Study shows contagions could be catalysts for mass migration

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Pandemics and civil unrest often lead to mass migration, both temporarily and permanently. Credit: Pixabay.

Could the COVID-19 pandemic spell the end of globalisation and migration?

Not according to new epidemic research published in *Scientific Reports*, by a group of University of Sydney pandemic modelers led by Centre for Complex Systems Director, Professor Mikhail Prokopenko.

Disease outbreaks, civil unrest and war often bring about the biggest movements of people. The end of the Second World War saw the largest movement of people in Europe's history, with millions settling in Australia in the decades following 1945.

In 2015-16, the Syrian conflict displaced over four million people who dispersed across the world seeking safety, while the Ebola crisis similarly saw both temporary and permanent relocation.

"While many countries' borders are now closed, making migration virtually impossible, a post-pandemic world might look very different," said Faculty of Engineering academic, Professor Mikhail Prokopenko, who recently contributed to the G08 COVID-19 Federal Advisory report, Roadmap to Recovery

"Epidemics are examples of wider contagion phenomena which also include social segregation, "infodemics"—waves of misinformation, and social unrest," said Professor Prokopenko.

"Our theoretical modelling suggested that, when faced with either threat or opportunity, people tend to avoid risks, seek an advantage, or both. One can stretch these scenarios and imagine how attractive a destination Australia may appear if the local transmission of COVID-19 is eliminated in our country," he said.

While governments around the world have called for restrictions on migration during the post-pandemic recovery phase, people who have been affected by economic collapse or worsened health conditions may consider short-term or even long-term relocation to safer regions.

"We showed that large-scale collective behaviors, such as migration, can result from very small changes in human decision-making", said the study's lead author and Centre for Complex Systems Ph.D. student, Nathan Harding.

"In other words, even if individuals re-assess their risks only slightly, their combined actions can bring a tipping point in terms of population resettlement," said Mr Harding.

"While Ebola outbreaks affected only relatively small areas of the world, the COVID-19 pandemic has affected almost every country and continues to spread. Therefore we can expect far-reaching impacts that may boost global and regional migration," said Professor Prokopenko.

How the modelling worked

The model traces a "contagion" spread in an abstract geographical region, where agents representing people make choices to stay or move around. The method looks at how changes in individual preferences affect the behaviour of a large population. The model is theoretical and needs to be calibrated and validated with real-world data in order to evaluate specific diseases and scenarios.

More information: Nathan Harding et al. Population mobility induced phase separation in SIS epidemic and social dynamics, *Scientific Reports* (2020). DOI: 10.1038/s41598-020-64183-1

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