

Department: Microbiology	Gloucestershire Hospitals NHSFT	Review Interval: 3 years
Author: J. Lewis	Approved by: S. Byrne	

Factors Affecting Microbiology Tests

Although not an exhaustive list, the following are factors which may affect the performance of microbiology tests. Steps should be taken wherever possible to minimise the potential impact of these factors. Further information on factors affecting individual tests can be found at our websites:

<https://intranet.gloshospitals.nhs.uk/departments/diagnostics-specialties/pathology/>
<https://www.gloshospitals.nhs.uk/our-services/services-we-offer/pathology/>

Site of Collection

In some cases, the site of sampling is essential to ensuring an accurate culture result. For example:

- For fungal culture of skin infection, scrapings should be taken at the advancing edge of the infection.
- For wound or abscess infections, samples of pus rather than swabs should be collected where possible.
- For gonococcal infection, cervical swabs are better than vaginal swabs
- For pertussis infection, a properly taken pernasal swab is essential to ensure recovery of the organism (serology is also useful if >2 weeks post the onset of symptoms).

Lower limb ulcers will always be colonised with bacteria, so a positive culture result may not distinguish clinical infection from colonisation. To help improve the culture result, debris on ulcers should be removed and the ulcer cleaned with saline before swabs are taken.

Time of Collection

Samples for culture should, if possible, be taken before antibiotics are started.

Delays in the time from collection to receipt of the sample by the laboratory may allow contaminating organisms to overgrow leading to potentially misleading results.

Certain tests are more sensitive if the samples are taken at particular times of the day (e.g. early morning urine sampling for Mycobacteria culture and between 10am and 2pm for Schistosomiasis microscopy).

Sample Container

It is important that the correct specimen container is used. Further details on the approved containers can be found on our website. Specimen containers have been validated for use in microbiological testing. Samples that are sent using incorrect or inappropriate containers may not be tested.

The specimen containers used for semen samples have been checked to ensure that they do not have spermicidal properties (which would adversely affect the test). If you are provided with a specimen container to use for a particular test, please ensure to only use that container.

Transport Medium

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Title: Factors Affecting Microbiology Tests	
User Ref: MICHC 091	Issue No. 1.2
Page 1 of 3	Issue Date: 19.05.2022
Location of copies: 1. Q-pulse 2. Pathology Web Pages.	

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Most of our swabs contain a charcoal-based transport medium. This is designed to neutralise any antimicrobial agents present and to preserve the bacteria during transit to the laboratory. The presence of charcoal has been shown to significantly improve the recovery of fastidious organisms (such as *Neisseria gonorrhoeae*).

We do use dry transport swabs for MRSA screening, but these should only be used for this purpose. Sending dry transport swabs for routine bacterial culture will significantly reduce the effectiveness of the culture.

Other types of swab include virocult swabs (green top) for general purpose virology and respiratory PCR investigations, and pernasal swabs (blue top) for pertussis culture.

Please make sure all swabs are used before their expiry date. Stocks of infrequently used swabs (e.g. virocult swabs) may expire before use. The laboratory is not able to process swabs if used after the expiry date.

Transport Temperature

Most microbiology specimens can be stored at room temperature for up to 24 hours before transport to the lab. Storage beyond 24 hours should ideally be at 2-8°C. Refrigerating samples will help to prevent overgrowth of bacteria, and will help ensure a more accurate culture result. The key exceptions are blood culture bottles and genitourinary samples for gonococcal culture. These samples should not be refrigerated, as it can affect the recovery of fastidious organisms.

Transport Time

In general, specimens should be transported to the laboratory as soon as possible, and ideally within 24 hours.

There are critical transport times for some blood tests:

- Samples for gamma-interferon testing must reach the laboratory by 3pm on the day of collection. In the case of quantiferon tests, these samples can only be processed between Monday and Wednesday.
- Samples for viral load testing should ideally reach the laboratory within 6 hours.

For some time sensitive tests (e.g. hot stool for detection of amoebic dysentery), the lab should be informed before the sample is sent, so that preparations can be made to process immediately on receipt.

Semen samples need to be received within certain timeframes to ensure the validity of results. Samples for fertility investigations must be received within 1 hour, and samples for post-vasectomy testing should be received within 4 hours.

Staff

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Staff both collecting and processing Microbiology samples can impact on the results provided. To mitigate the impact of staff on quality and reproducibility of results, sample collection guides are provided on user web pages where appropriate, and a series of competency assessments are completed by laboratory staff prior to performing a process independently. As part of the verification/validation process of any new assay or procedure inter and intra operator variability is reviewed and subsequently monitored through the use of EQA and IQC material.

Clinical Details

Although not a direct impact, the sensitivity and interpretation of some tests relies on the laboratory being given suitable clinical details. In some cases, we will only look for a particular infection if indicated by the clinical details. Important clinical details would include history of foreign travel, recent hospitalisation abroad, occupational factors such as abattoir worker or vet, and vaccination history. Date of onset of symptoms is particularly important for serological investigations. Samples without full clinical details may have testing delayed if further information is needed.

Sample Labelling

All samples sent to the laboratory must comply with the Pathology Labelling Policy: <https://www.gloshospitals.nhs.uk/our-services/services-we-offer/pathology/information-service-users/sample-labelling/>

Unlabelled samples will not be tested by the laboratory, so please ensure adequate labelling of both the sample and the request form.

Quantitative Results

Assays that provide a quantitative result are assessed by the laboratory so that we can calculate the degree of uncertainty. This gives us an indication of the variability of the assay, and enables us to accurately set the cut-offs for clinical importance. Information on the variability of each assay is currently available on request from the lab.

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