



Public Health
England

Protecting and improving the nation's health

Technical Summary

Public Health England Data Series on Deaths in People with
COVID-19

Prepared 29 April 2020 by COVID-19 EpiCell

Note: this document will not be updated on a regular basis. For most up to date information on the England and UK death data, see the gov.uk Coronavirus Dashboard: <https://coronavirus.data.gov.uk/about>

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1. Summary

- a. Monitoring the number of deaths in people with COVID-19 is a vital part of tracking the pandemic. The Department of Health and Social Care (DHSC) has reported the daily UK-wide number of deaths in hospital among people with confirmed COVID-19 since 5 March 2020. In England, this data was collected by NHS England. The Office for National Statistics (ONS) also publishes weekly counts of deaths in which COVID-19 was mentioned on the death certificate up to 11 days before publication.
- b. Public Health England (PHE) has developed a data series that collates reports from multiple sources to give a daily number of deaths in people with a positive COVID-19 test in England, regardless of where they died.
- c. From 29 April 2020, COVID-19 deaths in England will be reported using the PHE data series. Each day, PHE combines data from three different sources:
 - i. Deaths occurring in hospitals, notified to NHS England by NHS trusts
 - ii. Deaths notified to local PHE Health Protection Teams in the course of outbreak management
 - iii. Laboratory reports where a person has had a laboratory confirmed COVID-19 test linked to death reports from electronic hospital records
- d. The advantage of the PHE data series is that it includes deaths in anyone with laboratory confirmed COVID-19, including those who die outside of hospital settings. It is a more timely and complete measure by combining information from multiple sources.. The PHE data series also aligns England's COVID-19 death reporting with how deaths are reported in the rest of the UK.
- e. Death data are checked for errors and a semi-automated program is run to match records and ensure a person who died is not counted twice across different reporting systems.
- f. Of the additional deaths included in the PHE data series, we estimate that just over two-thirds (70%) occur in non-hospital settings and just under one-third (30%) occur in hospital but are not yet reported in the published figures¹.
- g. The PHE data series does not include deaths in people where COVID-19 was suspected but a laboratory test was not carried out or was negative. Furthermore, the PHE data series does not report cause of death, and as such represents *deaths in people with COVID-19* and not necessarily due to COVID-19. The weekly counts of deaths from ONS includes all deaths where COVID-19 is recorded on the death certificate.

¹ Based on where information on location of death is available.

2. Background

Monitoring the number of deaths due to COVID-19 is a vital part of tracking the pandemic. It is critical to ensure death data are as accurate, comprehensive and timely as possible.

Since 5 March 2020, NHS England have reported a daily count of confirmed COVID-19 deaths occurring in hospitals in England. More recently, Public Health England (PHE) has developed a methodology that links data from three sources to provide broader coverage of deaths among people with a confirmed COVID-19 laboratory test, whether they occurred in hospitals, care homes or the wider community.

3. Aims

This paper explains why the process for reporting deaths is changing and describes the advantages and limitations of the new reporting method. It provides an explanation of how to interpret the PHE COVID-19 death data series and sets out answers to frequently asked questions.

4. Outline of PHE data series

4.1 Definition of COVID-19 related deaths

All deaths reported to Public Health England that have a laboratory confirmed report of COVID-19 (including at post-mortem), in any setting. The daily number represents new deaths reported to PHE in the 24 hours up to 5pm the previous day. Report date does not necessarily equate to date of death as it may take up to a week for deaths to be reported to PHE.

4.2 Data sources and processing

Public Health England receives reports of death from three sources:

- a. Deaths occurring in hospitals, notified to NHS England by NHS trusts using the COVID-19 Patient Notification System (CPNS) (*previously the source of daily COVID-19 deaths in England*)
- b. Deaths with a confirmed COVID-19 test, notified to PHE Health Protection Teams during outbreak management (primarily in non-hospital settings) and recorded in an electronic reporting system
- c. All people with a laboratory confirmed COVID-19 test reported to PHE via the Second Generation Surveillance System (SGSS) (a centralised repository of laboratory results from Public Health and NHS laboratories)². This list is submitted on a daily basis to the Demographic Batch Service (DBS)³ to check NHS patient records for reports of individuals who died in the previous 24 hours in any setting.

²https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/739854/PHE_Laboratory_Reporting_Guidelines.pdf

³ <https://digital.nhs.uk/services/national-back-office-for-the-personal-demographics-service/demographics-batch-service-bureau>

Data from each source are collected and automated programmes check for errors and make sure deaths are not counted twice.

4.3 Quality assurance

Quality assurance is undertaken by PHE using semi-automated programmes, with manual checking before and after processing. This involves sense checking data in relation to key information (eg age at death, date of birth, hospital admission, death report). Data from each source are merged and duplicate reports are removed.

On a weekly basis, data reported from the Office for National Statistics (ONS) death registrations (with an 11-day lag) are compared with the PHE data series. These data are used to enhance information on cause of death and setting of death.

5. How does the PHE data series compare?

5.1 Advantages of the new PHE data series

The PHE data series has the following advantages:

- broader coverage by including deaths in anyone diagnosed with COVID-19, including those outside of hospital settings
- more timely reporting of deaths: there is a time lag between the date of death and the date it is reported to PHE. Using multiple overlapping data sources, the delay is reduced by approximately 1-2 days
- improves completeness of hospital reporting by combining information from multiple sources, making it less likely that deaths are missed.
- it aligns England COVID-19 death reporting with how deaths are reported in the rest of the UK. Scotland, Wales and Northern Ireland capture deaths outside hospitals

5.2 Difference in the number of deaths compared to NHS England hospital deaths

Using data reported up to 5pm on 28 April 2020, 19,739 deaths in hospitals were reported by NHS England. The PHE data series currently identifies 23,550 deaths, or an additional 3,811 deaths. Figure 1 and Figure 2 compare the two data series by date of death. This shows that the additional deaths identified in the PHE data series do not represent a sudden increase in deaths, but rather that they have occurred across the entire duration of the pandemic.

5.3 Where are the additional deaths coming from?

The 'additional' deaths identified in the PHE data series include deaths outside of hospital settings and unreported deaths in hospital settings to NHS England. Where place of death is known, we estimate that 70% of the 'additional' deaths occurred in non-hospital settings.

Figure 1: Daily number of COVID-19 laboratory confirmed deaths by date of death and data source; England, 2 March to 28 April 2020

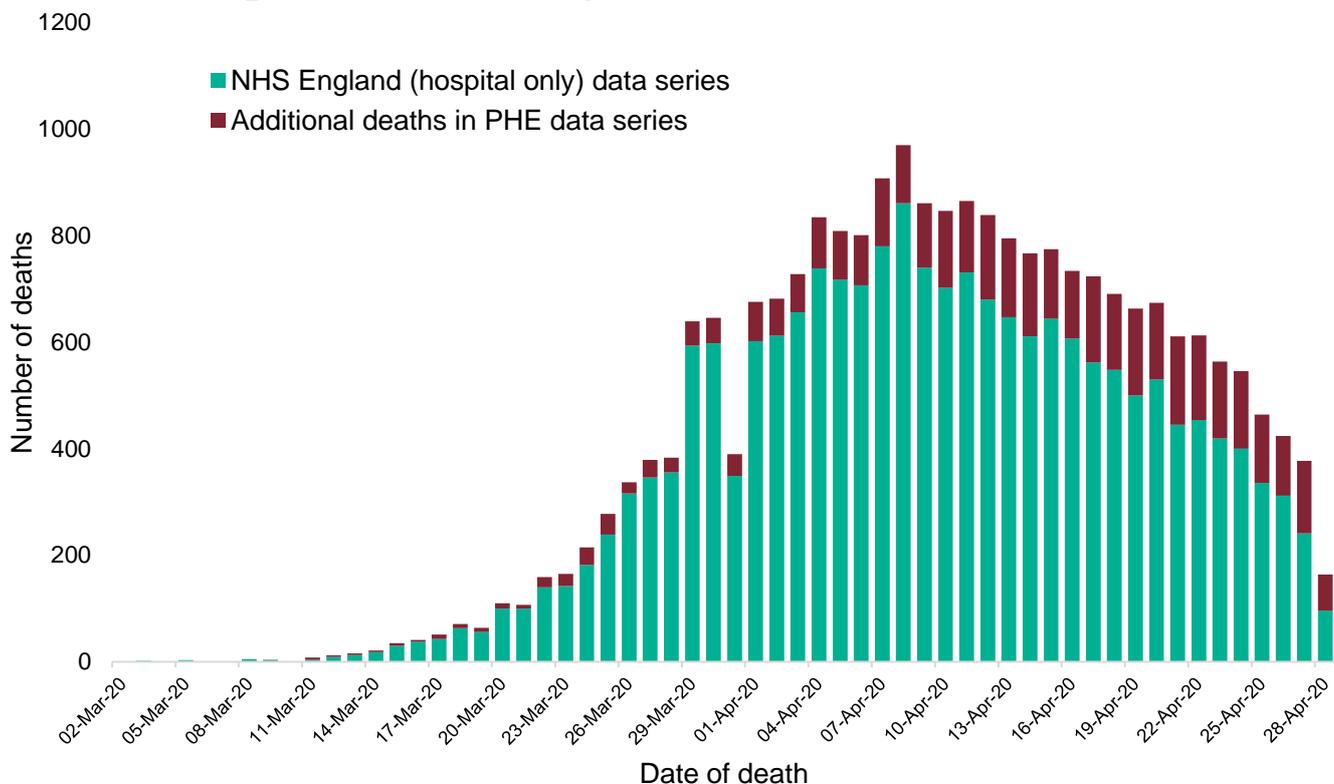
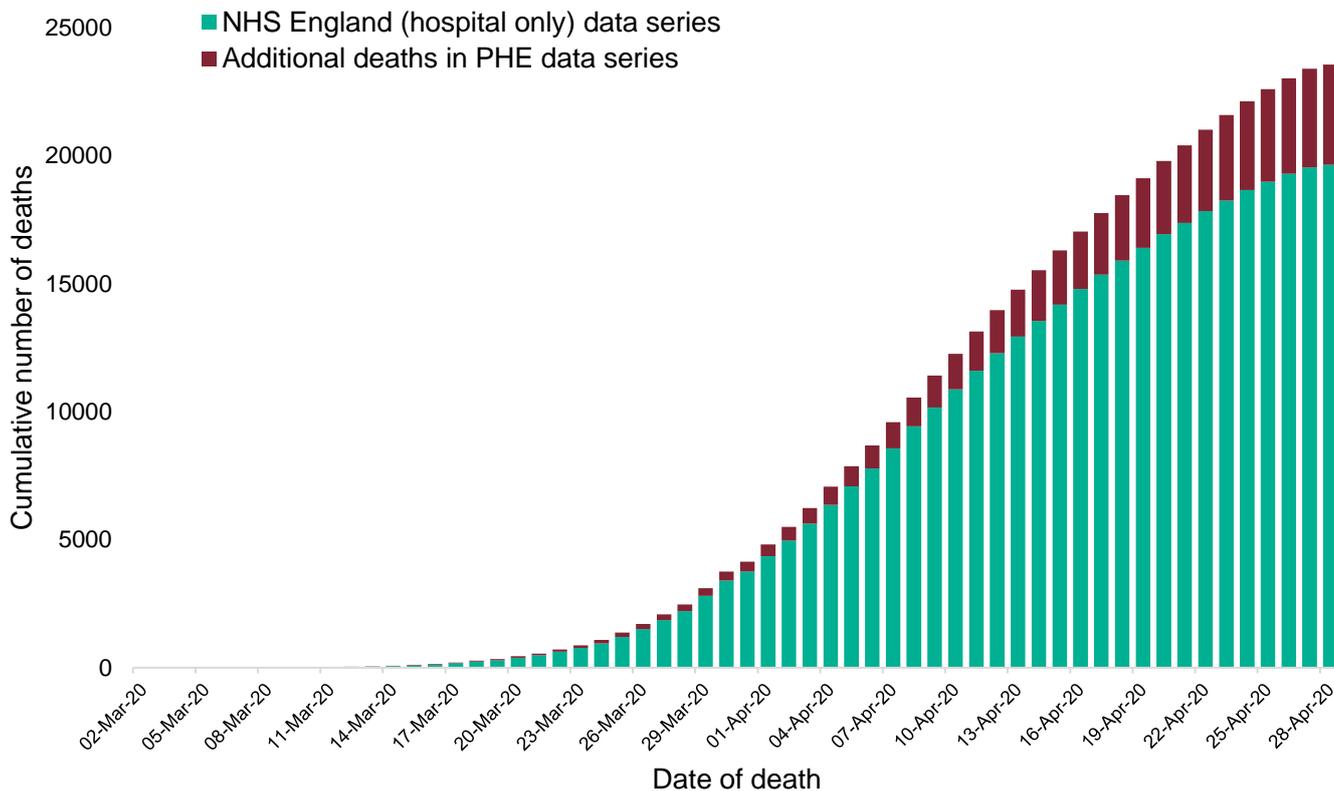


Figure 2: Cumulative number of COVID-19 laboratory confirmed deaths reported by date of death and data source; England, 2 March to 28 April 2020



5.4 Limitations of the PHE data series

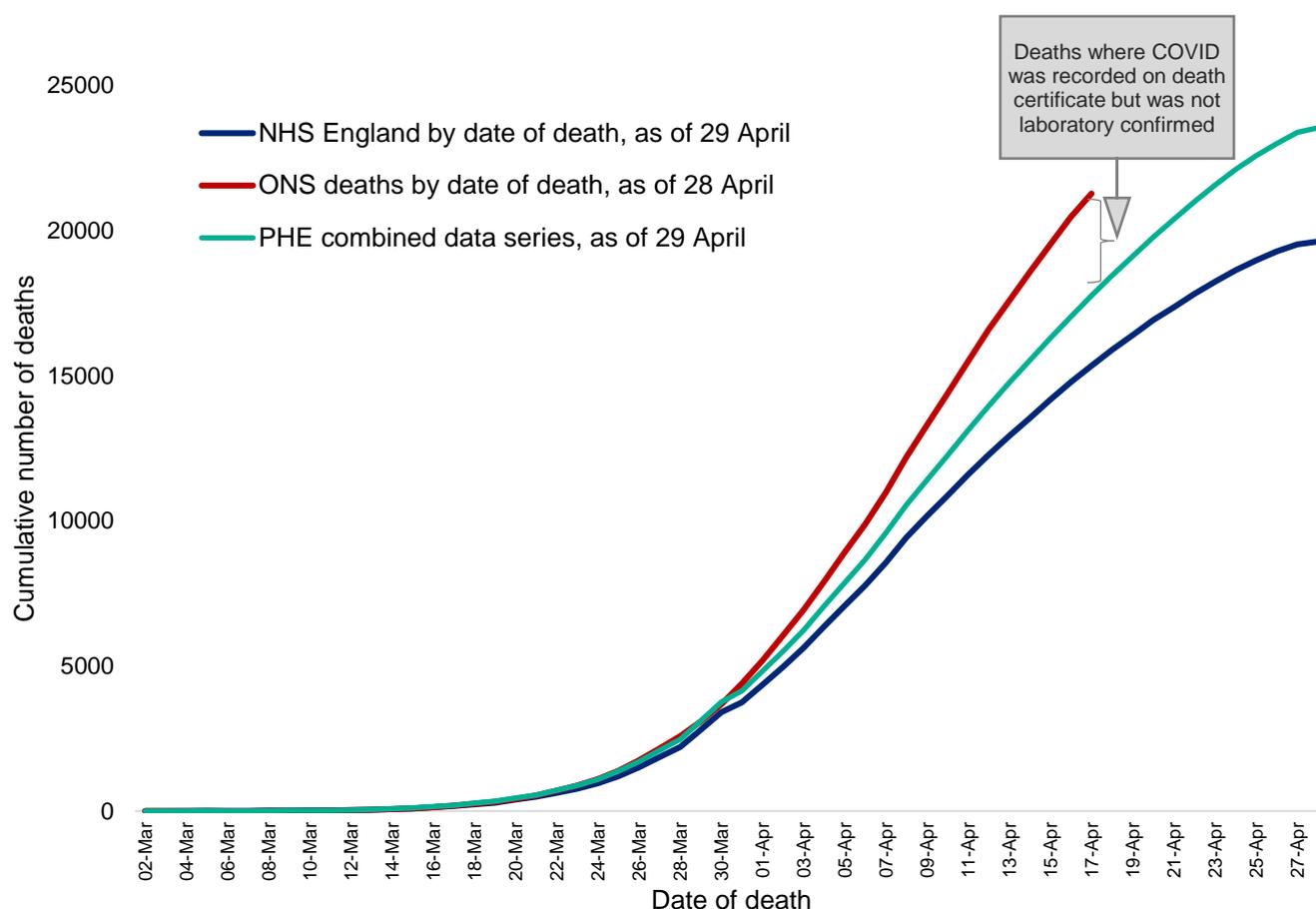
The PHE data series does not include deaths in people where COVID-19 is suspected but not confirmed by testing (either negative or not done). Furthermore, the PHE data series does not report cause of death, and as such represents *deaths in people with COVID-19* and not necessarily due to COVID-19.

5.5 How does the PHE data series compare to the ONS death registrations?

The PHE data series is used to count daily deaths in people with a confirmed COVID-19 test in England. ONS provides a weekly count of all deaths in England and Wales where COVID-19 is recorded on the death certificate (eg including deaths where COVID-19 was suspected based on symptoms and/or linked to an outbreak, and not limited to laboratory confirmed cases); these are reported on an 11-day lag.

Figure 3 shows the PHE data series compared to the ONS death registrations and NHS England data series. The PHE data series more closely aligns with the ONS data series, although there may be up to an additional 3,600 deaths (to 17 April) reported by ONS which represent deaths where COVID-19 was recorded as a cause of death but there was no laboratory confirmed test. Going forward, as more people are being tested, the PHE data series is likely to capture additional deaths, particularly outside hospitals. PHE are continuing to work closely with ONS and CQC to understand the number of suspected COVID-19 deaths are taking place in care home settings and the wider community.

Figure 3: Comparison of cumulative deaths by date of death and source: NHS England (lab confirmed COVID-19), PHE combined (laboratory confirmed COVID-19) and ONS death registrations (both confirmed and unconfirmed COVID-19), England



6. Frequently asked questions

1. Were we under-estimating deaths before this?

To date, the England focus on hospital deaths was the best way to give a consistent, reliable number on a daily basis. The PHE data series was developed to provide a broader measure of COVID-19 deaths in England by counting deaths in anyone with a laboratory confirmed COVID-19 test through combining multiple data sources. As of 5pm on 28 April 2020, the PHE data series counted 23,550 deaths in people with COVID-19, which is 3,811 more COVID-19 deaths compared to the current hospital-only data series.

2. Where have these data come from?

These data are now collected and combined from data sources: hospitals, local Health Protection Teams and automated laboratory systems. It means we can now also include deaths in anyone with a confirmed COVID-19 test which occur in hospitals, care homes and any other setting. Using multiple sources means we are much less likely to miss deaths. Data are checked to and ensure a person who died is not counted twice.

3. Does this mean that COVID-19 epidemic is getting worse?

No. The additional deaths have occurred over the length of the epidemic. We have published the new series, going back to 2 March 2020 to show how this new count relates to the old one. This does not represent a new surge in the number of deaths.

4. Why haven't you published these data sooner?

To date, only COVID-19 deaths occurring in hospitals have been reported. Collating data across all sectors is technically difficult and challenging. It just isn't possible to get a daily count of deaths from every care home and residence in the country, so this has been done by bringing together a range of existing data systems. It is important to get the numbers right. Together with DHSC, PHE have undertaken rigorous validation and quality assurance of the PHE data series of combining deaths from multiple sources to understand how many additional COVID-19 deaths are captured.

5. Does this represent everyone in the country who has died from COVID-19?

This dataset includes all deaths in people who had a positive COVID-19 test in Public Health and NHS laboratories in England. Combining deaths from multiple sources reduces the risk of underreporting compared to the current data series. However, this data series does not include deaths in people who had suspected COVID-19 but were never tested, for example those linked to an outbreak or had COVID-19 symptoms at the time of death. These deaths will be identified over time through ONS death registrations. Going forward, as more people are being tested, this data series is likely to capture additional deaths, particularly outside hospitals. Options to test post-mortem samples where no testing has been undertaken are being explored to improve the accuracy of death reporting.

6. If deaths are being reported from several sources, are we over counting deaths?

We are carefully going through the data and have developed a process to ensure the data are accurate and a person who died is not counted twice across different reporting systems.

7. Can you provide a breakdown by setting?

This cannot be provided on a daily basis. More accurate information on place of death are available weekly through ONS death registrations, with a 11-day reporting lag.

8. What period do these data cover?

This data series covers all deaths in people in England with laboratory confirmed COVID-19 test diagnosed since 2 March 2020, regardless of where they died. For our UK figures we have combined them with similar series for Scotland, Wales and Northern Ireland.

Annex 1: Details of data sources included in PHE data series

Data source	Description
NHS England line listing of deaths reported by NHS trusts in the COVID-19 Patient Notification System (CPNS)	This data contains information on deaths of patients who have died in hospitals in England and had tested positive for COVID-19 at the time of death. Data are reported to NHS England by individual NHS Trusts via a web-based reporting system.

<p>Health protection teams (HPTs) reporting deaths notified to them (primarily non-hospital settings)</p>	<p>These are deaths reported to Health Protection Teams as part of their outbreak management. This are primarily from non-hospital settings such as care homes but can also include other settings.</p>
<p>NHS Demographic Batch Service tracing of patients with a laboratory confirmed COVID-19 test</p>	<p>These are reports of deaths among individuals who have a laboratory confirmed diagnosis of COVID-19, as recorded in the SGSS dataset (national dataset extracted directly from PHE and NHS hospital laboratories)⁴</p> <p>These data are submitted on a daily basis to the Demographic Batch Service (DBS)⁵ to check NHS patient records for reports that individuals who died in the previous 24 hours.</p> <p>These deaths are not limited to specific places of death</p>

⁴https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/739854/PHE_Laboratory_Reporting_Guidelines.pdf

⁵ <https://digital.nhs.uk/services/national-back-office-for-the-personal-demographics-service/demographics-batch-service-bureau>