Combined social distancing measures prove effective in reducing spread of COVID-19: research

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New world-leading research by The University of Western Australia has confirmed that social distancing measures such as working from home, self-isolation, and community contact reduction are highly effective in reducing the number of cases of COVID-19.

Researchers used computer modeling to evaluate a range of social distancing measures to determine for the first time which strategies were most effective in reducing the peak daily infection rate and resulting pressure on the health care system.

The study, published today in MedRxiv, found that the two most effective social distancing measures were self-isolation and a 70 percent reduction in community-wide contact, which is defined as any social contact outside of school, work or home.

Research leader Professor George Milne, from UWA's School of Computer Science and Software Engineering, said both these measures could be further strengthened.

"Given we assumed that only cases are isolated, not the whole family, there is scope to increase the effectiveness of that strategy," Professor Milne said.

The ability of countries to contain and control transmission of COVID-19 was critical in the absence of a vaccine, he said.

Professor Milne said the modeling suggested that school closure was the least effective single social distancing measure and it was highly disruptive as adults needed to care for younger children.

"Its moderate effectiveness arises from our assumption that children still have contact in the wider community when schools are closed," he said. "This suggests that combining school closure with even a 30 percent reduction in community-wide contact will be significantly more effective."

Using COVID-19 transmission data from the outbreak source in Hubei Province in China collected before containment measures were activated, the researchers adapted an established individual-based simulation model of the city of Newcastle in New South Wales, Australia, which has a population of 272,409.

Professor Milne said simulation of virus transmission in the community model without interventions provided a baseline from which to compare alternative social distancing strategies.

"The infection history of each individual was determined, as was the time of infection," he said. "From this model-generated data the rate of growth in cases, the magnitude of the epidemic peak and the outbreak duration was obtained."

Researchers found that both the timing and

strength of social distancing measures had a substantial effect in reducing the number of infections in a pandemic situation.

Professor Milne said the timing of activation of social distancing measures was a challenge facing public health authorities, balancing what needed to be done with what was feasible, and this would vary between countries.

"Our modeling gives initial guidance on the relative benefit of a range of mitigation strategies," he said.

"As the COVID-19 pandemic develops more subtle strategies will need to be evaluated, such as the phased introduction of additional measures if it is found that existing strategies are ineffective in reducing daily case numbers.

"Similarly, modeling will be required to determine optimal strategies to phase the ending of interventions once the epidemic peak has passed."

More information: George J Milne et al. The Effectiveness of Social Distancing in Mitigating COVID-19 Spread: a modelling analysis, (2020). DOI: 10.1101/2020.03.20.20040055

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