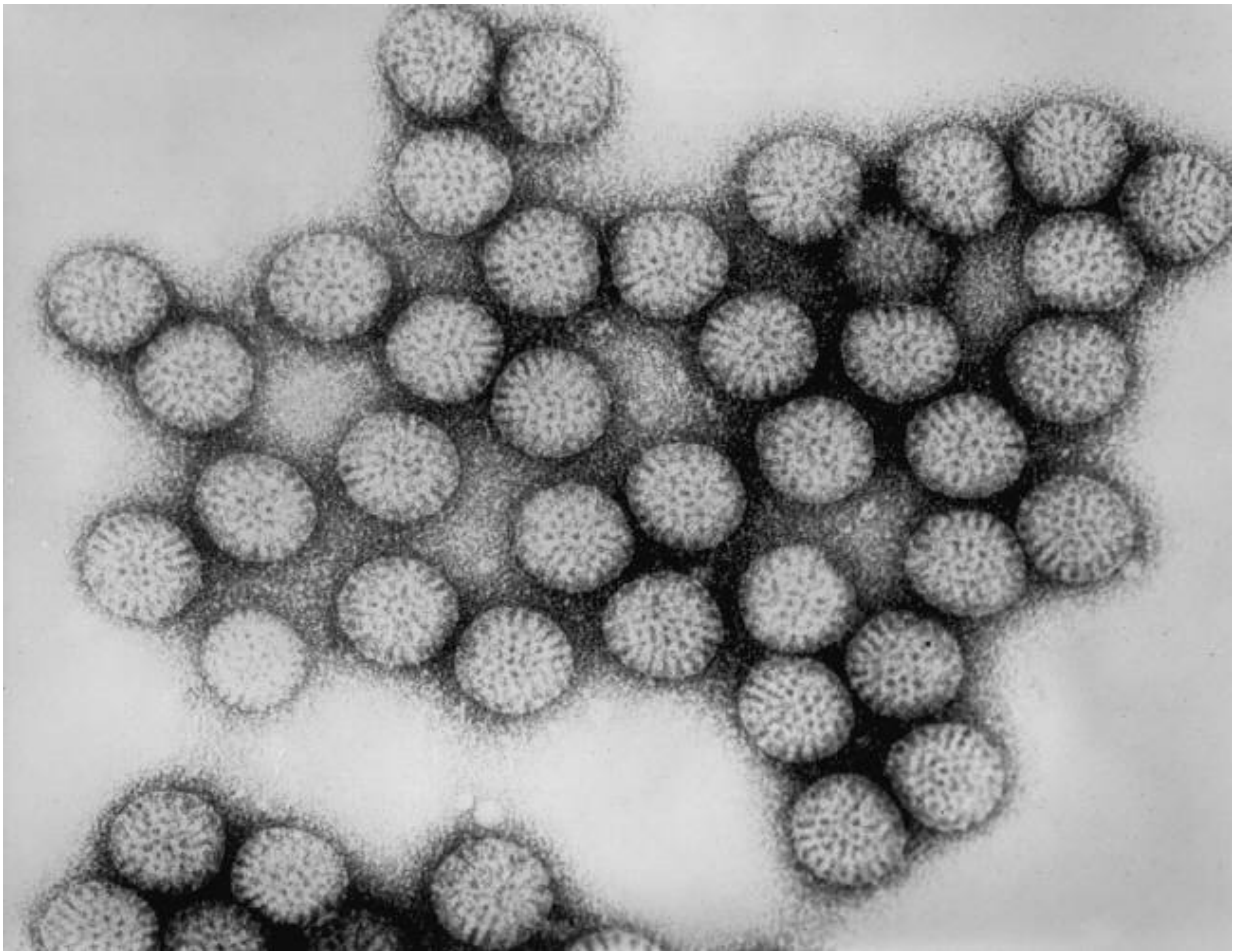


Lower risk of type 1 diabetes seen in children vaccinated against 'stomach flu' virus

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Transmission electron micrograph of intact rotavirus particles, double-shelled.
Transmission electron micrograph of intact rotavirus particles, double-shelled.
Credit: CDC

Vaccinating babies against a virus that causes childhood "stomach flu" greatly reduces their chance of getting so sick that they need hospital care, a new study shows.

But the study also reveals a surprise: Getting fully vaccinated against [rotavirus](#) in the first months of life is associated with a [lower risk](#) of developing Type 1 diabetes later on.

As a group, [children](#) who received all recommended doses of [rotavirus vaccine](#) had a 33 percent lower risk than [unvaccinated children](#) of getting diagnosed with type 1 diabetes—a lifelong disease with no known prevention strategies or cure.

A team from the University of Michigan made the finding using nationwide health insurance data, and published their results in the journal *Scientific Reports*.

The study provides strong post-market evidence that the [vaccine](#) works. Children vaccinated against rotavirus had a 94 percent lower rate of hospitalization for rotavirus infection, and a 31 percent lower rate of hospitalization for any reason, in the first two months after vaccination. Rotavirus hits infants and toddlers hardest; it can cause diarrhea and vomiting that can lead to dehydration or loss of fluids.

Yet the study finds more than a quarter of American children don't get fully vaccinated against rotavirus, and that the rate varies widely across the country. Less than half of children in New England and Pacific states were fully vaccinated. Two-thirds of children in the central part of the country were fully vaccinated.

The Centers for Disease Control and Prevention recommends that infants receive the multi-dose vaccine starting no later than 15 weeks, and finish receiving it before they are eight months old. Infants receive

the vaccine in oral drops.

Type 1 diabetes relationship

The paper's authors, led by epidemiologist Mary A.M. Rogers, Ph.D., caution that they cannot show a cause-and-effect relationship between rotavirus vaccination and Type 1 [diabetes risk](#).

"This is an uncommon condition, so it takes large amounts of data to see any trends across a population," says Rogers, an associate professor in the U-M Department of Internal Medicine. "It will take more time and analyses to confirm these findings. But we do see a decline in Type 1 diabetes in young children after the rotavirus vaccine was introduced."

The new result echoes the findings of a study of Australian children published earlier this year, which found a 14 percent reduced risk of Type 1 diabetes after the rotavirus vaccine was introduced in that country. That study, and the new one, suggest that a childhood vaccine may lead to a lower risk of a later chronic condition.

It also fits with laboratory studies showing that rotavirus attacks the same kind of pancreas cells that are affected in people with Type 1 diabetes.

The death of insulin-producing cells, called beta cells, means people with Type 1 diabetes depend on injections of insulin, and multiple daily checks of their blood sugar, for life. If the condition is not managed well, people with Type 1 diabetes may develop problems with their kidneys, heart, eyes, blood vessels and nerves over time.

Data-driven discovery

The U-M team used anonymous insurance data from 1.5 million

American children born before and after the modern rotavirus vaccine was introduced in 2006. In nearly all cases, the vaccine was free, with no copayment, to the family of the infant. The total lifetime cost of caring for an individual with Type 1 diabetes has been estimated in the millions of dollars.

The risk was especially lower among children who received all three doses of the pentavalent form of the vaccine than those who received two doses of the monovalent form. The pentavalent rotavirus vaccine protects against 5 types of the rotavirus while the monovalent vaccine protects against 1 type.

Children partially vaccinated—that is, started the vaccine series but never finished it—did not have a lower risk of Type 1 diabetes.

More than 540,000 of the children in the study and born after 2006 received the complete series of rotavirus shots; nearly 141,000 received at least one dose, and more than 246,000 did not.

Another comparison group, born in the five years before the vaccine was available, included nearly 547,000 children.

In absolute terms, Rogers and her colleagues report that eight fewer cases of Type 1 diabetes would be expected to occur for every 100,000 children each year with full vaccination.

Type 1 diabetes, once called "juvenile diabetes," only affects a few children out of every 100,000, so having such a large pool of data can help spot trends, says Rogers, an epidemiologist who worked with internist Catherine Kim, M.D., M.P.H. and statistician Tanima Basu, M.S. Rogers and Kim are members, and Basu is a staff member, of the U-M Institute for Healthcare Policy and Innovation, which provided the data used in the study.

"Five years from now, we will know much more," says Rogers. "The first groups of children to receive the rotavirus vaccine in the United States are now in grade school, when Type 1 [diabetes](#) is most often detected. Hopefully, in years to come, we'll have fewer new cases—but based on our study findings, that depends upon parents bringing in their children to get vaccinated."

More information: *Scientific Reports* (2019). [DOI: 10.1038/s41598-019-44193-4](#) , www.nature.com/articles/s41598-019-44193-4

Provided by University of Michigan

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