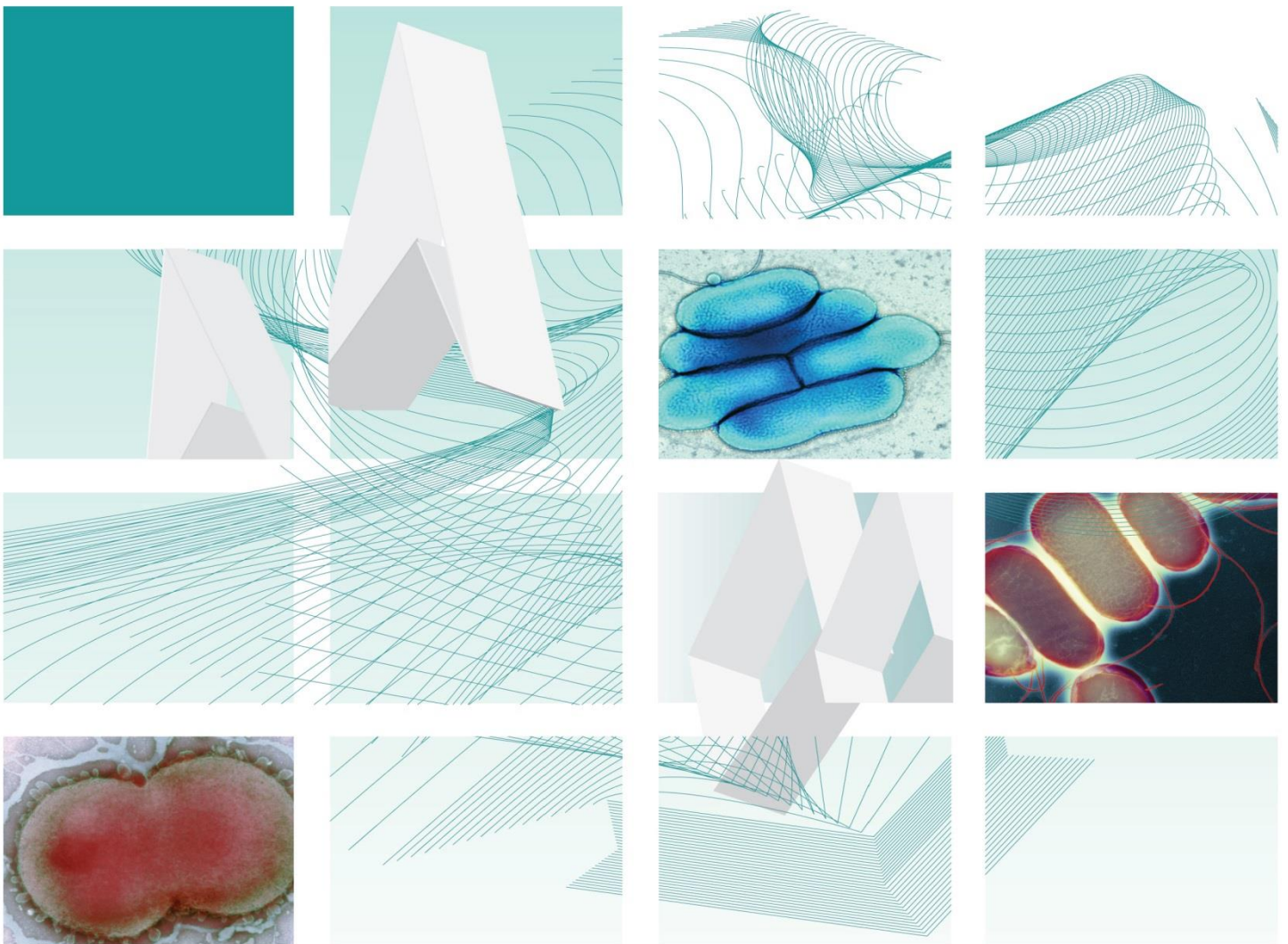


# UK Standards for Microbiology Investigations

## Abdominal organ transport fluid testing



"NICE has renewed accreditation of the process used by **Public Health England (PHE)** to produce **UK Standards for Microbiology Investigations**. The renewed accreditation is valid until **30 June 2021** and applies to guidance produced using the processes described in **UK standards for microbiology investigations (UKSMIs) Development process, S9365', 2016**. The original accreditation term began in **July 2011**."

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## Amendment table

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Each UK SMI method has an individual record of amendments. The current amendments are listed on this page. The amendment history is available from [standards@phe.gov.uk](mailto:standards@phe.gov.uk).

New or revised documents should be controlled within the laboratory in accordance with the local quality management system.

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

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

## 1. General information

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[View](#) general information related to UK SMIs.

## 2. Scientific information

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[View](#) scientific information related to UK SMIs.

## 3. Scope of document

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This 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

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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%<sup>1,2</sup>. 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<sup>2-6</sup>.

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 Standard for Microbiology Investigations 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

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Containment Level 2.

## 6. Investigation

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### 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<sup>7</sup>:

#### 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<sup>8</sup>

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<sup>8</sup>.

## 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 [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 <sub>2</sub>	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 [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
<i>Candida</i> spp. Filamentous fungi <i>Staphylococcus aureus</i> Group A Streptococci	Communicate these organisms as soon as they are identified; antibiotic sensitivities to follow, when available
Enterobacterales <i>Enterococcus</i> spp. <i>Pseudomonas aeruginosa</i> 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 susceptibility testing**

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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**

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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**

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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 and Wales

<https://www.gov.uk/specialist-and-reference-microbiology-laboratory-tests-and-services>

Scotland

<http://www.hps.scot.nhs.uk/reflab/index.aspx>

Northern Ireland

<http://www.publichealth.hscni.net/directorate-public-health/health-protection>

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

## Appendix: ODT rapid alert form

### **RAPID ALERT – ID & Sensitivities** **Positive Organ Transport Fluid Result**

<b>Donor Information</b>	<b>ODT Number</b>		<b>Case number</b>	
	<b>Forename</b>		<b>Date of Birth</b>	
	<b>Surname</b>			

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

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

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

<b>Organism</b>	<b>When to send the Rapid Alert</b>
<i>Candida</i> spp. Filamentous fungi <i>Staphylococcus aureus</i> <i>Streptococcus pyogenes</i>	Communicate these organisms as soon as they are identified; antibiotic sensitivities to follow, when available
Enterobacterales Enterococcus spp. <i>Pseudomonas aeruginosa</i> 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](mailto:odthub.operations@nhsbt.nhs.uk) and they will disseminate to all relevant centres.

## References

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1. Ranghino A, Diena D, Simonato F, Messina M, Burdese M, Piraina V et al. Clinical impact of bacterial contamination of perfusion fluid in kidney transplantation. *Springerplus* 2016;5:7. **B, II**
2. Garcia-Zamora C, Segura J, Lopez-Lopez V, Salvador C, Cascales Campos PA, Pons Minano JA et al. Clinical Significance of Contamination of the Preservation Solution in Liver Transplantation. *Transplant Proc* 2015;47:2322-3. **B, II**
3. Cotter MP, Smyth E, O'Gorman J, Browne S, Hickey DP, Humphreys H. Low predictive value of positive transplant perfusion fluid cultures for diagnosing postoperative infections in kidney and kidney-pancreas transplantation. *J Clin Pathol* 2012;65:1132-5. **B, II**
4. Levesque E, Suet G, Merle JC, Compagnon P, Amathieu R, Feray C et al. Candida vascular complication in a liver transplant recipient due to yeast contamination of preservation solution. *Transplant Infectious Disease*. **B, II**
5. Sharma AK, Smith G, Smith D, Sinha S, Rustom R, Sells RA et al. Clinical outcome of cadaveric renal allografts contaminated before transplantation. *Transplant International* 2005;18:824-7. **B, II**
6. Albano L, Bretagne S, Mamzer-Bruneel M-F, Kacso I, Desnos-Ollivier M, Guerrini P et al. Evidence That Graft-Site Candidiasis after Kidney Transplantation Is Acquired during Organ Recovery: A Multicenter Study in France. *Clinical Infectious Diseases* 2009;48:194-202. **B, II**
7. Official Journal of the European Communities. Directive 98/79/EC of the European Parliament and of the Council of 27 October 1998 on *in vitro* diagnostic medical devices 1998. 1-37. **A, V**
8. Baron EJ, Miller JM, Weinstein MP, Richter SS, Gilligan PH, Thomson RB, Jr. et al. A Guide to Utilization of the Microbiology Laboratory for Diagnosis of Infectious Diseases: 2013 Recommendations by the Infectious Diseases Society of America (IDSA) and the American Society for Microbiology (ASM). *ClinInfectDis* 2013;57:e22-e121. **B, V**