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## High BMI: A New Determinant of Impaired Rubella Immunity During Pregnancy?

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1 **Commentary**

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3 High BMI: A New Determinant of Impaired Rubella Immunity during Pregnancy?

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11 Universal immunization programs have been implemented in many countries worldwide, and have  
12 significantly lowered the incidence and spread of infectious disease. The effective measles,  
13 mumps, and rubella (MMR) vaccine is widely-administered globally (1); however, recent studies  
14 have demonstrated a decline in protective anti-rubella antibodies in countries with universal  
15 vaccination programs – including among women of reproductive age, thus increasing risk of  
16 rubella infection and severe birth defects due to congenital rubella syndrome (2,3).

17

18 While various factors have been associated with declining rubella immunity following childhood  
19 immunization, Hui et al. (4) present compelling evidence to suggest that elevated body mass index  
20 (BMI) may impair serological immunity against rubella in pregnant women. In this large-scale  
21 retrospective cohort study, pregnant women with BMI > 25.0 kg/m<sup>2</sup> were more likely to present  
22 with serological rubella non-immunity (rubella IgG antibody titre < 10 IU/ml), as compared to  
23 women with BMI < 25.0 kg/m<sup>2</sup>. Interestingly, the risk of rubella non-immunity in women with

24 high BMI was greater in women born in Hong Kong, where rubella immunization is mandatory  
25 during childhood. The positive association between rubella non-immunity and high BMI persisted  
26 after controlling for potential confounding factors, such as maternal age, parity, short stature, as  
27 well as year and location of birth, which could impact participation in immunization programs.

28

29 Obesity can impair the regulation of immune responses by promoting lipid deposition in lymphoid  
30 tissues, alterations in leukocyte profiles and activity, and chronic inflammation. While studies have  
31 previously demonstrated that obesity negatively impacts the efficacy of vaccines against influenza,  
32 hepatitis B and tetanus (5), the current work of Hui et al. (4) is novel in that is one of few studies  
33 to find an association between high BMI and immunity against rubella, and the first study to  
34 identify this trend in pregnant women – a population most at risk for conferring severe effects of  
35 rubella infection to offspring.

36

37 While obesity initiatives often focus on reducing the risk of chronic diseases stemming from  
38 metabolic dysfunction (e.g. cardiovascular disease, type 2 diabetes mellitus)(5), these findings  
39 emphasize the importance of targeting overweight and obesity as a means to reduce the risk of  
40 infectious disease. Given that this current study was conducted in geographical areas where  
41 mandatory rubella immunization programs have implemented, these findings call into question the  
42 long-term success of these initiatives in preventing rubella outbreaks where the prevalence of  
43 overweight and obesity is high. Further investigation may be warranted to determine the need for  
44 serological screening and booster immunizations on the basis of BMI, particularly within the  
45 context of antenatal care, as a means to promote population health.

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67 **Disclosure:** The author declares no conflict of interest.