Extended Data Table

Parameter	Description	Population value	Standard deviation of random effect
$\boldsymbol{H}$	Maximum antibody production rate	6,090 AU/mL	0.697
$\boldsymbol{m}$	Steepness parameter of antibody production response to mRNA	0.0176	0.369
$\boldsymbol{K}$	mRNA amount at which antibody production rate takes half its maximum value	28,100 μg/0.5mL	0
$\boldsymbol{\mu}$	Antibody decay rate	0.875 day^{-1}	0
$\boldsymbol{\tau_d}$	Delay before induction of antibody response	4.09 days	0
$\boldsymbol{D}$	mRNA dose	100 μg/0.5mL	0
$\boldsymbol{\delta}$	mRNA decay rate	0.693 day^{-1}	0

Extended Data Table 1. Population values and random effect parameters for individual antibody model parameters. We assumed individual values of each parameter, $\theta \in \{H, m, K, \mu, \tau_d, D, \delta\}$, of the antibody dynamics model (equations 7-8 in the main text) to be distributed as $\theta = \theta_{pop} \exp(\omega_\theta \varepsilon_\theta)$, where θ_{pop} is the population median value, ω_θ is the standard deviation of the random effect, and ε_θ is a random variate drawn from a normal distribution with mean zero and standard deviation one. For each such parameter, θ, the values of $\log(\theta_{pop})$ and ω_θ were taken to be the mean and standard deviation between individuals, respectively, of the natural logarithm of the individual parameter estimates obtained in (5). Specifically, in (5), individual estimates of the parameters H and m were obtained by fitting the antibody dynamics model to longitudinal data collected from 1,618 individuals following booster vaccination. The parameters K, μ and τ_d were assumed to take the specified fixed values in (5) based on separate parameter estimates obtained in that study using more densely sampled data from 12 healthcare workers (with this estimation indicating limited variability in these three parameters (5)), while the values of D and δ were assumed in that study (and we take the same values here).