Early and combined interventions crucial in tackling COVID-19 spread in China

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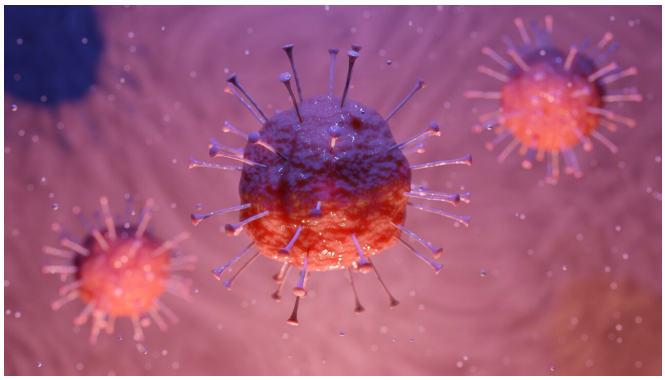

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A study by the University of Southampton examining non-pharmaceutical interventions (NPIs) in response to the new coronavirus (COVID-19) in China shows that a range of early, coordinated and targeted measures are needed to help significantly reduce its spread.

Researchers in the population mapping group WorldPop ran complex modeling, using anonymized data on both human movement and illness onset, to help simulate different outbreak scenarios for cities in mainland China. This allowed them to understand how variations in the timing, level and combinations of interventions affect speed and transmission of the disease. Findings are available in a preprint paper on *medRxiv* website.

The study estimates that by the end of February 2020 there was a total of 114, 325 COVID-19 cases in China. It shows that without non-pharmaceutical interventions—such as early detection, isolation of cases, travel restrictions and cordon sanitaire—the number of infected people would have been 67 times larger than that which actually occurred.

The research also found that if interventions in the country could have been conducted one week, two weeks, or three weeks earlier, cases could have been reduced by 66 percent, 86 percent and 95 percent respectively—significantly limiting the geographical spread of the disease. However, if NPIs were conducted one week, two weeks, or three weeks later than they were, the number of cases may have shown a 3-fold, 7-fold, or 18-fold increase, respectively.

Study author Dr. Shengjie Lai, of the University of Southampton, comments: "Our study demonstrates how important it is for countries which are facing an imminent outbreak to proactively plan a coordinated response which swiftly tackles the spread of the disease on a number of fronts. We also show that China's comprehensive response, in a relatively short period, greatly reduced the potential health impact of the outbreak."

The research also found that improved disease detection, isolation of cases and social distancing (for example, the canceling of large public events, working from home and school closures) are likely to have had a far greater positive impact on containment than travel restrictions. The authors suggest social distancing should be continued for the next few months in China to prevent case numbers increasing again after the lifting of travel restrictions in late February.

Director of the University of Southampton's WorldPop group, Professor Andy Tatem, says: "We have a narrow window of opportunity globally to respond to this disease and given effective drugs and vaccines are not expected for months, we need to be smart about how we target it using non-drug-related interventions. Our findings significantly contribute to an improved understanding of how best to implement measures and tailor them to conditions in different regions of the world.

"We are now focused on adapting this work to new

settings beyond China to support response efforts. Different countries may need different approaches, but we aim to help them make informed decisions on how best to put interventions in place."

Population mapping work by WorldPop, funded primarily by the Bill and Melinda Gates Foundation, is helping to inform the World Health Organisation and the US Centers for Disease Control and Prevention (CDC) about the potential spread of COVID-19 and provides valuable information about how best to effectively target interventions in countries globally.

More information: Shengjie Lai et al. Effect of non-pharmaceutical interventions for containing the COVID-19 outbreak: an observational and modelling study, (2020). DOI: 10.1101/2020.03.03.20029843

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