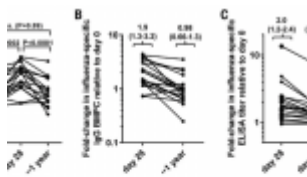
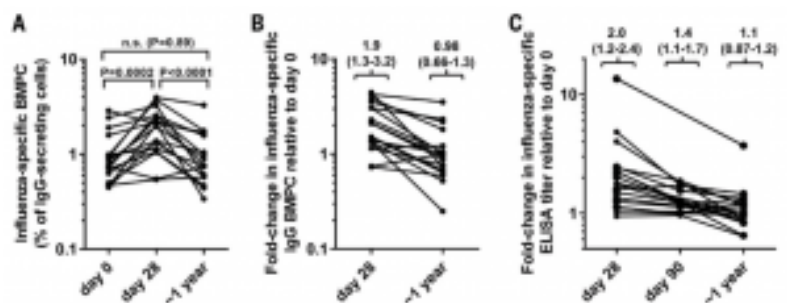


# Why is flu vaccine induced immunity short-lived?



**2** Influenza-specific BMPCs at 1 year after vaccination. (A) Percentage Cs shown over time in volunteers who returned for a third bone marrow aspiration. P values shown are for paired, two-tailed t tests of the log-transformed data. (B) Same data plotted as in (A) except the percentages of influenza-specific BMPCs at day 28 and 1 year are normalized to the day 0 percentage to visualize the fold change relative to prevaccination levels. Numbers above the points indicate the geometric means of the fold changes, with 1 influenza-specific blood IgG ELISA titers at day 28, day 90, and 1 year normalized to the day 0 titer and plotted as in (B). The same  $n = 18$  responses from 15 unique donors are shown

Viral strains that cause influenza (flu) change annually, as a result, a new flu vaccine that aims to induce immunity to new influenza strains is provided annually. One of the strategies of the flu vaccine pipeline is to develop a universal flu vaccine that could generate protective immunity to multiple influenza strains, without the need for annual vaccination. However, vaccine-induced influenza immunity declines rapidly presenting a challenge for long-term vaccine induce immunity. Bone marrow plasma cells (BMPCs) play an important role in maintaining serological IgG antibody (Ab) titres and have been shown to correlate with antigen-specific antibodies. Researchers (Davis et al.,) thus aimed to track BMPCs and Ab titres induced by flu vaccination in 53 volunteers.



**3** Decline of influenza-specific BMPCs at 1 year after vaccination. (A) Percentage of influenza-specific IgG BMPCs shown over time in volunteers who returned for a third bone marrow aspiration 1 year after vaccination. P values shown are for paired, two-tailed t tests of the log-transformed data. (B) Same data plotted as in (A) except the percentages of influenza-specific BMPCs at day 28 and 1 year are normalized to the day 0 percentage to visualize the fold change relative to prevaccination levels in each donor. Numbers above the points indicate the geometric means of the fold changes, with the IQRs in parentheses. (C) Influenza-specific blood IgG ELISA titers at day 28, day 90, and 1 year normalized to the day 0 titer and plotted as in (B). The same  $n = 18$  responses from 15 unique donors are shown in all panels.

Davis et al., detected influenza-specific BMPCs and IgG/IgA Abs in volunteers before vaccination. This immunity was due to previous flu vaccination and flu episodes. New seasonal flu vaccination significantly increases influenza-specific BMPCs and IgG/IgA Ab titres, however, 1-year post-vaccination vaccine-induced immunity declined to similar levels as

baseline. Using clonotype-tracking researchers attributed this contraction of humoral immunity to loss of newly-generated vaccine-specific cells. These results present a potential challenge for a universal flu vaccination strategy as vaccine-induced immunity declines rapidly. Detection of robust immunity before recent vaccination suggests that there is hope for inducing life-long Ab immunity. Thus future vaccine strategies should aim to induce long-lived BMPCs that have *undergone gene expression and metabolic changes required to promote longevity*.

Journal Article: Davis et al., 2020. [Influenza vaccine-induced human bone marrow plasma cells decline within a year after vaccination.](#) Science

*Summary by Cheleka AM Mpande*