines. Houghton et al¹⁶ identified a range of interventions that could be effective, but it was important to go further and consider the capability, opportunity and motivation issues that needed to be addressed in a given context. First, in terms of capability there was the nature of the guidelines, how they were communicated and what training was required. Secondly, when it came to opportunity it was essential to consider the physical spaces the staff work in and the support they received from managers¹⁶. Thirdly, with regard to motivation, it was important that staff had trust in their personal protective equipment and that these were comfortable to use as required. Finally, to fully address the capability, opportunity and motivational issues it was essential to include all staff, including support staff, in the process of intervention development and implementation.¹⁵ It further illustrated the need to treat all the actors and behaviours in a given scenario as part of an interconnected system and pointed to workplace culture as an important influence, specifically managerial and peer support, social norms solidarity and a focus on safety rather than complacency¹⁶.

Leadership, trust, and solidarity

When it comes to motivation to adhere to stringent pandemic control regulations, variation of practice across different countries has highlighted the importance of good leadership fostering public trust in government and experts, and a sense of solidarity.¹⁷ Trust derives from authorities being seen as part of and serving the community¹⁸, and this in turn derives from these authorities treating the public as a respected partner rather than as a problem.¹⁹

The importance of fostering trust and solidarity has informed much of the advice provided by behavioural scientists participating in the UK Government's Scientific Advisory Group in Emergencies (SAGE). This group has urged the Government to understand the diversity of communities that make up the UK population, and engage with, consult, listen to and learn from them. In addition, the Government was urged to support and enable the population to adhere, and avoid blame and punishment, recognise, reward and celebrate achievements often in challenging circumstances, communicate clearly, consistently and concisely in line with evidence. Finally, Government was advised to be transparent, honest and open in written and verbal communication, engender trust, and avoid socially divisive language, policies and behaviour.

Sustaining behaviour change involves taking these principles and applying them to create a mutually reinforcing system in which capability, opportunity and motivation support each other (Table 2). For example, sustained improvements in knowledge will need education to be built into educational programmes at all levels. Improved opportunity will require structural changes to inhabited spaces to make it easier to achieve social distancing when required. Sustained changes to motivation will involve development of social identities that place greater value on behaviours that mitigate infection risk and development of habits and routines that embed these behaviours in everyday life.

The above principles are generic. Detailed scientific investigation is needed to develop and successfully apply them to create interventions suited to different scenarios. Such interventions

have been termed Behavioural, Environmental, Social and Systems Interventions (BESSIs)⁴. Despite the importance of these kinds of intervention, research investment in all BESSIs put together has been estimated to be less than 4% of the \$3.3B global spending on Covid-19 research.²⁰ In comparing BESSI vs pharmacological trials, the contrast is stark: as of December 2020, there were 1725 registered and 213 conducted pharmacological trials, but only 11 registered and 3 conducted BESSI trials.²¹

Tackling inequalities

An important lesson from this pandemic is that no person, community or country can protect itself on its own: humans are all interconnected, and solutions must be global. Building pandemic-resilient societies for the future must include changing population-wide behaviours, as well as reducing inequalities. Embedding behaviours in societies requires changing physical and social environments, for example, fostering safe workplaces and norms around hygiene behaviours. These need to be underpinned by community activation, organisation regulation and national legislation.

Societies that are already unequal have been made more so by the COVID-19 pandemic, with the virus spreading most aggressively in overcrowded, multigenerational housing and poorly regulated workplaces. Furthermore, those with pre-existing health problems and those from specific ethnic backgrounds, both linked to poverty, were hit harder by the virus. Structural racism in many countries meant those who were already more vulnerable were made doubly so due to low incomes and poor working conditions. On top of these increased inequalities came government policies that exacerbated inequalities further in many countries. In the UK, salaried workers were financially protected more than those working in the precarious economy, and mortgage-holders were better protected than renters.

Testing for the virus, medicines, and vaccines will continue to be vital to the strategy for tackling COVID-19 and future pandemics. But a significant rebalancing of funding on research and programmes required to embed behavioural changes across society and address inequality will also be critical in the long run

Author contributions

S.M. and R.W. contributed to the concept for the paper, to the initial drafting and to revisions.

Ethics statement

S.M. and R.W. are unpaid Directors of the Unlocking Behaviour Change Community Interest Company. They are participants in the Scientific Pandemic Behavioural Insights group of the Scientific Advisory Group on Emergencies for England, and in the Independent Scientific Advisory Group on Emergencies.

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Figure 1. The Capability-Opportunity-Motivation-Behaviour (COM-B) model of behaviour.

Capability, opportunity and motivation are all essential for any behaviour to occur. Capability and opportunity influence motivation. Behaviour feeds back to influence capability, opportunity and motivation.

Figure 2. The Behaviour Change Wheel framework for designing interventions. The layers in the wheel are not intended to line up with each other. Michie *et al*^{7,14} provides a table showing how a COM-B analysis points to intervention types and policy options most likely to be effective in a given context.

Table 1: Examples of behaviours required to minimise pandemic harm, along with the stakeholders responsible for them.

Goal for preventing and mitigating pandemics	Behavioural targets	Whose behaviours
Reduce opportunities for zoonotic infections	<ul style="list-style-type: none"> • Capture, breeding, storage and sale of animals • Preserving ecosystems in which host and reservoir animals live 	Policymakers, traders, business leaders, consumers, general public
Prevent initial spread of infection	<ul style="list-style-type: none"> • Early detection, local isolation and quarantine • Global early warning systems for pandemics 	Policymakers, public officials, health professionals, general public
Prevent spread within communities	<ul style="list-style-type: none"> • Case finding, testing, supported isolation and quarantine • Social distancing, reducing contact, disinfection and mask-wearing 	Policymakers, health professionals, key workers, enforcement officers, general public
Prevent spread between communities	<ul style="list-style-type: none"> • Case finding, testing, supported isolation and quarantine • Travel, border controls 	Policymakers, border officials, health professionals, travelers, enforcement officers
Build resilient public health system, and health and care services	<ul style="list-style-type: none"> • Adequately resourcing public health and health and care services • Creation and flexible deployment of surge capacity, and protection of staff 	Policymakers, health professionals
Minimise exacerbation of inequalities	<ul style="list-style-type: none"> • Engagement of communities in co-producing policies and interventions • Tailoring policies and interventions to the needs and circumstances of individuals and groups in society 	Policymakers, community representatives, health professionals, enforcement officers

Table 2. Ways of creating sustained behaviour change for pandemic prevention and mitigation

Target in terms of Capability, Opportunity or Motivation	Examples of strategies
Change capabilities	<ul style="list-style-type: none"> • Build pandemic prevention and mitigation into mainstream educational programmes at all levels • Create and maintain accessible educational resources tailored to the needs of all social groups
Change opportunities	<ul style="list-style-type: none"> • Create environments at home, work and travelling that allow for social distancing when required • Develop strong social norms around infection mitigation behaviours
Change motivations	<ul style="list-style-type: none"> • Foster new identities and values around pandemic prevention and mitigation • Develop habits and routines that are protective to self and others