



UK Health  
Security  
Agency

# **COVID-19 transmission from the deceased**

A rapid review (brief update 1)

# Contents

|   |    |
|---|----|
| Contents.....                                   | 2  |
| Purpose.....                                    | 3  |
| Evidence from our previous review .....         | 3  |
| Methods .....                                   | 3  |
| New evidence .....                              | 3  |
| Limitations .....                               | 5  |
| Conclusions .....                               | 5  |
| Acknowledgment.....                             | 5  |
| Disclaimer .....                                | 5  |
| References.....                                 | 6  |
| Annexe A. Inclusion and exclusion criteria..... | 7  |
| About the UK Health Security Agency .....       | 11 |

## Purpose

This is a brief update of our rapid review examining risk of coronavirus (COVID-19) transmission from the deceased (1) (search up to 22 November 2021).

## Evidence from our previous review

Our previous review (1) (search up to 17 March 2021) included 12 studies: 4 observational studies (with laboratory components) and 8 laboratory studies conducted in autopsy settings.

Evidence on SARS-CoV-2 detection in body fluids of the deceased: evidence from laboratory studies conducted in autopsy settings suggested that SARS-CoV-2 RNA can be detected in the respiratory tract, skin and eyes of deceased persons with confirmed or suspected COVID-19 up to 35 days after death. Across these studies, viable (infectious) virus was detected in 3 studies (up to 17 days after death in one study). However, more research was needed to understand the risk of transmission from contact with the body fluids of deceased persons with COVID-19 and its association with factors such as disease severity, disease duration and post-mortem interval.

Evidence on risk of transmission from the deceased: 3 case series suggested that the risk of transmission from the deceased in autopsy settings (with strict infection control protocols) was low. A prevalence study in mortuary and cemetery workers in Qatar showed high infection rates, although the results suggested that transmission may have occurred in the community rather than from handling bodies of COVID-19 cases.

## Methods

Our search update was conducted on 22 November 2021 to identify studies published since 17 March 2021. Additional citation searching was conducted on 3 December 2021. An overview of inclusion and exclusion criteria is summarised in [Annexe A](#), and the full methodology is available in our original review (1). No adjustments were made to the original methodology.

## New evidence

Ten new studies were identified (see PRISMA diagram, [Annexe A](#)). All studies reported on post-mortem reverse transcriptase polymerase chain reaction (RT-PCR) testing for SARS-CoV-2 in swabs from the body of deceased persons with suspected or confirmed COVID-19 (sample sizes ranged from 2 to 151 bodies), including in the respiratory tract (2 to 10), eyes (3, 4, 9), skin (2, 6) and urine and faeces (3). Two of these studies also examined the infectivity of body fluids by conducting virus isolation in cell culture (2, 6) and 2 reported on COVID-19 infection in

autopsy staff (6, 10). The amount of detail reported regarding sampling methodologies was highly variable across studies, and not all studies reported RT-PCR results with associated cycle threshold (Ct) values or viral load findings. Additionally, the post-mortem interval between death and swab collection varied widely between studies (one hour to 4 months). Swabs were mainly collected only once after death, except in one study in which swabs were taken at 3 different time points up to 24 hours after death (7).

The results of the 10 studies suggest that SARS-CoV-2 RNA can be detected in swabs from the respiratory tract (longest post-mortem interval with positive result: 4 months) (2 to 11), the skin (longest post-mortem interval with positive result: 9 days) (6), and the eyes (longest post-mortem interval with positive result: 27 days) (3, 9) as well as in urine and faeces (longest post-mortem interval with positive result: 27 days) (3). These results are consistent with the findings of our previous review that SARS-CoV-2 RNA can be detected in the bodies of deceased persons with confirmed or suspected COVID-19 for varied time-intervals post-mortem. However, this does not provide evidence of infectivity as RT-PCR tests do not distinguish between live and dead virus or viral fragments.

One study, conducted in England, reported that rates of positive post-mortem RT-PCR tests were higher for deceased cases who had tested positive less than one week before death, compared to those with a last positive test more than 2 weeks before death (5). Viable (infectious) virus was not detected in the 2 studies that had conducted virus culture tests: in swabs from the skin (11 bodies, up to 5 days after death) in one study (6), nor from the respiratory tract of an exhumated body (4 months after death) in the other study (2).

In our previous review, SARS-CoV-2 had been successfully isolated in the respiratory tract of confirmed COVID-19 cases in 3 studies with maximum post-mortem intervals ranging from 36 hours to 17 days. In this update, no study reporting on viral culture tests in swabs from the respiratory tract of the deceased with similar post-mortem interval was identified. More research is needed to understand the risk of transmission from contact with the body fluids of deceased persons with COVID-19 and its association with factors such as disease severity, disease duration and post-mortem interval.

Two studies also conducted regular testing in autopsy staff, neither detected current infections at any point in the study (assessed by RT-PCR and/or antigen testing) (6, 10). One of these studies also tested for past infection (serology) and found that one out of 25 staff had antibody against SARS-CoV-2 although it is not known where transmission occurred (6). No epidemiological investigations reporting on transmission from handling bodies of COVID-19 cases were identified. Whilst this may suggest that clusters of COVID-19 infection amongst persons handling the bodies of the deceased has not been reported, this does not constitute evidence of absence of risk. More research is required to understand the risk of transmission from handling the bodies of deceased persons with suspected or confirmed COVID-19.

## Limitations

The 2 studies providing some evidence on risk of transmission from the deceased were both conducted in autopsy settings (with strict infection control protocols) which limits their applicability to non-clinical settings.

A detailed analysis of the results on SARS-CoV-2 detection in body fluids from the deceased had not been conducted and as postmortem virus persistence was not the primary objective of this review, relevant studies may have been missed.

No formal risk of bias assessment was completed for included studies and their findings are limited due to small sample sizes and variation in methods between studies (difference in type of samples, time of collection, detection method and so on).

## Conclusions

Based on the evidence identified in this update, the conclusions from our previous review (1) remain unchanged.

## Acknowledgment

We would like to thank colleagues within the Public Health Advice, Guidance and Expertise function who either reviewed or input into aspects of the review, especially Jo Nurse. Thanks also to colleagues within the COVID-19 Rapid Evidence Service team for their support into specific aspects of this review, especially Sean Harrison.

## Disclaimer

UKHSA's rapid reviews aim to provide the best available evidence to decision makers in a timely and accessible way, based on published peer-reviewed scientific papers, unpublished reports and papers on preprint servers. Please note that the reviews: i) use accelerated methods and may not be representative of the whole body of evidence publicly available; ii) have undergone an internal, but not independent, peer review; and iii) are only valid as of the date stated on the review.

In the event that this review is shared externally, please note additionally, to the greatest extent possible under any applicable law, that UKHSA accepts no liability for any claim, loss or damage arising out of, or connected with the use of, this review by the recipient and/or any third party including that arising or resulting from any reliance placed on, or any conclusions drawn from, the review.

## References

1. PHE COVID-19 Rapid Evidence Service. '[COVID-19 transmission from the deceased. A rapid review](#)'. 2021
2. Plenzig S and others. '[Detection and infectivity of SARS-CoV-2 in exhumated corpses](#)'. International Journal of Legal Medicine 2021: volume 135, issue 6, pages 2,531 to 2,536
3. Sablone S and others. '[Post-mortem persistence of SARS-CoV-2: a preliminary study](#)'. Forensic Science, Medicine and Pathology 2021: volume 17, issue 3, pages 403 to 410
4. Fuest M and others. '[Postmortem conjunctival and nasopharyngeal swabs in SARS-CoV-2 infected and uninfected patients](#)'. Acta Ophthalmologica 2021: volume 99, pages e615 to e7
5. Hall JA and others. '[On the sensitivity and specificity of postmortem upper respiratory tract testing for SARS-CoV-2](#)'. Journal of Infectious Diseases 2021: volume 224, issue 3, pages 389 to 394
6. Schroder AS and others. '[The handling of SARS-CoV-2 associated deaths - infectivity of the body](#)'. Forensic Science, Medicine and Pathology 2021: volume 17, issue 3, pages 411 to 418
7. Servadei F and others. '[Persistence of SARS-CoV-2 Viral RNA in nasopharyngeal swabs after death: an observational study](#)'. Microorganisms 2021: volume 9, issue 4, pages 10
8. Syamsun A and others. '[Postmortem diagnosis characteristics of probable covid-19 victims by rapid molecular testing](#)'. IOP Conference Series. Earth and Environmental Science 2021: volume 712, issue 1
9. Aiello F and others. '[Post-Mortem RT-PCR assay for SARS-CoV-2 RNA in COVID-19 patients' corneal epithelium, conjunctival and nasopharyngeal swabs](#)'. Journal of Clinical Medicine 2021: volume 10, issue 18, page 20
10. Pomara C and others. '[Safe management strategies in clinical forensic autopsies of confirmed COVID-19 Cases](#)'. Diagnostics 2021: volume 11, issue 3, page 6
11. Hirschbuhl K and others. '[Viral mapping in COVID-19 deceased in the Augsburg autopsy series of the first wave: A multiorgan and multimethodological approach](#)'. PLoS ONE [Electronic Resource] 2021: volume 16, issue 7, page e0254872

## Annexe A. Inclusion and exclusion criteria

Article eligibility criteria are summarised in [Table A.1](#). The PRISMA diagram showing the flow of citations is provided in [Figure A.1](#).

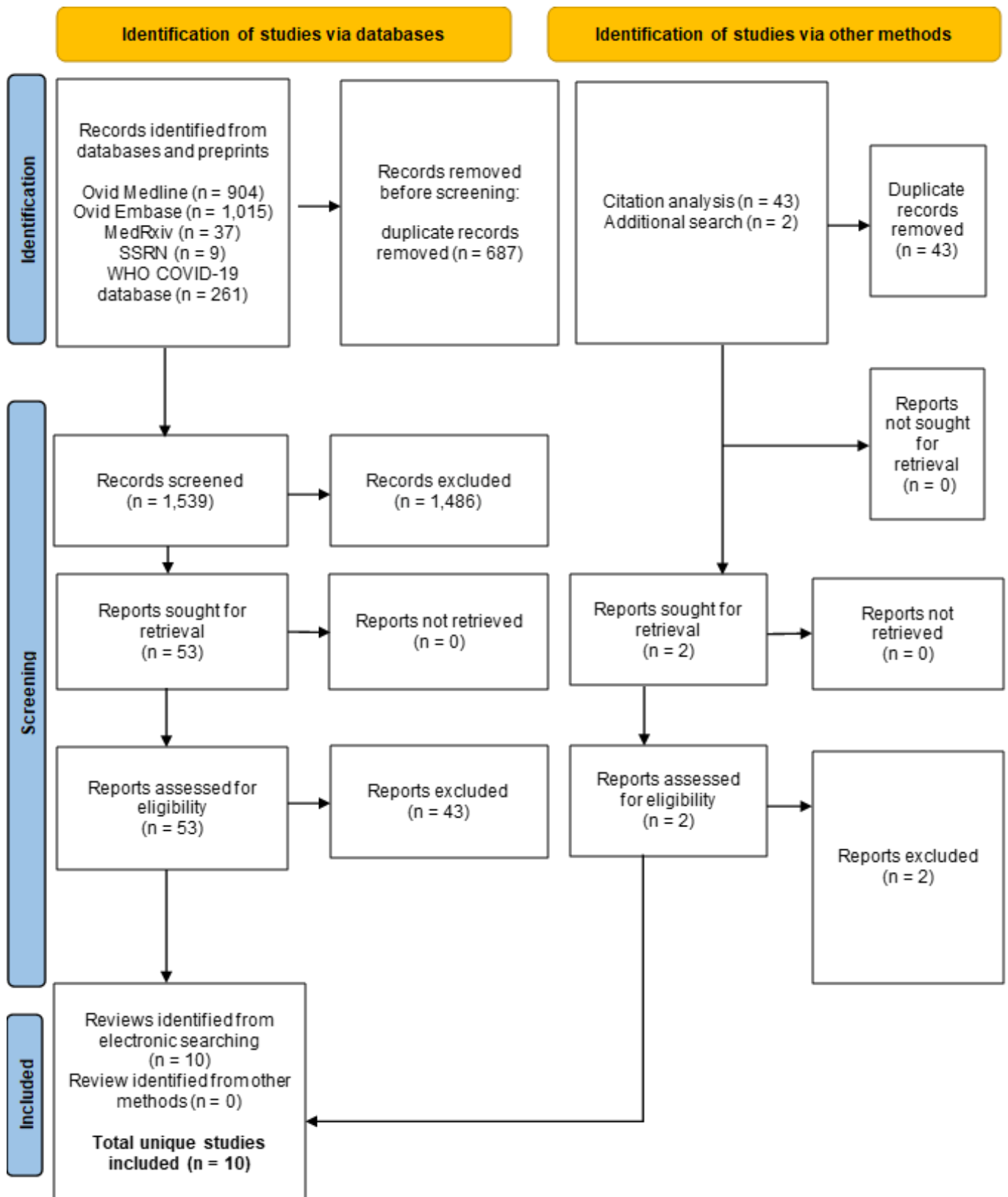
The main objective of this rapid review was to assess the risk of transmission to individuals handling bodies of deceased persons with suspected or confirmed COVID-19. Outcome measures were not specified in the protocol so ‘any measures deemed appropriate to assess transmission risk [would] be considered’. Due to the limited number of studies identified on risk from handling dead bodies in our previous review (1), studies reporting on post-mortem virus persistence in body fluids had been included. Only studies reporting on fluids from the respiratory tract, from the eyes and from the gastrointestinal tract (urine and faeces) collected with a swab were considered for inclusion as virus persistence in these fluids were considered as an intermediate outcome for transmission risk when handling bodies. Studies focusing on internal organs and tissue sample analysis were excluded. Similar criteria were used for this update.

**Table A.1. Inclusion and exclusion criteria**

|                     | <b>Included</b>  | <b>Excluded</b>  |
|---------------------|--|--|
| Population          | Bodies of deceased persons with suspected or confirmed COVID-19<br><br>Individuals handling bodies of deceased persons with suspected or confirmed COVID-19            |  |
| Setting             | All  |  |
| Context             | COVID-19 pandemic  | Other infectious disease   |
| Intervention        | Handling of bodies of deceased persons with suspected or confirmed COVID-19<br><br>Any strategy to manage bodies of deceased persons                                   | Studies looking at post-mortem virus persistence in internal organs or tissue samples will be excluded (only body fluids in which one could get in contact with when handling a body will be considered) |
| Outcomes            | Risk of COVID-19 transmission to the individual handling the bodies<br><br>Measures:<br>Any measures deemed appropriate to assess transmission risk will be considered |  |
| Language            | English  |  |
| Date of publication | 17 March 2021 to 22 November 2021  |  |
| Study design        | Experimental or observational studies<br><br>Outbreak investigation  | Systematic or narrative reviews<br>Guidelines<br>Opinion pieces<br>Modelling studies   |
| Publication type    | Published and preprint   |  |



**Figure A.1. PRISMA diagram**



### Figure A.1. PRISMA diagram – accessible text

A PRISMA diagram showing the flow of studies through this review.

From identification of studies via databases and registers, records identified from databases and preprints:

- Ovid Medline (n=904)
- Ovid Embase (n=1,1015)
- medRxiv (n=37)
- SSRN (n=9)
- WHO COVID database (n=261)

From these, records removed before screening:

- duplicate records removed (n=687)

n=1,539 records screened, of which n=1,486 were excluded, leaving n=53 papers sought for retrieval, all of which were retrieved.

n=53 reports assessed for eligibility from identification of studies via databases and register, of which n=43 reports were excluded.

n=45 records identified from identification of studies via other methods:

- citation analysis (n=43)
- additional search (n=2)

Of these, n=43 records were removed:

- duplicate records removed (n=43)

n=2 reports sought for retrieval, n=2 reports assessed for eligibility, n=2 reports excluded

n=10 reports identified from electronic searching, n=0 reports identified from other methods, giving n=10 total unique studies included in report.

# About the UK Health Security Agency

UKHSA is responsible for protecting every member of every community from the impact of infectious diseases, chemical, biological, radiological and nuclear incidents and other health threats. We provide intellectual, scientific and operational leadership at national and local level, as well as on the global stage, to make the nation health secure.

UKHSA is an executive agency, sponsored by the [Department of Health and Social Care](#).

© Crown copyright 2022

Prepared by: Daphne Duval, Bethany Walters, Isobel Tudge, Zalaya Simmons, Nicola Pearce-Smith and Rachel Clark

For queries relating to this document, please contact: [enquiries@ukhsa.gov.uk](mailto:enquiries@ukhsa.gov.uk)

Published: June 2022

Publishing reference: GOV-12587



You may re-use this information (excluding logos) free of charge in any format or medium, under the terms of the Open Government Licence v3.0. To view this licence, visit [OGL](#). Where we have identified any third party copyright information you will need to obtain permission from the copyright holders concerned.



UKHSA supports the  
Sustainable Development Goals

