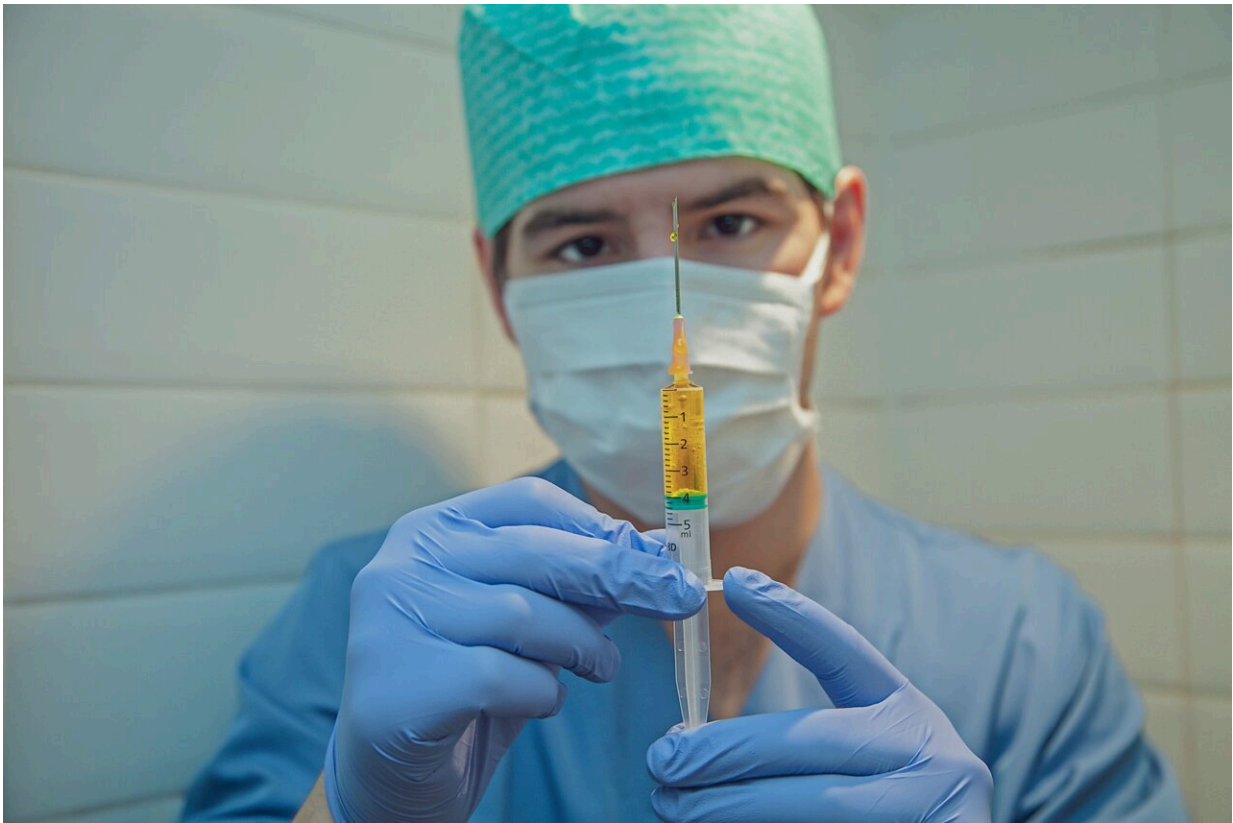


# Scientists find that external factors impact vaccine belief-behavior predictions

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Building on a new mathematical model that represents vaccine hesitancy as a belief that can influence whether parents vaccinate their children, Nicole Creanza, assistant professor of biological sciences, and

postdoctoral scholar Kerri-Ann Anderson extended their work to include the effect of external factors that affect vaccine availability, such as vaccine mandates and vaccine inaccessibility.

"Instead of modeling [vaccine](#) mandates and inaccessibility as a physical driver or barrier to vaccination, respectively, we considered their effects from a cultural perspective," Anderson said. "We model the effects of these external factors by considering how beliefs interact with them to shape vaccination behaviors. Our data shows that a vaccine mandate has a lesser consequence on a person's motivation to vaccinate if they already had very positive feelings about vaccines."

The [article](#), "Internal and external factors affecting vaccination coverage: modeling the interactions between [vaccine hesitancy](#), accessibility, and mandates" was published in the journal *PLOS Global Public Health* on Oct. 4. The simulations are available to be reviewed on [GitHub](#).

The findings also demonstrate that when large groups trust vaccines, they usually get vaccinated. But if there aren't enough vaccines, even those who trust them might not get them. In addition, when vaccine mandates are in place, it can seem like everyone is getting vaccinated. But more people than researchers expected might still be unsure about vaccines and not get them.

"We hope that our research emphasizes how important it is to not generalize populations based on a single characteristic or assume populations behave similarly or beliefs have similar influences across varying circumstances," Anderson said.

"This research provides a better understanding of how [public health policies](#) could interact with cultural dynamics to bring about unexpected outcomes," Creanza said.

Next, Creanza and Anderson will pursue the creation of a model to comprehend how people respond when a new vaccine, like the COVID-19 vaccine, is introduced. When a novel [vaccine](#) is initially introduced, people tend to exhibit more unpredictable behavior, even those who have confidence in established vaccines, Creanza said.

**More information:** Kerri-Ann M. Anderson et al, Internal and external factors affecting vaccination coverage: Modeling the interactions between vaccine hesitancy, accessibility, and mandates, *PLOS Global Public Health* (2023). [DOI: 10.1371/journal.pgph.0001186](https://doi.org/10.1371/journal.pgph.0001186)

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