Measles vaccination linked to health, schooling benefits among children in LMICS

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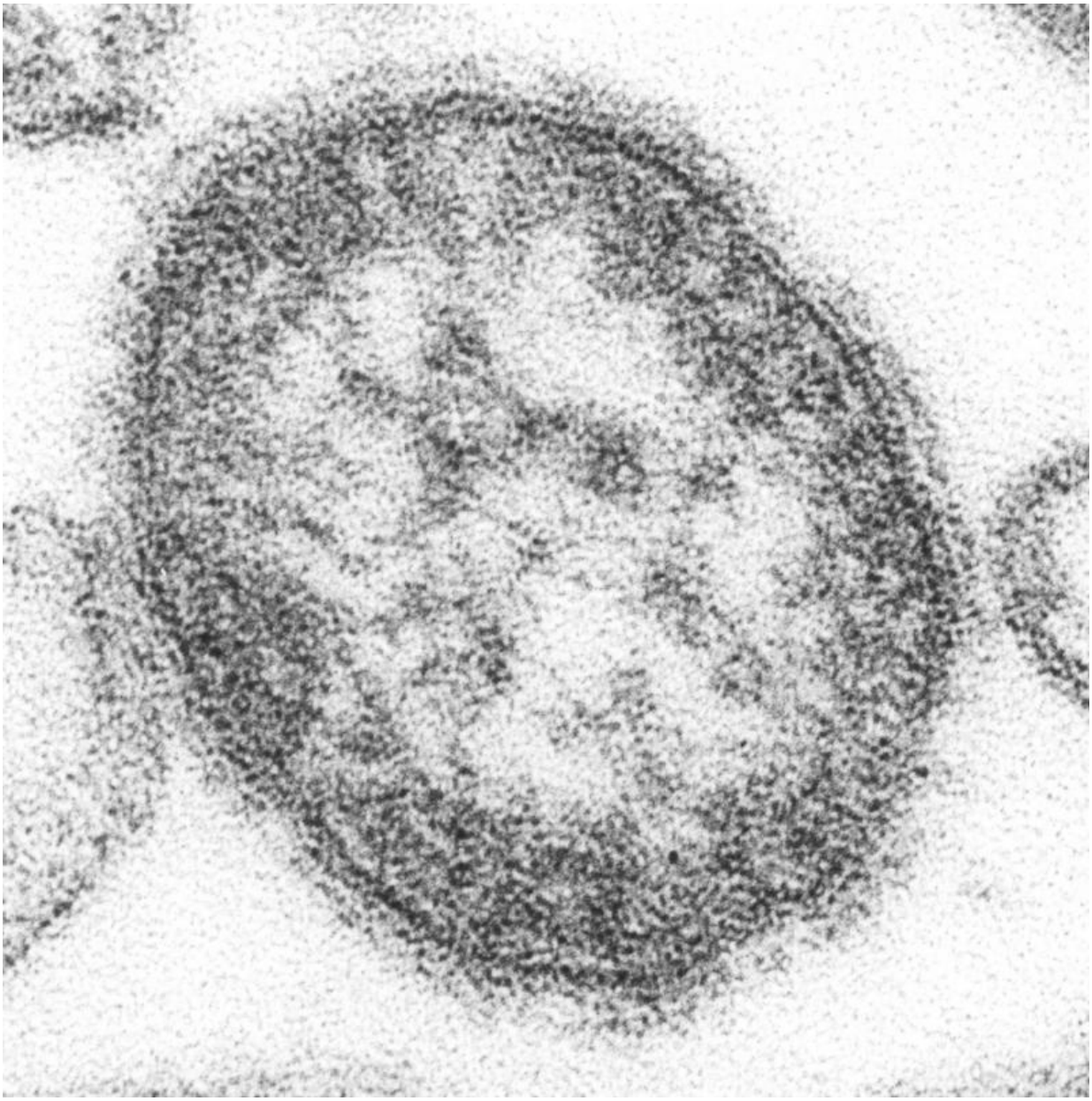

An electron micrograph of the measles virus. Credit: CDC/ Courtesy of Cynthia S. Goldsmith

While the measles vaccine has eliminated the virus in many high-income countries, the global burden of disease persists with an estimated 245,000 measles cases and 68,000 measles-associated deaths worldwide in 2016. India alone accounted for 50 percent of measles cases and 30 percent of measles deaths in 2016. Although low- and middle-income countries (LMICs) account for a large proportion of global measles cases, high-income countries have recently seen a resurgence of measles outbreaks.

According to the US Centers for Disease Control and Prevention (CDC), there have been over 1,000 measles cases reported across 28 states in the US so far in 2019. This is the largest number of cases the country has seen in almost 3 decades, and since measles was eliminated in 2000. Despite these recent setbacks, the highly efficacious and cost-effective measles vaccine prevented an estimated 21.1 million child deaths worldwide between 2000-2017. The vaccine has also been tied to reductions in all-cause childhood mortality and infectious disease morbidity outcomes in LMICs, although little generalizable evidence exists on the early-life receipt of measles vaccines and associated child growth parameters, cognition, and schooling grades.

Researchers examined Z- scores of height-for-age (HAZ), BMI-for-age (BMIZ), weight-for-age (WAZ), scores of Peabody Picture Vocabulary Test (PPVT), early grade reading assessment (EGRA), language and mathematics tests, and highest schooling attainment across ~6,000 measles-vaccinated and unvaccinated children in Ethiopia, India, and Vietnam. Propensity score matching methods were used to reduce the

effects of potential confounding factors.

Researchers analyzed survey data from 3 cohorts of children enrolled in the Young Lives Survey (YLS), a longitudinal study assessing childhood poverty. Growth, cognitive, and schooling indicators were evaluated across measles-vaccination groups, and outcomes at ages 7-8 and 11-12 years were compared between children across the 3 countries with reported receipt or non-receipt of measles vaccination at 6-18 months of life.

"We reviewed children who were followed since infancy through childhood and used statistical techniques that produced robust estimates of the associations of measles vaccination with later life outcomes. It is the first and the largest multi-country study of its kind.", said CDDEP senior fellow Arindam Nandi, the lead author of the study.

The study found that at ages 7-8 years, measles-vaccinated children had significantly higher HAZ scores in India (an increase of 0.13 points, P=0.05), and significantly higher BMIZ and WAZ scores in Vietnam (an increase of 0.18 and 0.23 points, P=0.04, 0.01) as compared with matched measles-unvaccinated children. Measles-vaccinated children scored 2.3, 2.5, and 2.7 points more on EGRA in Ethiopia, India, and Vietnam, respectively. Vaccinated children scored 4.5 and 2.6 percentage points (pp) higher on PPVT and 2.9 and 4.0 pp higher on mathematics in Ethiopia and Vietnam.

Similarly, at ages 11-12 years, measles-vaccinated children had 0.19 higher BMIZ scores in Vietnam (P= 0.04), and they scored 3 pp more on English and PPVT in India. Vaccinated children also attained 0.2-0.3 higher schooling grades across all ages and countries compared to measles-unvaccinated children.

Findings indicate that measles vaccination at 6-18 months of life is

associated with long-term health, cognition, and schooling benefits among children in Ethiopia, India, and Vietnam.

"As a pediatrician and parent myself, I feel confident that these results will show other parents and medical workers how the measles vaccine may help their children achieve better health and educational outcomes.", said Anita Shet, who is a coauthor of the study and a pediatric infectious disease specialist at the International Vaccine Access Center, Johns Hopkins Bloomberg School of Public Health.

CDDEP director Ramanan Laxminarayan, a coauthor of the study, said, "At a time when there is hesitation about measles vaccination by parents, the results of this study are an important reminder that the benefits of measles vaccination go beyond child survival and are instrumental in enabling adults who have higher cognitive ability, education and physical stature. These are critical to economic development that every country aspires to."

The study titled, "Anthropometric, cognitive, and schooling benefits of measles vaccination: longitudinal cohort analysis in Ethiopia, India, and Vietnam," was published on June 18, 2019 in *Vaccine*.

More information: Arindam Nandi et al, Anthropometric, cognitive, and schooling benefits of measles vaccination: Longitudinal cohort analysis in Ethiopia, India, and Vietnam, *Vaccine* (2019). DOI: 10.1016/j.vaccine.2019.06.025

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