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**EDITORIALS AND COMMENTARIES**

## **In the room where it happens: The consequences of the lack of public health expertise during the COVID-19 pandemic**

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The failure of many Western democracies to control COVID-19 has been the biggest surprise of the pandemic. There has been a long-held view in the West that only fragile states and low-income countries will do poorly in a pandemic, as reflected in the 2019 Global Health Security Index (GHSI) (1). These rankings failed to predict which countries controlled the COVID-19 pandemic well and which did not (2). The United States, which was ranked number one, has the highest number of COVID-19 cases and deaths in the world, while Vietnam, which had less than 1,500 cases by December 2020, ranked 50, and Samoa, which shut international borders early in the pandemic and remained COVID-19-free for much of 2020, ranked 162 (1).

The experiences of many countries that would have been predicted to do well proves that money, technical know-how and scientific knowledge do not guarantee good pandemic control. Culture, leadership and the willingness of the public to follow expert advice matters too. Countries which share these characteristics have done better – ranging from communist states such as China and Vietnam to democracies such as Australia and New Zealand. In these countries, the pandemic was brought under control with classic evidence-based public health measures such as case finding, contact tracing, quarantine, social distancing and lockdown (3).

Civic mindedness and trust in government have also proven to be of major importance in pandemic control. Australians and New Zealanders tend to trust the government and largely followed public health orders (4). In contrast, there has been resistance to public health orders in the US and UK. We have seen the dire outcomes of poor leadership in the US, where leaders have fanned mistrust by peddling unscientific theories, miracle cures and actively discouraged public health interventions such as masks and social distancing. This has resulted in basic public health measures such as masks and vaccines being politicised and being seen as symbols of violation of civil liberties in the US and allowed the pandemic to rage out of control. The lasting damage and mistrust will also make high vaccination coverage rates and herd immunity much harder to achieve in the US (5).

Pandemic leadership also means selecting advisors with public health experience to lead control efforts. Public health is invisible compared to clinical medicine

and the rule of rescue is far more compelling than prevention. Thus, we have seen clinicians and basic scientists favoured over public health experts on pandemic planning and expert groups at local, national and international level, leaving many such committees [without the requisite knowledge of public health epidemic control](#). Bureaucrats, clinicians, basic scientists and hospital infection control experts have been steering major decisions, without the input of experts in population-based epidemic control measures or other relevant disciplines. Control of SARS-COV-2 requires very multidisciplinary expertise.

An example of failure to utilise relevant expertise at international level that has had major consequences is the denial of the importance of airborne transmission of SARS-CoV-2 by experts on the WHO infection control committee (6). The evidence is clear that SARS-COV-2 is airborne, yet guidelines globally do not yet reflect this, thus hampering the ability to control the spread and endangering health workers (7). The absence of aerosol scientists or engineers on the WHO committee has resulted in a critical knowledge gap around the influence of ventilation on transmission of respiratory viruses and movement of aerosols. When their expertise was not sought, scientists called for the WHO to acknowledge airborne transmission (8).

At national and local level, the lack of public health input has also resulted in unscientific theories and poor management being pushed in many countries by expert groups – such as the “herd immunity by natural infection” theory which has become a household narrative during the pandemic despite being unscientific (9). Herd immunity is a concept which arose from vaccine programs, and anyone with knowledge of the pre-vaccine epidemiology of infections now prevented by vaccines, understands that no infection ever controlled itself without the use of vaccines. Smallpox caused recurrent, large scale cycling epidemics in the pre-vaccine era, as did measles. Finally, clinician advisors who do not understand non-pharmaceutical epidemic control measures turn to medical technology as the only familiar solution. Recently, for example, the UK recommending blanket testing of everyone in an entire city (10), another shot-gun approach reflecting lack of knowledge of non-pharmaceutical epidemic control.

At least part of the problems of lack of appropriate public health and multidisciplinary expertise is exacerbated by failure of many decision-makers and the public to understand the difference between “public health” and the provision of acute health care in public hospitals or primary care (11). Public health is the organised response by society to protect and promote health, and to prevent illness, injury and disability. Knowledge of the three pillars of public health is essential for pandemic control:

- Health protection is the use of legislation to protect the public. Most countries have public health laws for emergency powers which place emphasis on public good over individual rights. These laws allow pandemic control measures such as lockdowns.
- Health promotion is the process of “enabling people to increase control over, and to improve, their health” (12). An example is the promotion of masks and social distancing.
- Disease prevention and early detection which includes surveillance, screening, and prevention programs. Examples of surveillance are wastewater surveillance for SARS-COV-2, which can provide early warning of community transmission of COVID-19 (13) and genomic surveillance for the emergence of mutant strains of the virus. Vaccination programs are another important example of disease prevention and are one of the most successful public health interventions in history, with achievements such as eradication of smallpox (14). Whilst eradication of COVID-19 with vaccines is unlikely because of asymptomatic transmission and animal hosts for the virus, elimination of community transmission is achievable with high efficacy vaccines and high vaccination rates (5).

As can be seen from the description of these three activities, public health requires specialised skills, training and a workforce. During the pandemic we have seen resources committed to surge capacity for clinical workforce and intensive care capacity, but there has been a lack of understanding of the need for public health surge capacity. In Australia, a second wave occurred in the state of Victoria because even though there had been an expansion of ICU capacity early in the year, the need for surge capacity in contact tracing and outbreak investigation was not recognised. This lack of recognition left hospitals and primary care physicians to organise their own contact tracing, resulting in further disease spread (15).

Much of the public health expertise in pandemic control rests with those who are trained in field epidemiology, an underrecognised discipline within public health. Field epidemiologists are trained in the science of detecting, preventing and controlling epidemics and are well versed in core concepts of successful epidemic control such as contact tracing and case finding (16). A global network of countries (TEPHINET) have Field Epidemiology Training

Programs (FETP) (17), which are a specialised workforce program spawned from the United States Epidemic Intelligence Service (EIS) training program of the Centers for Disease Control and Prevention - a program developed in 1951 in response to the threat of biowarfare (18). Outbreak investigation, disease surveillance, prevention, field response, contact tracing, risk assessments and other aspects of outbreak control are core competencies in field epidemiology, which is an essential specialty for pandemic control.

Field epidemiologists are an important addition to any pandemic team, but many different disciplines in the broad church of infectious diseases, including the sub-specialities of clinical medicine, epidemiology, basic science, drug development and public health, will also be needed to bring this pandemic under control. Like aviation, each area is equally critical, but if public health, field epidemiology, aerosol science, and occupational hygiene and engineering is not represented on decision-making bodies during a pandemic, accidents will happen. Pandemic control requires specific skills and knowledge, and when people without these skills are driving the response, it is a bit like putting an air traffic controller or a mechanic in charge of flying the plane. They have to learn as they go, and may make mistakes, sometimes catastrophic. Unfortunately, during the COVID-19 pandemic, government advisors without training in epidemic control have learned the basics along the way, as the pandemic unfolded, at great cost globally.

Because of exponential epidemic growth, time is of the essence: the earlier you intervene, the more deaths and cases you prevent. Without greater input from experts in pandemic management, many health systems have become overwhelmed, compromising care not only for COVID-19 but for many other serious medical conditions. Sadly, this is a lesson that had to be learned in real time during the pandemic because of the lack of public health experts advising governments.

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