





### Thematic Team on "Rigorous Impact Evaluation"

# Evidence on Covid-19 Pandemic Control Interventions and their Impacts on Health-Related Outcomes

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Three months after the first cases of SARS-CoV-2 infection were detected, the World Health Organization announced a global pandemic. To date, over 33 million people have been infected by the virus and over a million have reportedly died of the disease (Johns Hopkins University, 2020).

The Covid-19 outbreak exposed governments and societies to unforeseen challenges of tracking a rapidly spreading virus with unclear symptoms and transmission channels on the one hand and treating a large number of patients with clinically uncertain approaches on the other. In the absence of clear treatment protocols and effective vaccines, slowing the spread of the virus is essential to reduce deaths and to avoid overloading healthcare systems. Low- and middle-income countries (LMICs) are particularly at risk due to shortages of skilled health personnel, technical healthcare equipment and infrastructure, and lack of funds to implement preventive measures. In addition, emerging evidence clarifies initial claims that a younger age distribution inevitably causes lower fatalities (Philip, Ray, and Subramanian, 2020).

To support measures against Covid-19 and its secondary effects, the German Ministry for Economic Cooperation and Development (Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung - BMZ) launched an Emergency COVID-19 Support Programme.

#### **KEY MESSAGES**

- In high-income countries, testing, social distancing, travel restrictions, blanket lockdowns and mask-wearing, combined with handwashing, have proved effective in slowing the spread of Covid-19.
- In the Global South, weak pre-conditions exacerbate the trade-off between containing the virus and securing livelihoods and constitute a real challenge for effective policy intervention. Context-specific and targeted approaches and high-quality data are needed.
- Further research gaps exist around the medium- and long-term effects, costefficiency and -effectiveness, and compliance rates.
- Future policies need to account for unintended effects of the fight against Covid-19, particularly the crowding-out of funds for other investments.



Robust evidence on the effects of health and pandemic control interventions can guide the cost-efficient and -effective use of such funds. In this brief, we review the current state of empirical research.

While prior evidence on disease control is highly relevant, this brief focuses primarily on Covid-19 studies. The novelty and rapid transmission of the disease have left little time for rigorous impact evaluations. The first relevant scientific evidence relied on non-experimental designs. Simulation exercises were largely used to predict health impacts of distinct mitigation strategies. Event studies, including before-and-after studies, allowed the development of health outcomes to be tracked over time. Quasi-experimental studies compare outcomes of pandemic control interventions with non-intervention or a so-called "control" group. Recently initiated randomized control trials (RCTs) generated the most robust evidence on the impacts of interventions because the control group is randomly selected.

## WHICH PANDEMIC CONTROL MEASURES ARE EFFECTIVE IN REDUCING THE SPREAD OF COVID-19?

Early policies and recommendations sought to halt the spread of the disease through the reduction of social interactions. In fact, from simulations, we quickly learned that strict mobility restrictions in Wuhan and in Hubei province had significantly reduced the spread of the disease (Fang, Wang and Yang, 2020). This result is, however, questioned by the event study covering 153 countries by Askitas, Tatsiramos and Verheyden (2020), who show that, when other non-pharmaceutical interventions are taken into account, travel restrictions do not significantly impact the disease's spread. Instead, they identify cancellation of public events and gatherings as the most effective measure. Exploiting variations in the timing and intensity of lockdown introductions, Conyon, He and Thomsen (2020) and Juranek and Zoutman (2020) show that lockdowns cut the number of intensive care patients and fatalities in Denmark and Norway,

compared to Sweden. Similar results were found for the US, where states that implemented **shelter-in-place orders** had 44% fewer Covid-19-related fatalities (Dave et al. 2020).

For LMICs, however, more nuanced approaches are needed to balance the costs and benefits of minimizing social interaction. In many LMICs weak social security systems, fiscal incapacities for substantial government transfers, little household savings, and limited teleworking capacity force people to run the risk of infection and participate in face-to-face labour market interactions. To mitigate the economic effects of blanket lockdowns, Alon et al. (2020) argue in favour of stay-at-home orders and social transfers solely for the elderly. Following a simulation of fatalities per GDP lost, targeted lockdown for the vulnerable (e.g. the elderly) could be efficient, but still hard to implement in crowded intergenerational households.

However, "Stay home, Stay safe" recommendations are challenged by limited access to clean water and hygiene facilities in low-income households, combined with overcrowded, multigenerational living arrangements. Here, cluster-based responses are one possible solution. Oshitani et al. (2020) argue that most transmissions were spurred by a small proportion of cases, which led to cluster formations (e.g. in enclosed or crowded spaces). Tracing contacts of infected people can help to avoid clusters and therefore has the potential to mitigate transmission. However, effective contact-tracing needs reliable data. In an ongoing large-scale RCT, Avdeenko et al. (2020) track the spread of the disease over time and space in rural Pakistan using frequent, short phone interviews, and test whether geographical clusters can be identified. However, to estimate the disease prevalence rate, evidence on actual infection rates will need to be complemented with polymerase-chain-reaction and antibody tests. A study in India revealed that more than half of residents in informal settlements, and every fourth person in Delhi, had

 $<sup>^{1}</sup>$  For example, De Buck et al. (2017) find that community engagement and social marketing interventions are effective in promoting handwashing in LMICs.

Covid-19, with more women being affected (BBC News, 2020).

To address the trade-off between health risks and economic burden, non-pharmacological interventions such as hand hygiene, wearing face masks, and social distancing could help people resume their economic activities safely. The effectiveness of face protection and social distancing has been shown in a meta-analysis of 44 observational studies, mainly conducted with health-sector personnel. Including respiratory infectious diseases such as SARS and MERS as well as Covid-19, Chu et al. (2020) provide evidence that eye protection, face masks, and social distancing of over one metre do not fully eliminate but effectively reduce the risk of infection. Mitze et al. (2020) use a synthetic control method approach to show that the mandatory wearing of face masks in Jena, Germany, slowed the daily growth of new infections by 40%. Hand-washing, studied in the case of influenza transmission, is effective in reducing infection only in combination with face masks (Wong, Cowling and Aiello, 2014). Finally, effective measures in this sphere need to address supply constraints, as only half of healthcare facilities in the Global South are equipped with alcohol rub or adequate hand-washing facilities (World Health Organization, 2019). The Emergency COVID-19 Support Programme therefore provided hospitals and healthcare centres with handwashing installations, face masks and gloves, among other protective equipment.

Social norms, motivation and habit play important roles in adherence to safe hygiene behaviour (Powell-Jackson et al., 2020; Curtis et al., 2011). Awareness raising can be a powerful tool to promote preventive healthcare behaviour (Dupas 2011). Information about both the disease and recommended behaviour must be passed on to the population. A pre-pandemic meta-analysis showed that text messages (SMSs) can be useful to induce behavioural change (Orr and King, 2015). In the context of Covid-19, Falco and Zaccagni (2020) sent SMSs in Denmark to remind people to stay at home. The messages increased recipients' intention to not leave the house, but did not translate into action. Banerjee et al. (2020) conducted an RCT in West Bengal, India, on the effectiveness of Covid-19 information campaigns. They show that an

additional SMS from a prominent public figure emphasizing the importance of complying with the rules notably increases the desired behaviour. Study participants' mobility reduced, handwashing and mask-wearing increased, and more symptoms were reported to local health facilities. The harm public messaging can do is examined by Ash et al. (2020), who show a causal link between Covid-19-sceptic programmes on Fox News and noncompliance with social distancing rules. Once a vaccine is developed, further awareness campaigns will need to quickly address potential fears and misconceptions that could prevent take-up.

Finally, evidence from earlier studies on other viral diseases, such as other respiratory viruses, Ebola and HIV, can inform about potentially successful responses to Covid-19. What seemed to matter then was timely strengthening of health systems, i.e. maintaining essential health services, access to infection-prevention and -control measures, testing and treatment, especially for displaced populations, fast and flexible production of protocols, timely shift of resources, establishment of new communication technologies and innovative community engagement, and standardized data collection (Jefferson et al., 2011; Etkind et al., 2020; Lau et al., 2020; Jefferson et al., 2008). Thus, Covid-19 responses will help and contribute to a large evidence pool on global responses to other viral diseases. This helps in adjusting, designing and testing new interventions, such as on preventing social stigma, building trust, and taking account of migration patterns (Eaton and Kalichman, 2020; Logie et al., 2020; KfW, 2016, 2020). The approaches should be integrated.

#### (Cost-)effectiveness

When interventions need to lead to the desired behavioural change quickly and cost-effectively, what matters is the nuances of implementation – i.e. content, target groups, and method and intensity of delivery. One important tool for implementing interventions at scale is to use multiplier effects from social learning and peer effects (Dupas, 2011). An example from HIV testing showed that people are more likely to inform themselves about their test results if their neighbours do so (Godlonton and Thornton, 2012). So-called "spillover effects" were also identified by

Banerjee et al. (2020), in whose study nonparticipants adopted preventive healthcare measures when surrounded by treatment group participants.

#### **Cross-cutting consequences**

The analysis of potential unintended or even **negative effects** is an integral part of impact evaluation. With attention exclusively focused on preventing and treating Covid-19, take-up and quality of other health services decreased or were disrupted. Immunization rates fell significantly, including for diseases such as polio, threatening to undermine advances in the eradication of preventable and fatal childhood diseases (Nelson, 2020) and increasing child and maternal deaths (Roberton et al., 2020). Maternal healthcare needs have been less attended during lockdowns, e.g. in Nepal, where institutional childbirth fell by over 50% and stillbirths increased sharply (KC et al., 2020). With increased social isolation, vulnerable population groups – e.g. migrants, the elderly, the mentally ill – experienced higher levels of mental illness (Brooks et al., 2020; Gunnell et al., 2020; Rajkumar, 2020), domestic violence rose (Bullinger, Carr and Packham, 2020), and stigmatization and human rights violations increased (Riley et al., 2020). Projects by Kreditanstalt für Wiederaufbau (KfW, German Development Bank) and Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) try to tackle some of these problems in particular in fragile contexts, for example by raising stakeholder awareness on Covid-19-related consequences (e.g. domestic violence) and strengthening psychosocial support for medical workers. Future research will need to look closely at adverse impacts.

#### Ongoing initiatives

Continuing to evaluate ongoing and important interventions is important for future learning. For example, GIZ currently uses the peer learning approach in an awareness campaign training 200 Senegalese on Covid-19 knowledge and protective measures. By actively spreading information through their networks, many more traders and other craftspeople are reached. Similarly, KfW supports health service providers and laboratories by providing equipment and medical supplies, and capacity building. KfW further is supporting

vulnerable populations through cash transfers for health expenses (e.g. in Malawi) and livelihoods (e.g. in Mali).

#### **OUTLOOK AND RECOMMENDATIONS**

Identifying successful approaches to reduce the spread of Covid-19 and, potentially, future pandemics will shape the trajectory of countries worldwide in the short and long run. These approaches may vary, from being targeted and specific to being more encompassing and integrative (i.e. considering the role of *One Health* initiatives). Impact evaluations can help uncover the impacts of pandemic response strategies and guide future investment. Yet rigorous evidence remains scarce.

First, current scientific evidence on containing Covid-19 health consequences reports short-term effects, which may change or even vanish in the long term. Second, while lessons can be learned from earlier pandemics, Covid-19 evidence so far is mostly based on studies from high-income countries. The same interventions may yield differing outcomes when implemented in different cultural, socio-economic, and demographic contexts. Finally, rigorous studies require an ethically sound design, a credible control group, time for effects to unfold, and reliable and relevant data. The need for rapid evidence and limited testing capacity can undermine these goals.

More replication studies in diverse settings and further rigorous evaluations of more targeted and innovative approaches are thus important. Reliable impact evaluations will require high-quality data, from either administrative sources or large-scale primary data collection. Antibody tests will further improve data quality and certainty about effective approaches. High-quality data will also allow the interventions' cost-efficiency and -effectiveness to be studied, i.e. considering compliance rates and the sustainability of the effects. Carefully designed evaluations can also help to anticipate widening and dangerous healthcare gaps for other diseases.

Once the new studies have produced the hopedfor causal evidence, meta-analyses and systematic reviews can synthesize findings and provide valuable evidence to guide policy.

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The thematic team on "Rigorous Impact Evaluation" is contributing to a more systematic integration of rigorous impact evaluations and the use of their results in German Development Cooperation. Evidence-based policy and program design is crucial to increasing the effectiveness of German Development Cooperation and thus to promoting sustainable development. To this end, the thematic team brings together experts from BMZ, evaluation, academia and governmental as well as civil society implementing organizations.

Short explanatory video on the subject of "rigorous impact evaluations" (in German):

https://youtu.be/2iVqBhooeA8