

ASSESSING THE IMPACT OF COVID-19 ON NEURODEGENERATIVE DISEASES IN VACCINATED AND UNVACCINATED PEOPLE, USING THE SECURE OPENSAFELY PLATFORM

Dr Harry T. Mason

Mengxuan Zou, Emily Eyles, Jonathan A.C. Sterne,
Rachel Denholm, Elizabeth Coulthard, Venexia Walker

Jose Ignacio Cuitun Coronado, Paul Madley-Dowd, Marwa Al Arab, Yinghui Wei, Genevieve Cezard, Tom M. Palmer, Ameilia Green, Alex Walker, Simon Davy, Louis Fisher, Amir Mehrkar, Seb Bacon, Ben Goldacre, Nishi Chaturvedi

bristol.ac.uk



Observation

COVID-19 appears to affect neurological function

COVID-19 appears to affect vaccinated individuals differently

COVID-19 was more severe in some individuals

Study Structure

Investigate **incidence rate changes** in **dementia, cognitive impairment**, and other neurological conditions after COVID-19 using **adjusted hazard ratios**

3 cohorts to control for vaccination effect:
Pre-vaccination (Jan 20-Jun 21, alpha, n=18M)
Vaccination (Jun 21-Dec 21, delta, n=15M)
Unvaccinated (Jun 21-Dec 21, delta, n=3.5M)

Run analysis 3 times:
Anyone who had COVID-19
Those hospitalised with COVID-19
Those with COVID-19, but not hospitalized

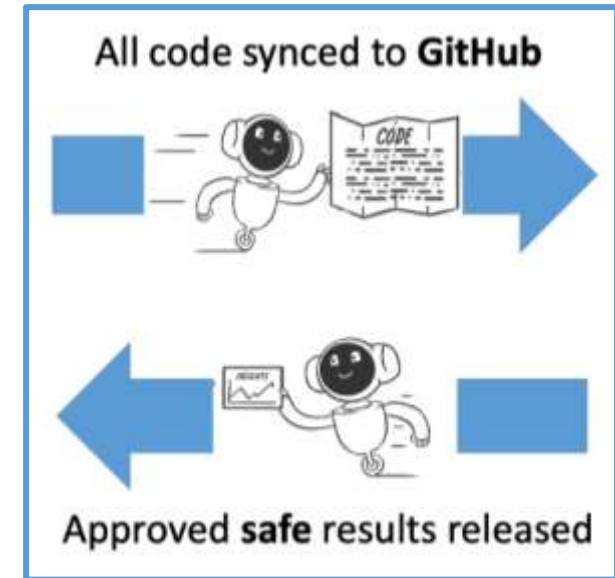
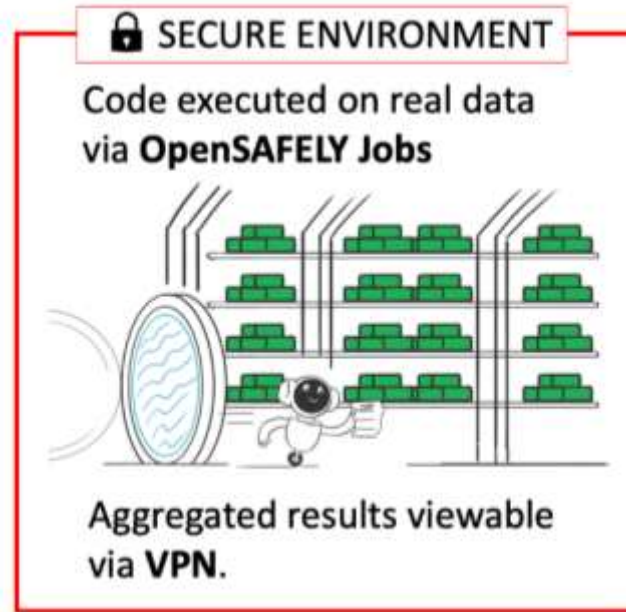
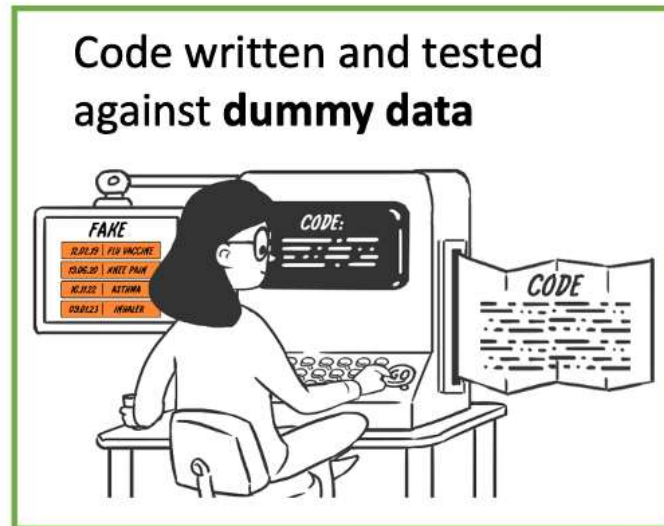
We also need to control for age, ethnicity, sex, IMD, etc.
Where can we get enough data to do this?



OpenSAFELY

: A dataset of 18* million NHS records

*After inclusion/exclusion criteria applied. There are 37 million total records.



This set-up allows us to follow the 5 safes protocol, while making our code as open as possible.

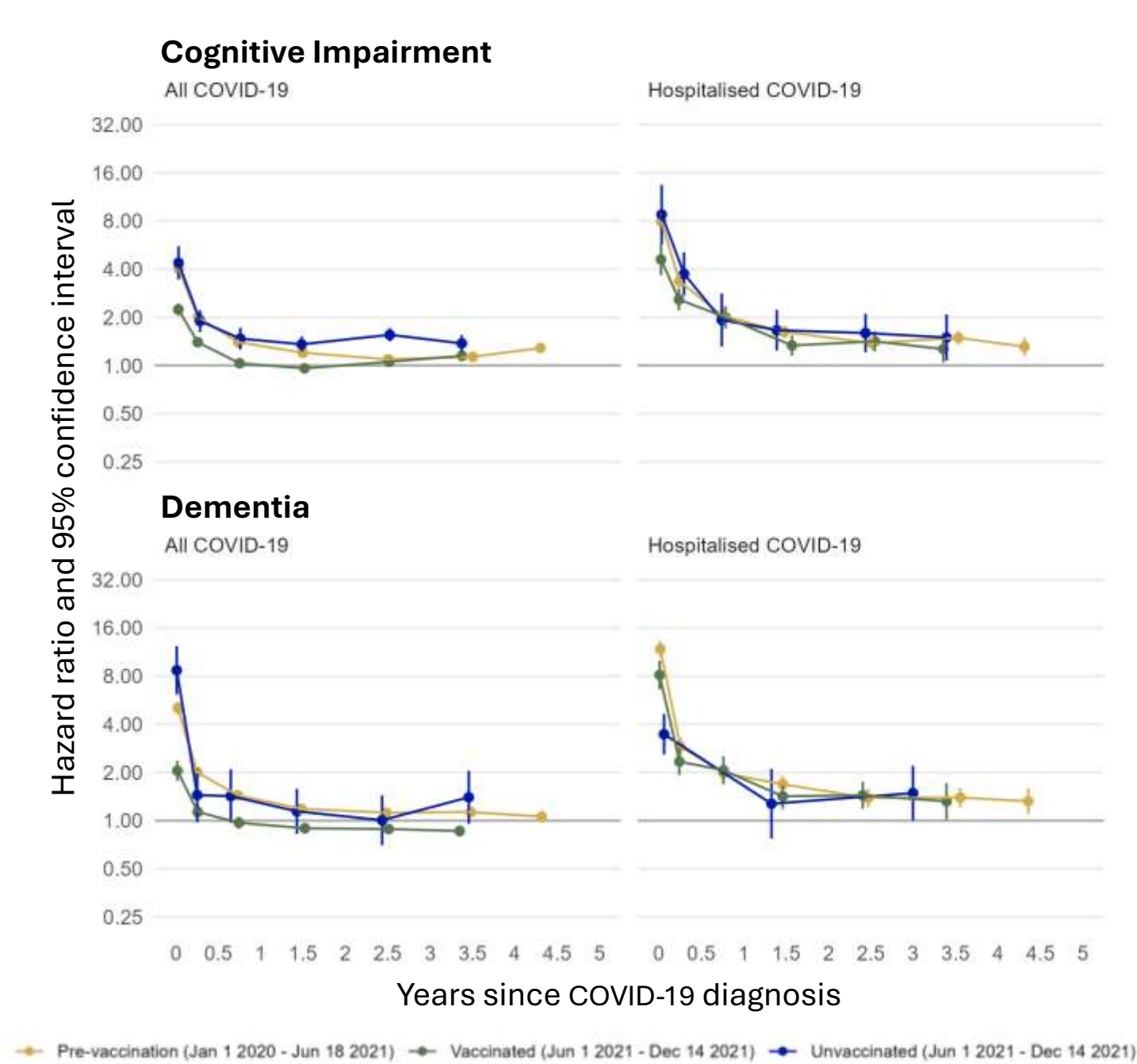


HR: (adjusted) Hazard Ratio
CI: Confidence Interval

HR	CI↑
	CI↓

HR (and 95% CI) after COVID-19	Condition	Cohort	Weeks 0-4		Years 1-2	
	Cognitive Impairment	Pre-vax	4.0	4.3	1.2	1.2
				3.7		1.2
		Vax	2.2	2.5	1.0	1.0
				2.1		0.9
		Unvax	4.4	5.6	1.5	1.7
				3.5		1.3
	Dementia	Pre-vax	5.1	5.5	1.2	1.3
				4.6		1.1
		Vax	2.1	2.4	0.9	1.0
				1.8		0.8
		Unvax	8.7	12	1.1	1.6
				6.1		0.8
HR (and 95% CI) after hospitalized COVID-19	Condition	Cohort	Weeks 0-4		Years 1-2	
	Cognitive Impairment	Pre-vax	8.0	9.1	1.6	1.8
				7.0		1.5
		Vax	4.6	5.8	1.3	1.5
				3.7		1.2
		Unvax	9.1	14	1.8	2.3
				6.0		1.3
	Dementia	Pre-vax	12	13	1.7	1.9
				10		1.5
		Vax	8.1	6.6	1.4	1.7
				10		1.2
		Unvax	*	*	1.3	2.1
				*		0.8

*Insufficient events for direct estimation



Summary

OpenSAFELY provides access to 37 million electronic health records

The OpenSAFELY environment is secure, with multiple levels of output checking (while allowing for open code)

This allows statistical analyses to adjust for a lot of important factors
Ethnicity, age, sex, IMD, previous disease histories, etc.

COVID-19 led to elevated incidence rates of many neurological conditions.
These rates were more elevated amongst those hospitalised with COVID-19
These rates were less elevated amongst those vaccinated