Specimen collection 1: general principles and procedure for obtaining a midstream urine specimen

Obtaining a specimen involves the collection of tissue or fluids for laboratory analysis or near-patient testing, and may be the first step in determining a diagnosis and treatment (Dougherty and Lister, 2015). The procedure used to collect a specimen must minimise the risk of introducing error and protect the health and safety of both the patient and the staff who handle the sample. This article, the first in a four-part series, explores the general principles of specimen collection and describes how to collect a midstream specimen of urine (MSU).

Specimens are an important part of a holistic assessment and can help to:
- Build a clinical picture of the patient;
- Confirm a diagnosis;
- Inform a treatment plan.

Nurses frequently collect specimens including urine, stool and sputum. They may also perform venepuncture to collect blood samples and support patients through complex procedures to collect specimens, such as biopsies.

An accurate specimen collection technique is essential to reduce the risk of contamination, which can lead to inaccurate results and inappropriate treatment (Brekle and Hartley, 2014), and can result in a longer length of hospital stay (Dougherty and Lister, 2015).

Specimens must be collected at the right time, using the correct technique and equipment, and be delivered to the laboratory as quickly as possible (Dougherty and Lister, 2015). Good practice principles for specimen collection are outlined in Box 1.

**Consent**

Patients should give informed consent for specimen collection and, as part of the process, the nurse should:
- Inform the patient of the reason for specimen collection;
- Explain the procedure;
- Assess the patient’s understanding;
- Explain how long it will take for the

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**Box 1. Specimen collection: good-practice principles**

The specimen must be:
- Appropriate to the patient’s clinical presentation
- Collected at the right time
- Collected in a way that minimises contamination
- Collected in a way that reduces health and safety risk to all staff handling the specimen (including laboratory staff)
- Collected using the correct equipment
- Documented clearly using appropriate forms
- Stored/transported appropriately

Source: Higgins (2008)

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**Box 2. Collecting tissue/body fluids: precautions to take**

The collection of any tissue/fluid carries a risk to staff from splash or inoculation injury, so standard infection prevention and control precautions should be followed. These include adhering to:
- Hospital environmental hygiene principles
- Hand hygiene principles
- Use of personal protective equipment
- Safe use and disposal of sharps
- Principles of asepsis

Source: Loveday et al (2014)

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**Professional issues**

Nurses must be:
- Aware of their organisation’s policies and procedures for specimen collection;
- Able to explain the purpose of the specimen to the patient and the implication for treatment, and be able to obtain informed consent;
- Competent to undertake the procedure (Nursing and Midwifery Council, 2015) – this includes knowing the correct procedure for the collection, handling and transportation of the sample (Dougherty and Lister, 2015; RCN, 2012);
- Aware of standard infection prevention and control principles involved in the collection of tissue and body fluids (Box 2) (Loveday et al, 2014);
- Aware and understand the importance of accurate record keeping (NMC, 2015).

**Equipment**

The equipment required will vary according to the specimen so nurses should consult local policies about which container to use. Using an incorrect container can affect the accuracy of results; for example, bacterial swabs contain a transport medium that is incompatible with viruses (Dougherty and Lister, 2015).

General equipment required includes:
- Disposable gloves and apron – additional personal protective equipment (gown, mask/respirator, visor) may be required depending on the specimen;
- Protective tray to carry equipment;
- Sterile container appropriate for the specimen (consult local policies);
- Laboratory specimen form;
- Polythene transportation bag;
- Biohazard (high-risk) label indicating the danger of infection (Brekle and Hartley, 2014) if the patient is known or suspected to have a Hazard Group 3 pathogen such as hepatitis B, hepatitis C or HIV (Health and Safety Executive, 2003).
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Fig 1. Specimen pot used for MSU collection

results to be available and how the patient will receive them;
- Implications for care (Dougherty and Lister, 2015).

Request forms
Request forms should include:
- Patient’s name, date of birth, ward/department and patient identification number or NHS number;
- Type of specimen and the site from which it was obtained;
- Investigation required;
- Date and time collected;
- Diagnosis, history and reasons for request – for example, diarrhoea and vomiting, rash, pyrexia;
- Rationale for taking the sample;
- History of antimicrobial drugs prescribed and administered if possible – specimens should be collected before antibiotics are prescribed as they may affect the result;
- Contact details of the health professional ordering the investigation (Dougherty and Lister, 2015; Brekle and Hartley, 2014);
- High-risk label if required.

Sample label
The sample should be labelled with:
- The patient’s name and date of birth;
- Ward/department/clinic;
- Identifier/NHS number;
- Date and time of specimen collection;
- Type and site of specimen;
- High-risk label if required.

Transporting specimens
All specimen containers must be transported in a self-sealing polythene bag with two compartments: one for the laboratory request form and one for the specimen (Brekle and Hartley, 2014). Specimens should be sent to the laboratory as soon as possible after collection as a delay may adversely affect the results. If immediate transportation is not possible, it is important to consult local guidelines about storage of specimens.

Collecting an MSU
When a urinary tract infection is suspected, an MSU may be required for microscopy, culture and sensitivities. This helps to identify the causative organism and select appropriate antibiotics to treat the infection. An MSU may also be obtained for near-patient urine testing and other tests, such as toxicology screening to identify causes of poisoning or drug overdose.

The collection of an MSU must be performed as part of a holistic assessment and must be considered alongside the presenting signs and symptoms (Box 3).

Patient preparation
To obtain an MSU, patients need to be continent and able to empty their bladder on request.
Urine in the bladder is sterile and, in the absence of a UTI, it should not be contaminated with bacteria. However MSUs can become contaminated by:
- Bacteria that colonise the distal urethra;
- Hand or genital contamination.
The aim of collecting MSUs is to reduce the effects of urethral contamination by taking a sample of urine while the bladder is emptying, avoiding the initial and end stages of micturition. Bacteria around the distal urethra are washed away by the initial urine flow (Dougherty and Lister, 2015).

Patients should wash and dry their hands before collecting an MSU; Dougherty and Lister (2015) also recommend that the urethral meatus is cleaned to further reduce the risk of contamination, although they acknowledge that the effectiveness of this intervention has been questioned.

Equipment
The following equipment is required:
- Sterile specimen pot (Fig 1);
- Sterile container with a wide top to collect the urine, which can then be transferred into a specimen pot;
- Soap and water, 0.9% sodium chloride solution or a disinfectant-free solution for genital hygiene;
- Gloves/plastic apron (if required);
- Appropriate forms/documentation.

The procedure
1. Obtain informed consent and explain the procedure to optimise the quality of the specimen.
2. Explain the steps of the procedure and how to avoid contaminating the specimen. Check whether the patient needs any help.
3. Identify a suitable location to collect the specimen, for example a clean toilet, and ensure the patient’s privacy and dignity are maintained.
4. Wash your hands and put on gloves and an apron if you are accompanying the patient or handling the specimen.
5. Ask the patient to wash their hands with soap and water and dry them, to reduce the risk of the specimen being contaminated.
6. Patients who are able to do so should

Box 3. Urinary tract infection: signs and symptoms
- Dysurea (pain when passing urine)
- Frequency or urgency to urinate
- Pyrexia (38°C or above skin temperature) or chills
- Worsening of mental or functional status, particularly in older people
- New flank or suprapubic pain or tenderness
- Change in character of urine (such as new bloody urine, foul smell or sediment)

Source: Health Protection Scotland (2013)
perform genital hygiene with soap and water, 0.9% sodium chloride solution or a disinfectant-free solution (Dougherty and Lister, 2015). Uncircumcised men should retract the foreskin and women should part the labia and clean from front to back around the urethral meatus. Women should separate their labia with their fingers and clean around the urethral meatus. Uncircumcised men should retract their foreskin to clean around their urethra meatus. Women should part their labia and clean from front to back around the urethral meatus. Women should separate their labia with their fingers while passing the first 15-30ml of urine into the toilet to wash away any bacteria colonising the distal urethra.

This procedure should be undertaken only after approved training, supervised practice and competency assessment, and should be carried out in accordance with local policies and protocols.

Professional responsibilities

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The patient can then void the remaining urine into the toilet.

Transfer the specimen into a sterile container and seal the lid.

Ask the patient to wash their hands.

Remove your gloves and wash your hands.

Complete the documentation on the specimen pot, request form and in the patient’s notes (2d).

Place the specimen and request form in the specimen bag.

At the end of the procedure, decontaminate your hands with either alcohol hand rub or soap and water.

If the patient needs help, follow standard infection prevention and control precautions, and wear gloves and an apron (as a minimum) when collecting and handling the MSU. Patients may find the procedure embarrassing and it is important to protect their privacy and dignity while offering or providing support.

References


Specimen collection series Date

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Part 2: Catheter specimen of urine Aug

Part 3: Stool specimen Sep

Part 4: Sputum specimen Oct