

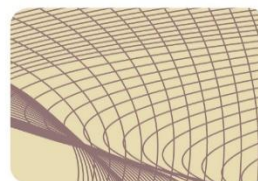
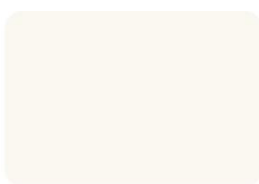


UK Standards for Microbiology Investigations

Review of users' comments received by

Working group for bacteriological identification and test procedures

ID 4 Identification of *Streptococcus* species,
Enterococcus species and morphologically similar organisms



This publication was created by UK Health Security Agency (UKHSA) in partnership with the partner organisations.

Recommendations are listed as ACCEPT/ PARTIAL ACCEPT/DEFER/ NONE or PENDING

Issued by the Standards Unit, UK Standards for Microbiology Investigations, UKHSA

RUC | ID 4 | Issue no: 1 | Issue date: 01.10.26 | Page: 1 of 10

Consultation: 20/03/2026 – 20/04/2026

Version of document consulted on: dn+

Comments on Section 4 - Introduction

British Infection Association

Comment number: 1

Date received: 02/04/2026

1. On page 7 paragraph 3, the SMI recommends identifying enterococci to species level to pick up *E. gallinarum/casseliflavus* et al, and specifically recommends not to report these as VRE, since only VanA/VanB merit IPC interventions. Some institutions do report *gallinarum* et al as VRE, for a variety of reasons (whether to simplify things at a lab level, or at an IPC level). And UKHSA surveillance data is based on all “glycopeptide resistant enterococci”, including *gallinarum* et al (though one could counter-argue that perhaps they should tighten that up).
2. Page 8 paragraph 3—including *S. pneumoniae* with alpha-haemolytic streps as “not associated with pyogenic disease” rather underplays its significance as a pathogen!
3. Early in the document, the beta-haemolytic streps are referred to as “*S. pyogenes*”, “*S. agalactiae*” etc. From section 7 (“reporting”) onwards, the document switches to calling them “group A”, “group B”, etc. Page 9 penultimate paragraph states “species-level identification is essential for *S. pyogenes*”. Is the SMI expressing a preference/instruction for reporting by species versus group? We report them by group, which carries more weight with clinicians, IPC practitioners etc, and many general guidelines are by group (UKHSA group A strep guidelines, obstetric group B strep guidelines, etc), and we plan to continue this practice.

Recommended Action

1. ACCEPT. The text has been revised to clarify the distinction between intrinsically vancomycin-resistant VanC enterococci and VanA/VanB-mediated VRE. Additional wording acknowledges variation in reporting and surveillance practices, while emphasising that IPC measures may vary depending on local policies and risk assessments.
2. ACCEPT. Text revised and updated.
3. ACCEPT. The reporting section has been revised to acknowledge variation in laboratory practice and to clarify the recommended approach of reporting species name with Lancefield group where appropriate.

Rama Medical College and Research centre, Kanpur, India

Comment number: 2

Date received: 09/04/2026

1. In subsection 4.2, under Taxonomy and Characteristics: In the third paragraph, which starts with "The classical differentiation of streptococci is based primarily on their haemolytic patterns on blood agar (Refer to figure 1)" In the above lines, if authors wish, they may include the term "Brown's classification." So, may rewrite the sentence as "The classical differentiation of streptococci is based primarily on hemolytic patterns on blood agar given by Brown (Refer to figure 1)."
2. Figure 1: "Classification of clinically relevant streptococcal species according to haemolysis patterns on blood agar and their clinical grouping into pyogenic and non-pyogenic organisms." However, in the flow chart, the gamma hemolysis, its organisms, and their clinical significance have not been shown. So, the author may wish to incorporate it.

Recommended Action

1. NONE. Haemolytic patterns are a standard concept in microbiology, and adding historical attribution is not consistent with the UK SMI approach.
2. ACCEPT. The flowchart has been reviewed and updated.

Staphylococcus & Streptococcus Reference Section (SSRS, AMRHAI), UKHSA

Comment number: 3

Date received: 16/05/2026

It would be good to note adult disease more fully beyond puerperal sepsis eg SSTIs and prosthetic joint infection.

Recommended Action

1. ACCEPT. This has been incorporated into the document.

Staphylococcus & Streptococcus Reference Section (SSRS, AMRHAI), UKHSA

Comment number: 4

Date received: 16/05/2026

S. infantarius, consists of 2 subspecies: subsp. *infantarius* and subsp. *coli* according to Karen. Please see the reference below.

Subsp coli has been reclassified as *S. lutetiensis*

Poyart, C., G. Quesne, and P. Trieu-Cuot. 2002. Taxonomic dissection of the *Streptococcus bovis* group by analysis of manganese-dependent superoxide dismutase gene (*sodA*) sequences: reclassification of '*Streptococcus infantarius* subsp. *coli*' as *Streptococcus lutetiensis* sp. nov. and of *Streptococcus bovis* biotype II.2 as *Streptococcus pasteurianus* sp. nov. Int. J. Syst. Evol. Microbiol. 52:1247–1255.i

Recommended Action

1. PARTIALLY ACCEPT. *S. infantarius* subsp. have been added into the document. The reference was not used, as it was not considered necessary to include references for each species and subspecies.

Comments on Section 6 - Identification

British Infection Association

Comment number: 5

Date received: 02/04/2026

1. My major concern is regarding the implication (intentional or otherwise) that MALDI-TOF identification alone can suffice for all streptococci. The flowchart on p22 says you can just do MALDI and then stop, only needing to do additional biochemical tests if MALDI unavailable or inconclusive. Whereas p13 section 6.4.1 specifically states that MALDI has significant limitations in distinguishing related strep species. Page 9 Section 6 doesn't, in my opinion, go far enough in emphasising when MALDI alone is sufficient or insufficient. I don't think that MALDI alone is always sufficient for group A vs C Strep, or to identify *S. pneumoniae*. Is this an error in the flowchart? Or is MALDI and group still essential for the beta streps? Should MALDI and optochin (+/- bile salts) remain essential for pneumococcus? I recommend robust clarification in the document regarding these potential pitfalls, unless there is new evidence to the contrary.
2. Page 15 table and p22 flowchart—some viridans streps can be variably positive for bile aesculin hydrolysis (e.g. *Strep salivarius*, I think we have observed this in our clinical microbiology lab)

Recommended Action

1. ACCEPT. Text and algorithm revised and updated.
2. ACCEPT. This has been added to the footnotes under the table.

Italian translator

Comment number: 6

Date received: 03/04/2026

It could be useful to add some comment about the value and limit of commercial test that are often used in laboratories such as Vitek and Phenix.

Underline that these commercial methods have few species in their panel

We know that there are few studies and in some case few strains are evaluated

Vitek2 according a WHO study (here enclosed) was able to correctly identify 90% of *Enterococcus faecalis*, 100% *E. faecium*, 100% *Streptococcus agalactiae*, 83% *S. pneumoniae*.

Because of the variability of strains and challenging taxonomic changes of *Streptococcus* and *Enterococcus* species, it is necessary to use a reliable

identification method to better understand the pathogenic potential of various streptococcal and enterococcal species. The currently used phenotypic identification methods based on morphological and biochemical characteristics appear to be unreliable and are characterized by low discriminatory potential. We showed that the Vitek® 2 system and MALDI-TOF MS did not correctly identify particular closely related species, such as *S. mitis*, *S. oralis*, and other species of the mitis group. Overall, the phenotypic methods allowed the identification of 48% of streptococcal and 100% of enterococcal strains (From Pathogens).

We evaluated the new BD Phoenix automated [microbiology](#) system (Becton Dickinson Diagnostic Systems, Sparks, MD) SMIC/ID-4 panel for routine identification (ID) and [antimicrobial susceptibility](#) testing (AST) of [streptococci](#) in a university-based laboratory. Clinical isolates of [Streptococcus pneumoniae](#) ($n = 92$), [Streptococcus pyogenes](#) ($n = 24$), and [Streptococcus agalactiae](#) ($n = 10$) were collected, and comparisons were made with the routine manual methods used in our microbiology laboratory for ID and susceptibility testing. ID concordance with manual methods was 85.9%, 95.8%, and 90.0% for [S. pneumoniae](#), *S. pyogenes*, and *S. agalactiae*, respectively. (From [Diagnostic Microbiology and Infectious Disease, Volume 53, Issue 2](#), October 2005, Pages 101-105, Evaluation of the BD Phoenix SMIC/ID, a new streptococci identification and antimicrobial susceptibility panel, for potential routine use in a university-based clinical microbiology laboratory, <https://doi.org/10.1016/j.diagmicrobio.2005.05.016>, <https://www.sciencedirect.com/science/article/abs/pii/S0732889305001501>).

Recommended Action

1. PARTIALTY ACCEPT. Commercial systems are not referenced to avoid perceived bias, but general wording has been added to highlight the limitations of phenotypic methods and the need for complementary approaches.

Rama Medical College and Research centre, Kanpur, India

Comment number: 7

Date received: 09/04/2026

First paragraph: Mentions "Gram staining (for example, Gram-positive cocci in chains) can further support identification, particularly from direct samples or positive blood cultures." In this primary identification, "Catalase test" can be incorporated if deemed suitable by the authors

Recommended Action

1. ACCEPT. Text updated to incorporate Catalase test.

Consultant Microbiologist, Pakistan

Comment number: 8

Date received: 14/04/2026

I would recommend including representative photographs of culture media illustrating the colony morphology and haemolysis patterns described in the text. In several sections, these features are described verbally without accompanying visual examples, which may make correlation and interpretation more difficult, particularly for

trainees and laboratory staff using the document in routine practice. The inclusion of clear, high-quality images showing typical growth appearances would improve clarity, support more standardised interpretation, and enhance the practical and educational value of the document, especially where subtle differences in colony morphology or haemolysis are important for organism recognition.

Recommended Action

1. NONE. The comment is acknowledged. The inclusion of representative images is being explored internally from UKHSA and will be incorporated if suitable high-quality images can be made available.

Staphylococcus & Streptococcus Reference Section (SSRS, AMRHAI), UKHSA

Comment number: 9

Date received: 16/05/2026

Comment (from multiple contributors at the reference laboratory on this section):

'I agree. Even though we know that GBS mostly include *S. agalactiae*, we also need to include SDSE, *Streptococcus equi* subsp. *zooepidemicus*, *S. anginosus* which occasionally express the GBS antigen or cross react with the antisera (even *S. halichoeri*)'.

'Other species that may express the Lancefield Group B antigen include *S. pseudoporcinus* which is usually seen as beta haemolytic colonies. Some *S. dysgalactiae* ssp *equisimilis* (SDSE) express the Lancefield Group A antigen. *Streptococcus equi* subsp. *zooepidemicus* expresses the Lancefield Group C antigen. *S. anginosus* occasionally express the Lancefield Groups A,C, F and G'.

'I have come across a paper that *S. halichoeri* expressing GB antigens on its surface. It could be included too.

<https://pmc.ncbi.nlm.nih.gov/articles/PMC8084511/>'.

'Immunological and molecular rapid methods, including real-time PCR and other nucleic acid amplification tests (NAATs), may be used where clinically indicated.

The level of identification undertaken should be guided by the clinical significance of the isolate and the specimen type. Lancefield grouping alone may be adequate for some clinical purposes; however, species-level identification is required for clinically significant organisms, including *Streptococcus pyogenes*, *Streptococcus dysgalactiae* subsp. *equisimilis* (SDSE), Group B streptococci (GBS), and *Streptococcus pneumoniae*.

It should be noted that expression of Lancefield antigens is not species-specific. For example:

Some isolates of *S. dysgalactiae* subsp. *equisimilis* (SDSE) may express Lancefield Group A antigen.

Streptococcus equi subsp. *zooepidemicus* expresses Lancefield Group C antigen.

Members of the *Streptococcus anginosus* group may express Lancefield Groups A, C, F or G antigens.

Streptococcus pseudoporcinus may express Lancefield Group B antigen and typically produces β -haemolytic colonies.

These limitations highlight the importance of correlating Lancefield grouping results with phenotypic characteristics and, where appropriate, supplementary identification methods’.

Recommended Action

1. ACCEPT. The text has been reviewed and suggestions added to the document as appropriate.

Staphylococcus & Streptococcus Reference Section (SSRS, AMRHAI), UKHSA

Comment number: 10

Date received: 16/05/2026

‘In addition, MALDI is unable to differentiate between the members of the *S.gallolyticus(bovis)* group’.

Recommended Action

1. ACCEPT. The text has been reviewed and suggestion added to the document as appropriate.

Staphylococcus & Streptococcus Reference Section (SSRS, AMRHAI), UKHSA

Comment number: 11

Date received: 16/05/2026

Should the limitation of grouping in distinguishing *S pyogenes* from SDSE be noted in 6.4.3?

Covered in Identification section now

I agree, we are seeing greater numbers of SDSE that are expressing the Lancefield A antigen.

Recommended Action

1. ACCEPT. The relevant section has been reviewed and suggestion added to the document as appropriate.

Comments on Section 7 - Reporting

Staphylococcus & Streptococcus Reference Section (SSRS, AMRHAI), UKHSA

Comment number: 12

Date received: 16/05/2026

What would be the rationale behind the list of clinical features which warrant certain species being flagged with the 'infection specialist'. In any case, this section should make it clear that iGAS and SF are notifiable diseases and to note that the HPT must be informed immediately for iGAS infection (diagnosed or suspected) (comments from TL).

I agree. I also do not agree completely with the following statement. *"Due to the potential for invasive disease, and for development of immunologically mediated or toxin-mediated sequelae, "new" putative isolates of Streptococcus pyogenes should be brought to the attention of the infection specialist in accordance with local protocols, along with "large colony" isolates which possess Lancefield Group C or G antigens"*. If this would be the criteria to be followed, then it seems subjective to me. We probably need to add, should be confirmed with other tests or send to the ref lab.

'Further tests in-house or confirmation by the reference lab needed to confirm the identity of the organisms.

As iGAS infection is a notifiable disease requiring urgent public health action, HPTs must be informed immediately of suspected or confirmed iGAS infections'.

Recommended Action

1. ACCEPT. The relevant sections have been reviewed and suggestion added to the document as appropriate.

Comments on Section 8 - Referral to reference or specialist testing laboratories

British Infection Association

Comment number: 13

Date received: 02/04/2026

Page 20 final para—send away enterococci with linezolid resistance. UKHSA Colindale currently recommend sending away enterococci with tigecycline or daptomycin resistance as well (BRD user manual 2024 edition), is there a plan to change this and/or which recommendation ought to be followed, the more up-to-date SMI or the Colindale user manual? (Tigecycline resistance is becoming very common, so I agree with the SMI recommendation that linezolid resistance is the only concerning/exceptional phenotype in enterococci.)

Recommended Action

1. ACCEPT. The text has been updated to include reference to the UKHSA Colindale BRD user manual.

Rama Medical College and Research centre, Kanpur, India

Comment number: 14

Date received: 09/04/2026

In the lines: "Examples of characterisation methods performed following referral include: • Streptococcus pyogenes (gas) - emm typing." Here, gas can be rewritten as "GAS"

Recommended Action

1. ACCEPT. This has been corrected.

Staphylococcus & Streptococcus Reference Section (SSRS, AMRHAI), UKHSA

Comment number: 15

Date received: 16/05/2026

'*Streptococcus pneumoniae* – serotyping

All *S. pneumoniae* isolates from a normally sterile site should be referred for species confirmation and capsular serotyping'.

Recommended Action

1. ACCEPT. This has been incorporated into this section.

Comments on Section 9 – Public health responsibilities of diagnostic laboratories

Comment number: 16

Date received: 16/05/2026

'The HPTs must be informed immediately of any suspected clusters or diagnosed iGAS infections as part of statutory notification of iGAS and Scarlet Fever'.

Recommended Action

1. PARTIALLY ACCEPT. This section remains as standard text. The suggestions were addressed in the reporting section instead.

Comments on the Algorithms

Rama Medical College and Research centre, Kanpur, India

Comment number: 17

Date received: 09/04/2026

Once colonies have been isolated, then, as per brown classification three types:

1. Alpha hemolysis: Blood agar purity plate with optochin to be included for differentiation between *S.pneumoniae* and Viridans streptococci.

Bile esculine testing seems to be inadequate here, as it's for non-hemolytic streptococci

2. Under the non-hemolytic group, bile esculine testing is done, but if it's negative, then *S. agalactiae* may appear unsuitable as *S. agalactiae* is a beta-hemolytic streptococci

Recommended Action

1. NONE. Bile aesculin testing remains included for alpha haemolytic as it is routinely performed.
2. ACCEPT. The algorithm has been updated to improve linkage between haemolysis groups, including beta-haemolytic *S. agalactiae*.

Respondents indicating they were happy with the contents of the document

Overall number of comments: 8			
Date received	31/03/2026	Laboratory name	North Kent Pathology Services
Date received	31/03/2026	Laboratory name	Microbiology department Maidstone hospital, Kent
Date received	31/03/2026	Professional body	IBMS Fellow
Date received	02/04/2026	Laboratory name	UKHSA
Date received	13/04/2026	Laboratory name	The London Clinic
Date received	15/04/2026	Professional body	Microbiology HCPC
Date received	16/04/2026	Laboratory name	University Hospitals of Coventry and Warwickshire NHS Trust
Date received	22/04/2026	Professional body	IBMS