

# Revised SARS-CoV-2 genomic surveillance sampling framework

## Background

The national SARS-CoV-2 sequencing sampling framework has undergone revision. The new sampling framework (Tables 1 and 2) reflects: the changes in the requirements for SARS-CoV-2 sequencing at the regional, national and international level and the devolution of the National SARS-CoV-2 Whole Genome Sequencing (WGS) Surveillance Programme's work to 'business-as-usual'. International bodies now recommend the integration of surveillance activities for respiratory viruses and as such<sup>1</sup> the agreed new national SARS-CoV-2 sequencing sampling framework will be integrated into an overall Respiratory Virus Sequencing Sampling Framework document (under development). The WHO guidelines for integrated respiratory virus sentinel surveillance including suggested minimum target numbers for testing and sequencing for adequate coverage for countries to meet their primary surveillance objectives<sup>1</sup>.

The previous SARS-CoV-2 sequencing sampling framework ([version 2.0](#)) which was last revised in January 2024 was based on the ECDC 2022 guidelines 'Operational considerations for respiratory virus surveillance in Europe'<sup>2</sup>. Note: a revision of these ECDC Guidelines is due in the latter half of 2025.

The revised framework outlined here is based on a streamlining of target groups and a reduction in the frequency and volume of SARS-CoV-2 sequencing. In the event of an emerging variant of concern, an increase in the frequency and volume of sequencing as outlined in this document may be required, at relevant time periods as dictated by the epidemiological situation and required dynamic risk assessments e.g. increased risk of transmissibility/disease severity/immune escape.

## Objectives of SARS-CoV-2 sequencing in Ireland

1. Provide timely reporting on genomic epidemiology of SARS-CoV-2 viruses in Ireland to inform health service planning, public health policy and response and to inform local/regional/national outbreak and incident management
2. Monitor new variants/genetic changes (e.g. variants/mutations of concern) as they relate to transmissibility, severity, immune escape, and antiviral resistance
3. Provide up to date sequence information to inform vaccine composition, including vaccine match/mismatch and to monitor vaccine effectiveness against specific variants
4. To monitor the impact of new vaccines/immunisation programmes on the genomic epidemiology of SARS-CoV-2
5. To add to the global knowledge of SARS-CoV-2 biology and epidemiology, and timely sharing of genetic sequence data to international public repositories (e.g. GISAID)

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<sup>1</sup> <https://www.who.int/publications/i/item/9789240101432>

<sup>2</sup> [Operational considerations for respiratory virus surveillance in Europe - July 2022 \(europa.eu\)](#)

## Frequency and volume

A proposed minimum number of **12 SARS-CoV-2 specimens\* sequenced per month per laboratory** (Table 1), with an overall total for Ireland of **96 specimens sequenced per month and approximately 1200 per year** (covering seven spoke laboratories and the National Virus Reference Laboratory (NVRL)) should be sufficient to meet the agreed surveillance objectives and for the timely detection of SARS-CoV-2 variants circulating in Ireland. Laboratories may increase the number of samples sequenced in certain scenarios, for example to maximise efficiencies or in response to a local emerging situation.

In the event of an **emerging variant of concern**, if needed and based on a dynamic risk assessment by HPSC/NHPO, this number may be **increased to a minimum of 12 specimens sequenced per fortnight** during the initial period of a COVID-19 wave where the risk of increased transmissibility/disease severity/immune escape has increased. This frequency is not prescriptive however and can be increased as needed. Also, surge capacity via the NVRL will be available should there be any resource or capacity issues. In their capacity and remit as the National Virus Reference Laboratory, the NVRL may carry out additional sequencing activities.

\*note: specimens meeting the required Ct threshold for sequencing suitability

**Table 1: Proposed SARS-CoV-2 sequencing sampling volume and frequency**

| Laboratory                            | Year-round sequencing (min no. sequenced <i>per month</i> ) | Depending on situation if needed and based on dynamic risk assessment by HPSC/NHPO increase to (min no. sequenced <i>per fortnight</i> ) |
|---------------------------------------|-------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| NVRL                                  | 12                                                          | 12                                                                                                                                       |
| UHG                                   | 12                                                          | 12                                                                                                                                       |
| SVUH                                  | 12                                                          | 12                                                                                                                                       |
| Beaumont                              | 12                                                          | 12                                                                                                                                       |
| SJH                                   | 12                                                          | 12                                                                                                                                       |
| UHL                                   | 12                                                          | 12                                                                                                                                       |
| CUH                                   | 12                                                          | 12                                                                                                                                       |
| CHI Crumlin                           | 12                                                          | 12                                                                                                                                       |
| <b>Total per month</b>                | 96                                                          | 192                                                                                                                                      |
| <b>Annual Total</b>                   | 1152                                                        | ~1300 (includes 11 months at 12 per lab per month and one month at 24 per lab per month)                                                 |
| <b>Detection threshold per month*</b> | min 10%                                                     | min 5%                                                                                                                                   |

\*As per 'Operational considerations for respiratory virus surveillance in Europe', ECDC July 2022

**Table 2: Proposed SARS-CoV-2 Genomic Surveillance Sampling Framework Update**

| Group to be sequenced                                                                            | Considerations                                                                                                                                                                                                     | Sequencing laboratory                             |
|--------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|
| <b>Sentinel GP Surveillance</b>                                                                  | All Sentinel GP SARS-CoV-2 case positive specimens suitable for sequencing                                                                                                                                         | NVRL                                              |
| <b>Sentinel Severe Acute Respiratory Infection (SARI) surveillance</b>                           | All sentinel SARI SARS-CoV-2 positive case specimens suitable for sequencing                                                                                                                                       | SARI site laboratories<br>NVRL for surge capacity |
| <b>Hospitalised Cases</b>                                                                        | A proportion of specimens from laboratory confirmed COVID-19 hospitalised cases, including cases in individuals identified at increased risk of disease. This proportion can be less during peak epidemic activity | NVRL/SARS-CoV-2 Programme Spoke Laboratories      |
| <b>ICU cases</b>                                                                                 | All individuals positive for COVID-19 admitted to ICU due to COVID-19                                                                                                                                              | NVRL/SARS-CoV-2 Programme Spoke Laboratories      |
| <b>Deaths</b>                                                                                    | All/proportion of COVID-19 deaths (prioritising those where COVID-19 is the primary/contributing cause of death – if information is available)                                                                     | NVRL/SARS-CoV-2 Programme Spoke Laboratories      |
| <b>Outbreaks in health and care settings following public health risk assessment<sup>†</sup></b> | Up to 3 positive symptomatic suitable case specimens from each outbreak to be sequenced                                                                                                                            | NVRL/SARS-CoV-2 Programme Spoke Laboratories      |
| <b>Outbreaks in other at-risk settings following public health risk assessment<sup>†</sup></b>   | Up to 3 positive symptomatic suitable case specimens from each outbreak to be sequenced                                                                                                                            | NVRL/SARS-CoV-2 Programme Spoke Laboratories      |
| <b>New Variant of Concern<sup>‡</sup></b>                                                        | Surge capacity/escalation when new SARS-CoV-2 Variant of Concern (VOC) arises                                                                                                                                      | NVRL/SARS-CoV-2 Programme Spoke Laboratories      |
| <b>Wastewater Surveillance Programme</b>                                                         | SARS-CoV-2 sequencing included as part of National Wastewater Surveillance Programme                                                                                                                               | UCD/NVRL only                                     |

<sup>†</sup>Severe illness, high mortality, unexpectedly high attack rate

<sup>‡</sup>In addition, NVRL may decide to increase sequencing during the emergence of a new Variant Under Monitoring (VUM) or Variant Of Interest (VOI)