

# Covid-19: statutory means of scrutinizing workers' deaths and disease

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<b>Background</b>	By law, covid-19 disease and deaths in workers may lead to coroners' inquests and/or Health and Safety Executive (HSE) investigations.
<b>Aims</b>	This study assesses the adequacy of these statutory means to yield recommendations for prevention of acquiring covid-19 infection from work.
<b>Methods</b>	Covid-19 guidance from the chief coroner and the HSE was appraised, including using Office for National Statistics (ONS) data. Practitioners were asked to estimate the likelihood that covid-19 disease may have arisen from 'near-miss' scenarios. Data from the judiciary and the HSE were analysed.
<b>Results</b>	The coroners' guidance allowed a wider range of reports of death than did the HSE and conformed better with ONS data on covid-19 mortality by occupation. In the practitioner survey, 62 respondents considered a higher likelihood that reported covid-19 cases would have arisen from the scenario deemed unreportable as a 'dangerous occurrence' by HSE than the reportable scenario ( $P < 0.001$ ). On average there was only one coroner's report to prevent future death from occupational disease every year in England and Wales. The HSE dealt with a yearly average of 1611 reports of work-related disease including 104 on biological agents, but has received about 9000 covid-19 reports.
<b>Conclusions</b>	Current HSE guidance for reporting work-related covid-19 may miss many thousands of cases and needs further iteration. Coroners have very limited experience of inquiry into occupational disease caused by biological agents compared with the HSE. Concerns regarding national policy such as on protective equipment warrant a full public inquiry.
<b>Key words</b>	Coroners; covid-19; death; HSE; occupational diseases; occupational health; RIDDOR.

## Introduction

Workers ranging from health and social care to public transport and the emergency services have been at the forefront of exposure to covid-19 in the pandemic. While epidemiological and other research will be invaluable in learning lessons to prevent further ill-health and death, there are complementary statutory means which may lead to recommendations for the mitigation of risk [1].

There is a legal duty for employers in the UK to report to the Health and Safety Executive (HSE) (or local authorities, depending on the workplace) any covid-19 case with 'reasonable evidence that it was caused by exposure at work', as well as reporting 'dangerous occurrences' [2]. HSE usually responds to these reports with investigations which can be an important step in preventing

future adverse events. HSE has published a second technical summary of such notifications mandated by the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (2013) (RIDDOR) [3].

Doctors completing Medical Certificates of Cause of Death (MCCD) have a statutory obligation to notify a coroner if they suspect 'that the person's death was due to ... disease attributable to any employment' [4]. If the coroner in England and Wales (E&W) deems that an inquest is necessary, witnesses may be summoned to testify. Where a concern is identified, the coroner has a statutory duty to make a report to 'Prevent Future Deaths' (PFDs) [5] 'intended to improve public health, welfare and safety' and which compels any addressees such as the HSE to respond.

The investigations that arise from reports to the HSE and notifications to coroners are not to be viewed in

## Key learning points

### What is already known about this subject:

- Notification of suspected work-related covid-19 deaths to the coroner (in England and Wales) is a legal obligation of attending doctors.
- Employers have a legal duty to report work-related covid-19 deaths, disease and dangerous occurrences to the Health and Safety Executive or local authorities as laid down by statute, i.e. Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (2013).
- About 9000 cases of covid-19 disease attributed to exposure at work (including at least 125 deaths) have been reported so far to the Health and Safety Executive according to its second summary.

### What this study adds:

- Although coroners will consider death notifications arising from any occupation and with a lower threshold for notification than the Health and Safety Executive, the latter has a much greater capacity and experience relevant to investigation of work-related covid-19.
- Current Reporting of Injuries, Diseases and Dangerous Occurrences Regulations coronavirus guidance from the Health and Safety Executive is difficult to apply. Available evidence from the Office for National Statistics suggests that the HSE might have failed in capturing many thousands of work-related covid-19 disease cases and hundreds of deaths, thereby missing valuable opportunities for preventive advice.
- The statutory investigations (by Health and Safety Executive and coroners) of work-related covid-19 deaths and disease are unlikely to be able to answer many pertinent questions, such as on national policy and resourcing of testing or personal protective equipment.

### What impact this may have on practice or policy:

- The Health and Safety Executive guidance on Reporting of Injuries, Diseases and Dangerous Occurrences Regulations relating to covid-19 would benefit from amendment to improve clarity and ease of use and to explicitly allow reports from a wider range of occupations dealing with the general public.
- The Health and Safety Executive's quasi-automatic alignment with Public Health England standards means that it could be conflicted in an inquest or inquiry considering whether a higher personal protective equipment standard, such as that of the European Union agency, could save or have saved lives.
- It is essential to have a rapid review of national policy on mitigation of work-related risks of covid-19 to help prevent further imminent disease and death, as well as a subsequent wide-ranging public inquiry to learn lessons for the future.

competition since they fulfil different statutory purposes [1,2,4]. They may help the bereaved or harmed victims to achieve closure, and some workplaces to mitigate future risks. Preventive steps that ensue would not only help workers, but would reduce risks to the public they serve, and would help economic recovery. The serious implications of the covid-19 pandemic warrant that these statutory means be urgently exploited. Doctors, other health professionals, employers, the bereaved, workers and their representatives would expect no less. Since the pandemic is so unprecedented in its extent and the need to respond, questions need to be asked about the suitability of these legally mandated means to sufficiently, objectively and independently help stakeholders learn lessons and act accordingly. Would these statutory means be comprehensive enough [6] to obviate the calls to address specific matters such as testing and personal protective equipment (PPE) policy through a public inquiry [1,7,8] or interim rapid review [9]?

This study assesses the criteria and data relevant to scrutiny by coroners and HSE, of work-related covid-19

deaths and disease—with a view to understanding and guiding their capacity to help mitigate specific future risks.

## Methods

The latest relevant guidance from the chief coroner [4] and the HSE [2] was identified for each class of reportable event, i.e. death, disease or 'dangerous occurrence', and then compared according to who was responsible for reporting, the nature of employment and/or degree of exposure that was needed to report, and finally the threshold of likeliness or weight of evidence that mandated notification.

To determine the likelihood of relevant covid-19 deaths being covered by the guidance or criteria for coronial notification or HSE reports, the best available UK evidence consisted of the data sets associated with the latest relevant Office for National Statistics (ONS) bulletin [10]. The Standard Occupational Classification (SOC) '4 digit' coded occupations for men and women

were ranked for age-standardized mortality rates involving covid-19. The threshold to categorize these occupations was chosen to approximate the HSE's criterion of 'more likely than not that the person's work was the source of exposure to coronavirus as opposed to general societal exposure'. Therefore, this was for at least a statistically significant doubling of mortality rate (relative to the 'all of working age' 20- to 64-year population). Moreover, there had to have been at least 20 deaths for these ranked occupations in the registration period under study namely between 9 March and 25 May 2020.

To benchmark the examples cited by HSE which were reportable as 'dangerous occurrences' two multiple choice questions were put to attendees anonymously at a Society of Occupational Medicine (SOM) webinar on 2 July 2020. They were each asked to choose a percentage range out of five categories, in response to the following two questions preceded by the common stem:

*In your opinion, out of the cases of covid-19 deaths or disease in workers reported to HSE what proportion would have arisen from:*

*[a] a health or social care worker providing treatment or care to a patient or service user who is not known to be covid-19 positive, but the patient or service user subsequently tests positive*

*[b] a laboratory worker accidentally smashing a vial containing coronavirus on the floor or a sample from a covid-19 patient breaking in transit leading to spillage*

Since data involving covid-19 in coronial PFDs are not yet available, analogous historical data were collated. Summary reports were searched on the website of the Courts and Tribunals Judiciary [11]. Redacted PFD reports for the four full calendar years available 2016–19 were searched on the judiciary's database [12]. Out of the total, the main category of interest, i.e. 'Accident at Work and Health and Safety related deaths' ('health and safety') as well as two other related categories, i.e. 'Hospital Death (Clinical Procedures and medical management) related deaths' ('hospital') and 'Community health care and emergency services related deaths' ('community') were counted. Other categories such as police deaths were ignored for the purposes of this study. Stratified samples of the PFD were selected for coding and consisted of all the PFDs over the 4 years for 'health and safety' together with larger sample numbers of the most recent (2019) PFD reports in the other two categories studied. Coded data were entered into a spreadsheet for the categories of interest. The fields included the addressees of the PFDs: 'local' (e.g. employer, hospital, residential care manager, local director of public health, etc.), national chief executives (e.g. of the NHS or the Care Quality Commission) and the Secretary of State for Health and Social Care. Moreover, depending on the category of PFDs they were coded as

to whether they contended with occupational disease, PPE, or whether they concerned tests/investigations or infections. The narrative of the PFDs was also assessed against specific aspects of the guidance especially the recommendation [5].

The hse.gov.uk website as well as other pages in the gov.uk and parliament.uk domains were searched for RIDDOR data (Great Britain) for covid-19/SARS-CoV-2 and other past data, including enforcement notices or convictions arising out of RIDDOR [3,13–15]. Other data not publicly available were sought through 'Freedom of Information' (FOI) requests numbers such as annual RIDDOR disease reports (FOI:202005185) and covid-19/SARS-CoV-2 dangerous occurrences (FOI:202007103). The RIDDOR data thus ranged from 13 March to 8 August 2020.

Data handling and statistical analysis were conducted using Microsoft Excel. No ethical oversight was needed for this study.

## Results

A summary comparison between the chief coroner's guidance and the HSE's guidance/criteria is in Table 1. It shows that the coroners' guidance is comprehensive as it admits notifications from any employment (e.g. transport), whereas the HSE explicitly excludes reports from 'work with general public (as opposed to work with persons known to be infected)'. Moreover, the threshold is much lower for a coroner's investigation which requires 'only grounds for surmise', whereas the HSE's threshold requires that it is 'more likely than not that the person's work was the source of exposure to coronavirus'.

The latest available evidence [10] abstracted from the ONS in respect of people of working age showing the occupations with at least a doubling of the age-standardized mortality involving covid-19 is presented in Table 2A and B. Out of the 13 occupation categories fulfilling this criterion four are in health and social care (265 deaths) while the other nine (500 deaths) are not.

The responses of the 79 SOM webinar attendees to the questions as to what proportion of cases of covid-19 deaths or disease in workers reported to HSE would have arisen from two defined scenarios are summarized in Table 3. The first scenario of 'a health or social care worker providing treatment or care to a patient or service user who is not known to be COVID-19 positive, but the patient or service user subsequently tests positive' is deemed not reportable as a dangerous occurrence by the HSE. The modal category of frequency range assigned by the respondents was 15–50%. In contrast for the scenario deemed by HSE to be reportable as a dangerous occurrence the modal category of frequency selected by the respondents was 0–5% ('a laboratory worker accidentally smashing a vial containing coronavirus on the

**Table 1.** Comparison of guidance on notification to coroners (England and Wales) and guidance/criteria on reporting to HSE of work-related covid-19 deaths, disease and dangerous occurrences

Statute	Coroner (SI 1112/2019)	HSE (RIDDOR 2013)		
Event	Death	Death	Disease	Dangerous occurrence
Who reports	Notification by attending doctor	Employer (usually) after doctor in writing, but covid must have been significant cause of death	Employer (usually) after doctor’s written diagnosis, or positive lab test	Employer (usually)
Employment/exposure	Any employment May include front-line NHS staff as well as others (e.g. public transport employees, care home workers)	Reasonable evidence linking nature of person’s work with increased risk of becoming exposed to coronavirus, e.g. nature of work activities, specific identifiable incident, contact with known hazard without effective control (PHE) Work with general public (as opposed to work with persons known to be infected) not sufficient evidence		Any accident or incident which results, or could have resulted, in release or escape of coronavirus, e.g. broken vial in lab but not worker caring for patient who later tests +ve
Judgement/threshold	Doctor suspects death due to disease attributable to employment. Coroner’s ‘low threshold... requiring only grounds for surmise’	‘Reasonable evidence’ that a work-related exposure is the likely cause: ‘more likely than not’ that the person’s work was the source of exposure as opposed to general societal exposure. Or doctor highlights significance of work-related factors		Reasonable judgement that circumstances gave rise to a real risk or had potential to cause significant harm

floor or a sample from a COVID-19 patient breaking in transit leading to spillage’).

In 2019, 210 900 deaths were reported to coroners (E&W) and inquests were opened in 30 000 (14%) of these notifications with an estimated average time of 27 weeks to process an inquest [11]. The yearly numbers of PFDs by each selected category are shown in Table 4, as are the addressees of the reports. Over the available 4-year period for which PFDs were extracted only 32 (i.e. 2%) of all PFDs related to ‘health and safety’. Out of these PFDs, four were for occupational disease (none caused by biological agents) and four involved PPE (none respiratory). In 21 of the 81 ‘hospital’ PFDs a concern arose out of an omission or misinterpretation of a test or investigation, and in 10 the illness included infection. The narrative in all 161 PFDs perused conformed to the prescribed guidance with ‘a recommendation that action should be taken, but not what that action should be’ [5]. A reply to a FOI request to the the chief coroner’s office for data about notifications involving covid-19 stated that the Ministry of Justice did not hold this information.

Historical RIDDOR data summarized in Table 5 show that HSE contended with a yearly average of 104

reports relating to disease caused by biological agents yet ~9000 RIDDOR disease reports for covid-19 have been received. Over the last 10 years there have been 32 convictions for breaches of RIDDOR, but it was not clear whether RIDDOR reports had led to enforcement or prosecutions (a FOI request was unenlightening).

## Discussion

This study showed that the guidance for coronial notification of covid-19 deaths was more wide-ranging and had a lower threshold than for reporting to HSE, and the coroners’ guidance corresponded better with the available statistical evidence on occupational mortality. Historical data showed a much greater experience of investigation relevant to covid-19 by HSE, than through coroners’ inquests. However, surveyed practitioners considered a near-miss scenario deemed unreportable by the HSE to be a much more likely precursor of covid-19 contracted at work than scenarios deemed reportable to RIDDOR.

The variety of methods used in this study reflects an aim to comprehensively address a topic of urgent practical

**Table 2.** ONS data demonstrating age-standardized covid-19 mortality rates per 100 000 (95% CI) in males (A) and females (B) (aged 20–64 years) showing occupations with a statistically significant doubling compared to ‘all’ the population [10] (see text for details)

	(A) Males			
	Deaths	Rate	Lower CI	Upper CI
SOC individual occupation description				
Security guards & related occupations	104	74	59.6	88.4
Care workers and home carers	70	71.1	55	90.4
Taxi & cab drivers & chauffeurs	134	65.3	54.1	76.5
Food, drink and tobacco process operatives	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 technicians, 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
Reference group				
‘ALL’ males, 20–64 years involving covid-19	3122	19.1	18.4	19.8
	(B) Females			
	Deaths	Rate	Lower CI	Upper CI
SOC individual occupation description				
Care workers and home carers	134	25.9	21.5	30.4
National government administrative occupations	22	23.4	14.5	35.6
Reference group				
‘ALL’ females, 20–64 years involving covid-19	1639	9.7	9.3	10.2

**Table 3.** Responses of SOM webinar attendees to questions as to what proportion of cases of covid-19 deaths or disease in workers would have arisen from two scenarios cited in the HSE RIDDOR guidance

Scenarios: (HSE RIDDOR reportability)	Responses by category of frequency range					(No. of responses)
	0	>0 to <5%	≥5% to <15%	≥15% to <50%	≥50%	
Patient not known to be covid-19+ subsequently tests +ve (not reportable)	3% (2)	10% (6)	31% (19)	39% (24)	18% (11)	(62)
Accidental smashing of vial with virus or spillage from patient sample (reportable)	29% (19)	48% (31)	11% (7)	8% (5)	5% (3)	(65)

Results expressed as percentages (number in brackets). Chi-square = 53.17;  $P < 0.001$ .

importance, as well as a necessity driven by the available relevant data. Thus, the ONS data on UK covid-19 mortality associated with occupation, albeit the best available evidence, do not take co-morbidity into account nor have they yet been adjusted for the significant determinants of deprivation, ethnicity and area of residence [10]. The mortality rates in Table 2 may be negatively biased because of the cases notified to coroners and whose death is not usually registered until after completion of the inquest [16]. In fact, more doctors' deaths were identified in the media by ONS in their first bulletin than had been registered [17]. A sensitivity analysis based on limited summary data from interim ‘coroner’s certificates of the

fact of death’ [16] would help improve future estimates in the short term.

Besides the ONS data in Table 2, the assessments of various authors [1,18] indicate that occupations such as bus drivers dealing with the general public (and not just with sick people) may be causally associated with an increased risk to workers. Therefore, this balance weighs in favour of the more comprehensive catchment of cases through the coroners’ guidance [4] than that of the HSE [2]. The HSE should widen its guidance to include RIDDOR reporting of cases arising from high risk exposure to the general public [6]. If an aim of investigating ‘dangerous occurrences’ is to prevent

**Table 4.** Coroners’ PFD reports by category studied, year and selected fields of addressees: local, e.g. manager/employer, national chief executive, e.g. of NHS or Care Quality Commission, or Secretary of State

PFD category	All PFD reports in database					Sample of PFDs—by addressees			
	2016	2017	2018	2019	4-year total	Sample size	Local	National chief executive	Secretary of State
Health & Safety	8	8	8	8	32	32	27	4	0
Hospital	188	233	179	244	844	81	70	27	4
Community	48	65	51	48	212	48	47	17	5
All PFDs	394	444	383	592	1813	161	144	48	9

Stratified samples: all 4 years for ‘Health & Safety’, last 4 months of 2019 for ‘Hospital’, all of 2019 for ‘Community’.

**Table 5.** Numbers of reports made under RIDDOR to the HSE for the reporting years 2015/16 to 2018/19 and for 2020

RIDDOR category	2015/16	2016/17	2017/18	2018/19	Average of the complete reporting years	Only covid-19/SARS-Cov-2 in part of 2020	
						Interim <sup>b</sup>	Substantive <sup>c</sup>
Deaths <sup>a</sup>	X	X	X	X	X	71	119
Disease: biological agents	103	122	88	X	104	>3000	7971
Disease: other	1752	1624	1456	X	1611	–	–
Fatal injuries	147	135	141	147	143	–	–
Non-fatal injuries	73 441	71 147	71 531	69 208	71 332	–	–
Dangerous occurrences	6766	6467	7664	7651	7137	Nearly 200	343

X = not specified.

<sup>a</sup>Deaths are a subset of disease.

<sup>b</sup>Interim data were from start of pandemic as disclosed by HSE on 12 May 2020.

<sup>c</sup>Substantive data for covid-19 deaths and disease are from 10 April to 8 August 2020, while for dangerous occurrences they are from the first instance on 13 March to 30 June (see text for details).

disease, then HSE should note that practitioners are of the opinion (Table 3) that many more covid-19 cases arose from workers who were exposed to sources of the coronavirus, unknown at the time.

Besides the broad scope and low threshold of notification, coroners have a wide judicial discretion and after pre-investigation enquiries only 14% in 2019 [11] proceeded to public inquest [16], and only 20% of the latter yielded PFD reports [11]. A small survey suggested inconsistencies and wide variation in this preliminary process in the pandemic [19]. After the original covid-19 guidance for coroners, concern was raised that the process could not address crucial issues such as national PPE policy failures [20]. Although coroners’ PFDs can be a valuable tool, coroners do not have the resources to engage their own experts, can only make generic recommendations for a process to be reviewed and cannot recommend specific solutions [5,21]. As the results show, coroners have had very little experience of generating PFDs relevant to industrial disease and PPE, though some clinical inquests might have had analogous considerations. Coroners cannot be expected to be competent in aerosol science or in determining what PPE would have been adequately precautionary [22] and might need training to better

address these issues. Under these circumstances coroners can call for HSE assistance [23]. For instance, the bereaved of a health or social care worker might believe that a ‘culpable human failure’ or ‘failure of systems or procedures at any level’ [4] contributed to the death through inadequate PPE [24]. They might claim that the deceased had only been furnished with a surgical mask as determined for their specific exposure by Public Health England (PHE) [25] rather than the better protection offered by a fitted FFP respirator as per European guidance [26] or the application of a precautionary principle [22]. However, in these circumstances it could be alleged that HSE would have a conflict of interest since it had already aligned itself with the less stringent PHE standards [2,6,25].

Similar reservations as above might apply to HSE investigations arising from RIDDOR whereby a commitment to prior PPE standards and limits on RIDDOR reporting criteria [6] might constrain individual investigations in a manner which would not apply in a wide public inquiry. As Table 5 shows, HSE deals with tens of thousands of yearly RIDDOR reports, including about a hundred arising from biological agents. According to HSE’s published criteria [27], it will investigate all reports of any disease attributed to an occupational

exposure to a biological agent. Hence, HSE would require substantial additional specialist inspections to meet the demands of investigating covid-19 RIDDOR disease reports (~9000 so far) in time to learn specific lessons to help prevent further disease. The mortality data (Table 2) and the ratio of RIDDOR notified covid-19 deaths to disease (Table 5) suggest a potential for many thousands of unreported cases of work-related covid-19 whose investigation might have led to valuable opportunities for prevention of further disease, such as in transport workers.

Although the coroners' data were limited to E&W, similar considerations apply to Scotland where doctors who suspect that occupation might have contributed to death have a duty to notify the Procurator Fiscal [28]. Other countries in Europe have analogous legally mandated mechanisms for collating reports and conducting inquests into health and safety breaches. In Italy occupational infections are considered as accidents and a medical report triggers a chain of reporting [29] and inquiry. In Spain, although the Ministry of Labour includes a department similar to HSE, complaints have been such that the Supreme Court asked the prosecutor to opine on the institution of criminal proceedings against senior government members [30].

The demonstrated limitations of the statutory mechanisms for scrutiny of individual covid-19 cases lend strong support to the case for a rapid forward looking review of the UK's occupational preventive measures [9]. Moreover, the concerns that tens of thousands have contracted covid-19 at work warrant a full public inquiry [1,7,8].

This study and allied concerns [6] suggest that further iteration of HSE guidance is warranted, that prospects for coronial scrutiny leading to workplace covid-19 prevention exist but are limited, that HSE has a wider experience to advise about prevention but its capacity to respond through reports has been limited and a public inquiry is warranted.

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## Competing interests

None declared.

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