

## **Appendix 13 – NHSScotland Minimum Alert organism and condition list**

Tables 1 to 5 outlines a nationally agreed minimum dynamic list of alert organisms and conditions. This list is generated from multiple sources, including Scottish epidemiological data, reported outbreaks in Scotland and the UK, and intelligence from ARHAI Scotland scientific literature reviews.

The purpose of this list is to alert NHS Board infection prevention and control teams (IPCT) of the occurrence of these alert organisms and conditions. These should be used by local boards to establish and maintain local surveillance and reporting systems including the development of triggers for clinical areas determined by a risk-based approach. This will enable:

- timely and adequate alert response and investigation
- implementation and ongoing need for interventions and control measures to minimise their ongoing risk of transmission
- early recognition and identification of a healthcare infection incident, outbreak or data exceedance in accordance with [Chapter 3](#) of the National Infection Prevention and Control Manual (NIPCM)

Specialist units, for example those managing patients with Cystic Fibrosis, will also be guided by local policy regarding other alert organisms not included within these lists.

The responsibilities for managing, investigating and communicating these alert organisms and conditions are outlined in [Chapter 3](#) of the NIPCM for health and care settings and within [The Management of Public Health Incidents \(MPHI\) Guidance for all other settings](#). Further information on patient placement considerations and use of fluid resistant surgical facemasks (FRSMs) and respiratory protective equipment (RPE) is available in [Appendix 11](#) of the NIPCM. Pathogen specific information and links to specific guidance can be found in the [A-Z of Pathogens](#).

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**Antimicrobial Resistance & Healthcare Associated Infection (ARHAI) Scotland  
An NHS Scotland Assure Service, part of Public Services Delivery Scotland**

In addition, [Table 6](#) outlines resistant organisms (unusual phenotypes), the identification of which should act as an alert to Microbiology Teams, IPCTs and Antimicrobial Management Teams (AMT).

## Table 1: Bacteria

(This table refers to clinical isolates)

Bacteria	Locations/Patient cohorts
<i>Bacillus anthracis</i>	All health and care settings and patient cohorts
<i>Burkholderia</i> spp.	All health and care settings and patient cohorts
<i>Bordetella pertussis</i>	All health and care settings and patient cohorts
<i>Clostridioides difficile</i>	All health and care settings and patient cohorts
<i>Corynebacterium diphtheria</i>	All health and care settings and patient cohorts
<i>Corynebacterium pseudotuberculosis</i>	All health and care settings and patient cohorts
<i>Corynebacterium ulcerans</i>	All health and care settings and patient cohorts
<i>Legionella</i> spp.	All health and care settings and patient cohorts
<i>Mycobacterium tuberculosis</i> complex	All health and care settings and patient cohorts
<i>Neisseria meningitidis</i>	All health and care settings and patient cohorts
<i>Mycobacterium abscessus</i> <i>Mycobacterium chelonae</i> <i>Mycobacterium fortuitum</i> <i>Mycobacterium chimaera</i> <i>Mycobacterium mucogenicum</i>	High risk units and patient cohorts for example, cystic fibrosis, lung transplantation, bone marrow transplantation, cardiac transplantation, cardiac surgery and haemato-oncology patient cohorts.
<i>Staphylococcus aureus</i>	High risk units for example, combined Critical Care Unit, ICU/PICU/NICU.  High risk units/patient cohorts for example, burns units, lung transplantation, bone marrow transplantation and haemato-oncology patients.  Boards should implement local surveillance in the above areas to

Bacteria	Locations/Patient cohorts
	<p>allow appropriate intervention where two or more cases with the same resistant strain or a toxigenic strain are identified (if toxin production information available), and where a data exceedance is recognised for common circulating strains.</p> <p>NB: <i>S. aureus bacteraemia</i> must be investigated in all wards/departments as per National surveillance protocol</p>
<i>Staphylococcus aureus</i> – Panton valentine leucocidin (PVL)	All health and care settings and patient cohorts
<i>Staphylococcus capitis</i>	NICU settings
<i>Streptococcus pyogenes</i>	All health and care settings and patient cohorts
<i>Campylobacter</i> spp.	All health and care settings and patient cohorts
<i>Escherichia coli</i> (toxin producing strains for example <i>E. coli</i> O157)	All health and care settings and patient cohorts
<i>Salmonella</i> spp.	All health and care settings and patient cohorts
<i>Shigella</i> spp.	All health and care settings and patient cohorts

Environmental Bacteria	Locations/Patient cohorts
<p><i>Acinetobacter</i> spp.</p> <p><i>Chryseobacterium</i> spp.</p> <p><i>Cupriavidus pauculus</i></p> <p><i>Pseudomonas aeruginosa</i></p> <p><i>Serratia</i> spp.</p> <p><i>Sphingomonas</i> spp.</p> <p><i>Stenotrophomonas maltophilia</i></p>	<p>High risk units for example, Combined Critical Care Unit, ICU, PICU, NICU.</p> <p>High risk patient cohorts for example, oncology and haematology patient cohorts.</p>
<p>This list is not exhaustive. Consider clinical likelihood of infection due to these opportunistic pathogens, particularly in patients at high risk of infection. Refer to <a href="#">Water section of Chapter 4 of the NIPCM</a> for a list of infectious agents associated with healthcare water incidents and outbreaks.</p>	

Environmental Bacteria	Locations/Patient cohorts
<p><b>Contaminated products</b></p> <p>NHS Boards should report any instances of known or suspected contaminated health and care products to the Incident Reporting and Investigation Centre (IRIC) Scotland.</p> <p>The list is not exhaustive, this may include products such as wipes, ultrasound gel and hygiene products.</p> <p>Where there is known patient involvement this should be reported in accordance with Chapter 3, for example as a near-miss or exposure incident.</p>	<p>All health and care settings and patient cohorts</p>

Resistant Bacteria	Locations/Patient cohorts
<p>Extended-spectrum beta-lactamase (ESBL) producers</p>	<p>High risk units for example, ICU, PICU, NICU</p> <p>High risk patient cohorts for example, oncology and haematology patient cohorts</p>
<p>Meticillin-resistant <i>Staphylococcus aureus</i> (MRSA) and borderline oxacillin-resistant <i>S. aureus</i> (BORSA)</p>	<p>All health and care settings and patient cohorts</p>
<p>Vancomycin-resistant enterococci (VRE)</p>	<p>High risk units for example, Combined Critical Care Unit, ICU, PICU, NICU</p> <p>High risk patient cohorts for example, oncology and haematology patient cohorts</p>
<p>Carbapenemase-producing organisms (CPO)</p>	<p>All health and care settings and patient cohorts</p>
<p>Multi-drug resistant (MDR) or extensively drug resistant (XDR) <i>M. tuberculosis</i> complex</p>	<p>All health and care settings and patient cohorts</p>

## Table 2: Viruses

Virus	Locations
BBV (HBV, HCV and HIV)	All health and care settings and patient cohorts
Hepatitis A	All health and care settings and patient cohorts
Norovirus Rotavirus	All health and care settings and patient cohorts
Adenovirus Parainfluenza RSV	High risk units for example, ICU, PICU, NICU  High risk patient cohorts for example, oncology and haematology patient cohorts
Influenza Novel coronavirus (MERS/SARS) SARS-CoV-2	All health and care settings and patient cohorts
Mpox (MPXV)	All health and care settings and patient cohorts
Varicella zoster virus (chickenpox)	All health and care settings and patient cohorts
Parvovirus B19	All health and care settings and patient cohorts
Measles Mumps Rubella	All health and care settings and patient cohorts

### Table 3: Fungi

Fungi	Locations
<i>Aspergillus</i> spp.	<p>High risk units for example, Combined Critical Care Unit, ICU, PICU, NICU.</p> <p>High risk patient cohorts for example, oncology and haematology patient cohorts and transplant patients.</p>
<i>Pneumocystis jirovecii</i>	<p>High risk units for example, Combined Critical Care Unit, ICU, PICU, NICU.</p> <p>High risk patient cohorts for example, oncology and haematology patient cohorts and transplant patients.</p>
<p><i>Candidozyma auris</i></p> <p>Single isolate from any patient sample</p>	<p>All health and care settings and patient cohorts</p>
<p><i>Cryptococcus</i> spp.</p> <p>Single isolate from any patient sample</p>	<p>All health and care settings and patient cohorts</p>
<p><i>Mucorales</i> including: <i>Mucor</i> species, <i>Rhizopus</i>, <i>Rhizomucor</i>, <i>Lichtheimia</i></p> <p>Single isolate from any patient sample</p>	<p>High risk units for example, Combined Critical Care Unit, ICU, PICU, NICU.</p> <p>High risk patient cohorts for example, oncology and haematology patients and transplant patients.</p>
<p><i>Fusarium</i> spp.</p> <p>Single isolate from any patient sample</p>	<p>High risk units for example, Combined Critical Care Unit, ICU, PICU, NICU.</p> <p>High risk patient cohorts for example, oncology and haematology patients and transplant patients.</p>
<p><i>Exophiala</i> spp.</p> <p>Single isolate from any patient sample</p>	<p>High risk units for example, Combined Critical Care Unit, ICU, PICU, NICU.</p> <p>High risk patient cohorts for example, oncology and haematology patients and transplant patients.</p>

## Table 4: Parasites

Parasite	Locations
<b>GI parasites:</b> <i>Cryptosporidium</i> spp. <i>Giardia lamblia</i>	All health and care settings and patient cohorts
<b>Ectoparasite</b> <i>Sarcoptes scabiei</i>	All health and care settings and patient cohorts

## Table 5: Alert conditions

Condition	Locations
Acute flaccid myelitis or paralysis with infectious aetiology for example, EVD68	All health and care settings and patient cohorts
Potentially infectious diarrhoea/vomiting	All health and care settings and patient cohorts
Mucormycosis	All health and care settings and patient cohorts
Necrotising fasciitis	All health and care settings and patient cohorts
Necrotising pneumonia (suggesting possible PVL <i>S. aureus</i> infection)	All health and care settings and patient cohorts
Scabies	In-patient and care settings and day care settings
Shingles	All health and care settings and patient cohorts
Transmissible Spongiform Encephalopathy (TSE) for example, CJD	All health and care settings and patient cohorts
Viral Haemorrhagic Fever (VHF) (Transmissible)	All health and care settings and patient cohorts
Scalded skin syndrome	All health and care settings and patient cohorts
Adenoviral conjunctivitis	All health and care settings and patient cohorts
Post-surgical or procedural-related endophthalmitis, including suspected cases	All health and care settings and patient cohorts

## **Table 6: Resistant organisms (unusual phenotypes)**

**(Amended version based on 'EUCAST Expert rules and expected phenotypes, 2023', taking into account the epidemiology of Scottish isolates)**

This list has been produced in conjunction with the Scottish Microbiology and Virology Forum (SMVF). Not all organism and antimicrobial combinations are routinely tested. Any unusual organism and antimicrobial combinations, where reported, should be checked first to ensure accuracy by the submitting laboratory.

See [Information on isolates for reference laboratory referral](#).

See [EUCAST Clinical Breakpoint Tables](#)

The ARHAI Scotland Human Health Antimicrobial Resistance and Prescribing Surveillance (HHARPS) team monitor the unusual combinations within this list on a twice weekly basis and communicate with submitting laboratories if an isolate with unusual resistance is reported into the Electronic Communication of Surveillance in Scotland (ECOSS) system. In addition, ARHAI Scotland issues quarterly surveillance reports on unusual antimicrobial resistance phenotypes, supporting early detection and response in alignment with the National Infection Prevention and Control Manual.

**A single isolate from a healthcare associated case would constitute an 'alert'.**

If microbiologically confirmed (and not already communicated), local IPCT and AMT, as appropriate, need to be made aware to ensure appropriate actions are put in place.

## Unusual resistance phenotypes of Gram-negative bacteria

Organisms <sup>1</sup>	Unusual resistance phenotypes	Transmission based precautions (TBPs) <sup>2</sup>
<i>Any Enterobacterales</i>	Resistant to colistin (except <i>Proteus</i> spp., <i>Providencia</i> spp., <i>Morganella</i> spp. and <i>Serratia marcescens</i> , <i>Hafnia</i> spp.) Resistant to meropenem or is a carbapenemase producer Resistant to ceftazidime-avibactam	Contact precautions
<i>Salmonella Typhi</i>	Resistant to fluoroquinolones, carbapenems or azithromycin	Contact precautions
<i>Pseudomonas aeruginosa</i>	Resistant to colistin Resistant to ceftolozane-tazobactam Resistant to a meropenem/imipenem AND ceftazidime AND piperacillin-tazobactam	Contact precautions  Refer to <a href="#">Appendix 11</a> if identified in respiratory tract
<i>Acinetobacter</i> spp.	Resistant to colistin Resistant to meropenem or imipenem	Contact precautions
<i>Haemophilus influenzae</i>	Resistant to any 3rd, 4th, 5th generation cephalosporins or carbapenems	Contact precautions Refer to <a href="#">Appendix 11</a> if identified in respiratory tract
<i>Moraxella catarrhalis</i>	Resistant to any 3rd, 4th, 5th generation cephalosporins, carbapenems or fluoroquinolones	Contact precautions
<i>Neisseria meningitidis</i>	Resistant to meropenem, any 3rd generation cephalosporins, fluoroquinolones or rifampicin	Droplet precautions
<i>Neisseria gonorrhoeae</i>	Resistant to spectinomycin or 3 <sup>rd</sup> generation cephalosporins	Droplet precautions

## Unusual resistance phenotypes of Gram-positive bacteria

Organisms <sup>1</sup>	Unusual resistance phenotypes	Transmission based precautions (TBPs) <sup>2</sup>
<i>Staphylococcus aureus</i>	Resistant to vancomycin, teicoplanin, daptomycin (Minimum inhibitory concentration (MIC) >4 mg/L <sup>3</sup> ), linezolid, tedizolid, quinupristin-dalfopristin, tigecycline, dalbavancin	Contact precautions
Coagulase-negative staphylococci	Resistant to vancomycin, daptomycin (MIC > 4 mg/L <sup>3</sup> ), linezolid, tedizolid, quinupristin-dalfopristin, tigecycline, dalbavancin	Contact precautions
<i>Corynebacterium</i> spp.	Resistant to vancomycin, teicoplanin, linezolid, dalbavancin, daptomycin, tigecycline or quinupristin-dalfopristin.	Standard Infection Prevention and Control Precautions (SICPs) <b>unless</b> <i>C. diphtheria</i> or <i>ulcerans</i> in which case refer to <a href="#">Appendix 11</a> .
<i>Streptococcus pneumoniae</i>	Resistant to carbapenems, vancomycin, teicoplanin, linezolid or rifampicin. Also isolates with high level penicillin resistance (MIC > 2 mg/L <sup>3</sup> ) and those susceptible, increased exposure or resistant to 3 <sup>rd</sup> generation cephalosporins (MIC > 0.5 mg/L <sup>3</sup> )	Contact precautions Refer to <a href="#">Appendix 11</a> if identified in respiratory tract
Group A, B, C and G $\beta$ -haemolytic streptococci	Resistant to penicillin, cephalosporins, vancomycin, teicoplanin, dalbavancin, oritavancin, daptomycin, linezolid, tedizolid or tigecycline	Contact precautions Refer to <a href="#">Appendix 11</a> if identified in respiratory tract

Organisms <sup>1</sup>	Unusual resistance phenotypes	Transmission based precautions (TBPs) <sup>2</sup>
<i>Enterococcus</i> spp.	<p><b><i>E. faecalis</i>:</b> Resistant to ampicillin/amoxicillin or daptomycin (MIC &gt; 2 mg/L<sup>3</sup>)</p> <p><b><i>E. faecium</i>:</b> Resistant to daptomycin (MIC &gt; 4 mg/L<sup>3</sup>)</p>	Risk assessment of symptoms and care location for contact precautions otherwise SICPs
All enterococci	Resistant to tigecycline or linezolid.	Contact precautions

### Unusual resistance phenotypes of anaerobes

Organisms <sup>1</sup>	Unusual resistance phenotypes	Transmission based precautions (TBPs) <sup>2</sup>
<i>Bacteroides</i> spp.	Resistant to metronidazole	Contact precautions
<i>Clostridioides difficile</i>	Resistant to metronidazole, vancomycin	Contact precautions

### Unusual resistance phenotypes of Candida species

Organisms <sup>1</sup>	Unusual resistance phenotypes	Transmission based precautions (TBPs) <sup>2</sup>
<i>Candida</i> spp.	Resistant to amphotericin B or any echinocandin	SICPs <b>unless</b> <i>C. auris</i> ( <a href="#">Table 3</a> ) in which case refer to <a href="#">Appendix 11</a> .
<i>Candida albicans</i>	Resistant to any azole (invasive isolates)	SICPs
<i>Aspergillus fumigatus</i>	Resistant to amphotericin B, echinocandins or azoles (excluding fluconazole)	SICPs

## Footnote 1

IPCTs should include all of these organisms in their local surveillance systems as a monitoring tool. Detection of greater than one isolate of these unusual phenotypes would warrant further investigation in line with [Chapter 3](#) of the NIPCM.

## Footnote 2

Resistance in the organism and antimicrobial combinations detailed in [Table 6](#) are highly unusual. In all cases where this phenotype has been confirmed locally this should prompt discussion with the local IPCT or HPT as to the appropriate precautions required and this will depend on the body site or clinical condition as well as the type of clinical area the patient is located.

There is limited evidence on the transmissibility and therefore the TBPs required for all of these organisms. These recommendations are a pragmatic suggestion based on the likelihood of this organism and antimicrobial occurring and the public health implications if it were to arise. [Appendix 11](#) details the patient placement considerations and FRSM or RPE type (where applicable) required for different organisms. Information regarding transmission modes, notifiable status and available UK and international guidance for pathogens can be found in the [A-Z of Pathogens](#). Not all the organisms in [Table 6](#) are referred to in Appendix 11 and A-Z of pathogens. Written patient information resources are not available so a plan for communication with patients should form part of patient placement discussions. Many of these organism and antimicrobial combinations may have had TBPs already recommended on the basis of the organism or background resistance pattern and nothing additional will be required on the basis of this particular resistance pattern.

## Footnote 3

MIC values relate to the [Reference Laboratory threshold](#) for referral.