



Approaches for the attribution of cases of Covid-19 to occupation

MODERNET

Covinar

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Statement of current interests

Deputy Chair: Occupational Medicine Committee, British Medical Association

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Introduction - background

- High / variable frequency of covid-19 in the community
- Generally good RT-PCR tests for viral RNA but in a limited time window
- Unclear status of antibody tests in determining disease
- Clinical diagnostic criteria for post-acute / 'long' covid still evolving
- Good epidemiologic studies are awaited to determine (for example) the: **Population attributable fraction (PAF)**
{the proportional reduction in population disease or mortality that would occur if exposure to a risk factor (occupation) were reduced to an alternative ideal exposure scenario (e.g. zero)}

Occupational attribution of covid-19

- Lack of universal criteria for attributing cases of covid-19 to occupation can hinder, for example:
 - observational epidemiology e.g. for comparisons nationally, within industry, or monitoring temporal trends.
 - workplace investigation
 - compensation awards

Different approaches for occupational attribution

A single definition for occupational attribution of covid-19 may be difficult to achieve.

Debate on criteria for occupational attribution of covid-19 can be assisted by addressing the relevant approaches:

- (i) Specific occupations
- (ii) Exposure
- (iii) Individual workplaces
- (iv) Individual patients

Specific occupations*

- Attribution to occupation could be assumed for specified occupations reaching a threshold of quality of evidence and relative risk.
- Well suited for compensation by job 'class'.
- For example routine data in the UK has so far (August 2020) shown 13 occupations with at least a doubling of the age-standardized mortality involving covid-19.
- But need to consider confounding, other biases, & power

*N.B.: some analyses have also been published by industrial sector (rather than occupation) but this would be too heterogenous

(e.g. a desk based informatician working in health care would not have risks comparable to a nurse).

Office of National Statistics (ONS)

Coronavirus (COVID-19) related deaths by occupation, England & Wales: deaths registered between 9 March & 25 May 2020

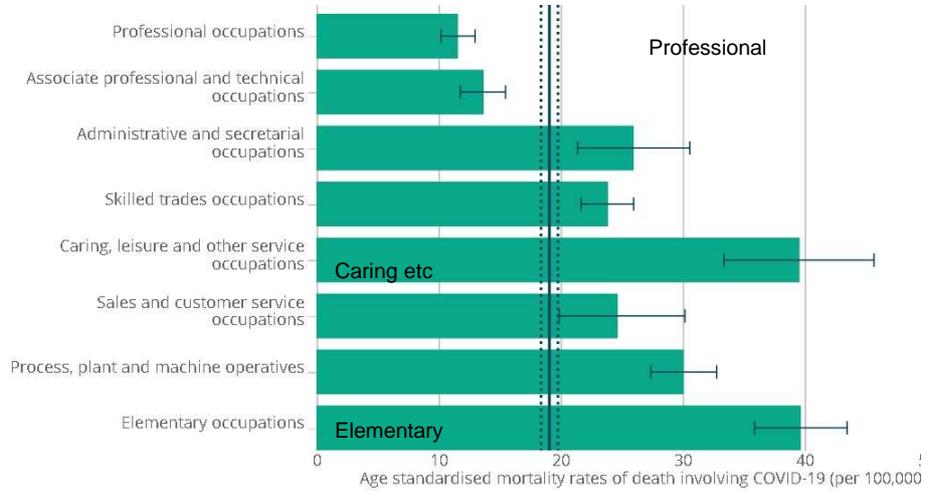
(2nd Stats. Bulletin on this topic released on 26.06.2020).

- Provisional analysis of deaths involving the coronavirus (COVID-19), (*including those with an underlying cause*) by different occupational groups,
- Males & females aged 20 - 64 years in England and Wales

Office for National Statistics '2nd Bulletin'

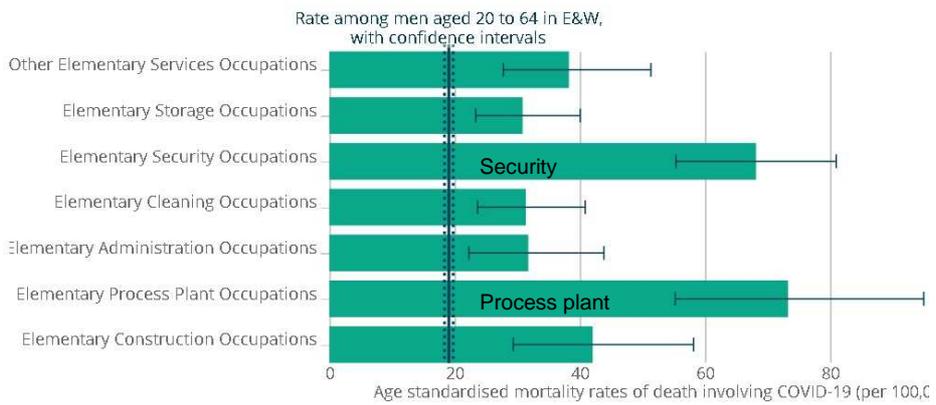
- Total: 4761 deaths involving Covid-19 in working age population
- 3122 deaths in men (~2/3)
- Age standardised death rates per 100,000 (with 95% CI)
- Rate in men ~2X > women (19.1 vs 9.7 /100,000)
- Analysed by 9 major, 25 sub-major, 90 minor & >350 individual occupations
- ***Not*** adjusted for deprivation, ethnicity, geography
- + *numerator bias (see later)*

Office for National Statistics '2nd Bulletin'



Age-standardised mortality rates (involving COVID-19) in men by major occupational group (compared to rate amongst 'all' 20-64 year old men, with confidence intervals)

Office for National Statistics '2nd Bulletin'



Age-standardised mortality rates (involving COVID-19) in men in 'Elementary Occupations'

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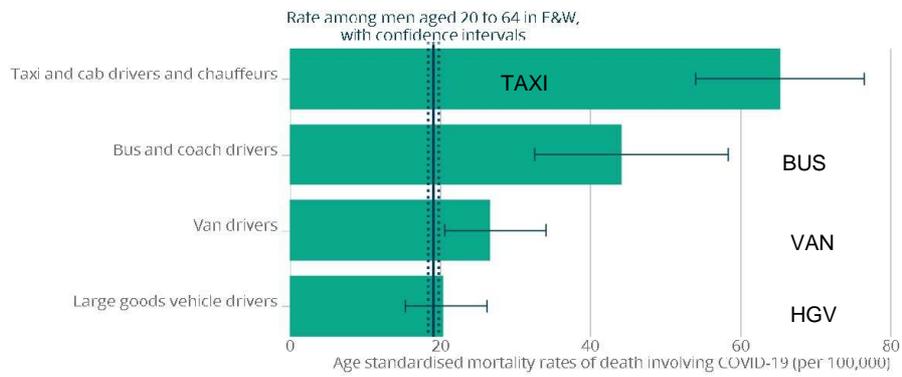
- Other key findings follow
- **Highlighted in red:**
 - with a rate at least twice as high as for 'all' the 20-64y population
 - statistically significant difference from the above
 - presented only for occupations with at least 20 deaths
- Data abstracted from ONS Tables 1, 6a, 6b follow...

<https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/causesofdeath/bulletins/coronaviruscovid19relateddeathsbyoccupationenglandandwales/deathsregisterebetween9marchand25may2020>

Males – individual occupations (SOC 4 digit level) Death rates involving Covid

Individual occupation description	Deaths	Rate	Low.CI	Up. CI
Security guards & related occupations	104	74	59.6	88.4
Care workers & home carers	70	71.1	55	90.4
Taxi & cab drivers & chauffeurs	134	65.3	54.1	76.5
Food, drink & tobacco process operat.	32	64.3	43.7	91.1
Nursing auxiliaries and assistants	30	58.9	39.5	84.4
Chefs	49	56.8	40.1	77.4
Nurses	31	50.4	33.6	72.4
Vehicle techs, mechanics & electricians	36	44.3	30.7	61.7
Bus and coach drivers	53	44.2	32.6	58.4
Elementary construction occupations	36	42.1	29.4	58.2
Cleaners and domestics	34	38.3	26.3	53.7
'ALL' males, 20-64yrs inv. Covid-19	3122	19.1	18.4	19.8

Office for National Statistics '2nd Bulletin'

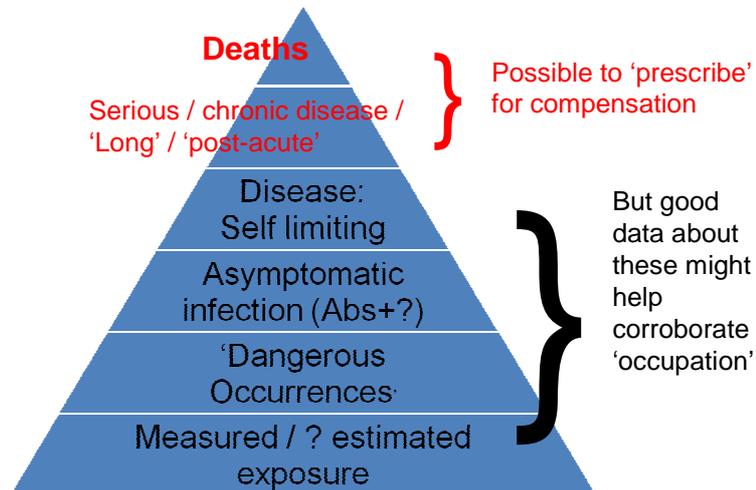


Age-standardised mortality rates (involving COVID-19) in male 'drivers'

Females – individual occupations (SOC 4 digit level)
Death rates involving Covid

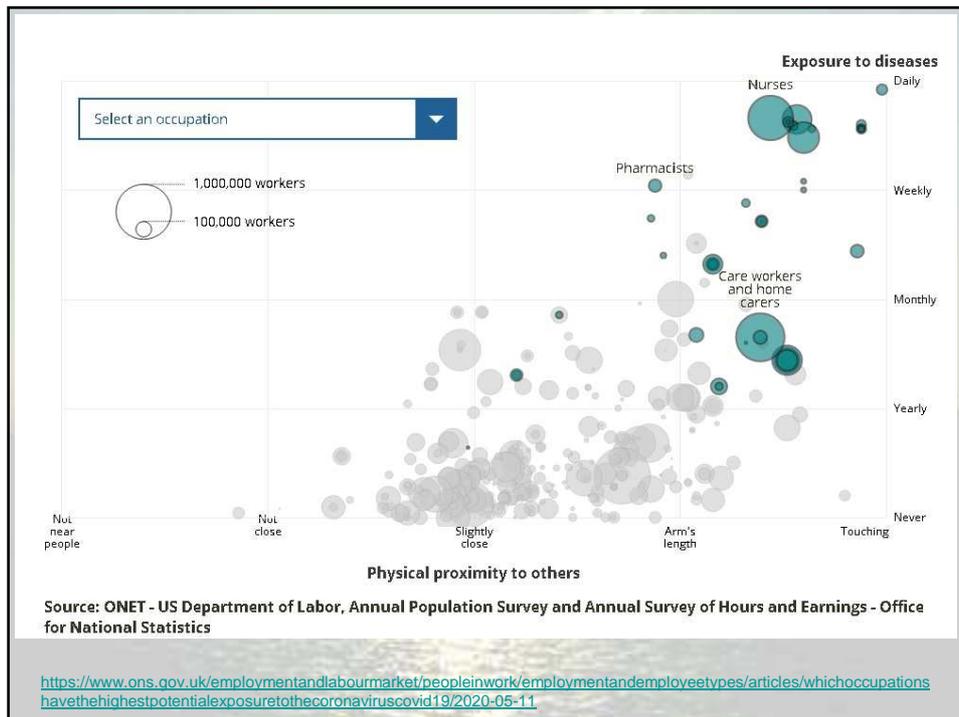
Individual occupation description	Deaths	Rate	Low.CI	Up. CI
Care workers & home carers	134	25.9	21.5	30.4
National govt. admin.occupations	22	23.4	14.5	35.6
COMPARATORS:				
'ALL' females 20-64y inv. Covid-19	1639	9.7	9.3	10.2
Others (don't reach >2x)				
Sales & retail assistants	64	15.7	12.1	20.1
Nurses	70	15.3	11.7	19.6
Nursing auxiliaries & assistants	31	14.5	9.8	20.7

Pyramid of Covid disease & SARS-Cov-2 exposure



Exposure

- Once adequate exposure-response studies have been established, ideally it might be epidemiologically possible to define a metric and quantum of exposure to attribute a covid-19 case to work.
- However it would be very difficult to have a pragmatic means of measuring exposure directly
- In the meantime proxies for exposure have been proposed which might help characterise higher risk occupations.



Individual workplaces

- Outbreaks / clusters
- Thousands reported in the EU and adjacent smaller states
- Definition relatively simple so far:
 - Minimum of two confirmed cases
 - Without necessarily showing that cases contracted from work
- Wide variation in methods of data collection and handling
- Difficult to have consistency in current data
- Comparisons and interpretation not easy



COVID-19 clusters and outbreaks in occupational settings in the EU/EEA and the UK

11 August 2020

Key messages

- Outbreaks and clusters of COVID-19 in a variety of occupational settings have been reported since the start of the pandemic in the European Union, the European Economic Area (EU/EEA) and the United Kingdom (UK). Fifteen EU/EEA countries and the UK reported 1 376 clusters of COVID-19 in occupational settings which occurred between March and early July 2020.
- Workers in occupations which bring them in close physical proximity to other people (co-workers, patients, customers, etc.), particularly when working in indoor settings or with shared transport or accommodation, are more exposed to and at higher risk of COVID-19 in the absence of mitigation measures.
- The majority of occupational COVID-19 clusters reported were from the health sector, however testing of healthcare workers has been prioritised in all EU/EEA countries and the UK. Large numbers of clusters were also reported from the food packaging and processing sectors, in factories and manufacturing, and in office settings. Fewer clusters were reported from the mining sector, however some of these clusters have been large.
- Occupations are commonly linked to socio-economic status which can also affect the individual's risk of COVID-19. Moreover, workers in many essential sectors cannot work from home, which may explain why certain occupations have been shown to have a higher risk of COVID-19 infection and mortality than others.
- Increased focus on testing for COVID-19 in workplace settings, combined with robust policies on physical distancing, hygiene and cleaning, appropriate use of personal protective equipment (PPE) where necessary and hand hygiene, particularly in closed settings and situations where workers have extended contact or share transportation and accommodation, will help prevent further COVID-19 outbreaks.
- Robust surveillance and contact tracing are essential, as are clear protocols on how to address outbreaks when they are detected.
- Within the EU there is a body of occupational safety and health legislation in place, including legislation on the protection of workers from biological agents at work. This legislation sets out technical and organisational measures to be implemented by employers at work places following a workplace risk assessment. Specific guidance is available at EU and national level on how to protect workers and this includes the sectors and occupations where clusters have occurred.
- Collaboration between public health and occupational health and safety agencies at local and national level will help with communication and mitigation of the spread of COVID-19 in occupational settings and communities in the EU/EEA and the UK.

Workplace clusters/outbreaks (continued)

- More robust generalisable definition needed e.g.:
 - Time & space relationships
 - Genomic analysis
 - .
- Need consistency of methodology
 - Investigation (history including backward tracing, clinical virology, exposure assessment etc)
 - Specification of a minimum data set to be collected from cluster
 - .
- Should non-occupational exposure be taken into account?

Individual patients

- Work attribution of covid-19 can be decided on a case by case basis
- e.g. in some statutes / jurisdictions it can be deemed an 'accident'
- Assessments vary in methods can be undertaken by:
physicians, panels, enforcement bodies, or legal bodies
- Criteria, or at least robust evidence based guidance are needed
 - Positive RT-PCR test (but what if 'window' missed?)
 - Then positive antibody test ? (but especially poor sensitivity)
 - What exposure threshold – how would it be measured/ estimated?
- What weight for evidence of non-occupational exposure
(genomic analysis may help in some cases)
- Many difficulties remain: but need to be resolved especially for individual reasons (e.g. equity, fairness) & also for valid comparisons

Conclusion & Discussion

- A single definition of 'occupational covid' / covid caused by work
 - Might not be feasible or perhaps even desirable
 - However it should be possible to agree definitions for:
 - Observational epidemiology / surveillance
 - Individual compensation
 - Other circumstances ? (e.g. clusters)
- Debate may be needed on other aspects e.g. whether evidence for non-occupational risk might also have to be considered.

References (cited in abstract)

- [1] Agius RM, Robertson JFR, Kendrick D, Sewell HF, Stewart M, McKee M. (2020) Covid-19 in the workplace. British Medical Journal 2020;370:m3577 <https://doi.org/10.1136/bmj.m3577>
- [2] Agius RM. (2020) Covid-19: statutory means of scrutinizing workers' deaths and disease. Occupational Medicine 2020 <https://doi.org/10.1093/occmed/kqaa165>
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- [4] European Centre for Disease Prevention and Control. (2020) COVID-19 clusters and outbreaks in occupational settings in the EU/EEA and the UK. Stockholm: ECDC; 2020. <https://www.ecdc.europa.eu/sites/default/files/documents/COVID-19-in-occupational-settings.pdf>
- [5] Agius R. (2020) Disease and death from work: RIDDOR and covid-19. Occupational Medicine. 2020. <https://doi.org/10.1093/occmed/kqaa155>

Thank you for listening

Questions, comments & discussion are welcome.

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