Herd Immunity and Vaccination

The original theory of herd immunity had nothing to do with vaccination

The underlying hypothesis of the original theory was that a community as a whole would develop a certain degree of natural protection from an infectious disease after a portion of its members actually contracted the disease, recovered from it, and became immune to it.[1] [2]

In other words, the more members of a community (herd) who were exposed to an infectious disease and developed natural immunity to it, the less of a threat that disease posed to the entire community (herd).

This theory cannot be applied to vaccination

Vaccination and immunization are not the same thing. Recovery from disease provides a person with long-lasting immunity. Vaccination can only provide temporary immunity, hence the need for booster doses. Many adults who received vaccines as children no longer have immunity.[3] [4]

Not everyone develops antibodies after vaccination. Vaccine effectiveness varies widely among vaccines and among individuals. People are unique and respond differently to nearly everything in their environments, including vaccine products. For example, in the case of the measles vaccine, up to 10% of the population may not develop protective antibodies.[5] [6]

Problems with vaccine-acquired immunity

We do not know how long vaccine-acquired immunity lasts. Diseases such as chickenpox, measles, and mumps have been historically referred to as "childhood illnesses". As vaccines wear off, adults are becoming more at risk for childhood illnesses, which are more likely to result in serious complications in adulthood.[7] [8] [9]

Today, because most women have been vaccinated as children, they don't have the same kind of robust maternal measles antibodies to pass on to their newborns like mothers in past generations. Most newborns today are susceptible to measles infections from birth, when complications can be more severe.[10]

---

[1] Fine PEM. Herd Immunity: History, Theory, Practice. The Johns Hopkins University School of Hygiene and Public Health. *Epidemiological Reviews* 1993;15(4):265-302. (https://tinyurl.com/pv7duxc)
[2] Hedrich AW. Estimates of the child population susceptible to measles, 1900-1930. *Am. J. Hyg*. 17:613-630.
[3] Mizumoto K, Kobayashi, T, Chowell G Transmission potential of modified measles during an outbreak, Japan, March–May 2018 *Euro Surveill.* 2018 Jun 14; 23(24): 1800239. (https://tinyurl.com/yxjdncnb)
[4] Gibney KB, Attwood LO et al. Emergence of attenuated measles illness among IgG positive/IgM negative measles cases, Victoria, Australia 2008-2017. *Clin Infect Dis* May 6, 2019. (https://tinyurl.com/y6ydmbzu)
[5] Haralambieva IH, Ovsyannikova IG et al. The genetic basis for interindividual immune response variation to measles vaccine: new understanding and new vaccine approaches. *Expert Rev Vaccines* 2013; 12(1): 57-70. (https://tinyurl.com/y5sg8w57)
[6] Poland GA, Jacobson RM, The Re-Emergence of Measles in Developed Countries: Time to Develop the Next-Generation Measles Vaccines? *Vaccine.* 2012 Jan 5; 30(2): 103–104. (https://tinyurl.com/yxgufqth)
[7] Fox A, Hung TM, Wertheim H, et al. Acute measles encephalitis in partially vaccinated adults. *PLoS One.* 2013 Aug 13;8(8):e71671(https://tinyurl.com/y364t8yz)
[8] CDC Varicella – Complications *Epidemiology and Prevention of Vaccine-Preventable Diseases* (The Pink Book). 13th ed. 2015. (https://tinyurl.com/y5zsknkj)
[9] CDC Complications of Mumps. Mar. 15, 2019 (https://tinyurl.com/yyfgnjbg)
[10] Gans HA, Maldonado YA. Editorial: Loss of Passively Acquired Maternal Antibodies in Highly Vaccinated Populations: An Emerging Need to Define the Ontogeny of Infant Immune Responses. *J Infect Dis* 2013; 208. (https://tinyurl.com/y52lmud8)