

Press release

Fighting the pandemic in Africa

When distancing rules are futile

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Researchers from ETH Zurich and the Swiss Tropical and Public Health Institute have created a risk map showing which regions in Africa may see a faster spread of infectious diseases due to lacking infrastructure.

The coronavirus pandemic has made people around the globe realise how important individual behaviour is for mitigating the spread of diseases. But is it possible to comply with distancing rules everywhere in the world? Researchers from ETH Zurich and the Swiss Tropical and Public Health Institute (Swiss TPH) tackled this question in an interdisciplinary research project using the example of Africa.

Major national and regional differences

The analysis shows that households often lack the most basic infrastructure needed to comply with distancing rules. For example, drinking water and toilets must frequently be shared with other households. In addition, families sometimes live in a single room together.

However, huge differences were found among the 34 countries examined. The situation in West African countries, such as Nigeria, is much more challenging than in Namibia, for example. But even within a single country, the situation can vary considerably from region to region. In South Africa, for instance, infrastructure is more limited in the north-eastern regions. Moreover, not all places lack the same type of infrastructure. In Benin, multiple households have to share sanitary facilities, whereas Ethiopia mainly has a shortage of private transport options. “Our analysis shows that fighting the pandemic will not only require expanding healthcare systems and guaranteeing more equitable access to vaccines, but also that it is imperative to invest more in private infrastructure as well,” says Isabel Günther, ETH Professor of Development Economics and one of the researchers who led the study. The results were published today in the journal *Nature Communications*.

Need for infrastructure does not correlate with GDP

The researchers showed that the lack of infrastructure is not only due to economic factors. Thus, the extrapolated “physical distancing index” (PDI), i.e. the lack of infrastructure needed to maintain distancing rules, barely correlates with the gross domestic product (GDP) of a country. Ghana, for example, has a relatively high GDP but lacks private infrastructure to a much greater extent than Mozambique, which has a much lower GDP.

Researcher analysed data from a large ensemble of household surveys conducted by the respective national statistics institutes. A total of 273,000 households were surveyed. Based on the data, the researchers initially identified six factors that are important for compliance with distancing rules. These include, for example, the number of occupants per room, drinking water in the household and ownership of a mobile phone – so that people can still communicate while distancing. The researchers also factored in population density. Using what is referred to as a principal component analysis, they then developed an index on a scale of 0 to 100 showing how difficult it is for the population to avoid contact with infected people. The researchers were able to show that this index strongly correlates with COVID-19 case numbers.

A high-resolution risk map provides insights into which areas of a country are least capable of complying with distancing and might thus experience a faster spread of diseases. “Our results can help governments target their investments in certain regions through activities like information and vaccination campaigns or expanding infrastructure, thus helping with pandemic response and prevention,” says Jürg Utzinger, Director of the Swiss TPH. This could make it possible to avoid drastic nationwide measures such as prolonged school closures, which many low-income countries have implemented over the past two years.

Study might apply to Asia and South America

Calculations beyond Africa are also possible. “This type of risk map can now, for example, also be created relatively quickly for India, Bangladesh or regions in South America,” says ETH Zurich researcher Kenneth Harttgen, who played a leading role in the study. For wealthy countries like Switzerland, however, it would not be useful because the crucial private infrastructure already exists throughout the whole country. “If people don’t comply with distancing rules in this country, there are other reasons,” says Harttgen.

Reference

Isabel Günther, Kenneth Harttgen, Johannes Seiler and Jürg Utzinger. “An index of access to essential infrastructure to identify where physical distancing is impossible”, *Nature Communications*, published 14 June, DOI: 10.1038/s41467-022-30812-8

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