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A comparison of high-dose and regular-dose seasonal influenza vaccines toward eliciting homologous and heterologous immunity

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Background: Antigen dose is an important component of any vaccine. For influenza, both a standard-dose (SD) and high-dose (HD) version of the Fluzone vaccine are in use. The HD vaccine is approved in the US in individuals >=65 years of age. While there is solid evidence that the HD vaccine induces a stronger immune response against the influenza strains present in the vaccine, there is little information regarding its impact on induction of heterologous immunity.

Methods: We used a Bayesian, multilevel modeling framework to explore the impact of dose on immune protection as quantified by hemagglutination inhibition titer (HAI) following vaccination of a cohort of individuals with either SD or HD influenza vaccine. We investigated the impact of dose on HAI titer increase, seroconversion and seroprotection for homologous and heterologous immunity. We performed analyses for individual vaccine strain components and the overall per-vaccine impact each season.

Results: Our strain-specific analysis showed that the HD vaccine led to improved homologous immunity compared to SD. This was most notable for the H1N1 vaccine components, less so for the H3N2 and B components. The benefit of increased dose was also seen for heterologous responses, with exceptions for a few vaccine strains. On a per-vaccine analysis, increased dose was beneficial for both homologous and heterologous responses.

Conclusions: Overall, HD influenza vaccine induced higher HAI responses compared to SD vaccine. This was true for both homologous and heterologous responses. Extending HD vaccines to the general population might be worth considering, as well as attempts to further optimize the dose.

1. What is your pathogen? Multiple options possible (e.g. if working on coinfections)
    Other viruses: influenza

2. On a scale of 1-5 is your work mostly eco/epidemiological or evolutionary? 1 (100% eco/epidemiological)

3. On a scale of 1-5 is your work mostly theoretical or experimental/empirical?
    1 (100% theoretical or experimental)