

## Learning from past mistakes? The COVID-19 Vaccine and the Inverse Equity Hypothesis

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“This virus does not discriminate” was a phrase frequently used by politicians across the world to emphasise that no one is free of risk when it comes to contracting severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Whilst there is no discrimination based on the pathogenicity of the virus, there is social discrimination – based on the inequalities inherent within the society in which we live in. Indeed, people from black, Asian, and minority ethnic (BAME) groups, as well as those living in more deprived areas are more likely to be infected by COVID-19, as well as having poorer outcomes from the disease. In countries including England and Sweden, for example, mortality rates are more than twice as high for people living in the most deprived areas, compared to those living in the most affluent.<sup>1</sup> Similarly, after adjusting for the effect of sex, age, deprivation and region, people of Bangladeshi ethnicity have around twice the risk of death when compared to people of White British ethnicity. These socioeconomic and ethnic inequalities, in both COVID-19 prevalence and mortality, have been reported in different health systems across Europe and America.<sup>1</sup> As Bambra *et al* have argued, for the most disadvantaged communities in our society, COVID-19 is experienced as a syndemic – that is, a co-occurring synergistic pandemic, which interacts with, and is exacerbated by, chronic health and unequal social conditions.<sup>1</sup>

The announcement that several COVID-19 vaccine candidates have demonstrated safety and efficacy in phase III trials is timely, and represents an important victory for science. Indeed, it is expected that vaccine roll-out at scale will start to occur in the next several months, with governments around the world ordering millions of doses. While a safe and effective COVID-19 vaccine is considered by many as the “magic bullet”, it is important that we learn from the challenges of the past – to ensure the vaccine is available to *all* – and particularly those in most need.

History, however, suggests that access to good healthcare is not always equal; it tends to favour people of higher socioeconomic position – the *inverse care law*.<sup>2</sup> Related is the *inverse equity hypothesis*,<sup>3</sup> this suggests that as new health interventions are developed, they initially favour more privileged members of our society. This, in the short term, increases health inequalities. It is only over time that the intervention reaches areas all parts of society. Because of this preferential access and uptake, less privileged groups always lag behind their more privileged counterparts. This observation has been reported across many areas; most recently in the work of Norris *et al.* who showed that novel – more

expensive – and more effective cancer treatments were significantly more likely to be adopted by people of higher socioeconomic position.<sup>4</sup>

Before COVID-19 vaccine programmes are rolled out, consideration needs to be given to the challenges posed by the inverse equity hypothesis. If equity issues are not considered, it is likely that we will observe similar inequalities – favouring people of higher socioeconomic position – in the coming months. We need to learn from what happened in the first wave of the pandemic, and ensure the most vulnerable are not placed at a similar disadvantage with the delivery of the vaccine. As part of this, the logistics of vaccine distribution must also be considered: the Pfizer vaccine, for example, must be stored at -70 degrees Celsius. To achieve this, specialist, and costly, equipment is required, which may further compound potential inequalities. In addition, a large body of literature suggests that, even well-established vaccination programmes (e.g., influenza), uptake is not equal – with higher vaccine uptake occurring in more affluent communities compared to more deprived ones.<sup>5</sup>

We have investigated heavily in the biomedical sciences to develop a COVID-19 vaccine, the same consideration should now to be given – with the same urgency – to the public health delivery approaches needed to ensure that everyone in our society has equal opportunity to receiving the vaccine. Mechanisms to support more equitable distribution include rollout via primary care, mobile delivery targeting more deprived neighbourhoods as well as the use of community pharmacies (which have been shown to be more accessible in areas of high deprivation).<sup>6</sup> It is only when this is achieved that we will have truly overcome the challenges associated with COVID-19.

In summary, the inequalities associated with COVID-19 are stark. While the discovery of a safe and effective vaccine represents a significant breakthrough, it will not necessarily abolish the inequalities associated with it. Careful consideration should be given to how delivery of the COVID-19 - and future - vaccination programmes will address the challenges associated with the inverse equity hypothesis.

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