
Archived Editions (COVID-19 Genomics and Precision Public Health Weekly Update)

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COVID-19 Genomics and Precision Public Health Weekly Update Content

- Pathogen and Human Genomics Studies
- Non-Genomics Precision Health Studies
- News, Reviews and Commentaries

Pathogen and Human Genomics Studies

- Dynamics of humoral and T-cell immunity after three BNT162b2 vaccinations in adults older than 80 years ([https://www.thelancet.com/journals/laninf/article/PIIS1473-3099\(22\)00219-5/fulltext](https://www.thelancet.com/journals/laninf/article/PIIS1473-3099(22)00219-5/fulltext))
AJR Olmedo, et al, Lancet Infectious Diseases, April 2021

We conclude that a third dose of BNT162b2 in older adults, while establishing immunity in primary non-responders,⁴ induces a durably escalated humoral response in the bulk of vaccinees for at least 3 months, indicating longer lasting humoral immunity. In a younger cohort, this boost also led to a strong increase of neutralising antibodies against the omicron (B.1.1.529) variant and protection from infection with the omicron variant.

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In this study we quantified infectious VL in SARS-CoV-2 infected individuals during the first 5 symptomatic days by in vitro culturability assay in unvaccinated or vaccinated individuals infected with pre-variant of concern (pre-VOC) SARS-CoV-2, Delta, or Omicron. Unvaccinated individuals infected with pre-VOC SARS-CoV-2 had lower infectious VL compared to Delta-infected unvaccinated individuals.

- Emergence and phenotypic characterization of the global SARS-CoV-2 C.1.2 lineage.

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Scheepers Cathrine et al. Nature communications 2022 4 (1) 1976

Global genomic surveillance of SARS-CoV-2 has identified variants associated with increased transmissibility, neutralization resistance and disease severity. Here we report the emergence of the PANGO lineage C.1.2, detected at low prevalence in South Africa and eleven other countries. The initial C.1.2 detection is associated with a high substitution rate, and includes changes within the spike protein that have been associated with increased transmissibility or reduced neutralization sensitivity in SARS-CoV-2 variants of concern or variants of interest. Like Beta and Delta, C.1.2 shows significantly reduced neutralization sensitivity to plasma from vaccinees and individuals infected with the ancestral D614G virus.

- Second round of the interlaboratory comparison (ILC) exercise of SARS-CoV-2 molecular detection assays being used by 45 veterinary diagnostic laboratories in the US

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- Expanded COVID-19 phenotype definitions reveal distinct patterns of genetic association and protective effects (<https://www.nature.com/articles/s41588-022-01042-x>)

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Multiple COVID-19 genome-wide association studies (GWASs) have identified reproducible genetic associations indicating that there is a genetic component to susceptibility and severity risk. To complement these studies, we collected deep coronavirus disease 2019 (COVID-19) phenotype data from a survey of 736,723 AncestryDNA research participants. With these data, we defined eight phenotypes related to COVID-19 outcomes: four phenotypes that align with previously studied COVID-19 definitions and four 'expanded' phenotypes that focus on susceptibility given exposure, mild clinical manifestations and an aggregate score of symptom severity.

- Inequities in COVID-19 vaccine and booster coverage across Massachusetts ZIP codes: large gaps persist after the 2021/22 Omicron wave (<https://www.medrxiv.org/content/10.1101/2022.04.07.22273593v1>)

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We analyzed data on 418 ZIP codes. We observed wide geographic variation in primary series vaccination and booster rates, with marked inequities by ZIP-code-level education, median household income, essential worker share, and racial-ethnic composition. In age-stratified analyses, primary series vaccine coverage was very high among the elderly. However, we found large inequities in vaccination rates among younger adults and children, and very large inequities in booster rates for all age groups. In multivariable regression models, each 10 percentage point increase in "percent college educated" was associated with a 5.0 percentage point increase in primary series vaccine coverage and a 4.9 percentage point increase in booster coverage.

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By constructing a detailed mathematical model and calibrating it to the Israeli data, we extend the understanding of the impact of the booster campaign from the individual to the population level. We used the calibrated model to explore counterfactual scenarios in which the booster vaccination campaign is altered by changing the eligibility criteria or the start time of the campaign and to assess the direct and indirect effects in the different scenarios. The results point to the vast benefits of vaccinating younger age groups that are not at a high risk of developing severe disease but play an important role in transmission

- Myopericarditis following COVID-19 vaccination and non-COVID-19 vaccination: a systematic review and meta-analysis ([https://www.thelancet.com/journals/lanres/article/PIIS2213-2600\(22\)00059-5/fulltext](https://www.thelancet.com/journals/lanres/article/PIIS2213-2600(22)00059-5/fulltext))
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The overall risk of myopericarditis after receiving a COVID-19 vaccine is low. However, younger males have an increased incidence of myopericarditis, particularly after receiving mRNA vaccines. Nevertheless, the risks of such rare adverse events should be balanced against the risks of COVID-19 infection (including myopericarditis).

- Effectiveness of COVID-19 mRNA Vaccination in Preventing COVID-19–Associated Hospitalization Among Adults with Previous SARS-CoV-2 Infection – United States, June 2021–February 2022 (https://www.cdc.gov/mmwr/volumes/71/wr/mm7115e2.htm?s_cid=mm7115e2_w)
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Persons with previous SARS-CoV-2 infection have some protection against reinfection leading to hospitalization, but there is limited evidence regarding the additional benefit of vaccination among these persons. This study found that among persons with previous infection, COVID-19 mRNA

vaccination provided protection against subsequent COVID-19–associated hospitalization. Estimated vaccine effectiveness against reinfection leading to hospitalization during the Omicron-predominant period was approximately 35% after dose 2, and 68% after a booster dose.

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