Model shows potential contact tracing impact against COVID-19

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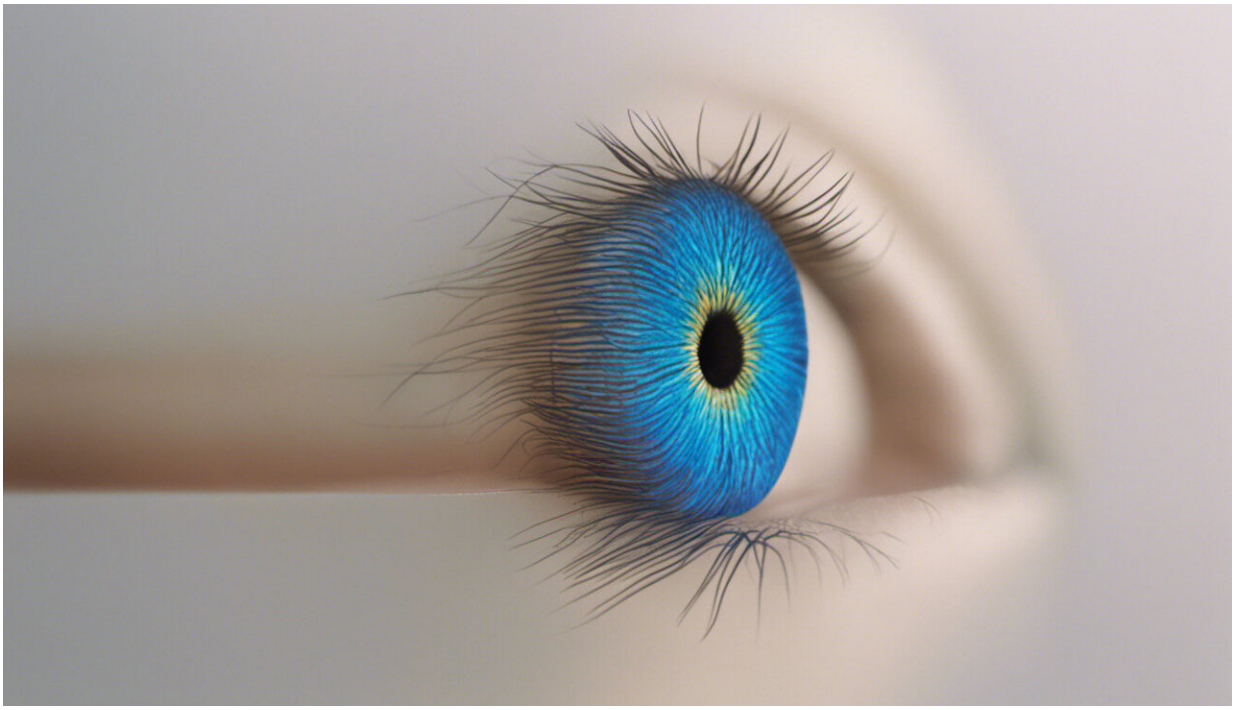

Credit: AI-generated image (disclaimer)

Researchers have developed a mathematical model to examine the potential of contact tracing to reduce the spread of the coronavirus.

The United States is the global leader in deaths from the virus, yet there is no national effort to adopt a cohesive contact-tracing plan. As a result,

public health departments in most states have established their own plans, hiring contact tracers to fan out in their communities and build maps to show who has come into contact with people who have tested positive for the virus. The data lets public health officials know where transmissions are happening and when it's safe to ease up on lockdowns and quarantines.

Most importantly, contact tracing can lead to earlier identification of people who may be infected, and they can be encouraged to quarantine and isolate.

Stanford Health Policy's Joshua Salomon, Ph.D., professor of medicine and senior fellow at the Freeman Spogli Institute for International Studies, and his colleagues have developed a mathematical model to examine the potential of contact tracing to reduce the spread of the coronavirus. They modeled contact-tracing programs in the context of relaxed physical distancing, varying the percentage of hypothetical symptomatic infections detected in a community from 10% to 90% compared with scenarios without contact tracing.

They found that detection of cases in the community and successful outreach to contacts both need to exceed 50% for contact tracing to reduce transmissions significantly. They also found that the most effective programs—those with high levels of testing, tracing, isolation and quarantine efficacy—could reduce overall transmission by almost half. Such a benefit would allow for considerable loosening of physical-distancing measures and public health restrictions while still helping control the spread of COVID-19.

"The benefits of contact tracing depend substantially on adherence to isolation and quarantine among individuals who are traced, which could be enhanced through policy measures such as voluntary out-of-home accommodations, income replacement, and social supports," Salomon

and his co-authors write in a *JAMA Network* research letter published Aug. 21. Salomon is the senior author. Alyssa Bilinski, a graduate student in health policy at Harvard, is the lead author.

Simulating chains of transmission

The model evaluates the benefits of contact tracing programs by simulating chains of transmission. It then considers how these chains can be broken by diagnosing people who are infected, identifying their contacts and helping those contacts prevent further transmission by self-isolating or self-quarantining. In the study, the authors look at factors that reduce or increase the benefits of contact tracing.

There are many obstacles that limit the ability to realize the maximum benefits from contact tracing programs, Salomon said, including the lack of national coordination and funding—and the large volume of ongoing transmissions.

"With the epidemic continuing to rage in many places, and ongoing strains on testing capacity, a lot of contact tracing programs are really stretched to their limits," Salomon said.

On the other hand, he noted that contact-tracing programs in some states, including New York and Massachusetts, are achieving promising results.

"It is also important to continue to invest in contact tracing capacity now, because once we're able to get our arms around the epidemic a little bit better, the combination of testing, contact tracing and supported isolation will be essential to containment and outbreak response," he said.

More information: Alyssa Bilinski et al. Modeling Contact Tracing Strategies for COVID-19 in the Context of Relaxed Physical Distancing Measures, *JAMA Network Open* (2020). DOI:

10.1001/jamanetworkopen.2020.19217