Appendix 13 – NHSScotland Minimum Alert organism and condition list

Tables 1 to 5 outlines a nationally agreed minimum (non-exhaustive) 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 literature reviews.

The purpose of this list is to alert NHS board infection prevention and control teams (IPCT) of the occurrence of these 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 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 available guidance can be found in the A-Z of Pathogens.

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

Bacteria	Locations/Patient cohorts
Bacillus anthracis	All care settings and patient cohorts
Burkholderia spp.	All care settings and patient cohorts
Bordetella pertussis	All care settings and patient cohorts
Clostridioides difficile	All care settings and patient cohorts
Corynebacterium diphtheria or ulcerans	All care settings and patient cohorts
Legionella spp.	All care settings and patient cohorts
Mycobacterium tuberculosis complex	All care settings and patient cohorts
Neisseria meningitidis	All care settings and patient cohorts
Mycobacterium abscessus *Mycobacterium chelonae* *Mycobacterium fortuitum* *Mycobacterium chimaera* *Mycobacterium mucogenicum*	High risk units and patient cohorts for example, cystic fibrosis, lung transplantation, bone marrow transplantation, cardiac transplantation, cardiac surgery and haemato-oncology patient cohorts.
Staphylococcus aureus	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 allow appropriate intervention where two or more cases with the same resistant strain or a toxigenic strain are identified, and where a data exceedance is recognised for common circulating strains.

Bacteria	Locations/Patient cohorts
	NB: *S.aureus bacteraemia* must be investigated in all wards/departments as per National surveillance protocol.
Staphylococcus aureus – Panton valentine leucocidin (PVL)	All care settings and patient cohorts
Staphylococcus capitis	NICU settings
Streptococcus pyogenes	All care settings and patient cohorts
Campylobacter spp. *Escherichia coli* (toxin producing strains for example *E. coli* O157) *Salmonella* spp. *Shigella* spp.	All care settings and patient cohorts

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

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

Table 2: Viruses

Virus	Locations
BBV (HBV, HCV and HIV)	All care settings and patient cohorts
Hepatitis A	All care settings and patient cohorts
Adenovirus Norovirus Rotavirus	All 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 care settings and patient cohorts
Mpox (MPXV)	All care settings and patient cohorts
Varicella zoster virus (chickenpox)	All care settings and patient cohorts
Parvovirus B19	All care settings and patient cohorts

Virus	Locations
Measles Mumps Rubella	All care settings and patient cohorts

Table 3: Fungi

Fungi	Locations
Aspergillus spp.	High risk units for example, Combined Critical Care Unit, ICU, PICU, NICU. High risk patient cohorts for example, oncology and haematology patient cohorts and transplant patients.
Pneumocystis jirovecii	High risk units for example, Combined Critical Care Unit, ICU, PICU, NICU. High risk patient cohorts for example, oncology and haematology patient cohorts and transplant patients.
Candida auris Single isolate from any patient sample	All care settings and patient cohorts.
Cryptococcus spp.	All care settings and patient cohorts.
Mucormycosis spp. Single isolate from any patient sample	High risk units for example, Combined Critical Care Unit, ICU, PICU, NICU. High risk patient cohorts for example, oncology and haematology patients and transplant patients.
Fusarium spp. Single isolate from any patient sample	High risk units for example, Combined Critical Care Unit, ICU, PICU, NICU. High risk patient cohorts for example, oncology and haematology patients and transplant patients.

Table 4: Parasites

Parasite	Locations
GI parasites: *Cryptosporidium* spp. *Giardia lamblia*	All care settings and patient cohorts

Table 5: Alert conditions

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

The ARHAI Scotland Scottish One Health and Antimicrobial Use and Antimicrobial Resistance (SONAAR) 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.

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[1]	Unusual resistance phenotypes	Transmission based precautions (TBPs)[2]
Any *Enterobacterales*	Resistant to colistin (except *Proteus* spp., *Providencia* spp., *Morganella* spp. and *Serratia marcescens*) Resistant to meropenem or is a carbapenemase producer Resistant to ceftazidime-avibactam	Contact precautions
Salmonella Typhi	Resistant to fluoroquinolones, carbapenems or azithromycin	Contact precautions
Pseudomonas aeruginosa	Resistant to colistin Resistant to ceftolozane-tazobactam Resistant to a meropenem/imipenem	Contact precautions

Organisms[1]	Unusual resistance phenotypes	Transmission based precautions (TBPs)[2]
	AND ceftazidime AND piperacillin-tazobactam	Refer to Appendix 11 if identified in respiratory tract
Acinetobacter spp.	Resistant to colistin Resistant to meropenem or imipenem	Contact precautions
Haemophilus influenzae	Resistant to any 3rd, 4th, 5th generation cephalosporins or carbapenems	Contact precautions Refer to Appendix 11 if identified in respiratory tract
Moraxella catarrhalis	Resistant to any 3rd, 4th, 5th generation cephalosporins, carbapenems or fluoroquinolones	Contact precautions
Neisseria meningitidis	Resistant to meropenem, any 3rd generation cephalosporins, fluoroquinolones or rifampicin	Droplet precautions
Neisseria gonorrhoeae	Resistant to spectinomycin or 3rd generation cephalosporins	Droplet precautions

Unusual resistance phenotypes of Gram-positive bacteria

Organisms[1]	Unusual resistance phenotypes	Transmission based precautions (TBPs)[2]
Staphylococcus aureus	Resistant to vancomycin, teicoplanin, daptomycin (Minimum inhibitory concentration (MIC) >4 mg/L[3]), linezolid, tedizolid, quinupristin-dalfopristin, tigecycline, dalbavancin	Contact precautions
Coagulase-negative staphylococci	Resistant to vancomycin, daptomycin (MIC > 4 mg/L[3]), linezolid, tedizolid, quinupristin-dalfopristin, tigecycline, dalbavancin	Contact precautions

Organisms[1]	Unusual resistance phenotypes	Transmission based precautions (TBPs)[2]
Corynebacterium spp.	Resistant to vancomycin, teicoplanin, linezolid, dalbavancin, daptomycin, tigecycline or quinupristin-dalfopristin.	Standard Infection Prevention and Control Precautions (SICPs) **unless** *C. diphtheria or ulcerans* in which case refer to Appendix 11.
Streptococcus pneumoniae	Resistant to carbapenems, vancomycin, teicoplanin, linezolid or rifampicin. Also isolates with high level penicillin resistance (MIC > 2 mg/L[3]) and those intermediate or resistant to 3rd generation cephalosporins (MIC > 0.5 mg/L[3])	Contact precautions Refer to Appendix 11 if identified in respiratory tract
Group A, B, C and G β-haemolytic streptococci	Resistant to penicillin, cephalosporins, vancomycin, teicoplanin, dalbavancin, oritavancin, daptomycin, linezolid, tedizolid or tigecycline[4]	Contact precautions Refer to Appendix 11 if identified in respiratory tract
Enterococcus spp.	***E. faecalis*:** Resistant to ampicillin/amoxicillin or daptomycin (MIC > 2 mg/L[3]) ***E. faecium:*** Resistant to daptomycin (MIC > 4 mg/L[3])	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[1]	Unusual resistance phenotypes	Transmission based precautions (TBPs)[2]
Bacteroides spp.	Resistant to metronidazole	SICPs
Clostridioides difficile	Resistant to metronidazole, vancomycin	Contact precautions

Unusual resistance phenotypes of Candida species

Organisms[1]	Unusual resistance phenotypes	Transmission based precautions (TBPs)[2]
Candida spp.	Resistant to amphotericin B or any echinocandin	SICPs **unless** *C. auris* (Table 3) in which case refer to Appendix 11.
Candida albicans	Resistant to any azole (invasive isolates)	SICPs
Aspergillus fumigatus	Resistant to amphotericin B, echinocandins or azoles (excluding fluconazole)	SICPs

Footnote 1

IPCTs should include all of these organisms in their 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.

Footnote 4

The inclusion of tigecycline resistance as an unusual phenotype in Group A, B, C and G β-haemolytic *streptococci* is currently under review.