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

MODERNET

Covinar

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Raymond Agius

Emeritus Professor of Occupational & Environmental Medicine

The University of Manchester

## Statement of current interests

Deputy Chair: Occupational Medicine Committee, British Medical Association

Member: Industrial Injuries Advisory Council

Membre: Conseil scientifique, Réseau national de vigilance et de prévention des pathologies professionnelles, Agence nationale de sécurité sanitaire de l'alimentation, de l'environnement et du travail

## 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

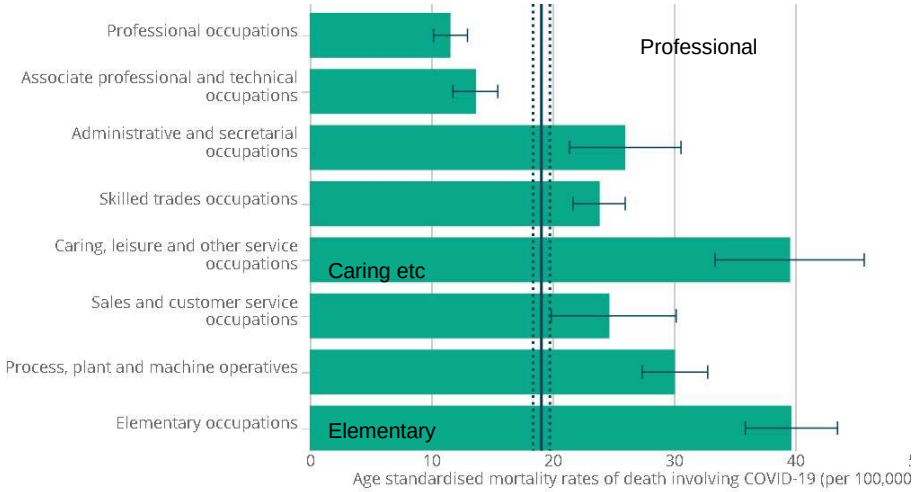
## Office for National Statistics '2nd Bulletin'

- 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

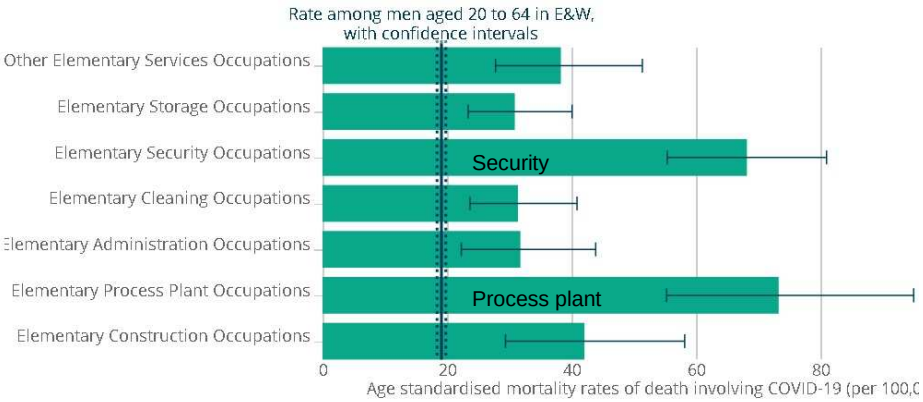
- **Not* adjusted for deprivation, ethnicity, geography*
- *+ numerator bias (see later)*

## 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**'

## Office for National Statistics '2nd Bulletin'

- 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…

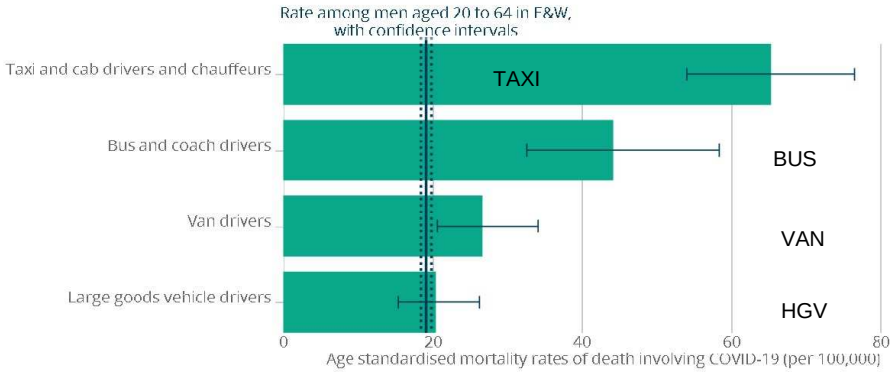
https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/causesofdeath/bulletins/coronaviruscovid19relateddeathsbyoccupationenglandandwales/deathsregisteredbetween9marchand25may2020

## 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'



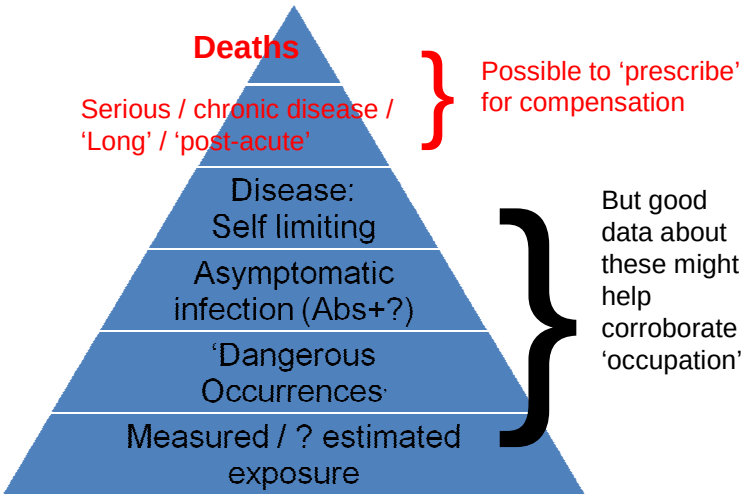

Age-standardised mortality rates (involving COVID-19) in **male 'drivers'**

## Females – individual occupations (SOC 4 digit level)

Death rates involving Covid

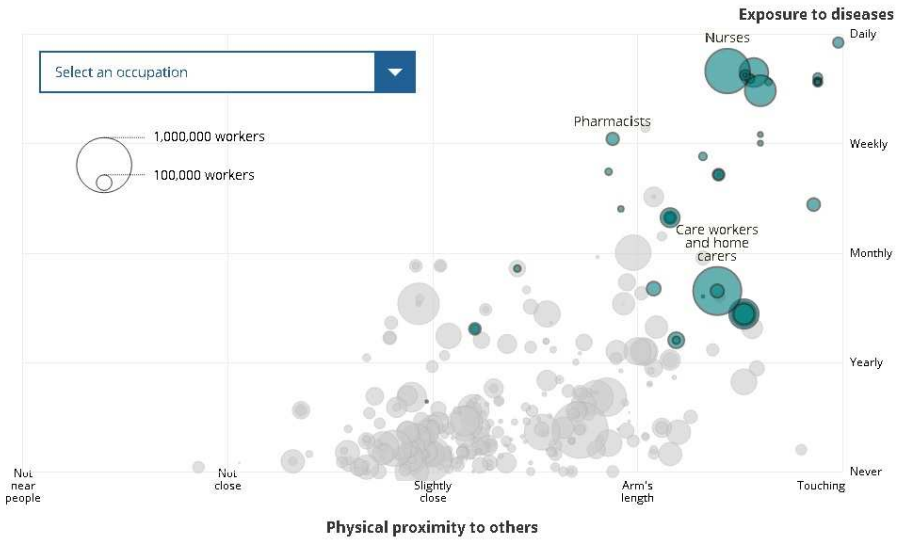
| **Individual occupation description** | Deaths | Rate | Low.CI | Up. CI |
|---|---|---|---|---|
| Care workers & home carers | 134 | 25.9 | 21.5 | 30.4 |
| National govt. admin.occupations | 22 | 23.4 | 14.5 | 35.6 |
| **COMPARATORS:** | | | | |
| **'ALL' females 20-64y inv. Covid-19** | **1639** | **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

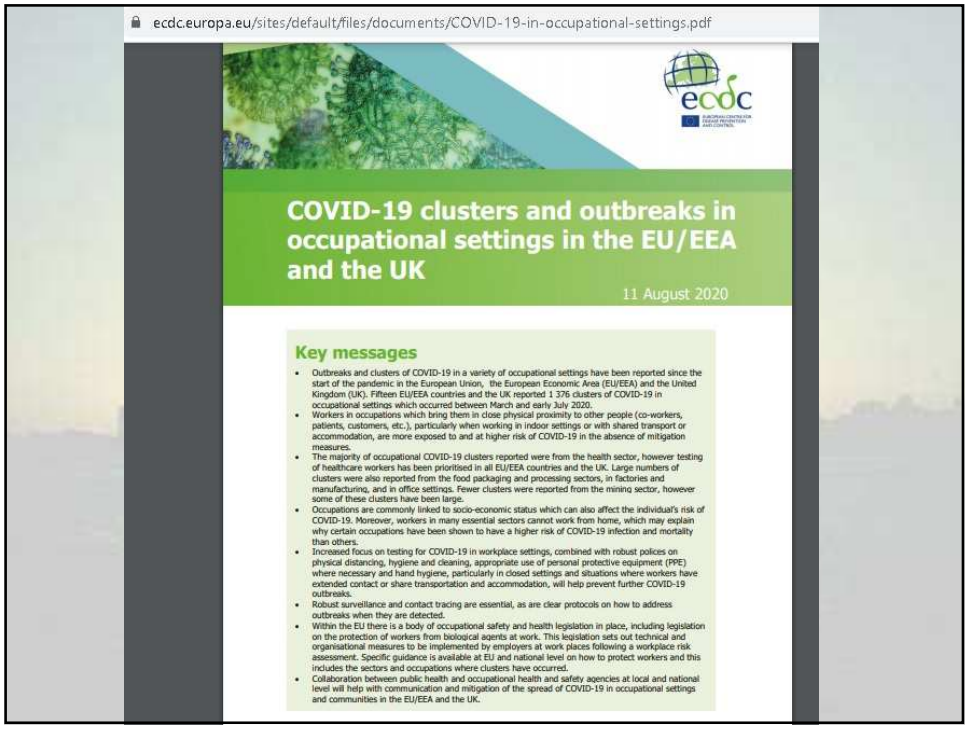
- Once adequate exposure-response studies have been established, ideally it might be epidemiologically possible to define a metric and quantum of exposure to attribute a covid-19 case to work.
- However it would be very difficult to have a pragmatic means of measuring exposure directly
- In the meantime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




https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes/articles/whichoccupationshavethehighestpotentialexposuretothecoronaviruscovid19/2020-05-11

# 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
- Comparions and interpretation not easy




## 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 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

[3] Office for National Statistics (UK). (2020) Which occupations have the highest potential exposure to the coronavirus (COVID-19)? https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes/articles/whichoccupationshavethehighestpotentialexposuretothecoronaviruscovid19/2020-05-11

[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.


(C) Raymond Agius

Twitter: @ProfEmer

https://www.linkedin.com/in/raymond-agius-6276866/