

Journal Club “COVID-19 Medley”

Ana Durovic

Klinik für Infektiologie und Spitalhygiene

Universitätsspital Basel

22.02.2021

The SIREN study

**Do antibody positive healthcare workers have lower SARS-CoV-2
infection rates than antibody negative healthcare workers?**

multi-centre prospective cohort study (the SIREN study) from healthcare-workers

England: June to November 2020

Positive cohort

- antibody positive
- prior PCR/ antibody test positive

Negative cohort

- antibody negative, not previously known to be PCR/antibody positive

every 2-4 weeks

- Repetitive testing (antibody and PCR-test)
- questionnaires (symptoms and exposures)

Reinfection rates in the positive cohort vs. new PCR positives in the negative cohort

- 18.06.2020 – 09.11.2020
- mixed effective multivariable logistic regression analysis

Table 2: Characteristics of reinfections and new infections detected in SIREN participants up to 24 November 2020, stratified by case definition (n=362)

	Positive cohort			Negative cohort
	Probable n (%)	Symptomatic possible n (%)	All probable/ possible n (%)	New PCR+ n (%)
Gender				
Female	2 (100)	11 (84.6)	36 (81.8)	261 (82.1)
Male	0 (0)	2 (15.4)	8 (18.2)	56 (17.6)
Other	0 (0)	0 (0)	0 (0)	1 (0.3)
Age				
Median (range)	41.5 (37-46)	46 (25-58)	48.5 (23-63)	45.3 (19-70)
Antibody status at baseline				
Positive	2 (100)	12 (92.3)	40 (90.9)	0 (0)
Negative	0 (0)	1 (7.7)	3 (6.8)	310 (97.5)
Indeterminate/not available	0 (0)	0 (0)	1 (2.3)	8 (2.5)
Reinfection PCR semi quantitative values (CT/RLU)				
CT range (n)	21-24 (2)	13-37 (5)	13-45 (16)	-
RLU range (n)	-	587-1193 (6)	591-1260 (20)	-
Symptom status +/-14 days reinfection PCR+				
COVID-19 symptoms	1 (50)	3 (23.1)	4 (9.1)	196 (61.6)
Any other symptoms	1 (50)	10 (76.9)	11 (25)	53 (16.7)
No symptoms	0 (0)	0 (0)	21 (47.7)	40 (12.6)
Not known	0 (0)	0 (0)	8 (18.2)	29 (9.1)
Time interval in days – median (range); n				
Symptom onset first episode to reinfection PCR	212 (197-227); 2	166 (90-223); 10	169 (90-227); 32	-
First positive PCR to reinfection PCR	-	155 (95-201); 7	162 (95-223); 21	-
First antibody positive to reinfection PCR	63 (62-64); 2	110 (35-136); 12	101.5 (35-174); 42*	-
Total	2	13	44	318

*One participant never antibody positive, one participant first reported as antibody positive on the same date as reinfection PCR date.

Negative cohort

- 14,173 participants
- 318 new PCR+ infections
- 94 seroconversions
- Cumulative incidence: 22.4 / 1000 participants

Positive cohort

- 6614 participants
- 44 reinfections
- Cumulative incidence: 6.7 / 1000 participants

Reinfections in positive cohort

- Total 44 reinfections: 2 probable, 42 possible
- median interval between episodes: 160d
- 50% asymptomatic (20% at first episode)
- 1/44 HCW remained antibody negative

Conclusion:

- Prior SARS-CoV-2 Infection protects most individuals against reinfection for at least five months
- 83% lower risk of infection
- Reinfection: less symptomatic
- Reduced risk for onward transmission

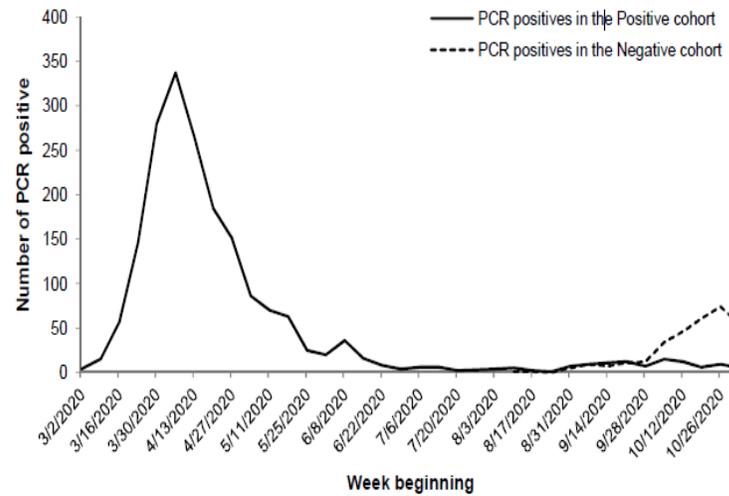


Figure 2: Weekly frequency of SIREN participants with a first PCR positive test result by baseline cohort assignment, March to 24 November 2020

ONS Coronavirus Infection Survey

Community prevalence of SARS-CoV-2 in England from April to November 2020



Results from the Office for National Statistics
(ONS) Coronavirus Infection Survey

England: April to November 2020

Large longitudinal community surveys of SARS-CoV-2 infection

Repeated cross-sectional household survey and sampling

- Randomly selected Individuals (>2 years) in private households across England
- Visits and questionnaires: weekly during 1st month:, then 1x monthly
- self-swabs of nose and throat for PCR-Testing

- 26.04.2020 – 01.11.2020
- 280 327 individuals
- 3923 individuals positive for SARS-CoV-2

Analysis

- Percentage of individuals testing positive for SARS-CoV-2 RNA over time
- Potential changes in risk factors for testing positive over time
- Symptoms of individuals testing positive

Percentage of population testing positive differs by time

- National lockdown: decline in percentage of positive tests
- End of first wave: 0.40% to 0.06%
- Beginning of second wave: >1%

Percentage of population testing positive differs by region

Risk factors for testing positive changed substantially over time

- First wave: working outside your home and a patient-facing role
- Second wave: Young adults (17–24 years)

Substantial proportion of infections were in asymptomatic individuals

- 45-68% of individuals not reporting symptoms around their positive test

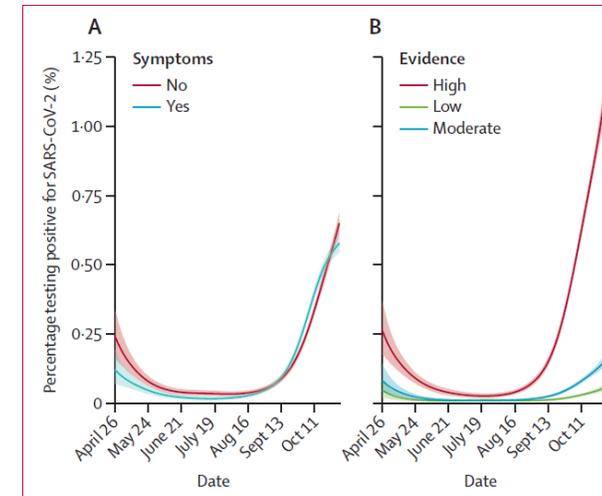
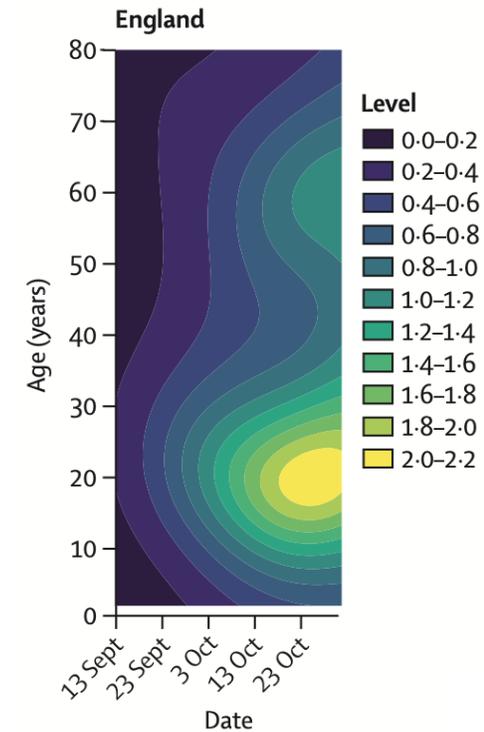


Figure 2: Percentage of population living in private households testing positive for SARS-CoV-2. Plots are with and without reporting symptoms (A) and stratified by high, moderate, and low evidence positivity (B). Shaded areas are 95% credible intervals. SARS-CoV-2=severe acute respiratory syndrome coronavirus 2.



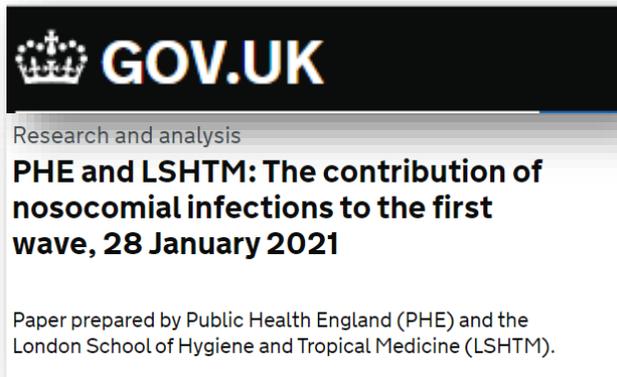
Conclusions:

- Young adults were an important initial driver of increased positivity rates in the second wave.
- Role of asymptomatic infected individuals possibly underrated.
- Allows for early detection of changes in risk factors and drivers of infection in a subgroup of the population at low risk of hospitalization and death.

Research and analysis for SAGE

Contribution of nosocomial infections to the first wave

England : February to July 2020



Paper prepared by PHE and LSHTM as pre-print publication for
Scientific Advisory Group for Emergencies (SAGE) England

63. SAGE meeting on COVID-19 on 22.10.2020

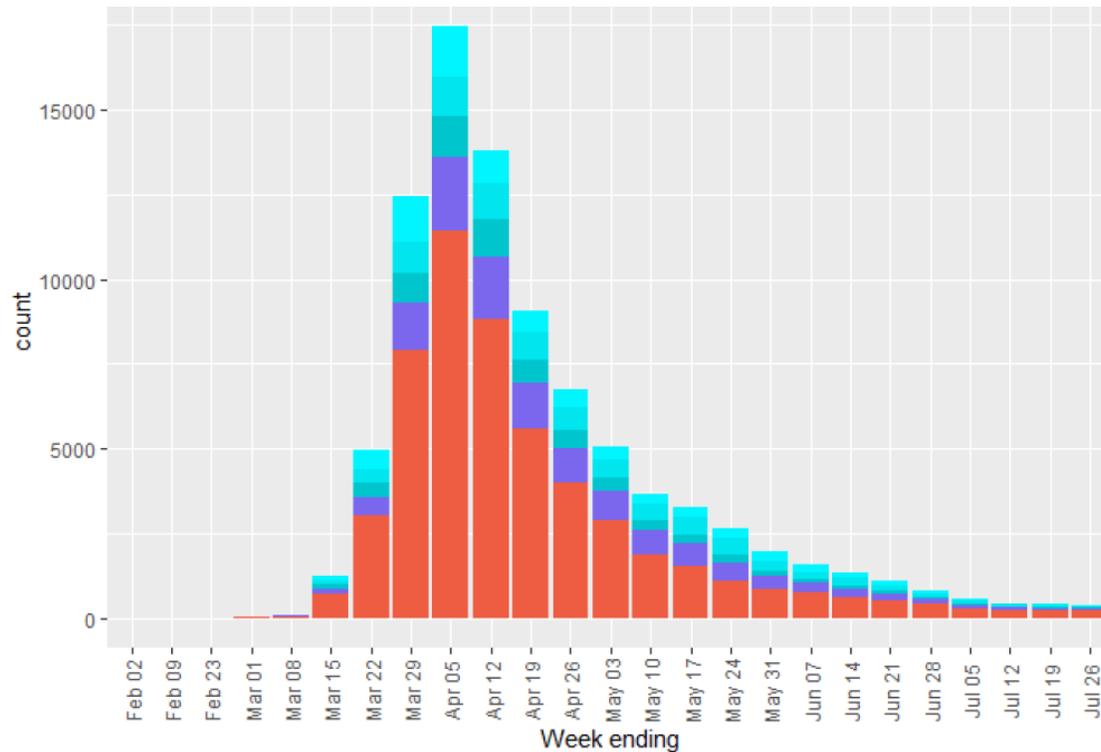
78. SAGE meeting on COVID-19 on 28.01.2021

Quantification of nosocomial cases:

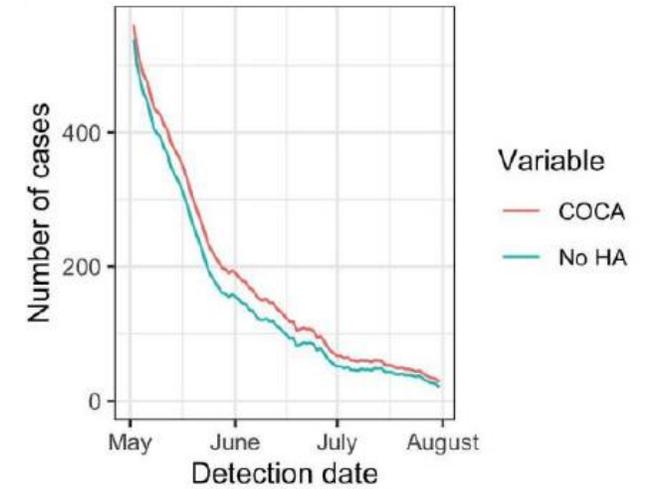
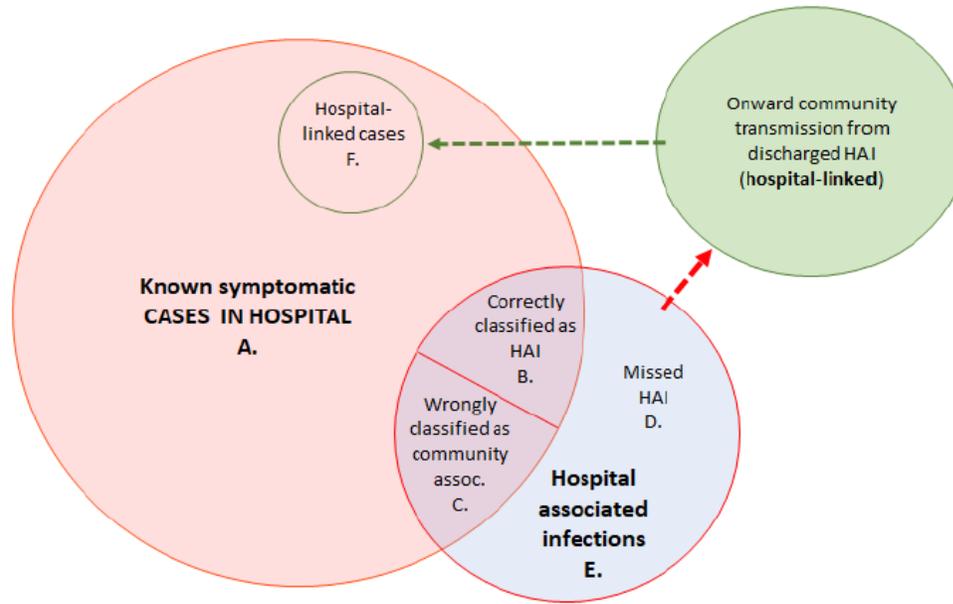
- Depends on definition and testing strategy

Estimated nosocomial infections over first wave

- 20-25% of all COVID-19 infections in hospital patients
- Range: 8.8% to 40.5% of all hospital cases (7906 – 36152 cases)
- represent 1% of total infection numbers at a population level



Effect of nosocomial transmission on total infections in England



Estimated onward community transmission due to nosocomial infections

- Subsequent COVID-19 admissions ~20% of admissions in the end of the first wave
- duration of the first wave may have been prolonged with nosocomial transmission