

COVID-19 and Post-COVID in health and social workers – a German perspective

26.Oct.2023

Albert Nienhaus

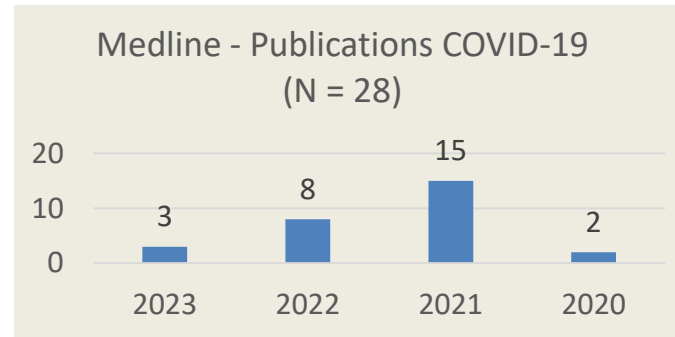
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Conflict of Interest

The compensation board for Health and Welfare Workers (BGW) supports the research of CVcare at the University Clinics Hamburg, Eppendorf, Germany



Epidemiology for Health and Welfare Workers



Compensation Board for Health and Welfare Workers

I am Head of the 'Occupational Medicine, Toxicology and Health Research' department of the BGW. We drafted the guideline for the confirmation of COVID-19 as occupational disease in Health and Welfare Workers

Conflict of interest – we care for those who care

- Epidemiology of COVID-19 in HW
- The dynamic of SARS-CoV-2 infections during the first year of the pandemic for hospital workers in Germany
- Vaccination and severity of COVID-19
- Survey data on Post-COVID in health and welfare workers

OPEN ACCESS

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Risk of hospital admission with coronavirus disease 2019 in healthcare workers and their households: nationwide linkage cohort study

Anoop S V Shah,^{1,2} Rachael Wood,^{3,4} Ciara Gribben,³ David Caldwell,³ Jennifer Bishop,³ Amanda Weir,³ Sharon Kennedy,³ Martin Reid,³ Alison Smith-Palmer,³ David Goldberg,³ Jim McMenamin,³ Colin Fischbacher,³ Chris Robertson,³ Sharon Hutchinson,^{3,5} Paul McKeigue,⁶ Helen Colhoun,^{3,7} David A McAllister^{3,8}

For numbered affiliations see end of the article.

Correspondence to: D McAllister David.mcallister@glasgow.ac.uk (ORCID 0000-0003-3550-1764) Additional material is published online only. To view please visit the journal online.

Cite this as: *BMJ* 2020;371:m3582 <http://dx.doi.org/10.1136/bmj.m3582>

Accepted: 11 September 2020

ABSTRACT

OBJECTIVE

To assess the risk of hospital admission for coronavirus disease 2019 (covid-19) among patient facing and non-patient facing healthcare workers and their household members.

DESIGN

Nationwide linkage cohort study.

SETTING

Scotland, UK, 1 March to 6 June 2020.

PARTICIPANTS

Healthcare workers aged 18-65 years, their households, and other members of the general population.

MAIN OUTCOME MEASURE

Admission to hospital with covid-19.

RESULTS

The cohort comprised 158 445 healthcare workers, most of them (90 733; 57.3%) being patient facing, and 229 905 household members. Of all hospital admissions for covid-19 in the working age population (18-65 year olds), 17.2% (360/2097) were in healthcare workers or their households. After adjustment for age, sex, ethnicity, socioeconomic deprivation, and comorbidity, the risk of admission due to covid-19 in non-patient facing healthcare workers and their households was similar to the risk in the general population (hazard ratio 0.81 (95% confidence interval 0.52 to 1.26) and 0.86 (0.49 to 1.51), respectively). In models adjusting for the

same covariates, however, patient facing healthcare workers, compared with non-patient facing healthcare workers, were at higher risk (hazard ratio 3.30, 2.13 to 5.13), as were household members of patient facing healthcare workers (1.79, 1.10 to 2.91). After sub-division of patient facing healthcare workers into those who worked in "front door," intensive care, and non-intensive care aerosol generating settings and other, those in front door roles were at higher risk (hazard ratio 2.09, 1.49 to 2.94). For most patient facing healthcare workers and their households, the estimated absolute risk of hospital admission with covid-19 was less than 0.5%, but it was 1% and above in older men with comorbidity.

CONCLUSIONS

Healthcare workers and their households contributed a sixth of covid-19 cases admitted to hospital. Although the absolute risk of admission was low overall, patient facing healthcare workers and their household members had threefold and twofold increased risks of admission with covid-19.

Introduction

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) continues to spread globally, with more than 8 million cases of coronavirus disease 2019 (covid-19) and more than half a million deaths as of 10 July 2020.¹

Healthcare workers, who have been integral to the response to covid-19, may be at increased risk of contracting SARS-CoV-2 and hence subsequently transmitting it to their household, workplace contacts, or both.^{2,3} Estimating the risk in this population is important to guide public health measures to protect healthcare workers and their families, maintain a functioning healthcare system, and control rates of secondary transmission within the community.⁴

Despite this, the extent of these risks is not well understood, as most studies have been in single centres and limited by small sample sizes and/or biased selection and recording of disease.^{2,5} We are well placed to overcome these limitations in Scotland for two reasons. Firstly, the overwhelming majority of healthcare (especially acute care) is directly delivered by the National Health Service (NHS), which also maintains a national database on all directly employed staff in Scotland, including nursing, medical, and support staff and allied health professionals. Secondly, Scotland has a well established health record linkage system.⁶⁻⁸

WHAT IS ALREADY KNOWN ON THIS TOPIC

Several systematic reviews and reports have summarised studies of covid-19 infections in healthcare workers

Most studies have been small, based in single centres, and cross sectional in nature and used methods highly susceptible to bias or restricted their populations to physicians and nurses

Studies evaluating the risk of covid-19 infection in household members of healthcare workers are lacking

WHAT THIS STUDY ADDS

Healthcare workers and their households contributed a sixth of hospital admissions with covid-19 among working age adults

Healthcare workers in patient facing roles—especially those in "front door" roles—are, along with their households, at higher risk of admission with covid-19. Importantly, those in non-patient facing roles had similar risks to the general population

Scotland, 1 March to 6 June 2020

Risk of hospital admission because of COVID-19 for Health Workers with patient contact (at the front door)

3-fold

for relatives of these HW

2-fold

Linkage Cohort Study

Hazard Ratio

HW with patient contact: 3.3 (2.13-5.13)

Relatives of these HW: 1.8 (1.10-2.91)

Baseline UK Biobank data (2006-10) for England combined with results of SARS-CoV-2 testing of Public Health England (March to July 2020).

120,075 participants

271 with severe COVID-19.

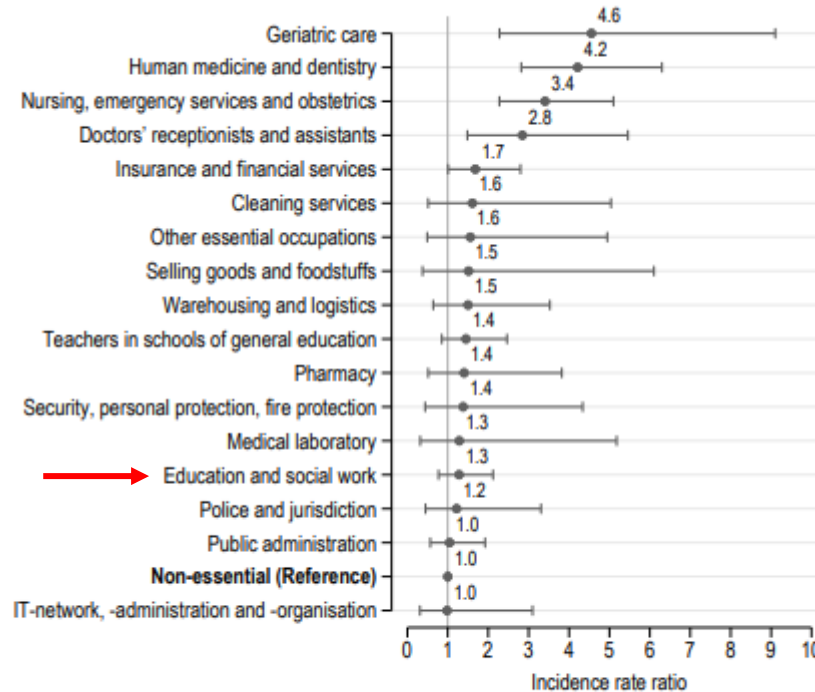
Relative Risk	RR	(95%CI)
HW	7.4	(5.5 – 10.0)
Social worker, teacher	1.8	(1.2 – 2.8)
Essential worker	1.6	(1.05 – 2.5)

Mutambudzi et al. Occupation and risk of severe COVID-19: prospective cohort study of 120,075 UK Biobank participants. OEM 2020 Dec. 09; oem-2020-106731

Four occupations with increased risk (significant)

- Geriatric care
- Human medicine and dentistry
- Nursing, emergency services
- Doctors' assistants

Childcare



N = 108,960
N = 404 (0.37 %)
with positive PCR after **first wave**





Figure 2. Risk for SARS-CoV-2 infection (1 February–31 August 2020) among different groups of essential workers in comparison to non-essential workers. Incidence rate ratios obtained from robust Poisson regression analysis (person-time at risk specified as an exposure variable to control for different observation times). Estimations were adjusted for age group (in five-year increments), sex, migration background, study centre, weekly working hours, self-employment, occupational skill level (5th digit of the KdB-2010), and supervisory/leadership role (4th digit of the KdB-2010). N=108 960 employed individuals.

Occupation and SARS-CoV-2 infection risk among 108 960 workers during the first pandemic wave in Germany

Reuter et al. 2022

Article

Who Is at Higher Risk of SARS-CoV-2 Reinfection? Results from a Northern Region of Italy

Maria Francesca Piazza ^{1,*} , Daniela Amicizia ^{1,2} , Francesca Marchini ^{1,2}, Matteo Astengo ¹, Federico Grammatico ^{1,2}, Alberto Battaglini ^{1,2}, Camilla Sticchi ¹, Chiara Paganino ¹, Rosa Lavieri ¹, Giovanni Battista Andreoli ¹, Andrea Orsi ^{2,3} , Giancarlo Icardi ^{2,3}  and Filippo Ansaldi ^{1,2}



Vaccines 2022, 10, 1885. <https://doi.org/10.3390/vaccines10111885>

Healthcare workers were more than twice as likely to be re-infected than non-healthcare workers (OR of 2.4, $p < 0.001$).

Increased re-infection risk in HW

Two doses or more of vaccination were found to be protective against the risk of reinfection rather than a single dose (mRNA vaccines: OR of 0.06, $p < 0.0001$, and OR of 0.1, $p < 0.0001$; vector vaccines: OR of 0.05, $p < 0.0001$).

Vaccination reduces infection risk

Patients with chronic renal failure, cardiovascular disease, bronchopneumopathy, neuropathy and autoimmune diseases were at increased risk of reinfection (OR of 1.38, $p = 0.0003$; OR of 1.09, $p < 0.03$; OR of 1.14, $p = 0.006$; OR of 1.78, $p < 0.0001$; OR of 1.18, $p = 0.02$).

Chronic diseases increase infection risk (effect seems small)

Odds Ratios for IgG-Antibodies

Physicians	2.4 (1.6-3.5)
Nurses	1.7 (1.1-2.5)
Emergency rooms	1.5 (1.0-2.3)
COVID-19 wards	1.7 (1.2-2.4)

2,590 HW tested in April 2020

31.6% IgG positive



Original article

Hospital-Wide SARS-CoV-2 seroprevalence in health care workers in a Spanish teaching hospital

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ARTICLE INFO

Article history:

Received 17 September 2020

Accepted 27 November 2020

Available online xxx

Keywords:

Seroepidemiologic studies

Health personnel

SARS-CoV-2

Cross infection

ABSTRACT

Introduction: Hospital-wide SARS-CoV-2 seroprevalence is rarely explored and can identify areas of unexpected risk. We determined the seroprevalence against SARS-CoV-2 in all health care workers (HCW) at a hospital.

Methods: Cross-sectional study (14-27/04/2020). We determined SARS-CoV-2 IgG by ELISA in all HCW including external workers of a teaching hospital in Madrid. They were classified by professional category, working area, and risk for SARS-CoV-2 exposure.

Results: Among 2919 HCW, 2590 (88.7%) were evaluated. The mean age was 43.8 years (SD 11.1), and 73.9% were females. Globally, 818 (31.6%) workers were IgG positive with no differences for age, sex or previous diseases. Of these, 48.5% did not report previous symptoms. Seropositivity was more frequent in high- (33.1%) and medium- (33.8%) than in low-risk areas (25.8%, $p=0.007$), but not for hospitalization areas attending COVID-19 and non-COVID-19 patients (35.5 vs 38.3% $p>0.05$). HCW with a previous SARS-CoV2 PCR-positive test were IgG seropositive in 90.8%. By multivariate logistic regression analysis seropositivity was significantly associated with being physicians (OR 2.37, CI95% 1.61–3.49), nurses (OR 1.67, CI95% 1.14–2.46), nurse assistants (OR 1.84, CI95% 1.24–2.73), HCW working at COVID-19 hospitalization areas (OR 1.71, CI95% 1.22–2.40), non-COVID-19 hospitalization areas (OR 1.88, CI95% 1.30–2.73), and at the Emergency Room (OR 1.51, CI95% 1.01–2.27).

Conclusions: Seroprevalence uncovered a high rate of infection previously unnoticed among HCW. Patients not suspected of having COVID-19 as well as asymptomatic HCW may be a relevant source for nosocomial SARS-CoV-2 transmission.

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Seroprevalencia frente a SARS-CoV-2 en 2.590 trabajadores de un hospital universitario español

RESUMEN

Introducción: Los estudios de seroprevalencia frente a SARS-CoV-2 en los trabajadores sanitarios (TS) permiten identificar áreas de riesgo inesperado en los hospitales.

Palabras clave:

Seroprevalencia

Trabajador sanitario

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¹ These first authors contributed equally to this article.

^o Please see a list of the members of the Alcorcón COVID-19 group in [Appendix A](#).

Article

Cumulative Incidence of SARS-CoV-2 in Healthcare Workers at a General Hospital in Germany during the Pandemic—A Longitudinal Analysis

Martin Platten ¹, Albert Nienhaus ^{2,3,*}, Claudia Peters ², Rita Cranen ⁴, Hilmar Wisplinghoff ^{1,5}, Jan Felix Kersten ², Alexander Daniel Bach ⁶ and Guido Michels ⁷

Cumulative Incidence of SARS-CoV-2 in Healthcare Workers at a General Hospital in Germany during the Pandemic—A Longitudinal Analysis

Follow-up Study St. Antonius Hospital (SAH), Germany

- An indoor carnival on 15 February 2020 with 300 participants is assumed to have been the source of the first regional outbreak in Germany, the region is covered by SAH
- All workers of the hospital invited to the study
- Four surveys between April 2020 and April 2021
- Nasal swap for PCR and blood for antibody test
- Questionnaire on infection risks

Prof. Dr. Guido Michels
Dr. Rita Cranen



Principle Investigators at SAH
with team



Gym became examination parkour at St. Antonius Hospital (SAH)

reception



blood draw



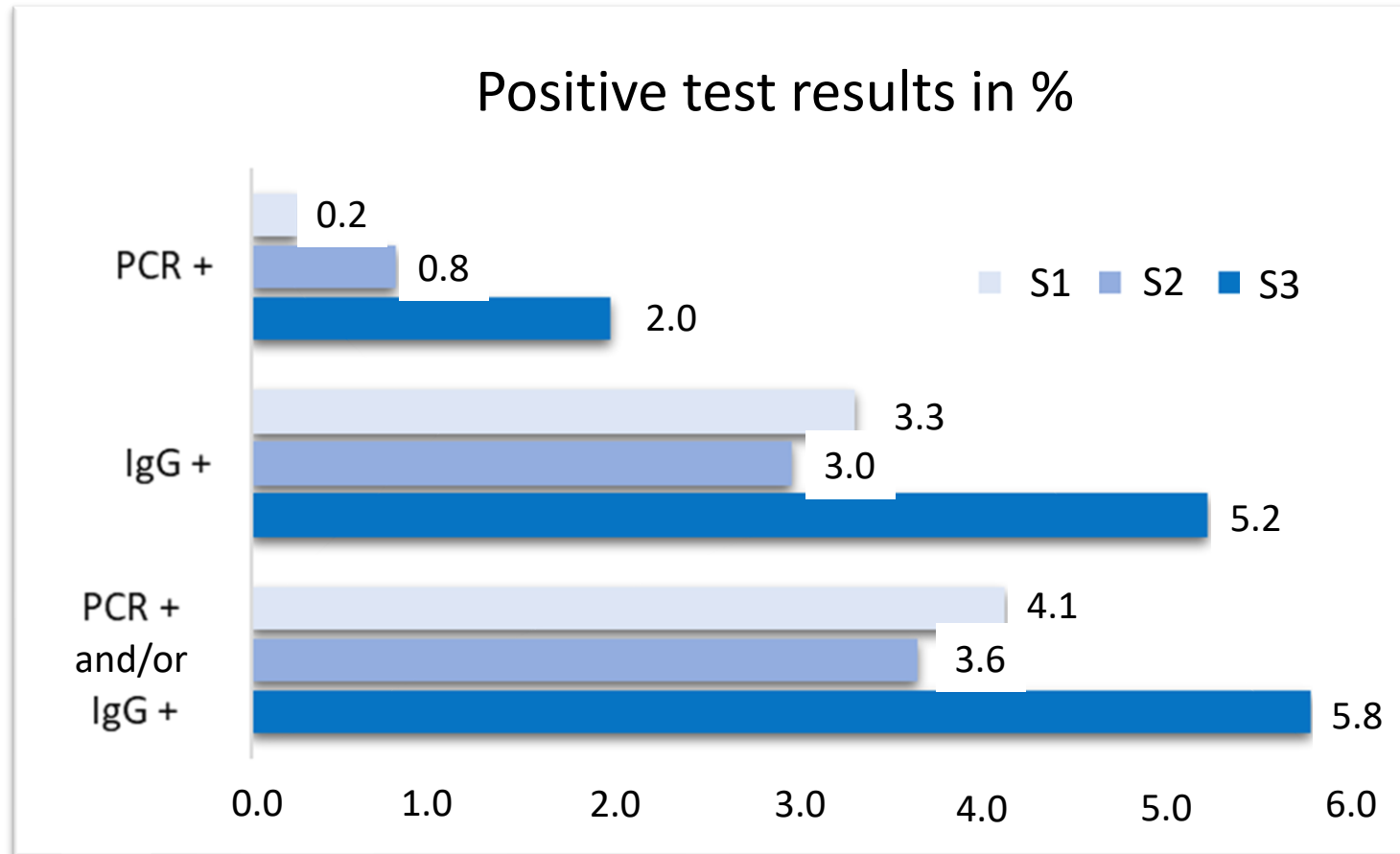
nasal swap



questionnaire



Results



Prävalenz von SARS-CoV-2 bei Mitarbeitern eines Krankenhauses der Regel-/Schwerpunktversorgung in Nordrhein-Westfalen

Prevalence of SARS-CoV-2 in employees of a general hospital in Northrhine-Westphalia, Germany

Bibliografie

Dtsch Med Wochenschr 2021; 146: e30–e38

DOI 10.1055/a-1322-5355

**OPEN
ACCESS**

Autoren

Martin Platten¹, Rita Cranen², Claudia Peters³, Hilmar Wisplinghoff^{1,4}, Albert Nienhaus^{3,5}, Alexander Daniel Bach⁶, Guido Michels⁷

	Positive PCR or IgG		Negative PCR and IgG		OR (95%CI)
	n	%			
Contact with COVID-Patient	23	5.6	391	94.4	2.6 (1.3 – 5.4)
No contact known	15	2.2	657	97.8	1

N=1,086 with complete data

Results of follow-up Study St. Antonius Hospital (SAH), Germany April 2020 to April 2021 (Survey 1 to 4)

Ward	IgG and PCR -		IgG(M*) or PCR +		Logistic Regression**	
	N	%	N	%	OR	95%-KI
ICU	101	80.8	24	19.2	4.4	[1.7 – 13.6]
General ward	566	86.1	91	13.9	2.9	[1.3 – 8.5]
Workers with no patient contact	108	95.6	5	4.4	1	

** Logistic Regression with n=895
PCR, IgG or IgM* positive n=120 (13.4%)

* IgM not influenced by vaccination



Article

Cumulative Incidence of SARS-CoV-2 in Healthcare Workers at a General Hospital in Germany during the Pandemic—A Longitudinal Analysis

Martin Platten ¹, Albert Nienhaus ^{2,3,*}, Claudia Peters ², Rita Cranen ⁴, Hilmar Wisplinghoff ^{1,5}, Jan Felix Kersten ², Alexander Daniel Bach ⁶ and Guido Michels ⁷

Potential explanations for low cumulative infection rate during the first 12 months of the pandemic

Infection prevention measures hairdresser

- Close every second work station
- Nobody waiting
- Masks for client and hairdresser
- No drinks, no journals
- Wash hair before cutting
- PoC test before entering the parlor
- Hand disinfection

- We had two more weeks to prepare
- Mandatory COVID-19 specific infection control measures for different workplaces
- Example:
 - Undercover observation of 162 hair parlors in Berlin, Hamburg, Freiburg
 - October – December 2020
 - High compliance with infection control measures (97%)

Zentralblatt für
Arbeitsmedizin, Arbeitsschutz
und Ergonomie

ORIGINALIEN

Zbl Arbeitsmed
<https://doi.org/10.1007/s40664-021-00433-x>
Eingegangen: 15. Februar 2021
Angenommen: 14. April 2021

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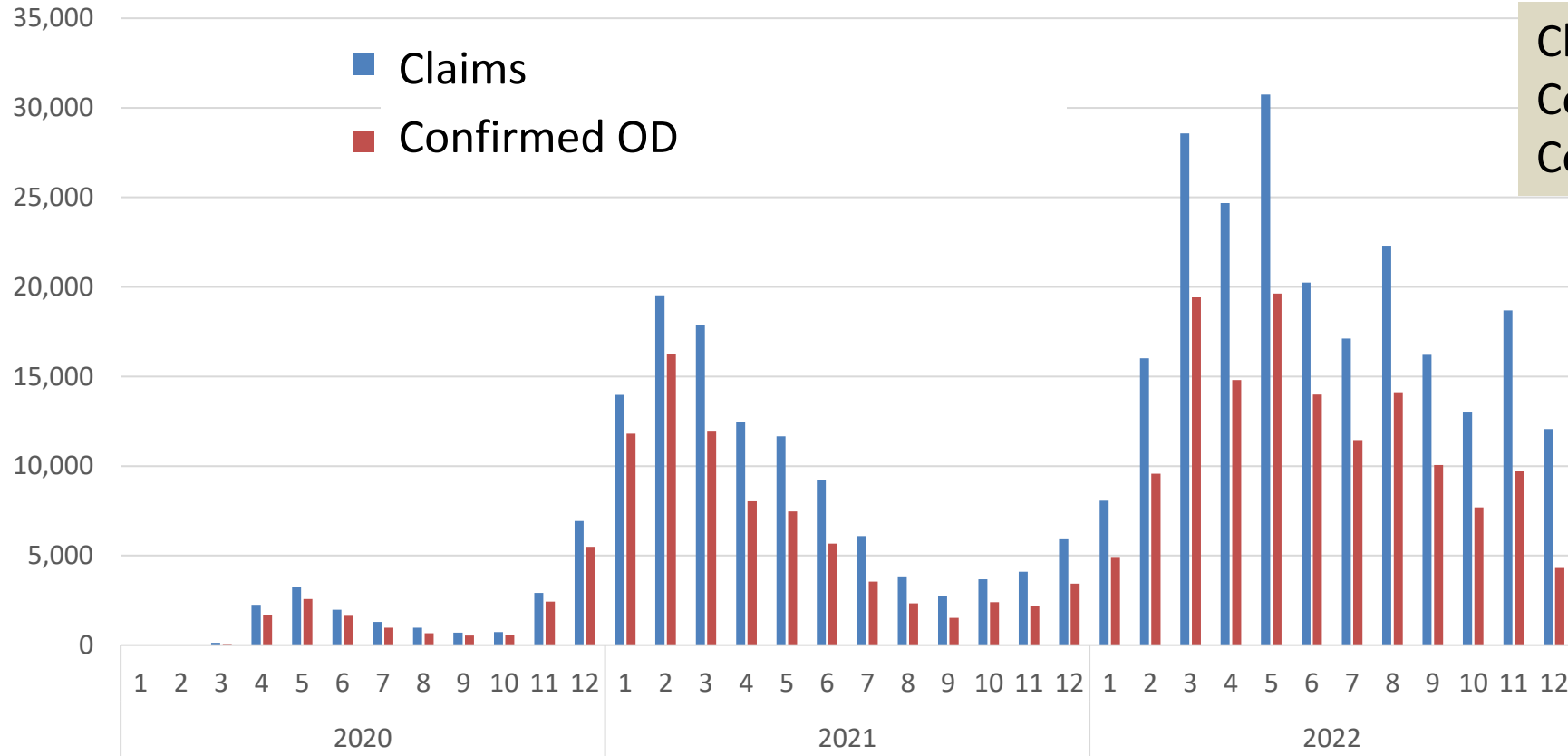
Martina Michaelis¹ · Ulrich Stöbel¹ · Johanna Stranzinger² · Albert Nienhaus²

¹FFAS – Freiburger Forschungsstelle Arbeits- und Sozialmedizin, Freiburg, Deutschland

²Abt. Arbeitsmedizin/Gefahrstoffe/Gesundheitswissenschaften, Berufsgenossenschaft für Gesundheitsdienst und Wohlfahrtspflege (BGW), Hamburg, Deutschland

Implementation of occupational health and safety during the SARS-CoV-2 pandemic in hairdressers' salons

Occupational Disease (OD) – because of COVID-19 of the compensation board BGW in 2020, 2021 and 2022



Claims	376,557
Confirmed OD	232,880
Confirmation rate	62%

All compensation boards in Germany > 500,000 claims

37,772
16,622

111,055
76,618

227,730
131,640

Occupational disease (OD) because of COVID-19 since beginning of pandemic separated by sectors

Data until
30.09.2022

Sorted by case/
100 FTE

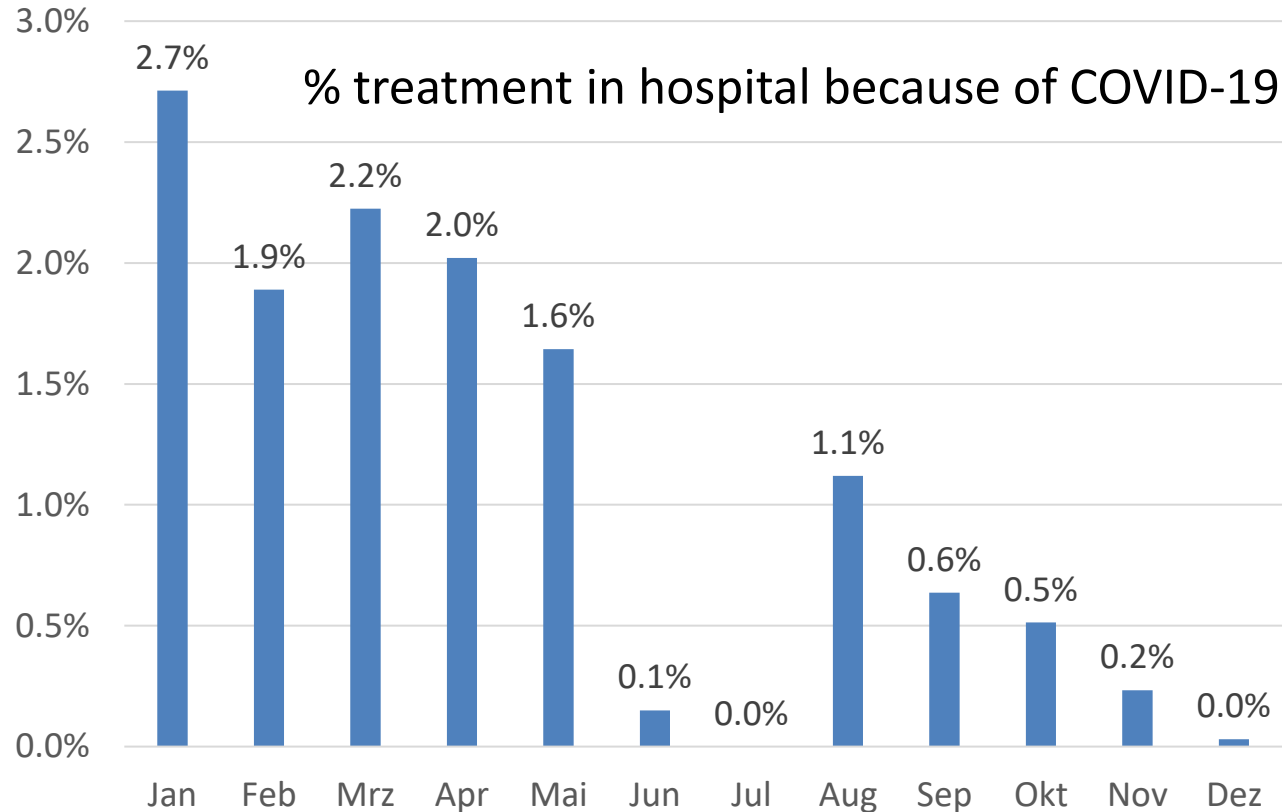
* In top 3 since Dec. 2021

Sector	confirmed OD	case / 100 full time equivalences
Hospitals	53,789	6.97
Child care*	36,772	6.75
Geriatric care	65,108	6.49
Administration, Social Work	3,576	3.28
Welfare and Social Work	23,221	3.16
Workplaces for persons with handicaps	7,724	1.87
Education (Vocational Training)	1,100	1.44
Doctors' Office	5,711	1.19
Therapeutic Practices (e.g. physiotherapy)	2,406	0.84
Dentistry	608	0.25
Pharmacy	240	0.16
Hairdresser	167	0.08
Veterinary Medicine	27	0.08
Beauty und Wellness	17	0.05
Total	200,505	3.94

COVID-19 by year and severity of disease

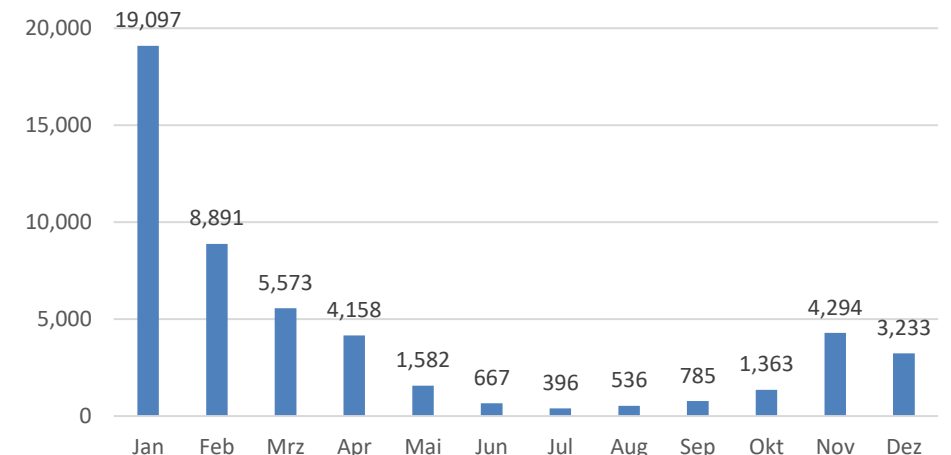
Year	Claims	Treatment in hospital		Death		Sick leave >6 weeks	
	n	n	%	n	%	n	%
2020	21,147	1,018	4.8	32	0.15	921	4.4
2021	111,043	3,431	3.1	109	0.098	4,489	4.0
2022	227,497	281	0.12	28	0.012	580	0.25
Total	359,687	4,730	1.3	169	0.047	5,990	1.7
Reduction 2020 to 2022			97.5		92.0		94.3

Proportion treated in hospitals of all ODs because of COVID-19 in 2021 separated by month



- 50,575 ODs,
- 950 hospital treatment,
- 1.9% of all ODs with SARS-CoV-2 infection in 2021

Month of Infection of OD in 2021

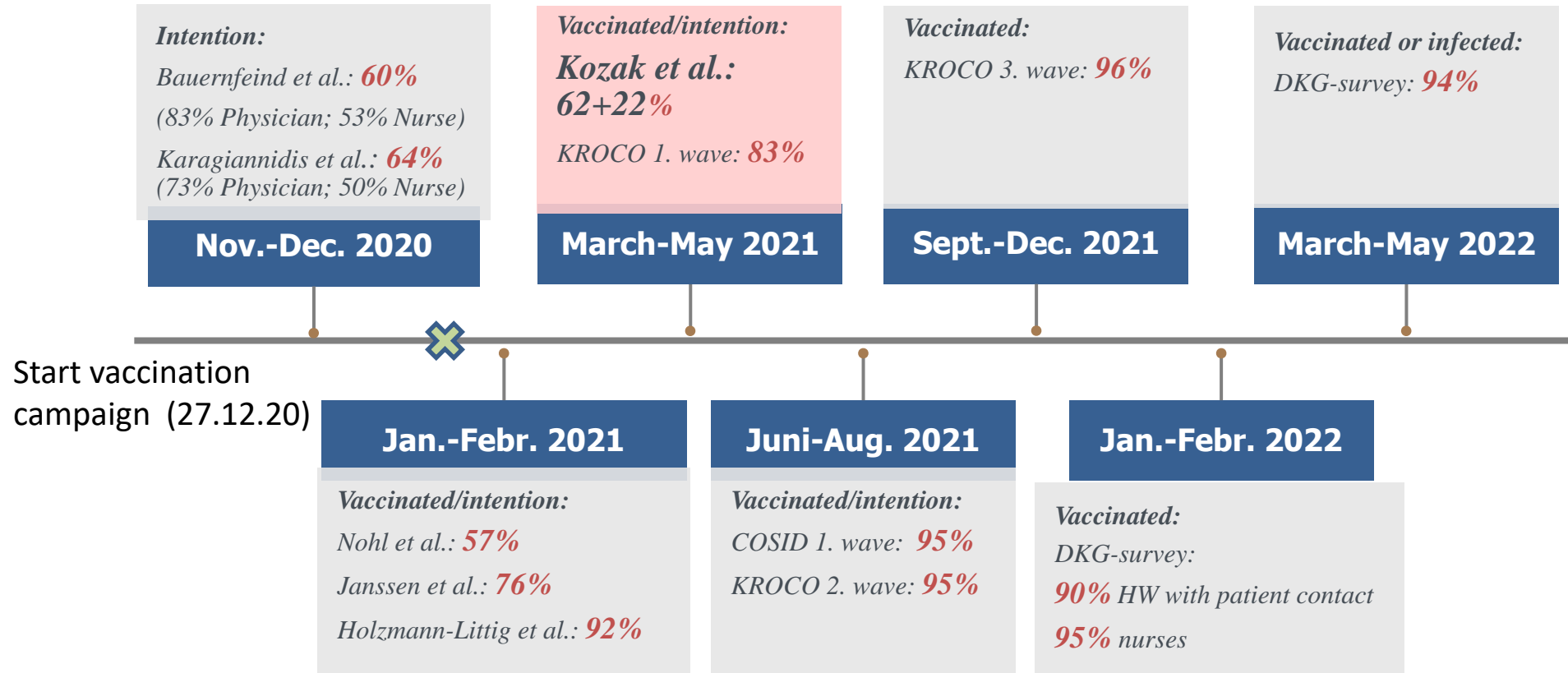


Article
COVID-19 as an Occupational Disease—Temporal Trends in the Number and Severity of Claims in Germany

Albert Nienhaus ^{1,2,*}, Johanna Stranzinger ² and Agnessa Kozak ²

Int. J. Environ. Res. Public Health **2023**, *20*, 1182.

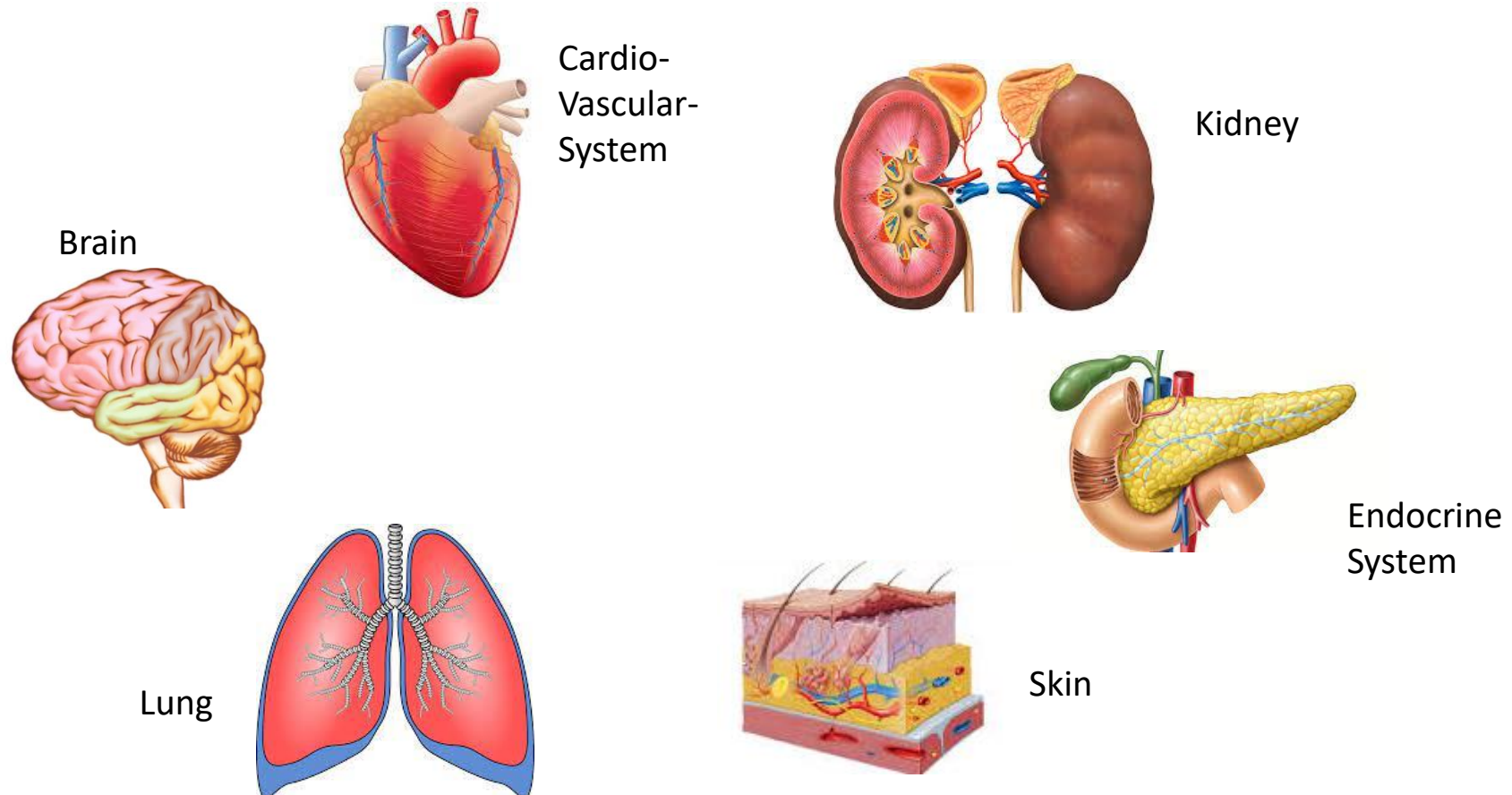
Intention to receive vaccination and proportion of vaccinated HWs



Literature: Bauernfeind et al. 2021, DOI: 10.1007/s15010-021-01622-9; Holzmann-Littig et al. 2021, doi:10.3390/vaccines9070777

Kozak et al. 2021, DOI: <https://doi.org/10.3390/ijerph18136688>; Karagiannidis et al. 2021, DOI: 10.1007/s00063-021-00797-1; Muschalik et al. 2022, DOI: 10.3238/arztebl.m2022.0206; Nohl et al. 2021, DOI: 10.3390/vaccines9050424; Janssen et al. 2021, DOI: 10.1007/s00063-021-00821-4; RKI, 2021, 2022 https://www.rki.de/DE/Content/InfAZ/N/Neuartiges_Coronavirus/Projekte_RKI/KROCO.html; DKG, 2022, <https://www.dkgv.de/dkg/presse/>

COVID-19 and Post-COVID are multi-organ diseases or syndromes



Typical symptoms following the Long-/Post-COVID guideline of the German scientific medical associations

very often

- Fatigue
- Dyspnea
- Performance/Activity Limitations
- Headache
- Smell and taste disorders

often

- Cough
- Insomnia
- Depressed mood
- Anxiety symptoms
- PTSD Symptoms
- General pain
- Altered breathing pattern
- Cognitive impairment
- Hair loss

seldom

- Paralysis, sensory disturbance
- Vertigo
- Nausea
- Diarrhea
- Loss of appetite
- Tinnitus
- Earache
- Loss of voice
- Heart palpitations
- Tachycardia

Typical symptoms following the Long-/Post-COVID guideline of the German scientific medical associations

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- Tinnitus
- Earache
- Loss of voice
- Heart palpitations
- Tachycardia

Sleep disorders, depressive symptoms, anxiety, post-traumatic stress in HW during pandemic

- 14 studies with hospital workers
- Considerable level of stress, depressive and anxious symptoms. Severe symptoms were found in 2.2–14.5% of respondents.
- Sleep disorders up to 36%

Mental Health Disorders in Nurses During the COVID-19 Pandemic:

Brittney Riedel¹, Sydney R. Horen², Allie Reynolds³ and Alireza Hamidian Jahromi^{2}*

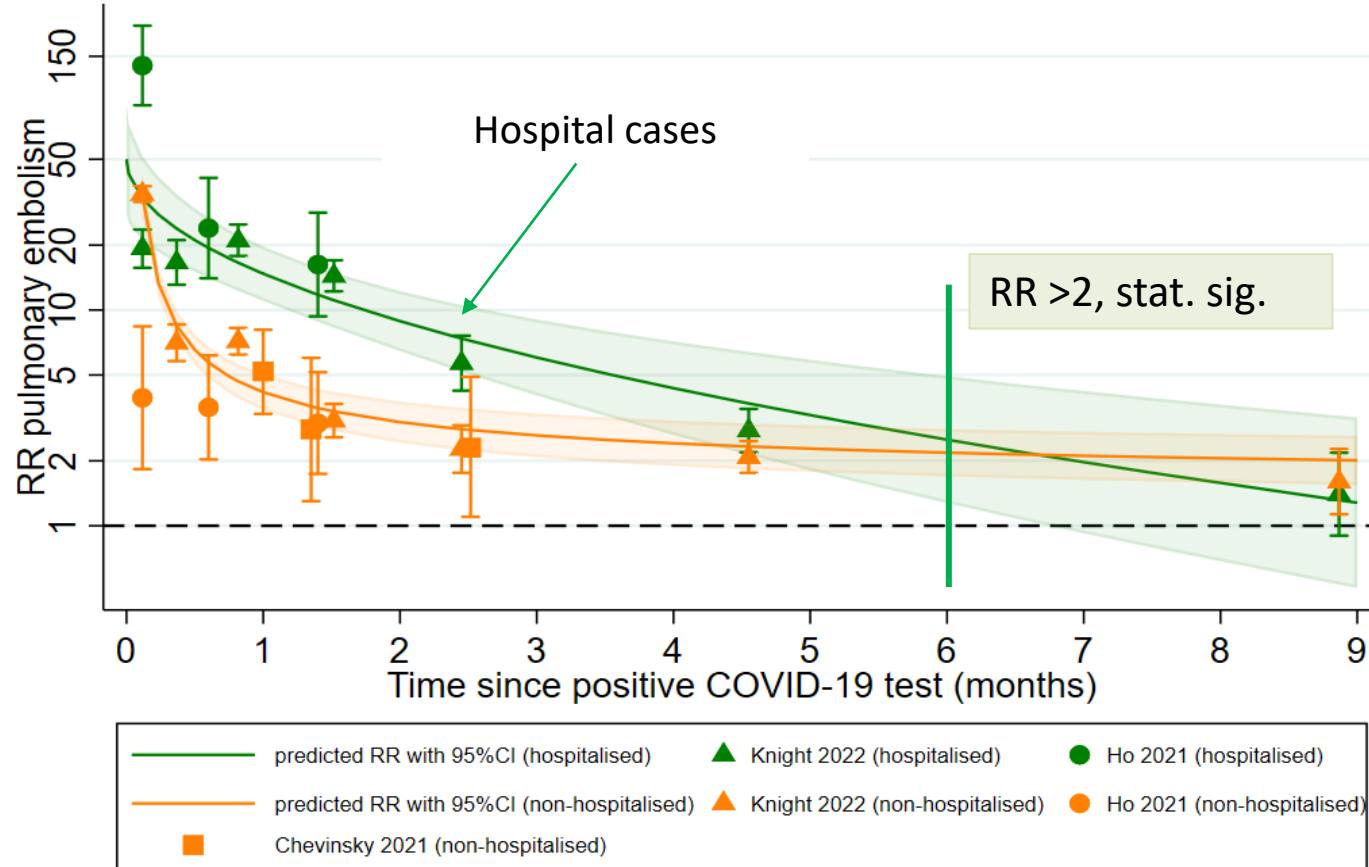
- Nurses should be educated on how to deal with anxiety, depression, post-traumatic stress disorder and other mental health issues in order to better protect themselves.

COVID-19-Pandemie: Belastungen des medizinischen Personals
 Ein kurzer aktueller Review
 Jens Bohlken¹, Friederike Schömig², Matthias R. Lemke³, Matthias Pumberger², Steffi G. Riedel-Heller¹

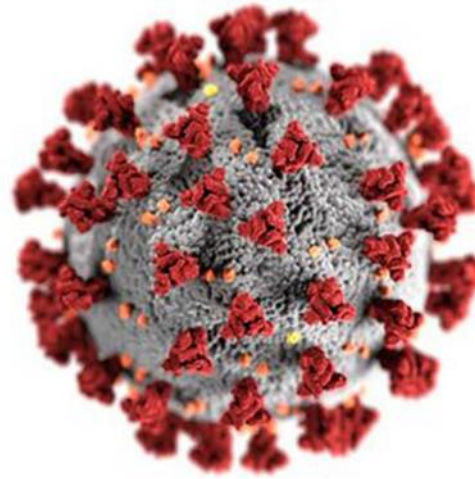
The Psychological Impact of Epidemic and Pandemic Outbreaks on Healthcare Workers: Rapid Review of the Evidence
 Current Psychiatry Reports (2020) 22: 43
 Emanuele Preti^{1,2} · Valentina Di Mattei^{3,4} · Gaia Perego¹ · Federica Ferrari⁴ · Martina Mazzetti⁴ · Paola Taranto⁴ · Rossella Di Pierro^{1,2} · Fabio Madeddu^{1,2} · Raffaella Calati^{1,5}

Diseases caused by COVID-19

Risk of pulmonary embolism after a COVID-19 infection by time



Meta-Analyse performed in
March 2023
in cooperation with
A. Seidler and his group,
University Dresden



Long-Term Effects of COVID-19 on Workers in Health and Social Services in Germany – a follow-up survey

Claudia Peters, Madeleine Dulon, Claudia Westermann, Agnessa Kozak, Albert Nienhaus



International Journal of
*Environmental Research
and Public Health*

Int J Environ Res Public Health 2022, 19, 6983

Response rate and population

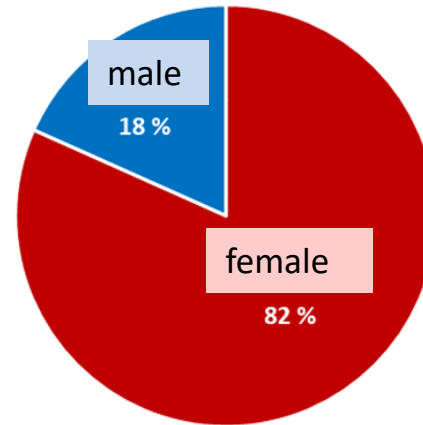
Letter sent in Feb. 2021
N = 4,325

Response first survey
N = 2,053 (47%)

Response second survey Oct. 2021
N = 1,428 (70%)

Response third survey March 2022
N = 1,261 (61%)

Sample n = 2,053



Age 18 – 81 years,
Median 51 years



International Journal of
*Environmental Research
and Public Health*

Article

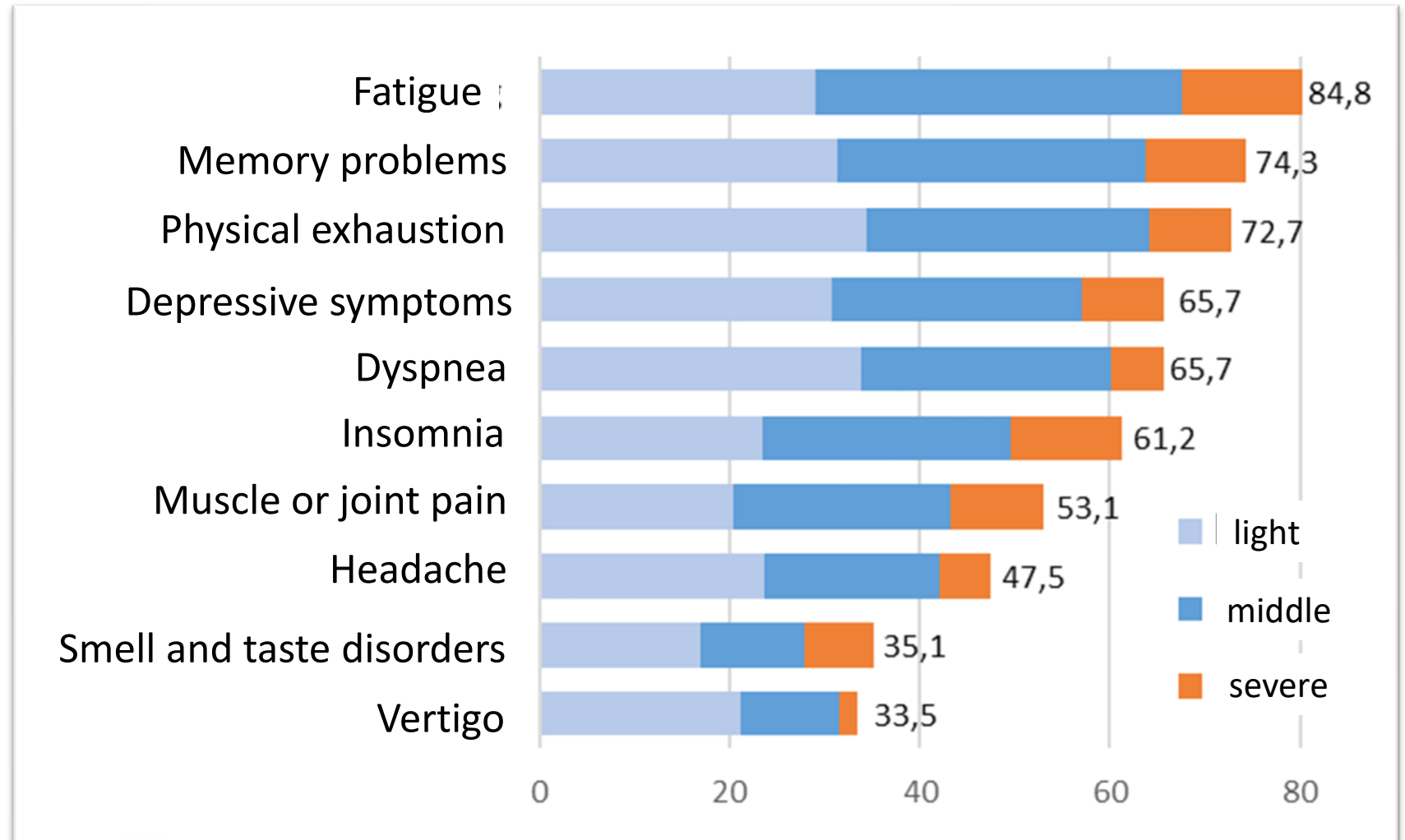
Long-Term Effects of COVID-19 on Workers in Health and Social Services in Germany

Claudia Peters ^{1,*}, Madeleine Dulon ², Claudia Westermann ², Agnessa Kozak ¹ and Albert Nienhaus ^{1,2}

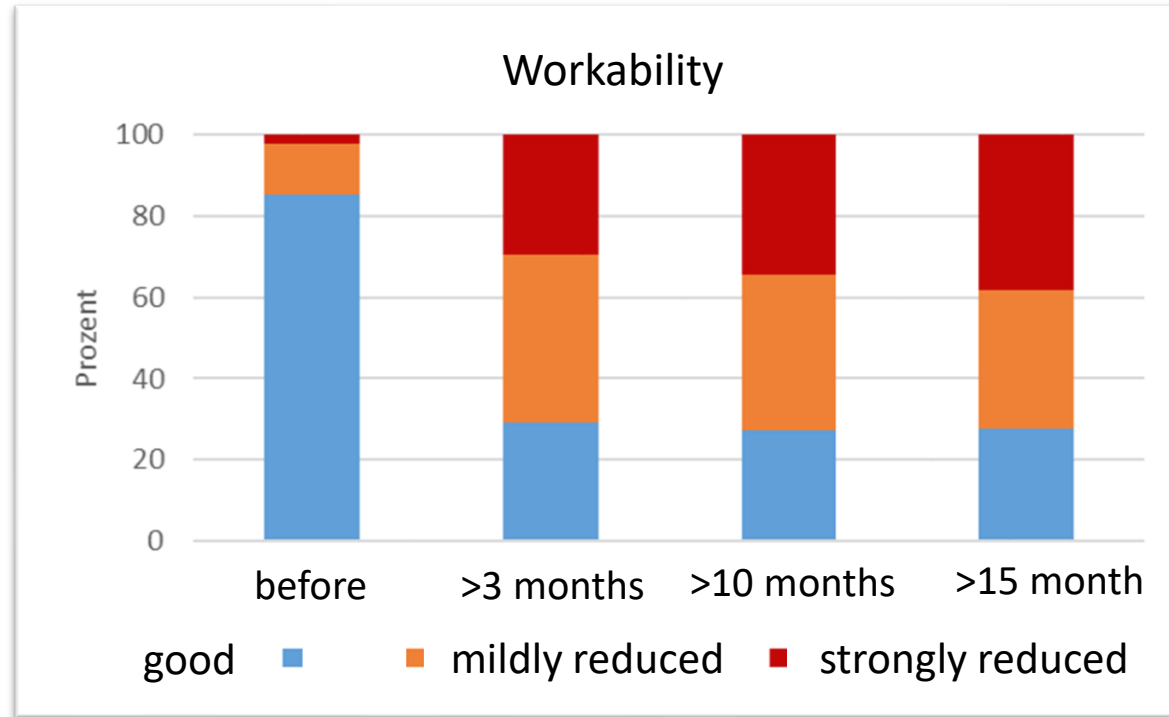
Persisting symptoms > 15 months after infection (n=1,094) (unpublished data)

Symptoms after COVID-19

first survey	76%
second survey	72%
third survey	70%



Workability before and after COVID-19



8% are on sick leave (3. survey >15 month after COVID-19)
 13% rehabilitation performed, 30% indicate need for rehabilitation

- Infection prevention and control was effective
- Vaccination reduced the number of severe COVID-19
- High need for rehabilitation after COVID-19
- Prevention is still needed, because of re-infection risk
- Compensation of Post-COVID is fair, but the need for compensation is difficult to assess



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HAMBURG

A cooperation of

CVcare



Competenzzentrum Epidemiologie und
Versorgungsforschung bei Pflegeberufen



BGW

Berufsgenossenschaft
für Gesundheitsdienst
und Wohlfahrtspflege

Thank you for your attention!

**The projects of CVcare are supported by the social partners
of the self-government of the BGW**