Chinese infants not getting measles protection from moms

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Mothers in China are not passing on protective antibodies against measles to their infants, leaving children under 8 months—the age at which vaccine is first administered—vulnerable to the disease, researchers at the University of Michigan have found.

Further, the level of protective antibodies decreased with age, with almost all infants lacking maternal antibodies at 3 months old.

Matthew Boulton, senior associate dean for global public health at the U-M School of Public Health, said the team's results show current vaccination programs are not effective in controlling transmission of measles to infants. The researchers suggest either the infants or their mothers may need additional protection.

"Effectively controlling measles in China and globally will require that we achieve and maintain very high levels of vaccination among children, but also adoption of new strategies that likely involve immunization of young adult populations who remain susceptible to disease," Boulton said.

The research involved 551 infants from 1-to-8 months old and their mothers. The 2011-2015 study included mother-infant dyads from 120 rural villages and urban communities representing each of the 16 geographic districts in Tianjin.

Research has shown that when a pregnancy goes full term and the

mother has adequate nutrition, she will typically pass on antibody protection to the fetus if she has been immunized or has had a case of the measles.

The current study showed mothers with a known history of measles provided 1.6 times higher titers to their infants—the concentrations of antibodies in the blood—than those mothers who had no known history with the disease or vaccination. Over two-thirds of mothers who were immune to measles were unsure if they had been vaccinated or had disease.

Measles continues to be one of the most highly infectious diseases in the world. Although deaths have decreased 79 percent since 2000, measles claimed more than 134,000 lives worldwide in 2015, mostly in infants and young children. A large percentage of cases continue to occur in China.

After the first dose of vaccine at 8 months, children in China receive a second dose at 18-24 months. The Tianjin CDC also offers a third dose at age 5, although this is not done in all parts of China.

"China has been very successful at immunizing eligible children for measles and for carrying out very large Special Immunization Activities (e.g., National Immunization Days), which have resulted in literally millions of children being vaccinated for measles in a short period of time," Boulton said.

"Despite these successes, measles continues to occur at unacceptably high rates in both young infants and adults, which points to the need for new approaches—including the possibility of launching organized campaigns to immunize young women of reproductive age, many of whom were either never vaccinated or only received one of the two recommended doses of measles vaccine and therefore remain susceptible

to disease."

Boulton said both solutions have challenges. An additional and earlier vaccine dose for infants whose immune systems are immature might not be as effective, will add expense, and may not be appreciated by mothers who feel their infants already receive many vaccines in their first year.

An additional vaccine for young women of reproductive age would also add cost, and because adult vaccination programs are not widespread in China, could be a tough sell. Yet, of the two, Boulton said immunizing mothers might be the better option.

"With this approach, not only would we be directly preventing mothers from acquiring measles but we would also be preventing measles transmission from these young mothers to their infants while also improving the likelihood that the mother would pass on protective levels of measles antibodies to any future children she might have," he said. "Additionally, that would be important to passing on protective antibodies to the infant in the first several months of life."

Abram Wagner, postdoctoral fellow in the School of Public Health Department of Epidemiology, was a co-author on the study appearing in the *Journal of Infectious Diseases*.

More information: Matthew L Boulton et al. Measles Antibodies in Mother-Infant Dyads in Tianjin, China, *The Journal of Infectious Diseases* (2017). DOI: 10.1093/infdis/jix453

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