

SARS-CoV-2 Vaccine Protection in Scotland: Omicron

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on behalf of EAVE II and PHS

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Cases and doubling times in Scotland

Number of daily cases by s gene type

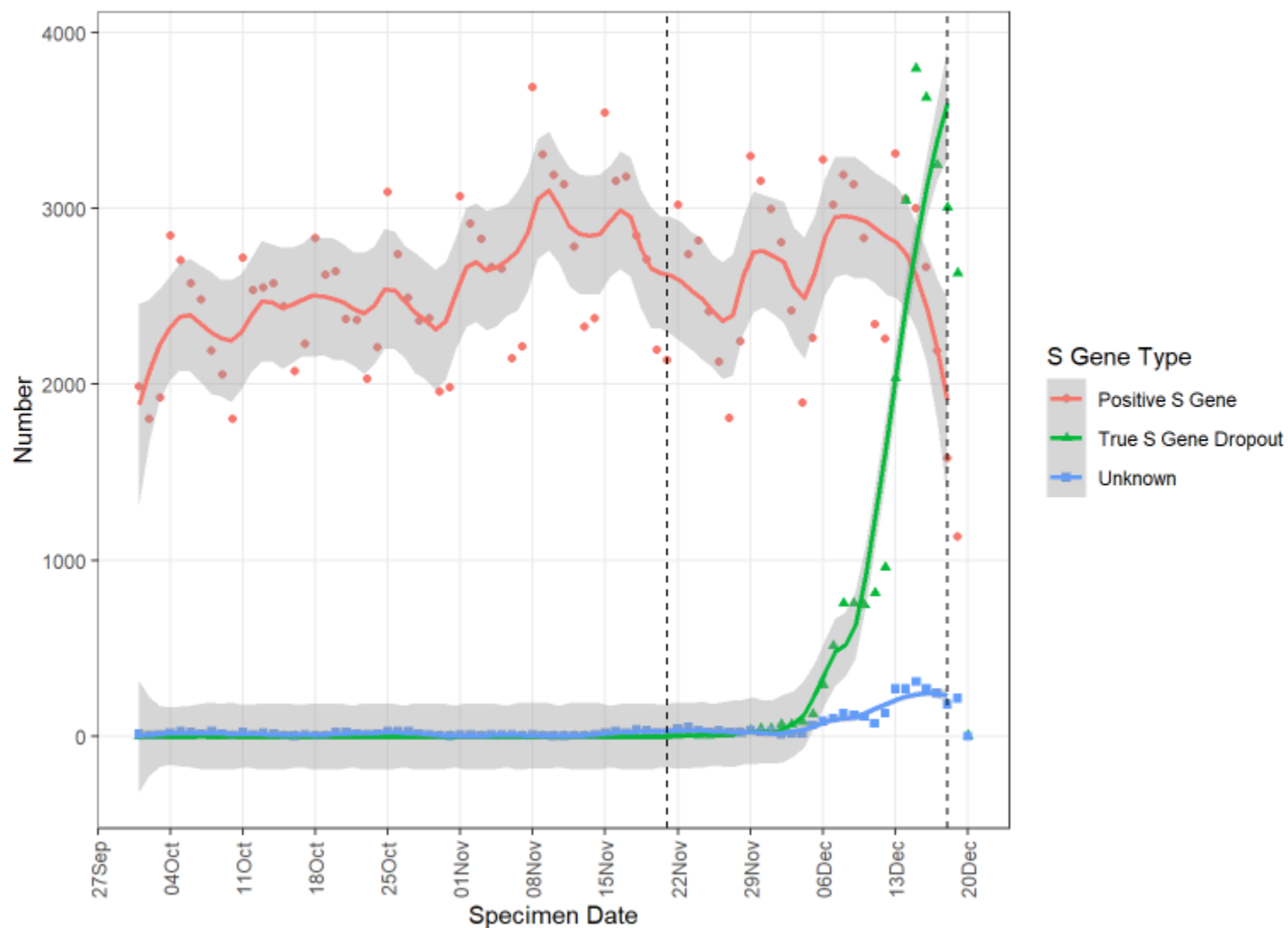


Table 3

Days (95%CI)
3.54 (3.48, 3.61)

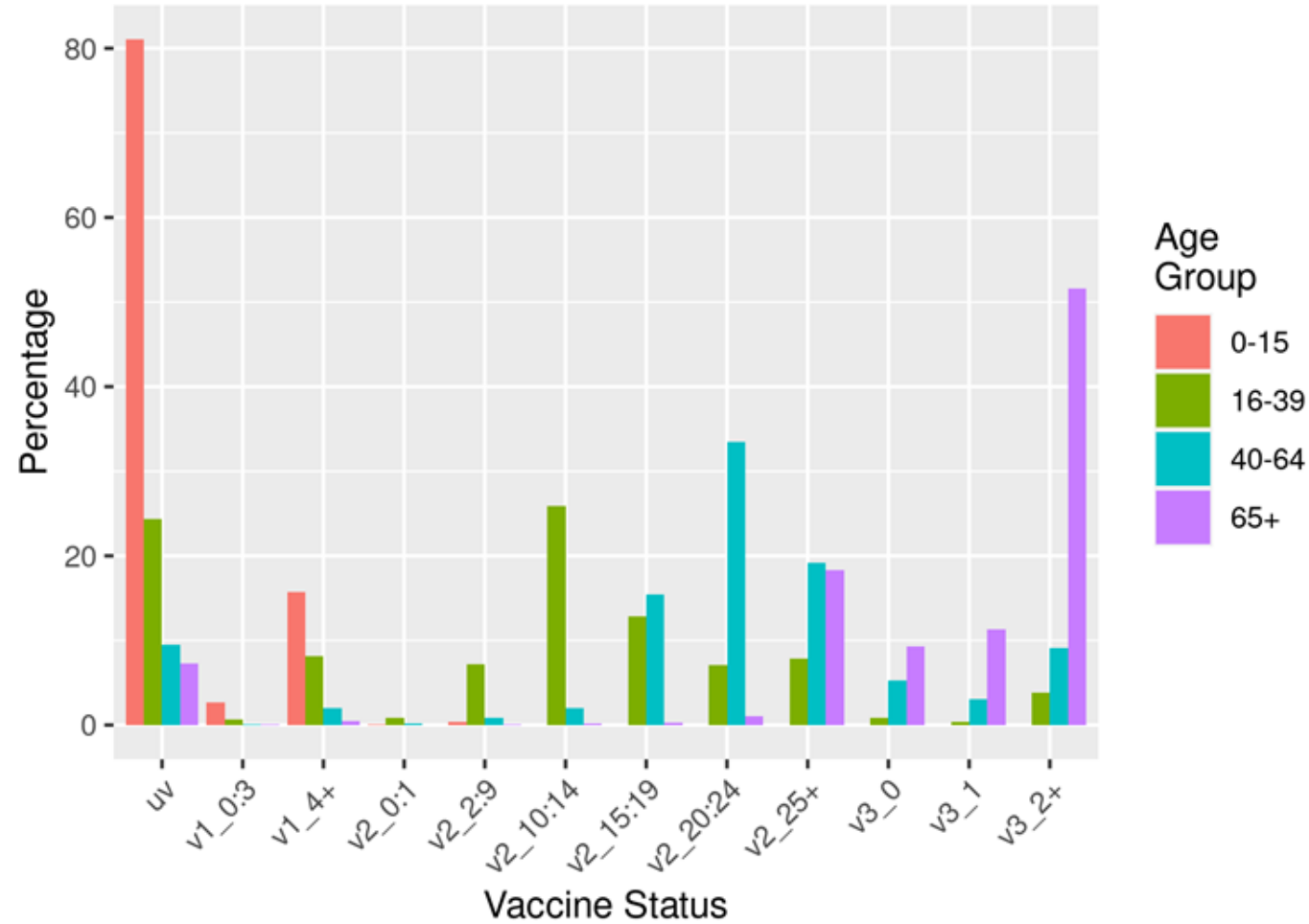
Table 4

Health Board	Days (95%CI)
NHS Ayrshire & Arran	3.39 (3.16, 3.66)
NHS Borders	3.08 (2.61, 3.75)
NHS Dumfries & Galloway	2.5 (2.11, 3.07)
NHS Fife	4.04 (3.7, 4.46)
NHS Forth Valley	3.49 (3.21, 3.82)
NHS Grampian	3.15 (2.86, 3.51)
NHS Greater Glasgow & Clyde	3.48 (3.36, 3.61)
NHS Highland	5.19 (4.54, 6.06)
NHS Lanarkshire	3.93 (3.73, 4.15)
NHS Lothian	3.4 (3.28, 3.52)
NHS Tayside	3.21 (2.96, 3.51)

Table 5

Age Group	Days (95%CI)
[00-19]	3.39 (3.23, 3.56)
[20-39]	3.39 (3.31, 3.49)
[40-59]	4.01 (3.86, 4.17)
[60+]	3.49 (3.24, 3.77)

Vaccine uptake in Scotland by time from vaccination at 15th November 2021



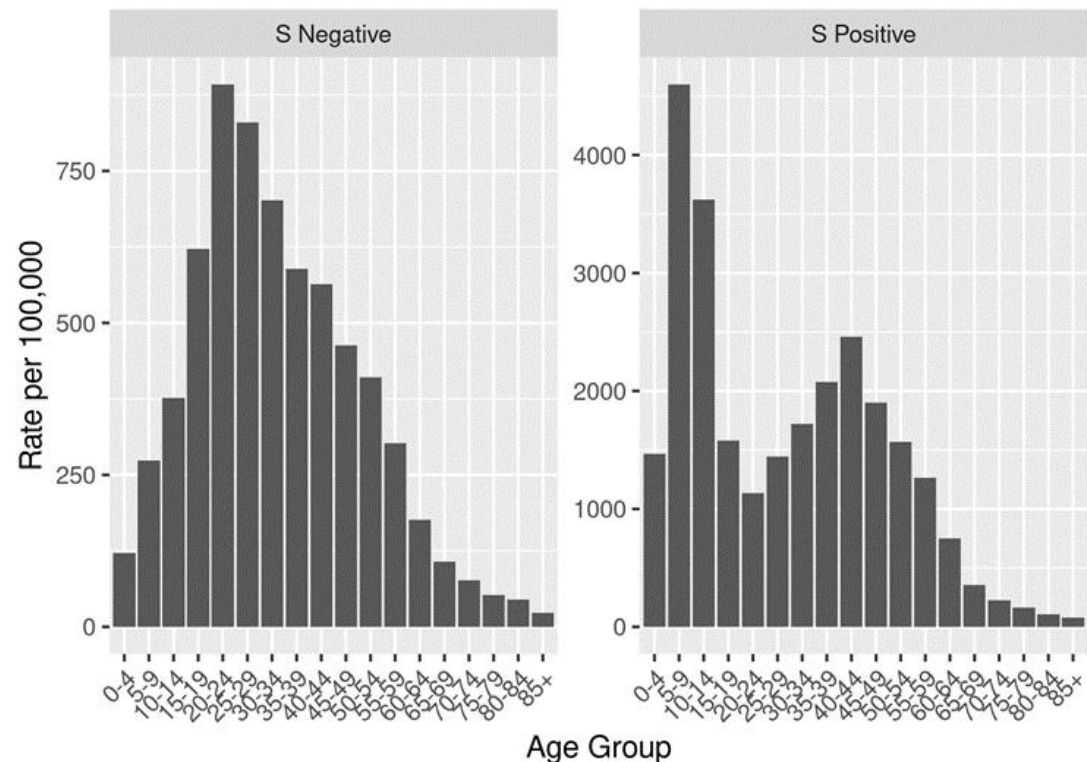
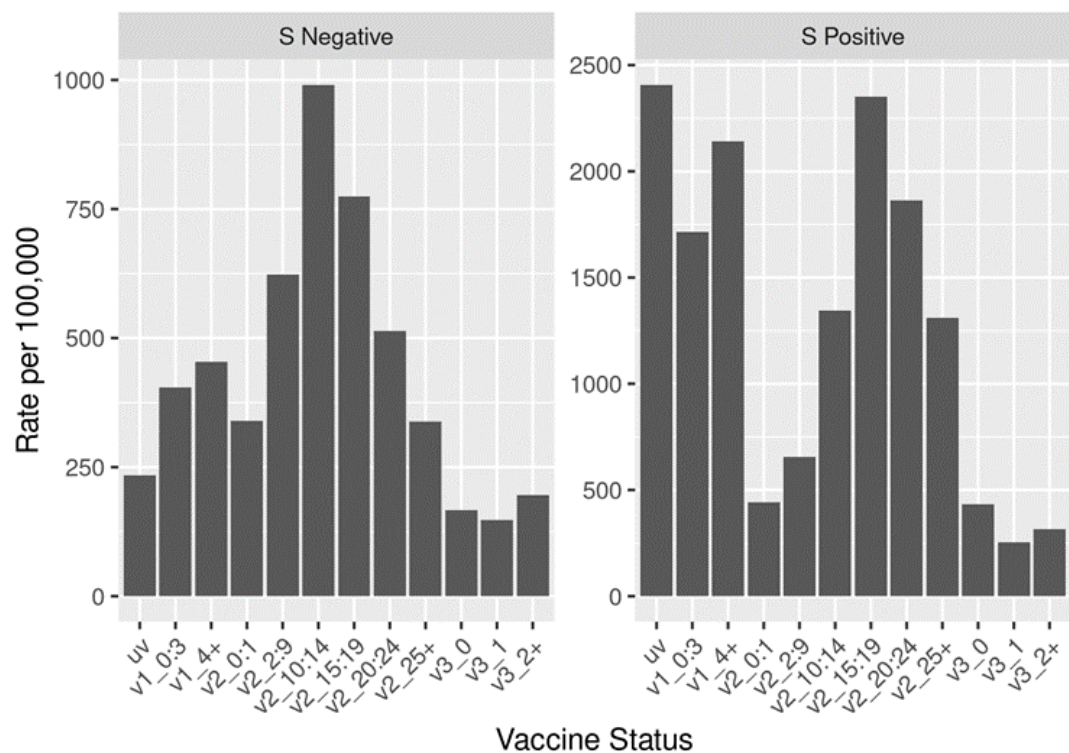
80% of children are unvaccinated, while 50% of those aged 65+ have had 2 doses plus a booster for at least 2 weeks. Among young adults aged 16-39, 24% are unvaccinated and 33% had 2 doses 10 or more weeks ago, while among adults aged 40-64 53% had 2 doses 20+ weeks ago.

All positive cases in Scotland - 1st November to 19th December

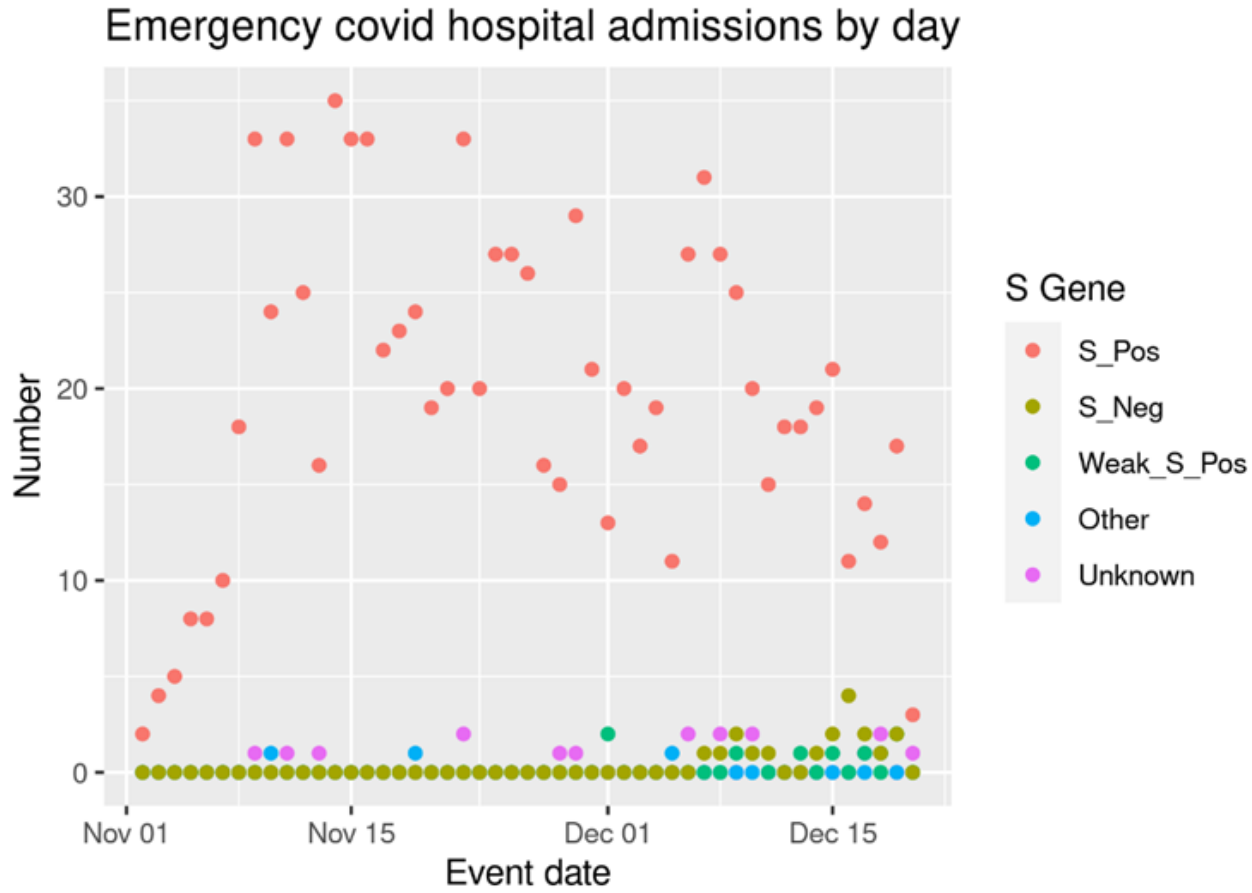
Characteristic	Levels	S Positive	S Negative	Weak S Positive	Other	Unknown
Total		126,511 (100.0%)	23,840 (100.0%)	2,385 (100.0%)	1,081 (100.0%)	9,129 (100.0%)
Gender	Female	65,128 (51.5%)	12,805 (53.7%)	1,355 (56.8%)	553 (51.2%)	4,659 (51.0%)
	Male	61,383 (48.5%)	11,035 (46.3%)	1,030 (43.2%)	528 (48.8%)	4,470 (49.0%)
Age Group	0-11	29,329 (23.2%)	1,389 (5.8%)	500 (21.0%)	253 (23.4%)	1,238 (13.6%)
	10-19	14,665 (11.6%)	2,277 (9.6%)	253 (10.6%)	126 (11.7%)	549 (6.0%)
	20-39	32,628 (25.8%)	11,732 (49.2%)	879 (36.9%)	352 (32.6%)	2,037 (22.3%)
	40-59	39,528 (31.2%)	6,862 (28.8%)	609 (25.5%)	278 (25.7%)	2,535 (27.8%)
	60-74	9,101 (7.2%)	1,354 (5.7%)	126 (5.3%)	66 (6.1%)	1,401 (15.3%)
	75+	1,260 (1.0%)	226 (0.9%)	18 (0.8%)	6 (0.6%)	1,369 (15.0%)
Periously tested Positive	Never	125,064 (98.9%)	21,949 (92.1%)	2,123 (89.0%)	1,034 (95.7%)	8,285 (90.8%)
	1 to 28 days before	292 (0.2%)	0(0.0%)	* (0.2%)	* (0.4%)	375 (4.1%)
	29 to 90 days before	207 (0.2%)	91 (0.4%)	* (1.6%)	* (0.9%)	249 (2.7%)
	> 90 days before	948 (0.7%)	1,800 (7.6%)	219 (9.2%)	33 (3.1%)	220 (2.4%)

Compared to S Positive, a much smaller percentage are under 20 and a much larger percentage are 20-39

Rates per 100,000 population of S Positive and S Negative infections 15th November to 19th December in Scotland by Vaccine Status and by age group



Trends in hospital admissions within 14 days of a positive test by S gene status 1 November to 21 December in Scotland



The increase in admissions at the beginning of the time period for individuals with S Positive infections reflects the selection criterion of testing positive from November 1st and the time to hospital admission from testing positive.

Individuals can be admitted any day following the positive test but most are admitted within 5 to 10 days following testing positive.

Expected S Negative Covid Hospitalisations among those who tested positive in the community

	S Gene Status	N	Person Years	Hospital Admissions	Expected Admissions	Observed/Expected	LCL	UCL
All Cases linking into the EAVE data set	S Positive	119100	4375.1	856	856.9	1	0.93	1.07
	S Negative	22205	413.4	15	46.6	0.32	0.19	0.52
	Weak S Positive	2199	57.3	7	6.9	1.02	0.45	2
	Other	990	33.8	*	*	0.79	0.26	1.88
	Unknown	1647	58.2	14	14.8	0.94	0.54	1.54

Individuals were not in hospital at the time of test. Hospitalisations (reason unknown) within 14 days of a positive test.

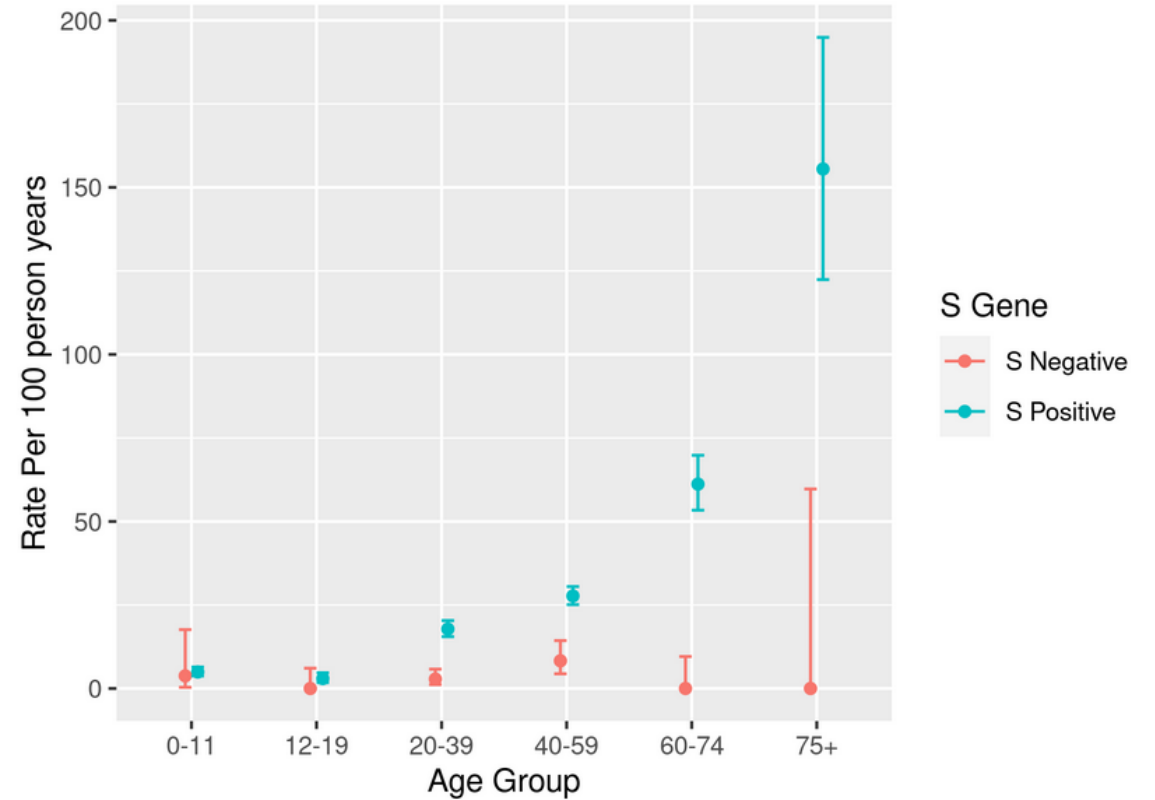
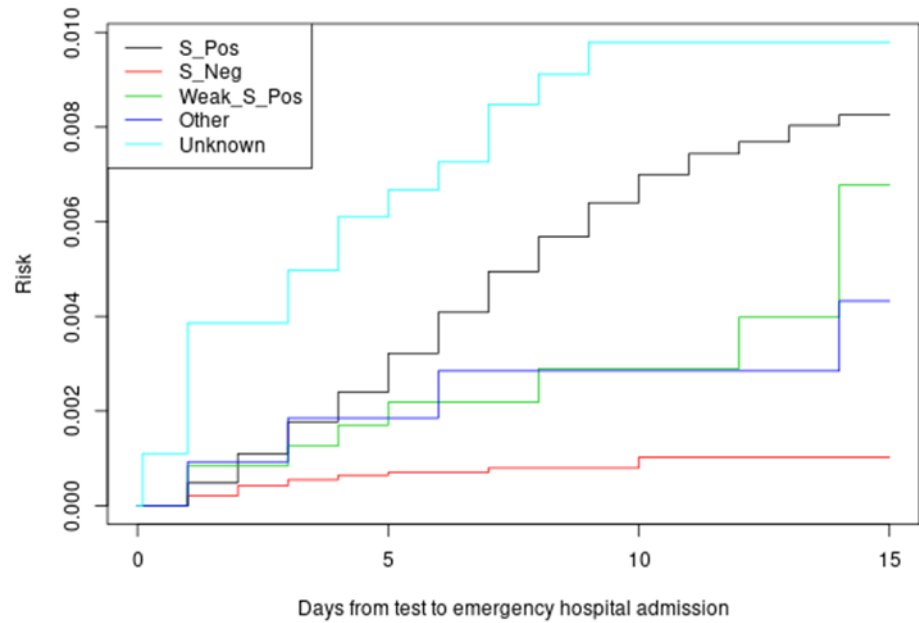
The expected numbers of hospitalisations were calculated by fitting a cox proportional hazards regression model to the time to hospital admissions among the S Positive cases only in the study period using predictors of age group, gender, deprivation, previous positive history, number of co-morbid Q Covid conditions, vaccine status including vaccine type, dose and duration. The expected number of cases is derived from the predictions of expected survival from the model in all cases. Hence the expected number of hospitalisations in the S positive group will match the observed.

* Suppressed for small numbers

Expected S Negative Covid Hospitalisations among those who tested positive in the community – sensitivity analyses

	S Gene Status	N	Person Years	Hospital Admissions	Expected Admissions	Observed/Expected	LCL	UCL
All Cases	S Positive	126464	4643.5	967	903.7	1.07	1	1.14
	S Negative	23830	443.1	18	50.1	0.36	0.22	0.56
	Weak S Positive	2384	62.1	9	7.5	1.2	0.59	2.19
	Other	1080	36.5	*	*	0.71	0.24	1.69
	Unknown	1813	63.3	17	16.1	1.05	0.64	1.65
All cases followed up for at least 7 days	S Positive	102765	4096.2	824	824.9	1	0.93	1.07
	S Negative	4111	140.2	7	21.2	0.33	0.15	0.65
	Weak S Positive	995	37.5	7	5.3	1.32	0.59	2.59
	Other	748	29.5	*	*	0.64	0.18	1.7
	Unknown	1336	52.8	10	14.1	0.71	0.36	1.25
All cases aged 20-59	S Positive	68035	2489.4	575	575.6	1	0.92	1.08
	S Negative	17302	322.9	15	34.4	0.44	0.25	0.7
	Weak S Positive	1373	34.7	6	5.1	1.18	0.49	2.44
	Other	567	19.1	*	*	0.58	0.11	1.85
	Unknown	1057	36.4	5	8.6	0.58	0.22	1.28

Covid Hospitalisations among those who tested positive in the community – Cumulative incidence and rates by age group



Symptomatic Infection – Test Negative Design - 1st November to 19th December – Individuals aged 16-49

Age Group	Vaccine Status	S Negative Infections					S Positive Infections				
		Tested	Positive	OR	LCL	UCL	Tested	Positive	OR	LCL	UCL
16-49	uv	10302	1003	0.78	0.71	0.86	14583	5284	1.98	1.87	2.09
	v1_0:3	550	36	0.53	0.37	0.76	676	162	1.24	1.03	1.5
	v1_4+	6570	581	0.7	0.62	0.79	8339	2350	1.39	1.3	1.49
	v2_0:1	732	46	0.42	0.3	0.58	805	119	0.69	0.56	0.84
	v2_2:9	4248	256	0.47	0.4	0.54	4258	266	0.27	0.24	0.31
	v2_10:14	12581	814	0.67	0.6	0.74	13559	1792	0.5	0.47	0.54
	v2_15:19	29209	3503	0.85	0.79	0.91	31963	6257	0.68	0.64	0.71
	v2_20:24	14986	1824	0.97	0.89	1.05	17991	4829	0.91	0.87	0.96
	v2_25+	13183	1435	1	1	1	15462	3714	1	1	1
	v3_0	3773	515	0.74	0.66	0.84	4003	745	0.67	0.61	0.73
	v3_1	2185	143	0.38	0.32	0.46	2155	113	0.16	0.13	0.2
	v3_2+	12887	783	0.44	0.4	0.49	12798	694	0.17	0.16	0.19
50+	uv	716	48	0.67	0.48	0.93	1158	490	1.45	1.28	1.65
	v1_0:3	27	*	1	0.3	3.3	36	13	1.16	0.58	2.34
	v1_4+	256	13	0.52	0.28	0.93	343	100	0.9	0.7	1.15
	v2_0:1	23	*	0.38	0.05	3.07	23	*	0.1	0.01	0.73
	v2_2:9	120	9	0.95	0.46	1.98	131	20	0.38	0.23	0.62
	v2_10:14	128	12	0.92	0.48	1.76	149	33	0.6	0.4	0.9
	v2_15:19	463	17	0.65	0.38	1.1	634	188	0.8	0.67	0.96
	v2_20:24	5513	265	0.96	0.81	1.13	8205	2957	0.96	0.9	1.03
	v2_25+	8007	799	1	1	1	10856	3648	1	1	1
	v3_0	3522	420	1	0.87	1.15	4352	1250	0.8	0.74	0.87
	v3_1	3006	180	0.46	0.38	0.54	3146	320	0.23	0.2	0.26
	v3_2+	17572	1045	0.43	0.38	0.48	17504	977	0.12	0.11	0.14

All positive cases 1st November onwards , one negative test per person
 Generalised additive logistic regression adjusted for age, sex, deprivation, number of risk groups and vaccine by time from vaccinations (weeks) + positive before test

Prior positive test

- Within the test negative analysis
- A positive test anytime before the date of test is associated with a reduced odds of testing positive compared to an individual who had never tested positive previously
- For S Positive
 - OR = 0.06 (95% CI 0.05, 0.08) 29-90 days prior to date of symptoms
 - OR = 0.08 (95% CI 0.07, 0.09) 91+ days prior to date of symptoms
- For S Negative
 - OR = 0.25 (95% CI 0.20, 0.32) 29-90 days prior to date of symptoms
 - OR = 0.57 (95% CI 0.53, 0.61) 91+ days prior to date of symptoms

Summary

- Very Preliminary Results
- Evidence of vaccine protection against symptomatic S negative infection for dose 3/ booster compared to dose 2 - 57% (95% CI 54, 60)% reduction in odds of testing positive
- But lower than for S Positive where the reduction is 86% (95% CI 85%, 87%)
- The level of hospital admissions following a positive test are lower than expected in the S Negative infections compared to S Positive infections with the same individual characteristics.
- All Ages: 68% (95% CI 48, 81)%; Aged 20-59: 56% (95% CI 30, 75)%
- Assuming the time to admission rates are the same for S+ and S- - if it is longer with S- then the observed values will be an underestimation
- There are few unvaccinated and few over 65 in the S- cases at the minute – if S- is relatively more severe among the elderly than S+ then again there will be an under estimation
- Not included waning effects post dose 3.