

Hong Kong finds way to measure vaccine effectiveness in absence of adequate health data

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Helpful in data-deficient countries where public health data infrastructure is not good enough to apply standard measurements



A research team from the Hong Kong University of Science and Technology (HKUST) has demonstrated how to measure vaccine effectiveness (VE) in the absence of adequate public health data, offering an easy-to-implement alternative to measuring VE and keeping data-deficient countries informed when formulating and adjusting their vaccination and immunization policies.

Measuring VE could be difficult for low- and middle-income countries. This is because while the health authorities in these countries may know how many people in the total population were vaccinated, infected, or hospitalized, they often don't know whether a particular person who tested positive was vaccinated or not. Without such knowledge of personal vaccination status, the standard test-negative design (TND) methodology could not be used.

Now, a research team **from HKUST and University of New South Wales** has demonstrated how to estimate VE even in the absence of such personal data. The team exploits the fact that many governments applied age-based eligibility cut-offs when rolling out their vaccination programs – meaning that at some point citizens above the cut-off age are eligible for vaccination, whereas those below are not.

Using a simple statistical model called the Regression Discontinuity Design (RDD), the team then compared the various COVID-19 outcomes (positive cases, positive cases with high CT value, hospitalizations, deaths) of groups of individuals above and below the cut-off age. These groups are very close in age, and hence assumed identical in terms of health conditions or their exposure to disease. This allows one to calculate VE with less data than required by standard VE methods. A key input for RDD-based VE measure is the proportional drop in COVID-19 outcomes at the cut-off age, which is factored into the calculation along other inputs, including the vaccination rates corresponding to the same age groups.