Chapter 4 Table of Contents

4 Surveillance, detection and situation monitoring

4.1 Overview

This chapter describes surveillance, detection and situation monitoring activities needed in preparing for a pandemic. Good surveillance is essential as an early warning system for the emergence of novel viruses, and also for identifying those most at risk of serious disease and death from the pandemic strain. This information will be used to identify vaccine and antiviral priority groups for early intervention. Detailed plans for situation monitoring reporting are essential so that absenteeism rates, occupancy by healthcare setting, essential supplies, consumption of antivirals and vaccines, and non health impact intelligence information will be available to those charged with managing and coordinating the response to the pandemic. Pandemic surveillance and situation monitoring planning needs to build on existing activities as well as introducing new sources and types of information that will be needed to monitor impact.

4.2 Introduction

Surveillance of influenza activity is important. It provides information on the prevalence of influenza in the community, including in select populations and groups; and on factors that may be involved in transmission. It can also be used to measure the efficacy of potential control measures. In the Northern Hemisphere (Europe, North America, Canada, Asia), community based surveillance of seasonal influenza and influenza-like illness (ILI) is conducted all year round with particular emphasis placed on the period from October (week 40) to May (week 20) when activity peaks. This involves surveillance of clinical conditions i.e. influenza-like illness (ILI) and also virological surveillance of laboratory confirmed cases of influenza.

During a pandemic, all experience of pandemic exercises and planning suggest that the requirements and expectations of influenza surveillance in the pandemic period will be considerably greater than during a normal influenza season. Surveillance may be expected to deliver reports that have

not been produced previously; reports that are far more timely and precise; and also to deliver parameters, which are outside the scope of routine seasonal surveillance. In particular, there will be increased requests for information from health and political decision makers and the media. In conjunction with this, the technical capacity to deliver even routine influenza surveillance data will be compromised by staff illness and increased workload.

The national influenza surveillance system, which monitors seasonal influenza, will be used to provide clinical and virological disease surveillance data needed to guide response efforts during a pandemic.

When a pandemic begins, enhancements will need to be instituted to improve demographic and geographical coverage, and to increase the amount of detail captured by particular components of the system. **The Expert Group advises that enhancements to the national influenza surveillance system should be designed and developed now during the pandemic alert period so that baseline data for interpreting information gathered during the pandemic will be available and users will have experience and familiarity with new methodologies.**

Testing the resilience of existing seasonal influenza surveillance, and further development and expansion of components of the surveillance system, are critical in order to strengthen surveillance capacity during a pandemic. A pragmatic approach to developing surveillance will however be needed e.g. it will be pointless to identify a desired surveillance output, which could not be delivered even in optimal conditions.

Situation monitoring reports may present even more of a challenge. Timely information that will be needed by health and policy decision makers on absenteeism, use of healthcare and other resources, are not currently collated rapidly nationally, and procedures to collate, analyse and report on this key information are not currently in place. This will require unprecedented efforts both within the health system, and also cross sectorally to achieve this. Appropriate monitoring systems to assess the health and non-health impact

and need for resources during the pandemic are needed. **The Expert Group advises that template situation reports should be developed now in the pandemic alert period so that situation monitoring information requirements are identified and sourced in advance of the pandemic.**

Pandemic influenza surveillance objectives:

The objectives of pandemic influenza surveillance are summarised here, and described in more detail in the subsequent sections by WHO and Irish pandemic alert phases. These objectives are:

1. To serve as an early warning system to detect increases in ILI[1] in the community
2. To rapidly detect the introduction and early cases of a novel influenza virus or strains with pandemic potential, to assess the extent of human to human transmission and determine pandemic risk
3. To monitor the epidemiology, morbidity and mortality caused by pandemic influenza and from this to identify populations, which are severely affected, and to whom interventions can be targeted.
4. To track the pandemic virus's introduction into local areas
5. To monitor changes in the pandemic virus, including development of antiviral resistance

During a pandemic, virological and clinical surveillance data, supplemented by data from outbreak investigations and special studies, can help decision makers identify effective control strategies and re-evaluate recommended priority groups for vaccination and antiviral therapy. They can also facilitate efforts to mathematically model disease spread during the pandemic.

Outbreak investigations and special studies e.g. to address questions related to viral transmission or the clinical course of disease may include the following:

[1] * Influenza-like illness (ILI) is defined as the sudden onset of symptoms with a temperature of 38^0C or more and two or more of the following: headache, sore throat, dry cough and myalgia.

- Early on, studies of humans who are in close contact with animal reservoirs or human cases in the case of the pandemic, to assess both cross-species transmission and subsequent human-to-human transmission. Such studies detect sub-clinical, asymptomatic cases.
- Studies to determine the impact of antiviral drugs and the evolution of resistance
- Studies to measure the impact of social distancing measures and the behaviour of individuals during an outbreak.
- Telephone surveys for the impact of pandemic i.e. morbidity and burden of illness measured by use of healthcare services and absenteeism from work and school.

The European Centre for Disease Control (ECDC) is reviewing and consulting with Member States on surveillance activities to be carried out during the pandemic. This includes the likelihood that ECDC will issue calls for tender to develop protocols for surveillance of antivirals and vaccine effectiveness, side effects and toxicity within the EU.

The Expert Group advises that Ireland supports ECDC now during the pandemic alert period in its call for tender to develop protocols for surveillance of antivirals and vaccine effectiveness, side effects and toxicity within the EU

Pandemic Influenza Situation Monitoring objectives:

The objectives of pandemic influenza situation monitoring are summarised here, and described in more detail in the subsequent sections by WHO and Irish pandemic alert phases. These objectives are:

1. To assess on a timely basis the impact of the pandemic and resource needs during the pandemic, in health and in the wider public system.
2. To provide regular up to date summarised information including information on absenteeism, use of healthcare resources (beds, staff, supplies etc) and other resources (food supply, fuel etc) for use by the

National Public Health Emergency Team (NPHET) and the HSE National and Area Crisis Management Teams.

4.3 Situation monitoring and surveillance requirements by WHO and Irish Alert Phases

The WHO Global Influenza Preparedness Plan outlines situation monitoring and assessment objectives, and actions that countries should be undertaking by pandemic phase.[(1)] This approach will be used when examining the objectives and actions needed in Ireland.

Pandemic Alert Period: WHO Phase 3 (current situation)

4.4 National objectives

Surveillance

1. To have available up to date information on trends in human infection with seasonal strains of influenza
2. To be able to detect animal and human infections with new influenza virus strains, identify potential animal sources of human infection and assess the risk of transmission to humans.
3. To report information internationally to WHO rapidly

Situation monitoring

4. To develop plans for ongoing assessment of impact and resource needs during the pandemic

There are several systems in place in Ireland that can meet most of the objectives above.

A. The Irish national influenza surveillance system meets objective one.

B. National human virological surveillance and national reporting of clusters of unusual illness are in place, as well as veterinary surveillance and protocols for assessment, investigation and reporting of avian influenza outbreaks in Ireland. Mechanisms are in place for rapid international alerting of the detection of novel viruses. These systems meet objectives two and three.

C. The health system has initiated work on identifying and monitoring resource needs during a pandemic. This partly addresses objective four.

Each of these systems will now be described briefly.

4.5 The National Influenza Surveillance System

The Health Protection Surveillance Centre (HPSC) maintains and co-ordinates the national influenza surveillance system, which monitors disease activity during interpandemic influenza seasons and identifies circulating influenza viruses. This is done in collaboration with the National Virus Reference Laboratory (NVRL) and the Irish College of General Practitioners (ICGP).

The components of the national influenza surveillance system include:

1. Reporting of clinical data/influenza-like illness (ILI) by sentinel GPs
2. Virological reporting (NVRL)
3. Hospital surveillance comprising weekly data on total admissions, total Emergency Department (A&E) admissions and total respiratory admissions (upper respiratory tract infection, lower respiratory tract infection, pneumonia, asthma, chronic bronchitis, and exacerbations of chronic obstructive pulmonary disease) from sentinel hospitals
4. Surveillance of absenteeism rates in sentinel schools
5. Reports on outbreaks due to influenza or ILI
6. Mortality data (weekly review of all cause and pneumonia and influenza registered deaths (uncoded)) from the General Registrar's Office (GRO)
7. Weekly regional influenza indices based on clinical activity, virological activity and outbreak activity. This is defined as no report, no activity, sporadic activity, localised activity, and widespread activity. (Appendix A).

These components help to determine when, where and which influenza viruses are circulating; details of the various types of disease surveillance; and provide an overall national level assessment of influenza activity. They are described in more detail in Appendix B.

Mortality data is potentially a very important source of information during a pandemic, and the quality of the information provided from the General Registrar's Office is good. However the main difficulty is the timeliness of registration of deaths. Up to December 2005, there was a requirement to register a death within five days of its occurrence. The legislation then changed to allow persons to register deaths up to three months following death, thus potentially limiting the value of this data source as a timely early warning of the impact of the pandemic. **The Expert Group advises that consideration should be given to reviewing the Civil Registration Act, with a view to shortening the timeframe for death registration to five days, so that timely mortality surveillance during the pandemic can be achieved**.

In Europe, the surveillance of ILI and influenza is presently co-ordinated by the European Influenza Surveillance System (EISS). Ireland participates in EISS.

4.6 National human virological surveillance, national veterinary Avian Influenza (AI) surveillance

4.6.1 Monitoring for novel strains of influenza

During the pandemic alert period enhanced surveillance to identify patients at increased risk for infection with a novel influenza virus is being implemented. Novel influenza strains include avian influenza (influenza A/H5N1) that can infect humans, other animal influenza viruses that can infect humans or new or re-emergent human influenza strains that cause cases or clusters of human disease.

There are national, European Centre for Disease Prevention and Control (ECDC) and WHO case definitions and criteria for cases of avian influenza A/ (H5N1). Ireland is using the WHO case definition. (Appendix C) Guidance on the screening, detection, reporting and surveillance of persons potentially infected with avian influenza A/ (H5N1) has been circulated to the health system and is available in Supplement 11.

4.6.2 Reporting of novel strains

Clinicians should immediately contact the Medical Officer of Health (MOH) once they suspect a human case of infection with an avian or animal strain of influenza virus or with any other novel human influenza virus strain. Following epidemiological and laboratory investigation HPSC will report probable and confirmed cases to ECDC and to WHO. HPSC has been nominated as the National Focal Point for the new International Health Regulations, which have been implemented (Sept 2006) for avian and pandemic influenza. These regulations require countries to rapidly investigate and report internationally any public health emergency of international concern, and also to rapidly disseminate within the country any information relating to a public health emergency of concern that has arisen abroad.

4.6.3 Veterinary Surveillance

The Department of Agriculture, Fisheries and Food (DAFF) (in collaboration with the poultry industry and Birdwatch Ireland) undertakes active and passive surveillance for avian influenza in wild birds and poultry. This is outlined in detail in Chapter 11. Notification procedures have been agreed between the Department of Agriculture, Fisheries and Food and the HSE in the event of avian influenza being identified or highly suspected.

4.7 Plans for situation monitoring during the pandemic

As well as information on the epidemiology of the disease in terms of who is most at risk, locations where outbreaks are occurring, morbidity in those affected, and response to interventions etc, considerable additional information will be needed to monitor the situation. **The Expert Group advises that systems are put in place in the pandemic alert period to**

ensure availability of the following types of situation monitoring information:

- **Daily health, and other essential sector absenteeism and availability rates**
- **General workplace absenteeism rates**
- **School absenteeism rates**
- **Daily bed occupancy, admissions, attendances by flu care setting, mortuary capacity etc**
- **Real time monitoring of essential supplies and resources**
- **Consumption, uptake and impact of antivirals, vaccines and other countermeasures**
- **Vaccine and antiviral efficacy, safety and emergence of antiviral resistance**
- **Non health impact e.g., status on fuel, food supply, maintenance of essential services**

Pandemic alert period: WHO Phases 4 and 5

4.8 National objectives

Surveillance

1. To assess the extent of human-to-human transmission and determine pandemic risk
2. To detect, notify and characterise additional clusters (including the identification of risk factors and other data concerning transmission as requested by WHO).
3. To assess the threat to human health and the impact of any control measures

Situation monitoring

4. To identify resources required for enhanced control.
5. To determine and monitor public health resources required for pandemic response

If, as is likely, Ireland is not an affected country at WHO Phases 4 and 5, then the actions needed are to enhance surveillance to the maximum extent in order to detect any possible cases that might be imported into the country. The methods are the same as those described at Phase 3.
If however, Ireland is an affected country, then the surveillance and protocols described for Phase 3 need to be implemented fully, and in addition, the following should be done:

- Attempt to assess the impact of containment measures via epidemiological investigation of cases and contacts, and review and refine the case definition
- Enhance surge capacity for surveillance
- Assess the sustainability of human-to-human transmission
- Report cases internationally
- Adjust modelling forecasts of the likely impact of both infection spread and control measures, using data from real cases
- Monitor the development of antiviral resistance

HPSC will coordinate the national epidemiological investigation, reporting and modelling work. The NVRL will analyse samples from potential cases and when appropriate monitor for development of antiviral resistance. The health system will develop public health surge capacity plans to cater for the considerable public health requirements during these phases.

The system will need to put in place the mechanisms to determine and monitor the public health resources required for pandemic response

Also, during WHO Phase 4 and 5 it will be important to monitor the global situation (vaccine, antiviral availability, best practice recommendations) and estimate the impact of antiviral programmes (and vaccination programmes if used) elsewhere.

Pandemic period: WHO Phase 6

4.9 National objectives

Surveillance

1. To monitor the epidemiological, virological and clinical features of the pandemic at the national level, in order to forecast trends, identify those most at risk, and hence indicate where interventions could be targeted

Situation Monitoring

2. To monitor the impact of the pandemic, and to assess the use and effectiveness of interventions used, in order to guide future actions and optimise the use of finite resources

4.10 Early – Ireland not yet affected

Initiate enhanced surveillance and laboratory testing procedures to detect any possible early imported cases. Guidance for surveillance and laboratory procedures are outlined in Appendix D.

4.11 Once Ireland is affected (Irish alert level 2, 3 and 4)

As soon as the first cases of pandemic influenza are detected in the country the surveillance activities will be focused on detecting community outbreaks, tracking trends in influenza disease activity and identifying populations that are severely affected. Real-time reporting between healthcare institutions, clinicians and public health will be crucial in order to obtain daily influenza information. It will also be important to monitor the pandemic's impact on health, the health system, and on society.

4.11.1 Surveillance activities

The Expert Group advises that enhanced (detailed case based) surveillance be undertaken on all initial cases of pandemic influenza in order to describe accurately the epidemiology of the disease, the clinical features and outcome. This information will be used to guide policy decisions regarding priority groups for interventions.

The enhanced surveillance and case management database facility in the national electronic database Computerised Infectious Disease Reporting (CIDR) can be used to identify initial cases and track initial geographic spread. For case/contact management to be effective:

- The MOH should be notified immediately of all cases fulfilling the agreed case definition.
- Surveillance data should be reported on a daily basis as required by all partners
- HPSC should collate and disseminate case data nationally and internationally to ECDC and WHO.
- Clinicians and general practitioners should also be encouraged to report any unusual clusters of cases of influenza-like illness or other acute respiratory illness to the Department of Public Health
- Pathologists should be asked to notify any deaths due to unusual causes or any clusters of unexplained deaths to the MOH

This initial detailed case based data should be used as the main means to clarify the epidemiology, age specific incidence, clinical presentation, outcome and virological features of the pandemic virus.

Once the numbers of cases increase and disease activity becomes widespread, detailed enhanced surveillance for all cases should discontinue and the focus should move to more standard data collection, which will provide information on age groups affected, and on morbidity and mortality. HPSC will advise on the timing of this change. Further work is needed on how best to sustain this activity which will be needed throughout the pandemic period.

There is currently is no electronic contact tracing system in place in Ireland, to facilitate contact tracing and management. **The Expert Group advises that a national electronic contact tracing system for monitoring and managing initial contacts of patients with pandemic influenza be developed**.

4.11.2 Maintain GP sentinel surveillance

The Expert Group advises that during the pandemic it will be important to maintain weekly GP sentinel surveillance of the community incidence of ILI and influenza. The existing system uses computerised practices and is fairly highly automated and robust, thus facilitating its continuation during the pandemic. In addition, it is proposed that the planned development to use CIDR for sentinel surveillance will facilitate further automation and assist in increased geographical completeness, frequency of reporting and sustainability of ILI data. Currently it is proposed that reporting from sentinel GPs will continue on a weekly basis during a pandemic. This will allow ongoing measurement of the age specific incidence during the pandemic. The weekly reports will combine this data with all virology results from the NVRL (sentinel and non sentinel) to provide an up to date epidemiological picture.

4.11.3 Continue and strengthen monitoring of hospital admissions in sentinel hospitals to estimate morbidity and impact

Data on age specific hospitalisation rates for influenza will be needed on a frequent basis nationally and regionally in order to monitor disease severity and to determine the most severely affected age groups. At present surveillance of data in relation to hospitalisations associated with influenza is limited to sentinel hospitals (nine nationally) and is not timely. This system is being strengthened at present, and will serve as the means for measuring age specific hospitalisation rates for influenza in sentinel hospitals during the pandemic. Alternative methods will need to be considered for measuring hospital admissions overall, as a measure of impact.

The Expert Group advises that the existing sentinel system for surveillance of influenza in hospitals be improved so that it will have the capacity to provide robust age specific hospitalisation rates for influenza in sentinel hospitals during the pandemic.

The Expert Group advises that a system for active hospitalisation surveillance including virological investigation of a subset of hospitalised patients in all age groups in a limited number of sites be

developed. This method will also be developed for bacterial super infection surveillance.

Additional types of hospital surveillance are currently under review, including:

- Emergency Department surveillance of ILI and acute respiratory infection
- ICU occupancy with influenza/pneumonia cases
- Surveillance of age profile, risk factors, and clinical outcome in a subset of ICU admitted patients
- Mortality surveillance in hospital

4.11.4 Continue Mortality surveillance

The Expert Group advises that weekly mortality surveillance reporting be continued and supported during the pandemic. If timely death reporting is reintroduced, as advised by this Group, GRO based mortality data will be used to help monitor the severity of the pandemic and to determine the areas and age groups in which the highest mortality rates are occurring. This data, which will be analysed and reported on weekly by HPSC, will guide decisions on control and response measures. It will be important during the pandemic that death registration is viewed as essential work that will need to be maintained, and that relatives are encouraged to register deaths promptly.

4.11.5 Implement surveillance surge capacity plans

There is a need to ensure that surveillance activities continue during the pandemic, as the information provided will be essential to an appropriate response. This information for action will allow decisions to be made that will save lives and trigger essential actions. As there will be massive demands within the system, and more immediate activities may seem more relevant locally to response, these activities must be planned for and protected. Therefore, **the Expert Group advises that the system plans for surge capacity for surveillance and that it ensures that adequate resources (personnel and financial) are allocated to these tasks.**

If the surveillance activities outlined above are implemented, they will provide information on the impact of the pandemic in terms of age specific incidence rate of ILI in the community, hospitalisations for respiratory illness, ICU admissions for influenza and the morbidity, clinical outcome and risk factors associated with illness for a subset of these patients, as well as mortality by location and age group.

4.11.6 Virological surveillance

Virological surveillance of influenza will enable detection of the introduction and early cases of a pandemic influenza virus in Ireland, including tracking the virus's introduction into local areas and monitoring changes in the pandemic virus including development of antiviral resistance.

There will be a need to rapidly and accurately identify the influenza type and to subtype influenza A virus haemagglutinin to determine whether it is the pandemic strain. Hence it is important that tests with high sensitivity and specificity are used in order to ensure accurate identification of the strain.

During the pandemic the volume of requests for laboratory testing is expected to increase dramatically. The most intense testing will be required during the early stages of the pandemic, when detecting the introduction of the virus into the country is the primary objective. In an area with known high pandemic activity, diagnostic testing will usually not be needed at all.

However, highly accurate testing is still necessary whenever pandemic activity is detected in a previously unaffected area or when it is critical to the management of individual patients or in the public health management of the pandemic. Throughout this period, there may be ongoing cell culture of a proportion of samples at the NVRL in order to allow antigenic and genetic monitoring of the strain. During the late phases of the pandemic, there will be a return to the routine testing so that the end of the pandemic can be confidently identified.

The NVRL is responsible for initial identification and characterisation of novel influenza strains. If however numbers increase, other laboratories have been identified to supplement the diagnostic testing for the pandemic strain. The NVRL will be the agency at a national level to decide on the introduction of new diagnostic assays and remain responsible for resistance testing and detailed analysis of resistant strains. A protocol for the involvement of other laboratories in diagnostic testing is being developed by an operational laboratory implementation committee within HSE.

***Note*:** During a pandemic as the burden of disease increases and health services and public health face multiple competing demands, it might be necessary to adjust surveillance strategies and to reassess the need for daily reporting from the laboratory. Reporting on the pandemic virus will be via CIDR.

If the care settings differ from usual care settings during the pandemic, e.g. with use of telephone triage etc., then the feasibility of surveillance in these settings should also be considered and planned for.

4.12 Situation monitoring during the pandemic

The situation monitoring information requirements to be planned in Phase 3 now need to come into operation. The situation monitoring information needs include:

- Daily health, and other essential sector absenteeism and availability rates
- General workplace absenteeism rates
- School absenteeism rates
- Daily bed occupancy, admissions, attendances by flu care setting, mortuary capacity etc
- Real time monitoring of essential supplies and resources
- Consumption, uptake and impact of antivirals, vaccines and other countermeasures

- Vaccine and antiviral efficacy, safety and emergence of antiviral resistance
- Non health impact e.g., status on fuel, food supply, maintenance of essential services

The Expert Group advises that standardised situation reports, which are customised for each organisation that is responding to the pandemic, and which contain appropriate and relevant up to date information, are used during the pandemic.

4.13 References

1. WHO. WHO Global Influenza Preparedness Plan. www.who.int . 2005.

2. Kyncl J, Prochazka B, Goddard NL, Havlickova M, Castkova J, Otavova M et al. A study of excess mortality during influenza epidemics in the Czech Republic 1982 - 2000. Eur J Epidemiol 2005; 20:365-371.

3. Centers for Disease Control and Prevention. 122 Cities Mortality Reporting System. Manual of Procedures. 2004. Atlanta,USA.

4.14 Appendix A: Influenza Activity Index

The influenza activity index is based on weekly data on influenza-like illness, laboratory confirmed cases of influenza, and/or outbreaks associated with influenza/influenza-like illness. The index is analogous to that used by the WHO global influenza surveillance scheme and the European Influenza Surveillance Scheme www.eiss.org. The index (0-5) is described in Table 1.

Table 1: Irish Influenza Activity Code, Name and Description

Index Code	**Index Name**	**Index Description***
0	No Report	No reports received.
1	No Activity	No ILI or laboratory confirmed influenza cases and no influenza/ILI outbreaks in a HSE-Health Area.
2	Sporadic Activity	Isolated case(s) of ILI or laboratory confirmed influenza case(s) in a HSE-Health Area, or an influenza/ILI outbreak in a single institution.
3	Localised Activity	Increases in ILI in local areas (such as a city, county, or district) within a HSE-Health Area, or outbreaks in two or more institutions within an area, with laboratory confirmed cases of influenza infection. Levels of activity in the remainder of the HSE-Health Area would be sporadic or have no activity.
4	Regional Activity	Increases in ILI in one or more regions with a population comprising less than 50% of the HSE-Health Area's total population, with laboratory confirmed influenza cases in the affected region(s). Levels of activity in the remainder of the HSE-Health Area would be sporadic or have no activity.
5	Widespread activity	Increases in ILI in one or more regions with a population comprising 50% or more of the HSE-Health Area's total population, with laboratory confirmed influenza infections.

*ILI=Influenza-like illness

4.15 Appendix B: The National Influenza Surveillance System

The Health Protection Surveillance Centre (HPSC) maintains and co-ordinates the national influenza surveillance system, monitors disease activity during interpandemic influenza seasons, and identifies circulating influenza viruses, in collaboration with the National Virus Reference Laboratory and the Irish College of General Practitioners (ICGP).

The objectives of seasonal influenza surveillance are outlined as follows:

1. To serve as an early warning system to detect increases in ILI[2] in the community
2. To monitor the morbidity and mortality caused by seasonal influenza including monitoring trends in influenza disease activity and identifying populations, which are severely affected.
3. To identify and characterise influenza viruses that are circulating; Note: Each season these data are used for updating the formulation of the next season's vaccine

The role of HPSC as influenza surveillance co-ordinator is to:

1. Maintain and develop the current sentinel influenza surveillance network
2. Oversee enhancements as outlined e.g. year round surveillance, surveillance of hospitalised cases.
3. Promote year round surveillance of influenza
4. Maintain close working relationship with the National Virus Reference Laboratory (NVRL) and the Irish College of General Practitioners (ICGP).

The components of the national influenza surveillance system include:

8. Reporting of clinical data/influenza-like illness (ILI) by sentinel GPs

[2] * Influenza-like illness (ILI) is defined as the sudden onset of symptoms with a temperature of 38^0C or more and two or more of the following: headache, sore throat, dry cough and myalgia.

9. Virological reporting (NVRL)
10. Hospital surveillance comprising weekly data on total admissions, total Emergency Department (A&E) admissions and total respiratory admissions (upper respiratory tract infection, lower respiratory tract infection, pneumonia, asthma, chronic bronchitis, and exacerbations of chronic obstructive pulmonary disease) from sentinel hospitals
11. Surveillance of absenteeism rates in sentinel schools
12. Reports on outbreaks due to influenza or ILI
13. Mortality data
14. Weekly regional influenza indices based on clinical activity, virological activity and outbreak activity. This is defined as (no report, no activity, sporadic activity, localised activity, widespread activity). (Appendix A).

These components help to determine when, where and which influenza viruses are circulating; details of the various types of disease surveillance; and provide an overall national level assessment of influenza activity.

4.15.1 Reporting of clinical data by sentinel GPs

In Ireland clinical surveillance of ILI and influenza is conducted by sentinel general practices distributed throughout all HSE areas. At present 52 general practices (comprising116 general practitioners) participate which cover over 4.8% of the population (2006 census). These GPs report, on a weekly basis, the number of flu-like illnesses seen (defined as the sudden onset of symptoms with a temperature of 38^0C or more and two or more of the following: headache, sore throat, dry cough and myalgia) and include date of birth, sex, the date of consultation and the diagnosis. Virological confirmation is sought by supplying combined nose (preferably nasopharyngeal swabs) and throat swabs on at least one patient in whom ILI was diagnosed from each practice per week.

ILI surveillance is undertaken all year round with weekly reports produced by HPSC between weeks 40 (October) and 20 (May) and monthly reports produced from June through to September. Year round surveillance during the summer provides information on the baseline level of influenza activity

during the summer and these data have the potential to become an important component in the surveillance of novel strains of influenza e.g. influenza A (H5N1) or in the early detection of a pandemic.

This is a collaborative project between ICGP, NVRL, HSE Departments of Public Health and HPSC. HPSC is the co-ordinating centre for all these data. In Europe, the surveillance of ILI and influenza is presently co-ordinated by the European Influenza Surveillance System (EISS), though it is moving to ECDC later in 2008.

4.15.2 Virological Reporting

Year-round virological monitoring for influenza in Ireland is undertaken by the NVRL in the form of routine detection of influenza viruses. The NVRL is a member of the WHO Global Influenza Surveillance Network. The aim of this laboratory network is to monitor influenza trends and to compare seasonal differences rather than to record all influenza tests performed.

Data obtained on virological specimens include sex, date of birth, date of onset of illness, dates sample taken and received, vaccination status, test applied, brief clinical history and history of antiviral drug use in the previous 14 days. For any confirmed positive sample, preliminary sequence analysis and virus characterisation occurs at the NVRL. When appropriate the isolate and viral sequences are referred to the WHO Collaborating Centre, London, UK for further characterisation.

4.15.3 Hospital Surveillance

There are 10 sentinel hospitals throughout the country, which monitor the following on a weekly basis: Total admissions, total A&E admissions and total respiratory admissions. Ideally, sampling for influenza virus should also be carried out in these populations. These data are reported to HPSC on a weekly basis between weeks 40 and 20. It is proposed to extend this to year-round surveillance.

Enhanced surveillance is also undertaken on all children aged 14 years and under who are hospitalised with influenza (probable or confirmed). This surveillance examines clinical presentation and complications, risk factors, vaccination and outcome status.

4.15.4 Surveillance of absenteeism rates in sentinel schools

The sentinel school network monitors absenteeism rates in both primary and secondary schools between weeks 40 and 20. This network represents approximately 1% of the school population in Ireland. HSE Departments of Public Health collate data on weekly absenteeism rates for the sentinel schools. These data comprise the average number of pupils absent on a given week. If more than 10% of the school's population is absent on any one day in the week for any cause this should be recorded. These data are collected and combined with data from hospitals and nursing homes in each HSE Department of Public Health area to allow assessment of the impact of influenza on the community and the health services.

4.15.5 Surveillance of outbreaks due to influenza or ILI

Under the Infectious Diseases (Amendment) (No.3) Regulations 2003 (SI No.707 of 2003) medical practitioners and clinical directors of laboratories are required to notify to the Medical Officer of Health (MOH) any unusual clusters or changing pattern of illness, and individual cases thereof, that may be of public health concern. This would include outbreaks of influenza or ILI. These data are notified to HPSC who include them in the weekly influenza surveillance report. Most of these outbreaks to date have been identified in schools or residential settings e.g. nursing homes for older people.

4.15.6 Mortality Surveillance

Since December 2004, HPSC has received a weekly electronic file from the General Registrar's Office (GRO) on all causes of death in the previous week. HPSC checks the number of deaths caused by influenza on a weekly basis. However, this is not an accurate estimate, as the literature would indicate that influenza as a cause of death is under reported.[(2)]

Currently a pilot study is underway exploring the benefits of using these data. It is proposed to use these data in future to estimate excess deaths from pneumonia and influenza (P&I). A model to estimate baseline and excess thresholds for P&I deaths will be developed thus allowing for the detection of excess deaths due to P&I which is a proxy for increased influenza activity. This is similar to the 121 City Mortality System, which is used by the Centres for Disease Control in Atlanta (USA).[3] However, several years data are required in order to calculate the thresholds and at present, there are only two years data available. The Central Statistics Office (CSO) collects mortality data, however, these data are not available for at least 6 to 12 months after the date of death and so are not sufficiently timely for this purpose.

4.15.7 Regional influenza activity by HSE area

Weekly regional influenza indices based on clinical activity, virological activity and outbreak activity. This is defined as no report, no activity, sporadic activity, localised activity, and widespread activity. (Appendix A).

4.15.8 Weekly Notifications of Influenza

Under the Infectious Diseases (Amendment) (No.3) Regulations 2003 (SI No.707 of 2003) medical practitioners and clinical directors of laboratories are required by law to notify to the MOH a list of 77 notifiable diseases, one of which is influenza.

However, while influenza is notifiable, it is not possible to provide an absolute case count for influenza or to determine population-based rates of infection or illness on a national level because many infected persons are asymptomatic or experience only mild illness and do not seek medical care.

Nevertheless the national influenza surveillance system comprising weekly data on GP sentinel surveillance, sentinel hospital and schools data, weekly ID notifications, and mortality data, allows HPSC to monitor regional and national disease trends and to compare the timing and intensity of the current influenza season with previous seasons.

4.16 Appendix C WHO case definitions for A(H5N1) (August 2006)

Person under investigation

A person whom public health authorities have decided to investigate for possible H5N1 infection.

Suspected H5N1 case

A person presenting with unexplained acute lower respiratory illness with fever (>38 ºC) and cough, shortness of breath or difficulty breathing.

AND

One or more of the following exposures in the 7 days prior to symptom onset:

a. Close contact (within 1 metre) with a person (e.g. caring for, speaking with, or touching) who is a suspected, probable, or confirmed H5N1 case;

b. Exposure (e.g. handling, slaughtering, defeathering, butchering, preparation for consumption) to poultry or wild birds or their remains or to environments contaminated by their faeces in an area where H5N1 infections in animals or humans have been suspected or confirmed in the last month;

c. Consumption of raw or undercooked poultry products in an area where H5N1 infections in animals or humans have been suspected or confirmed in the last month;

d. Close contact with a confirmed H5N1 infected animal other than poultry or wild birds (e.g. cat or pig);

e. Handling samples (animal or human) suspected of containing H5N1 virus in a laboratory or other setting.

Probable H5N1 case (notify WHO)
Probable definition 1:
A person meeting the criteria for a suspected case

AND

One of the following additional criteria:

a. Infiltrates or evidence of an acute pneumonia on chest radiograph plus evidence of respiratory failure (hypoxemia, severe tachypnea)

OR

b. positive laboratory confirmation of an influenza A infection but insufficient laboratory evidence for H5N1 infection.

Probable definition 2:
A person dying of an unexplained acute respiratory illness who is considered to be epidemiologically linked by time, place, and exposure to a probable or confirmed H5N1 case.

Confirmed H5N1 case (notify WHO)

A person meeting the criteria for a suspected or probable case

AND

One of the following positive results conducted in a national, regional or international influenza laboratory whose H5N1 test results are accepted by WHO as confirmatory:

a. Isolation of an H5N1 virus;

b. Positive H5 PCR results from tests using two different PCR targets, e.g. primers specific for influenza A and H5 HA;

c. A fourfold or greater rise in neutralization antibody titer for H5N1 based on testing of an acute serum specimen (collected 7 days or less after symptom onset) and a convalescent serum specimen. The convalescent neutralizing antibody titer must also be 1:80 or higher;

d. A microneutralization antibody titer for H5N1 of 1:80 or greater in a single serum specimen collected at day 14 or later after symptom onset and a positive result using a different serological assay, for example, a horse red blood cell haemagglutination inhibition titer of 1:160 or greater or an H5-specific western blot positive result.

4.17 Appendix D

A. Guidance for surveillance in WHO Phase 6, Irish Alert Level 1 (Ireland not yet affected)

1. Establish surveillance of clinical conditions which have been linked to the novel virus abroad, but which are not necessarily part of the clinical criteria for routine influenza investigation
2. Travellers returning from areas with pandemic activity should be provided with information and advised to seek medical attention if they become unwell.
3. All doctors should be advised to ask patients presenting with respiratory illnesses about overseas travel. Samples should be collected for influenza detection and sent to the NVRL from all patients with respiratory illness who have:
   - Fulfilled the case definition for pandemic influenza or
   - Been hospitalised with viral pneumonia or
   - Travelled to areas of known or potential pandemic influenza activity in the week preceding onset of illness or;
   - Have a flu-like illness and are family members or other close contacts of either of the above.
4. Departments of Public Health must immediately be notified of:
   - All cases who have been hospitalised with viral pneumonia (or other particular clinical features associated with the pandemic strain that form part of the case definition); and who have travelled to areas of known or potential influenza activity in the week preceding onset of illness and
   - Those who have a flu-like illness and are family members or other close contacts of a person in either of these categories.

B. Guidance on Laboratory procedures when pandemic influenza is present outside Ireland (Irish Alert Level 1)

1. Samples should be collected for influenza investigation (including viral culture when advised by WHO) from all patients who:

- Have been hospitalised with viral pneumonia;
- Have travelled to areas of known or potential influenza activity in the week preceding onset of illness and have symptoms associated with the pandemic influenza strain
- Have a flu-like illness and are family members or other close contacts of either of the above.

2. All samples from “highly suspicious cases” must be promptly referred to NVRL for investigation, as per agreed procedures. Any influenza strains detected should be provisionally characterised at the NVRL urgently and referred with available phylogenetic data urgently to the WHO Collaborating Centre in London for confirmation and sub typing.
3. NVRL should validate any novel diagnostic tests to ensure that “best practice” methodologies are utilised and can be introduced immediately
4. NVRL should monitor the developments regarding the laboratory diagnosis and “bedside” diagnosis of the new influenza strain.