Office for National Statistics

Article

Influenza and other respiratory viruses pilot study, Coronavirus (COVID-19) Infection Survey, UK: October 2022 to February 2023

Summary of findings from the influenza (flu) and Respiratory Syncytial Virus (RSV) pilot survey, which ran from October 2022 to February 2023, as part of the Coronavirus (COVID-19) Infection Survey (CIS). Thispilot is delivered in partnership with the University of Oxford, University of Manchester,UK Health Security Agency (UKHSA)andWellcomeTrust, working with the University of Oxfordand partner laboratories tocollect and test samples.

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1 . Main points

- The Coronavirus (COVID-19) Infection Survey (CIS) has been hugely successful at monitoring levels of COVID-19 infections and antibodies in the population; exploratory work has been conducted to understand whether other viruses that cause respiratory illness could be monitored in the same way.

- Over the course of a 20-week pilot, a total of 14,900 nose and throat samples were tested for two other respiratory viruses in addition to COVID-19.

- Over this 20-week period, 130 participants tested positive for influenza (flu) A or B, representing 0.9% of our sample (95% Confidence Interval: 0.7% to 1.0%), and 180 participants tested positive for Respiratory Syncytial Virus (RSV), representing 1.2% of our sample (95% confidence interval: 1.0% to 1.4%).

- Using survey samples in this way has shown how the Coronavirus (COVID-19) Infection Survey could support any future health surveillance strategy by providing early warning of levels of flu and RSV in the population, as well as providing more information on which flu strains are in circulation.

2 . Overview of the pilot study

The Coronavirus (COVID-19) Infection Survey (CIS) was initiated in April 2020, in response to the immediate risks posed by the coronavirus pandemic. The survey was established to provide timely monitoring of COVID-19 infection levels across the UK, by testing nose and throat swabs taken from a representative sample of participants. These samples are tested using reverse transcriptase polymerase chain reaction (RT-PCR) to detect the presence of SARS-CoV-2, the specific virus that causes COVID-19. For further information please refer to our Coronavirus (COVID-19) Infection Survey: methods and further information.

SARS-CoV-2 is one type of virus that causes respiratory illness that can include a range of symptoms such as cough, sore throat and fever (high temperature). Influenza (flu) viruses A and B also cause respiratory illness and are responsible for flu seasons in the winter months each year. Similarly, Respiratory Syncytial Virus (RSV) can also cause coughs and colds in winter months. When increasing numbers of the population have these viruses it can cause pressure on our health system.

Flu cases have been historically low since the emergence of COVID-19. This is because public health measures taken to reduce the transmission of COVID-19 also reduce the spread of other viruses that cause respiratory infections like flu. For more information, see the World Health Organization's web page on influenza in the northern hemisphere, 14 October 2022. Since these measures have been removed, many people predicted the 2022 to 2023 influenza season would be much larger and more challenging than previous years.

Our main protection from flu is vaccination. Each year vaccinations are provided based on the specific flu strains predicted to be in circulation in winter months, see the Centres for Disease Control and Prevention's Selecting Viruses for the Seasonal Influenza Vaccine web page. Sometimes this prediction does not match the type of flu that ends up circulating, resulting in larger outbreaks of disease.

At present, most information about flu comes from people admitted to hospital. There is currently very little information about how much flu circulates in the community, particularly in people without symptoms, who may spread it without knowing.

This pilot has successfully shown that the Coronavirus (COVID-19) Infection Survey could be expanded to provide more accurate information about specific flu strains circulating within the community, and act as an early warning for the NHS.

The influenza and other respiratory viruses pilot

The pilot study was conducted from 10 October 2022 to 26 February 2023 to understand how the existing CIS could be used to monitor these additional viruses that cause respiratory illness in the community. A random selection of approximately 750 samples per week was taken from existing CIS samples (with research ethics approval) and tested for two additional viruses as well as SARS-CoV-2. These samples were processed by the Berkshire and Surrey Pathology Services (BSPS) laboratory where multiplex RT-PCR testing was used to detect the presence of SARS-CoV-2, flu A and B and RSV.

We were also able to analyse test results according to demographic characteristics such as age, and whether participants reported symptoms.

Results from this exploratory work are experimental and are not considered representative of the UK population. This pilot used a relatively small number of samples, results are unweighted and do not necessarily reflect the characteristics of the UK population in general.

It should be noted that it is possible to test positive for flu after vaccination with the Live Attenuated Influenza Vaccine (LAIV), for further information regarding test accuracy refer to Section 7: Data sources and quality.

3 . Experimental Results

From 10 October 2022 to 26 February 2023 a total of 14,900 samples were tested. Over this period:

- 130 participants tested positive for flu A or B, this was 0.9% of the sample (95% confidence interval: 0.7% to 1.0%)

- 180 participants tested positive for Respiratory Syncytial Virus (RSV), this was 1.2% of the sample (95% confidence interval: 1.0% to 1.4%)

- there were 12 instances where participants tested positive for more than one virus (SARS-CoV-2, flu A or B or RSV)

Caution should be taken when interpreting these results. Estimates are unweighted and therefore cannot be considered representative of the UK population and are based on relatively low sample sizes.

For additional information including results according to age, refer to our Influenza and other respiratory viruses pilot dataset.

Whole genome sequencing

Samples that tested positive for flu A or B and had a sufficient amount of virus in them were sent for whole genome sequencing. This involves a detailed investigation to work out the letters that make up the genetic material of the virus in the sample. The specific strain can be identified through comparisons with the genetic sequences of known flu A or B strains.

Of the 130 participants that tested positive for flu A or B from 10 October 2022 to 26 February 2023, 50 samples underwent whole genome sequencing. Of these 50 samples, 48 samples were identified as influenza A (H3N2 or H1N1), one was influenza B and one was related to a recent vaccination with the live influenza virus. The influenza A strains identified were represented within the seasonal flu vaccine.

Symptoms

As well as testing the samples for additional respiratory viruses, we were able to link the results to questionnaire responses. Where people tested positive for flu A or B or RSV, we analysed the self-reported symptoms the participants recorded. This helps to understand asymptomatic cases and also the most common symptoms associated with each illness.

The Coronavirus (COVID-19) Infection Survey (CIS) questionnaire asks participants to select from a list of symptoms that they have been experiencing. It is important to note that not all symptoms recorded may be related to flu or RSV infection. We used the [European Centre for Disease Control (ECDC) definition of influenza-like illness (ILI)](), which allows us to analyse a defined group of symptoms out of all the symptoms reported at the time of infection. This definition defines influenza-like illness as at least one of fever, fatigue, headache or myalgia and at least one of cough, sore throat or shortness of breath. Of those in our sample who tested positive for flu A or B or RSV, we also considered the proportion who did not report any of these eight flu-like symptoms (but may or may not have reported other symptoms).

Our pilot data show that, of the 130 participants in our sample who tested positive for flu A or B:

- 56 reported symptoms under the ECDC ILI definition, representing 43.1% of the flu A or B positive cases in our sample (95% confidence interval 34.4% to 52.0%)

- 42 did not report any flu-like symptoms, representing 32.3% of the flu A or B positive cases in our sample (95% confidence interval: 24.4% to 41.1%)

Of the 180 participants in our pilot data sample who tested positive for RSV:

- 58 reported symptoms under the ECDC ILI definition, representing 32.2% of the RSV positive cases in our sample (95% confidence interval: 25.5% to 39.6%)

- 83 did not report any flu-like symptoms, representing 46.1% of the RSV positive cases in our sample (95% confidence interval: 38.7% to 53.7%)

A substantial proportion of individuals in our sample that tested positive for flu A or B or RSV did not report flu-like symptoms. These results highlight the potential insight into community transmission of viruses such as flu A or B and RSV among individuals with no or relatively few flu-like symptoms.

4 . Comparing with other sources

The main existing source of information on flu and Respiratory Syncytial Virus (RSV) is the [Weekly national Influenza and COVID-19 surveillance reports produced and published by the UK Health Surveillance Agency (UKHSA) (PDF, 2,989KB)](). These reports include laboratory-confirmed influenza and coronavirus (COVID-19) cases admitted to hospital and critical care units, as well as outbreaks of respiratory infection in other settings such as care homes, prisons and schools.

Comparisons between our pilot data and the UKHSA surveillance data help us to understand how representative our pilot data is.

The trends are broadly the same between the two sources. For example, both sources show a peak in flu positivity from mid to late December 2022. The Coronavirus (COVID-19) Infection Survey (CIS) and the UKHSA weekly surveillance report test individuals in different settings, and therefore provide different results when considering the estimated proportion of individuals testing positive for flu A or B and RSV. The sample used in our pilot is also relatively small and therefore cannot be considered representative of the UK population in general.

Despite the low sample sizes in the pilot, the trends and timing are broadly similar, supporting the idea that the Coronavirus (COVID-19) Infection Survey, using a larger sample, could be used as an additional measure for flu and RSV in any future health surveillance programme.

5 . Influenza and other respiratory viruses pilot data

[Influenza and other respiratory viruses pilot study: Coronavirus (COVID-19) Infection Survey](#) Dataset | Released 27 March 2023 Analysis from a Coronavirus (COVID-19) Infection Survey pilot, which tested for influenza (flu) and Respiratory Syncytial Virus (RSV) from October 2022 to February 2023.

6 . Glossary

Confidence interval

A confidence interval gives an indication of the degree of uncertainty of an estimate, showing the precision of a sample estimate. The 95% confidence intervals are calculated so that if we repeated the study many times, 95% of the time the true unknown value would lie between the lower and upper confidence limits. A wider interval indicates more uncertainty in the estimate. Overlapping confidence intervals indicate that there may not be a true difference between two estimates.

Coronavirus

Coronaviruses are a family of viruses that cause disease in people and animals. They can cause the common cold or more severe diseases, such as coronavirus (COVID-19).

COVID-19

COVID-19 is the name used to refer to the disease caused by the SARS CoV-2 virus, which is a type of coronavirus. The Office for National Statistics (ONS) uses COVID-19 to mean presence of SARS-CoV-2 with or without symptoms.

Influenza (flu)

Influenza is a virus that causes the respiratory illness commonly referred to as flu. Symptoms can include cough, fever and sore throat.

Multiplex RT-PCR

Multiplex RT-PCR testing is a technique that allows the sample to be tested for multiple viruses at the same time.

Reverse Transcriptase Polymerase Chain Reaction (RT-PCR)

RT-PCR testing is an accredited technique that enables the detection of genetic material. The Coronavirus (COVID-19) Infection Survey (CIS) uses RT-PCR testing to detect the following three genes present in SARS-CoV-2:

- N (nucleocapsid) protein

- S (spike) protein

- ORF1ab

Respiratory Syncytial Virus (RSV)

Respiratory Syncytial Virus (RSV) is a virus that causes respiratory illness with symptoms that can include runny nose, cough and fever.

SARS-CoV-2

This is the scientific name given to the specific virus that causes COVID-19.

7 . Data sources and quality

Influenza and other respiratory viruses pilot sample

A small selection of Coronavirus (COVID-19) Infection Survey (CIS) participant swabs were analysed for this pilot. Approximately 750 samples per week were chosen at random, a total of 14,900 over the course of the pilot. These samples were processed at the Berkshire and Surrey Pathology Services (BSPS) laboratory.

Although samples were selected randomly, the sample is relatively small and cannot be considered representative of the UK population. Results are unweighted and do not necessarily reflect the characteristics of the UK population and therefore cannot be generalised.

Multiplex test sensitivity and specificity

An accredited multiplex Reverse Transcriptase Polymerase Chain Reaction (RT-PCR) test was used to detect the presence of SARS-CoV-2, flu A or B and RSV.

Test sensitivity measures how often the test correctly identifies those who have the virus, so a test with high sensitivity will not have many false-negative results. The ability of any test to detect the presence of virus will depend on how much virus there is in a sample. For example, someone who had flu a week ago will have lower levels of virus in their nose and throat than someone who became unwell more recently.

Test specificity measures how often the test correctly identifies those who do not have the virus, so a test with high specificity will not have many false-positive results.

Analysis on a limited number of samples suggests that sensitivity and specificity are greater than 96%.

Acknowledgements

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- Eric Haduli - Senior Scientist

- Hugh Boothe - Laboratory Manager

- Reggie Samuel - General Manager

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- Sarah Walker

- David Eyre

- Jennifer Cane

- Nicholas Sanderson

- Sophie Barnett

- Teresa Street

8 . Future developments

Coronavirus (COVID-19) Infection Survey (CIS) data collection is being paused from mid-March 2023. As the UK Health Security Agency (UKHSA) works to confirm its approach to surveillance, the Office for National Statistics (ONS) plans to work with existing participants to continue gathering valuable insight into the experiences of COVID-19, long COVID and other respiratory infections, details of which will be announced in due course. We thank our participants for their continued support.

9 . Related links

The Bigger Picture: Using the COVID-19 Infection Survey to track other infections Blog | Released 15 December 2022 Information on how the Coronavirus (COVID-19) Infection Survey has been used to monitor other respiratory infections in the private residential population.

Coronavirus (COVID-19) Infection Survey, UK Bulletin | Updated weekly Estimates for England, Wales, Northern Ireland and Scotland. This survey is being delivered in partnership with the University of Oxford, University of Manchester, UK Health Security Agency and Wellcome Trust.

Coronavirus (COVID-19) Infection Survey, characteristics of people testing positive for COVID-19, UK Bulletin | Updated monthly Characteristics of people testing positive for COVID-19 from the Coronavirus (COVID-19) Infection Survey, including antibody data by UK country, and region and occupation for England. Antibodies data published before 3 February 2021 are available in this series.

Coronavirus (COVID-19) Infection Survey: antibody data, UK Bulletin | Updated monthly Antibody data, by UK country and age, from the Coronavirus (COVID-19) Infection Survey.

Regional and sub-regional estimates of coronavirus (COVID-19) positivity over time, UK: 12 January 2023 Article | Released 12 January 2023 Percentage of people testing positive for coronavirus (COVID-19) in private residential households by region and sub-region over time.

10 . Cite this article

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