VAC.12 - Effectiveness of 2018 trivalent influenza vaccine on healthcare professionals

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Introduction: Influenza viruses (IV) are responsible for millions of infections each year worldwide. IVs evolves rapidly, by antigenic drift, resulting in the need to update trivalent influenza vaccine (TIV) composition annually, in an effort to match predicted circulating strains. For this reason, studying the immune response to the TIV in the general population is important both for IV epidemiological surveillance and for providing insights into vaccine effectiveness in the different subpopulations.

Objective: Evaluate the 2018 TIV-induced response in adult health professional volunteers by means of Hemagglutination Inhibition assays (HAI).

Methodology: We collected blood from adult healthcare volunteers (CEP/IOC 2.590.783) before (S1), 21 days (S2) and 6 months (S3) after TIV administration to titer serum antibody against 6 IV strains, the current IV components: H1N1 – A/Michigan/45/2015 (MI), H3N2 – A/Singapore/INFIMH-16-0019/2016 (SI) and B/Yamagata B/Phuket/3073/2013 (PH); and the previous TIV components: H1N1- A/California/7/2009 (CA), H3N2- A/Hong Kong/4801/2014 (HK) and B/Victoria: B/Brisbane/60/2008 (BR), by HAI. Nasopharyngeal swabs of people reporting influenza-like illness (ILI) symptoms were collected, RNA extracted using commercial kit (Qiamp), tested for IV by RT-qPCR and sequenced by Sanger.

Results: We recruited 113 volunteers, 76% female, 36.6 years old on average, with 8% being elderly. 78% received TIV in any prior year, and 22% never did. Seroprotection (SP) levels (HAI titer ≥40) ranged from 67-92% (S1) to 83-99% (S2), with Seroconversion (SC) rates (4 fold increase on HAI titers) of 24.8%, 9.7%, 34.5%, 25.7%, 16.8% and 25.6% against PH, BR, MI, CA, SI and HK respectively. Overall, immune responses were more intense for H1N1, followed by H3N2, and IV-Bs, with a high degree of cross protection between the different strains of H1N1 and H3N2, being very low between IV-Bs. Previously vaccinated people presented increases of 1.41 to 2.27 times in HAI geometric mean titers (GMT) after vaccination, versus 1.81 to 9.01 times on the unvaccinated population, depending on the virus, with lower SC rates in the previously vaccinated group for all viruses. The elderly population presented similar GMT increases to the under 60 y.o. population. However, the elderly population presented lower SC rates against all viruses. On the follow-up of the volunteers, only one out of 13 volunteers who reported ILI symptoms following vaccination was positive for IV-A H1N1. The volunteer was 37 y.o and the recovered virus belongs to the MI-like genotype, the only virus she was not SP against. SP levels were reduced for TIV components after 6 months of vaccination.

Conclusion: 2018 TIV confers high levels of protections against viral components and significant protection against previous TIV components. Factors as age and previous vaccination negatively affect the response to the vaccine. Influenza vaccine evaluations should be continuous to support a better understanding of the responses in the different sub-populations and thereby the development of more effective vaccines.

Keywords: Vaccine; Influenza; Seroconversion