



Respiratory Virus Testing Pathway for Nursing Homes

National Health Protection Office

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Nursing Home Respiratory Virus Testing Pathway Survey Team:

Lois O'Connor, Augustine Pereira – National Health Protection Office

Lisa Domegan, Adele McKenna, Joan O'Donnell, Maureen O'Leary, Eve Robinson – Health Protection Surveillance Centre

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Summary

Respiratory virus outbreaks cause considerable morbidity and mortality in nursing homes each winter. To minimise this, early identification of outbreaks, as well as prompt implementation of control measures including antiviral treatment and chemoprophylaxis, are essential. Post the COVID-19 pandemic, Ireland is experiencing multi-pathogen winters with COVID-19, influenza, respiratory syncytial virus (RSV) and other respiratory viruses in circulation. These pathogens can all cause a similar clinical picture but differ in some outbreak control measures especially regarding the use of antivirals. Therefore, it is essential that the outbreak-associated pathogen is identified early.

During the 2022/2023 winter season, some nursing homes were unsure of the appropriate respiratory virus testing pathway to use, when a suspected respiratory virus outbreak occurred. To avoid similar confusion this winter, this project was undertaken to describe the current testing pathways and develop a standardised approach where necessary. Therefore, the aim of this project is to describe the current pathways for nursing homes to test for respiratory viruses when they suspect an ARI/ILI outbreak at their facility.

Public Health, Health Protection teams were emailed and asked what laboratory their local nursing homes used to test for respiratory viruses when an acute respiratory infection (ARI) outbreak was suspected in the facility. Community Support Teams (CST) were asked to complete a survey on the local nursing home respiratory virus testing pathway. The responses from these two groups informed the overall results.

Nursing home pathways for respiratory virus testing pathways differ across the country. Nursing homes in the Northwest, Mayo, Northeast and Dublin use the National Virus Reference Laboratory (NVRL) as their testing laboratory. Generally, nursing homes in these areas acquire viral transport medium (VTM) swabs from NVRL, send swabs to NVRL to be tested for COVID-19, influenza and RSV and receive the results using a variety of methods including from the GP, by phoning the lab and by post. In contrast, nursing homes in the West, Midwest, South, Southwest, Southeast and Midland areas of the country use local laboratories as their testing laboratory. They acquire their swabs from the local laboratory, GP or CST, and send swabs to the local laboratory for onsite testing for COVID-19, influenza and RSV. SARS-CoV-2 antigen tests are also widely used in nursing homes.

Some challenges identified include;

- confusion regarding the correct swab to use
- logistical difficulties relating to transport of swabs to laboratories for testing
- laboratory testing capacity at both local laboratories and at NVRL
- delays in accessing results

The following recommendations should be considered to further streamline the nursing home respiratory virus testing pathway:

- All stakeholders should be familiar with their local nursing home testing pathway, including correct swab type and access to supplies of these swabs
- Any central HSE supply of swabs should include a number of different swab types to ensure all testing pathways are covered
- To improve turnaround times and ensure NVRL testing capacity is sufficient, consideration should be given to providing a local testing pathway for all nursing homes

- Consideration should be given to providing nursing homes access to test results available on electronic platforms, again to ensure a rapid turnaround time from time swab is taken to result receipt

Background

Respiratory viruses are responsible for a large number of outbreaks in nursing homes each winter. Early identification of outbreaks, as well as prompt implementation of control measures, are essential to minimise outbreak-associated morbidity and mortality. Early use (within 48 hours of symptom onset) of antivirals in COVID-19 and influenza outbreaks has been shown to reduce mortality and disease severity, as well as reducing influenza transmission and symptom duration in symptomatic individuals. Therefore, it is essential that nursing home teams are familiar with the appropriate respiratory virus testing pathway, in the event of a suspected acute respiratory infection (ARI) outbreak at their facility.

During the 2022/2023 winter season, the first multi-pathogen winter season including co-circulation of influenza, RSV, other respiratory viruses (ORV) and COVID-19, nursing homes used a variety of pathways to test for respiratory viruses when an ARI or influenza-like illness (ILI) outbreak was suspected. Some facilities were not clear on how to access swabs, where to send swabs for testing and how to access laboratory results. This impacted on the timely identification of pathogens and on the time sensitive use of antivirals.

In addition, during the summer of 2023, the Health Protection Surveillance Centre (HPSC) conducted a survey of testing practices for SARS-CoV-2, influenza, respiratory syncytial virus (RSV) and other respiratory viruses (ORV) in acute hospitals in Ireland. Thirty of 40 laboratories surveyed provided a response. Twenty-eight (93%) laboratories reported using multiplex RT-PCR testing for respiratory viruses, including 25 (83%) testing for all three of SARS-CoV-2, influenza, RSV, and 3 (10%) testing for both SARS-CoV-2 and influenza. The remaining two laboratories that provided a response have advised that multiplex testing for at least COVID-19 and influenza will be possible for winter 2023/24.

Given this information and to ensure the implementation of prompt outbreak control measures during the 2023/24 season, clear respiratory virus testing pathways for nursing homes are required. This document describes the current pathways and challenges identified by key stakeholders.

Aim

To describe the current pathways for nursing homes to test for respiratory viruses when they suspect an ARI/ILI outbreak at their facility.

Methodology

An email was sent to regional Consultants in Health Protection requesting an outline of the nursing home respiratory virus testing pathway in their region. Email replies from regional Health Protection teams were collated and analysed.

In addition, a short electronic survey was developed for Community Support Teams (CSTs) in each Community Health Organisation (CHO) requesting the following information regarding nursing home respiratory virus testing pathways in their CHO; swab access, pathogens tested for, transport of swabs, laboratory where test is undertaken, receipt of results and turnaround time for results, as well as a free text field for further comments. CSTs were asked to answer the survey once per CHO. Results of the survey were analysed in MS Excel.

Data collected from both data sources were merged to describe the current nursing home respiratory virus testing pathways nationwide.

Results

All six regional Public Health, Health Protection teams provided a response to the initial email requesting information on nursing home respiratory virus testing pathways.

Survey responses were received from CST teams in six of the nine CHOs. One CST completed the survey twice while another distributed the survey to a variety of healthcare facilities in their CHO including acute hospitals and nursing homes. Three CHOs did not complete the survey.

Results from Public Health, Health Protection teams

- Health protection teams working in the Dublin area (CHOs 6,7 and 9) reported that when an ARI/ILI outbreak is suspected, nursing homes in their areas send swabs to the NVRL for respiratory virus testing.
- Nursing homes in the Northeast (Cavan, Monaghan, Louth and Meath) in general also use NVRL as their testing laboratory, though often the nursing homes swabs are transported to the local acute hospital laboratory for onward transfer to NVRL. For urgent results, a small number of nursing home swabs will be tested onsite at the acute hospital laboratories in the Northeast, following discussion between Public Health consultants/specialists and the local Consultant Microbiologist.
- Nursing homes in the Northwest and Co. Mayo also use NVRL as their testing laboratory.
- In general, nursing homes located in the rest of the country (West (except Co. Mayo), Midwest, Southwest, South, Southeast and Midlands) send swabs to their local acute hospital laboratory for onsite testing. However, some of these acute hospital laboratories have limited capacity for testing nursing home swabs. Therefore, some excess swabs from counties Galway, Roscommon, Kerry and the Midlands are tested at NVRL. Figure 1

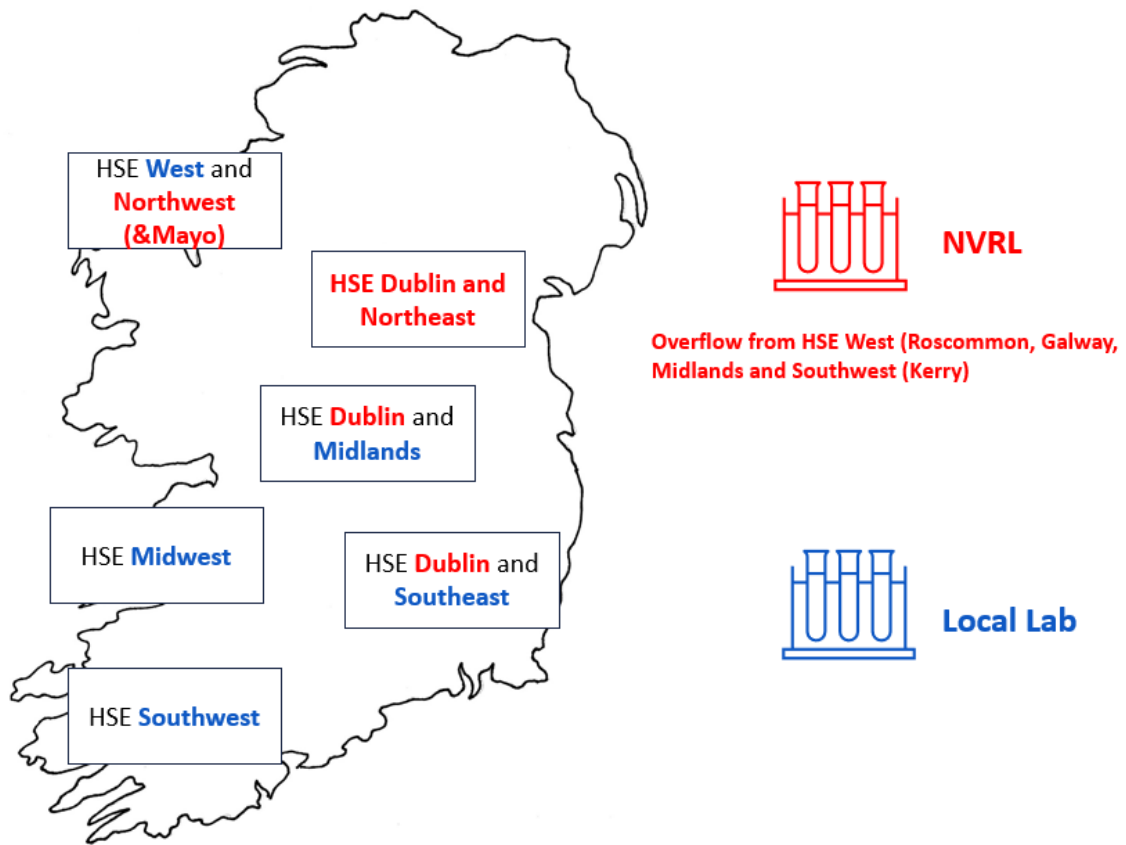


Figure 1 Location of laboratories used by nursing homes for respiratory virus testing, by HSE health region location of nursing home

Results from CST survey

All respondents reported that nursing homes in their region tested for multiple pathogens in a suspected ARI/ILI outbreak. CSTs reported that nursing homes **received swabs and laboratory forms** from several sources, most frequently NVRL (n=4), local laboratories (n=3) and GPs (n=3).

- Nursing homes located in the greater Dublin area (CHOs 6, 7, and 9) use Viral Transport Medium (VTM)/Copan swabs and send their swabs to NVRL for testing (n=3) using nursing home transport, taxis or couriers.
- Nursing homes in the West, Midwest and Midlands use lysis buffer swabs and in general send their swabs to the local acute hospital laboratory for onsite testing (n=3), using nursing home transport and taxis. Table 1

Table 1 Nursing home respiratory virus testing pathway by CHO, including requested pathogen test

	CST CHO 2	CST CHO 3	CST CHO 6	CST CHO 7	CST CHO 8	CST CHO 9
Swab and laboratory request form supply	Local laboratory, GP	CST	NVRL, GP	Local laboratory, NVRL, CST	Local laboratory, NVRL	NVRL, GP
Swab Type used	Lysis buffer	Lysis buffer or VTM/Copan swab	VTM/Copan swab	VTM/Copan swab	Lysis buffer	VTM/Copan swab
Requested pathogen test	COVID-19, Influenza AND RSV	COVID-19, Influenza AND RSV	COVID-19, Influenza AND RSV	COVID-19, Influenza AND RSV	COVID-19, Influenza AND RSV	COVID-19, Influenza AND RSV
Testing laboratory	Send to local laboratory for onsite testing	Send to local laboratory for testing on site	Send directly to NVRL	Send directly to NVRL	Send to local laboratory for testing on site	Send directly to NVRL
Swab transport method	Nursing Home transport	Nursing Home transport	Taxi	Nursing Home transport, taxi, courier	Taxi	Nursing Home transport

A variety of methods were used to access laboratory results. For some nursing homes pathways to access COVID-19 results differed from pathways to access other respiratory virus results in some instances. Phoning the laboratory was the most frequently used method to access respiratory virus results. Table 2 and 3

Table 2 Methods used by nursing homes to access respiratory virus test results

	Access to COVID-19 results	Access to influenza, RSV and other respiratory virus results
GP	3	3
Public Health	3	2
CST	1	0
Text message	3	2
Phone call	3	4
Postal service	2	2
Electronic records	1	0

Table 3 Methods used by nursing homes to access respiratory virus test results, by CHO

	CST CHO 2		CST CHO 3		CST CHO 6		CST CHO 7		CST CHO 8		CST CHO 9	
	COVID-19	ORVs	COVID-19	ORVs	COVID-19	ORVs	COVID-19	ORVs	COVID-19	ORVs	COVID-19	ORVs
GP	yes	yes	yes		no	no	no	no	no	yes	yes	yes
Public Health	no	no	yes		no	no	yes	yes	no	no	yes	yes
CST	no	no	no		no	no	no	no	no	no	yes	no
Text message	yes	yes	no		yes	no	yes	yes	no	no	no	no
Phone call	no	yes	no		yes	yes	yes	yes	yes	yes	no	no
Postal service	no	no	no		yes	yes	yes	yes	no	no	no	no
Electronic records	no	no	no		no	no	yes	no	yes	no	no	no

The **turnaround time** (TAT) from sending swabs to the laboratory for testing to receipt of COVID-19 results was in **general 24 to 48 hours**, though it was reported as longer by two CSTs (CHO 9 - 48 to 72 hours and CHO 6 – 72 to 96 hours). The turnaround time for receipt of influenza, RSV and other respiratory viruses test results was the same as that for COVID-19 results in most CHOs. **Table 4**

Table 4 Turnaround time for respiratory virus results by CHO and respiratory virus

	CST CHO 2	CST CHO 3	CST CHO 6	CST CHO 7	CST CHO 8	CST CHO 9
COVID-19	24 to <48 hours	24 to <48 hours	72 to <96 hours	24 to <48 hours	<24 hours	48 to <72 hours
Influenza, RSV and other respiratory pathogens	48 to <72 hours	Unknown	72 to <96 hours	24 to <48 hours	<24 hours	48 to <72 hours

CST teams reported the following in the additional comments field: SARS-CoV-2 antigen tests are widely used in nursing homes. There can be a delay in receiving results and the fact that NVRL does not operate on the weekend can further delay receipt of results.

Overview of nursing home respiratory virus testing pathway

Combining results from the correspondence from regional Public Health, Health Protection teams and the CST survey, **Figure 2** describes the nursing home respiratory virus testing pathways nationwide.

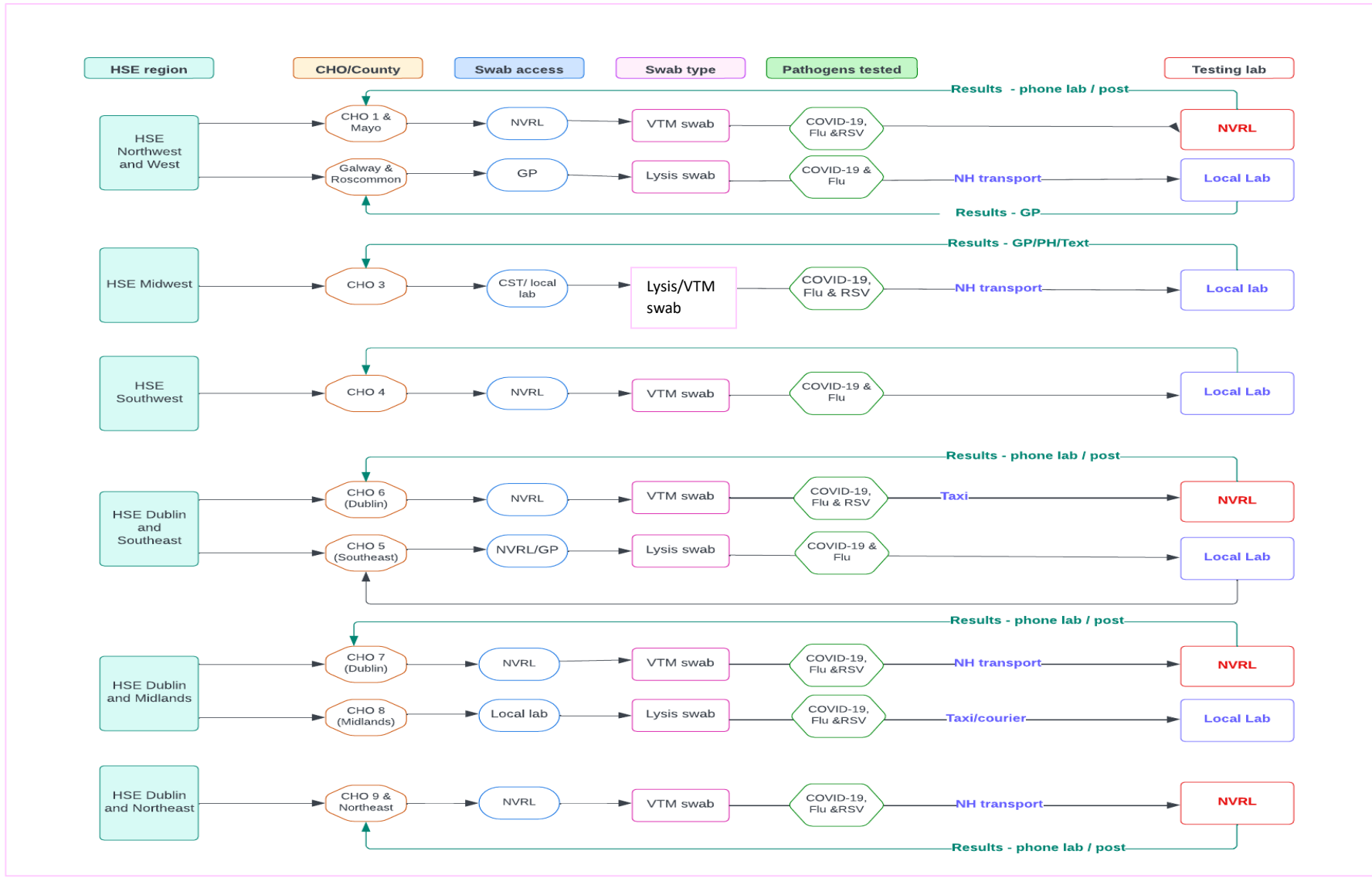


Figure 2 Nursing home respiratory virus testing pathways by HSE health region

Discussion

Nursing home respiratory virus testing pathways differ across the country. Broadly speaking there is a north-south divide:

- Nursing homes in the Northwest, Mayo, Northeast and Dublin use the NVRL as their testing laboratory. In general, nursing homes in these areas acquire VTM swabs from NVRL, send swabs to NVRL to be tested for COVID-19, influenza and RSV and receive the results using a variety of methods including, from the GP, by phoning the lab and by post.
- In contrast, nursing homes in the West, Midwest, South, Southwest, Southeast and Midland areas of the country use local laboratories as their testing laboratory. They acquire their swabs from the local laboratory, GP or CST, and send swabs to the local laboratory for onsite testing for COVID-19, influenza and RSV. Capacity in some of these local laboratories is limited and nursing homes in these areas rely on NVRL to process the overflow.

Encouragingly all respondents reported that nursing homes are requesting laboratories to test for multiple respiratory pathogens. During the pandemic, nursing homes were advised to test only for COVID-19. The HSE provided test kits and established testing pathways specifically for this purpose. The winter of 2022/2023 was the first winter when multiple respiratory viruses were in circulation, including COVID-19. Considerable efforts including: hosting webinars, presentations, and development of information materials, were made by regional Public Health Teams, COVID Response Teams and others to emphasise the need for nursing home teams to consider other, non-COVID-19, respiratory pathogens during winter 2022/2023. Winter 2023/2024 will be another multi-pathogen winter and multiplex testing for at least COVID-19, influenza and RSV will be important.

The survey results report that nursing homes **source microbiological swabs from a variety of sources** including GPs, local laboratories and NVRL. Public health teams and CSTs report that nursing home staff are often unsure as to what type of swab to use when testing for multiple respiratory viruses. Laboratories do not all use the same swab type and this can lead to confusion. During the pandemic, HSE provided lysis buffer swabs to test for COVID-19 and nursing home teams are familiar with these. Now however, VTM/Copan swabs are the swab type required by many local laboratories and NVRL. Central HSE swab supplies should reflect this change. Providing nursing homes with images of the correct swabs may also help to avoid confusion (see **Appendix A** for some images). Ideally nursing homes should have links to the local laboratory, where they can access the correct swab type used there and send their swabs for onsite testing there. As part of winter preparedness, it is also important that nursing homes **acquire a quantity of swabs at the start of the winter season for use when an ARI/ILI outbreak is suspected in the facility**: This will facilitate prompt diagnosis of the responsible pathogen and initiation of antivirals.

A large proportion of nursing homes nationwide, especially nursing homes in Dublin and the north of the country, rely on NVRL as their testing laboratory. This is, at least in part, due to testing capacity issues at local laboratories. A recent HPSC survey of laboratories across the country reported that only 12 of 30 laboratories that provided a response to the survey processed respiratory virus swabs from nursing homes. (Personal Correspondence; HPSC) While NVRL's primary function is that of a reference laboratory, during the pandemic a satellite NVRL laboratory at Backweston was stood up specifically for SARS-CoV-2 testing. The majority of community swabs including nursing home swabs were processed there. However, this satellite laboratory has now closed. NVRL advise that their capacity for respiratory virus multiplex PCR testing this winter using multiplex PCR is 200 tests per day, with additional surge capacity. It is not clear if this will be sufficient for the winter season surge.

Nursing homes in the West, Midwest, South, Southeast and Midlands use local acute hospital laboratories for the majority of respiratory virus testing. There are a number of advantages of a local testing pathway. For example, supplies of swabs can be acquired quickly as opposed to waiting for a postal delivery from NVRL. Additionally, while most CSTs reported relatively short turnaround times between sending swab for testing and receipt of results, there is a very short time window in which commencement of antivirals, both for treatment and chemoprophylaxis, is effective. Sending swabs to a local laboratory, as opposed to NVRL, should reduce turnaround times for some nursing homes, especially those outside Dublin.

In general nursing homes do not receive swab results electronically. GPs order the respiratory virus tests via their Healthlink account and receive the results electronically, again through their Healthlink accounts. Many nursing homes rely on phoning the laboratory to access results. This is not an efficient method of accessing results as frequently laboratory staff do not have time to answer the phone and multiple calls to the laboratory are required. NVRL advise that aside from sending results electronically via Healthlink, they routinely post results. Receiving results by post extends the turnaround time considerably, therefore nursing homes frequently phone the NVRL to receive results at an earlier stage. As highlighted, multiple phone calls are usually required which is not an efficient use of nursing home or laboratory staffs' time. **One consideration is to provide nursing homes with Healthlink accounts, which could facilitate more rapid receipt of results.** This was highlighted recently at a regular forum attended by HSE Community Support Teams (CSTs) and Nursing Home Ireland (NHI). However, implementation of such a plan is not straight forward for a number of reasons:

- Technical development to the functionality of Healthlink will be required. This is to allow GPs to order a test and indicate that in addition to receiving the result in their Healthlink account, a copy of the result should be sent to a second Healthlink account. i.e. the nursing home's Healthlink account. This functionality is possible in Healthlink but not currently available. This will ensure that clinical governance continues to be maintained while facilitating timely access to results for the nursing home
- Electronic patient system software in nursing homes may need to be compatible with Healthlink to allow for integration of results into patient files.
- There will be a cost to the health service to develop and implement this new process.
- The technical developments and process change outlined above will need to be agreed by all key stakeholders, namely GPs, laboratories, HSE eHealth team and nursing homes.

This study has a number of strengths. Information was collected from the key teams who support nursing homes during winter. In addition, responses were received from across the country, ensuring an understanding of the respiratory virus testing pathways for nursing homes nationwide. **A notable limitation of the study is that the survey was circulated to CSTs rather than individual nursing homes.** While more granular information may have been collected at nursing home level, it was felt that surveying CSTs would be more time-efficient and, as one of the primary roles of the CSTs is to support nursing homes in their area, CSTs would be able to provide comprehensive survey responses.

Conclusion and recommendations

In conclusion, there is a pathway for respiratory virus testing available to all nursing homes in Ireland when an ARI/ILI outbreak is suspected in their facility. Regarding the laboratory used by nursing homes for testing, a north-south divide is evident with nursing homes in Dublin, Northwest and Northeast using NVRL and nursing homes in other geographical areas using local laboratories. Challenges experienced by nursing homes include: uncertainty regarding procurement of swabs and swab type to use, issues relating to transport of swabs to testing laboratories, access to results and long turnaround times for receipt of results.

The following recommendations should be considered:

- Regional Public Health, Health Protection teams and CSTs should be familiar with the respiratory virus testing pathway for nursing homes in their region and should be able to advise the local nursing homes accordingly.
- Public Health, Health Protection teams, CSTs and nursing home teams should be clear as to where to access swab supplies and the correct type of swab to use for their local nursing home testing pathway.
- Nursing homes should be advised to have a supply of swabs at the start of the winter season and throughout the season to avoid the need to urgently source swabs when an ARI/ILI outbreak is suspected in their facility.
- Any central HSE supply of swabs should include a number of different swab types to ensure local laboratories and NVRL testing processes are covered.
- **Consideration should be given to a local respiratory virus testing pathway for nursing homes in all HSE regions.** This would require agreement from acute hospital laboratories, many of whom have cited capacity issues preventing them from processing local nursing home swabs. NVRL capacity could then be used for overflow and surge capacity requirements.
- Electronic reporting of results should be used as far as possible, to facilitate rapid receipt of results. **One consideration is the provision of Healthlink accounts to all nursing homes, in order for them to receive results in a timely manner.** Implementation of such a process will require planning and buy-in from key stakeholders.

Appendix A Swab types

Copan (VTM) swab



Figure A Copan (VTM) swab

Lysis swab



Figure B Lysis swabs