# The dilemma of imposing or releasing restrictions to control the spread of covid-19 during the second wave of the pandemic in low- and middle-income countries

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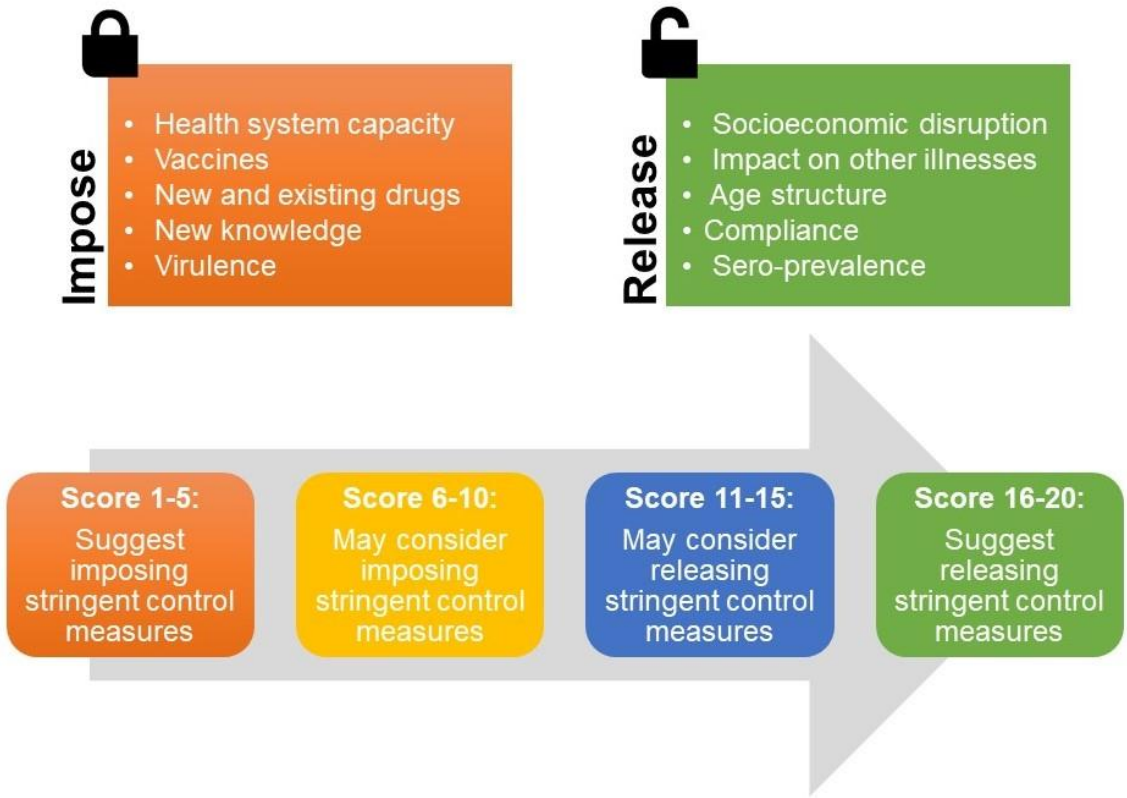
Policymakers in low- and middle-income countries (LMICs) are grappling with the dilemma of whether to impose or release stringent measures to control the spread of covid-19. In high income countries, the reproductive number ($R_0$) of the virus is used to guide these decisions. However, most LMICs do not have the robust healthcare systems and widespread testing capacity necessary to generate the reliable, representative data required to accurately determine $R_0$. Many LMICs also have other complex factors that are often unique to each country, which may have important implications for these decisions. Here, we summarise ten key factors that could play an important role in these decisions, with the first five in support of restrictions and the remaining five opposing them (Figure 1).

**Figure 1: Framework for covid-19 decision support tool**



**Health system capacity:** In LMICs that have a limited health system capacity, an unmitigated covid-19 epidemic could overwhelm the system. In such a scenario, tougher measures aimed at 'flattening the epidemic curve' and delaying the epidemic peak to ensure that healthcare workers have adequate personal protective equipment (PPE) and training are a fundamental strategy for saving lives.[1]

**Vaccination:** There are more than 200 vaccine candidates under development, as an effective and safe vaccine against SARS-CoV-2 is currently the most desirable solution to control the pandemic.[2] Imposing restrictions could save lives by reducing the number of people who become infected prior to a vaccine becoming available.

**New and existing drugs:** Numerous clinical trials are ongoing to identify lifesaving treatments for covid-19. Some treatments have already proven to be effective in reducing the severity and/or duration of covid-19 (e.g. dexamethasone).[3]

**New knowledge:** Scientists and clinicians are continuously gaining new insights into the risk factors, clinical manifestations and potential treatments for some of the complications associated with covid-19.[4]

**Virulence:** A common property of zoonotic diseases, such as covid-19, is that the virulence of the pathogen gradually decreases as it is transmitted among humans. This has yet to be proved to be the case for SARS-CoV-2, but there is possibility that SARS-CoV-2 will also mutate into a milder form globally and stricter measure may buy some time for that to happen.[5]

**Socioeconomic disruption:** The restrictive measures imposed to control the spread of covid-19 have serious negative impacts on every aspect of people's lives and livelihoods, including the economy, food security, social care, education, law and order and more. [6] These impacts can be even more pronounced in LMICs, and this is probably the strongest argument in favour of releasing stringent measures.

**Impact on other illnesses:** Stringent measures to contain covid-19 are also having direct negative impacts on other diseases; again, LMICs are especially hard hit.[7] There have been reports of people not receiving either routine or emergency healthcare, children not being vaccinated and family planning services not being offered, all of which make it harder for LMICs to continue imposing strict measures to limit transmission of the virus.[8]

**Age structure:** The morbidity and mortality of covid-19 is highly correlated with age, with elderly people disproportionality affected by the disease.[8] Since the proportion of elderly people is lower in LMICs than in HICs, it may be easier to shield those that are most vulnerable and open the economy.

**Compliance:** Unlike some of the worst affected Western countries, most LMICs introduced strict control measures before widespread community transmission of covid-19 had begun, making it even more difficult to continue restrictions for an indefinite period.[9]

**Sero-prevalence:** *S*ARS-CoV-2 exhibits highly efficient human to human transmission; therefore, some have assumed that a large proportion of the population has already been or soon will be infected and subsequently become immune, for at least some time.[10]

**Table 1: Factors for imposing and releasing covid-19 restrictions**

| Factor | Possible scoring criteria | Score |
|---|---|---|
| **Health system capacity** | Is already stretched with no additional capacity ..... 0<br>Can cope with a 50-100% increase in demand ..... 1<br>Can cope with a >100% increase in demand ..... 2 | |
| **Vaccine** | Likely to be available in 6 months ..... 0<br>Likely to be available in 6-12 months..... 1<br>Unlikely to be available in 12 months ..... 2 | |
| **New and existing drugs** | Likely to be available in 6 months ..... 0<br>Likely to be available in 6-12 months..... 1<br>Unlikely to be available in 12 months ..... 2 | |
| **New knowledge** | New, life-saving knowledge is imminent ..... 0<br>There are signs of new, life-saving knowledge..... 1<br>No clear signs of new, life-saving knowledge ..... 2 | |
| **Virulence** | No clear evidence on decreasing virulence ..... 0<br>Epidemiological data suggest decreasing virulence ..... 1<br>Genome sequencing data suggest decreasing virulence 2 | |
| **Socioeconomic disruption** | Can withstand stringent control measures ..... 0<br>There is significant socioeconomic disruption ..... 1<br>On the verge of collapse ..... 2 | |
| **Age structure** | Proportion of population aged >65 years is >10%..... 0<br>Proportion of population aged >65 years is 5-10% ..... 1<br>Proportion of population aged >65 years is <5%..... 2 | |
| **Impact on other illnesses** | Minimum negative impact on other illnesses ..... 0<br>Some evidence of negative impact on other illnesses..... 1<br>Clear signs of negative impact on other illnesses ..... 2 | |
| **Compliance** | >10% population will not comply with the measures ..... 0<br>10-50% population will not comply with the measures .... 1<br>>50% population will not comply with the measures ..... 2 | |
| **Sero-prevalence** | <10% population has already developed antibodies ..... 0<br>10-50% population has already developed antibodies .... 1<br>>50% population has already developed antibodies ..... 2 | |
| **Total score** | | |

Together, these factors make it extremely difficult for policymakers in LMICs to undertake objective evaluations and then make informed decisions whether to impose or release stringent control measures. Therefore, we have designed a decision support tool that can provide a framework for

supporting evidence-based, context-specific decision-making on this matter (Table 1). An interactive version of this tool is available at https://www.opml.co.uk/covid-19/decision-support-tool.

The tool can be further customised and contextualised by adding additional factors and using different weightings. We understand that the decisions we have alluded to are a function of a complex set of issues, and it is not possible to explore the full complexity of this topic in this brief overview. However, we hope that this simple tool could at least help policymakers to consider all factors relevant to their specific context and then make an informed decision, particularly during a possible second wave of the pandemic.

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