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Date Document Printed: __________  Signed: __________

Time Document Printed: __________  Print Name: __________
**************Quick Reference STGH Test Menu***************

Blood Cultures for Microbiology should be taken before any blood samples.

<table>
<thead>
<tr>
<th>Adult Sample Type</th>
<th>Test</th>
<th>Paediatric Sample Type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coag, INR, APTT PT, D-Dimers</td>
<td></td>
</tr>
<tr>
<td>STGH</td>
<td>UE, LFT, FBP, MG, PO4, PHS, AST, ALT, Alk Phos, Calcium, Amylase, Acetaminophen (Paracetamol), Chloride, Na, K, Urea, Creatinine</td>
<td></td>
</tr>
<tr>
<td>GPs</td>
<td>Full Blood Count Troponin Monospot</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Crossmatch DCT Group &amp; Save Transfusion Reaction Investigation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Glucose</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pregnancy Test hCG CSF</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Urine Microscopy (Paeds/Mat Only)</td>
<td></td>
</tr>
</tbody>
</table>

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1.0 Mission Statement

The Pathology Laboratory is committed to providing a pathology service of the highest quality to all its users, by the use of examination procedures and methods which will ensure the highest quality of all tests performed and will report results in ways which are timely, accurate, confidential and clinically useful.

Please note this manual is intended as a reference guide to give an overall view of the services available in the Pathology Laboratory in South Tipperary General Hospital. The Master copy is held in the Pathology Laboratory with an electronic read only copy available on the network at P:\Regional Shares\STGHLab. A link to this page exists on the Web Based Laboratory Enquiry page. Read only copies are also available to GPs on the HSE website at http://www.hse.ie/eng/services/list/3/hospitals/Southtipp/

Please ensure that any uncontrolled printed copies are current as the Laboratory cannot be responsible for information contained in obsolete documents.

A copy of all laboratory documents referenced to are available from the laboratory on request.

1.1 Introduction

Pathology is a clinical service, which carries out investigations on specimens from patients as an aid to the diagnosis, management and treatment of disease. The service is at the heart of the development of modern scientific medicine, as the practice of pathology has become steadily more diverse and complex.

The Pathology Laboratory in South Tipperary General Hospital (STGH) provides a multidisciplinary service 24 hours a day, 7 days a week. It can be divided into three main departments Biochemistry, Haematology and Blood Transfusion. It provides a clinical diagnostic service in general Haematology, general Biochemistry for STGH inpatients, local community hospitals, local G.P.’s, but the Blood Transfusion/Haemovigilance service is only provided for inpatients of STGH. It also provides a limited Microbiology service for cell counts on certain STGH inpatient samples. The regional services for Microbiology and Histology are based in University Hospital Waterford (UHW) and all relevant samples are sent directly there.

The Pathology department is led by the Chief medical scientist. The department processes over 600,000 tests annually in Haematology & Biochemistry and over 3800 samples annually in Blood Transfusion.

Laboratory Accreditation

The Blood Transfusion Laboratory is currently accredited to the ISO 15189 standard by the Irish National Accreditation Board (INAB). The registration number for accreditation is 227MT and full details of our current accreditation status can be viewed on line at www.inab.ie. The following tests are currently accredited:

- ABO & Rhesus Blood Grouping
- Antibody Screening
- Antibody Identification
- Compatibility Testing including Transfusion Reaction Investigations
- Red Cell Phenotyping
- Direct Coombs Test

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Any changes to the status of the Laboratory Accreditation and scope will be notified to all users of the service.

Location of the Laboratory
The Laboratory is located on the ground floor, near Pharmacy and the Outpatients Department. It can be accessed from the hospital foyer by passing through the double doors to the left before reaching the lifts; following the corridor to the next set of double doors, turning right and the laboratory entrance is clearly signposted directly ahead. External delivery of samples to the Laboratory is from the Outpatients Entrance. This entrance is open Monday to Friday, 8am to 6pm. Access to the Laboratory is strictly controlled and all samples can be left at the Laboratory reception through the hatch. Samples for transport to UHW may also be left in the labelled container in the hospital foyer, next to the hospital reception/switchboard.

Laboratory Hours

<table>
<thead>
<tr>
<th>Pathology Laboratory</th>
<th>Hours of Business</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specimen Reception</td>
<td>Monday to Friday 08.00-20.00</td>
</tr>
</tbody>
</table>
| Routine Laboratory Diagnostic Service | Monday to Friday 08.00-20.00  
(Last routine specimen by 19.00 for Haematology and Biochemistry, and 15.30 for Blood Transfusion) |
| Emergency On Call Service | Monday to Friday from 20.00 until 08.00  
Saturday, Sunday and Public Holidays (24hr). Contact Duty Medical Scientist through switchboard |

Normal Working Hours
Routine samples for Haematology and Biochemistry analysis should be received in the laboratory before 19.00 each evening.
Routine samples for Blood Transfusion (this includes samples for elective surgeries) should be received in the laboratory before 15.30 each day, and at least 24 hours prior to elective surgeries/transfusions.

On Call Service
At all other times, an on call service is provided. Only emergency samples should be sent to the laboratory out of hours and the medical scientist on call should always be notified via the hospital switchboard. The Medical Scientist is always on site i.e. on hospital grounds however he/she should be contacted regarding clinically urgent bloods especially during the night. Tests available on call are indicated within the discipline specific information.

Laboratory Department Contact Details
Postal address: Pathology Laboratory,  
South Tipperary General Hospital,  
Western Road,  
Clonmel,  
Co. Tipperary.

<table>
<thead>
<tr>
<th>Section</th>
<th>Contact No within STGH</th>
<th>Contact No outside of STGH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specimen Reception</td>
<td>7056</td>
<td>052 6177056</td>
</tr>
</tbody>
</table>
In an effort to minimise disruption to Laboratory staff, please use the ward enquiry facility for all Laboratory results and direct all enquiries to the Laboratory secretary at 7055/7056. All Blood Transfusion enquiries should be directed to 7974. For external results etc. please ensure to ring between 15.30 – 16.30. We regret we are unable to deal with result enquiries externally after 17.00hrs.

1.2 Laboratory Supplies

Supplies of specimen containers, request forms and specimen bags are available from central stores. To avoid unnecessary delays in obtaining laboratory supplies always ensure that the identification of the person requesting the supplies is clear. STGH central stores phone number: ext. 7425. The only consumables supplied directly by the Laboratory are the following:

- Blood Culture bottles
- 24 hr Urine containers (Plain and Acid)
- Viral, high nasal and Chlamydia swabs
- Cervical Cytology Containers

Please ensure that all supplies are requested during routine hours only and send a porter to collect. All supplies for GPs are sent via the Laboratory Supplies Department in University Hospital Waterford, Tel: 051 842638 Fax: 051 848565.

### Types of specimen containers

**Adult Vacutainer Specimen Bottles**

<table>
<thead>
<tr>
<th>Cap Colour</th>
<th>Anticoagulant</th>
<th>Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red/Yellow</td>
<td>Clotted (No Anticoagulant)</td>
<td>All serum tests</td>
</tr>
<tr>
<td>Grey</td>
<td>Fluoride Oxalate</td>
<td>Blood Glucose</td>
</tr>
<tr>
<td>Purple</td>
<td>E.D.T.A</td>
<td>FBC</td>
</tr>
<tr>
<td>Green</td>
<td>Lithium Heparin</td>
<td>Plasma tests</td>
</tr>
<tr>
<td>Blue</td>
<td>Sodium Citrate</td>
<td>Coagulation tests</td>
</tr>
<tr>
<td>Pink</td>
<td>E.D.T.A</td>
<td>Blood Transfusion tests</td>
</tr>
</tbody>
</table>

**Paediatric Specimen Bottles**

<table>
<thead>
<tr>
<th>Cap Colour</th>
<th>Anticoagulant</th>
<th>Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td>E.D.T.A</td>
<td>FBC</td>
</tr>
<tr>
<td>Yellow</td>
<td>Fluoride Oxalate</td>
<td>Blood Glucose</td>
</tr>
<tr>
<td>Orange</td>
<td>Lithium Heparin</td>
<td>Plasma tests</td>
</tr>
<tr>
<td>Green</td>
<td>Sodium Citrate</td>
<td>Coagulation tests</td>
</tr>
</tbody>
</table>
**Types of Request Forms**

- The provision of legible and appropriate clinical details and therapy on the request form, together with a properly collected specimen, allows the Laboratory to issue relevant and accurate results.
- The Laboratory Scientific staff should be consulted where uncertainty exists about the availability, appropriateness, or selection of tests and the nature of the specimen required.

All Biochemistry and Haematology samples for the Laboratory in STGH should be sent on a STGH request form. The time and date of sample collection is important information required for the interpretation of laboratory test results.

*Please ensure that the tests requested are clinically justified and that unnecessary duplication of tests is avoided.*

- Any specialised external tests which require special handling such as freezing etc. prior to dispatch must also be sent on a STGH request form. Also ensure that such bloods are handed directly to laboratory staff, who must be informed that the sample requires freezing.
- A STGH Request Form must also be included with **ALL CSF** samples so that the Laboratory in STGH can perform the microscopy locally.
- Blood Transfusion requests for STGH must be sent on a STGH Blood Transfusion request form (STGH-BT-LF-015) white with red and blue type, which is not to be confused with the white Waterford Regional Ante-Natal Request Forms, or the Cord Blood Request Form (STGH-BT-LF-019) pink form.
- All samples for testing in Waterford Regional must have separate samples and request forms for each department. Samples for UHW Haematology and Biochemistry can be sent on one form WRH-PATH-LF-299.
1.3 Preanalytics

All determining factors and processes, which influence the specimen material before it is analysed in the laboratory, are part of preanalytics. This covers preparation of the patient, sample collection, pre-processing, storage and transport of specimen material as well as handling in the laboratory prior to analysis. It should be noted that the majority of the preanalytical phase is outside of the control of the laboratory, so it is important that robust procedure/policies are defined for these processes. The people with responsibility for the quality of the specimen material include;

<table>
<thead>
<tr>
<th>Activity</th>
<th>Persons involved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Request</td>
<td>Treating Doctor</td>
</tr>
<tr>
<td>Preparation of Patient</td>
<td>Treating Doctor, nursing staff, doctor’s assistant, patient</td>
</tr>
<tr>
<td>Identification of patient and specimens</td>
<td>Treating Doctor, nursing staff, doctor’s assistant, patient</td>
</tr>
<tr>
<td>Blood Collection</td>
<td>Treating Doctor, nursing staff, doctor’s assistant</td>
</tr>
<tr>
<td>Mixing with anticoagulants</td>
<td>Treating Doctor, nursing staff, doctor’s assistant</td>
</tr>
<tr>
<td>Storage until transportation</td>
<td>Nursing staff, doctor’s assistant</td>
</tr>
<tr>
<td>Transportation</td>
<td>Porter, courier service</td>
</tr>
<tr>
<td>Acceptance, storage and preparation of samples</td>
<td>Laboratory staff</td>
</tr>
</tbody>
</table>

1.3.1 Phlebotomy

The Phlebotomy service provided in STGH is not located in the Pathology Laboratory. The Phlebotomy service is managed by the Director of Nursing. Contact number – Bleep 218. The Phlebotomy department does not routinely provide a service for GPs.

1.3.2 Sample Quality (Blood Collection)

Haemolysis occurs when the cell membrane of the red blood cells is destroyed. Even a slight haemolysis can cause increased serum/plasma values e.g. Potassium, Bilirubin, LDH, AST, ALT, Mg, Urea, Glucose. The following errors lead to haemolysis and should be avoided in any case;

- Tourniquet applied to tightly.
- Needles with too small diameter being used.
- Aspiration of tissue fluid after puncturing vein.
- Transfer of blood into other containers with a syringe.
- Shaking the sample instead of mixing.
- Delayed separation of cells from serum/plasma >3 hours.

Other factors that can affect sample quality include;

- Lipaemic and icteric samples.
- Expiry date on tubes. The function of the additives only work if used prior to their expiry date printed on label.
- Mixing ratios and specimen volumes. It is essential that tubes are filled exactly taking fill tolerances into account. Particularly serious errors can occur when citrate tubes for coagulation diagnostics are either over- or under-filled.
- Mixing blood and tube additives. All tubes must be completely inverted 8 times after filling, except coagulation tubes which are inverted 4 times. Do not shake.
• Disinfecting the puncture site incorrectly. Disinfection solution used should have dried completely before the vein is punctured.
• Repeated venipuncture can lead to contamination due to tissue thromboplastin (affects coagulation)
• If collection from a horizontal catheter is unavoidable, great care should be taken to avoid contaminating the sample with remains of infusion solution.
• Correct order of draw of samples. Click here to see correct order. If a blood culture is not required, a no-additive discard tube should be filled first.
• Wrong anticoagulant. Carelessness or lack of knowledge can lead to taking the blood in wrong anticoagulant or tube. Such samples cannot be used by the laboratory. Samples should never be poured from one tube into another tube, even if the tubes have the same anticoagulant. See section 1.2 above for anticoagulant details.

1.3.3 Disposal of consumables used during blood collection

It is the responsibility of the person performing the blood collection that all consumables used during the process, including needles, butterfly needles, discard tubes etc., are disposed of in the correct fashion, as per local defined policies.

1.4 Completing the Request Form and Labelling the Specimen

For accurate identification of specimens and patients, it is essential that specimens are labelled properly and that request forms are completed clearly and accurately. Upon receipt in the laboratory every specimen is checked to ensure it is suitable for processing. Discrepancies or omission of essential information may result in the specimen not being analysed. Up to date Addressograph labels are acceptable on laboratory request forms.

Positive Patient Identification

Safe Transfusion Practice begins with Positive Patient Identification. At the patients bedside ask the patient, without prompting, to state their first name, surname and Date of Birth. Verify these identifiers are identical on the completed Blood Transfusion Request form, on the Hospital Identification bracelet that the patient is wearing and on the patients Medical Records. A sample must not be taken from an in-patient who does not have a hospital identification bracelet in situ.

When dealing with Unconscious/ Unidentified patients, the minimum information necessary on the sample tube and request form is a unique chart (‘J’) number and patient gender, and also the date and signature of the person who took the blood sample (NBUG 2004).

It is recommended that unconscious patients, confused patients, new born infants and neonates should have two identification bracelets applied (NBUG 2004). At present, this is only in use for new born infants and neonates in STGH. Multiple unknown patients who may be admitted to Emergency Department should be identified as per Health Service Executive South East Area Major Emergency Plan.
Outpatients without hospital identification bracelets in situ must verbally confirm the following before a sample can be taken—first name, surname, date of birth and address. Clinical staff must verify these details are identical on the Blood Transfusion Request Form and on the patient’s medical records.

*Ensure that all materials used in the collection of specimens are disposed of in accordance with Health Service Executive South East South East Area Policy for the Safe Use, Handling and Disposal of Sharps and Sharps Containers.*

To avoid processing delays or sample not being processed please fill in samples and request forms with the following information

### Mandatory information on Haematology/Biochemistry Specimens

<table>
<thead>
<tr>
<th>Patients FULL name</th>
<th>(First name and surname)</th>
</tr>
</thead>
<tbody>
<tr>
<td>D.O.B and/or hospital number</td>
<td></td>
</tr>
</tbody>
</table>

### Mandatory information on Blood Transfusion Specimen

Details on specimens must be handwritten – Addressograph labels are not accepted.

<table>
<thead>
<tr>
<th>Patient’s FULL name</th>
<th>(First name and surname)</th>
</tr>
</thead>
<tbody>
<tr>
<td>D.O.B</td>
<td></td>
</tr>
<tr>
<td>Hospital Number</td>
<td></td>
</tr>
<tr>
<td>Signature of phlebotomist</td>
<td></td>
</tr>
</tbody>
</table>

### Blood Science Request Form (Haem/Biochem) – Mandatory information highlighted

<table>
<thead>
<tr>
<th>Patient’s FULL name</th>
<th>(First name and surname)</th>
</tr>
</thead>
<tbody>
<tr>
<td>D.O.B. and/or hospital number</td>
<td></td>
</tr>
<tr>
<td>Patient’s Gender</td>
<td></td>
</tr>
<tr>
<td>Patient’s Address</td>
<td></td>
</tr>
<tr>
<td>Patient Consultant or GP/ GP code</td>
<td></td>
</tr>
<tr>
<td>Bleep number of requestor</td>
<td></td>
</tr>
<tr>
<td>Date of Specimen</td>
<td></td>
</tr>
<tr>
<td>Time of Specimen</td>
<td></td>
</tr>
<tr>
<td>Tests Requested and Specific Clinical Information</td>
<td></td>
</tr>
</tbody>
</table>
## Blood Transfusion Request Form – Mandatory information highlighted

**Patient’s FULL name** (First name and surname)

**D.O.B.**

**Hospital Number**

**Patient’s Gender**

**Time and date of specimen and signature of phlebotomist**

**Patient’s Consultant or GP**

**Hospital & Ward or GP Address**

**Tests requested and Specific Clinical Information**

**The signature of the person requesting the test and contact no.**

**Number of units of blood required, date and time required (if for cross matching)**

**Product required and amount.**

**Transfusion history/history of administration of Anti-D/Antenatal history etc. is also relevant**

**Specific transfusion requirements for individual patients. If modified blood components are required e.g. CMV negative and/or Irradiated, this should be indicated on request form.**

**The specific clinical indication for a transfusion request must be documented on the transfusion form**

**A clear indication as to whether the tests/services requested are urgent or routine.**

**Sample will be processed but blood or products will not be released until the requestor comes to the lab and fills in details retrospectively**
1.5 Mislabelled Laboratory Specimens and Request forms

Laboratory Policy on Mislabeled Forms/Samples

The laboratory procedure STGH-PATH-LP-001 and STGH-BT-LP-001 Specimen and Request Form Identification Criteria outlines the laboratory’s rejection policy for request forms and samples which are not appropriately labelled. The policy includes directions for handling both replaceable and irreplaceable samples.

Laboratory staff are acting correctly in refusing to accept a request for testing when either the request form or the sample is inadequately/incorrectly labelled.

The Laboratory staff will inform the ward/Dr if a sample is inadequately/incorrectly labelled and request a new sample. The laboratory will not be responsible should any problems arise due to delays caused by inadequate/incorrect labelling of samples or forms. All rejected samples are logged in the Laboratory Information System and the reason for the rejection documented.

Definition of replaceable and irreplaceable samples

Replaceable samples:
Can be re-obtained without any significant risk to the patient and whose results are not likely to be different from those obtained initially because of any therapeutic intervention.

a. Among blood and urine samples, all but a few types are considered replaceable. Samples from patients with difficult or inconvenient venous access are considered replaceable unless they meet one of the criteria listed below in irreplaceable samples.

b. All blood samples sent to the Blood Bank for purposes of obtaining material for transfusion are automatically viewed as replaceable; that is, if misidentified or unidentified, they must be redrawn even if they fall under one of the qualities listed below.
Irreplaceable samples:
Samples which cannot be re-obtained are detailed below. Some irreplaceable samples may be processed provided certain specific procedures are followed to determine and document the unique identity of the samples.

a. Samples obtained by invasive procedures such as surgery, biopsies, fluid aspirates and foetal amniotic sampling.
b. Samples obtained before an intervention that might alter the result (e.g. a sample sent for blood culture where antibiotic therapy was administered before a repeat sample could be obtained).
c. Umbilical cord blood, blood samples from neonates or from infants less than 6 months of age for whom the total blood volume is problematic.

General Rules for Specimen/ Request Form Evaluation
- On receipt in the lab both the test request form and the sample are checked for accuracy and completeness.
- Sample is rejected if essential criteria is not correct as outlined in above tables
- When specimens are being sorted and numbered all discrepancies are documented on the request form.
- Laboratory staff are not permitted to amend details on specimens or request forms.
- Addressograph labels will be accepted on specimens except for Blood Transfusion specimens.
- Identification criteria for X-match specimens and request forms are as laid down by the Hospital Transfusion committee.
- Staff should err on the side of caution and never process a discrepant specimen unless they have good reason to believe that the specimen belongs to the person identified on the request form/sample
- Users will be informed if a decision is made to reject a specimen.
- All samples will be held in the laboratory for at least 48 hours post authorisation of results.
- Only the patient’s consultant, GP, or a pathology consultant can direct the laboratory to process a sample not meeting the minimum requirements set out above (a note of which will be recorded on the final report.)
- If the Blood Transfusion request form is not signed and dated by the person who took the sample, the phlebotomist or doctor will be contacted and allowed to come to the laboratory to sign the request form. Otherwise the sample will be rejected.
- If blood/products are ordered on the Blood Transfusion request form without the doctor’s signature who prescribed the blood/products, the doctor will be contacted to come to the laboratory to sign the request form. Instead, a new request form with the doctors’ signature re-ordering the blood/products may also be sent to the laboratory. Otherwise the blood/products will not be issued.

1.6 Specimen Transportation to the Laboratory
Samples should be placed in specimen transport bags as soon as the sample has been taken. The sample/s should be placed in the sealable pocket of the transport bag and this should then be closed properly. The request form/s should be placed in the open compartment so that in the event of leakage the request forms are not contaminated and the leakage is contained. Collection staff are acting correctly in refusing to collect samples that are not sealed correctly.
Large specimens such as some histology specimens or 24-hour urines should be put in large specimen bags and the request form placed in the outer pouch.

- Specimen containers that are contaminated externally must not be sent to the laboratory.
- High risk specimens should be identified.
- Under no circumstances should anyone transport specimens in their hands or pockets. Transport containers are available on the wards & in the lab for the internal collection and transport of samples.

**High risk specimens**

It is a requirement that laboratory specimens from patients who have known or suspected Risk Group 3 infections be labelled in such a manner that this knowledge be conveyed to the laboratory. Specimens from these patients should be labelled Biohazard or Danger of Infection. The specimen container should be labelled on the outside and clearly visible. The accompanying paperwork should be appropriately labelled. It is good practice for those requesting tests to provide as much information as is relevant, consistent with maintaining patient confidentiality, with any request for a laboratory investigation.

**Specimen Transport within STGH**

Please refer to the Procedure for the Internal Transport of Laboratory Specimens STGH-PATH-LP-100.

In STGH the porters transport the specimens to the laboratory. Specimens are collected from the wards on an hourly basis from 09.00 to 16.00. The porter should be contacted on *5250 or bleep 287 for any samples after this time requiring transport to the lab after 16.00. Urgent and all On Call samples requiring immediate collection should be notified to the porter as soon as possible. Internal transport boxes are available for the safe carriage of bloods to the Laboratory. All blood samples are collected from designated collection points on each ward.

Note: The laboratory is not responsible for the transport of samples, or delays in transport, to the laboratory. In the case of Blood Transfusion samples specifically, they are Time and Date stamped when they are received by the lab staff in the laboratory, and turnaround times are calculated from the time the sample is received by the laboratory. Also, during on-call hours, it is the responsibility of the person requesting the test, and not the porter, to make contact with the medical scientist via the switchboard to inform them of any sample being sent to the laboratory.

**External Transport to/from outside South Tipperary General Hospital**

The External Transport of Samples procedure STGH-PATH-LP-099 describes how all samples are transported externally from STGH. All specimens transported by road must comply with the ADR transport regulations. All specimens should be packaged as per the ADR P650 Packaging Instruction (See Appendix 1). It is the responsibility of the sender to ensure that specimens are transported in accordance with ADR. ADR compliant packaging should always be used. This also applies to specimens sent by post. The Laboratory is equipped with packaging materials and containers, which comply with the requirements of ADR. Specimens to University Hospital Waterford are sent in sealed containers and transported by hospital approved transport.

**Specimen Dispatch Times to Waterford Regional and other External Sites**

<table>
<thead>
<tr>
<th>Collection Point</th>
<th>Collection Time</th>
<th>Comments</th>
</tr>
</thead>
</table>

Electronic copies of the User Manual are read-only. Printed copies of this Manual are only valid until 23.59 on the day of printing.
1.7 Reporting of results

Laboratory reports from STGH are issued by computer, and reference ranges for different analytes are printed with the test results. A hard copy printed report of internal results is delivered to wards and consultants secretaries daily, and external results are downloaded by GP Link or sent by external mail to the requester of the tests. Many of the wards have lab printers on site which will automatically print off the hard copy once the result is authorised in the lab. **Problems with ward laboratory printers should be logged with the IT helpdesk and not the lab.** Results are also available on the wards via the Lab Web Browser function on all STGH networked computers. Please contact lab for further details on how to request access to Lab Web Browser.

GPs requiring access to electronic access to results should contact the Primary Care Unit, Health Service Executive - South Eastern Area, Lacken, Dublin Road, Kilkenny. Tel: (056)7784113

**Hard copies of the ward enquiry screen should never be printed off as some results could be missing from this print off.** Relevant staff are given access to results on the wards.

Histology results are only available to ward staff that has been given specific access to histology results. Histology reports are printed in the Laboratory in STGH daily and distributed to the appropriate consultant. STGH Laboratory Medical Scientists and Secretaries do not have access to histology results.

For General Ward Enquiry Access, contact IT helpdesk in HSE/SE.
For Histology Ward Enquiry Access, contact Dr Michelle Griffin, Chief Medical Scientist, Histology Department, University Hospital Waterford on 051-848586

1.8 Reporting of Results by Phone

On occasion the laboratory will phone results on a patient if they fall outside certain defined ranges, or if there is a significant change compared to a previous sample’s result. See each department for critical alert action limits. A note of results reported by phone is recorded in the laboratory information system.
The scientist on call is unable to handle telephone calls from GP practices after hours. All GP results can be accessed by electronic link if the surgery has been set up for web based access.

1.9 Laboratory Complaints Procedure

The laboratory has a complaints procedure for users of the service. This procedure maintains the method for receiving and processing complaints. This procedure is audited with results feeding into the quality management system. Complaints can be made verbally or in writing to any member of laboratory staff. If a verbal complaint is being made details will be recorded on a complaint form STGH-PATH-LF-302.
2.0 Blood Transfusion Department

2.1 Service Description

The Blood Transfusion laboratory performs a range of tests including, blood grouping, antibody screening, compatibility testing etc. The laboratory provides blood components/products to hospital inpatients and some day-care patients in STGH when required. The Haemovigilance Clinical Nurse Specialist (CNS) ensures the provision of a quality transfusion surveillance service and is based in STGH.

2.2 Tests available

The following tests are available in the Blood Transfusion Department:

- Group and Screen
- Crossmatch
- Blood Component/Product Issue
- Antibody Identification
- Phenotype
- Direct Coombs Test
- Cord Blood

2.3 Turnaround Times

**Turnaround Times for Emergency Crossmatch/Blood Component Issue. (Lab staff need to be contacted by phone).**

<table>
<thead>
<tr>
<th></th>
<th>Blood Products available**</th>
<th>Interim Report</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uncrossmatched blood</td>
<td>Within 10 minutes</td>
<td>At time of collection</td>
</tr>
<tr>
<td>Urgent Crossmatched blood</td>
<td>Within 1 hour</td>
<td>At time of collection</td>
</tr>
<tr>
<td>Plasma</td>
<td>Within 20 minutes</td>
<td>At time of collection</td>
</tr>
<tr>
<td>Platelets – from IBTS Cork</td>
<td>Within 3 hours</td>
<td>At time of collection</td>
</tr>
</tbody>
</table>
**Turnaround Times for routine Cross-matching/Blood Component Issue**

<table>
<thead>
<tr>
<th>Time sample arrives in Lab*</th>
<th>Blood Products available**</th>
<th>Final Report</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before 10.30</td>
<td>14.00</td>
<td>At time of collection</td>
</tr>
<tr>
<td>Before 15.30</td>
<td>18.00</td>
<td>At time of collection</td>
</tr>
<tr>
<td>After 15.30</td>
<td>Check with Lab Staff</td>
<td>At time of collection</td>
</tr>
</tbody>
</table>

* If specimen/request-form non-conformances are identified by Blood Transfusion staff, the ward will be notified, and a repeat sample/request-form may be requested. Laboratory staff will not be responsible for delays caused by errors of this nature.

** If delays are unavoidable, e.g. Antibodies present, the ward will be notified of such, and a repeat sample may be requested to either re-test locally or send to IBTS Cork.

**Turnaround Times for Group & Screens, DCTs, Cord Bloods**

<table>
<thead>
<tr>
<th>Time sample arrives in Lab</th>
<th>Final Report*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Routine Samples</td>
<td>24 hours after arrival in lab</td>
</tr>
<tr>
<td>Urgent Group and Screen</td>
<td>Within 1 hour</td>
</tr>
</tbody>
</table>

*If delays are unavoidable, e.g. Antibodies present, the ward will be notified of such, and a repeat sample may be requested to either re-test locally or to send to IBTS Cork.

**Turnaround Time for In House Antibody Identification and Phenotyping:**
- Samples requiring Antibody Identification are initially tested in STGH and only complex investigations are referred out to the IBTS. In house turn around time is 72 hours for full authorisation; however the investigation is normally completed sooner bearing in mind the clinical requirements.

**Specimen requirements**

Samples received in the laboratory which are over 48 hours old are unsuitable for processing. A repeat sample must be requested.

**Group & Screen (also called Group Only or Group and Save or Group and Hold)**

- 6ml EDTA (pink capped bottle)
- An ABO & RhD Blood Group and Antibody Screen for irregular antibodies is performed on the sample.
- The plasma is held in the laboratory should crossmatching be required within the next seven days (this decreases to 3days depending on the patient’s transfusion and pregnancy history).
- A Group and Screen sample is valid for
  - 7 days if the patient has not been transfused in previous 3 months
  - 3 days (72 hours) if the patient has been transfused within 3 months
  - 7 days if the patient is pregnant
- ‘Group and Save’ requests for elective surgery/transfusion should be received in the laboratory at least 24 hours prior to the scheduled surgery time.
Blood is not reserved or available for immediate use for a patient on a ‘Group & Save’ sample. If a patient has no antibodies and/or special requirements, crossmatched blood should be available within 1 hour of the laboratory receiving a phone request and completed request from.

Group & Crossmatch (adult)

- **6ml EDTA (pink capped bottle)**
- Compatibility testing of donor red cells against the patient’s sample is performed.
- The requested number of red cell units are issued to that patient and are held in the Blood Transfusion Issue fridge for 48 hours from the time the blood is required. Following this time the red cells are returned to the Blood Bank stock fridge. The laboratory must be notified if there is a clinical need for blood to be held for longer, or if surgery is deferred to a different day.
- Where a patient’s plasma contains an irregular antibody a delay may be unavoidable in providing antigen negative blood that is suitable for that patient.
- Refer to the STGH MSBOS (Appendix 2) when requesting red cells for surgical procedures. Deviations from the MSBOS should be notified to the Blood Transfusion Department.
- Crossmatch requests for elective surgery/transfusion should be received in the laboratory at least **24 hours** prior to the scheduled surgery time.
- Where a patient’s plasma contains an irregular antibody or the patient requires irradiated products, a delay may be unavoidable in providing blood that is suitable for that patient.

Antibody Identification

- **6ml EDTA (pink capped bottle)**
- Antibody investigations most often arise from the detection of a positive antibody screen or incompatible crossmatch.
- When antibodies develop it is most often the result of exposure to donor red cells through transfusion or through exposure to foetal cells during pregnancy.
- A delay in the provision of compatible red cells occurs when an irregular antibody is identified; close liaison with the Blood Transfusion Department is advised in such instances.

Phenotyping

- **6ml EDTA (pink capped bottle)**
- Antigen typing of patient red cells is most frequently performed in conjunction with antibody investigation testing in Blood Transfusion Department.

Cord Blood testing

- **6ml EDTA (pink capped bottle)**
- Cord Blood samples are required for testing on all Rhesus D Negative women following delivery. Based on the blood group result of the infant, prophylactic Anti-D immunoglobulin may need to be given to the mother.
- A cord blood sample must be labelled with both mother and baby’s details (mothers name, mother’s hospital number, baby’s surname, baby’s hospital number and DOB) and accompanied with the pink Cord Blood Request Form STGH-BT-LF-019.
- A maternal sample and request form must also be received along with the cord blood sample.
• A Blood Group and Direct Coombs test are performed on the baby’s cord blood sample. Additional testing on a cord blood may be required in cases where the mother has developed clinically significant red cell antibodies.
• Cord bloods may also be required where irregular antibodies have been identified in maternal plasma.

Direct Coombs Test

• 6ml EDTA (pink capped bottle)
• A Direct Coombs test indicates if a patient’s cells are coated in vivo with either immunoglobulin and/or complement.

Cold Agglutinin Testing

• This test is no longer performed in Blood Transfusion due to the unavailability of External Quality Control Material. Please contact Consultant Haematologist if further advice required.

Additional Examinations & Requests

• Any additional testing can be requested by phoning the Blood Transfusion Lab at extension 7974. Once a request has been placed for a blood component or product to be issued, the medical scientist will ensure that a suitable sample is available in the laboratory. It may be necessary to take a repeat sample from the patient depending on pregnancy or previous transfusion history of the patient.
• Any additional request for blood components or products requires that a request form signed by the requesting doctor is sent to the lab once the request has been made. Units will not be released from the laboratory until this request form is received in the laboratory.

Repeat Samples Requested by the Laboratory

• Repeat samples may be requested by the laboratory if a sample or the quality of a sample is not suitable for testing i.e. samples may be insufficient, haemolysed, extra samples may be required for antibody investigation or referral to the IBTS. Repeat samples must also be accompanied by a request form.

2.3.1 Transfusion Reaction Investigation

Refer to the ‘Administration of Blood Components and Blood Products’ procedure, STGH-BT-HP-005 in the Blood Transfusion User Manual (available on all clinical areas).

All suspected reactions reported will be fully investigated by the Haemovigilance CNS and reviewed by Consultant Haematologist. It is a mandatory requirement (EU Directive 2002/98/EC) for all Serious Adverse Reactions (SAR) and Serious Adverse Events (SAE) which fit criteria to be reported to the National Haemovigilance Office (NHO).

On discovery of a suspected transfusion reaction:
• Stop transfusion of blood product immediately where a suspected reaction has occurred and verify Patient ID, ABO group of patient and donor unit immediately.
• Medical advice should be sought immediately from the patient’s team and/or the haematology team.
• Contact the Blood Transfusion laboratory during both routine and on-call hours.
• Contact the Haemovigilance CNS during routine hours.

To serologically investigate the suspected reaction:
• Complete the ‘Report of a Suspected Adverse Reaction/Event’ form on the reverse of the Blood Component and Product Transfusion Record (STGH-BT-HF-001) and follow this report form for suggested actions.
• Return the implicated red cell pack and administration set to the laboratory for investigation.
• A repeat grouping sample (6ml pink capped EDTA bottle) is required with request form.
• Repeat grouping, antibody screening, crossmatching and Direct Coombs testing of both the pre and post transfusion reaction samples are performed to determine any possible red cell incompatibility.
• Patient blood cultures as well as cultures from the suspect blood pack* must be sent to Microbiology UHW if temperature rise ≥ 1.5ºC above the baseline temperature together with another acute symptom such as chills or rigor.
• Full Blood Count
• Renal Profile
• MSU for culture/sensitivity if required

*Procedure for Blood Culturing of implicated red cell pack

Carry this procedure out at the patient’s bedside using an aseptic technique. Ensure that both the patient and the implicated unit of blood are cultured at the same time and that both sets of bottles are clearly differentiated.

Requirements:
• Clean tray containing sterile gloves, alcohol swabs, 20ml syringe and 23g needle (blue)
• Sharps container
• Blood Culture bottles X 2 sets (Aerobic and Anaerobic)
• Microbiology Request form.
  o Wash and dry hands. Apply sterile gloves.
  o Collect a set of blood cultures from patient as per normal procedure. Label bottles with patient’s labels and write “Peripheral blood” on both labels.
  o Wash and dry hands. Apply sterile gloves.
  o Remove the cover of the second set of blood culture bottles. Wipe the rubber bung on the bottle tops with an alcohol swab. Allow to dry.
  o Swab the un-opened port of the blood unit. Allow to dry.
  o Attach needle and syringe to un-opened port of blood unit using aseptic technique.
  o Withdraw approx. 20mls of blood into a syringe maintaining asepsis.
  o Place 8 – 10mls of blood into each blood culture bottle.
  o Label blood culture bottles with patient’s labels and write: “Blood from blood pack and Donor Unit No.”
  o Complete the Microbiology Request Form with following details:
    ▪ Patient’s Addressograph label plus name of Consultant Haematologist and address for reporting.
    ▪ Fill in Specimen as “Blood culture X 2. Peripheral blood + Blood from pack”.
    ▪ Fill in Clinical details as “Transfusion reaction. Donor Unit No: XXXXXX”.
    ▪ Fill in Tests Required as “C/S”
  o Send bottles and accompanying request form immediately to the Microbiology Department in a bio-hazard bag.
Dispose of sharps in the correct manner and wash hands.

Ensure Blood Cultures are taken from the patient as Blood Cultures from a blood pack cannot be processed unless both sets arrive in lab with details on the one form.

2.4 Emergency Testing and Requests

- **Emergency sample processing in Blood Transfusion must be accompanied by a telephone call to the laboratory or medical scientist on duty explaining the urgency of the situation.**

From receipt of sample in Blood Transfusion laboratory:

- Allow 1 hour for provision of compatible red cells providing all serological compatibility tests are negative.

- Any incompatible test /positive antibody screen results will increase the delay in providing compatible blood. The medical scientist dealing with the request will inform the team concerned with the patient.

**Emergency Requests for Uncrossmatched Blood**

- In Emergency situations Uncrossmatched O Negative units or Group Specific red cells can be issued where there is insufficient time to wait for complete compatibility testing.

- There are four units of O RhD Negative red cells labelled as Emergency Blood and available at all times from the Blood Bank Issue Fridge.

- If there is a current sample available and completed in the laboratory – Group Specific Group O Rh Matched red cells or Patient Group Specific red cells can be issued uncrossmatched (dependent on previous history etc). Allow ten minutes from receipt of request.

- No sample available in the lab and patient blood group unknown – Group O RhD Negative red cells must be issued. All known patient details to be given to medical scientist taking request for blood. Allow ten minutes from receipt of request. (Please send blood grouping sample immediately).

- **It is a Medical Decision to Transfuse Uncrossmatched Red Cells.**


Other Recommended Websites:
- [www.transfusionguidelines.org.uk](http://www.transfusionguidelines.org.uk)
- [www.bcsghguidelines.com](http://www.bcsghguidelines.com)
Requests for Unidentified Patients

Requests for blood components / products for unidentified patients can be made using the patients’ gender and healthcare record number. As soon as the patient is identified the information as listed under “mandatory” on page 8 and 9, must be used for all further requests and a repeat crossmatch sample must be sent to the Laboratory.

Multiple unknown patients who may be admitted to Accident and Emergency should be identified as per Health Service Executive South East Area Major Emergency Plan and the STGH Patient Identification Policy.

2.5 On-Call Testing

- On-call testing in the transfusion laboratory is performed on emergency and/or urgent samples only.
- Please ensure that all routine Group/save and crossmatch requests arrive in the Laboratory before the daily cut off time of 15:30 or they will not be processed until the following day.
- On call staff should be contacted via the switchboard.
- Requests for emergency issue of blood must be accompanied by a phone call to the medical scientist on call.
- Blood Group reports cannot be fully authorised on call as it requires a second scientist to check the results therefore fully authorised results of blood groups will not be available until the next working day.

2.6 Maximum Surgical Blood Ordering Schedule (MSBOS)

A Maximum Surgical Blood Ordering Schedule (MSBOS) is a mechanism to maximise usage of blood and minimise wastage in elective surgery. A MSBOS can reduce the workload of unnecessary crossmatching and issuing of blood and optimise stock management. The MSBOS only applies to elective surgery and requires samples being in the BT laboratory at least 24 hours prior to surgery.

For operations / procedures requiring a “Group & Screen” Only the following applies:
- In patients with a negative antibody screen blood can be available within forty minutes if it is required urgently.
- If a patient has a positive antibody screen detected pre-op then the group & save will automatically transfer to a group & crossmatch.

For operations requiring crossmatched blood:
- The designated number of units is reserved for the patient for 48 hours from the proposed date of surgery.
- The blood will automatically be returned after 48 hours unless otherwise requested by the clinical team. If surgery is re-scheduled it is the responsibility of the team to notify the BT lab of the new date for surgery.
In all cases should blood be required urgently then 4 units of emergency O Rh D Negative blood are available in the issue fridge at all times.

The current MSBOS has been constructed by the Blood Transfusion Department in consultation with the Departments of Surgery/ Anaesthetics/ and Obstetrics/ Gynaecology and issued via the Hospital Transfusion Committee

See Appendix 2 for current STGH MSBOS

### 2.7 Blood Component/Product Information

<table>
<thead>
<tr>
<th>Product</th>
<th>General Description</th>
<th>Volume</th>
<th>Storage Temp</th>
<th>Shelf Life</th>
<th>Storage outside of controlled environment/after preparation</th>
<th>Compatibility Testing Requirement</th>
<th>Prescription/Requesting Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red Cells (additive solution) Leucocyte depleted</td>
<td>Red cell suspension obtained from whole blood</td>
<td>280ml ±60 ml</td>
<td>2 - 6°C</td>
<td>35 days</td>
<td>4 hours to complete transfusion from time of removal from Issue fridge.</td>
<td>Yes- to be compatible with recipient ABO &amp; RhD type</td>
<td></td>
</tr>
<tr>
<td>Platelet concentrate (Pooled/ Apheresis)</td>
<td>Platelet preparation from pooling of 5 single donor units or single apheresis donor</td>
<td>&gt;300ml per pooled unit &gt;160ml per apheresis prep.</td>
<td>22±2°C</td>
<td>5-7 days under gentle agitation</td>
<td>Immediate use i.e. less than 60 minutes</td>
<td>Preferably ABO identical with recipient group, depending on availability.</td>
<td>Platelets – ordered by Consultant or Registrar only. Telephone Laboratory in advance</td>
</tr>
<tr>
<td>Human Pooled Plasma</td>
<td>Octaplas &amp; Uniplas pooled plasma, solvent detergent treated</td>
<td>200ml</td>
<td>≤ 18°C</td>
<td>4 years - frozen</td>
<td>Immediate use preferable, must be used within 4 hours</td>
<td>Preferably ABO identical with recipient group</td>
<td></td>
</tr>
<tr>
<td>Human Fibrinogen</td>
<td>Riastrap freeze dried powder for re-constitution</td>
<td>50ml when re-constituted</td>
<td>2-8°C</td>
<td>Do not use after expiry date</td>
<td>Immediate use preferable – Refer to product insert for</td>
<td>None</td>
<td>Haematologist in UHW must be contacted when ordering Factor concentrates,</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th></th>
<th>Human Albumin (Flexbumin)</th>
<th>Pooled donor plasma</th>
<th>50g/L 250ml (5g) or 200g/L 100ml (20g)</th>
<th>2-25°C</th>
<th>3 years</th>
<th>Immediate Use</th>
<th>None</th>
<th>Monitor Fluid Balance.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anti-D Immunoglobulin</td>
<td>Ready to use IM concentrate of anti-D Ig produced from human plasma</td>
<td>1250 IU (250µg) per IM injection</td>
<td>2-8°C</td>
<td>Do not use after expiry date</td>
<td>Solution to be used immediately after preparation</td>
<td>G&amp;S sample &lt;7 days required. Only for RhD Negative females when clinically indicated</td>
<td>Prescription for Anti-D required in Laboratory prior to issuing of Anti-D.</td>
<td></td>
</tr>
<tr>
<td>Human Prothrombin Complex (Octaplex)</td>
<td>Contains human Vitamin K dependent factors II, VII, IX, X, Proteins C &amp; S, freeze dried for reconstitutio</td>
<td>Contac</td>
<td>2-8C</td>
<td>Do not use after expiry date</td>
<td>Octaplex is to be used immediately after reconstitution and on one occasion only</td>
<td>None</td>
<td>Haematologist in UHW must be contacted when ordering Factor concentrates, Octaplex &amp; Fibrinogen</td>
<td></td>
</tr>
<tr>
<td>Clotting Factor Concentratos</td>
<td>Freeze-dried human or recombinant factor concentrates</td>
<td>Contac</td>
<td>2-8°C</td>
<td>Do not use after expiry date</td>
<td>Immediate use preferable – Refer to product insert for reconstitution</td>
<td>None</td>
<td>Haematologist in UHW must be contacted when ordering Factor concentrates, Octaplex &amp; Fibrinogen</td>
<td></td>
</tr>
</tbody>
</table>

Points to Note: Administration
Record transfusion of each component/product in the Blood Component and Product Transfusion Record, STGH-BT-HF-001. Follow the STGH protocol for ordering and administering blood components. For special blood product requirements i.e. irradiated, washed or reconstituted products, the shelf-life may be shortened. Contact the laboratory for further information.
2.8 Specialised Blood Products

Currently there are no Irish National Guidelines on then use of CMV negative or irradiated blood products. The following is an interpretation of the UK BCSH guidelines, more recent data from SHOT – the UK Haemovigilance reporting system, and a telephone review of current practice in Irish Transplant units. These recommendations aim to ensure that specialised products, which are a limited resource, are available to the patients who derive most benefit from them.

Cytomegalovirus (CMV)

Cytomegalovirus is a significant cause of mortality and morbidity in three main groups of immunocompromised patients: -

1. Pregnant women
2. The Neonate especially children with immune deficiencies
3. Immunosuppressed patients
   - Bone Marrow / Stem cell transplant (SCT) recipients
   - Solid organ recipients
   - HIV positive patients

Indications for CMV Negative Blood Products at STGH

- All pregnant mothers
- All children up to one year
- All children with malignancies or immunodeficiencies having shared care with Our Lady’s Hospital, Crumlin
- CMV negative patients in the following categories are at risk of CMV disease but remember where CMV status is unknown assume the patient is CMV negative:
  - Bone Marrow / Stem cell transplant (SCT) recipients
  - Solid organ recipients - Kidney transplant patients from the time of transplant if negative. Liver transplant patients from the time of transplant if negative.
  - HIV positive patients

N.B All “pedi-pack” blood is CMV-negative and also plasma-reduced blood for exchange transfusion is CMV negative.

Irradiated Blood Products

Graft Versus Host Disease

This was first recognised as a serious complication of allogeneic bone marrow transplantation. It occurs when a donor marrow contains some viable lymphocytes, which once transfused, can survive in the immunosuppressed patient. In such patients these donor lymphocytes can become activated by recipient antigens and cause Graft versus Host Disease (GVHD). It is characterised clinically by skin rash, diarrhoea and hepatitis.
The risk of GVHD is now minimised by the use of specific immunosuppressive drugs.
The foetus and neonate are the other group of patients who are “naturally” immunosuppressed

Later in Japan it was recognised that another more serious form of Graft versus Host Disease occurred in immunocompetent patients. The initial reports were from recipients of fresh blood in cardiac surgery and the common features were:

- High numbers of viable lymphocytes in fresh blood
- High incidence of shared HLA haplotypes between donor and recipient.
The latter features happen frequently because the Japanese population contains relatively few haplotypes. The recipient does not recognise the donor lymphocytes as “foreign” as they share a haplotype so the donor lymphocytes can become activated and cause Transfusion Associated Graft Versus Host Disease (TA-GVHD). This is characterised clinically by skin rash, hepatitis, and severe bone marrow failure and almost universally fatal. Irradiation of cellular blood products prevents donor lymphocytes proliferation thus preventing TA-GVHD. There are increasing reports of TA-GVHD in patients receiving lymphotoxic chemotherapy, which has lead to a widening of the indications for irradiated blood products.

**Indication of Irradiated Blood Products at STGH**

**Paediatrics**
- Congenital immunodeficiency states.
- All children with malignancies or immunodeficiencies having shared care with Our Lady’s Hospital, Crumlin.

**Haematological Malignancies**
- Hodgkin’s Disease.
- Patients who have received Purine analogues or anti-T cell monoclonal antibody therapies e.g. Fludarabine, Cladribine, Deoxycoformicin, Campath, Clofaraine, Bendamustine, Anti-lymphocyte globulin therapy
- All platelets now issued from IBTS are routinely irradiated whether required for the individual patient or not.
- Irradiated components are recommended for aplastic anaemia patients receiving immunosuppressive therapy with anti-thymocyte globulin (ATG).
- Irradiated components indicated for patients receiving the biological immunosuppressive agent alemtuzumab (anti-CD52).

**HLA-matched platelets**
- Used in cases of platelet refractoriness – additional testing required for provision of HLA matched platelets

**References:**
- Practical Transfusion Medicine. Murphy and Pamphilon 2005 Blackwell Publishing
- Handbook of Transfusion Medicine 2001 HMSO
- BCSH Guidelines on the prevention of transfusion-transmitted CMV infection. Transfusion Medicine, 1999, 9, 115-123.

**2.9 Collection of Blood Component/Products from the Laboratory**

- Prior to collection of any blood component/product, patient details and the blood component/product required must be filled out on ‘Blood Collection’ form (STGH-BT-HF-002).
- A suitable transport container must be used to bring the blood component/product to the ward, i.e. ‘Blood Transport box’ or ‘Cell Safe Igloo’ (Resus or theatre usually).
• All red cells and platelets must be scanned out of the Issue fridge using the Blood Track system. All red cells and blood products must also be signed out in the Blood Bank Sign Out log (STGH-BT-LF-010) which is beside the Blood Bank Issue fridge before being taken to the ward. The ‘Blood Collection’ form must also be signed and returned to the ward with the blood component/product. The blood & form must be handed directly to nursing staff, who must then sign for the receipt of the blood component/product.
• Check for patient’s capability form.
• Avoid delays as components/products taken should be transfused as soon as practicably possible.
• If any blood component/product has to be returned to the laboratory/fridge, the laboratory must be contacted both during routine and on-call hours and scanned and signed back in with time, date and patient details.
• Red cells that have been out of the fridge for > 30 minutes cannot be returned to the fridge.

Storage of Component/Products for Collection:

• Red cells: stored in the Blood Bank Issue Fridge in Specimen Reception
• Albumin: stored in the Blood Bank Issue Fridge in Specimen Reception
• Platelets: placed in designated Platelet Agitator in Specimen Reception
• Plasma/Fibrinogen/Coagulation factors: collection from within the Transfusion laboratory from Medical Scientist
• Anti-D: stored in the Blood Bank Issue Fridge in Specimen Reception
• Blood component/products should only be collected from the Transfusion Laboratory by trained individuals. Access to the issue fridge in the Blood Transfusion Department is controlled by means of the Blood Track system and staff barcoded ID card.

Traceability

• Collection forms must be used when collecting any blood component or product from the laboratory.
• When pre-transfusion checking procedure is completed and the component/product is connected to the patient, the peelable section of the Traceability label containing the donor number is removed from the product and placed in the observation section of the prescription.
• The 2nd (detachable) section of the traceability label is removed from the pack, signed dated and timed by the person commencing/witnessing the transfusion. This part of the label is then returned to the laboratory.
• These procedures are described fully in the Haemovigilance SOPS available in the Blood Transfusion User Manual in all clinical areas.
3.0 Biochemistry Department

3.1 Service Description & Contact Details

Clinical Biochemistry deals with the biochemical basis of disease and the use of biochemical tests for its diagnosis, prognosis, screening and management. Routine Biochemistry requests (renal, liver, cardiac & bone profiles) are processed locally in STGH, however many tests such as endocrinology etc. are processed centrally in Waterford Regional Biochemistry Laboratory.

<table>
<thead>
<tr>
<th>Contact</th>
<th>Internal ext</th>
<th>External Phone No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biochemistry Enquiries</td>
<td>7972</td>
<td>052 6177972</td>
</tr>
<tr>
<td>Dr. Mike Louw – University Hospital Waterford</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consultant Chemical Pathologist</td>
<td></td>
<td>051 842475</td>
</tr>
<tr>
<td>Clinical Advice University Hospital Waterford</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3.2 Specimen labelling and Completion of Request Forms

Routine Specimens

For accurate identification of specimens it is essential that all samples are labelled properly and that request forms are filled out clearly and accurately using the guidelines issued by STGH.

Refer to *Completing the Request Form and Labelling the Sample – in Section 1.4 earlier.*

In the interest of patient safety, incorrectly labelled (or unlabelled) samples will NOT be accepted, unless in limited critical situations where repeat bloods cannot be obtained and the responsible consultant authorises the processing of the samples.

3.3 Turnaround Times

All tests for routine biochemistry should be written on one request form. The turnaround time for routine in-house biochemistry tests is 4 hours from time of sample receipt in the lab. Turnaround times for MAU/A&E/ICU bloods is 2 hours from time of sample receipt in the lab. Critically urgent samples may be available sooner depending on the test required and must be accompanied by a phone call to 7056.

Referral Specimens

Tests not done in-house or in UHW are sent to outside laboratories for analysis. Many tests are referred to Biominis Laboratories whose website [www.biomnis.ie](http://www.biomnis.ie) has the latest referral information. Information on the tests sent to referral laboratories is found in the UHW laboratory user manual (weblink available in Lab Web Browser). All samples referred out by the lab in STGH are recorded on STGH-PATH-LF-099 which records details of the test requested and where it was sent. Due to the expense of some external tests, it may be necessary to restrict ordering of such tests to a Consultant only.
Please note
- If the test requested is not processed in-house but is sent to Waterford Regional Laboratory, please send a separate sample and request form.
- It is essential that any specialised test requiring special handling e.g. freezing prior to dispatch is sent on a STGH request form and the lab is informed that the sample is being taken. Please ensure that the sample is then handed directly to laboratory staff.
- Failure to do so may result in the sample being missed and therefore unsuitable.
- All such samples are identified in UHW laboratory user manual.

Emergency Specimens
- Samples from Accident & Emergency Department, MAU and ICU in STGH are automatically treated as urgent samples. These samples are given priority.
- If there is an emergency request from other areas, the laboratory should be telephoned and the specimen request form clearly marked as urgent so that it can be easily identified.
- Outside normal working hours, on call staff must be contacted via the switchboard.

3.4 Biochemistry Tests Available in STGH

Please Note
- One FULL vacutainer is sufficient for ALL general biochemistry tests.
- Please refer to Section 1.2 for colour coded adult and paediatric vacutainer sample bottles.
- A separate EDTA sample, filled to the mark is required for Troponin (must be tested within 2 hours of sampling) tests.
- Please send a separate form and sample for all tests that are dispatched to UHW lab and external referral laboratories.
- Bring to laboratory as soon as possible –within four hours. Altered levels of electrolytes and LFTs can occur if separation is delayed. See Appendix 3 for stability of analytes once the samples have been separated using a gel separator.
- All Biochemistry samples are retained for 48hrs stored at Room Temperature, allowing for add on requests where suitable. Contact the lab for specific advice regarding add on requests.

The following table is a list of all tests processed here in STGH. Only use a STGH request form for these tests. Types: B – blood, U- urine.

U/E – comprises Urea, Electrolytes AND Creatinine.
LFT – comprises ALT, ALP, AST, Albumin, Bilirubin and GGT.
FBP – comprises U/E, LFT, Ca and CPK

<table>
<thead>
<tr>
<th>Test</th>
<th>Type</th>
<th>Specimen</th>
<th>Vol.</th>
<th>Frequency of Assay</th>
<th>Comments.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetaminophen</td>
<td>B</td>
<td>Clotted</td>
<td>4ml</td>
<td>On Demand</td>
<td>Sample should be tested at least 4 hours</td>
</tr>
<tr>
<td>(Paracetamol)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test</td>
<td>Type</td>
<td>Specimen</td>
<td>Vol.</td>
<td>Frequency of Assay</td>
<td>Comments.</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>------</td>
<td>---------------------------</td>
<td>------</td>
<td>------------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Alanine Amino Transferase (ALT)</td>
<td>B</td>
<td>Clotted specimen/Lithium Heparin</td>
<td>4mls</td>
<td>Continuous – however routine specimen should be received before 19.00 hrs.</td>
<td>Part of LFT</td>
</tr>
<tr>
<td>Albumin</td>
<td>B</td>
<td>Clotted specimen/Lithium Heparin</td>
<td>4mls</td>
<td>Continuous – however routine specimen should be received before 19.00 hrs.</td>
<td>Part of LFT</td>
</tr>
<tr>
<td>Alkaline Phosphatase (ALP)</td>
<td>B</td>
<td>Clotted specimen/Lithium Heparin</td>
<td>4mls</td>
<td>Continuous – however routine specimen should be received before 19.00 hrs.</td>
<td>Part of LFT</td>
</tr>
<tr>
<td>Amylase</td>
<td>B</td>
<td>Clotted specimen/Lithium Heparin</td>
<td>4mls</td>
<td>Continuous – however routine specimen should be received before 19.00 hrs.</td>
<td></td>
</tr>
<tr>
<td>Aspartate amino-transferase (AST)</td>
<td>B</td>
<td>Clotted specimen/Lithium Heparin</td>
<td>4mls</td>
<td>Continuous – however routine specimen should be received before 19.00 hrs.</td>
<td>Part of LFT</td>
</tr>
<tr>
<td>Bilirubin (Total)</td>
<td>B</td>
<td>Clotted specimen/Lithium Heparin</td>
<td>4mls</td>
<td>Continuous – however routine specimen should be received before 19.00 hrs.</td>
<td>Part of LFT</td>
</tr>
<tr>
<td>Calcium</td>
<td>B</td>
<td>Clotted specimen/Lithium Heparin</td>
<td>4mls</td>
<td>Continuous – however routine specimen should be received before 19.00 hrs.</td>
<td></td>
</tr>
<tr>
<td>Chloride</td>
<td>B</td>
<td>Clotted specimen/Lithium Heparin</td>
<td>4mls</td>
<td>Continuous – however routine specimen should be received before 19.00 hrs.</td>
<td></td>
</tr>
<tr>
<td>Cholesterol</td>
<td>B</td>
<td>Clotted specimen/Lithium Heparin</td>
<td>4mls</td>
<td>Continuous – however routine specimen should be received before 19.00 hrs.</td>
<td>Full Lipid profile should be sent to UHW for processing</td>
</tr>
<tr>
<td>CPK</td>
<td>B</td>
<td>Clotted specimen/Lithium Heparin</td>
<td>4mls</td>
<td>Continuous – however routine specimen should be received before 19.00 hrs.</td>
<td></td>
</tr>
<tr>
<td>Test</td>
<td>Type</td>
<td>Specimen</td>
<td>Vol.</td>
<td>Frequency of Assay</td>
<td>Comments.</td>
</tr>
<tr>
<td>----------------------</td>
<td>------</td>
<td>-------------------</td>
<td>------</td>
<td>-----------------------------------------------------------------------------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>Blood</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>U</td>
<td>Urine</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Creatinine</td>
<td>B</td>
<td>Clotted specimen</td>
<td>4mls</td>
<td>Continuous – however routine specimen should be received before 19.00 hrs.</td>
<td>Part of U/E</td>
</tr>
<tr>
<td>GGT</td>
<td>B</td>
<td>Clotted specimen</td>
<td>4mls</td>
<td>Continuous – however routine specimen should be received before 19.00 hrs.</td>
<td>Part of LFT</td>
</tr>
<tr>
<td>Glucose</td>
<td>B.</td>
<td>Fluoride oxalate</td>
<td>4mls</td>
<td>Continuous – however routine specimen should be received before 19.00 hrs.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>plasma.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glucose Tolerance Test (GTT)</td>
<td>B</td>
<td>Fluoride oxalate</td>
<td>4mls</td>
<td>Continuous – however routine specimen should be received before 19.00 hrs.</td>
<td>A min of two samples are required – one fasting sample and one 2 hour post Prandial sample.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>plasma.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Magnesium</td>
<td>B.</td>
<td>Clotted specimen</td>
<td>4mls</td>
<td>Continuous – however routine specimen should be received before 19.00 hrs.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>/Lithium Heparin.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phosphate</td>
<td>B.</td>
<td>Clotted specimen</td>
<td>4mls</td>
<td>Continuous – however routine specimen should be received before 19.00 hrs.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>/Lithium Heparin.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Potassium</td>
<td>B.</td>
<td>Clotted specimen</td>
<td>4mls</td>
<td>Continuous – however routine specimen should be received before 19.00 hrs.</td>
<td>Part of U/E Sample should be received in lab within 4 hours of collection or sample must be separated.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>/Lithium Heparin.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sodium</td>
<td>B</td>
<td>Clotted specimen</td>
<td>4mls</td>
<td>Continuous – however routine specimen should be received before 19.00 hrs.</td>
<td>Part of U/E</td>
</tr>
<tr>
<td></td>
<td></td>
<td>/Lithium Heparin.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Troponin</td>
<td>B</td>
<td>EDTA</td>
<td>2.5 mls</td>
<td>On Demand</td>
<td>Separate sample required</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urea</td>
<td>B</td>
<td>Clotted specimen</td>
<td>4mls</td>
<td>Continuous – however routine specimen</td>
<td>Part of U/E</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
24 Hour Urine

- All 24 hour urine containers and bags are available from the laboratory and should only be requested 9-5pm, Monday to Friday.
- The following 24 hour collections require acid- Catecholamine, 5-HIAA, VMA, Calcium.
- A plain container is required for Protein, Creatinine, and Cortisol.

### 3.5 On Call Biochemistry Testing

All the above tests are available on call in the Biochemistry Department

All of the tests listed in the table above are available on call where the clinical need requires it. Occasionally GP’s may require a particular blood to be done out of hours, however this must be phoned to the scientist on call in advance and there must be a clear urgent clinical need.

### 3.6 Biochemistry Samples for University Hospital Waterford

All samples for UHW Biochemistry are dispatched twice daily Monday-Friday. For urgent samples to UHW after the routine dispatch time, please contact the Laboratory in STGH and appropriate transport arrangements will be made. Note that in order to process therapeutic drug levels or any other urgent samples, the latest times for receipt in UHW is 16:00hr Monday to Friday and 12:00hr at the weekend.

### 3.7 Biochemistry Samples for External Laboratories

All samples for external Laboratories are dispatched daily at 7.30am via hospital transport services, if available. Samples for Biomnis are sent via UHW or directly with the courier. If samples are required to be sent urgently outside these times, a taxi is necessary and laboratory staff must be contacted to organise same.

### 3.8 Critical Alerts for Phoning Abnormal Results (1st time only)

Below is a list of action limits for contacting medical practitioners and wards with urgent abnormal results. These limits are based on the first abnormal set of results or repeat results that have shown a markedly significant change for an individual patient.
<table>
<thead>
<tr>
<th>Analyte (serum/ plasma)</th>
<th>Unit</th>
<th>Below</th>
<th>Above</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium</td>
<td>mmol/L</td>
<td>120</td>
<td>150</td>
</tr>
<tr>
<td>Potassium</td>
<td>mmol/L</td>
<td>2.5</td>
<td>6.3</td>
</tr>
<tr>
<td>Urea</td>
<td>mmol/L</td>
<td>None</td>
<td>30</td>
</tr>
<tr>
<td>Creatinine</td>
<td>umol/L</td>
<td>None</td>
<td>300</td>
</tr>
<tr>
<td>Glucose</td>
<td>mmol/L</td>
<td>2.5</td>
<td>20</td>
</tr>
<tr>
<td>Calcium</td>
<td>mmol/L</td>
<td>1.8</td>
<td>3.0</td>
</tr>
<tr>
<td>Magnesium</td>
<td>mmol/L</td>
<td>0.4</td>
<td></td>
</tr>
<tr>
<td>Phosphate</td>
<td>mmol/L</td>
<td>0.3</td>
<td></td>
</tr>
<tr>
<td>AST</td>
<td>U/L</td>
<td>None</td>
<td>300</td>
</tr>
<tr>
<td>ALT</td>
<td>U/L</td>
<td>None</td>
<td>300</td>
</tr>
<tr>
<td>CPK</td>
<td>U/L</td>
<td>None</td>
<td>500</td>
</tr>
<tr>
<td>Amylase</td>
<td>U/L</td>
<td>None</td>
<td>500</td>
</tr>
<tr>
<td>TnI</td>
<td>ng/ml</td>
<td>None</td>
<td>0.04</td>
</tr>
<tr>
<td>Trig</td>
<td>mmol/L</td>
<td>None</td>
<td>20</td>
</tr>
</tbody>
</table>
4.0 Haematology Department

4.1 Service Description

The Haematology laboratory provides a diagnostic service for STGH. This laboratory provides diagnostic investigations in general haematology and coagulation. FBC samples and coagulation samples are processed in the lab each day. Some specialised investigations not performed at STGH are sent to the Haematology Laboratory in University Hospital Waterford. Other more specialist tests are referred out to external laboratories. The clinical haematology service is governed by a Consultant Haematologist based in University Hospital Waterford. Referrals for consultations should be directed to one of the secretaries below secretary in UHW.

Department Telephone Numbers

<table>
<thead>
<tr>
<th>Contact</th>
<th>Title</th>
<th>Phone Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Haematology Dept</td>
<td></td>
<td>052-6177973 Ext:7973</td>
</tr>
<tr>
<td>Dr. B. Hennessy</td>
<td>Consultant Haematologist</td>
<td>051-848746 Secretary</td>
</tr>
<tr>
<td>Haematology Registrar</td>
<td>Haematology Registrar</td>
<td>051-842105</td>
</tr>
</tbody>
</table>

4.2 Specimen Labelling and Completion of Request Forms

For accurate identification of specimens it is essential that all samples are labelled properly and that request forms are filled out clearly and accurately referring to ‘Completing the request form and labelling the specimen’ (See Section 1.4). In the interest of patient safety, samples that do not meet these minimum sample identification requirements cannot be accepted for analysis.

4.3 Turnaround Times Haematology

The following turnaround times apply to Haematology Tests:

<table>
<thead>
<tr>
<th>Test</th>
<th>Urgent</th>
<th>Routine</th>
<th>Routine Cut off Time for routine samples</th>
</tr>
</thead>
<tbody>
<tr>
<td>FBC</td>
<td>2 hours</td>
<td>4 hours</td>
<td>19.00</td>
</tr>
<tr>
<td>Coagulation/ D Dimer</td>
<td>2 hours</td>
<td>4 hours</td>
<td>19.00</td>
</tr>
<tr>
<td>IM Screen</td>
<td>Contact lab to advise – 2 hours</td>
<td>24 hours</td>
<td>19.00</td>
</tr>
</tbody>
</table>
Critical tests can be available sooner than the times above, however please contact the lab at 7972 to advise that a test is required critically. All blood films are referred to UHW and their turnaround times apply (see UHW user manual). If a blood film requires urgent review, the laboratory must be informed immediately and the slides will sent to UHW as soon as possible.

4.4 Haematology Tests Available

General Haematology

If abnormalities are detected in the full blood count profile which fit set criteria set out by the Regional Haematology Laboratory in UHW, laboratory staff will make a blood film and forward it to UHW for examination. The laboratory has set criteria, which will prompt a blood film examination on the patient.

<table>
<thead>
<tr>
<th>Test</th>
<th>Specimen /bottle</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>FBC</td>
<td>EDTA/purple top</td>
<td>FBC should be less than 24 hrs old at time of testing</td>
</tr>
<tr>
<td></td>
<td>2.5ml Blood</td>
<td></td>
</tr>
<tr>
<td>Blood Film</td>
<td>EDTA/purple top</td>
<td>Blood film should be made from fresh FBC sample by the lab staff.</td>
</tr>
<tr>
<td></td>
<td>2.5ml Blood</td>
<td></td>
</tr>
<tr>
<td>IM Screen (Monospot)</td>
<td>EDTA/ purple</td>
<td>IM should be &lt; 24 hrs old</td>
</tr>
<tr>
<td></td>
<td>2.5ml Blood</td>
<td></td>
</tr>
<tr>
<td></td>
<td>or 1ml serum</td>
<td></td>
</tr>
</tbody>
</table>

• EDTA FBC samples are stored for 24 hrs at room temperature, allowing for add on requests where suitable. Contact the lab for specific advice regarding add on requests.

Coagulation Profiles

Routine coagulation samples (PT/INR and APTT) are analysed daily in the STGH lab. D Dimers are also tested in STGH. Samples for special coagulation are frozen, sent to UHW and subsequently done in batch in the Haematology Lab, UHW. More unusual coagulation assays are dispatched frozen to the special coagulation Laboratory in St. James Hospital, Dublin. If required urgently in a particular clinical case please discuss with the laboratory and/or Consultant Haematologist who will advise on guidelines for Thrombophilia screening etc.

It is essential that all tubes be filled accurately to the marked line on the bottle. They should not be taken from heparin containing IV lines. Please contact the laboratory for advice if any other clotting assay is required which is not listed below.

Prothrombin Time/INR

• The Prothrombin time (PT) is a measure of the activity of the extrinsic pathways. It is useful in the monitoring of liver disease and Warfarin therapy. It may also be prolonged in Disseminated Intravascular Coagulation (DIC).

Activated Partial Thromboplastin Time (APTT)

Electronic copies of the User Manual are read-only.
Printed copies of this Manual are only valid until 23.59 on the day of printing.
• The APTT measures the intrinsic pathway. It is used to monitor heparin therapy. It may also be prolonged in some factor deficiencies (e.g. Factor VIII, factor IX, factor XI and factor XII), von Willebrand’s disease and DIC. Occasionally it may be prolonged due to the presence of an auto-antibody such as the Lupus anticoagulant

D Dimers
• D-Dimers have replaced fibrinogen degradation products. They are of little use in the diagnosis of disseminated intravascular coagulopathy (DIC) as this is really a clinical diagnosis supported by prolonged PT, APTT and falling platelet count. D Dimers provide a useful guide to the presence of DVT or PE but must only be used in conjunction with a clinical probability scoring system.
• “The diagnosis of deep vein thrombosis in symptomatic outpatients, and the potential for clinical assessment and D Dimer assays to reduce the need for diagnostic imaging.”

• Refer to www.bcshguidelines.com Guidelines on Oral Anticoagulation.

<table>
<thead>
<tr>
<th>Test</th>
<th>Specimen /bottle</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coagulation Screen (PT, INR, APTT)</td>
<td>3ml blood Sodium Citrate (blue top) Fill to black line</td>
<td>Specimens should be tested on the same day of collection and received in the laboratory before 19.00 hrs. Samples for INR only can be stored overnight at room temperature if not required urgently. APTT tests must be performed within 4 hours of sample being taken. If a requestor wishes to add on tests, these time requirements must be satisfied or otherwise a fresh sample will be required.</td>
</tr>
<tr>
<td>Fibrinogen</td>
<td>3ml blood Sodium Citrate (blue top) Fill to black line</td>
<td>A derived fibrinogen screen test is available in STGH on request.</td>
</tr>
<tr>
<td>D-Dimers</td>
<td>3mls blood Sodium Citrate (blue top) Fill to black line</td>
<td>D Dimer tests must be performed within 4 hours of sample being taken. If a requestor wishes to add on tests, these time requirements must be satisfied otherwise a fresh sample will be required.</td>
</tr>
</tbody>
</table>

Repeat Samples Requested by the Laboratory
• Repeat samples may be requested by the laboratory if a sample or the quality of a sample is not suitable for testing i.e. samples may be insufficient, haemolysed, clotted etc.

• Coagulation samples are stored for 48 hrs at room temperature, allowing for add on requests where suitable. Contact the lab for specific advice regarding add on requests.

4.5 On-Call Haematology Tests
The following tests are available on call in Haematology Laboratory
- FBC
- Coagulation Screen
- D-Dimers
- IM screen

### 4.6 Haematology samples for University Hospital Waterford

All samples for UHW Biochemistry are dispatched twice daily Monday-Friday. For urgent samples to UHW after the routine dispatch time, please contact the Laboratory in STGH and appropriate transport arrangements will be made. Note that in order to process therapeutic drug levels or any other urgent samples, the latest times for receipt in UHW is 16:00hr Monday to Friday and 12:00hr at the weekend.

### 4.7 Haematology Samples for External Laboratories

All samples for external Laboratories are dispatched daily at 7.30am via hospital transport services, if available. Samples for Biomnis are sent via UHW or directly with the courier. If samples are required to be sent urgently outside these times, a taxi is necessary and laboratory staff must be contacted to organise same.

### 4.8 Critical Alerts for Phoning Haematology Tests (1st Occasion Only)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Phone List Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Haemoglobin</td>
<td>&lt;7.0 g/dl</td>
</tr>
</tbody>
</table>
| Neutrophils | <0.5 x 10^9/L  
>=50 x 10^9/L |
| Lymphs | >75 x 10^9/L (new case only) |
| Platelets | <30 x 10^9/L  
>=1000 x 10^9/L |
| INR | > 5.0 |
| APTT | >70 secs |
| D Dimer | Dr. Ryan to confirm |

### 4.9 Andrology (Semen Analysis)

There is no andrology service provided in STGH.

Contact the Histology Laboratory in Waterford for details on semen analysis.

<table>
<thead>
<tr>
<th>Hospital</th>
<th>Contact</th>
</tr>
</thead>
<tbody>
<tr>
<td>UHW Histology Department</td>
<td>051-842494</td>
</tr>
</tbody>
</table>

Please read these instructions thoroughly.
Collection of the sample:

- If the test is to be useful: -
- It is important not to have had sex or masturbation for 48 hours prior to collecting the sample but to have an abstinence period of no longer than 7 days. First wash your hands and genitals in the normal way. Dry thoroughly.

The container:

- Please use the sterile container provided. Do not open the container until you are ready to produce the sample. Collect the specimen by masturbation, putting the entire specimen directly into the container. It is important that you collect the whole sample.

- Seal container immediately afterwards with the lid only. Do not use adhesive tape. Write your name, date of birth, clinic number, period of abstinence and date and time of production on the label. Fill in the form provided. Do not use a sheath/condom, as these are harmful to sperm.

- Deliver the sample and completed form to the laboratory within 1 hour of collection. Please keep the sample warm by carrying it under clothing near to your body.

Delivering the Sample:

- The sample is to be delivered by either you or your partner as soon as possible after collection to the laboratory on morning of appointment.

4.10 Additional Tests performed

- Pregnancy Test
- CSF
- MSU

Pregnancy Test (Alere hCG rapid test)

Type of container and optimal time of specimen collection:

- Use sterile universal containers in a sealed plastic bag. Samples cannot be tested if containers with preservatives are used.
- It is possible to use the Alere test with a urine sample collected at any time of day, however a first morning sample will usually contain the highest level of hCG.
- Samples may be stored at 2-8°C for 72 hours if necessary, but must come to room temperature before testing.
- Detects hCG levels at a concentration of 25mIU/ml.

Safety requirements:

Ensure specimens are placed in a sealed plastic specimen bag with request form in pouch for transport to the laboratory. Samples which have leaked in transit may not be processed by staff, so ensure that containers are fully closed.
Time between collection and processing:
Laboratory staff will endeavour to process samples within 1 hour of receipt in laboratory, however there may be instances where delays are unavoidable i.e. staff shortages etc. if a result is required urgently, staff must be informed by phone before sending sample to the laboratory.

Expected values:
Urine samples from healthy males and post-menopausal females generally contain <10mIU/ml hCG. Levels are generally <5mIU/ml in pre-menopausal females. On the first day of the first missed period, the levels of maternal hCG are normally 50-250mIU/ml.

Limitations:
- Positive results from very early pregnancy may later prove negative due to natural termination of pregnancy. It is therefore recommended that weak positive results be re-tested 48-72 hours later with an early morning sample.
- A negative result can be obtained if the sample is too dilute. If pregnancy is still suspected, it is therefore recommended that the patient be re-tested 48-72 hours later with an early morning sample.
- hCG remains elevated for a time after pregnancy. Pregnancy tests carried out less than 3 weeks after giving birth or 9 weeks after natural loss or termination may need further evaluation.
- A number of conditions other than pregnancy may cause elevated levels of hCG e.g. menopause, trophoblastic disease and certain non-trophoblastic neoplasms.
- Occasionally samples containing less than 25mIU/ml hCG may test positive, Alere cassette has been shown to be over 99% accurate.
- Drugs containing hCG may interfere and cause misleading results.
- False positive and false negative pregnancy tests may be found in patients with abnormal bladder or kidney function.

CSF

Type of container and optimal time of specimen collection:
- Use sterile universal containers in a sealed plastic bag. Specimen should preferably be collected before antimicrobial therapy is started.
- Collect aseptically in sequence into sterile universal containers labelled 1, 2 and 3. If a fourth sample is taken, label container 4. Ideally, a minimum volume of 1ml CSF should be collected into each container.

Safety requirements:
Ensure specimens are placed in a sealed plastic specimen bag with request form in pouch for transport to the laboratory.

Time between collection and processing:
Specimens should be transported to the laboratory for processing as soon as possible. Laboratory should be telephoned to alert staff that a CSF is en route to the laboratory.

Specimen Quality:
Cells in CSF disintegrate and any undue delay may produce a cell count that does not reflect the clinical situation of the patient.
Special consideration to minimise deterioration:
Treat all CSF specimens as urgent and transport to the laboratory immediately. Do not refrigerate the specimen.

Sample processing and turnaround time:
Microscopy only is performed in STGH. As per UHW protocol, microscopy is only performed on sample 3 in the case of meningitis queries. If SAH is suspected, this must be clearly stated on the request form and all samples will undergo microscopy only in these cases. Turnaround time from receipt in laboratory to result of microscopy is 45mins. Samples are then packaged and sent by taxi to UHW for further testing i.e. Gram stain, differential, culture, glucose and protein. If oligoclonal bands are requested, a serum sample must accompany the CSF.

MSU

Type of container and optimal time of specimen collection:
Boric acid containers are suitable for all urine specimens for microbiological examination.

Correct Method of Collection:
Midstream urine (MSU):
Avoiding first part of the voided urine and without interrupting the flow, approximately 20 ml is collected into the specimen container. The remaining urine is discarded.
Clean-catch urine:
Thorough periurethral cleaning is recommended. The whole specimen is collected into a sterile container and then an aliquot sent for examination.
Suprapubic aspirate (SPA):
Urine is obtained aseptically, directly from the bladder by aspiration with a needle and syringe.
Catheter urine (CSU):
The specimen is obtained aseptically from a sample port in the catheter tubing or by aseptic aspiration of the tubing. The specimen should not be obtained from the collection bag.
Bag urine: A sterile bag is taped over the freshly cleaned and dried genitalia and the collected urine is transferred to specimen container.
Ileal conduit – urostomy urine: Urine is obtained via a catheter passed aseptically into the stomal opening after removal of the external appliance.
Cystoscopy urine: Urine is obtained directly from the bladder using a cystoscope.
Ureteric urine: Paired urine specimens are obtained from each ureter during cystoscopy via ureteric catheters inserted from the bladder.

Quantity and appropriate number of specimens:
One specimen is sufficient in most cases.
Fill to the dotted line (or as close as possible) on boric acid containers.

Time between collection and processing:
Specimens should be transported and processed within 4 hours where possible.

Special considerations to minimise deterioration:
Specimens collected with boric acid preservative remain stable for up to 96 hours after collection.

Safety Requirements:
Specimens from general practitioners, and from hospital clinics, wards, etc. are placed in a sealed plastic specimen bag.

Electronic copies of the User Manual are read-only.
Printed copies of this Manual are only valid until 23.59 on the day of printing.
Sample processing and turnaround time:

**Microscopy only** is performed in STGH for Paediatric and Maternity patients. Turnaround time for MSU microscopy is 4 hours from receipt. If a result is required urgently, staff must be informed by phone before sending sample to the laboratory. Samples are sent in daily morning transport to the Microbiology laboratory in UHW for all further testing i.e. culture and sensitivities where deemed necessary by microscopy results.

**Appendix 1  Packaging Instruction P650**

- **This packing instruction applies to UN No. 3373 (Diagnostic Specimens)**

1. The packaging shall be of good quality, strong enough to withstand the shocks and loadings normally encountered during carriage, including transhipment between vehicles or containers and between vehicles or containers and warehouse as any removal from a pallet or over pack for subsequent manual or mechanical handling. Packaging shall be constructed and closed to prevent any loss if contents that might be caused under normal conditions of carriage by vibration or by changes in temperature, humidity or pressure.

2. The packaging shall consist of three components
   - a. a primary receptacle;
   - b. a secondary packaging; and
   - c. an outer packing.

3. Primary receptacles shall be packed in secondary packaging in such a way that, under normal conditions of carriage, they cannot break, be punctured or leak their contents into the secondary packaging. Secondary packaging shall be secured in outer packaging with suitable cushioning material. Any leakage of the contents shall not compromise the integrity of the cushioning material or of the outer packaging.

4. For carriage, the mark illustrated below shall be displayed on the external surface of the outer packaging on a background of a contrasting colour and shall be clearly visible and legible. The width of the line shall be at least 2mm; the letters and numbers shall be at least 6mm high.

5. The completed package shall be capable of successfully passing the drop test in 6.3.2.5. as specified in 6.3.2.3. and 6.3.2.4. except that the height of the drop shall not be less that 1.2m. The smallest external dimension of outer packaging shall be not less than 100mm. (See note).
   (Note: This condition has been removed in a corrigendum issued by the UN dated, December 2004).

6. For liquid substance:
   - a. The primary receptacle(s) shall be leak proof;
   - b. The secondary packaging shall be leak proof;
c. If multiple fragile primary receptacles are placed in a single secondary packaging, they shall be either individually wrapped or separated to prevent contact between them;

d. Absorbent material shall be placed between the primary receptacles(s) and the secondary packaging. The absorbent material shall be in quantity sufficient to absorb the entire contents of the primary receptacle(s) so that any release of the liquid substance will not compromise the integrity of the cushioning material or of the outer packaging;

e. The primary receptacle or the secondary packaging shall be capable of withstanding, without leakage, and internal pressure of 95 kPa (0.95 bar).

7. For solid substances:
   a. The primary receptacle(s) shall be sift proof;
   b. The secondary packaging shall be sift proof;
   c. If multiple fragile primary receptacles are placed in a single secondary packaging, they shall be either individually wrapped or separated to prevent contact between them.

8. Refrigerated or frozen specimens: Ice, dry ice and liquid nitrogen
   a. When dry ice or liquid nitrogen is used to keep specimens cold, all applicable requirements of ADR shall be met. When used, ice or dry ice shall be placed outside the secondary packaging or in the outer packaging or an over pack. Interior supports shall be provided to secure the secondary packaging in the original position after the ice or dry ice has dissipated. If ice is used, the outside packaging or over pack shall be leak proof. If carbon dioxide, solid (dry ice) is used, the packaging shall be designed and constructed to permit the release of carbon dioxide gas to prevent a build up of pressure that could rupture the packaging and the package (the outer packaging or the over pack) shall be marked “Carbon dioxide, solid” or “Dry ice”.
   b. The primary receptacle and the secondary packaging shall maintain their integrity at the temperature of the refrigerant used as well as the temperatures and the pressures, which could result if refrigeration were lost.

9. Infectious substances assigned to UN No. 3373 which are packed and packages which are marked in accordance with this packing instruction are not subject to any other requirement in ADR.

10. Clear instructions on filling and closing such packages shall be provided by packaging manufacturers and subsequent distribution to the consignor or to the person who prepares the package (e.g. patient) to enable the package to be correctly prepared for carriage.

11. If any substance has leaked and has been spilled in a vehicle or container, it may not be reused until after it has been thoroughly cleaned and, if necessary, disinfected or decontaminated. Any other goods and articles carried in the same vehicle or container shall be examined for possible contamination.
Appendix 2  Current STGH MSBOS Version 1 Issued 2010 Maximum Surgical Blood Order Schedule STGH

A Maximum Surgical Blood Ordering Schedule (MSBOS) is a mechanism to maximise usage of blood and minimise wastage in elective surgery. A MSBOS can reduce the workload of unnecessary crossmatching and issuing of blood and optimise stock management. The MSBOS only applies to elective surgery and requires samples being in the Transfusion Laboratory at least twenty four hours prior to surgery.

For operations /procedures requiring a “group and save only” the following applies:

- In patients with a negative antibody screen blood can be available within one hour if it is required urgently.
- If patients have a positive antibody screen identified in the group and save sample crossmatched blood will be made available but surgery is very likely to be delayed.

For operations requiring cross matched blood:

- The designated number of units are reserved for the patient for 48 hours from the proposed date of surgery
- Crossmatched blood will be returned to the blood bank 48 hours post surgery unless otherwise requested by the clinician/ward. In the event of surgery being cancelled or postponed it is the responsibility of the clinician /ward to inform the blood bank of the change in circumstances.
- Four units of “O” Negative concentrate red cells in ASL-D are available from the issue fridge in the laboratory for emergency use only.
  - However if patient’s ‘group & save’ is available ‘group confirmed uncrossmatched’ blood will be issued

This schedule has been constructed by Department of Haematology and Blood Transfusion in conjunction with Division of Surgery, Anesthetics, and Obstetrics/Gynecology and is intended to act as a guide for generation of cross-matching requests. It needs to be updated constantly. Using these guidelines will ensure efficient blood utilisation

**Transfusion services for STGH Blood Transfusion Laboratory 052 6177974**

**General Surgery**

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cholecystectomy and exploration of common bile duct</td>
<td>G&amp;S</td>
</tr>
<tr>
<td>Laparotomy- elective - emergency (? resection)</td>
<td>2–4</td>
</tr>
<tr>
<td>gastrosomy, ileostomy, colostomy</td>
<td></td>
</tr>
<tr>
<td>Liver Biopsy (surgery/radiology)</td>
<td>G&amp;S</td>
</tr>
<tr>
<td>Oesophageal Dilation- endoscopic</td>
<td>G&amp;S</td>
</tr>
<tr>
<td>Partial Gastrectomy- total</td>
<td>4-6</td>
</tr>
</tbody>
</table>

**Endocrine**

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thyroidectomy – partial / total</td>
<td>G&amp;S</td>
</tr>
</tbody>
</table>

**Urology**

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>TURP</td>
<td>3</td>
</tr>
<tr>
<td>TUR bladder tumour (large tumour)</td>
<td>G&amp;S</td>
</tr>
<tr>
<td>Cystoscopy</td>
<td>G&amp;S</td>
</tr>
</tbody>
</table>
G.I. Surgery

Ulcerative Collitis
Panproctocolectomy 2-4
Creation of ileal pouch 2-4

Colon Cancer
Right Hemicolecctiony 2-4
Left Hemicolecctiony 2-4
Sigmoid colon 2-4

Insertion of PEG Tube FBC & Coag
Oesophageal Stent FBC & Coag
Insertion of Portocaths FBC & Coag

Obstetrics and Gynecology

Elective Day Surgery

<table>
<thead>
<tr>
<th>Description</th>
<th>MSBOS (number of units)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternity</td>
<td></td>
</tr>
<tr>
<td>LSCS</td>
<td>G + S</td>
</tr>
<tr>
<td>ERPC</td>
<td>G + S</td>
</tr>
<tr>
<td>Gynaecology</td>
<td></td>
</tr>
<tr>
<td>Laparoscopy</td>
<td>No blood transfusion tests</td>
</tr>
<tr>
<td>Hysterectomy- abdominal or vaginal</td>
<td>G + S</td>
</tr>
<tr>
<td>Simple</td>
<td>G + S</td>
</tr>
<tr>
<td>Extended</td>
<td>2</td>
</tr>
<tr>
<td>Pelvic Floor Repairs</td>
<td>G + S</td>
</tr>
<tr>
<td>Hydatidiform Mole</td>
<td>2</td>
</tr>
</tbody>
</table>

NOTE: Variations on above requires approval from a Consultant Obstetrician / Gynaecologist

Non Elective Events -Additional non-elective events require a decision by consultant or registrar e.g.

<table>
<thead>
<tr>
<th>Event</th>
<th>MSBOS (number of units)</th>
</tr>
</thead>
<tbody>
<tr>
<td>APH</td>
<td>G + S depends on clinical judgement</td>
</tr>
<tr>
<td>PPH</td>
<td>G + S depends on clinical judgement</td>
</tr>
<tr>
<td>Placenta Previa</td>
<td>G + S depends on clinical judgement</td>
</tr>
<tr>
<td>Ectopic Pregnancy</td>
<td>G + S depends on clinical judgement</td>
</tr>
</tbody>
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## Appendix 3  Stability of Biochemistry Analytes once separated using a Gel Separator

<table>
<thead>
<tr>
<th>Analyte</th>
<th>Stability at Room Temperature (25°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetaminophen</td>
<td>8 hours</td>
</tr>
<tr>
<td>Albumin</td>
<td>7 days</td>
</tr>
<tr>
<td>Alkaline Phosphatase (ALP)</td>
<td>4 days *</td>
</tr>
<tr>
<td>Alanine Aminotransferase (ALT)</td>
<td>3 days</td>
</tr>
<tr>
<td>Amylase</td>
<td>7 days</td>
</tr>
<tr>
<td>Aspartate Aminotransferase (AST)</td>
<td>3 days</td>
</tr>
<tr>
<td>Calcium</td>
<td>7 days</td>
</tr>
<tr>
<td>Cholesterol</td>
<td>7 days</td>
</tr>
<tr>
<td>Creatine Kinase (CK)</td>
<td>4 hours</td>
</tr>
<tr>
<td>Chloride</td>
<td>7 days</td>
</tr>
<tr>
<td>Creatinine (CRS)</td>
<td>5 days</td>
</tr>
<tr>
<td>γ-Glutamyl Transferase (GGT)</td>
<td>7 days</td>
</tr>
<tr>
<td>Glucose</td>
<td>1 day</td>
</tr>
<tr>
<td>Lactate Dehydrogenase (LDH)</td>
<td>2 days</td>
</tr>
<tr>
<td>Magnesium</td>
<td>7 days</td>
</tr>
<tr>
<td>Phosphorus</td>
<td>3 days</td>
</tr>
<tr>
<td>Potassium</td>
<td>4 days</td>
</tr>
<tr>
<td>Sodium</td>
<td>4 days</td>
</tr>
<tr>
<td>Total Bilirubin</td>
<td>4 hours **</td>
</tr>
<tr>
<td>Triglycerides</td>
<td>3 days</td>
</tr>
<tr>
<td>Urea</td>
<td>3 days</td>
</tr>
<tr>
<td>TnI</td>
<td>2 Hours</td>
</tr>
</tbody>
</table>

**Notes:**

Stability of analytes in processed samples - this is assuming that the gel separator tube is used

* Serum APL increases slowly with storage. Generally it is best to analyse on the day of collection.

** Protect from light
## DOCUMENT REVIEW HISTORY

<table>
<thead>
<tr>
<th>Date</th>
<th>Reviewed by</th>
<th>Document Amended</th>
<th>Next Review Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>01.01.2011</td>
<td>G Prendergast</td>
<td>Yes. New Version 3. Changes to Section 1.1, 1.2, 1.3.</td>
<td>01.01.2013</td>
</tr>
<tr>
<td>10/08/2013</td>
<td>C Hough</td>
<td>Yes, New version issued – now includes all of pathology, not just Blood Transfusion Department.</td>
<td>Aug 2015</td>
</tr>
</tbody>
</table>
| 07/01/2014 | C Grieve          | Yes V5  
 1.2 Cord Blood Request Form added  
 1.5 Dr/Phlebotomist coming to lab to sign BT request form.  
 4.7 Andrology Service removed from STGH. | Jan 2016         |
 WRH changed to UHW throughout document.  
 1.0 Addition of ‘A copy of all laboratory documents referenced to, are available from the laboratory on request.’  
 1.3 Phlebotomy section expanded to Preanalytics  
 1.4 BT request form updated.  
 1.6 Transport bags not closed correctly added.  
 2.1 Contact details for Dr. Ryan and Dr Jackson removed.  
 2.2 Urgent testing removed.  
 2.3 Addition of ‘Samples received in the laboratory which are over 48 hours old are unsuitable for processing. A repeat sample must be requested.’  
 3.4 Addition of Calcium to the FBP profile. Removal of Osmolarity from biochemistry tests available in STGH.  
 Biochemistry Tests available in STGH –addition of GGT.  
 Bring to laboratory as soon as possible –within four hours. Altered levels of electrolytes can occur if separation is delayed.  
 Troponin samples must be tested within 2 hours of sampling. |