SPECIMEN COLLECTION AND LABELLING
(For NUHS Regional Healthcare System)
QUALITY SAMPLE IN → QUALITY RESULT OUT
IN DEPARTMENT OF LABORATORY MEDICINE...

To better serve our patients in the hospital and in our healthcare system, and to process their samples efficiently, we equip our laboratory 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!
PLEASE HELP US TO HELP YOU...

To improve patients’ experience during their stay by:
• Reducing redraw
• Improving the results TAT
Points to note for Specimen Labelling

- Type of sample
- Information on iSMART labels
- Adequate sample volume
- Quality of sample
- Alignment of Laboratory Accession label
TYPE OF SAMPLE

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

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.

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.
iSMART Labels

What information can you see from the label?

Dept of Laboratory Medicine
- CO = Core Laboratory
- CH = Chemistry
- HM = Haematology
- MB = Microbiology
- MD = Molecular Diagnostic Centre
- BSC = Stem Cell
- BTS = Blood Transfusion Services
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 Needs to be sufficiently filled

Lower blood volumes leads to:
• False negative results
• Slower time to detection and recovery of organisms
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 will be invalidated if there is gross haemolysis
- A repeat sample may be required
QUALITY OF SAMPLES

Consequences of Bubbles in ABG

- Air bubbles may seriously affect the arterial sample, parameters related to $pO_2$ will be biased
- $\uparrow pO_2$, $\downarrow pCO_2$, $\uparrow O_2$ saturation

Preventing Air Bubbles in ABG

- Visually inspect the sample for air bubbles
- Dislodge any bubbles by gently tapping the sides
- Expel air bubbles right after sampling
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
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

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
• Causes increased result turnaround time
• Results in a longer waiting time for the patient = Unhappy experience for patient
UNACCEPTABLE EXAMPLES OF SPECIMEN LABELLINGS

**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 direction**
- Barcode cannot be read
- Manual intervention
- Increased TAT
**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 sample belongs to which patient
- **Compromises Patient Safety**

**Many tubes sharing 1 barcode labels**
- Cannot be loaded on automation
- Manual intervention
- Increased TAT

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UNACCEPTABLE EXAMPLES OF SPECIMEN LABELLINGS
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 the Clinic/Ward... To NUH Laboratory

Let us work together!

Quality Sample in → Quality Result out

A member of the NUHS