

Covid-19 Surveillance and Reporting Strategy for Ireland.

ECDC recently circulated draft “Covid-19 Surveillance Guidance”. In summary it states:

COVID-19 surveillance at EU/EEA level has three main objectives:

1. To monitor disease incidence by severity, in order to guide public health measures and to understand their impact;
2. To rapidly detect and monitor SARS-CoV-2 variants at the early stage of local circulation in order to rapidly assess their characteristics and to issue potential containment measures;
3. To support the monitoring of vaccine effectiveness in order to inform optimal vaccination programmes and strategies.

To achieve these objectives, surveillance systems should rely on both primary care (or other dedicated community-based settings where testing of suspect COVID-19 cases takes place) and secondary care systems. These systems could be complemented by additional surveillance systems or ad hoc studies/surveys depending on specific objectives (Table 1).

Table 1. COVID-19 surveillance objectives and systems

Objective	Surveillance system		
	Primary care/community-based setting	Hospitals	Other
1. Monitor disease			
Detect and quantify intensity of community circulation	Yes	If population-based, multiplier factors can be used to estimate incidence.	Periodic serosurveys (to monitor infection); Point prevalence surveys; Participatory surveillance methods
Monitor trends and characteristics of severe cases	No	Yes, better with SARI surveillance where suspect cases have equal chances of being tested. SARI surveillance in one pilot hospital (SVUH).	Ad hoc studies to assess risk factors for severity Mortality surveillance, including excess mortality monitoring
2. Detect and monitor viral changes			
Rapidly detect variants, trigger their assessment, and monitor their spread and trends	Comprehensive or a representative sample of specimens undergo sequencing. All sentinel GP SARS-CoV-2 specimens (CT<25) are sequenced.	Comprehensive sequencing is preferred to ensure detection of variants associated with severity or with vaccine breakthrough infections. SARI surveillance pilot in SVUH will include sequencing of all SARS-CoV-2 positive cases (with CT<25).	Targeted sampling (e.g. travellers at transportation hubs) to delay importation of variants that are not yet present in the national territory
3. Support monitoring of vaccine effectiveness (VE)			
Estimate and monitor VE	Yes, for VE against symptomatic infection	Yes, for VE against severe infection	Ad hoc studies to estimate VE in specific settings/populations and VE against infection.

COVID-19 surveillance is an essential component of the public health response to the COVID-19 pandemic. It provides timely and appropriate information to decision makers, healthcare professionals and the public on the current situation in relation to COVID-19. As the Public Health response to the pandemic moves to a phase of harm-reduction and mitigation, surveillance priorities will also change. Surveillance objectives in the next phase include:

1. Monitoring disease incidence and detection of changes in disease patterns
2. Monitoring disease severity and detecting changes
3. Monitoring circulating strains and detection of new variants
4. Monitoring vaccine uptake, impact and vaccine effectiveness
5. Monitoring the impact of the vaccination programme on the prevalence of antibodies against COVID-19 as an indicator of population level immunity by age, sex, and region over time.
6. Identification of emerging risk groups at increased risk

The surveillance systems through which these objectives will be met are described below and these will be modified according to this new ECDC Covid-19 Surveillance Guidance.

- **Laboratory confirmed COVID-19 cases:** COVID-19 is a notifiable infectious disease in Ireland and laboratories report positive SARS-CoV-2 results which are processed by Departments of Public Health/Robotic Process Automation solution into new events/cases or linked to existing events/cases as per the COVID-19 case definition. Basic demographic details are available on all cases e.g. age, sex, geographical location (CCA, County, HSE area and CHO), patient type at time of notification (Inpatient, A&E patient, GP patient etc.) and outcome (alive, died-see enhanced surveillance of deaths below). Therefore, during the next phase of the pandemic HPSC will be able to continue report on all confirmed cases COVID-19 by age, sex, geographical location and vaccination status. Prior infection history will be available from CIDR and reinfection rate though low, is an important marker to keep under observation.

1. Monitoring disease incidence and detection of changes

- **Sentinel surveillance of community COVID-19 cases** using the Irish sentinel GP network. This network was established in 2000 to monitor influenza-like illness (ILI) and other syndromic diseases. This system currently involves 60 GP practices nationally and covers approximately 6% of the national population. This scheme undertakes clinical and virological surveillance. Patients who present to participating GPs (via phone consultation) with clinical symptoms of COVID-19 (as per the Irish COVID-19 case definition www.hpsc.ie) are referred for a SARS-CoV-2 test and swabbed at a COVID-19 community testing centre. All patients that meet the EU/Irish influenza-like illness (ILI) case definition are swabbed for SARS-CoV-2, influenza, RSV and other respiratory viruses (ORVs). All sentinel GP specimens are referred to the NVRL or laboratories under the governance of the NVRL for PCR testing. All SARS-CoV-2 positive cases (with CT value <25) are sequenced. A report is produced on a weekly basis during the influenza season (early October to late May). In addition, **all** COVID referrals from sentinel GPs are monitored (IMOVE primary care risk factor study) on a weekly basis. A minimum dataset currently collected for these COVID referrals which includes variables on patient symptoms, date of illness onset, COVID vaccination status, influenza vaccination status, age, sex, underlying medical conditions, pregnancy, BMI, previous history of COVID infection, antiviral drugs. The validity of this system is dependent on moving from a self-referral testing approach to a clinician referral requirement for testing. This system would need to be reconfigured when GPs resume face to face

consultations and swabbing. Sentinel GP COVID-19 data will be linked to COVID-19 vaccination data (from the National COVID-19 immunisation system) in order to monitor COVID-19 vaccine effectiveness in primary care, as part of the European COVID-19 VE primary care study.

- **Surveillance of COVID-19 outbreaks**, using an agreed hierarchy of prioritisation as agreed with regional Departments of Public Health surveillance teams and HPSC and the corresponding outbreak-associated cases
- The **Waste-water Surveillance Programme** will continue. This system samples wastewater from 68 catchments areas (at least 2 in each country and covers all large urban areas) for the presence of SARS-CoV-2 RNA. This system is not dependent on health seeking behaviour or testing strategies. Detection of virus RNA in wastewater may be an early indicator of recirculation of the virus in an area. Research has shown that the amount of virus detected in wastewater correlates with the number of cases in the catchment area.

2. **Monitoring disease severity and detecting changes**

- **Enhanced surveillance of confirmed COVID-19 and influenza cases in ICU** using the existing influenza ICU surveillance network which was established during the 2009 influenza pandemic. This system was adapted and augmented to undertake surveillance of confirmed COVID-19 cases in ICU. For the future it is envisaged that the surveillance of influenza and COVID-19 cases in ICU will continue. This surveillance system involves all ICUs nationally (public and private hospitals) A comprehensive suite of enhanced surveillance data are collected on all ICU cases including patient demographics, diagnosis, vaccination status, clinical interventions e.g. ventilation, underlying medical conditions, clinical complications and outcome-
See <https://www.hpsc.ie/az/respiratory/coronavirus/novelcoronavirus/surveillance/> for more precise details on variables collected. HPSC works closely with the National Office of Clinical Audit in this regard.
- **Surveillance of COVID-19 hospital cases.** At present, CIDR has the capacity to provide basic demographic data on these cases. Enhanced surveillance of these cases to describe underlying clinical conditions, clinical interventions, vaccination status etc is dependent on infection prevention control resources in acute hospitals. Continuation of this enhanced surveillance may require additional resources and liaison with the acute hospital's division in HSE.
- **Enhanced surveillance of COVID-19 deaths**, continuing to use the basic demographic data (provided through laboratory notifications on CIDR) augmented by the General Register Office (GRO) data on deaths received on a daily basis. Variables collected include basic demographics, date of death, place of death, cause of death, patient's underlying clinical condition, HCW status, patient resided in RCF and vaccination status.
- **Excess mortality surveillance** HPSC receives daily mortality data from the General Register Office (GRO) on all deaths from all causes registered in Ireland. These data are used to monitor excess all-cause mortality as part of the European Mortality Monitoring Project (EuroMOMO), using the EuroMOMO algorithm. Weekly excess mortality reports are produced by HPSC.

- **SARI surveillance.** A Severe Acute Respiratory Infection (SARI) pilot surveillance project has been established in St Vincent's University Hospital (SVUH). This project was established as part of an ECDC/WHO SARI surveillance network. All SARI patients presenting to ED and hospitalised will be tested for SARS-CoV-2, influenza and RSV. All SARS-CoV-2 positive cases (CT<25) will be sequenced in the NVRL. Enhanced surveillance data on patient demographics, diagnosis, clinical interventions e.g. ventilation, underlying medical conditions, clinical complications and outcome will be collected. SARI data will be linked to COVID-19 vaccination data (from the National COVID-19 immunisation system) in order to monitor COVID-19 vaccine effectiveness (VE) in SARI patients, as part of the European SARI VE study.
- **Surveillance of COVID-19 outbreaks.** The morbidity and mortality of outbreak associated cases will be monitored.

3. Monitoring circulating strains and detection of new variants

- The **National Whole Genome Sequence (WGS) Surveillance Programme** will also continue, using the agreed sampling framework of COVID-19 cases which includes; sequencing a representative sample of community cases as well as targeted sequencing of key COVID-19 case categories. WGS will also be incorporated into the surveillance systems previously described.
- The **Waste-water Surveillance Programme** can also test for variants when virus RNA is detected
- All SARS-CoV-2 cases (with CT<25) identified through the Irish sentinel GP network and via the SARI surveillance project (in SVUH) will be sequenced in the NVRL, as detailed above.

4. Monitoring vaccine impact and vaccine effectiveness

- Data from the above surveillance system in combination with data linkage with COVAX will enable the monitoring of vaccine impact and the reporting of vaccination status and breakthrough infections. Vaccine effectiveness studies in primary care (via Irish sentinel GP network), acute hospitals (via SARI surveillance project in SVUH) and among healthcare workers will continue. These VE studies are part of European multicentre studies coordinated by ECDC (and Epiconcept).

5. Sero-epidemiology

Monitoring the impact of the vaccination programme and previous infection on prevalence of antibodies against COVID-19 as an indicator of population level immunity by age, sex, and region over time. **The National Sero-surveillance Programme**, working with the Irish Blood Transfusion Service is measuring seroprevalence (due to vaccination and infection) in blood donors, with the aim of detecting any waning immunity over time. Serosurveillance using residual specimens from primary care is now commencing, measuring both the extent of spread of infection in the population and the impact of the vaccination programme. The PRECISE HCW seroprevalence study is about to commence its third phase shortly.

6. Identification of emerging risk groups at increased risk

- ICU, hospital and death surveillance will be used to monitor for any emerging risk groups for infection or severe disease
- Sentinel GP and SARI surveillance projects will also be used to identify risk groups
- Ongoing surveillance of other key groups such as healthcare workers and vulnerable groups.

National surveillance outputs:

Throughout the pandemic, HPSC has provided a suite of epidemiology reports to stakeholders, informing national public health policy and providing valuable information for public health colleagues, the wider health service and the public. A variety of daily and weekly reports have been provided. As the pandemic moves to the next phase, COVID-19 epidemiology reporting will transition to align.

- Epidemiological reporting should move to a weekly basis. We propose a comprehensive weekly epidemiological report be produced in dashboard format, incorporating data from all the surveillance elements listed above. In addition, the HPSC COVID-19 dashboard would be updated on a weekly basis.
- Monitoring and reporting of vaccine uptake should continue, with a focus on areas or groups with lower vaccination rates. In addition, participation in ECDC coordinated vaccine effectiveness studies in primary care, acute hospitals and healthcare workers will also continue.