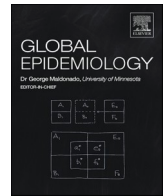




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Commentary

Can you lock down in a slum? And who would benefit if you tried? Difficult questions about epidemiology's commitment to global health inequalities during Covid-19



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ABSTRACT

The initial response to the Covid-19 pandemic was characterised by swift “lockdowns,” a cluster of measures defined by a shared goal of suppressing Covid-19 and a shared character of restricting departure from the home except for specific purposes. By mid-April 2020, most countries were implementing stringent measures of this kind. This essay contends that (1) some epidemiologists played a central role in formulating and promulgating lockdown as a policy and (2) lockdowns were foreseeably harmful to the Global Poor, and foreseeably offered them little benefit, relative to less stringent measures. In view of the widespread commitment to reducing global health inequalities within the profession, this should prompt reflection within the epidemiological community and further work on pandemic response measures more appropriate for the Global Poor.

1. Introduction

It has been widely reported that the impact of Covid-19 on population health varies by socioeconomic factors, with poorer, less privileged, marginalised, and racial “minority” groups suffering significantly greater health burdens [1–4]. However, these findings primarily concern high-income countries. Furthermore, some of them fail to distinguish the direct effect of Covid-19 from the effect mediated by public health interventions, which becomes an important distinction if lockdown presents a high health cost but has low effectiveness.

In this essay, we make a case for the following two claims.

- (1) Epidemiologists made essential contributions to the formulation of lockdown as a policy, and to its endorsement as a universal precautionary measure in low-income settings.
- (2) Lockdown was foreseeably inappropriate for the Global Poor, defined in relation to any reasonable international poverty line.

We urge the epidemiological and public health communities to reflect on whether commitments to reducing health inequalities were lost from view during the early stages of the pandemic, along with the importance of context-appropriate intervention design. We call for more empirical work to be undertaken on the impact of lockdown on the

Global Poor and more attention given to devising context-appropriate pandemic response measures.

2. The role of epidemiologists

“Lockdown” has come to refer to a bundle of measures with two principle characteristics:

- The *goal* of suppressing Covid-19;
- The *character* of requiring reasons to leave one's home, which are then specified in a list that is more or less restrictive and usually excludes items such as trade, socialising and education.

Because specific regulations differ by jurisdiction, attempts have been made to place lockdowns on a percentage stringency scale (higher being more stringent) [5]. By the middle of April 2020, only a handful of countries remained below 50% on this index, with many countries in the 90–100% range for at least a few weeks. This policy was endorsed by influential institutions. The World Health Organisation (WHO) did not make an explicit recommendation for global lockdown, but implicitly endorsed it in various ways, for example, by praising leaders of low-income countries who had locked down, by making global recommendations about the standards that should be met before governments

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relaxed restrictions (implying a presumption in favour of restrictions) [6], by participating in the production of scientific policy advice and reports [7,8], and simply by not saying anything to the contrary. This changed, and in October 2020 the WHO's Special Envoy on Covid-19, David Nabarro, said: "We really do appeal to all world leaders: stop using lockdown as your primary control method" [9].

It is difficult and perhaps futile to attempt to pinpoint the role of one scientific discipline in the confusion of the early stages of a pandemic. Nonetheless, there are some clear channels by which some epidemiologists exerted a direct influence on both the formulation of lockdown policies and their promulgation on a global scale. Most prominent of these are two reports by the Imperial College COVID-19 Response Team (on which the WHO's name appeared) [7,8]. While these reports are famous for the projections of their models, some of which have been heavily criticised, our interest here is not in their accuracy but in the policy response framework that was created in one of them (Report 9), and then projected globally, with a focus on low-income countries (Report 12).

Between these two reports, the following four claims were established.

1. Regulations intended to reduce social contact are the primary non-pharmaceutical intervention by which governments may suppress or mitigate the spread of Covid;
2. There is, in effect, a binary distinction between suppressing the spread of Covid and mitigating it;
3. Suppression is the only way to avoid unacceptably high mortality (and conversely, mitigation will lead to very high mortality); and
4. Claims 1–3 apply globally.

Claims 1–3 were formulated and defended in Report 9 (published 16 March 2020) which concerns only the UK and the US. The case for claim 4 (global applicability) was made in Report 12 (published 26 March).

Report 12 is particularly motivated by preventing Covid-19 mortality in low-income countries. The report does acknowledge various international differences, predicting "lower incidence of disease, hospitalisation and deaths in lower income settings" and acknowledging that "we do not quantify the wider societal and economic impact of such intensive suppression approaches; these are likely to be substantial" [8]. However, the report argues that of "those countries pursuing mitigation, lower-income settings are likely to experience a higher degree of excess mortality due to health system failure" [8]. The Report also asserts that that lower income countries are likely to exhibit more co-morbidities, and that they are less likely to be able to implement alternative, non-distancing measures such as contact tracing. It concludes by acknowledging uncertainty at the level of detail but considerable certainty at a high level:

This analysis highlights the challenging decisions faced by all governments in the coming weeks and months. However, our counterfactual of an unmitigated pandemic clearly demonstrates the extent to which rapid, decisive and collective action can prevent billions of infections and save millions of lives globally [8].

This is a global policy recommendation, obviously intended as such, and bound to be interpreted as such by politicians and their advisors. The recommendation is: that every country in the world should respond to Covid-19 by implementing broadly similar regulatory packages designed to dramatically reduce social contact.

If Claims 1–4 are accepted, policy-makers have little choice but to take maximal efforts to reduce social contact: in short, to lock down. There was no opportunity to replicate or even thoroughly evaluate the reports, since both reports emphasised the importance of time. In Report 12, the difference between locking down at 0.2 deaths per 100,000 population per week and doing so at 1.6 is the difference between 1,858,000 and 10,452,000 deaths globally over 250 days. Replication in such circumstances is not feasible, even in those relatively few countries

with the scientific capacity to do so.

None of this analysis shows that one team of infectious disease epidemiologists is solely responsible for the spread of lockdowns through the world in first half of 2020. What it shows, rather, is that the core ideas behind this spread had an articulation and justification in influential parts of the scientific community. Even if the recommendations came from a fairly small corner of the wider epidemiological discipline, the remainder of the discipline largely allowed itself to be represented as supportive of these recommendations. There were some widely-publicised "head-on" confrontations but most epidemiologists either tacitly supported the general strategy or kept their dissent quiet.

3. Prospective assessment of globalised lockdown recommendations

The WHO's clear statement in October 2020 that lockdowns should not be used as the primary control measure against Covid-19 came in part from awareness of the negative impact of lockdowns, including on the Global Poor [9]. Awareness, however, has two potential meanings in this context: *knowledge* about these effects, and their *salience* in the minds of those influencing policies on a global scale. There is no problem with a growth of knowledge leading to a change in policy, but if a policy was adopted that was highly deleterious to the Global Poor due to their interests not being salient, then this is a grave problem for global public health institutions and scientists, given their aspirations to remedy global health inequalities and their commitment to fairness.

From this perspective, it is unfortunate that the relevant knowledge was indeed available very early in the pandemic, and well before global lockdown recommendations were endorsed. The situation can usefully be understood in terms of the foreseeable (health) costs and benefits to the Global Poor. There are different definitions of poverty, and the income levels corresponding to these definitions differ by World Bank region and even country, depending on a number of factors. In 2015 the World Bank updated the International Poverty Line to \$1.90 per day, below which 689 million people live, and which is regarded as extreme poverty. There are about 1.3 billion people living in multidimensional poverty, which considers other factors besides income [10].

3.1. Foreseeable health costs

The foreseeable health costs of lockdown are mainly of three kinds: deprivation of livelihood; disruption of health services for other conditions; and disruption of education. It is obvious that deprivation of livelihood will occur under lockdown restrictions that affect the ability to work and trade in person. The ability of the Global Poor to work from home is obviously limited, and even if cottage industries are possible, prohibition on trade would prevent profiting from them. The Global Poor lack assets and food stocks. In Africa, 80.8% of urban employment is in the informal sector, generally receiving no pay for no work. The ability of states to implement furlough schemes, feeding schemes, or other measures to mitigate impact is low in the contexts of Global Poverty, and social welfare nets cannot be expected to spring into existence overnight.

The effect on health services for other conditions would depend on the extent to which these were already available, but negative effects were foreseeable to established public health programmes for HIV, TB, malaria, maternal and neonatal care, along with vaccination [11] and nutrition programmes. These would be expected to arise both from limitation of access and diversion of resources.

The effect on education is obvious, and a link between health and education (especially of women) is well-established, mediated by a variety of mechanisms operating in both short and long term. Some education systems sometimes also include school feeding programmes, disruption of which would create a foreseeable detriment to child nutrition.

In short, it was entirely foreseeable that the effect of lockdowns on

the Global Poor would be negative. However, the important question is whether these effects were outweighed by even more negative effects of *not* locking down, based on evidence available at the time. Putting it equivalently but less awkwardly, the question becomes: what were the foreseeable health benefits of lockdown for the Global Poor?

3.2. Foreseeable health benefits

In early 2020, the justification for locking down came from comparing mortality in scenarios with different degrees of social contact. This line of thinking obviously assumes that it is possible to reduce social contact to the levels specified in the model. However, for the Global Poor, it was foreseeable that reductions of social contact to the extent modelled, e.g., reductions of the order of 75% [7], would be impossible. There were two reasons for this: overcrowding and unavoidable non-compliance.

If too many people share dwellings, then a lockdown reducing social contact outside the home will not reduce overall social contact to the necessary levels, even if it is complied with. For example, in Accra, over 50% of the population lives in a single-room dwelling [12]. In such a context, even if departures from the home are greatly restricted, overall social contact will remain high due to the number of people in each home. According to the NGO Habitat for Humanity, one in seven people lives in a slum, and overcrowding is one of the defining characteristics of a slum [13]. In developing countries, 1 in 3 urban residents live in slums, and in some countries 90% of the population live in a slum. Estimates for global slum population vary considerably from 900 million to 1.6 billion [14]. It could not have been reasonably imagined that any of these populations would satisfy any model of lockdown, and thus even assuming perfect compliance and perfect model accuracy, it was foreseeable that lockdown would offer minimal benefit to those of the Global Poor living in slums.

This is academic, however, since compliance was in any case never likely. The threats posed to livelihoods have already been described and these would inevitably force people from their homes, and further force them to engage with each other in economic activity such as trade. Government feeding programmes and grants inevitably mean long queues and these cannot be expected to remain socially distanced in conditions of extreme stress. In addition, the need for water and sanitation, and extreme heat in some cases, would be obvious causes for people to leave their homes. These contextual factors mean that compliance with lockdown regulations could never have been a reasonable expectation.

To put these points another way, the relevance to a slum of a model projecting the benefits of a 75% reduction in social contact outside the home is no greater than the relevance to a wealthy suburb of a model projecting 100% reduction. In both cases, these reductions would not be achieved, and overcrowding means the reduction would not have the projected effect even if regulations were complied with. And in both cases, compliance is in any case impossible.

In contrast to the urban and peri-urban poor, the rural poor do not live in large conurbations, and overcrowding is rarer. Nonetheless, small multiple occupancy dwellings are common. Low compliance is to be expected for parallel reasons to those already discussed. Agriculture is a common livelihood (including subsistence agriculture) and requires constant activity outside the home. Amenities such as piped water are commonly absent, implying frequent departures from the home and mixing. Isolated communities may have no effective access to healthcare due to large distances, no transport, and clinics with no relevant capacity (no ventilators, no ICU, etc.), meaning that there is also much less effective benefit from preserving hospital capacity by reducing incidence of Covid-19. Bringing levels within the capacity of healthcare systems is unachievable in many cases. The penetration of any government welfare schemes in rural areas is likely to be very limited. Enforcement is also likely to be minimal.

For all these reasons, it was foreseeable that the beneficial

effectiveness of lockdown would be minimal in many of the contexts in which the Global Poor lived. This does not mean that there were no available non-pharmaceutical interventions, however. Restrictions on large gatherings, some restrictions on travel between regions, the use of masks (initially pronounced ineffective by the World Health Organisation), hand-washing, and other familiar non-pharmaceutical interventions were available. It was, however, not reasonable to expect significant additional benefit of stay-at-home orders designed with entirely different living contexts in mind.

Additionally, it was evident from very early on that Covid-19 was considerably more dangerous for the old than for the young. There is a very strong correlation between age and wealth. The median age in Europe is 43.9, but 19.7 in Africa (and therefore lower in many countries). Thus it never appeared, based on data available at any time, that Covid-19 would be a public health problem among at least half the population of that continent, even considering the prevalence of other health issues. Africa is the second most populous continent, with 1.3 billion inhabitants—more than North America and Europe (including Russia) combined. This means that the public health benefit of preventing the spread of Covid-19 is accordingly less in Africa than in any other continent; and the same point applies to the Global Poor more generally, since the Global Poor are also the Global Young.

Moreover, the *relative* threat posed by Covid-19 in relation to other causes of mortality differs with context. This means that the relative benefit offered by measures designed to combat it will differ, compared to the benefit of directing the same resources to other causes of mortality. In short, the optimal health policy for a region will vary depending on the causes of mortality in that region. It was never likely that the same policy would be appropriate for all regions and countries, not only given what was already known about the fatality of Covid-19 and the age-profile, but also because what was known about the competing causes of mortality in different regions. Yet the same policies were implemented in very different places.

For all these reasons, it was foreseeable that lockdowns would offer minimal benefits to the Global Poor.

4. Discussion

If these points were foreseeable, then why were they not made in the early days of the pandemic? The answer is that these points were being made, starting as early as March 2020 [15–28], but that they did not attract widespread attention or apparently influence policy. It was not long before empirical evidence began to confirm many of these fears [11,12,15,17–19,22,26,29–37], but this did not prompt, and still has not prompted, the degree of reflection one might have expected.

There may have been a general sense that the early measures were precautions taken in a period of great uncertainty. However, a precaution is only a precaution if it can be reasonably expected to work; seatbelts are not a precaution when a boat strikes a rock. Moreover, as pointed out, there was in fact great certainty in all the relevant areas. These concerns were *known* but were not *salient*, presumably because Covid-19 poses the most serious infectious disease threat that wealthy countries have faced for some time. UNICEF reports that in 2020, 5 million children globally died under the age of 5 [38]. In the same year, 1.88 million Covid-19 deaths were reported [39]. Overall, of the 3.7 million Covid-19 deaths as of 22 March 2022, 13,400 were in children under 5 [40] (or 0.36%). Even accepting that Covid-19 deaths would have been higher without avoidance measures, it remains difficult to explain why Covid-19 prompted such a huge global response, including both lockdowns and massive vaccine development efforts, while the causes of mortality of a far larger number of children did not. These children are poor, and mostly of colour, while many (though certainly not all, of course) of those dying of Covid-19 are relatively rich. It is hard not to infer that wealth and power asymmetry has something to do with it.

Another important point for reflection is that (at time of writing)

between 75 million and 95 million more people now live in poverty than at the start of the pandemic (probably compounded by the Ukrainian conflict and rising inflation) [41]. Calling this the “result of Covid-19” is ambiguous between the impact of the disease itself and the impact of the measures selected to combat the disease. Most in global public health regard poverty and health as causally linked. It is reasonable to attribute at least some portion of this increase in poverty to inappropriate measures, and to see this as further likely to lead to a growth in global health inequalities.

The role of epidemiologists in influencing this distribution of resources is a point for reflection in the profession, given the widespread commitment to reducing health inequalities. If the philosopher Thomas Pogge is correct, then the participation of wealthy nations and even of scientists in global institutions that sustain and exacerbate health inequalities is enough for moral culpability [42–44]. Even if Pogge is incorrect, commitment to global health equality is sufficient to motivate reflection and research on the impact of lockdown on global health inequalities, as well as serious efforts to devise more context-appropriate pandemic response measures.

5. Conclusion

In the first part of 2020, most of the world entered stringent lockdowns. Epidemiologists played a central role in formulating the policy of lockdown and in recommending it globally, through global health institutions, notably the WHO. However, it was foreseeable at the time that these recommendations would pose much more significant health costs to the poor than to the rich, and that it would bring the poor minimal health benefits. It was also predictable that the logical endpoint of lockdown, namely vaccine availability, would be much delayed for the Global Poor. Considering all these points, the unfortunate but unavoidable conclusion is that, through global lockdown recommendations, some within the discipline of epidemiology contributed to an increase in global health inequalities, and that this was foreseeable. This is a point for reflection within the epidemiological community, and a spur for empirical work on the health impact of lockdown on the Global Poor with a view to developing better pandemic response measures for the future.

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