Study finds wide variation in those infected by H1N1

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An analysis of blood samples taken before, during and after an epidemic wave of influenza A(H1N1) in Singapore in 2009 finds variation in infection risks and antibody levels, with younger age groups and military personnel having higher infection rates than other groups, according to a study in the April 14 issue of *JAMA*.

On April 24, 2009, the World Health Organization (WHO) reported the emergence of a novel influenza A virus (2009 influenza A[H1N1]). Singapore detected its first imported cases of 2009 influenza A(H1N1) in late May 2009. "Virological surveillance documented sustained community transmission from the latter half of June 2009, followed by a single epidemic wave peaking in the first week of August and subsiding by September 2009," the authors write.

Mark I. C. Chen, Ph.D., of Tan Tock Seng Hospital, Singapore, and colleagues conducted a study using blood specimens to determine antibody levels against 2009 influenza A(H1N1) as a marker of infection in different population groups to compare the risk of infection in these groups and to investigate risk factors for infection. The study included serological samples from 4 distinct groups: general population (n = 838), military personnel (n = 1,213), staff from an acute care hospital (n = 558), and staff as well as residents from long-term care facilities (n = 300) from June 22, 2009, to October 15, 2009.

Titers (the concentration of the antibodies) were expressed as the reciprocal of the highest dilution of serum where hemagglutination (the

clumping or clustering of red blood cells caused by certain viruses or antibodies) was prevented. A 4-fold or greater increase in antibody titers between any of the 3 serological samples was defined as evidence of H1N1 seroconversion (the development of detectable antibodies in the blood directed against an infectious agent).

Baseline titers of 40 or more were observed in 2.6 percent of members of the community; 9.4 percent of military personnel; 6.6 percent of hospital staff; and 6.7 percent of participants from long-term care facilities. The researchers found that in participants with 1 or more follow-up serum samples, 29.4 percent of military personnel seroconverted compared with 13.5 percent of community members, 6.5 percent of hospital staff, and 1.2 percent of long-term care participants. Additional analysis indicated that having another household member who seroconverted remained associated with a higher likelihood of infection. "Our study also shows the variation in infection risks, with younger age groups and military personnel having much higher infection rates. The lower infection rates in older participants corroborate other epidemiological observations," the authors write.

The researchers also found that "only 13 percent of the community cohort seroconverted, which supports the case for targeted vaccination in populations for which protection is desired."

"In conclusion, our study shows wide variation in serologically determined infection rates by cohorts and age groups, suggesting that context-specific risks of infection need to be taken into account and that interventions need to be tailored to the population at risk. Although it appears that a large proportion of the Singapore adult population remain susceptible to the 2009 influenza A(H1N1) virus after the first epidemic wave, for a significant second wave to occur, a sufficient number of susceptible children may also be required for efficient transmission. These and other factors will need to be considered in the determination

of optimal pandemic vaccination strategies for influenza A(H1N1)."

More information: JAMA. 2010;303[14]:1383-1391.

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