Updated protocol for reporting of data on antimicrobial resistance (AMR) for EARS-Net pathogens (2022)

CONTENTS

IMPORTANT INFORMATION, including recent changes

- Data from blood or CSF (whichever is first) is now collected for all pathogens (previously only data from blood was collected for *S. aureus* and the enterococci)
- Aminoglycosides and *P. aeruginosa*: only tobramycin data is now collected
- Paper forms will no longer be accepted as a means of data collection/submission by HPSC for 2022 data: paper forms will be accepted for data with specimen dates up to the end of December 2021 only
- If possible, please include the hospital department for all acute hospital inpatients, including ED patients
- Data files, preferably encrypted, should be submitted to amr@hpsc.ie
- Deadline for submission of **2021 data** by labs to HPSC: **31st March 2022**

Key changes in the protocol below are highlighted in yellow

1. Introduction

The European Antimicrobial Resistance Surveillance System (EARSS) was established following a meeting "The Microbial Threat" in Copenhagen in 1998 that identified antimicrobial resistance as a major threat to public health globally. Ireland has participated in EARSS, which was hosted by the Dutch National Institute for Public health and the Environment (RIVM) since 1999. In 2010, responsibility for EARSS transferred to the European Centre of Disease Prevention and Control (ECDC) in Stockholm where it was renamed the European Antimicrobial Resistance Surveillance Network or EARS-Net.

All Irish clinical microbiology laboratories are required to report to **EARS-Net Ireland**. Participation by Irish laboratories, and thus coverage of the Irish population, in recent years has mostly been 100%, although occasionally it has been slightly lower when laboratories have been forced to suspend their participation due to resource issues. In 2021, two laboratories did not submit data for 2020 resulting in a coverage of 93%.

4. EARS-Net case definition

EARS-Net collects routinely-generated clinical antimicrobial susceptibility testing data on the first invasive isolate per patient per YEAR for each of the eight pathogens under surveillance (see list below).

The EU case definition for antimicrobial resistance can be accessed from ECDC's website under special health issues at bottom of list:
https://www.ecdc.europa.eu/en/surveillance-and-disease-data/eu-case-definitions

2. Pathogens under surveillance

The bacterial pathogens (WHONET codes given in brackets) under surveillance are:

2.1 Specific EARS-Net pathogens

- *Streptococcus pneumoniae* (spn)
- *Staphylococcus aureus* (sau)
- *Enterococcus faecalis* (efa)
- *Enterococcus faecium* (efm)
- *Escherichia coli* (eco)
- *Klebsiella pneumoniae* (kpn)
- *Pseudomonas aeruginosa* (pae)
- Any *Acinetobacter* spp. (ac-) ‡

‡ Speciation of acinetobacter is notoriously difficult so the actual species is not required

Invasive isolates of seven of the eight EARS-Net pathogens (*S. pneumoniae*, *S. aureus*, *E. faecalis*, *E. faecium*, *E. coli*, *K. pneumoniae* and *P. aeruginosa*) have been notifiable in Ireland since 2012, i.e. they are on the List of Notifiable diseases:

https://www.hpsc.ie/notifiablediseases/listofnotifiablediseases/

and in the latest "Case Definitions for Notifiable Diseases":

https://www.hpsc.ie/notifiablediseases/casedefinitions/

The EARS-Net pathogens should be reported directly to **EARS-Net Ireland** at HPSC on a bi-annual basis and not to your local public health department. This has been agreed in conjunction with the directors of public health.

In a few circumstances, laboratories are additionally required to notify certain infections to their local public health department in a timely manner:

- *S. pneumoniae* from blood or CSF (**invasive pneumococcal disease**)
- *E. coli*, *K. pneumoniae*, *P. aeruginosa* and *Acinetobacter* spp., or any other bacterial species, isolated from CSF in a person with clinical signs of meningitis (**bacterial meningitis, not otherwise specified**)
- *E. coli* or *K. pneumoniae* (or any other Enterobacterales species) from blood or CSF (or any other sterile site) with a confirmed carbapenemase (**carbapenemase-producing Enterobacterales infection, invasive**)

*2.2 Other invasive pathogens**

- Group A Streptococci (GAS; *Streptococcus pyogenes*) (bsa/spy)
- Group B Streptococci (GBS; *Streptococcus agalactiae*) (bsb/sgc)
- Any *Candida* spp.†

*Laboratories are requested to provide data on these isolates in addition to the eight official EARS-Net pathogens listed above

† *Candida* spp. must be speciated to rule out *C. auris*, which is an emerging pathogen

Laboratories are additionally required to notify some of these infections to their local public health department in a timely manner:

- All iGAS infections (**Streptococcus Group A infection, invasive**)
- All iGBS infections in infants aged less than 90 days or in stillborn infants (**Streptococcus Group B infection, invasive**)

For these other invasive pathogens under surveillance by EARS-Net Ireland, the case definition is similar to that for the EARS-Net pathogens above in that data are collected on the first invasive isolate patient per YEAR.

Laboratories are requested to report *Candida* spp. and iGBS (from all age groups; not just from infants <90 days, which is currently notifiable) even in the absence of any susceptibility testing to get an estimate of the overall burden of these infections in Ireland.

3. Antimicrobial susceptibility testing guidelines

IMPORTANT: From 2020, only data from labs using EUCAST guidelines should be submitted to ECDC

The current European Union (EU) case definition for antimicrobial resistance published in the Commission Implementing Decision 2018/945 implies that reporting of results of antimicrobial susceptibility testing (AST) of clinical bacterial isolates by countries to ECDC should be done in agreement with the appropriate EUCAST clinical breakpoints in a standardised methodology. The European Commission has recently requested ECDC to ascertain the adherence to EU case definitions. To meet the Commission request, EARS-Net only accepts susceptibility data generated with methods and breakpoints from EUCAST since 1st January 2020 (i.e. for data from 2019 onwards).

The latest EUCAST guidelines are available at: http://www.eucast.org/clinical_breakpoints/

In 2019, 95% of the data submitted to EARS-Net-Ireland was from 36 laboratories using EUCAST. Just three laboratories, accounting for 5% of the data, are still using CLSI guidelines.

Data from laboratories using CLSI guidelines will continue to be collected for inclusion in national reporting; however, these are not included in data submitted to ECDC. As a result, the numbers and proportions appearing in ECDC reports will differ from those in national reports produced by HPSC.

The three laboratories still using CLSI guidelines are strongly encouraged to make the switch to EUCAST guidelines.

5. Data variables collected

The data for EARS-Net should be from routinely-generated data in the laboratory. Very little additional bench work, if any, should be required.

The data collected includes:

- Laboratory details (each laboratory is assigned a 3-digit code by HPSC)
- Basic demographic data*
    - Patient ID/Medical Record Number (to facilitate de-duplication)
    - Date of birth (from which age is calculated for epidemiological studies)
    - Gender (for epidemiological studies)
- Admission details

    - Hospital/institution of current admission (using agreed codes: 3-digit laboratory code with a letter suffix to identify the hospital/institution)
    - Date of admission (particularly for *S. aureus* isolates)
    - Department type (in acute hospital only)
        - icu, eme (emergency/A&E), med (medical), sur (surgical), hao (haematology/oncology), obg (obstetrics/gynaecology), neo (neonatology), ped (paediatrics), out (outpatient), oth (other)
- Specimen details
    - Specimen type
    - Specimen date
- Pathogen details
    - Organism
    - Results of antibiotic susceptibility testing (see Table 1 for list of key antibiotics that may be tested and reported)
    - For labs using WHONET software - If the bulk of AST is performed using an automated system, the results should be reported as follows:
        - Interpretation only: RIS should be in the MIC field
        - MIC/breakpoint only: MIC (e.g. 0.5) or BP value (<=2) should be in the MIC field
        - MIC/breakpoint plus interpretation: MIC (e.g. 0.5) or BP value (<=2) should be in the MIC field AND RIS in the Disc field
- Additional information
    - Serotyping data on *S. pneumoniae* isolates (labs are requested to send all invasive pneumococcal isolates to the reference laboratory, for serotyping)**
    - Carbapenemase enzymes detected in *E. coli* or *K. pneumoniae* isolates (labs are requested to send all suspected and confirmed carbapenemase-producing isolates to the National CPE Reference Laboratory for further characterisation [confirmation and identification of the enzyme present (e.g. KPC, OXA-48, NDM, VIM, etc)]
    - Emm-typing data on invasive GAS isolates (labs are requested to send all iGAS isolates to the reference laboratory, IMSRL, for serotyping)**

*Please note: patient names are NOT collected and we cannot identify individual patients from the data provided; however, all data are treated securely and confidentially

**HPSC receives serotyping and emm-typing results directly from the reference laboratories

6. Means of data collection

- WHONET/BacLink software
- LIMS extract
- Excel tool
- Isolate record forms (paper forms) – only for data up to the end of 2021*

*Starting with Q1 2022 data, paper forms will no longer be accepted and laboratories will be required to report their data using one of the 3 other methods above

Most laboratories now download data from their Laboratory Information Management System (LIMS) on a quarterly basis. The extracted data is usually in a structured text (tab-delimited) or CSV file.

The majority of laboratories (21 of 36, accounting for 78% of the data in 2020; 2 laboratories did not participate in 2020) use WHONET, which is a free software produced by WHO that allows them to store and analyse their AST data in a meaningful way. Structured data files extracted from the LIMS can be easily translated into WHONET format using the allied BacLink software. Laboratories can also enter data directly into WHONET if they have no LIMS or are unable to download a file from their LIMS.

For smaller laboratories that don't use WHONET, a simple Excel tool has been developed that allows for local data entry to be undertaken. This system was used by four laboratories accounting for 5% of data in 2020.

The remaining laboratories send either a file downloaded from their LIMS (n=5, accounting for 6% of data) or paper forms (n=7, accounting for 1% of data).

7. Preparing data for submission to EARS-Net Ireland at HPSC

Before forwarding WHONET files, other file formats or paper forms to HPSC, the laboratory (Surveillance Scientist or Medical Scientist with responsibility for EARS-Net) should check that the data are as complete as possible, including the following:

- No missing data
    - Patient ID, date of birth or sex
    - Specimen type or date
    - EARS-Net hospital code
    - Hospital department type (if possible)
    - Admission date (especially for *S. aureus* isolates)
    - Key AST data, e.g. oxacillin or cefoxitin for *S. aureus*
    - ESBLs for all *E. coli* and *K. pneumoniae*
    - MICS to penicillin and cefotaxime for pneumococci
- Check dates are plausible, e.g. date of birth not 12/12/2029, specimen date not 21/08/1949 or date of birth is not after the specimen date
- Ensure no patient names are included
- Isolates that should be referred for confirmation or serotyping/other typing methods have been sent to the appropriate reference laboratory (see Appendix 1)
    - Pneumococci
    - Carbapenem-resistant *E. coli* and *K. pneumoniae*
    - iGAS isolates
    - iGBS isolates
    - Linezolid-resistant enterococci and staphylococci for confirmation of *optr*A/*cfr*/*poxt*A genes
    - Colistin-resistant *E. coli*/*K. pneumoniae* for confirmation of *mcr*1 gene

- All candida isolates should be speciated to exclude *C. auris*
- Any unusual or incongruent results have been checked*, e.g. vancomycin-resistant *S. aureus,* ampicillin-resistant *E. faecalis*, linezolid-resistant enterococci, ampicillin-susceptible *K. pneumoniae*, colistin-resistant *E. coli*
- Ensure certain infections are notified to public health in a timely manner:
    - IPD, iGAS, GBS (aged <90 days), invasive CPE, any pathogens causing meningitis

*It is suggested that any unusual result should be confirmed by another lab in your region or neighbouring region (e.g. GUH lab might send isolates to UHL lab)

8. Submitting data to EARS-Net-Ireland at HPSC

Paper forms (for data up to the end of Q4 2021 only) should be scanned, **encrypted*** and sent by email (please **do not** fax forms); alternatively, we can send you an Excel file

WHONET files, Excel files and other file types (e.g. text files) should ideally be **encrypted*** before sending by email to:

amr@hpsc.ie

At HPSC, this new generic mailbox is only accessible by Umut (umut.gurpinar@hpsc.ie) and Stephen (stephen.murchan@hpsc.ie)

Note: @hpsc.ie replaces @hse.ie in HPSC email addresses since the 2021 cyber-attack

*HPSC strongly advises that **all** attachments containing personally identifiable information (PII) are **encrypted** before sending by email to ensure data security and confidentiality

There are a number of methods available for encrypting data files, including Axcrypt (free software), CISCO (payment required), Winzip and 7Zip encryption (payment required) and Private File (legacy solution still used by a few laboratories but this is no longer supported by the developers of this software).

9. Timeline for reporting 2021 data in 2022 and frequency of reporting data to HPSC

Timeline for reporting 2021 data in 2022

Deadline for reporting data to HSPC (by labs)	31st March 2022
Deadline for reporting data to TESSy at ECDC (by HPSC)	30th June 2022

Frequency of reporting data

Prior to the COVID-19 pandemic, data were being collected on a six-monthly or biannual basis, although some labs continued to submit data quarterly.

Due to staff being re-deployed to COVID-19 duties at HPSC during the pandemic, as well as resource issues in participating laboratories (including many changes in personnel), EARS-Net reporting is currently on an annual basis. Labs may still choose the submit their data quarterly or biannually.

10. GDPR and EARS-Net/Antimicrobial Resistance (AMR) Data

HPSC has a legal obligation to collect data on notifiable diseases.

HPSC collects and processes personal data on all cases of notifiable diseases and other infections/diseases of public health concern. This processing of personally identifiable information is underpinned by the Infectious Disease Regulations 1981 to monitor and control the occurrence of infectious diseases and to help prevent further illness; and is permitted under the General Data Protection Regulations.

In addition to individual cases being notifiable, an amendment to the Infectious Disease Regulations, introduced in 2004, made outbreaks and "unusual clusters or changing patterns of illness" notifiable by medical practitioners and clinical directors of diagnostic laboratories to the medical officer of health (MOH). The MOH is either a Director of Public Health or Specialist in Public Health employed by one of the eight regional HSE Departments of Public Health.

While processing of such personal health information is allowed on public health grounds, all information provided to the MOH and HPSC is treated with utmost sensitivity and confidentiality and in line with the requirements of the General Data Protection Regulation (GDPR).

Most individual EARS-Net pathogens became notifiable in Ireland under the Schedule of Infectious Disease Regulations which came into effect in 2004 and 2011, and while two pathogens, *Acinetobacter* spp. and C*andida* spp. are not directly listed in the Schedule, they are included with 'unusual cluster or changing pattern of illness' category of that regulation.

11. Data retention

- All emails relating to EARS-Net/AMR data will be deleted after 3 years
- All paper forms will be shredded after 3 years
- All electronic files, including WHONET files, will be deleted after 8 years
- In the EARS-Net Access database, all records are pseudonymised after 8 years: patient identifiers (MRN) and dates of birth will be deleted

Table 1. Microorganism, specimen source and key antibiotics under surveillance by EARS-Net Ireland

Microorganism	Specimen source	Antibiotics
Streptococcus pneumoniae (spn)	Blood (bl); CSF (sf)	**Oxacillin (OXA)[1] and/or Penicillin (PEN)[2]** **Cefotaxime (CTX)[2] or Ceftriaxone (CRO)[2]** **Erythromycin (ERY)** Levofloxacin (LVX) or Moxifloxacin (MFX) or Norfloxacin (NOR; Disc only)
Staphylococcus aureus (sau)	Blood (bl); CSF (sf)	**Oxacillin (OXA) or Cefoxitin (FOX)** Vancomycin (VAN) Linezolid (LNZ) Rifampicin (RIF) Ciprofloxacin (CIP) or Levofloxacin (LVX)
Enterococcus faecalis (efa)	Blood (bl); CSF (sf)	**Ampicillin (AMP)** **High-level Gentamicin (GEH)** **Vancomycin (VAN)** Teicoplanin (TEC) Linezolid (LNZ) Quinupristin-dalfopristin (QDA)
Enterococcus faecium (efm)	Blood (bl); CSF (sf)	**Ampicillin (AMP)** **High-level Gentamicin (GEH)** **Vancomycin (VAN)** Teicoplanin (TEC) Linezolid (LNZ) Quinupristin-dalfopristin (QDA)
Escherichia coli (eco)	Blood (bl); CSF (sf)	**Ampicillin (AMP)** Amoxicillin-clavulanic acid (AMC) **Cefotaxime (CTX) or Ceftriaxone (CRO)[3]** **Ceftazidime (CAZ)[3]** Cefoxitin (FOX) Piperacillin/tazobactam (TZP) **Gentamicin (GEN) or Tobramycin (TOB)** Amikacin (AMK) **Ciprofloxacin (CIP)** **Meropenem (MEM) and/or Ertapenem (ETP)[4]** **Colistin (COL;** BMD only)[5]
Klebsiella pneumoniae (kpn)	Blood (bl); CSF (sf)	**Ampicillin (AMP)** Amoxicillin-clavulanic acid (AMC) **Cefotaxime (CTX) or Ceftriaxone (CRO)[3]** **Ceftazidime (CAZ)[3]** Cefoxitin (FOX) Piperacillin/tazobactam (TZP) **Gentamicin (GEN) or Tobramycin (TOB)** Amikacin (AMK) **Ciprofloxacin (CIP)** **Meropenem (MEM) and/or Ertapenem (ETP)[4]** **Colistin (COL;** BMD only)[5]

Table 1 (continued). Microorganism, specimen source and key antibiotics under surveillance by EARS-Net

Microorganism	Specimen source	Antibiotics
Pseudomonas aeruginosa (pae)	Blood (bl); CSF (sf)	**Ceftazidime (CAZ)** **Piperacillin/tazobactam (TZP)** **~~Gentamicin (GEN) and/or~~ Tobramycin (TOB)** Amikacin (AMK) **Ciprofloxacin (CIP)** **Meropenem (MEM) or Imipenem (IPM)** Colistin (COL; BMD only)
Acinetobacter spp. (ac-) Species not required as speciation considered to be problematic	Blood (bl); CSF (sf)	**Gentamicin (GEN) and/or Tobramycin (TOB)** Amikacin (AMK) **Ciprofloxacin (CIP) or Levofloxacin (LVX)** **Meropenem (MEM) or Imipenem (IPM)** [4] Colistin (COL; BMD only)
Other pathogens (not EARS-Net) under surveillance		
Invasive Group A Streptococci *(Streptococcus pyogenes)* (spy/bsa)[6]	Blood (bl), CSF (sf) or any other sterile site or any non-sterile site if the diagnosis is STSS or NF	Penicillin (PEN) Erythromycin (ERY) Clindamycin (CLI) Tetracycline (TCY) Moxifloxacin (MFX) Vancomycin (VAN)
Invasive Group B Streptococci *(Streptococcus agalactiae)* (sgc/bsb)[6]	Blood (bl), CSF (sf)	Penicillin (PEN) Erythromycin (ERY) Clindamycin (CLI) Tetracycline (TCY) Moxifloxacin (MFX) Vancomycin (VAN)
Candida spp.[6] Species required, especially in light of emergence of *C. auris*	Blood (bl); CSF (sf)	Any antifungal agents tested (if available)

BMD, broth microdilution; CSF, cerebrospinal fluid; STSS, streptococcal toxic shock syndrome; NF, necrotising fasciitis

Codes used by WHONET are given in parenthesis; antibiotics highlighted in **bold** are key antibiotics;

[1]Oxacillin screening test (by disc diffusion only) using a 1µg disc in accordance with EUCAST guidelines:

- isolates with a zone diameter >=20mm are considered to be susceptible to oxacillin and therefore susceptible to penicillin
- isolates with a zone diameter <20mm require an MIC to penicillin in order to determine their susceptibility to penicillin

[2]Determine MICs to cefotaxime or ceftriaxone for all isolates that are oxacillin or penicillin non-susceptible

[3]Report presence or absence of extended-spectrum beta-lactamase

[4]Report presence or absence of carbapenemase – refer first suspected isolate from a patient to CPERLS

[5]Refer colistin-resistant *E. coli* or *K. pneumoniae* isolates to CPERLS

[6]Not an EARS-Net pathogen but laboratories are requested to submit data on these isolates

12. EARS-Net FAQs

1. Which pathogen/specimen type combinations should I submit data on?

The **first isolate per patient PER YEAR** of the following pathogen-specimen type combinations are included in EARS-Net:

	Pathogen	Specimen type
•	*S. aureus**	Blood and CSF
•	*S. pneumoniae**	Blood and CSF
•	*E. coli**	Blood and CSF
•	*E. faecium**	Blood and CSF
•	*E. faecalis**	Blood and CSF
•	*K. pneumoniae* *	Blood and CSF
•	*P. aeruginosa**	Blood and CSF
•	*Acinetobacter* spp.	Blood and CSF

In addition, although not EARS-Net pathogens, laboratories are asked to provide AMR data on all invasive cases of group A streptococcal (iGAS)*, group B streptococcal (iGBS) and candida infections.

*These are on the list of notifiable diseases

2. If I have two strains of the same pathogen – one resistant and one susceptible – from the same specimen, which one do I report?

Report on the most resistant strain as this is potentially the most problematic from a treatment perspective.

3. If two isolates of a particular pathogen – one resistant and one susceptible – from different specimens over one calendar year, which one do I report?

Report on the first isolate, regardless of whether this is susceptible or resistant, in accordance with the EARS-Net case definition "first isolate (of each pathogen) per patient PER YEAR".

4. If I have an *E. faecium* and *E. faecalis* (or an *E. coli* and *S. aureus*) from the same sample, which one should I report?

Report both in accordance with the EARS-Net case definition: "first isolate (of each pathogen) per patient PER YEAR".

5. Should I report isolates that are not considered to be clinically significant?

You should report all isolates regardless of clinical significance as EARS-Net does not distinguish between significant and non-significant isolates (and laboratories are not expected to differentiate between these).

6. Should I de-duplicate isolates from the same patient but in different hospitals served by my laboratory?

No. The reason for not doing this is that we do not have a national patient identifier and therefore it is not possible to de-duplicate isolates from the same patient across all hospitals throughout the country. Therefore, this should ensure that everyone in each laboratory / region is doing the same thing nationwide. Besides, if the same patient presents at more than one hospital over time, they are contributing to the burden of infection and antimicrobial resistance in multiple hospitals.

7. Do I report isolates from post-mortem samples?

No, EARS-Net Ireland doesn't collect data on any isolates from samples taken after a patient has died.

8. Do any EARS-Net isolates need to be sent to a reference laboratory?

Yes, the following organisms should be sent to a reference laboratory where possible:

- all MRSA isolates from blood
- all *S. pneumoniae* isolates from blood and CSF (plus other invasive isolates, e.g. pleural fluid)

Also, ANY of the following isolates (and not just isolates reported to EARS-Net/HPSC):

- all suspect carbapenemase-producing *E. coli* or *K. pneumoniae* (or other Enterobacterales) regardless of whether from carriage or infection (invasive or non-invasive)
- linezolid-resistant *E. faecalis* or *E. faecium* (or other enterococci) to check for *optr*A gene
- colistin-resistant *E. coli* or *K. pneumoniae* (or other Enterobacterales) to check for *mcr*1 gene
- all iGAS isolates from normally sterile sites (for confirmed cases) and from non-sterile sites, e.g. throat (for probable cases, i.e. where the patient has a diagnosis of STSS or necrotising fasciitis)
- all iGBS isolates from all patients regardless of age
- *Candida auris* (should be confirmed by a neighbouring laboratory using Maldi-TOF: to be agreed locally)
- Unspeciated candida from blood should be sent to a neighbouring laboratory for id using Maldi-TOF (to be agreed locally)

9. We have an isolate of *S. pneumoniae*, or another EARS-Net pathogen, with no AST data as the organism failed to grow, do we report this?

No, you only need to report isolates for which AST data are available; however, you should still report such isolates to public health as IPD cases.

The exception to this is invasive Candida spp. as AST is not always performed on these isolates locally.

10. Should I submit data on *S. aureus*, *E. faecium* or *E. faecalis* from CSF?

Yes, the case definition has been updated to include these (see Table 1).

11. Should I submit data on other pathogens, e.g. *Klebsiella oxytoca*, *Enterobacter cloacae*, *Staphylococcus epidermidis*, *Enterococcus casseliflavus* or unspeciated enterococci from blood or CSF?

No, these are not pathogens under surveillance by EARS-Net (see Table 1).

Please note: K. ozaenae or *K. rhinoscleromatis* can sometimes be identified as *K. pneumoniae* subsp. ozaenae and *rhinoscleromatis*, respectively, by some automated instruments. These are not considered to be *K. pneumonaie* for the purpose of the EARS-Net: only data on *K. pneumoniae* subsp. *pneumoniae* isolates should be submitted.

12. Are EARS-Net pathogens notifiable?

Yes, all EARS-Net pathogens, apart from *Acinetobacter* spp., are notifiable, i.e. they are on the List of Notifiable diseases:

https://www.hpsc.ie/notifiablediseases/listofnotifiablediseases/

and the most up-to-date case definitions can be found at:
https://www.hpsc.ie/notifiablediseases/casedefinitions/

Unlike other notifiable diseases, the EARS-Net pathogens (with some exceptions listed below in question 13) are only notified directly to EARS-Net at HPSC on a quarterly/bi-annual basis and not to your local public health department. This was previously agreed with the directors of public health.

13. Do any of the EARS-Net pathogens need to be reported to public health (either via CIDR or using the standard notification forms) in addition to being submitted with our EARS-Net returns?

Yes, some of the pathogens should also be reported to your local public health department. These include:

- All cases of *S. pneumoniae*, i.e. from blood and CSF, in addition to other invasive isolates from other sterile sites, e.g. pleural fluid
- All invasive cases of carbapenemase-producing *E. coli* and *K. pneumoniae*, or any other Enterobacterales (Note: you only need to notify the first Enterobacterales species with a particular enzyme, e.g. OXA-48)
- All invasive Group A streptococci (iGAS) cases meeting the case definition (see https://www.hpsc.ie/a-z/other/groupastreptococcaldiseasegas/casedefinition/)
- All invasive Group B streptococci (iGBS) cases in children aged <90 days meeting the case definition (see https://www.hpsc.ie/a-z/other/groupbstreptococcaldisease/casedefinition/).
- *E. coli*, *K. pneumoniae*, *P. aeruginosa* and *Acinetobacter* spp., or any other bacterial species, isolated from CSF in a person with clinical signs of meningitis

Notification of other unusual resistances or emerging pathogens:

- Isolates with unusual resistance patterns, e.g. colistin-resistant *E.coli*, linezolid-resistant *E. faecium*, as advised by the clinical lead for HCAI and HPSC should be notified under the category of **novel or rare antimicrobial resistant organism (NRAO)**: see case definition at https://www.hpsc.ie/a-z/microbiologyantimicrobialresistance/nrao/casedefinition/
  NRAO with a "confirmed pattern of antimicrobial resistance" should always be confirmed in a second laboratory (generally a reference laboratory)
  Guidance on what constitutes a NRAO should be sought from the relevant reference laboratory and HPSC
- *Candida auris*

Appendix 1. Sending isolates to reference/referral laboratories

IMPORTANT NOTE: Please do **NOT** send any isolates or samples to HPSC for confirmation or typing as HPSC is not a reference laboratory and does not handle isolates or samples!

- All **invasive pneumococcal isolates** (from blood, CSF or other sterile site) to:

  Mary Corcoran
  Irish Meningitis and Sepsis Reference Laboratory (IMSRL)
  Temple Street Children's University Hospital
  Temple Street
  Dublin 1

  For further details:

  - email mary.corcoran@cuh.ie or
  - call 01-8784854
  - information on IMSRL and the IMSRL Request Form can be found at: https://www.cuh.ie/healthcare-professionals/departments/irish-meningitis-sepsis-reference-laboratory-imsrl/

  Note: Please do not send pneumococcal isolates to either RCSI/Beaumont (which was the old address used for referring isolates) or to the microbiology laboratory at Beaumont Hospital

- **MRSA isolates or Linezolid-resistant enterococci/staphylococci** to:

  Grainne Brennan
  National MRSA Reference Laboratory
  St James's Hospital
  Dublin 8

  For further details:

  - email GBrennan@STJAMES.IE or
  - call 01-4103662 or
  - the NMRSARL User Manual and Request Form can be found at: https://www.stjames.ie/services/laboratorymedicinelabmed/nationalmrsareferencelab/

- **Any presumptive carbapenemase-producing *E. coli*, *K. pneumoniae* (or any other enterobacteriaceae) or Acinetobacter isolates** to:

  Carbapenemase-producing Enterobacteriaceae (CPE) Reference Laboratory
  Department of Medical Microbiology
  University Hospital Galway
  Newcastle Road
  Galway

  For further details:

  - email niall.delappe@hse.ie
  - call 091-544570/091-544429
  - the NCPERL User's Guide and the CPE Request Form can be found at: https://saolta.ie/publications and filter for CPE

- All **iGAS or iGBS (regardless of age: not just from infants <90 days) isolates** to:

  Mary Meehan
  Irish Meningitis and Sepsis Reference Laboratory (IMSRL)
  Temple Street Children's University Hospital
  Temple Street
  Dublin 1

  For further details:

  - email Mary.Meehan@cuh.ie or
  - call 01-8784854
  - information on IMSRL and the IMSRL Request Form can be found at: https://www.cuh.ie/healthcare-professionals/departments/irish-meningitis-sepsis-reference-laboratory-imsrl/

Disclaimer

The information provided here is correct as of 17/01/2022. HPSC takes no responsibility for packages being incorrectly addressed by referring laboratories.

Strains submitted for confirmation, characterisation, susceptibility testing and/or epidemiological typing should be sent in accordance with the guidelines laid down by the particular reference laboratory.

Always refer to the reference laboratory's website or latest circular for the most up-to-date information, including contact details and address for submitting isolates/specimens.