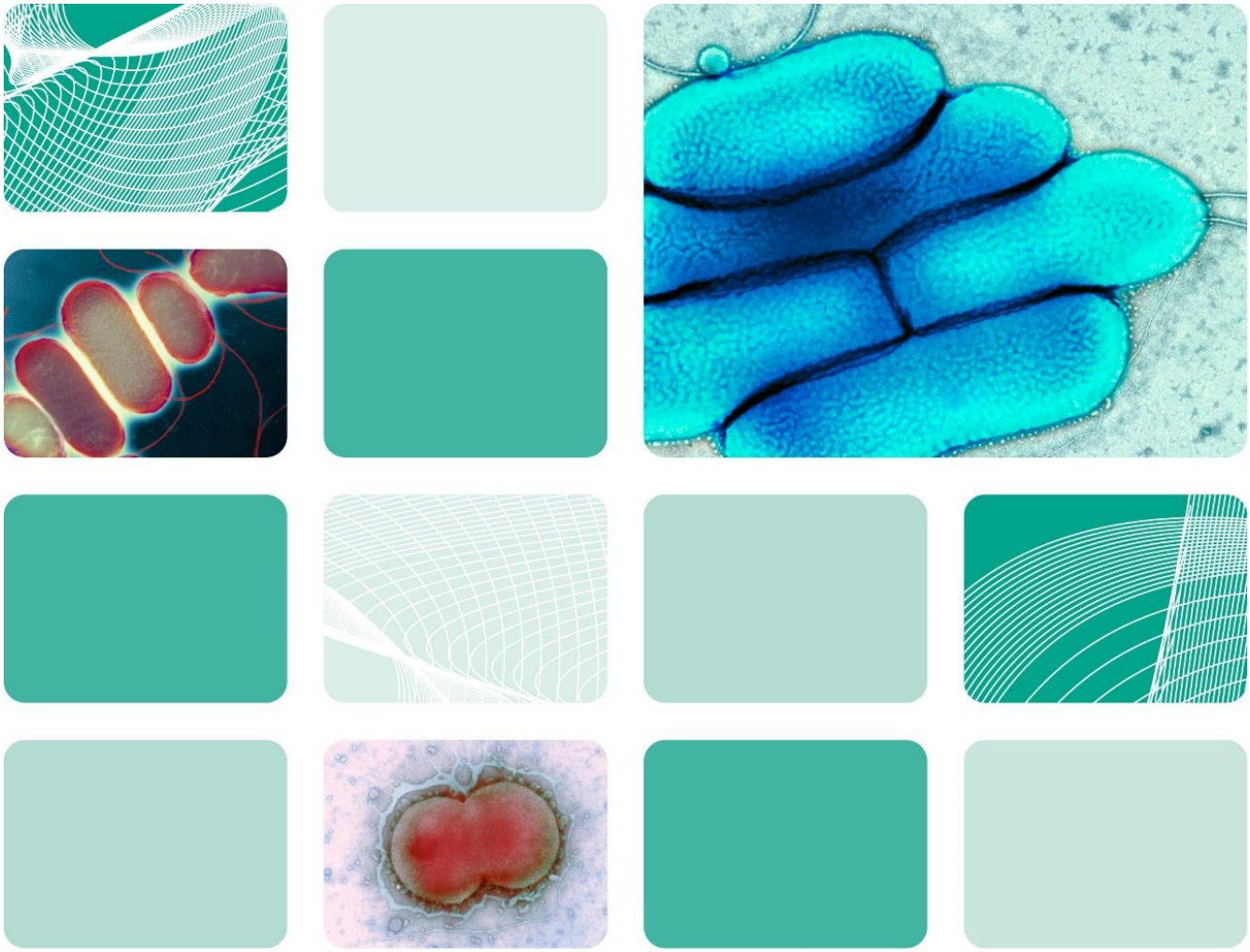
UK Health Security Agency

UK Standards for Microbiology Investigations

Abdominal organ transport fluid testing



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Acknowledgments

UK Standards for Microbiology Investigations (UK SMIs) are developed under the auspices of UKHSA working in partnership with the partner organisations whose logos are displayed below and listed on the UK SMI website. UK SMIs are developed, reviewed and revised by various working groups which are overseen by a steering committee.

The contributions of many individuals in clinical, specialist and reference laboratories who have provided information and comments during the development of this document are acknowledged. We are grateful to the medical editors for editing the medical content.

UK SMIs are produced in association with:

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Contents

Amendment table

Each UK SMI document has an individual record of amendments. The amendments are listed on this page. The amendment history is available from standards@ukhsa.gov.uk.

Any alterations to this document should be controlled in accordance with the local document control process.

Amendment number/date	1/06.02.26
Issue number discarded	1
Insert issue number	1.1
Section(s) involved	**Amendment**
Whole document.	**This is an administrative point change.** **The content of this UK SMI document has not changed.** **The last scientific and clinical review was conducted on 29/01/2020.** Hyperlinks throughout document updated to Royal College of Pathologists website. Public Health England replaced with UK Health Security Agency throughout the document, including the updated Royal Coat of Arms. Partner organisation logos updated. Broken links to devolved administrations replaced. References to NICE accreditation removed. Scope and Purpose replaced with General and Scientific information to align with current UK SMI template. 'Public health responsibilities of diagnostic laboratories' section added.

Amendment number/date	-/29.01.20
Issue number discarded	-
Insert issue number	1
Anticipated next review date*	29.01.23
Section(s) involved	**Amendment**

*Reviews can be extended up to five years subject to resources available.

1 General information

View general information related to UK SMIs.

2 Scientific information

View scientific information related to UK SMIs.

3 Scope of document

This UK Standard for Microbiology Investigations (UK SMI) describes the examination of abdominal organ transport fluid (OTF) relating to abdominal organs destined for transplantation. It details the methodology for isolation and characterisation of potentially significant bacterial and fungal pathogens.

Isolation of microorganisms should not automatically trigger treatment. Treatment and management of positive results is a matter of clinical decision process and is outside the scope of this document.

This UK SMI should be used in conjunction with other relevant UK SMIs.

4 Background

Infectious complications are amongst the major causes of morbidity and mortality in patients undergoing solid organ transplantation, with proven donor-derived transmission of infection being an infrequent event. Contamination of the graft with subsequent recovery of micro-organisms from the OTF may represent a source of early post-surgical infection in transplant recipients. The OTF used to preserve the graft offers favourable conditions in which micro-organisms can survive; contamination may occur at different stages between retrieval and transplantation, including during multi-organ retrieval, back table manipulation of the organ in theatre, packaging and removal of the organ from the transport container.

The true clinical impact of microbiological contamination in abdominal organ transplantation remains unresolved, with isolation rates varying widely, from very low to up to 40%[1,2]. Whilst positive culture results seem to be infrequently linked to infectious complications with the same organism in recipients, well documented cases have been reported where significant recipient morbidity has ensued, particularly in the case of *Candida* spp[2-6].

The Organ Donation and Transplantation (ODT) directorate of NHS Blood and Transplant (NHSBT) is responsible for the procurement, characterisation and offering of organs from deceased donors in the UK. In 2017 it conducted a survey of microbiological practices in relation to microbiological culture of OTF amongst UK transplant centres, with a 52% response rate. The majority of responders (78.6%) indicated that microbiological culture of OTF has the potential to provide relevant information for patient management and that this information should be shared amongst centres receiving an organ from the same donor.

The audit also revealed that in the absence of guidance, there is wide variation in the methodology used and participants were keen to learn from the experiences of other centres. Responders agreed that harmonisation of microbiological practices, including appropriate reporting of results, was highly desirable.

This UK SMI aims to address those gaps by developing an agreed methodology for culture of OTF, including the reporting of results, so as to contribute to improved and safer practices in abdominal organ transplantation. It does not prescribe treatment of isolates as a result of using this methodology.

It is hoped that with the harmonization of methodologies and practices, data can be collected to understand better and evaluate the role of microbiological culture of OTF.

5 Safety considerations

Containment Level 2.

6 Investigation

6.1 Culture of abdominal organ transport fluid

6.1.1 Specimen type

Abdominal organ transport fluid also known as perfusion fluid or transport perfusion fluid, is used to submerge abdominal organs during transportation between donor hospital and recipient transplant centres.

Abdominal organs (liver, pancreas and kidney) are packaged and cold stored by submersion in transport fluid. In the UK, two OTF types are used: University of Wisconsin (UW) solution and Soltran solution.

6.1.2 Pre-laboratory processes

Specimen collection, transport and storage[7]:

Type of specimen and sample registration

Samples should be clearly labelled as ‘Organ Transport Fluid’ and must be registered on the laboratory information management system under this specific specimen type.

Samples need to be logged and processed following local procedures in a manner that will allow the ODT Hub coordinator to link the results between donor(s) and recipient(s).

Optimal time and method of collection

For safety considerations refer to Section 5.

Collect specimen from fluid surrounding the organ immediately after the organ has been lifted from the transport bag for implantation.

Collect specimen into appropriate CE marked leak proof containers and place in sealed plastic bags.

Volume of material to submit for analysis[8]

The volume of transport fluid used differs depending on the size of organ being transplanted. A minimum of approximately 5% of the total volume in the organ transport bag should be used for analysis (ideally a minimum of 20mL).

Optimal transport and storage conditions

If not processed immediately following collection, specimens should be refrigerated and processed within 18 hours.

In accordance with ISO15189 standards, laboratories are responsible for monitoring the sample journey from collection through to commencement of processing to ensure specimen integrity and that samples are received within clinically-meaningful time-frames[8].

6.1.3 Laboratory processes (analytical stage)

Culture

Specimen processing

Centrifuge a minimum of 20mL of specimen (see 6.1) and use for inoculation of media plates:

- centrifuge in a sterile, capped, conical-bottomed container at 1200xg for 5mins
- remove all but the last 0.5mL of the supernatant using a sterile pipette
- re-suspend the deposit in the remaining fluid
- microscopy is not recommended
- inoculate each agar plate with the centrifuged deposit (see UK SMI Q 5 – Inoculation of culture media for bacteriology) using a sterile pipette
- for the isolation of individual colonies, spread inoculum with a sterile loop

Table 1: Culture media, conditions and organisms

Standard media	Incubation			Cultures read	Target organism(s)
	Temp °C	Atmosphere	Time		
Blood agar	35-37	5-10% CO_2	40-48 hrs	16-24 hours and 40-48 hours	Any organism
Sabouraud agar	28-30	Air	5 days	Day 2 and Day 5	Moulds and Yeasts
CLED	35-37	Air	16-24 hours	≥16hr	Enterobacterales

Identification:

Refer to individual UK SMIs for organism identification.

Minimum level of identification in the laboratory

All organisms should be identified to species level.

Mixed growth is not common.

Matrix-assisted laser desorption-ionization time-of-flight mass spectrometry (MALDI-TOF MS) has been shown to be a rapid and powerful identification tool for cultured isolates because of its reproducibility, speed and sensitivity of analysis and is available in most laboratories. Refer to UK SMI UK SMI TP 40 - MALDI TOF MS test procedure.

6.1.4 Post-laboratory processes (reporting procedures)

Routine local laboratory reporting

Report:

- Clinically significant organisms with antimicrobial susceptibility results
- No growth of clinically significant organisms*
- No growth

** Identification should not be reported for organisms of no clinical significance.*

Communicating results to ODT

The communication process below is in addition to the routine reporting and communication of results between the laboratory and clinical teams, according to local protocols.

Local protocols should ensure that results are reported to and received from the ODT Hub with the timely involvement of clinical transplant and microbiology specialists.

It is acknowledged that local algorithms will determine whether communication of results to ODT Hub is done by the transplant team or the microbiology team.

Table 2: Organisms to be communicated to ODT Hub

Organism	When to send the Rapid Alert
Candida spp. Filamentous fungi *Staphylococcus aureus* Group A Streptococci	Communicate these organisms as soon as they are identified; antibiotic sensitivities to follow, when available
Enterobacterales *Enterococcus* spp. *Pseudomonas aeruginosa* Pyogenic streptococci (other than Group A)	Communicate organism ID and sensitivities together when both are finalised
Other organisms considered locally to be of potential clinical significance	At local laboratory discretion
No growth of clinically significant organisms' or 'No Growth'	Not to be communicated to ODT Hub

Mechanism of communication with ODT Hub

Refer to ‘Appendix - ODT reporting form’ for communication of results to ODT Hub, as detailed in Table 2 above.

All reports received by the ODT hub are forwarded promptly to all other transplant centres where organs from the common donors have been transplanted. These do not undergo clinical vetting and are cascaded immediately, for consideration by the recipient transplant centres.

7 Antimicrobial susceptibly testing

Refer to EUCAST guidelines.

Choice of agents to be tested for susceptibility should follow laboratory practice for isolates obtained from sterile sites.

Isolates requiring antimicrobial susceptibility testing

- *Candida* spp.
- Enterobacterales
- *Enterococcus* spp.
- Filamentous fungi
- *Pseudomonas aeruginosa*
- Group A streptococci
- Pyogenic streptococci (other than Group A)
- *Staphylococcus aureus*
- Other organisms considered locally to be potentially clinically significant

This UK SMI does not recommend susceptibility testing of isolates not deemed to be clinically significant.

8 Referral for incident investigations

As part of investigations, including possible transmission events and clinical incidents, laboratories are requested to assist the organ procurement organisation (ODT) by referring samples or isolates on request.

9 Referral to reference laboratories

For information on the tests offered, turnaround times, transport procedure and the other requirements of the reference laboratory click here for user manuals and request forms.

Organisms with unusual or unexpected resistance, or associated with a laboratory or clinical problem, or anomaly that requires elucidation should be sent to the appropriate reference laboratory.

Contact appropriate devolved national reference laboratory for information on the tests available, turnaround times, transport procedure and any other requirements for sample submission:

England

Wales

Scotland

Northern Ireland

Notes: In case of sending away to laboratories for processing, ensure that specimen is placed in appropriate package and transported accordingly.

10 Public health responsibilities of diagnostic laboratories

Diagnostic laboratories have public health responsibility as part of their duties. Amongst these are additional local testing, or referral to further characterise the organism as required, primarily for public health purposes e.g. routine cryptosporidium detection; serotyping or microbial subtyping; and a duty to refer appropriate specimens and isolates of public health importance to a reference laboratory.

Diagnostic laboratory outputs inform public health intervention, and surveillance data is required to develop policy and guidance forming an essential component of healthcare. It is recognised that additional testing and referral of samples may entail some costs that has to be borne by the laboratory but in certain jurisdictions these costs are covered centrally.

Diagnostic laboratories should be mindful of the impact of laboratory investigations on public health and consider requests from the reference laboratories for specimen referral or enhanced information.

Appendix: ODT rapid alert form

RAPID ALERT – ID & Sensitivities Positive Organ Transport Fluid Result				
Donor Information	**ODT Number**		**Case number**	
	Forename		**Date of Birth**	
	Surname			

Organ Transport Fluid Result		
	Which organ was transport fluid from: (for example left kidney, liver, pancreas)	
	Screenshot or copy of report attached? (please delete as appropriate): **Y / N** (If '**N**', please fill in details of isolate below)	
	Name of Organism(s)	
	Antibiotic sensitivities (Organism with asterisk on list below – sensitivities to follow)	*No need to fill in if attaching report*

Contact Details for Further Information			
	Microbiology	**Laboratory**	
		Contact name/role	
		Phone number	
	Transplant team	**RCPOC name/role**	
		Phone number	
		Name and role of person completing form	
		Date of completion	

Criteria for Communication of Results to ODT Hub according to organisms isolated

Organism	When to send the Rapid Alert
Candida spp. Filamentous fungi *Staphylococcus aureus* *Streptococcus pyogenes*	Communicate these organisms as soon as they are identified; antibiotic sensitivities to follow, when available
Enterobacterales Enterococcus spp. *Pseudomonas aeruginosa* Pyogenic streptococci (other than Group A)	Communicate organism ID and sensitivities together when both are finalised
Other organisms considered locally to be of potential clinical significance	At local laboratory discretion
No growth of clinically significant organisms' or 'No Growth'	Not to be communicated to ODT Hub

Email a completed copy of this form **immediately** to: odthub.operations@nhsbt.nhs.uk and they will disseminate to all relevant centres.

References

An explanation of the reference assessment used is available in the scientific information section on the UK SMI website.

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