

COVID-19 mortality across occupations and secondary risks for elderly individuals in the household: A population register-based study¹

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1. *Supplementary material*

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Table S1. Swedish occupational codes included in occupational groups

	SSYK
Care workers	221, 222, 223, 532, 533, 534; excluding 2222, 2225, 2233, 2234
Taxi- and bus drivers	8321, 8331
Meat packers	7611
Teachers	234, 5311
Service sector	522, 941, 523
Policemen, security guards	5412, 5413, 3360
Postal workers, delivery	4420, 8329
Cleaners	9111
IT, economics, or admin (skilled)	241, 242, 243, 251

Table S2. Descriptive statistics for studied population

	Aged 20-66				Aged 67+			
	N at March 12	% or mean	N dead from COVID-19	N / mean dead per 1000 from COVID-19	N at March 12	% or mean	N dead from COVID-19	N / mean dead per 1000 from COVID-19
Exposure in occupation (mean)	-	58.4	-	56.4	-	62.02	-	61.82
Share never working from home in occupation (mean)	-	0.70	-	0.73	-	0.75	-	0.78
Occupation								
Other	2,824,735	61.14	265	0.09	112,848	53.94	491	4.35
Care workers	601,616	13.02	37	0.06	41,107	19.65	189	4.60
Taxi- and bus drivers	38,046	0.82	25	0.66	1,899	0.91	13	6.85
Meat packers	3,409	0.07	<5	0.00	125	0.06	<5	0
Teachers	310,084	6.71	16	0.05	18,759	8.97	63	3.36
Service sector	347,283	7.52	22	0.06	15,825	7.56	91	5.75
Police men, security guards	45,004	0.97	<5	0.04	1,507	0.72	11	7.3
Postal workers, delivery	27,722	0.6	<5	0.14	1,371	0.66	14	10.21
Cleaners	86,414	1.87	14	0.16	6,292	3.01	38	6.04
IT, economics, or admin (skilled)	336,082	7.27	24	0.07	9,496	4.54	36	3.79
Age								
-44	2,448,299	53.0	28	0.01	-	-	-	-
45-49	548,657	11.9	29	0.05	-	-	-	-
50-54	553,912	12.0	66	0.12	-	-	-	-
55-59	494,881	10.7	88	0.18	-	-	-	-
60-64	437,273	9.5	146	0.33	-	-	-	-
65-69	137,373	3.0	52	0.38	88,545	42.3	107	1.21

70-74	-	-	-	-	66,924	32.0	157	2.35
75-79	-	-	-	-	27,640	13.2	145	5.25
80-84	-	-	-	-	13,911	6.6	174	12.51
85-89	-	-	-	-	7,868	3.8	185	23.51
90-94	-	-	-	-	3,428	1.6	130	37.92
95+	-	-	-	-	913	0.4	48	52.57
Sex								
Man	2,326,120	50.3	314	0.13	140,636	67.2	571	4.06
Woman	2,294,275	49.7	95	0.04	68,593	32.8	375	5.47
Country of birth								
Sweden	3,753,871	81.2	241	0.06	168,424	80.5	635	3.77
HIC	252,662	5.5	33	0.13	20,154	9.6	130	6.45
LMIC other	421,578	9.1	92	0.22	13,974	6.7	118	8.44
LMIC MENA	192,284	4.2	43	0.22	6,677	3.2	63	9.44
Education								
Primary	402,201	8.7	68	0.17	57,598	27.5	359	6.23
Secondary	2,155,991	46.7	203	0.09	84,421	40.3	342	4.05
Post-Secondary	2,025,760	43.8	136	0.07	62,120	29.7	176	2.83
Missing	36,443	0.8	<5	0.05	5,090	2.4	69	13.56
Income								
Lowest tertile	698,935	15.1	72	0.10	83,659	40.0	567	6.78
Mid tertile	1,789,979	38.7	188	0.11	68,204	32.6	265	3.89
Highest tertile	2,131,481	46.1	149	0.07	57,366	27.4	114	1.99
Stockholm vs. rest								
Rest of Sweden	3,522,148	76.2	241	0.07	164,099	78.4	555	3.38
Stockholm county	1,098,247	23.8	168	0.15	45,130	21.6	391	8.66
TOTAL	4,620,395	100	409	0.09	209,229	100	946	4.52

Note: Occupational characteristics refer to own occupation for individuals aged 20-66, and for household members aged 20-66 for individuals aged 67+. Occupational characteristics for household members for individuals aged 67+ are not mutually exclusive. For instance, an individual can have both a manual and a skilled worker in their household.

Table S3. Full Cox proportional hazard model of death risks, ages 20-66 with a registered occupation

	Model 1			Model 2			Model 3			Model 4		
	Baseline model			Occupational Groups			Exposure in occupation			Work from home		
	RR	se	p	RR	se	p	RR	se	p	RR	se	p
Sex												
Man	3.80	0.45	0.000	3.56	0.46	0.000	3.68	0.46	0.000	3.80	0.45	0.000
Woman	1			1			1			1		
Residence												
Rest of Sweden	1			1			1			1		
Stockholm	2.35	0.24	0.000	2.31	0.24	0.000	2.35	0.25	0.000	2.35	0.25	0.000
Education												
Primary	1.09	0.17	0.567	1.09	0.17	0.573	1.08	0.17	0.637	1.09	0.18	0.585
Secondary	1.13	0.13	0.277	1.13	0.13	0.302	1.13	0.13	0.300	1.13	0.14	0.307
Post-secondary	1			1			1			1		
Missing	0.54	0.39	0.391	0.55	0.40	0.407	0.53	0.38	0.379	0.54	0.39	0.391
Country of birth												
Sweden	1			1			1			1		
HIC	1.49	0.28	0.033	1.50	0.28	0.033	1.50	0.28	0.032	1.49	0.28	0.034
LMIC other	3.91	0.50	0.000	3.86	0.51	0.000	3.94	0.51	0.000	3.90	0.52	0.000
LMIC MENA	3.20	0.55	0.000	3.10	0.55	0.000	3.26	0.56	0.000	3.20	0.56	0.000
Income												
Lowest tertile	2.51	0.38	0.000	2.52	0.39	0.000	2.53	0.38	0.000	2.51	0.39	0.000
Mid tertile	2.07	0.24	0.000	2.07	0.25	0.000	2.10	0.25	0.000	2.07	0.25	0.000
Highest tertile	1			1			1			1		
Occupational groups												
Other				0.90	0.20	0.617						
Care				0.74	0.21	0.281						
Taxi/bus				1.41	0.43	0.258						
Meat packer				0.00	.	.						
Teacher				0.82	0.27	0.550						
Service				0.87	0.27	0.642						

Police, guard	0.54	0.40	0.401
Delivery & postal	0.89	0.49	0.828
Cleaner	0.89	0.32	0.749
IT, economics, or admin (skilled)	1		

Exposure in occupation

1.00 0.00 0.394

Percent cannot work from home in occupation

1.00 0.00 0.993

N covid deaths	409	409	409	409
N	4620395	4620395	4620395	4620395
aic	8918	8927	8919	8920
bic	9052	9167	9066	9067

Table S4. Full Cox proportional hazard model of death risks, ages 67+ living with a person <67 with a registered occupation

	Model 1			Model 2			Model 3			Model 4		
	Baseline model			Occupational Groups			Exposure in occupation			Work from home		
	RR	se	p	RR	se	p	RR	se	p	RR	se	p
Sex												
Man	1.61	0.12	0.000	1.61	0.12	0.000	1.61	0.12	0.000	1.61	0.12	0.000
Woman	1			1			1			1		
Residence												
Rest of Sweden	1			1			1			1		
Stockholm	2.35	0.16	0.000	2.35	0.17	0.000	2.35	0.17	0.000	2.39	0.17	0.000
Education												
Primary	1.34	0.13	0.003	1.32	0.13	0.005	1.34	0.13	0.003	1.28	0.13	0.014
Secondary	1.34	0.13	0.002	1.33	0.13	0.003	1.34	0.13	0.002	1.30	0.13	0.006
Post-secondary	1			1			1			1		
Missing	0.90	0.15	0.501	0.88	0.14	0.413	0.89	0.15	0.487	0.86	0.14	0.359
Country of birth												
Sweden	1			1			1			1		
HIC	1.17	0.12	0.112	1.17	0.12	0.122	1.17	0.12	0.114	1.17	0.12	0.124
LMIC other	1.69	0.19	0.000	1.66	0.19	0.000	1.68	0.19	0.000	1.64	0.19	0.000
LMIC MENA	1.93	0.28	0.000	1.92	0.28	0.000	1.92	0.28	0.000	1.88	0.28	0.000
Income												
Lowest tertile	1.28	0.15	0.034	1.27	0.15	0.041	1.28	0.15	0.034	1.25	0.15	0.060
Mid tertile	1.28	0.15	0.035	1.27	0.15	0.040	1.28	0.15	0.035	1.25	0.15	0.051
Highest tertile	1			1			1			1		
Occupational groups												
Other				1.12	0.19	0.529						
Care				1.23	0.23	0.253						
Taxi/bus				1.18	0.38	0.609						
Meat packer				0.00	.	.						
Teacher				0.92	0.19	0.694						
Service				1.29	0.26	0.200						
Police, guard				1.53	0.53	0.215						

Delivery & postal		2.16	0.68	0.015					
Cleaner		1.39	0.33	0.163					
IT, economics, or admin (skilled)		1							
Exposure in occupation					1.00	0.00	0.612		
Percent cannot work from home in occupation								1.01	0.00 0.001
N covid deaths	946	946			946			946	
N	209229	209229			209229			209229	
aic	14831	14833			14833			14822	
bic	14934	15018			14946			14935	

Figure S1. Selection flow and final population

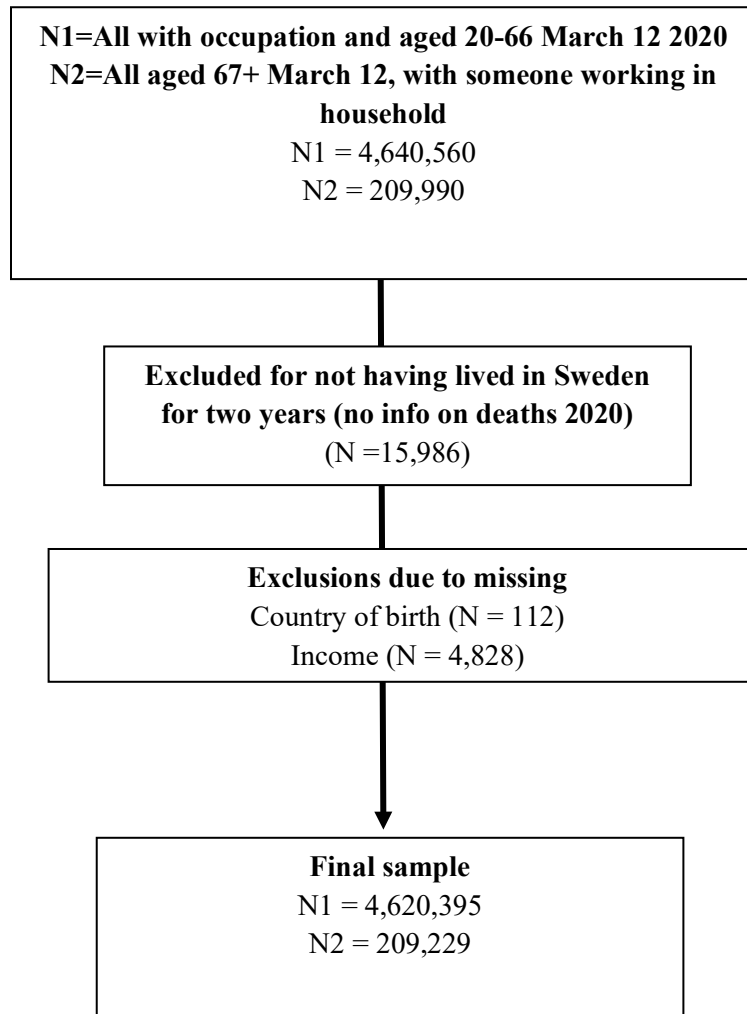


Figure S2. Occupational exposure measure origins and example

How much does this job require the worker to be in contact with others in order to perform? No contact (1) to constant contact (5)	How often does this job require exposure to disease/infections? Never (1) to every day (5)	How physically close to other people are you when you perform your job? Not near (1) to very close (5)	
Contact with others	Exposed to disease or infection	Physical proximity	
Standardized scores for taxi drivers based on the average of their answers			Mean exposure ONET data 63.3
86	25	79	
Crosswalk codes and labels ONET 53-3041: taxi drivers and chauffeurs SOC10 53-3041: taxi drivers and chauffeurs ISCO-08 8322: car, taxi and van drivers SSYK 8321: chauffeurs and car, travel service, and taxi drivers			Mean exposure After all crosswalks 65.1
92	27.4	75.8	

Note: The small difference in the final mean score we arrived at in comparison to the original O*NET data for taxi drivers is due to another group of drivers (light truck and delivery services) that joined taxi drivers in the crosswalk from the classification used in the US to the international classification

Figure S3. Share of study population working at various levels of occupational exposure (O*NET measure)

