

Occupational risk of COVID-19 across pandemic waves: a two-year national follow-up study of hospital admissions¹

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1. Supplementary material
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Supplemental table S1. Occupational groups at the 4-digit DISCO-08 level in industrial sectors with an average Covid-19 JEM score above 12¹ All occupational groups are included in analyses, but only specific occupations with > 2000 employees are listed.

Occupation (descending number of employees)	DISCO-08 code	N employees	JEM SUM-SCORE ¹ (range 0-24)
HEALTHCARE (DB07 code 86)	-	133 093	15.6 (average)
Nursing professionals	2221	51 156	16
Generalist medical practitioners	2211	18 518	16
Healthcare Assistants	5321	12 620	18
Dental assistants and therapists	3251	8068	13
Physiotherapists	2264	6596	14
Medical and Pathology Laboratory Technicians	3212	6229	16
Psychologists	2634	5052	13
Health Professionals Not Elsewhere Classified	2269	4495	16
Cleaners and Helpers in Offices, Hotels and Other Establishments	9112	4045	19
Dentists	2261	3351	14
Medical Imaging and Equipment Operators	3211	2438	14

Midwifery Professionals	2222	2042	15
SOCIAL CARE (DB07 code 87-88)		282 214	15.8 (average)
Home-based Personal Care Workers	5322	81 233	18
Early childhood educators	2343	55 842	14
Childcare workers	5311	42 012	14
Special Teaching Professionals	2357	31 529	15
Healthcare Assistants	5321	27 224	18
Nursing professionals	2221	11 103	16
Social Work and Counselling Professionals	2635	4314	13
Cleaners and Helpers in Offices, Hotels and Other Establishments	9112	4178	19
Social Work Associate Professionals	3412	4175	13
Health Professionals Not Elsewhere Classified	2269	3640	16
Primary school teachers	2341	3316	14
Physiotherapists	2264	2353	14
Kitchen Helpers	9412	2184	17
Occupation (descending number employees)	DISCO-08 code	N employees	JEM SUM-SCORE¹ (range 0-24)
EDUCATION (DB07 85)		128 780	14.4 (average)
Primary school teachers	2341	72 524	14

Secondary Education Teachers	2330	15 006	14
Early childhood educators	2343	12 487	14
Childcare workers	5311	5379	14
Cleaners and Helpers in Offices, Hotels and Other Establishments	9112	3704	19
Special Needs Teachers	2352	3349	15
Building caretakers	5153	3313	14
TRANSPORTATION (DB07 code 49-51)		21 120	18.5 (average)
Bus and Tram Drivers	8331	10 775	19
Car, Taxi and Van Drivers	8322	2858	21
Travel Attendants and Travel Stuarts	5111	2090	19
RETAIL AND SALES (DB07 code 45)	-	84 832	18.4 (average)
Shop Sales Assistants	5223	55 060	19
Cashiers and Ticket Clerks	5230	12 804	18
Service Station Attendants	5245	3592	19
Shelf Fillers	9334	3248	17
ACCOMODATION, FOOD, BUILDING PERSONAL AND PROTECTIVE SERVICES, RECREATION (DB07 codes 55 ,56, 81, 93, 96)		100 540	17.2 (average)
Cleaners and Helpers in Offices, Hotels and Other Establishments	9112	27 849	19
Cooks	5120	10 496	13
Waiters	5131	10 332	21

Kitchen Helpers	9412	7658	17
Civil Engineering Labourers	9312	6003	13
Building caretakers	5153	5660	14
Hairdressers	5141	5398	17
Fast Food Preparers	9411	3610	19
Hotel Receptionists	4224	2679	16
Occupations, Covid-19 JEM sumscore > 0, ≤12	-	993 939	10.6 (average)
Missing DISCO-08 code,	-	337 306	-
JEM based reference group ¹	-	369 341	0

¹ Likelihood of occupational SARS-CoV-2 exposure according to a population-based international expert-rated job exposure matrix that assesses four measures of number of close indoor contacts at work, two mitigation measures and two job insecurity measures, each rated on a scale from low (0) to high (3)

Supplemental table S2. Week in 2021 with completed second Covid-19 vaccination by industrial sector considered at higher risk according to a Covid-19 job exposure matrix.

High-risk industrial sector	25 percentiles	Median	75 percentiles	90 percentiles
Healthcare	5	19	24	32
Social care	14	24	30	33
Education	25	28	31	33
Transportation	24	26	29	33
Retail sales	25	30	32	34
Service occupations	23	29	32	34
Reference population	25	28	21	33

Note: The adjusted incidence risk rate ratio for Covid-19 related admission to hospital in 2021 was 0.26 (0.20-0.34) among vaccinated compared to non-vaccinated healthcare workers.

Supplemental table S3. Covid-19 related hospital admission incidence (number/year/million employees) by sex and age stratified by pandemic wave in Denmark 2020-21

Pandemic waves 2020-21	Men, age years			Women, age years			All
	20-40	41-55	56-69	20-40	41-55	56-69	
Weeks							
1 8 - 32	7.3	23.4	47.6	11.8	22.7	31.3	21.6
2 33- 56	25.4	69.9	133.6	43.1	48.4	75.9	60.1
3 57- 78	35.0	65.7	80.9	34.3	44.1	43.1	48.7
4 79-102	38.6	42.7	46.7	56.4	26.1	29.6	40.4

Supplemental table S4. Incidence rate ratio (IRR) with 95% confidence intervals (CI) for Covid-19 related hospital admission for at-risk industrial sectors¹ with and without adjustment for Covid-19 vaccination.

Occupations	DB07 code	3. wave week 5-26 2021			4. wave Week 27-50 2021		
		N Covid-19	IRR	95% CI	N Covid-19	IRR	95% CI
Healthcare	85						
Without adjustment ²		42	0.86	0.6-1.3	50	1.26	0.9-1.8
With adjustment ³			1.39	1.0-2.0		1.48	1.0-2.1
Social care	87-88						
Without adjustment ²		117	1.02	0.8-1.3	165	1.70	1.3-2.2
With adjustment ³			1.20	0.9-1.6		1.57	1.2-2.0
Education	86						
Without adjustment ²		58	1.29	0.9-1.8	57	1.60	1.1-2.3
With adjustment ³			1.30	0.9-1.8		1.46	1.0-2.1
Transport	49-51						
Without adjustment ²		46	2.73	1.8-4.2	23	1.98	1.2-3.4
With adjustment ³			2.71	1.8-4.1		1.64	1.0-2.8
Retail sales	46						
Without adjustment ²		24	0.73	0.5-1.2	40	1.20	0.8-1.8
With adjustment ³			0.73	0.5-1.2		1.11	0.7-1.7
Service trades	55,56,81,93,96						
Without adjustment ²		82	1.04	0.7-1.5	63	0.88	0.6-1.3
With adjustment ³			1.04	0.7-1.5		0.76	0.5-1.1
JEM based reference group ²	-	133	1.00	-	118	1.00	-

¹ Industrial groups at the 2-digit DB07 level with a higher likelihood of occupational SARS-CoV-2 exposure according to an expert rated Covid-19 job exposure matrix (sumscore >12, range 0-24) (9).

² Wave-specific risk adjusted for sex, age (10 year groups), duration of education at baseline (5 groups), number of hospital admissions for one or more of 11 chronic diseases in the 10 years preceding start of the pandemic (0, 1, >1), country of origin (4 categories) and geographical region (5 groups) in an high-risk industrial sector compared with a Covid-19 JEM reference group (9) (all employees with low likelihood of occupational SARS-CoV-2 exposure (sumscore for all eight rated measures = 0))

³ Adjustment for completed Covid-19 vaccination (time varying variable) offered from week 1 in 2021 in addition to the above covariates.