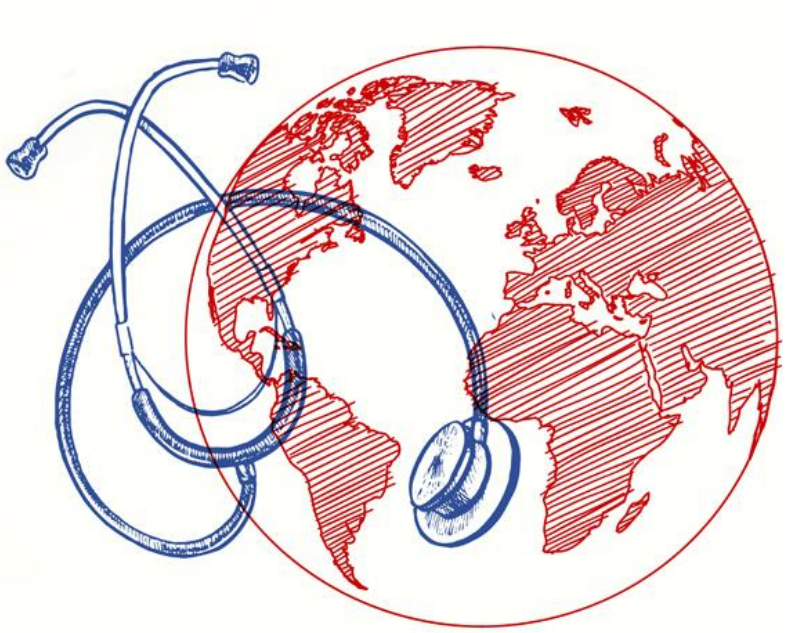
Global Health Cast 57

January 29, 2024



Dr. Melvin Sanicas
@Vaccinologist

Prof. Dr. Joe Schmitt
@Prof_Schmitt

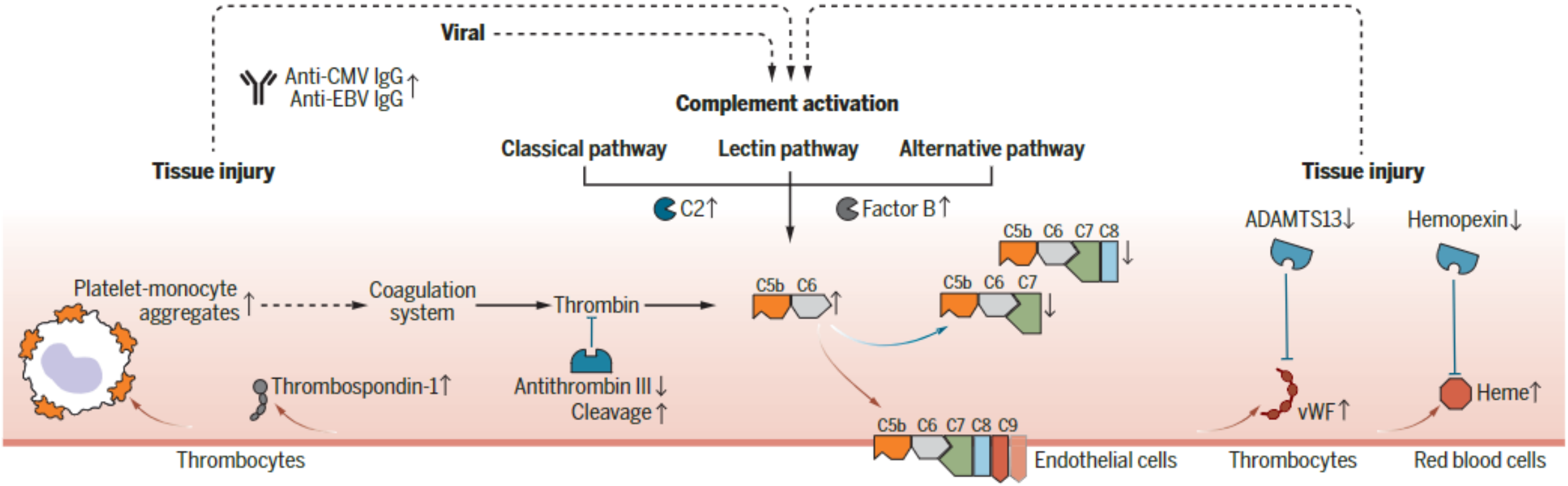
What we talk about today

- Increased risk of autoimmune disease AFTER COVID-19
- Persistent complement dysregulation in active Long Covid
- COVID-19 causes dopaminergic neuron senescence
- COVID vaccines protect against Long COVID
- Congenital syphilis – an “old-new” problem?
- HPV vaccination and cervical cancer risk reduction
- Longer education years reduce mortality risk

INCREASED RISK OF AUTOIMMUNE DISEASE AFTER COVID-19

Country	# with COVID	# Controls No COVID	Increase risk of New Autoimmune disease	Source
US	888,463	2,926,016	**19 – 47%** depending on specific condition	Chang R, Yen-Ting Chen T, Wang SI, Hung YM, Chen HY, Wei CJ. Risk of autoimmune diseases in patients with COVID-19: A retrospective cohort study. EClinicalMedicine. 2023 Feb;56:101783
Germany	641,704	1,560,357	**43%**	Tesch, F., Ehm, F., Vivirito, A. et al. Incident autoimmune diseases in association with SARS-CoV-2 infection: a matched cohort study. Clin Rheumatol 42, 2905–2914 (2023)
United Kingdom	458,147	1,818,929	**22%**	Syed, U., Subramanian, A., Wraith, D.C. et al. Incidence of immune-mediated inflammatory diseases following COVID-19: a matched cohort study in UK primary care. BMC Med 21, 363 (2023)
South Korea	354,527	6,134,940	**adjusted hazard ratio, 1.12 to 2.76** depending on specific condition	Lim SH, Ju HJ, Han JH, et al. Autoimmune and Autoinflammatory Connective Tissue Disorders Following COVID-19. JAMA Netw Open. 2023;6(10):e2336120.

Persistent complement dysregulation with signs of thrombo inflammation in active Long Covid



Pathomechanistic model of Long Covid. Model of complement-mediated thromboinflammation, showing increased and decreased biomarkers (up arrows and down arrows, respectively) measured at 6-month follow-up in patients with persistent Long Covid symptoms compared with recovered COVID-19 patients and healthy controls. Measurements were done using proteomics, spectral flow cytometry, single-cell transcriptomics, high-throughput antibody measurements, and targeted assays. Red arrows mark activating protein interactions, and blue arrows mark inhibiting protein interactions. Dashed arrows connect changes in different biological pathways.

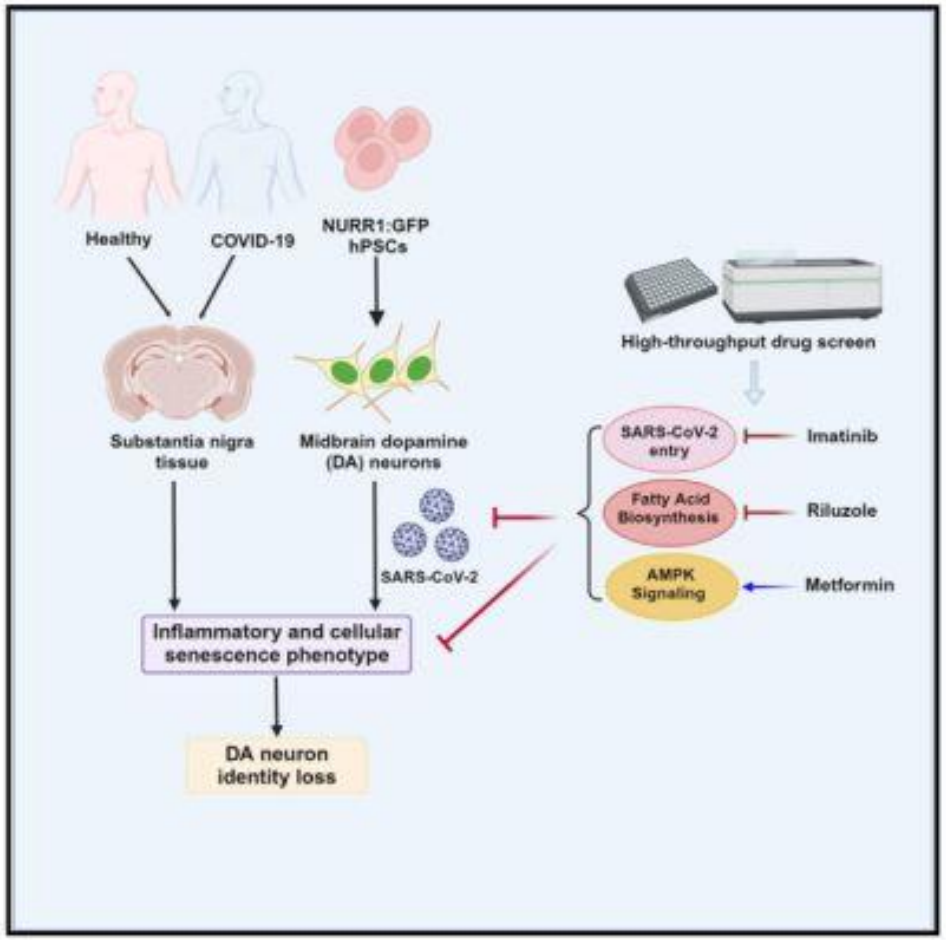
https://www.science.org/doi/10.1126/science.adg7942

Cell Stem Cell

Article

SARS-CoV-2 infection causes dopaminergic neuron senescence

Graphical abstract



Authors

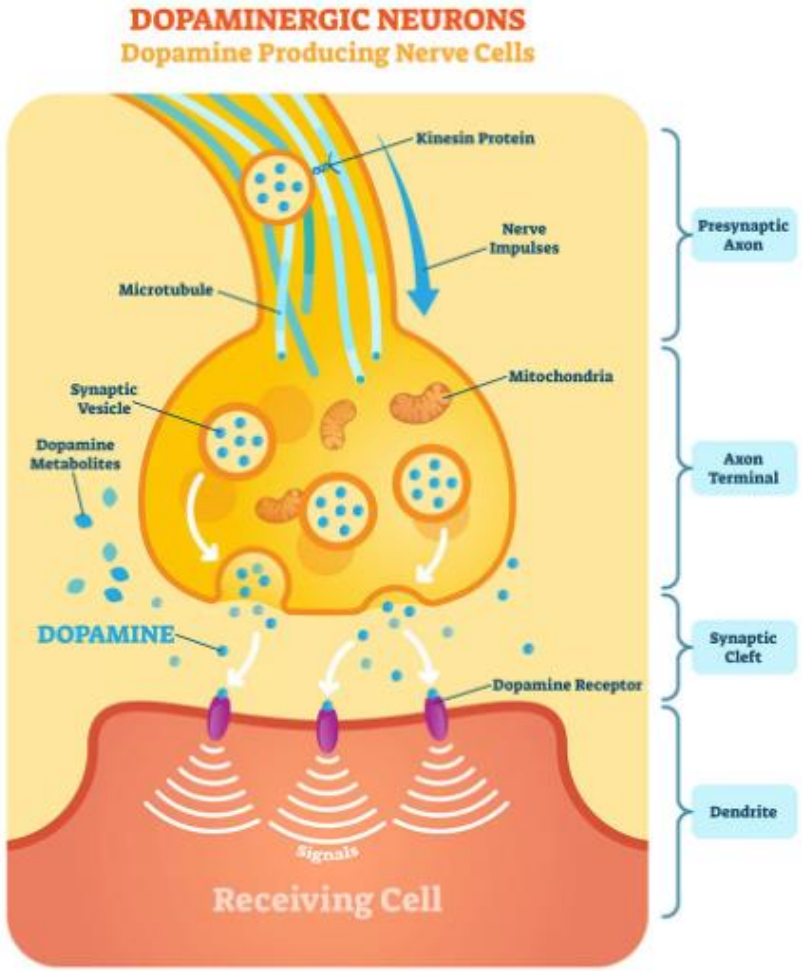
Liuliu Yang, Tae Wan Kim, Yuling Han, ..., David D. Ho, Lorenz Studer, Shuibing Chen

Correspondence

res2025@med.cornell.edu (R.E.S.), dh2994@cumc.columbia.edu (D.D.H.), studerl@mskcc.org (L.S.), shc2034@med.cornell.edu (S.C.)

In brief

Yang and colleagues demonstrate that SARS-CoV-2 can infect hPSC-derived midbrain dopamine (DA) neurons and induce cellular senescence. Several dru candidates were identified to rescue SARS-CoV-2 infection and DA neuron senescence. Inflammation and cellular senescence were also identified in substantia nigra tissue of COVID-19 patients.



Dopaminergic neuron loss is associated with one of the most prominent human neurological disorders, Parkinson's disease (PD).

The effectiveness of COVID-19 vaccines to prevent long COVID symptoms: staggered cohort study of data from the UK, Spain, and Estonia

Martí Català, Núria Mercadé-Besora, Raivo Kolde, Nhung T H Trinh, Elena Roel, Edward Burn, Trishna Rathod-Mistry, Kristin Kostka, Wai Yi Man, Antonella Delmestri, Hedvig M E Nordeng, Anneli Uusküla, Talita Duarte-Salles, Daniel Prieto-Alhambra, Annika M Jödicke**

Summary

Background Although vaccines have proved effective to prevent severe COVID-19, their effect on preventing long-term symptoms is not yet fully understood. We aimed to evaluate the overall effect of vaccination to prevent long COVID symptoms and assess comparative effectiveness of the most used vaccines (ChAdOx1 and BNT162b2).

Methods We conducted a staggered cohort study using primary care records from the UK (Clinical Practice Research Datalink [CPRD] GOLD and AURUM), Catalonia, Spain (Information System for Research in Primary Care [SIDIAP]), and national health insurance claims from Estonia (CORIVA database). All adults who were registered for at least 180 days as of Jan 4, 2021 (the UK), Feb 20, 2021 (Spain), and Jan 28, 2021 (Estonia) comprised the source population. Vaccination status was used as a time-varying exposure, staggered by vaccine rollout period. Vaccinated people were further classified by vaccine brand according to their first dose received. The primary outcome definition of long COVID was defined as having at least one of 25 WHO-listed symptoms between 90 and 365 days after the date of a PCR-positive test or clinical diagnosis of COVID-19, with no history of that symptom 180 days before SARS-Cov-2 infection. Propensity score overlap weighting was applied separately for each cohort to minimise confounding. Sub-distribution hazard ratios (sHRs) were calculated to estimate vaccine effectiveness against long COVID, and empirically calibrated using negative control outcomes. Random effects meta-analyses across staggered cohorts were conducted to pool overall effect estimates.

Findings A total of 1 618 395 (CPRD GOLD), 5 729 800 (CPRD AURUM), 2 744 821 (SIDIAP), and 77 603 (CORIVA) vaccinated people and 1 640 371 (CPRD GOLD), 5 860 564 (CPRD AURUM), 2 588 518 (SIDIAP), and 302 267 (CORIVA) unvaccinated people were included. Compared with unvaccinated people, overall HRs for long COVID symptoms in people vaccinated with a first dose of any COVID-19 vaccine were 0·54 (95% CI 0·44–0·67) in CPRD GOLD, 0·48 (0·34–0·68) in CPRD AURUM, 0·71 (0·55–0·91) in SIDIAP, and 0·59 (0·40–0·87) in CORIVA. A slightly stronger preventative effect was seen for the first dose of BNT162b2 than for ChAdOx1 (sHR 0·85 [0·60–1·20] in CPRD GOLD and 0·84 [0·74–0·94] in CPRD AURUM).

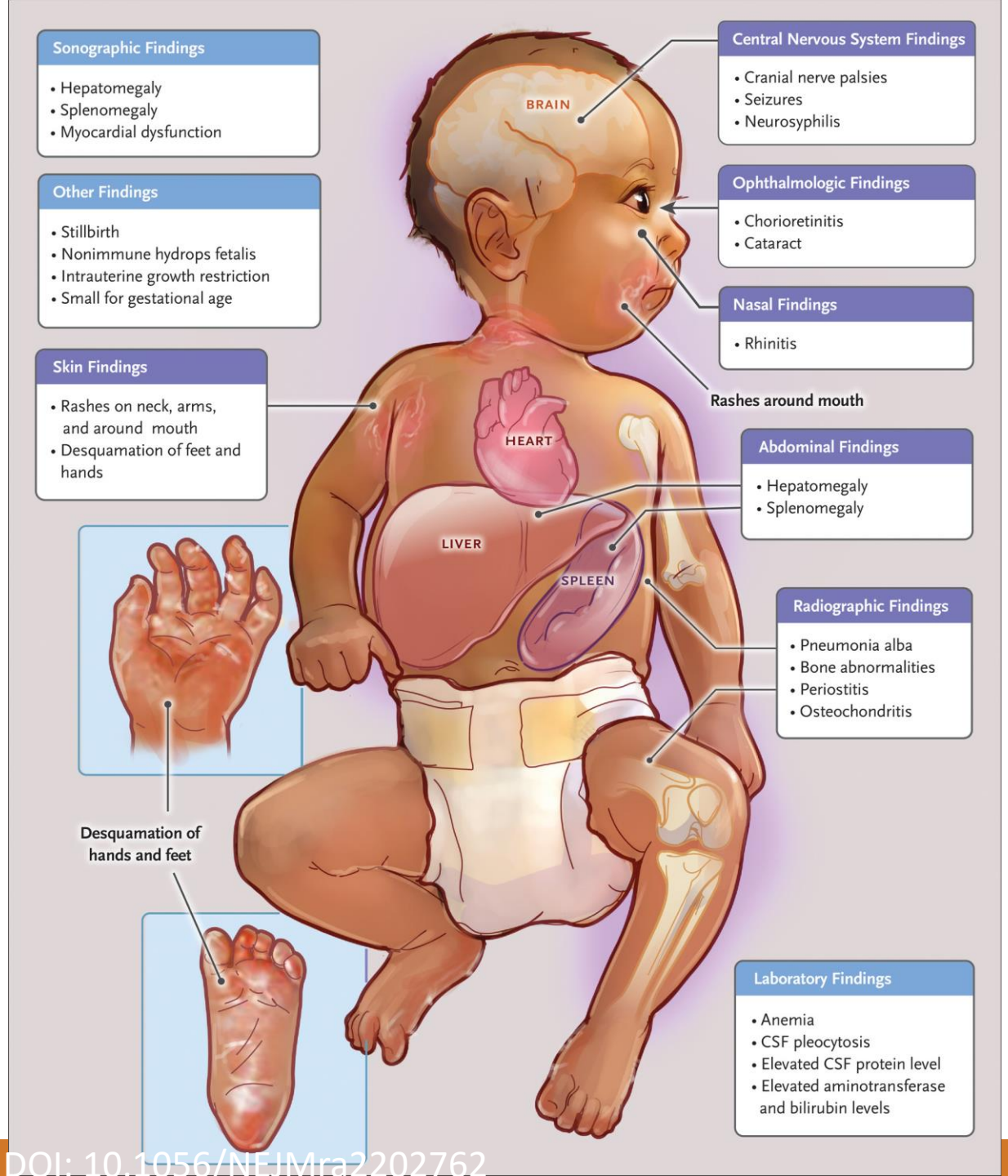
Lancet Respir Med 2024

Published Online
January 11, 2024
https://doi.org/10.1016/S2213-2600(23)00414-9

*Joint senior authors

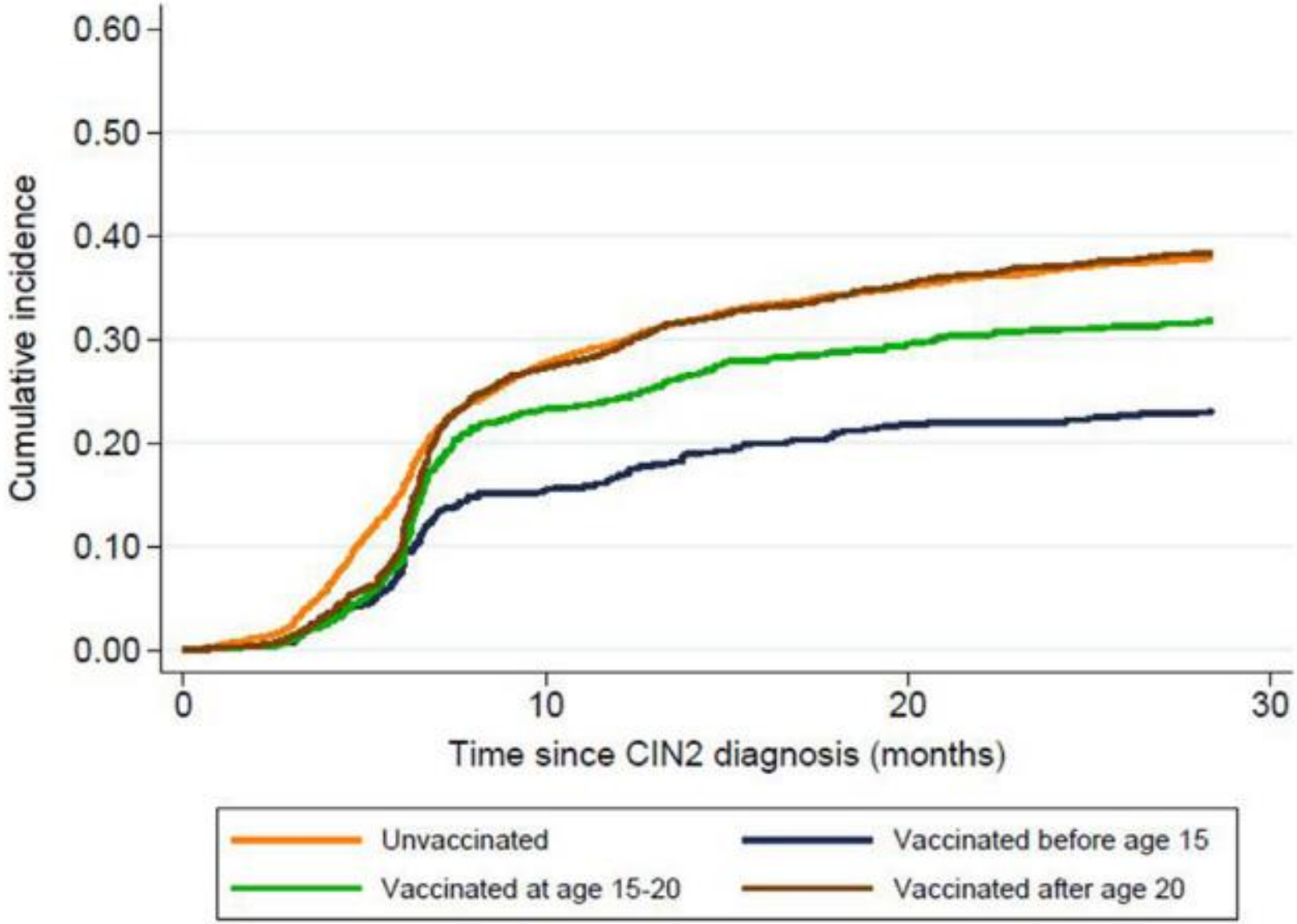
Pharmaco- and Device Epidemiology Group, Centre for Statistics in Medicine, Nuffield Department of Orthopaedics, Rheumatology and Musculoskeletal Sciences (M Català PhD, E Burn PhD, T Rathod-Mistry PhD, K Kostka MSc, W Yi Man MSc, A Delmestri PhD, Prof D Prieto-Alhambra PhD, A M Jödicke PhD) **and Oxford National Institute for Health and Care Research Biomedical Research Centre** (Prof D Prieto-Alhambra), **University of Oxford, Oxford, UK; Fundació Institut Universitari per a la recerca a l'Atenció Primària de Salut Jordi Gol i Gurina, Barcelona, Spain** (N Mercadé-Besora BA, E Roel PhD, T Duarte-Salles PhD); **Institute of Computer Science**

Congenital Syphilis

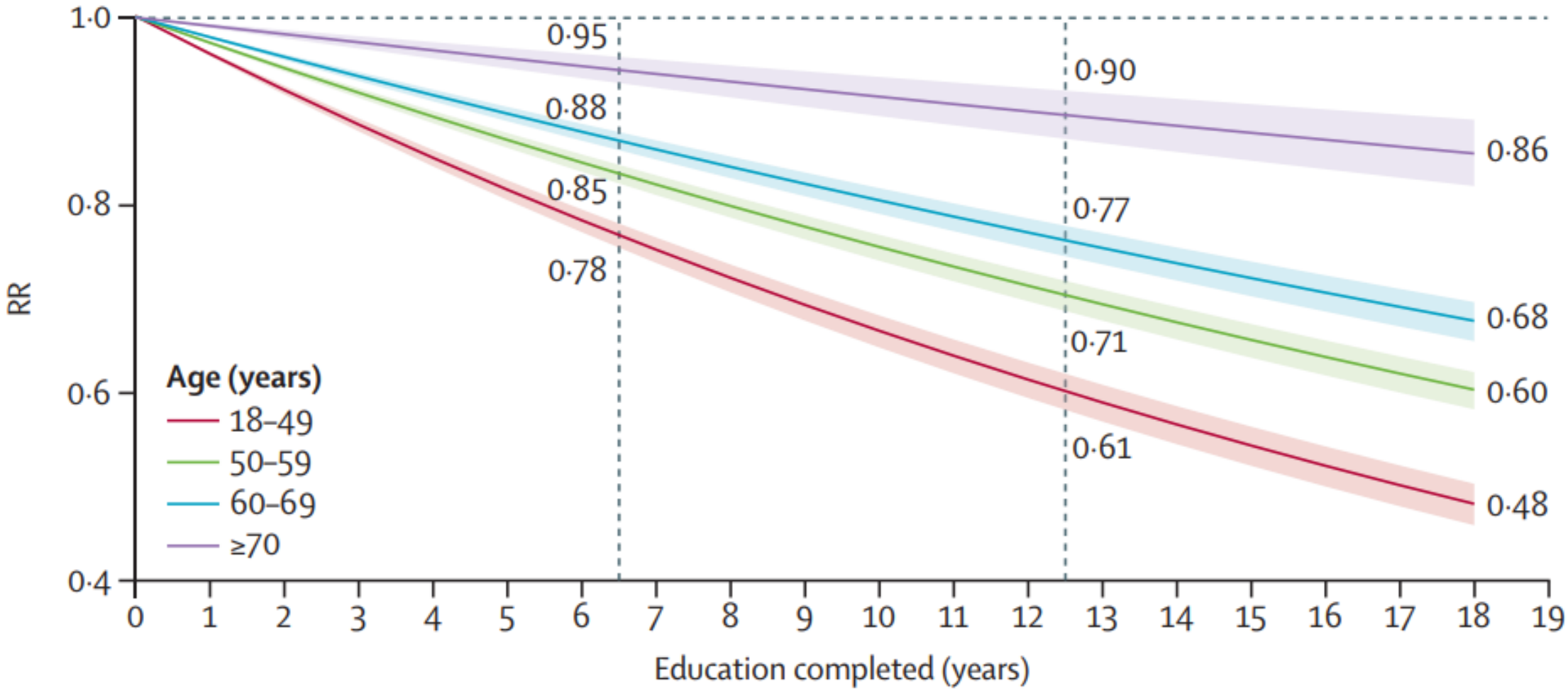


Stafford et al., N Engl J Med 2024; 390:242-253; DOI: 10.1056/NEJMra2202762

RISK for CIN3 or worse by HPV vacciation status and timing



Risk reduction by years of Education



What we talked about today

- Increased risk of autoimmune disease AFTER COVID-19
- Persistent complement dysregulation in active Long Covid
- COVID-19 causes dopaminergic neuron senescence
- COVID vaccines protect against Long COVID
- Congenital syphilis – an “old-new” problem?
- HPV vaccination and cervical cancer risk reduction
- Longer education years reduce mortality risk