

# Journal Club 24.08.20

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## Risk of COVID-19 in health-care workers in Denmark: an observational cohort study



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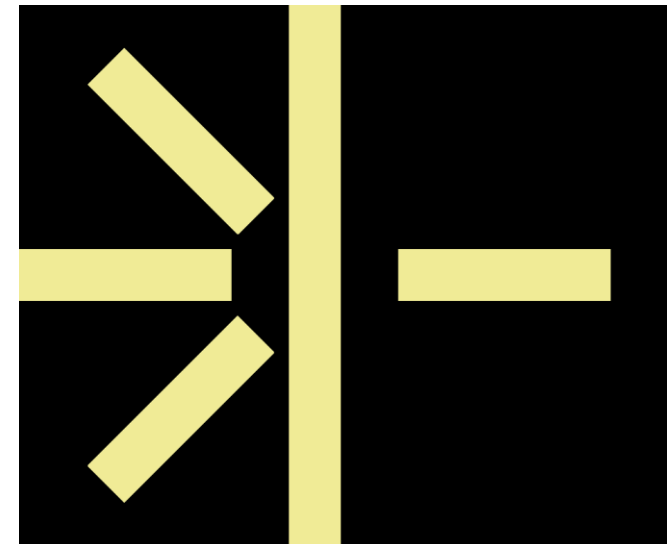
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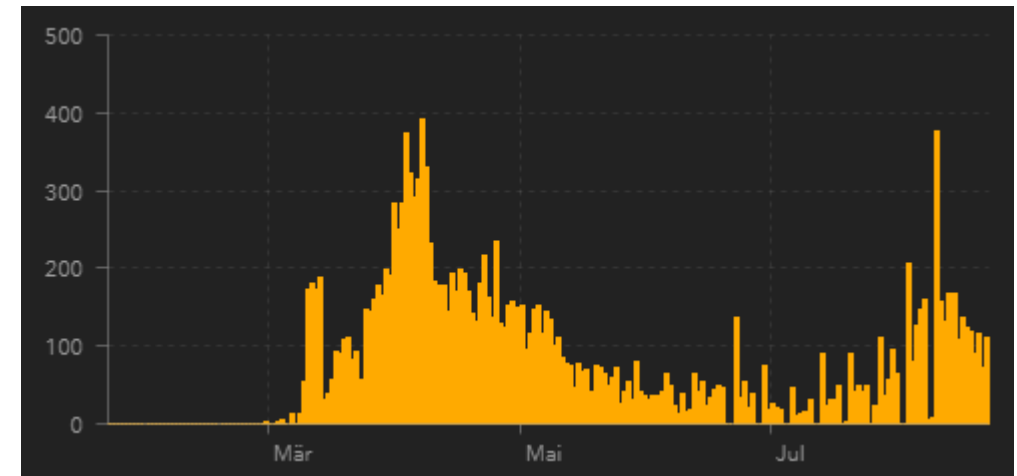
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# Background

- Of all individuals tested
  - 9% in Italy, 26% in Spain were Health-care workers (HCW)
- Different Seroprevalence between countrys/areas with different prevalence
- Different time for preparing
  - Numbers of infected HCW lower in countries with more time for preparation ?
  - Numbers lower with different population density ?
- Denmark
  - < 6 Mio inhabitants
  - Mortality per million inhabitants 75 (vs Italy: 452)



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# Aim of the study

- Key Question: Risk of Sars-CoV-2 infection among Health-care workers (HCW)
  - Up to 4/5 of Sars-CoV-2 infected individuals asymptomatic
- Aim:
  - Investigate the seroprevalence in HCW compared with that of the general population

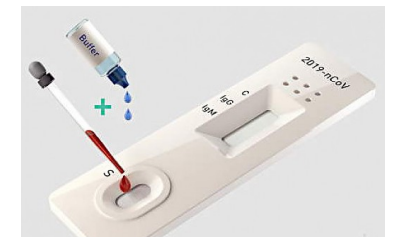
# Methods

## ■ Methods:

- Observational cohort study in capital region of Denmark (1.84 Mio inhabitants)
- Voluntary screening of all somatic, psychiatric, prehospital staff and staff at specialized institutions who considered themselves having contact to patients (students also invited)
  - Invitation for Screening on hospital websites and individually invited by email
- Screening period April 15-17 and 20-22, 2020
- Sars-CoV-2 IgG and IgM antibodies tested in whole blood by a point of care test
  - Result after 15 min, read by individual participant
  - Seropositive if IgM or IgG or both positive
  - Manufacturer: Sensitivity 90.6%, Specificity 99.2%
- Comparative group of blood donors in the same period used as proxy for general population
  - Screening for Sars-CoV-2

## ■ Primary Outcome

- Proportion of study population with a positive antibody test



# Results

- > 33'000 HCW were invited
  - 29'117 (97%) were included
  - 28'792 provided Sars-CoV-2 antibody results
    - 78.9% female, 21.1% male
- 4'672 blood donors were tested
  - 53.5% female

	Seronegative (n=27 629)	IgG or IgM positive (n=1163)
Age, years	44.5 (12.5)	43.3 (13.5)
Sex		
Female	21 883 (79.2%)	832 (71.5%)
Male	5746 (20.8%)	331 (28.5%)
Body-mass index	25.06 (4.69)	24.83 (4.17)
Any symptom of COVID-19	14 587 (52.8%)	908 (78.1%)
Diagnosed COVID-19	129 (0.5%)	231 (19.9%)

Data are n (%) or mean (SD).

**Table 1: Baseline characteristics**

- Participants had to complete a survey
  - Demographics
  - Type of work
  - History of contact
  - Symptoms of infections

- Seroprevalence in HCW 4.04%
- Seroprevalence in blood donors 3.04%
- Seroprevalence
  - highest in medical students (Hotspot: social gathering of medical students in copenhagen)
  - Lowest in laboratory personnel

	Participants	IgM	IgG	IgM and IgG	IgM or IgG
Physicians	4698	137 (2.92%)	112 (2.38%)	58 (1.23%)	191 (4.07%)
Nurses	9963	283 (2.84%)	265 (2.66%)	146 (1.47%)	402 (4.03%)
Assisting nurses	1786	66 (3.70%)	45 (2.52%)	28 (1.57%)	83 (4.65%)
Midwives	501	9 (1.80%)	6 (1.20%)	4 (0.80%)	11 (2.20%)
Radiographers	342	9 (2.63%)	9 (2.63%)	6 (1.75%)	12 (3.51%)
Laboratory personnel	1292	18 (1.39%)	15 (1.16%)	8 (0.62%)	25 (1.93%)
Medical students	688	41 (5.96%)	94 (13.66%)	32 (4.65%)	103 (14.97%)
Paramedics	323	7 (2.17%)	12 (3.72%)	3 (0.93%)	16 (4.95%)
Administrative staff	2631	51 (1.94%)	47 (1.79%)	27 (1.03%)	71 (2.70%)
Other	6568	187 (2.79%)	163 (2.72%)	101 (1.40%)	249 (4.11%)
All	28792	808 (2.81%)	768 (2.67%)	413 (1.43%)	1163 (4.04%)

Data are n or n (%).

**Table 2: Frequencies of positive antibody tests stratified according to categories of professions**

- Seroprevalence (SP) significantly higher in HCW compared to blood donors  
RR 1.33 (95 CI 1.12-1.58, p=0.0008)
- Frontline HCW (doctors, nurses, assistant nurses, medical/nursing students)
  - n = 17'135, SP 4.55%, SP higher than other HCW
- HCW on COVID-19 wards
  - n = 1'321, SP 7.19%

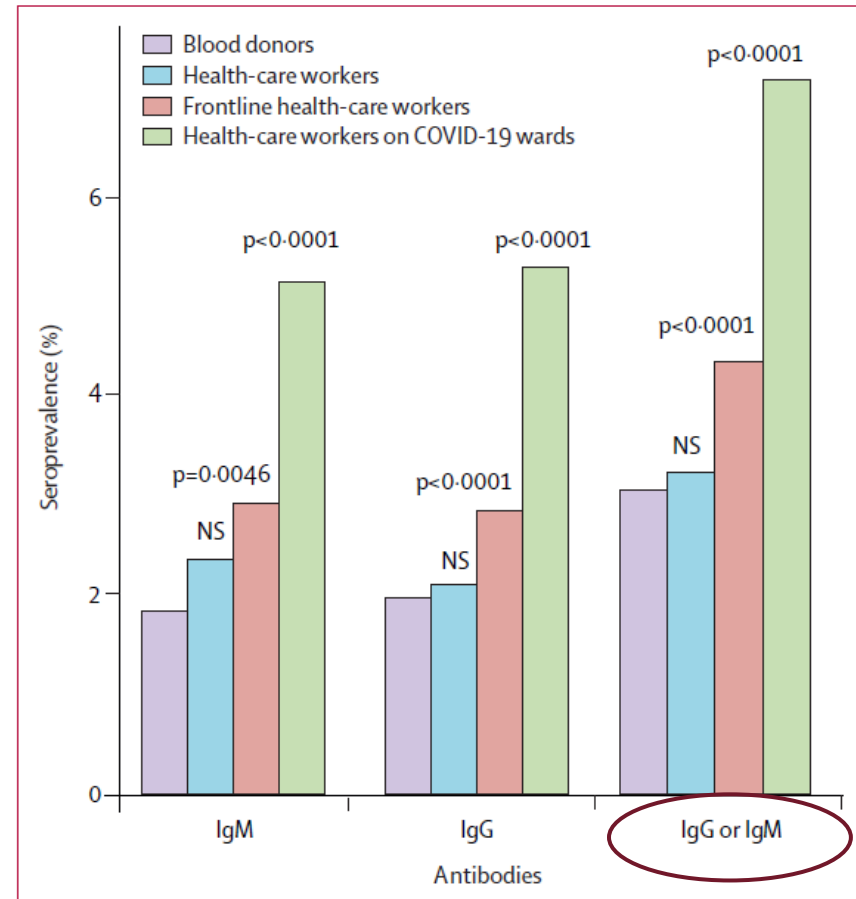


Figure 1: Seroprevalence according to job assignment compared with blood donors

Purple indicates blood donors serving as a proxy for the general population (n=4672). Blue indicates health-care workers not working on dedicated COVID-19 wards or frontline (n=11 488). Red indicates frontline health-care workers not working on dedicated COVID-19 wards (n=15 983). Green indicates health-care workers working on dedicated COVID-19 wards (n=1321). NS=not significant.

# Seroprevalence stratified by specialty

- Contact with patient, slight increase in SP, only significant when considering IgM and IgG
- SP higher in male compared with female
- SP highest in participants younger than 30 years (med.students)

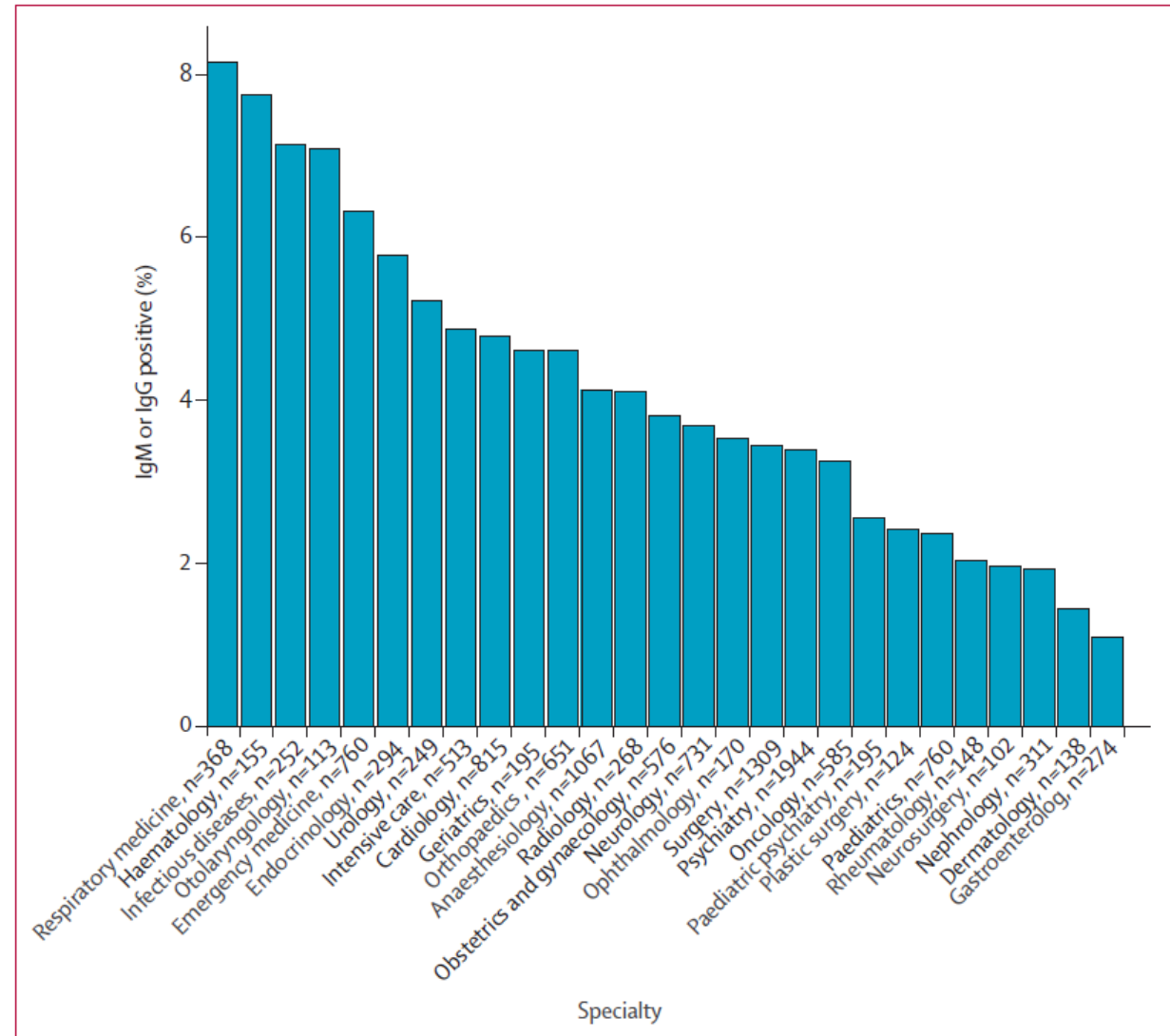
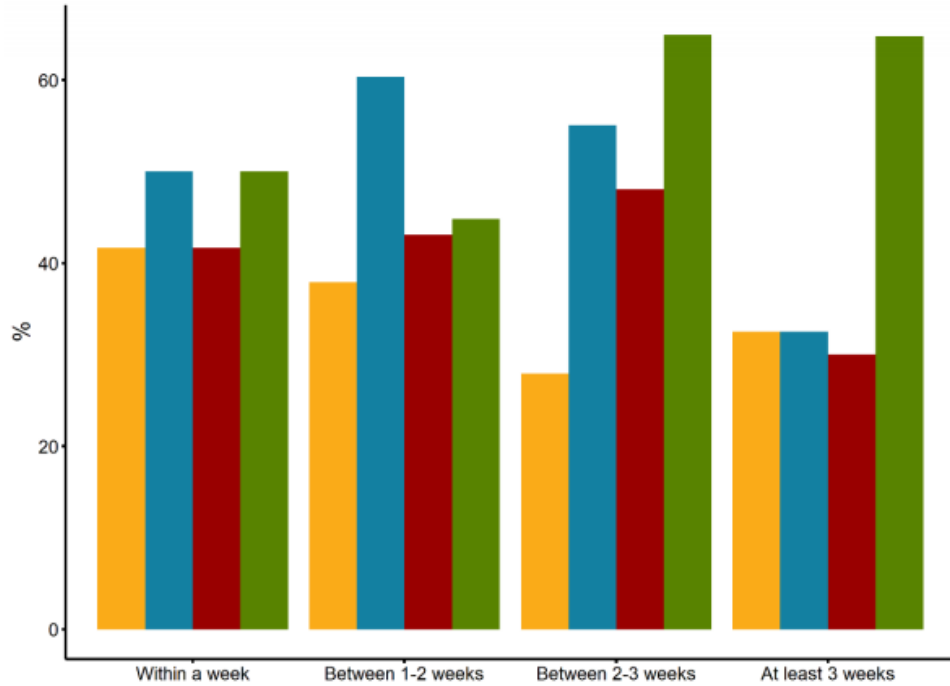


Figure 2: Seroprevalence stratified according to specialty for doctors, nurses, and assisting nurses  
Figure shows specialties with at least 100 participants.





Healthcare workers previously positive for SARS-CoV-2 by PCR differentiated by time from specimen extracted to antibody testing

Yellow = No antibodies, blue = IgM positive, red = Both IgM and IgG positive, green = IgG positive

	IgM or IgG antibodies	No antibodies	p value
Any symptom	908 (5.86%)	14587 (94.14%)	<0.0001
Fever	480 (14.99%)	2723 (85.01%)	<0.0001
Loss of smell or taste	377 (32.39%)	787 (67.61%)	<0.0001
≥3 symptoms	727 (7.39%)	9113 (92.61%)	<0.0001

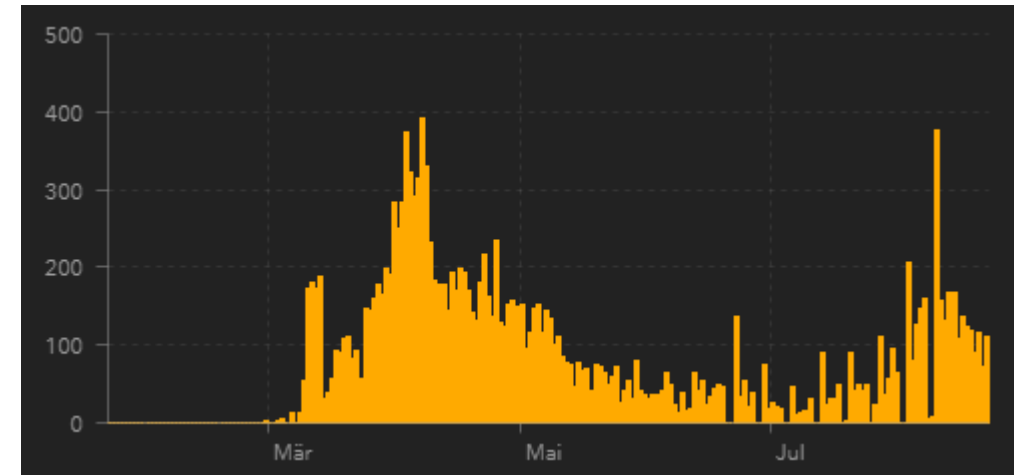
Data are n (%), unless otherwise indicated. p values were calculated using Fisher's exact test, comparing seropositivity with the factors listed.

**Table 3: Frequencies of positive antibody tests stratified according to symptoms of COVID-19**

- Any symptom increased SP compared with asymptomatic HCW
- Loss of smell or taste was most strongly associated with being seropositive

# Conclusion

- Seropositivity
  - higher in HCW < higher in Frontline HCW < even higher in HCW in COVID19 wards
  - Higher in men than women
  - Approx 50% of seronegative HCW reported symptoms
- Limitations
  - + Largest study population to date, without selection
  - - Reduced sensitivity of the test and depending on prevalence will underestimate SP
  - - Reporting of symptoms high
    - knowing the test result might have biased the reporting
  - - No information about route of transmission (patient to HCW, interactions between HCWs)
  - - Blood donors as proxy for general populations
    - healthier population
    - Baseline characteristics not even



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Vielen Dank für die Aufmerksamkeit

