

## **Behavioural, environmental, social and systems interventions against COVID -19: building a better evidence base**

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### Declaration of Interests

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COVID-19 has demonstrated the vital importance of human behaviours such as social distancing in controlling pandemics (1,2). The absence of a cure and an effective vaccine has meant that the world has thus far been reliant on changing behaviours to prevent virus transmission. Behaviour is also crucial to the success of public health measures such as test, trace and isolate (3), and to effective clinical management of cases. If an effective vaccine is developed, behaviour will also play a crucial role in its success as low uptake could be a major issue (4).

The Director General of the World Health Organization recognised the importance of behaviour in comments made on 29<sup>th</sup> June in which he stated 'Every individual must understand that they are not helpless – there are things everyone should do to protect themselves and others. Your health is in your hands. That includes physical distancing, hand hygiene, covering coughs, staying home if you feel sick, wearing masks when appropriate, and only sharing information from reliable sources' (5).

Behaviours are embedded in complex systems involving individuals, groups and communities operating in diverse physical and social environments. Large-scale behaviour change of the kind required to suppress pandemics requires behavioural, environmental, social and systems interventions (BESSIs). Where these have been applied in areas such as tobacco control, they have had considerable success, saving hundreds of thousands of lives each year across the globe (6).

These interventions need to be informed by a scientific understanding of the complex causal processes involved. Common sense understanding is not enough and can often lead to interventions that are at best wasteful and at worst counterproductive. In tobacco control an infamous example was acceptance of the common-sense idea that 'low tar' cigarettes meant 'low risk' (7). This was based on a failure to recognise that smoking is primarily a means of ingesting nicotine and that smokers would increase the intensity with which they smoked 'low tar' products in order to obtain their desired level of nicotine intake.

There are many more such examples in the field of behavioural science and such examples are beginning to emerge in the handling of the COVID-19 pandemic. For example, the common-sense idea of 'behavioural fatigue' and concern that locking down too early may lead to widespread non-adherence later, was invoked in the UK for justification of the catastrophic delay of strict social distancing measures in the UK (8). Behavioural fatigue was an ill-defined new term that had no basis in behavioural science.

Failure to recognise the importance of BESSI research in tackling global health problems is widespread. It has been pointed out that for non-communicable diseases such as cancer, behaviours contribute to more than 40% of the incidence (9) but behavioural prevention accounts for less than 5% of the research budget (10). In the case of COVID-19, the almost total dominance of clinical research over behavioural is illustrated by the fact that a recent search found 975 registered and 46 reported drug trials but only six registered and one reported BESSI trial (<https://www.bessi.net.au/>).

The imbalance in resources devoted to clinical versus behavioural intervention research is further compounded by a huge geographical imbalance. Thus 90% of COVID-19 research is being undertaken in countries that have around 10% of the world's population with most in high-income countries (11).

To get maximum benefit from large scale investment in behavioural research to tackle pandemics it is crucial to have a co-ordinated programme that can identify and address research gaps and priorities. This requires adoption of appropriate methods and frameworks that capture the hierarchy of actors in the system from individual to community (12) and full range of types of intervention that can be

effective (13). Advances in the application of artificial to behavioural science can greatly assist with this (14).

We currently have very little of evidence of the effectiveness, geographical and social variation and mechanisms of action of BESSIs to tackle COVID-19 (15). For example, there is almost no relevant evidence on how to promote adherence to behaviours such as distancing from other people and households, hand cleansing, effective use of face coverings, and avoiding touching one's eyes, nose or mouth with contaminated hands. Yet these behaviours are absolutely crucial in suppressing infection, particularly when governments decide that 'lock downs' are not sustainable.

In summary, there is an urgent need for a major co-ordinated programme of research to develop and evaluate BESSIs that will be effective and viable in tackling the COVID-19 and future pandemics. Success in other areas of behaviour shows that this kind of enterprise can be highly effective and cost-effective. This will require research funders and key stakeholders to recognise the importance of this work and allocate appropriate resources to it, and will require researchers to collaborate in consortia spanning a range of disciplines and researchers across countries varying in resource, and forming effective pipelines to policy-makers.

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