SPECIMEN COLLECTION AND LABELLING (For External Clients)

QUALITY SAMPLE IN → QUALITY RESULT OUT
To better serve our patients in the hospital and our external clients, and to process their samples efficiently, we equipped our laboratory with an Laboratory Automation System and other instruments.
Better equipment comes with more complex technologies

We have a lot more barcode readers and sensors to automate the process.

AUTOMATION = FASTER TAT!
OVERVIEW ON SENDING SAMPLES TO NUH

- Sample registration
- Samples are sent to NUH
- Samples are packed appropriately
- Results available in Laboratory Information System
- Results are sent to the Referring Laboratory as soon as possible
- Samples are sent to NUH

Referring Laboratory

National University Hospital

Sample registration

Sample analysis

Results available in Laboratory Information System
Points to note for Specimen Collection

- Type of sample
- Adequate sample volume
- Quality of sample
- Alignment of patient label
TYPE OF SAMPLE

Samples with correct preservatives
• Some tests can be run only on certain sample types.
• Please refer to our test catalogue for the correct specimen type to be sent and other additional information.

Samples with correct preservatives

Primary tube vs. aliquot tube
• It is recommended to separate the serum/plasma from blood cells within two hours of sample collection.
• For optimal sample stability, it is strongly advised to separate the blood cells and send the aliquoted sample at the appropriate temperature for the test to our laboratory.

It is important to ensure the correct type of sample is collected and sent to our laboratory for analysis.
1. Samples with correct preservative
2. Primary tube vs. aliquot tube
ADEQUATE SAMPLE VOLUME

Having sufficient blood/specimen levels ensure patients’ blood samples can be processed on the Laboratory Automation as soon as possible, without manual intervention.

Sodium Citrate Tube Needs to be 90% filled

Having sufficient blood/specimen in sodium citrate (blue top) tube ensures the correct blood:anticoagulant ratio to prevent dilution of coagulation factors.
ADEQUATE SAMPLE VOLUME

Blood Culture Bottles Need to be sufficiently filled
Lower blood volumes leads to:
• False negative results
• Slower time to detection and recovery of organisms
QUALITY OF SAMPLES

What causes haemolysed samples?
• Leaving tourniquet on for extended time (> 1 minute)
• Excessive fist clenching
• Vigorous mixing of blood tube
• Purging blood from syringe to vacutainer via needle
• Traumatic draw (collapsed vein / excessive probing)

Consequences of haemolysed samples
• Falsely elevated Potassium, enzymes
• Inaccurate results
• Results may be invalidated if there is gross haemolysis
• A repeat sample may be required
QUALITY OF SAMPLES

EDTA contamination in serum tubes

What causes EDTA contaminated samples?

- Incorrect order of draw (EDTA tube drawn before SST or Red top tube)
- The wrong (EDTA) cap is being replaced on the serum tube

Consequences of EDTA contaminated samples

- Falsely elevated Potassium
- Falsely low Calcium and ALP results
- A repeat sample must be taken
Order of Draw

Note:
1) Use a plain (red) discard tube when using a butterfly needle if the first tube collected is citrate (blue).
2) Draw blood culture bottles first (Aerobic followed by Anaerobic).
QUALITY OF SAMPLES

Drip arm contamination in blood tubes

What causes drip arm contaminated samples?

- Blood taken from the arm which an IV drip line was inserted

Consequences of drip arm contaminated samples

- Increased drip analytes e.g. Glucose, Potassium, etc
- **Dilutional effect** which lowers other analyte concentrations
- **A repeat sample must be taken**
Putting the right label on the right blood tube in the right alignment

LABELLING BLOOD TUBES CORRECTLY
The Correct Way to Label Blood Tubes

1. Barcode is aligned straight for analyser barcode readers to read
2. 2 Unique Identifiers are visible
   - Patient Name
   - Patient I/C Number
3. Tube / Container with sufficient volume
4. Leave a visible window to allow the laboratory personnel to check
UNACCEPTABLE EXAMPLES OF SPECIMEN LABELLINGS

These types of specimen labelling are not accepted by our Laboratory Automation System. Manual intervention is required to reprint the appropriate labels.
Tube and cap mismatch
• Sample contamination
• Inaccurate results

Barcode position not straight
• Barcode cannot be read
• Manual intervention
• Increased TAT

Barcode position too low
• Barcode cannot be read
• Manual intervention
• Increased TAT
• Wrinkled label at the bottom of tube may cause mechanical error

Barcode in wrong position
• Barcode cannot be read
• Manual intervention
• Increased TAT

UNACCEPTABLE EXAMPLES OF SPECIMEN LABELLINGS
UNACCEPTABLE EXAMPLES OF SPECIMEN LABELLINGS

**Barcode label over the cap**
- Tube cap cannot be removed by analyser
- Error

**2 barcode labels on 1 tube**
- 2 barcodes read
- Confuses the automation system

**No barcode label on tube**
- Do not know which sample belongs to which patient
- Compromises Patient Safety

**Many tubes sharing 1 barcode labels**
- Cannot be loaded on automation system
- Manual intervention required
- Increased TAT
Real-life Examples

Barcode label not straight

Under- and Over-filled blood culture bottles

Few drops of blood – Cannot run tests

Label pasted too low – barcode read error

2 Barcode labels on 1 blood tube – Creates barcode confusion

And many more ... ...
Additional Required Information

- Additional information should be provided to allow appropriate interpretation of results
- These information may be provided to us via:
  - Requisition form,
  - Information on the sample label

- Some examples of additional information required:
  1. Gender
  2. Date of birth and age
  3. Race
  4. Patient history, if necessary
  5. Etc
From Singapore/Overseas... To NUH Laboratory

Let us work together!

Quality Sample in → Quality Result out