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# Queens Hospital Burton Pathology Department

## General information

### Where to find us

Queens Hospital Burton  
Belvedere Road  
Burton-on-Trent  
DE13 ORB

Telephone number of hospital	01283 566333
Pathology enquiries	01283 566333 ext 3063
General Laboratory Fax number	01283 593064

### Consultant Advisory Service

Burton Pathology currently has four consultants available to give advice on appropriate investigations, investigation protocols, report interpretation and patient management.

### Contact Numbers

Consultant Haematologist	Ext 4047
Consultant Haematologist	Ext 5964
Clinical Specialist Haematology	Ext 4025
Consultant Microbiologist	Ext 4103
Consultant Microbiologist	Ext 4215
Consultant Chemical Pathologist	Ext 4036

### Quality Statement and standards

We take every possible effort to ensure that accurate results are returned as quickly as possible to the correct source and we are continuously striving to improve our performance both in terms of accuracy and turnaround times. To maintain our standards and ensure highest quality of service, all departments take an active part in the relevant External Quality Assurance schemes and rigorous Internal Quality Control systems are also in place. In addition each department has full accreditation status with Clinical Pathology Accreditation (CPA), a national scheme that externally assesses laboratory performance.

If you have any problems regarding the quality of service you receive, please contact:  
**Pathology Service manager (Burton Hospital, Ext. 4104)**

### Routine Laboratory Service

See each department for hours of routine service.

### On Call Service

See each department for hours of on call service.

## Phlebotomy Service

The Clinical chemistry/Haematology department at Queens Hospital provides a daily phlebotomy service within the hospital for inpatients, outpatients and GP patients and on specific days outside the hospital at five GP practices.

The service is available on the wards only on Saturdays, Sundays and Bank Holidays, to deal with urgent requests only.

See phlebotomy tube guide on Page 10

### WEEKLY SCHEDULE

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
<b>Phlebotomy Outpatients</b>	<b>Phlebotomy Outpatients</b>	<b>Phlebotomy Outpatients</b>	<b>Phlebotomy Outpatients</b>	<b>Phlebotomy Outpatients</b>		
0830-1700	0830-1700	0830-1700	0830-1700	0830-1700		
<b>Wards *</b>	<b>Wards *</b>	<b>Wards *</b>	<b>Wards *</b>	<b>Wards *</b>	<b>Wards *</b>	<b>Wards*</b>
0900-1200	0900-1200	0900-1200	0900-1200	0900-1200	0900-1130	0900-1130
	<b>Yoxall</b>	<b>Stapenhill</b>	<b>Yoxall</b>	<b>Stapenhill</b>		
	0930 -1030	0830 – 1300	0930-1030	0830 - 1300		
	<b>Tutbury</b>			<b>Tutbury</b>		
	1030 -1130			1030 -1130		
			<b>Northgate</b>			
			1030 -1200			
<b>Balance St</b>		<b>Balance St</b>	<b>Balance St</b>	<b>Balance St</b>		
1230 -1330		1230 -1330	1230 -1330	1230 -1330		

- \* Wards not covered are Maternity, Children's, Neo- natal, Intensive Care, High dependency Unit.

Should a patient be unavailable to have their blood taken, or if the sample cannot be obtained, the phlebotomist will leave the unused labels in the designated pouch for the ward staff's attention, or, in the case of external GP/referrer, will return the form to the patient and request them to return to the referrer.

Ward staff are requested to ensure phlebotomy labels are completed, have an intact bar code and are placed in the designated phlebotomy pouch in time for the phlebotomy round.

If you have any queries about phlebotomy services please contact:

**Chief BMS Support services, Burton Hospital, 01283 511511 Ext. 4126**

## Receipt of Specimens

**During the hours between 8.00am -6.00pm** all routine specimens should be delivered to department via the pneumatic tube, where it is accessible. All other specimens should be delivered in the blue sealed containers to the Pathology Laboratory and left in the relevant basket located near the blood bank fridge.

Urgent specimens during working hours should be delivered by hand to the department, requesting urgency, or delivered by pneumatic tube and the department telephoned as to the urgency.

-----  
**During hours 6.00pm-12midnight** for Haematology and Clinical chemistry ONLY (see relevant dept for Microbiology) specimens should be delivered by pneumatic tube to the department, where it is accessible. Other specimens should be delivered in the blue sealed containers to the relevant basket located near the blood bank fridge and **the relevant on-call pathology staff must be alerted, via the intercom, the specimen is there.**

Urgent specimens during 6.00pm -12.00midnight should be delivered by hand to the department, requesting urgency, or delivered by pneumatic tube and the department telephoned as to the urgency.

-----  
**During the hours between 12.00 midnight-8.00am.** Only urgent specimens should be sent during this time. **The relevant on-call pathology staff should be BLEEPED when the specimen is sent. ALL** specimens should be delivered by pneumatic tube to the department, where it is accessible. If delivered in the blue sealed containers to the relevant basket located near the blood bank fridge **the relevant on-call pathology staff must be alerted, via the intercom, the specimen is there.**

## Transport of Specimens

All specimens should be placed in a plastic transport bag and sent via the pneumatic tube system, delivered by hand in a blue specimen container or a vacuum pod.

Specimens from GP surgeries are collected and delivered by our courier drivers and these specimens must be packaged according the UN3373 regulations.

## Courier Service and Consumable/Supplies

The couriers have designated courier runs in the morning and afternoon to GP practices, Health Centres and local hospitals around Staffordshire, South Derbyshire and North West Leicestershire. Returning with the specimens at around 1300hrs and 1515hrs when the specimens are separated and processed before any deterioration occurs.

The couriers also:

- Distribute post from Queens hospital postal department and pathology reports to the GP surgeries.
- Provide a service for Pharmacy to deliver Liquid Nitrogen to some surgeries and hospitals.
- Deliver consumables e.g. vacuette bottles and 24hr urine bottles to GP surgeries.  
These must be ordered using the Pathology Consumables Order form which is available from the Pathology Laboratory on ext 3063.

Specimens should be suitably packaged (UN3373) and ready for the time the courier should arrive. In the event of a problem or breakdown the Pathology staff at Queens hospital will ring the GP surgeries to arrange alternative transport.

If you have any problems regarding the quality of the courier service please contact:  
**Chief BMS Chemistry/Haematology, Burton Hospital, 01283 511511 Ext.4126**

## Request forms

Within the hospital most ward requests can be made via the HISS order entry system; outpatient requests may be made via order entry or using the 'Combined Pathology Request' forms (distributed by Pathology Laboratory). GP requests are made using the 'Combined Pathology Request' form.

All forms should be completed legibly with the following information.

- **Patients surname and forename**
- **Patients date of birth** and sex
- **Hospital Number or NHS number(if available)**
- **Address and post code**
- Type of specimen
- Date and time of collection
- Relevant clinical details
- Details of medication/drugs
- Referring Practitioner and surgery address
- 'Danger of infection' labels (where appropriate)

\*\*Additional information may be required for some investigations please see departmental sections.

For specialist request forms e.g to manage warfarin please see the appropriate department section

## Specimens

Specimens should be placed in the appropriate container and filled to the correct level as under-filled specimens may give rise to inaccurate results.

For blood specimens, fill the containers in the correct order as EDTA can affect the results of both clotted and coagulation specimens (see vacuette draw order sheet at the end of this section.).

The minimum information required on specimens, **except** blood bank and specimens sent to the National Blood Service (NBS) e.g. HLA testing, is:

- Patients surname and forename
- Date of Birth or Hospital Number

There must be a total of three identifiers with the full name counting as two. It is helpful to have the date of collection on the bottle.

**See Blood bank and Haematology for the labelling of exceptions.**

**“Unknown” patients** e.g. those admitted unconscious or unaccompanied, should have their specimens identified with an unknown male or female casualty number.

**Specimens arriving from outside the hospital** should be packaged in accordance with regulation UN3373. If a specimen is to be posted it must comply with postal regulations P650 and packaging regulations UN3373.

**Blood Bank specimens** require special labelling. (refer to relevant section for details)

Regrettably specimens may have to be discarded if the patient’s identification is in doubt. We will not accept samples that are:

- Unlabelled
  - Mislabeled
  - Inadequately labelled
  - Broken or leaking
- Or request forms that are:
- Inadequately completed.

## High Risk Specimens

"Inoculation risk" refers to certain infections that can be transmitted when blood or some other tissue fluid from an infected person gets into the tissues of another person.

In the Health Service, sensible precautions have to be taken to protect staff and

patients from this risk while ensuring that infected patients receive all the medical care they need.

Specimens classified as high risk include all those from patients:

1. suspected or known to be infected with one or more of the hepatitis viruses: Hepatitis A, B, C, D, or E.
2. suspected or known to be infected with one of the Human immunodeficiency viruses: HIV I, II etc.
3. suspected or known to be infected with transmissible oncogenic viruses such as human T-cell leukaemia virus: HTLV-1.
4. who have received multiple blood transfusions, especially if abroad.
5. who are undergoing treatment on a renal unit.
6. who are in other known risk groups: drug addicts, institutionalised handicapped patients (e.g. Down's syndrome).

Specimens from these patients constitute a risk to all personnel handling them. To minimise the risk, we ask that the following is carried out:

- Inoculation risk labels should be attached to the specimen.
- Packaging of the specimens adheres to UN3373.
- If the sample is to be sent via the post it must adhere to postal regulation P650.

## **Turn-around times**

### **Haematology and Clinical Chemistry**

Results of routine tests will be available within 24 hours of receipt of specimens, unless further special tests are needed. Tests, which need to be referred to other sites for analysis will take varying lengths of time to complete.

### **Microbiology**

Urine Microscopy results are available within 24 hours of receipt of specimens.

Urine Culture results are available within 48 hours of receipt of specimens.

Swabs results are available within 72 hours of receipt of specimens.

Serology results are available 1-3 weeks of receipt of specimens depending on the test.

### **Histology**

Histology specimens are referred to Derby City hospital for processing and reporting and are reported within eight working days. Exceptions to this may arise if decalcification is required.

## **Results and reports**

Some GP's and external referrers will receive a written report.

Most General Practitioners receive both written reports and Electronic Laboratory Results but some GP'S receive only an electronic report.

These Electronic Transmissions are sent twice a day.

If there is any problems or queries about the Electronic Transmissions please ring 01283 566333 Ext. 5914, 5956 or 5938

The hospital wards and departments can access results via the Hospital Information Support System (HISS) and do not receive a written report with the exception of maternity.

**If there are any problems or queries about written reports please in the first instance ring the department the test was performed in.  
Chief BMS Microbiology is the IT lead for pathology and can contacted at  
Burton Hospital 01283 511511 Ext 4104.**


## Vacurette® Selection Chart


# VACUETTE® SELECTION CHART

Printed March 2007

**Burton NHS Trust - Queen's Hospital**

**Blood cultures should be drawn first then samples in the following order**



Item Number	Volume	Cap Colour	Tube Type	Tests	Special Instructions
454332	3.5ml	 Light Blue	Trisodium Citrate	INR, APTT Coagulation Screen, D-Dimer, Thrombophilia Screens Factor Assays	Only on clinical guidelines
456089	6ml	 Red	Serum	Serology (Microbiology) Down's, Glandular Fever Screening Test,	
456018	5ml	 Gold	Clotting Accelerator and Separation Gel	Myeloma Studies, AFP, B12 & Folate, Ca-125, CEA, Cortisol, Ferritin, FSH, FT3, FT4, HCG, LH, Oestradiol, Progesterone, Prolactin, PSA, Testosterone, Troponin, TSH, Urea & Electrolytes, Glucose, LFT, CE, SUA, FE, CRP, RF, Lipids, Ethanol, GGT, Cholesterol, Amylase, Phosphate, MG	Glucose for same-day testing only in this tube
456088	6ml	 Green	Li Heparin	Chromosomes Studies	
454021	4ml	 Lavender	EDTA	Glycated Haemoglobin, Full Blood Count (inc. Platelets), Reticulocytes, Glandular Fever Screening Test, Sickle Cell Screen, Haemoglobin Electrophoresis, Glucose-6-Phosphate, Dehydrogenase, Direct Coombs Test, Malarial Parasites, ESR KLEIHAUER, HLA Typing	Sickle Cell and Haemoglobin Electrophoresis need red top too
456297	6ml	 Pink	Crossmatch Serum	Crossmatch, Group & Save, Direct Coombs Test,	Tubes must be labelled fully by hand. No pre-printed labels are accepted for Blood Transfusion
454238	2ml	 Grey	Fluoride Oxalate	Glucose (tube only required if specimen is left overnight) CSF glucose	

**Recommended Order of Draw:**  
 1: Blood culture bottles    2: Coagulation tubes    3: Serum/Serum gel tubes    4: Other tubes with additives

Mrs. S. Russell	Cheif BMS. Support Services	Ext. 4126
Mr. G. P. Lomas	Cheif BMS - Chemistry	Ext. 4178
Mr. M. West	Cheif BMS - Microbiology	Ext. 4104
Mr. P. E. Brassington	Head of BMS Pathology	Ext. 4039
Dr. A. Smith	Consultant Haematologist	Ext. 4047
Dr. T. Reynolds	Consultant Chemical Pathologist	Ext. 4035
Dr. Paton	Consultant Microbiologist	Ext. 4103

**IMPORTANT**  
Hold tube in place with the thumb until tube is filled to the required level.



**Holdex**  
450203  
KFK 111



**Quickshield Safety Holder**  
450230  
KFK 287




**Multi Sampling Needle**  
21G 1.5" 450070  
KFK 228  
22G 1.5" 450075  
KFK 230




**Safety Blood Collection Set**  
+ Luer Adaptor  
450081 21G x 19cm (green) KFK 134



**Blood Transfer Unit**  
450225 KFK373





Greiner Blo-One Ltd  
Brunel Way  
Stroudwater Business Park  
Stonehouse,  
Glos, GL10 9SX  
Tel: 01453 828256  
Fax: 01453 828266

VABU01

## Haematology and Blood Bank

### Contact Numbers

Burton Hospital	01283 566333
Haematology Fax	01283 593064
Blood Bank Fax	01283 593052
Consultant Haematologist	Burton Hospital ext. 4047
Consultant Haematologist	Burton Hospital ext. 5964
Clinical Specialist Haematology	Burton Hospital ext. 4025
Head BMS Pathology	Burton Hospital ext. 4104
Chief BMS Chemistry/Haematology	Burton Hospital ext. 4126/4039
Blood Transfusion Co-ordinator/Blood Bank Manager	Burton Hospital ext. 4126
Point of Care Co-ordinator	Burton Hospital ext. 4147
Haematologist Secretary	Burton Hospital ext. 4025
Haematologist Secretary	Burton Hospital ext. 4032
Haematology Results Enquiries	Burton Hospital ext. 3063
Blood Bank Enquiries	Burton Hospital ext. 4034/4087
Blood Tests Reception	Burton Hospital ext. 5109
Haematology Outpatients Clinic	Burton Hospital ext. 5765
Macmillan Clinical Nurse Specialist	Burton Hospital ext. 5304 Bleep 574
Haematology Clinical Sister	Burton Hospital ext. 5749/5185 Bleep 587

### Routine Department Service

Opening times for individual departments vary and are listed under individual departments. As a guide however, all departments are open during the 'normal working day' from 8.00-6.00pm Monday- Friday (except National Bank Holidays when an emergency only service is provided).

**During hours 6.00pm-12midnight** Haematology/Blood Bank provide a limited service with a skeleton staff working. It is not necessary to phone the department unless the specimen is urgent. Specimens will be analysed automatically throughout this period.

When ordering urgent specimens via order entry please enter 'U' as the request status or write URGENT on a combined pathology request form.

### On Call Service

**During the hours 12.00 midnight-8.00am** Haematology/Blood Bank provide an on-call service.

During the emergency on call periods a BMS is on call for Haematology / Blood Bank to respond to emergency requests. The duty BMS can be contacted via the **bleep on 367**. Medical staff should personally contact the BMS for every request and it is the responsibility of the requestor to ensure the specimen is sent to the department. Specimens sent to the department without direct contact with the duty BMS will be left until the next batch run time. Only tests required for the immediate management of patients should be requested.

## Haematology Clinic

This provides investigation and treatment of patients with haematological disorders. The clinics are carried out in the Jubilee building. Appointments are made by sending a referral letter to either Dr. A.G. Smith, Consultant Haematologist or Dr H Ahmad, Consultant Haematologist. If an urgent appointment is needed this may be arranged by telephone on ext. 4025 or 4032 respectively. If there are any problems or cancellations of appointments please ring the same extension.

## Receipt Of Specimens

See general section.

## Transport of Specimens

See general section.

## Request forms and specimen labelling.

See the general section for the use of 'Combined Pathology Request' form and details required for specimen labelling. Each specimen sent to the department must be accompanied by the relevant request form or order entry labels.

It is vital that the red/white request form for Blood Bank or HISS generated forms contain all the information required and they are signed by the requesting medical officer.

We need four patient identifiers on the form:

- Patients surname and forename (counts as two)
- Date of Birth
- Hospital Number, NHS number or Address (one out of the three)

Making a total of four identifiers.

The specimen bottle label **MUST** have the same information, all with the same spelling, and **MUST** be signed by the person who has taken the blood specimen.

All specimens that have to be sent to the NBS for analysis e.g.HLA B27 must have the label **hand written** with the same identifiers as above and the date the sample was taken must be included.

There are several tests for Haematology/Blood Bank which require a special request form instead of the standard combined Pathology request form:

- **Blood grouping/Cross matching**
- **Anticoagulation Therapy record book**
- **'Request form to manage warfarin therapy'** available from the Haematology department.  
Any request for the Haematology consultant to take over warfarin or other anticoagulant management of a patient must be made on this request form. It must be accurately completed by the referring doctor or their team, ensuring all details especially the diagnosis, duration of therapy and any other medication the patient is taking are documented. The blood sample must be sent to the haematology department together with the request to manage warfarin form.

If the patient is in hospital at the time of discharge from the ward patients should be made fully aware of the purpose and procedure of anticoagulation therapy.

A sample for anticoagulation therapy will not be taken without the relevant paperwork (request form to manage warfarin therapy or yellow anticoagulant record book).

### **Specimens**

Unlabelled, mislabelled or inadequately labelled specimens cannot be processed.

Medical staff should ring the laboratory for any urgent requests.

See general section for requirements of patient's details.

See table below for specimen bottle requirements.

### **High Risk Specimens**

See general section.

## Haematology Sample requirements.

When requesting Haematological investigations, please use the following bottles:

Test	Specimen Requirement	Order Entry Code(s)
<b>ROUTINE</b>		
Full blood count	EDTA 4ml as single test	FBC
Erythrocyte Sedimentation Rate	EDTA 4ml as single test	ESR
Reticulocytes	EDTA 4ml as single test	Retics
Malarial parasites	EDTA 4ml as single test	MP G6PD +Retics included if Positive
Direct Coombs Test	EDTA 4ml as single test	DCT
<b>The above routine tests can be all be performed on one 4ml EDTA sample</b>		

<b>SCREEN FOR INFECTIOUS MONONUCLEOSIS</b>	Vac-Red or EDTA	GFST Can be done on FBC Specimen
--	-----------------	----------------------------------

<b>HAEMOGLOBINOPATHY SCREENING and Ante natal Sickle cell / thalassaemia screening</b>		
Haemoglobin electrophoresis screen	EDTA 4ml + Red top/serum	HBSC
Sickle cell	EDTA 4ml + Red top/serum	SS
Glucose 6 phosphate dehydrogenase	EDTA 4ml as single test	G6PD includes Retics
<b>The above Haemoglobinopathy tests can be all be performed on one 4ml purple topped EDTA and one Red topped sample</b>		

<b>ROUTINE COAGULATION</b>		
International Normalised Ratio (INR)	Citrate 3.5ml as single test	INR
Activated Partial Thromboplastin time	Citrate 3.5ml as single test	APTT
Coagulation Screen	Citrate 3.5ml as single test	COAGSC includes PT and APTT
D- Dimer	Citrate 3.5ml as single test	DD
Fibrinogen (Clauss)	Citrate 3.5ml as single test	FIB
Thrombin Time	Citrate 3.5ml as single test	TT done depending on Coagsc, please ring lab
<b>The above routine coagulation tests can be all be performed on ONE 3.5ml blue topped CITRATE sample</b>		

<b>THROMBOPHILIA SCREENING</b> *** Only performed according to our protocol. (See thrombophilia protocol) If requested for any other reason please ring laboratory. Full clinical details must be given.		
Thrombophilia screen (Full)	Citrate 4 x 3.5ml	TS includes COAGSC and all the tests below
Antithrombin III level	Citrate 2 x 3.5ml as single test	AT111
Protein C	Citrate 2 x 3.5ml as single test	PC
Protein S	Citrate 2 x 3.5ml as single test	PS
Activated Protein C resistance	Citrate 2 x 3.5ml as single test	APCR
Factor V Leiden \$	Citrate 1 x 3.5ml as single test	VLeiden done depending on APCR result-Order APCR

Prothrombin gene \$ Citrate 1 x 3.5ml as single test too  
 Lupus Screen Citrate 4 x 3.5ml as single test PGT  
**The above Thrombophilia tests can be all be performed on 4x 3.5ml blue topped CITRATE samples**

Filtered Activated Partial Thromboplastin Time	Citrate 1 x 3.5ml	FAPTTT only ordered by ITU
Factor Assays	Citrate 2 x 3.5ml	None Contact Lab
Bone Marrow	N/A	BM
Cell marker studies \$	EDTA 1 x 4ml	CMS
Chromosomes \$	Lithium Heparin 6ml	CHROMO
Cryoglobulin	Red top/serum	CRYO Must attend hospital for test in order for the sample to be taken and kept at 37degC
Cystic Fibrosis Screen \$	EDTA 1 x 4ml	CFS
Erythropoietin Level \$	Red top/serum or Gold top SST	EPL
Factor Xa \$	Citrate 4 x 3.5ml FRESH BLOOD	FXA Contact Lab. Must be received within 3 hours of sample collection.
Fragile X \$		FRAGX
Haemochromotosis Gene test \$	EDTA 1 x 4ml	HFE
Haemosiderin	Universal white	HAEMO
Haptoglobin \$	Red top/serum or Gold top SST	HAPTO
HLA B27 \$	EDTA 1 x 4ml	HLA B27
Homocysteine Precursor \$	Citrate 1 x 3.5ml	MTHFR
Human Lymphocyte antigens (other) \$	EDTA 1 x 4ml	Ring lab if any other HLA than B27 is required

**\$ Tests sent away.**

**\*Once the specimen has been taken, any further tests requested from that specimen should be telephoned to the department, even those on order entry system. The staff will then be able to tell you if the specimen is fresh enough, sufficient for the additional tests and if it possible for the additional test to be done. A re-printed label must be sent in order entry with the new tests added.**

**\*\*\*Thrombophilia screens are only performed on requests with clinical details that comply with our protocol. If no clinical details are provided then no tests will be performed. These specimens will then be stored for one month and then discarded.**

**If there are details you wish to discuss please speak to the Consultant Haematologist.**

## Thrombophilia protocol

The clinical indications for a thrombophilia are as follows:

Confirmed PE or DVT

- ~ all patient's < 50 years old
- ~ > 50 years old with any of the following:
  - recurrent thrombosis
  - relative with thrombophilia
  - first degree relative with VTE < 50 yrs

or in:

- Close relative with known thrombophilic condition (only test for relevant factor)
- VTE associated with OCP, pregnancy, HRT
- Thrombosis in an unusual site
- Central Retinal Vein Occlusion age < 50
- Recurrent foetal loss
- Unexplained neonatal thrombosis
- Skin necrosis after starting warfarin
- Unexplained arterial thrombosis age < 30
- Prior to starting OCP with strong Hx of VTE in 1st degree relatives
- Vasculopathy patients under 60

## Blood Bank Sample requirements.

When requesting blood bank tests use the following bottles and order entry codes

Test	Specimen requirement	Order Entry Code(s)
Group and Save	Pink top/serum 6 ml	G&S
Group and Save /Crossmatch	Pink top/serum 6 ml	SAG-M
Kleihauer	Mother: Pink top/serum 6 ml	KL
	: 1 x 4ml EDTA	
	Baby : Pink top/serum 6 ml	BKT( includes Group and Direct coombs test)
	: 1 x 4ml EDTA	
Repeat Kleihauer only		KT
Extra units added to crossmatch		XM+
Cold Agglutinin Titre	Pink top/serum 6 ml	CAT(must attend hospital for test )
Post Transfusion Reaction	EDTA 4ml+Pink top/serum 6 ml +Urine Universal + Bld Culture	POTR ( Transfused bag returned for testing )
Antenatal Group and Save	Pink top/serum 6 ml	ANGS
Maternity Group and Save	Pink top/serum 6 ml	MATGS**

Maternity Crossmatch	Pink top/serum 6 ml	MATSAGM**
Orthopaedic Crossmatch	Pink top/serum 6 ml	ORTHOSAGM**
Orthopaedic Group and save	Pink top/serum 6 ml	ORTHOGS**
Pre-op Crossmatch	Pink top/serum 6 ml	PREOPSAGM**
Oncology group & Save	Pink top/serum 6 ml	ONGS**
Oncology Crossmatch	Pink top/serum 6 ml	ONCSAGM**
<b>Products</b>		
250 IU Anti-D	#	DTAD250
500 IU Anti-D	#	AD500
Albumen 4.5% Paediatric		4.5ALB
Albumen 20% Adult		20ALB
Fresh Frozen Plasma	#	FFP
Platelets	#	PLT
Platelet Concentrate oncology	#	ONPLT**
Cryoprecipitate	#	CRYO
PRB	#	PRB

# The request of these products must be accompanied with a Pink top /serum specimen if a previous blood group is not known.

\*\* Requested by specialist units

## Crossmatching

For specimen and request form requirements relating to blood bank see section above:

### Request form and Specimen labelling.

Transfusion or pregnancy may stimulate the production of unexpected antibodies through a primary or secondary immune response. The timing of specimens selected for cross matching or antibody screening (G&S) must take account of this, as it is not possible to predict when or whether such antibodies will appear. It is also important to note that any component containing residual red cells can elicit an immune response.

The following table provides timing of phlebotomy with regard to previous transfusion.

If patient has had transfusion Within the last :	Sample to be taken not more than:
3-14 days	24hr before transfusion
15-28 days	72 hr before transfusion
29 days to 3 months	1 week before transfusion

## Products

### PLATELETS

Platelets are issued on request from the NBS Birmingham. Where possible PLEASE make requests 24 hours in advance. Any requests for platelets on patients showing a low platelet count should be discussed with the Consultant Haematologist.

**\*\*\*\*All requests must be accompanied by a signed request form\*\*\*\***

### FRESH FROZEN PLASMA

FFP is given only to provide coagulation factors, therefore a Coagulation Screen should be done prior to the request to determine if there are any factor deficiencies. A supply of FFP is held in the Blood Bank. On request, the units will be thawed by the department immediately and will be available within 40 minutes. These units should be used immediately or within 4 hours when stored at 22°C +/- 2°C or within 24 hrs if stored at 4°C +/- 2°C

**\*\*\*\*All requests must be accompanied by a signed request form\*\*\*\***

## ALBUMIN

The department stocks:

20% Albumin                    100ml ( adult)  
4.5% Albumin                50ml (for paediatric use)

During normal working hours contact Blood Bank staff with any requests for albumin. During on call periods albumin is available via bleeping the on call haematologist on bleep 367.

There are two other forms of Albumin:

4.5% Albumin                500ml

This is used for plasma exchange transfusions and can only be ordered by blood bank staff,

20% Albumin                50ml

This is used for children with nephrotic syndrome and can only be ordered by blood bank staff.

**\*\*\*\*All requests must be accompanied by a signed request form\*\*\*\***

## ANTI D

The department stocks:

250 iu anti D  
500 iu anti D  
1500 iu anti D

Anti D is given to Rhesus D negative women at 28 weeks of pregnancy and to women who have a potentially sensitising event.

- Delivery of a Rhesus D positive infant
- Abortion
- Invasive prenatal diagnosis e.g. amniocentesis, chorionic villus sampling, foetal blood sampling
- Other intrauterine procedures
- Antepartum haemorrhage
- External version of the foetus
- Closed abdominal injury
- Ectopic pregnancy
- Intrauterine death
- Stillbirth

A dose of 1500iu prophylactic anti D is given to rhesus negative pregnant women at 28 weeks gestation.

A dose of 250iu of anti D is recommended for prophylaxis following sensitising events (see above) up to 20 weeks gestation. For all events after 20 weeks, 500iu anti D should be given followed by a Kleihauer test to identify a foeto - maternal haemorrhage (FMH) greater than 4ml red cells. Additional anti D should be given as required.

At least 500iu of anti D must be given to every Rhesus D negative women with no preformed anti D within 72 hours following the delivery of a Rhesus D positive infant.

## Blood Storage

All units of blood (SAG-M) should be stored at a temperature of  $4^{\circ}\text{C} \pm 2^{\circ}\text{C}$  within a Blood Bank fridge which complies with BS4376; 1991 class 1 (1510) and class 2 (1520/30). Within these conditions SAG-M has a shelf life of 35 days. SAG-M can be stored within a cool box with a cool pack for up to four hours. This can be extended if the cool pack is changed at four-hourly intervals.

Once a unit of SAG-M is removed from the fridge or the cool box it must be transfused within a four hour period.

If the transfusion cannot be commenced within 30mins of removing the unit from the fridge or cool box it **must** be returned to the blood bank.

Failure to do this will lead to the units being discarded.

Platelets are stored and constantly agitated at  $22^{\circ}\text{C} \pm 2^{\circ}\text{C}$  in a platelet incubator. Platelets that are stored in these conditions have a maximum shelf life of 5 days. Platelets can be transported by hand or using a cool box provided it **DOES NOT** have a cool pack inside. It is imperative that the platelet transfusion commences immediately the platelets reach the ward, using the giving set provided by the blood bank.

Fresh Frozen Plasma is routinely kept below  $-30^{\circ}\text{C}$  within a Blood Bank freezer. FFP has a shelf life of up to 12 months within these conditions. Once removed, the product has to be thawed quickly in a  $37^{\circ}\text{C}$  water bath and then stored in a Blood Bank fridge. Once thawed, FFP has a shelf life of 24 hours when stored at  $4^{\circ}\text{C} \pm 2^{\circ}\text{C}$ . FFP is ideally used within 30 minutes of defrosting. If more than one unit of FFP is removed from the Blood Bank fridge all units must be transported in a cool box with a cool pack. Within the sealed cool box, with a fresh cool pack, FFP can be stored for up to 24 hours if the cool pack is replaced every 4 hours.

## Clinical Chemistry Department

### Contact Numbers

Burton Hospital	01283 566333
Clinical Chemistry Fax	01283 593064
Consultant Chemical Pathologist	Burton Hospital ext. 4035
Pathology Service manager	Burton Hospital ext. 4104
Chief BMS of Chemistry/Haematology	Burton Hospital ext. 4039
Clinical Scientist	Burton Hospital ext. 4094
Consultant Chemistry Secretary Pathology Service manager	Burton Hospital ext. 4056
Clinical Chemistry Results Enquiries	Burton Hospital ext. 3063
Research Nurse	Burton Hospital ext. 3042

### Routine Department Service

Opening times for individual departments vary and are listed under individual departments. As a guide however, all departments are open during the 'normal working day' from 8.00-6.00pm Monday- Friday (except National Bank Holidays when an emergency only service is provided).

**During hours 6.00pm-12midnight** Clinical chemistry provide a limited service with a skeleton staff working. It is not necessary to phone the department unless the specimen is urgent. Specimens will be analysed automatically throughout this period. When ordering urgent specimens via order entry please enter 'U' as the request status or write URGENT on a combined pathology request form.

### On Call Service

**During the hours 12.00 midnight-8.00am** Clinical chemistry provide an on-call service.

During the emergency on call periods a BMS is on call for Clinical chemistry to respond to emergency requests. The duty BMS can be contacted via the **bleep on 368**. Medical staff should personally contact the BMS for every request and it is the responsibility of the requestor to ensure the specimen is sent to the department. Specimens sent to the department without direct contact with the duty BMS will be left until the next batch run time. Only tests required for the immediate management of patients should be requested.

Certain tests are only assayed urgently if specifically requested by a doctor and if defined clinical criteria are met. Otherwise these test results will be made available at the soonest convenient time. Note: Once a specimen has been analysed, extra tests on that specimen must be discussed with the on-call BMS by a doctor and the specimen will only be assayed if there is a sound clinical reason. These extra

requests will be subjected to internal audit and retrospective justification for the split requesting may be required!

## Lipid/ Metabolic Clinic

A clinic is now available for treatment of patients with hyperlipidaemia and investigation of a variety of metabolic problems such as recurrent renal stones. This is held in the Pathology laboratory. To make an appointment please send a referral letter to Dr. Reynolds. If an urgent appointment is needed this may be arranged by telephone on **extension 4056**. Guidelines for treatment of hyperlipidaemia / referral to the lipid clinic can be found at the end of the clinical chemistry section of this handbook.

## Receipt of Specimens

See general section

## Transport of specimens

See general section

## Request Forms

See the general section for the use of 'Combined Pathology Request' form and details required for specimen labelling. Each specimen that is sent to the department must be accompanied by the relevant request form/order entry labels. It is the responsibility of the requesting medical officer that specimens are sent with the correct information and in the case of a request form all the details are correctly completed.

## Specimen Labelling

See general section for requirements of patient's details. See the vacuette tube guide in the general section for the type of bottle required for each specimen, or the table below.

All specimens must be labelled with the patient's details, the date of collection, and the time of collection especially if part of a series. **We regret that for legal liability reasons, we are unable to analyse unlabelled specimens under any circumstances.**

## High Risk Specimens

See general section

## Minimum Sample Volumes Required For Paediatric Samples

For paediatric samples the list below indicates the absolute minimum requirements

Test (Group)	Min Vol. of Serum or	Min Vol. of Blood if HCT
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	plasma ( $\mu\text{L}$ )	= 60%( $\mu\text{L}$ )
<b>Olympus Group (standard tests)</b>		
U&E + creatinine	200	500
LFT $\pm$ Gamma GT	200	500
U&E and LFT	300	750
<b>Olympus tests (special): If done with U&amp;E or LFT, Add volume for U&amp;E / LFT to requirement; if required individually, send 500<math>\mu\text{L}</math> blood (min.)</b>		
Conj. / unconj'd bilirubin	40	100
C Reactive protein	40	100
Gentamicin	50	125
Lipids	40	100
Magnesium	40	100
Phosphate	40	100
Theophylline	40	100
Albumin + calcium	40	100
<b>Centaur Group</b>		
TSH	200	500
fT4	200	500
Ferritin	200	500
<b>Others (Separate sample for each test required)</b>		
Blood Gases	100 $\mu\text{L}$ whole blood	
Iron / TIBC	100 (Iron)	250
	300 (TIBC)	750
B12 / Folate	300	750

## Sample Requirements.

These tests may be requested separately or together. If they are requested together, only a single sample is required.

Profile Name	Reference Range (for serum)	Sample Requirement	Hiss Order Entry Code(s)
<b>Urea &amp; electrolytes:</b> <b>U&amp;E</b> Sodium Potassium Chloride Urea Creatinine	135 - 145 mmol/L 3.5 - 5.0 mmol/L 95 - 112 mmol/L 2.5 - 7.0 mmol/L 50 - 110 µmol/L	Gold top for (serum UE) Universal for (urine UE) Universal for (fluid UE) 24hr urine(Plain)	UE UUE FUE U24UE
<b>Liver function test:</b> <b>LFT</b> Albumin ALT ALP Bilirubin  Calcium Globulins	32 - 50 g/L 8 - 45 U/L Age and Sex related. 0 - 18 µmol/L (Female) 0 - 23 µmol/L (Male) 2.15- 2.56 mmol/L(>11yr) 18 - 35 g/L	Gold top	LFT
<b>Cardiac Enzymes</b> LDH CK	0-580 U/L 0 - 160 U/L	Gold top	CE
Amylase	22 - 80 U/L	Gold top	AMY
Gamma GT	8 - 60 U/L	Gold top	GGT
Protein electrophoresis (Includes LFT)		Gold top	EPS
<b>Thyroid Function</b> <b>TSH</b> ft4 } assayed if clinical ft3 } indication or TSH results indicate.	0.3 – 5.5 mU/L 11 - 23 pmol/L 3.5 – 6.5 pmol/L	Gold top	TSH (FT4 / FT3 special circumstances)
Uric Acid	125-420 µmol/L	Gold top	SUA

### Other Sample Groups

Profile Name	Sample requirements	Hiss Order entry Code(s)
<b>Antenatal Screen for Down's Syndrome triple testing:</b> Give date of LMP, maternal d.o.b, scan size & date (if available). Test only useful if gestation 14 - 19 weeks.	Red top	DOWNS
<b>Anti-Convulsants:</b> Carbamazepine, \$ Phenytoin, \$ Phenobarbitone, \$ Primidone (overdose only), \$ Valproate. \$ Others (compliance only)	Gold top (specify drugs required in order entry)	CBZ PHY PHB  VAL Contact lab
Folate and Vitamin B12	Gold top	B12
Iron and TIBC ( TIBC depends on Iron results)	Gold top	FE
Ferritin	Gold top	FER
Fasting Lipid Profile (Cholesterol, Triglyceride & HDL) Cholesterol Only	Gold top	LIP CHOL
<b>Sex Hormones : Female:</b> FSH LH Oestradiol Prolactin Progesterone Testosterone SHBG \$  <b>Menopause Screen</b> FSH LH Oestradiol  <b>Sex Hormones: Male</b> FSH LH Prolactin * Testosterone	Gold top Full clinical details including drug history essential.           \$*Macroprolactin assayed on results >700 mU/L	FSH LH OES PRL PRG TST SHBG   FSH LH OES   FSH LH PRL TST
<b>Thyroid Function:</b> TSH fT4 } fT3 } fT4 / fT3 assayed if clinical indication or TSH result indicates (See later)	Gold top Full clinical details including drug history essential	TSH FT4 FT3
Urine U&E / creatinine	Universal(white)	UUE

	:	U24UE
	Random 24 hr urine	
Urine metabolic screen \$ Send as much urine as possible	Universal(white) Send to lab ASAP	UAA UOA

\$ Specimens sent away for analysis

## Listing Of Individual Tests

Note:

1. This test list is extensive but not exhaustive. If there is a test you require that does not appear on this list please contact the laboratory.
2. If no order entry code is shown, please send a specimen with a written request form.

**When requesting Clinical chemistry investigations, please use the following bottles:**

Test Name	Specimen Required	Order entry Code	
5'-Nucleotidase \$	Gold top	5NT	
ACE (Angiotensin converting enzyme) \$	Gold top	ACE	
Acetylcholinesterase Isoenzymes (Investigation of Scoline apnoea) \$	Gold top	CHE	Clinical details & relationship to carrier essential
Acetylcholine Receptor Abs \$	Gold top	ACR	
ACTH(Adrenocorticotropin) \$		ACTH	Contact Lab
Antidiuretic Hormone (ADH) \$			Contact Lab
Adrenal Autoantibodies \$	Gold top	ADABS	
<b>AFP</b> Downs screen (with HCG) AFP (Tumour marker) Amniotic fluid	Red top Gold top Universal(white)	DOWNS AFPNM	
$\alpha_1$ -Acid Glycoprotein (Orosomuroid) \$	Gold top	ORO	
$\alpha_1$ -Antitrypsin \$	Gold top	AAT	Phenotype done automatically if indicated
<b>Albumin</b> serum urine (early morning specimen) 24 hr urine	Gold top Universal(white) 24 hr urine	LFT UALB	
Alcohol (ethanol)	Gold top	ETH	
<b>Aldosterone</b>			

Plasma \$ 24 hour urine \$	Heparin 24 hr urine(plain)	ALDO	See Protocol Contact Lab
Allergy: RAST / specific IgE: <b>Specify allergens! \$</b>	Gold top 1ml Heparin	RAST	<b>Specify Allergens</b>
Alkaline phosphatase (ALP)	Gold top	LFT	
ALP Isoenzymes \$	Gold top		Contact Lab
Alanine transaminase (ALT)	Gold top	LFT	
Aluminium \$	Li Heparin/Green top	AL	Contact Lab
<b>Amino acids</b>			
Plasma \$	Heparin	AAC	
urine (fresh random) \$	Universal(white)	UAA	
δ-Aminolaevulinic acid (random urine) \$	Universal(white)	UALA	
Amiodarone \$	Gold top	AMI	
Ammonia		AMM	Inform lab
Amphetamine: random urine \$	Universal(white)	UDS	
<b>Amylase</b>			
serum	Gold top	AMY	
urine / other fluids	Universal(white)	FAM	
Androstenedione \$	Gold top	AND	
Anti-nuclear antibodies \$	Gold top	ANA	
Atrial natriuretic peptide \$	Li heparin/Green top		Contact Lab
Arsenic: random urine \$	Universal(white)	ARSENIC	
Ascorbic Acid (vitamin C) \$			Contact Lab
Vitamin B12 & folate	Gold top	B12	
Barbiturates (random urine) \$	Universal(white)	UDS	
Bence Jones Protein (urine)	Universal(white)	BJP	Send with Gold top for LFT.
Benzodiazepines \$ random urine	Universal(white)	UDS	
β <sub>2</sub> -microglobulin \$	Gold top	B2M	
Bicarbonate	Gold top	UE	Contact lab
Bile pigments (bilirubin & urobilinogen)	Universal(white): Fresh random urine	UBP	
<b>Bilirubin</b>			
total	Gold top	LFT	
conjugated / unconjugated	Gold top	BILC	
urine	Universal(white)	UB	
Fluid	Universal(white)	FB	
Blood Gases	Blood Gas Syringe	GAS	
C1-esterase inhibitor \$	Gold top	C1INH	
<b>Cadmium</b>			Contact Lab
Blood \$	EDTA purple top		
24 hr urine \$	24 hr urine or Random		
Caeruloplasmin \$	Gold top	CER	
Caffeine \$	Li Heparin green top	CAF	Contact Lab
Calcitonin: fasting plasma \$	Contact Lab		Only in diagnosis of Ca. of Thyroid
<b>Calcium</b>			

serum	Gold top	LFT	
24 hr urine	24 hr urine	U24CA	
Calculus Analysis \$	Universal(white)	CAL	
Cannabis: random urine \$	Universal(white)	UDS	100mL needed
Carbamazepine \$	Gold top	CBZ	Take specimen just before next dose
CA-125	Gold top		
CA-15-3 \$	Gold top		
CA-19-9 \$	Gold top		
Carboxy-haemoglobin	EDTA/Purple top	COHB	
Cardiac Enzymes	SST/Gold top	CE	
Cardiac muscle Abs \$	SST/Gold top		
Cardiolipin Abs \$	SST/Gold top	CAA	
<b>Catecholamines \$</b> (Phaeochromocytoma Screen) 24 hr urine	24 hr urine(Acid)	U24CATS	
Carcinoembryonic Ag: (CEA)	SST/Gold top	CEA	
Centromere Antibodies \$	SST/Gold top	CENABS	
<b>Chloride</b> serum urine 24 hr urine fluid	SST/Gold top Universal(white) 24 hr urine Universal(white)	UE UUE U24UE FUE	
<b>Cholesterol</b> Random Fasting (+ HDL and trigs)	SST/Gold top SST/Gold top	CHOL LIP	
Cholinesterase +phenotype \$	SST/Gold top	CHE	
Cholinesterase (Red cell) \$	EDTA/Purple top	CHE(RBC)	
Chromium (urine) \$	Universal(white)	UCK	Contact Lab
Clobazam \$	Gold top	CLOB	Compliance check
Clonazepam \$	Gold top		Compliance check
Cobalt \$	Gold top	CO	Contact Lab
Cocaine metabolites: (urine) \$	Universal(white)	UDS	100mL needed
<b>Complement (C3, C4) \$</b> CH50 \$	Gold top (fresh) Gold top (fresh)	COM CH50	Contact Lab Contact Lab
<b>Copper</b> Serum \$ 24 hr urine \$	Gold top 24hr urine	COPPER U24CU	
<b>Cortisol</b> serum 24 hr urine \$	Gold top 24 hr urine(plain)	COR U24COR	State times when ordering
C-peptide \$	Red top	INSULIN I+C	Contact Lab
C-Reactive protein	Gold top	CRP	
Creatine kinase (CK)	Gold top	CE	
CK-MB isoenzyme		CKMB	Not Available
<b>Creatinine</b> serum	Gold top	UE	

24 hr urine fluid creatinine clearance	24 hr urine Universal(white) 24 hr urine + SST/Gold	U24UE FUE CCT	
<b>CSF</b> Protein and glucose  Oligoclonal bands \$	CSF in Universal+CSF in Fl.Ox./Grey top CSF in Universal +SST/Gold top	CSF	
Cyclosporin \$ <b>Clinical details essential!</b>	EDTA purple top	CYC	Contact Lab
<b>Cystine</b> fresh random urine (screen) 24 hr urine renal calculus analysis \$ fractional clearance \$	Universal(white) 24 hr urine Universal(white) 24 hr urine +2 x Gold top	UCYS U24PHC CAL	Contact Lab
DHAS (Dehydro-epi- androsterone sulphate) \$	Gold top	DHA	
Digoxin	Gold top	DIG	Collect specimen > 6 hours after last dose
<b>DNA Autoantibodies \$</b> Double stranded Single stranded	Gold top Gold top	DNAABS SSDNA	
Down's screen	Red top	DOWNS	Give Full Clinical Details
Drugs of Abuse Screen \$ Overdose screen Random urine (serum testing is possible if absolutely necessary)	Universal(white) ± Gold top	UDS	100mL urine needed: clinical details essential
<b>Electrophoresis</b> serum random urine for BJP CSF (oligoclonal bands) \$	Gold top Universal(white) CSF + Gold top	EPS BJP	
ENA (extractable nuclear Ag) \$	Gold top	ENA	
Erythrocyte galactokinase \$	EDTA purple top	GKN	Contact Lab
Ethanol (blood)	Gold top	ETH	
Ethosuximide \$	Gold top	ESX	Collect specimen just before next dose
Faecal fat (5 day collection)		FF	See protocol
Faecal Occult Blood	Haemocult slides X3 or stool pots x 3	FOB	
Faecal pH	Stool pot	FPH	
Faecal reducing substances	Stool pot	FRS	Get specimen to Lab ASAP
Faecal Trypsin activity	Stool pot	FTR	
Ferritin	Gold top	FER	
Folate: serum	Gold top	B12	
Fructosamine \$	Gold top	FRU	

FSH (Follicle stimulating Hormone)	Gold top	FSH	
Galactitol: urine \$	Universal (white)	UGOL	
Galactokinase (Red cell) \$	EDTA purple top	GKN	
Galactose-1-phosphate \$	Li Heparin X2 green top	G1P	
Galactose-1-phosphate uridyl transferase (red cell) \$	EDTA purple top	GPU	
$\gamma$ Glutamyl transferase (GGT)	Gold top	GGT	
Gastrin Separately \$ Must be collected fasting. Stop H2-antagonists at least 4 days and Omeprazole at least 2 weeks before sampling	Red top + Gold top for UE, LFT	GAST	Contact Lab  ** Also send U&E and LFT specimens.
Gastric parietal cell and Intrinsic Factor Antibodies \$	Gold top	GPIFABS	
<b>Gentamicin</b> PRE Specimen POST specimen	Gold top Gold top	GENTPRE GENTPOST	
Tissue Transglutaminase IGA Antibodies \$	Gold top	GLI	
Globulins (total)	Gold top	LFT	
Glomerular basement membrane Autoantibodies \$	Gold top		
Glucagon (Must be collected fasting) \$	Special tube	GLUCAGON	Contact Lab Send straight to lab
<b>Glucose</b> plasma serum CSF Fluid	FI/Ox grey top Gold top FI/Ox grey top Universal (white)	GLU CSF FG	Can be done on Gold top if same day testing.
Glycosaminoglycans: (fresh random urine ) \$	Universal (white)	UGAG	
Glycated Haemoglobin: HbA <sub>1c</sub>	EDTA purple top	HBA1	Send separate specimen! Ghb is not assayed on a FBC specimen
<b>Gonadotropins:</b> FSH & LH FSH only LH only	Gold top Gold top Gold top	LHFSH FSH LH	
Growth Hormone \$	Gold top	GH	
Gut Hormones: Glucagon, Neurotensin, VIP, Pancreatic Polypeptide, Gastrin: \$ Must be collected fasting. Stop H2-antagonists at least 4 days and Omeprazole at least 2 weeks before sampling	Gold top ** +Special tube	GUT HORM	Contact Lab  ** Also send U&E and LFT specimens

Halothane antibodies \$	Gold top	HAB	
Haptoglobin \$	Gold top	HAPTO	
HbA1c	EDTA purple top	HBA1	
<b>HCG</b>			
Pregnancy test	Universal (white)		
Serum (?ectopic pregnancy)	Gold top	HCGETOPIC	Contact Lab
Down's screen	Red top	DOWNS	
with AFP		HCGAFP	
24 hr urine	24hr urine	U24HCG	Contact Lab
HDL cholesterol	Gold top		See Lipids
5-OH-indole acetic acid: 5-HIAA (quantitative assay) \$	24 hr urine (+ acid)	U24HIAA	For Carcinoid syndrome screening
Homovanillic acid / HMMA / VMA \$	24 hr urine	U24CATS	Do Catecholamines instead
25-hydroxy Cholecalciferol \$	Gold top	VID	Includes 125 dihydroxy Cholecalciferol
17- $\alpha$ -hydroxy-Progesterone \$	Gold top	OHP	
Hydroxyproline \$	24 hr urine	U24OHPRO	
IGF-1 \$	Red top	IGF	Contact lab
Immunofixation (paraproteins) serum urine	Gold top Universal (white)		Collect serum and urine specimens at the same time.
<b>Immunoglobulins</b>			
Total IgA / IgG / IgM	Gold top	IGS	
IgM only	Gold top	IGM	
IgG subclasses \$	Gold top	IGGSUBCLAS	Contact Lab
IgE / RAST \$	Gold top	S	
Insulin \$	Red top	INSULIN	Contact Lab
Intrinsic factor Autoantibodies \$	Gold top	GPIFABS	
<b>Iron (+ TIBC)</b>			
Investigation of anaemia	Gold top	FE	
Overdose in child	Gold top	FE	Contact Lab
Islet Cell Autoantibodies \$	Gold top	PANCABS	
JO-1 Autoantibodies \$	Gold top		Part of ENA
Ketones: semi quantitative	Universal (white)		Part of GTT
Lactate	Blood Gas Syringe or !ml Li Heparin/Green top	LACTATE	Contact Lab
LA (SSB) Antibodies \$	Gold top	LA	Part Of ENA
Laxative screen: urine \$	Universal (white)		
Lactate dehydrogenase (LDH)	Gold top		
Lead (blood) \$	EDTA Purple top	LEAD	Contact Lab
LH (Luteinising hormone)	Gold top	LH	
Lithium \$	Gold top	LI	Just before next dose
Lysosomal Enzymes \$			Contact Lab
Magnesium	Gold top	MG	

Manganese \$			Contact Lab
Melanogen: fresh urine \$	Universal (white)		Keep in Dark
<b>Mercury</b> Organic: Whole blood \$ Random Urine \$ Inorganic: 24 hr urine \$	Li Heparin/Green top Universal (white)	UHGR U24HG	For blood Contact Lab before collecting
Metabolic Renal stone screen	24 Hour Urine	STUR(acid) STUR(plain)	See Protocol
Metadrenalines \$			See catecholamines
Methadone: random urine \$	Universal (white)	UDS	100mL needed Part of UDS
Methaemoglobin			
Methotrexate \$	Gold top		Contact Lab
Microalbumin Early morning urine	Universal (white)	UALB	
β2-Microglobulin \$	Gold top	B2M	
Mitochondrial antibodies \$	Gold top	SMMABS	
Neurotensin (Gut Hormones) \$	Special tube	NEUROTENSI N	Contact Lab Part of Gut Hormones
Anti-Neutrophil cytoplasmic Abs (ANCA) \$	Gold top	NCA	
Nickel \$	Red top	NI	Contact Lab
Anti-Nuclear Factor \$	Gold top	ANABS	
Occult Blood (Faecal)	Haemoccult slides (x 3)	FOB	
Oestradiol	Gold top	OES	
Oligoclonal bands \$	CSF + Gold top		Part of CSF
Oligosaccharides (Fresh urine) \$	Universal (white)	UOL	Freeze if late arrival
Opiates: random urine \$	Universal (white)	UDS	100ml needed Part of screen.
Organic acids: Fresh urine \$	Universal (white)	UOA	
Orosomuroid \$ α1 acid glycoprotein	Gold top	ORO	
Orotic Acid: Fresh urine \$	Universal (white)		
<b>Osmolality</b> serum random urine 24 hr urine fluid	Gold top Universal (white) 24 hr urine (plain) Universal (white)	OSM UOSM U24OSM FOS	
Ovary Carcinoma Ag (CA125)	Gold top	CA125	
Oxalate \$	24 hr urine	U24OX	
Pancreatic polypeptide \$	Special tube	PPP	See Gut Hormones
Pancreolauryl test			See protocol
Paracetamol with salicylate	Gold top Gold top	TOX TOX	Take > 4 hours after overdose
<b>Paraprotein: type &amp; conc'n</b> serum urine (>20 mL needed)	Gold top Universal (white)	EPSLFT UBJP	

Paraquat: random urine \$	Universal (white)		Contact Lab
Parathyroid Autoantibodies \$			Contact Lab
Parathyroid Hormone (PTH) \$	Gold top	PTH	** Order LFT for Calcium level.
Parietal cell autoantibodies \$	Gold top	GPIFABS	Part of GPIFABS
Pemphigus Antibodies \$	Gold top	PEM	
pCO2 (blood gases)	Gas Syringe	GAS	Bring to Lab
<b>pH</b> Part of blood gases Fresh urine Fluid	Gas Syringe Universal (white) Universal (white)	GAS UPH FPH	Bring to Lab
pO2 (part of blood gases)	Gas Syringe	GAS	Bring to Lab
Phenobarbitone \$	Gold top	PHB	
Phenothiazines: random urine \$	Universal (white)	UDS	100mL needed
Phenylalanine: plasma \$	Lithium.Hep/Green top	PAL	
Phenytoin	Gold top	PHY	Collect specimen just before next dose
<b>Phosphate</b> serum (preferably fasting) 24 hr urine	Gold top 24 hr urine(plain)	PO4 U24PO4	
Phytanic acid \$		PTA	Contact Lab
Porphobilinogen (PBG) \$	Universal (white)	UPORB	Fresh Urine
<b>Porphyryns \$</b> blood (Send at least 10 mL) early morning urine (>20mL) fresh random urine (> 20 mL) faeces blood, urine and faeces	EDTA purple top Universal (white) Universal (white) Stool pot All three specimen pots	UPO UPOR  POR	Protect Specimens from light!!! We must receive all types of specimen
<b>Potassium</b> serum random urine 24 hr urine fluid	Gold top Universal (white) 24 hr urine Universal (white)	UE UUE U24UE FUE	
Primidone (overdose only) \$	Gold top		Collect just before next dose
Progesterone	Gold top	PRG	
Prolactin	Gold top	PRL	
Prostate Specific Antigen (PSA)	Gold top	PSA	
<b>Protein Electrophoresis</b> serum random urine for BJP CSF (oligoclonal bands) \$	Gold top Universal (white) CSF + SST	EPSLFT UGJP Part of CSF	Includes LFT
Protein Selectivity: Serum + random urine	Universal (white)+ Gold top		Collect specimens at same time!
<b>Protein</b> CSF CSF (with glucose)	Universal (white) Universal (white) +	CSFP CSF	

serum random urine 24 hr urine fluid	Fl/Ox Gold top Universal (white) 24 hr urine (Plain) Universal (white)	LFT UPR U24PR FP	
Pyruvate: plasma \$			Contact Lab
RAST and IgE \$	Gold top	RAST	List allergens!
Red Cell Transketolase (Thiamin) \$	Li Heparin green top		Contact Lab
<b>Reducing substances</b> Fresh random urine Fresh faeces	Universal (white) Fecon/Stool pot	URS FRS	Bring specimen direct to Lab.
Renal Stone Analysis \$	Universal (white)	CAL	
Renin activity: plasma \$	EDTA/Purple top	RENIN	Contact Lab Separate ASAP
Reticulin Abs (+ gliadin Abs)			Non Available
Rheumatoid factor Latex	Gold top	RHF	
RO(SSA) Antibodies \$	Gold top	RO	Part of ENA
Salicylate with paracetamol	Gold top Gold top	TOX TOX	Collect 4 hrs after overdose
Salivary gland Antibodies \$			Contact Lab
Scl-70 Autoantibodies \$	Gold top	SCL70	Part of ENA
Selenium: \$			Contact lab
Sex Hormone Binding Globulin \$	Gold top	SHBG	
Smooth muscle Antibodies \$ (Includes Mitochondrial Ab's)	Gold top	SMMABS	
<b>Sodium</b> serum \$ random urine 24 hr urine fluid	Gold top Universal (white) 24 hr urine (plain) Universal (white)	UE UUE U24UE FUE	
<b>Solvents (organic) \$</b> blood random urine	---- Universal (white)		Contact Lab Contact Lab
Somatostatin (Gut Hormones) \$	Special	SOMATOSTA TIN	Contact Lab
Stone Analysis (Renal) \$	Universal (white)	CAL	
Sperm Abs \$	Gold top	SPA	
Sugar Chromatography \$ Fresh random urine Fresh faeces	Universal (white) Fecon/Stool pot	FAECSUGAR S	Bring specimen direct to Lab.
Sweat Test (Na & Cl) <b>Prior booking essential</b>		SWE	Contact Lab to book
Synacthen Tests (Short/Long)	Gold top X3	SYN	See protocol
Testosterone (+ SHBG if female)	Gold top	TST (+ SHBG)	
Theophylline	Gold top	THE	
Thyroglobulin \$	Gold top	THG	
Thyroxine binding globulin \$	Gold top		Contact lab
Thyroid stimulating Horm.	Gold top	TSH	

Thyroid Autoantibodies \$	Gold top	TABS	
Thyrotropin Releasing Hormone \$	Gold top	TRH	See protocol
TSH Receptor Antibody \$	Gold top	TSHRECABS	
<b>Thyroxine</b>			
Free Thyroxine (fT4)	Gold top	FT4	
Free Triiodothyronine (fT3)	Gold top	FT3	
TmP/GFR: serum + urine (fasting) \$	Gold top + Universal (white)		Contact Lab See protocol
α-Tocopherol (Vitamin E) \$	Gold top	VIAE	
Total Iron Binding Capacity	Gold top	Fe or TIBC	
Transferrin \$	Gold top	TF	
Transketolase (red cell) \$	Li Heparin green top		
Tricyclic Antidepressants Serum \$	Gold top		
random urine \$	Universal (white)	UDS	
Triglycerides (fasting)	Gold top	LIP	
<b>Tumour markers</b>			
AFP	Gold top	AFPNM	
CA-125	Gold top	CA125	
CA-15-3 \$	Gold top		
CA-19-9 \$	Gold top		Contact Lab
HCG	Gold top	HCGAFP	Contact Lab
PSA	Gold top	PSA	
<b>Urea</b>			
Serum (part of U&E)	Gold top	UE	
Random urine	Universal (white)	UUE	
Fluid	Universal (white)	FUE	
24 hr urine	24 hr urine	U24UE	(+ Thymol)
<b>Uric Acid (Urate)</b>			
Serum	Gold top	SUA	
24 hr urine	24 hr urine	U24UA	(+ Thymol)
Fluid	Universal (white)	FUR	
Renal stone analysis \$	Universal (white)	CAL	
Urobilin: fresh urine	Universal (white)	URB	
Urobilinogen: fresh urine	Universal (white)	URBN	
Valproate \$	Gold top	VAL	Compliance check
Vasoactive intestinal peptide (See Gut Hormones) \$	Special tube	VIP	Contact Lab
Vitamin A \$	Gold top	VIAE	
Vitamin B6: Pyridoxine \$			Contact Lab
Vitamin B12	Gold top	B12	
Vitamin D (25 OH-cholecalciferol) \$	Gold top or Serum/Red top	VID	
Vitamin E (α-tocopherol) \$	Gold top	VIAE	
Zinc: plasma \$	Red top	ZINC	Contact Lab
Zinc protoporphyrin \$ (Lead poisoning)	EDTA purple top	ZPP	Contact Lab

**Dynamic Function Test Protocols Available**

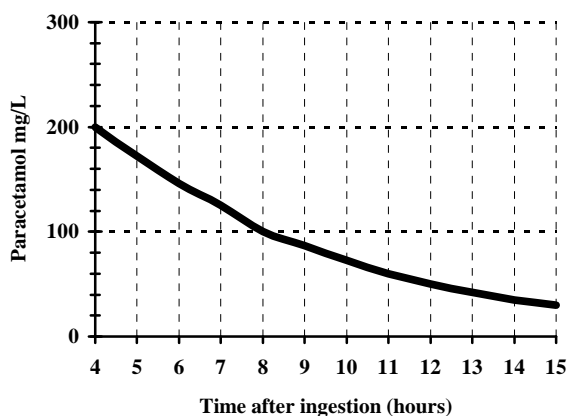
For further information and advice contact Prof. Reynolds (01283 511511 ext. 4036) or Alison Hall (01283 511511 ext. 4094)

## Protocols for Investigation of Metabolic / Other Disorders

For further information and advice contact Prof. Reynolds (01283 511511 ext. 4036) or Alison Hall (01283 511511 ext. 4094)

### Interpretation Of Paracetamol Levels After Overdose

Serum paracetamol levels cannot be interpreted until 4 hours after the overdose was taken: the graph shows the level above which treatment with acetyl-cysteine is indicated (adapted from Prescott L. Health Bull. 1978: 4; 204).



## Guidelines For Screening For Hyperlipidaemias

For further information and advice contact Prof. Reynolds (01283 511511 ext. 4036)

## Guidelines For Treatment / Referral Of Hyperlipidaemia

Lipid Abnormality	LDL Cholesterol	Degree of Hyperlipidaemia	Drug Regimen	
			1st Line	2nd Line
Type IIa Cholesterol ↑	↑	May be Moderate or Severe	Statin ± Resin	Fibrate or Probucol
Type IIb Cholesterol ↑ Triglyceride ↑	↑	May be Moderate or Severe	Trig < 5, Statin Trig > 5 Fibrate ± Resin	Fibrate ± Statin Watch LFT's Closely !!
Type III Cholesterol ↑ Triglyceride ↑	N / ↓	Usually Severe	Fibrate	Fibrate ± Statin Watch LFT's Closely !!
Type IV Cholesterol ↑/N Triglyceride ↑	N	May be Moderate or Severe	Fibrate	Fibrate + Nicotinic Acid (or Derivative)
Type V Cholesterol ↑ Triglyceride ↑	N	Always Severe	Fibrate	Fibrate + Nicotinic Acid (or Derivative)

### Functions Of The Lipid Clinic:

1. Investigation / Treatment of Hyperlipidaemia.
2. Secondary Prevention of Vascular Disease in patients with myocardial infarction / angina.
3. Family-study (case-finding) and subsequent Primary Prevention of Vascular Disease (Health of the Nation White Paper Targets).

If you wish to refer anyone with hyperlipidaemia to the lipid clinic an appointment may be arranged either by sending a referral letter to Prof. Reynolds in Clinical Chemistry, or by phoning Burton Hospital 01283 511511 extension 4036.

## Microbiology Department

### Contact Numbers

Burton Hospitals	01283 566333
Microbiology Fax	01283 593064
Consultant Microbiologist	Burton Hospital Ext 4103
Consultant Microbiologist	Burton Hospital Ext 4215
Pathology Service manager	Burton Hospital Ext 4039
Chief BMS Microbiology	Burton Hospital Ext 4104
Microbiology Department	Burton Hospital Ext 4045
Infection Control secretary	Burton Hospital Ext 4046
Lead Infection Control Nurse Infection Control Nurses	Burton Hospital Ext 4149

### Routine Department Service

The Department is open for routine specimens from 8:45am to 5:15pm Monday to Friday.

Most microbiological examinations require at least overnight incubation of cultures. In particularly grave or urgent situations it is advisable to discuss the case with a Consultant Microbiologist (or a Senior BMS) who may be able to give an earlier provisional report and who will ensure that full information is available as soon as possible. All specimens for microbiology should have been freshly collected from the patient then sent to the department. It is important to specify any antimicrobial therapy on the request.

### On Call Service

One Biomedical Scientist is on duty who should be contacted via switchboard.

#### Hours of Service

Weekdays : 5:15pm to 8:45am.

Saturdays/Sundays/Bank Holidays: 24 hrs.

Staff must be contacted for all urgent requests. It is not adequate for urgent or stat requests to be only entered on to the HISS system.

There is no need to contact staff with blood culture requests. .

Urgent samples will be accepted:

Up to 9.00 p.m. weekdays

Up to 7.00 p.m. Saturdays/Sundays/Bank Holidays

After these times, only CSF's and other consultant initiated requests which affect immediate patient management will be accepted.

A Consultant Microbiologist is always available on call.

Please contact the hospital switchboard.

## Receipt Of Specimens

See general section.

## Transport of Specimens

See general section.

## Request forms and specimen labelling.

See the general section for the use of 'Combined Pathology Request' form and details required for specimen labelling. Each specimen sent to the department must be accompanied by the relevant request form or order entry labels.

## Antibiotic Assays

Assays are required during treatment with aminoglycosides (gentamicin, tobramycin, netilmicin), and vancomycin, to ensure that adequate, but non-toxic, concentrations are reached in the serum. A routine method is available for these antibiotic assays. If assays of other agents are required please discuss with a Consultant Microbiologist.

The following antibiotics should be assayed routinely around the 3rd dose (before the second dose on once daily gentamicin) and twice weekly thereafter. A 5ml specimen of clotted blood (red top vacuette tube) is required.

Antibiotic	Desirable serum level mg/l	
	Trough (Just before dose)	Peak
Gentamicin (single dose)	<1	Not required
Gentamicin	<2	5-10 (1 hour post dose iv/im)
Tobramycin	<2	5-10 (1 hour post dose iv/im)
Netilmicin	<3	6-12 (1 hour post dose iv/im)
Vancomycin	5-10	Not Required
Chloramphenicol (neonates)		15-30 (2 hour post dose)

## Antibiotic Sensitivity Testing

In most cases the bacteria must first be isolated before their sensitivity may be tested, but direct sensitivity tests are sometimes of value. Sensitivity tests are carried out on isolates of bacterial species (e.g. Staphylococcus aureus, urinary coliforms) when they appear to be of possible clinical significance.

Commensals and isolates of very doubtful clinical significance are not routinely tested. In some cases of doubt the cultures are kept for one week and sensitivities can be determined later if the clinician requests this after discussing the problem with a Consultant Microbiologist.

Isolates are tested against a number of antibacterial agents that are relevant to the organism in question but are not all necessarily suitable to the particular infection or patient. The best choice must be made on clinical and other grounds.

The sensitivities most likely to be appropriate will be reported. Other sensitivity tests may have been performed and will be available on request.

### **Antral Washings**

Use sterile saline and send to the laboratory in a sterile universal container. They should arrive fresh.

### **Blood Cultures**

If bacterial endocarditis is suspected three cultures should be taken over a period of 2-3 hours. It is very rarely necessary to take more than three cultures, unless the patient has recently received antibiotics.

Obtain a set of two bottles of culture medium from the Pathology laboratory - one blue cap bottle, which supports the growth of aerobic bacterial and the other a purple cap bottle, which supports the growth of anaerobic bacteria. A third paediatric bottle, yellow cap, which has a 4ml fill should be used for children where only a small volume of blood is available.

Contamination of blood cultures with skin organisms (Staphylococcus epidermidis, Propionibacterium acnes) makes interpretation of culture results problematical. To keep contamination to a minimum, it is essential that the correct procedures be followed in taking a blood culture.

The protocols for determining the need to take blood cultures and for taking them are to be found on the infection control website.

Label the bottle/s with patient's details. Bar code labels on blood culture bottles do not identify patient, please DO NOT remove any bar code labels from the bottles. Send the bottles at once to the Pathology laboratory, with the request. Out of routine hours, the bottles must be placed in the microbiology box next to the blood bank fridge.

Clinical staff will be notified as soon as any significant growth is obtained in a blood culture. Negative reports are available from day 1, but cultures are not discarded until they have been incubated for 7 days.

## Cerebrospinal Fluid (CSF)

Please contact the department prior to sending any CSF sample, any delay in processing the specimen can affect the result. Specimens for glucose estimation should be sent in a paediatric fluoride (yellow top) container. All other specimens should be sent in the plastic universal containers included in the diagnostic puncture pack (Pack no.6).

(The containers provided for clotted blood specimens are not guaranteed to be sterile and should not be used for C.S.F.).

The caps must be screwed on tightly; many specimens have leaked before reaching the department. Often three plain specimens are sent, in case the first is contaminated by blood from the puncture. Samples 1 and 3 should be sent to the Microbiology department, and sample 2 to the Clinical Chemistry department. If there is limited specimen then discuss with the department prior to sending the specimen.

The following are the minimum quantities required for satisfactory investigations:

For protein, microscopy, antigen detection and culture (bacterial, viral) if indicated (larger volumes may improve culture results)	3.0 ml fluid
For glucose estimation (in paediatric fluoride container)	0.25 ml fluid
For Syphilis Serology	1.0 ml fluid
For IgG estimation	0.5 ml fluid

If it is not possible to send these quantities, smaller volumes may be used but provide less accurate and reliable results. The feasibility of this, and the priorities among the investigations requested should be discussed with a senior BMS or a Consultant Microbiologist.

As large a quantity as possible should be sent when an examination for tuberculous infection is required. Tubercle bacilli may be very scanty and difficult to find in films, and culture may take some weeks to yield results.

IgG estimation may be useful in the investigation of disseminated sclerosis, viral infections or meningo-encephalitis. The department is able to carry out a limited number of such tests when specific indications are present and on the request of a consultant. IgG estimation is invalidated if the CSF is bloodstained.

Direct antigen testing will be performed on CSF in possible bacterial meningitis if sufficient CSF is available. Direct testing includes *Streptococcus pneumoniae*, *Haemophilus influenzae* type b, and *Neisseria meningitidis*.

Although the agents of acute pyogenic meningitis may be recognizable on direct microscopy or detected on antigen testing, often a definite aetiological diagnosis

cannot be made until they are isolated in culture, and treatment must be started without this. If infections by unusual organisms such as *Cryptococcus neoformans* are suspected a Consultant Microbiologist should be informed.  
See also Virus Infections. CSF is not cultured for viruses unless cells are present.

### **CJD**

If either classical or variant CJD is suspected then this **MUST** be discussed with the consultant microbiologist. CSF samples from patients with a possible diagnosis of CJD can be processed for routine microscopy and culture, however if virology is also required then the sample cannot be processed until after discussion with the Consultant Microbiologist and the CJD surveillance unit in Edinburgh (0131 537 3075)

## **Chlamydia detection**

Chlamydia Specimen Collection Kit

### **Contents :**

One Male and one Female sterile swab.  
One Transport Vial .

### **Directions for use:-**

1. Peel and remove the required male or female swab.
2. Collect specimen.
  - 2.1 Urethral specimen: Insert swab 2-4 cms into the urethra, rotate for approx 10 seconds and withdraw.
  - 2.2 Cervical specimen: Remove excess mucus from the cervix with sterile cotton wool and discard. Insert swab into endocervical canal and rotate for 10-30 seconds. Withdraw swab, avoiding contact with the vaginal mucosa.
3. Place swab in Transport Vial.
4. Break swab shaft at scored mark.
5. Replace and tighten cap on vial.
6. Label with patient details and send to the Pathology laboratory within the same day. If this is not possible, samples may be stored at 2 to 8°C for up to 2 days prior to testing.

Also suitable for eyes and rectal specimens.

N.B. POOR SPECIMENS GIVE POOR RESULTS.

## **Exudates and Transudates**

10-20 ml should be put into a sterile plastic universal container (see Cerebrospinal Fluid).

## **Eye Cultures**

For serious eye infections corneal or conjunctival scrapings are best taken by members of the medical or nursing staff, using a sterile needle.

The material is immediately inoculated onto the surface of:

- 1) Fresh agar plates for culture

2) a slide for microscopy  
(these are available from the fridge opposite the blood bank fridge).  
The plates are labelled on the base (not on the lid). The slide can be labelled by writing with a pencil on the "frosted" end. Please label the SAME side as the sample is on, and send at once to the department. The date and time of taking the specimen should be entered on the request form.  
Culture for amoeba should be discussed with the microbiology department.

## Faeces

For most purposes a specimen of faeces, in either a 60ml container or blue topped sterile universal with spoon, should be sent. The container should only be filled to one third, and the cap screwed on tightly. This is satisfactory for detection of the organisms of enteric fever, dysentery and food poisoning, and for detection of the ova of most intestinal parasites.

Stool specimens from inpatients are only cultured if the patient has been in hospital less than 3 days. If a specimen from a patient who has been in more than 3 days is required then this should be discussed with the microbiology department. Clostridium diffile toxin testing, rotavirus and norovirus can however be requested.

If a patient on antibiotics develops diarrhoea, Clostridium difficile toxin testing should be requested.

Stool specimens should be processed on the day of collection. Although Salmonella survive long periods in faeces, Shigella and Campylobacter die off rapidly. Therefore rapid transport to the department will increase isolation rate.

If the patient has been abroad in the past three weeks, note this on the request form, so that more extensive examination (including cholera) can be carried out.

If Entamoeba histolytica is suspected and the patient is passing liquid stools, amoebae may be present, and a warm stool specimen should be examined so that these may be detected by their motility. The stool specimen should be collected free from urine or disinfectant in a bedpan, this should be transferred to a specimen container and taken immediately to the microbiology department. Departmental staff should be alerted beforehand.

Formed stools contain cysts, not vegetative amoebae. A specimen in a faeces container is satisfactory but preferably should be fresh. Exclusion of amoebiasis involves the examination of at least 3 specimens.

Modern treatment for tapeworm infestation does not result in the expulsion of an intact worm and therefore, there is no need to send the total stool output to the microbiology department for a search for the head.

Threadworm ova are detected on a cellophane or a sellotape slide from the perianal region; instructions for the use of these can be obtained from the microbiology department.

If faeces cannot be obtained, a rectal swab (which must have visible faecal material on it) may be used for bacterial examination, though it is less satisfactory. Rectal swabs cannot be tested for Clostridium diffile toxin.

## Fungus Infections

If superficial infection is suspected, scrapings (not a swab) of skin, or nail, and portions of hair, should be sent dry to the microbiology department - in universal containers, 60ml container of "dermapak" all available from pathology.

## Gastric Washings

When genuine sputum cannot be obtained and pulmonary tuberculosis is suspected, up to 25 ml fasting gastric contents (or the washings obtained by introducing a little sterile saline down the tube) may be sent in a sterile universal, with the minimum of delay (since tubercle bacilli do not withstand long exposure to acid). Please inform the microbiology department prior to sending specimen.

## Genital Infections

Syphilis. The consultants in the genito-urinary medicine should be informed so that dark ground examination may be made.

Urethral discharge in the male. Swabs in transport media must be sent to the Pathology laboratory.

### Genital Infections in the female.

Unless a special request is made, specimens are treated as follows:-

1. An acridine orange stained or wet film is examined in all cases where a swab in transport medium is sent and examined for the presence of *Trichomonas vaginalis*, *Candida* and other yeasts, and the presence of "Clue Cells" (indicative of bacterial vaginosis).
2. All genital swabs from post-operative, post-partum and postabortal patients are examined for aerobic pathogens. A cervical swab should be sent, as vaginal swabs are often made useless or misleading by the presence of irrelevant bacteria.
3. *Neisseria gonorrhoea* will only be looked for in cervical or urethral samples. HVS is not suitable for reliable diagnosis.
4. If no indication is given of the clinical condition, it is assumed that examination for yeasts, Clue Cells and *trichomonas vaginalis* only is required.

## Hepatitis B

Routine testing for infection	6mls clotted blood, red topped bottle, and a form marked "Inoculation Risk"
Testing of vaccine efficacy	6mls clotted blood, red topped bottle, with dates of vaccination on form.
Needlestick injury	See Inoculation Risk Policy in Control of Infection Policies Folder

The interpretation of Hepatitis B serological results can be made using the two charts below.

	HbsAg	Anti-HBs	HBeAg	Anti-HBe	Anti-HBc	
					IgM	IgG
1	+	-	+	-	-	-
2	+	-	+	-	+	+
3	+	-	+	-	-	+
4	+	-	-	+	-	+
5	-	+	-	+/-	-	+
6	-	+	-	-	-	-

The numbered reactions above relate to the corresponding numbered Hepatitis B status below.

		Infection Risk
1	Incubation Period	Y
2	Acute Hepatitis B OR Persistent Carrier State	Y
3	Persistent Carrier State	Y
4	Persistent Carrier State	N
5	Convalescence/Recovery	N
6	Post-Vaccination	N

## HIV Testing

A 6ml clotted blood sample (red top vacuette bottle) is required.  
 HIV tests can be ordered through the computer the result will be available via PCI.  
 Requests can also be sent on the Combined Pathology request form. The microbiology department MUST be informed in ALL cases, by telephone that the sample has been taken.  
 Tests are normally performed once a week.

A rapid test is available, but this **MUST** be requested via the Consultant microbiologist.

Permission must be obtained from the patient after adequate counselling. Refer to the Inoculation Risk Policy in the Control of Infection Policies folder on the Hospital Intranet site or speak to the department.

## **Nasal Swabs**

Nasal discharge should be collected with a swab in transport media and treated as pus (see below). Staphylococcal carriers are detected by swabbing both anterior nares with the same swab, moistened with sterile saline, the swab being rotated to procure as large a sample as possible.

## **Pernasal Swabs (for diagnosis of whooping cough)**

Special swabs (on wire) are provided by the microbiology department, which should be contacted in advance, so that the special medium may be prepared. A cough plate is also obtainable from the department, but these do not give as good results as pernasal swabs.

## **Pregnancy Testing**

Early morning urine in a sterile universal should be sent (HCG is maximal early morning). Usually, EMU's should not be sent earlier than 2 weeks post LMP. The current method offers the same sensitivity as "over the counter" tests.

## **PUS**

Whenever possible actual pus collected in either a 60ml sterile container or a sterile universal should be sent, rather than a swab. Certain infecting agents, such as Actinomyces, can rarely be detected in the small amount of pus available on a swab. If there is any likelihood of delay in specimens reaching the Pathology laboratory, swabs should be placed in transport medium and pus refrigerated at 4-8°C. When swabs are taken from wounds or abscesses it is important to avoid contamination from the surrounding skin.

The source of the pus or swab must be indicated clearly; for example, the site of wound should be stated.

Any particular pathogen suspected should also be mentioned, so that the most relevant techniques may be used.

## **Serological Tests**

For all serological investigations please send 6ml of blood, if possible, in a red topped vacuette bottle.

Serological tests usually only become positive after a week or more. Ideally a 4 fold rise in titre is demonstrated. (In enteric fever, blood culture and, later, culture of faeces and urine are the tests of choice. The Widal test is no longer available.)

Many serological tests for uncommon infections (such as parasitic infections) are available from reference laboratories. Senior microbiology laboratory staff should be consulted.

See also Virus Infections.

**Commonly available tests are for:**

Adenovirus	Epstein Barr Virus (EBV)	Mycoplasma
Avian precipitins	Fungal Precipitins	Parvovirus
Brucella	Hepatitis A,B,C	Respiratory Syncytial Virus (RSV)
Cytomegalovirus (CMV)	HIV	Rubella
Chlamydia group (inc psittacosis)	Influenza A,B	Lymes disease (Borrelia burgdorferi)
Coxiella burnetti (Q-fever)	Legionella	Varicella

For the above tests, the clotted blood sample should reach the Pathology laboratory within 24 hours of collection. It is very important to take two specimens of blood, the first as early as possible in the illness and the second ten days or more later. The pair will then be tested together.

Single specimens will be tested for rubella, psittacosis, Q fever, toxoplasmosis, Lymes disease.

## **Sputum**

Sputum expectorated directly into 60ml sterile containers provided, as far as possible uncontaminated by saliva, should be delivered fresh to the microbiology department. Sputum should not be refrigerated, as some pathogens may not survive. The type of infection suspected should be stated on the request form. Tuberculosis or fungus infection should be specified.

Sputum is not homogenous material and culture of a specimen may give misleading results. For this reason interpretation of sputum cultures is difficult, and requires correlation with clinical findings.

In general, purulence of the specimen and a heavy, relatively pure growth of a pathogen, are suggestive of a pathogenic significance.

In severe pneumonia an immediate examination of a Gram film may be requested and provide valuable information.

Infection by *Mycoplasma pneumoniae* is detected by a complement fixation test on paired specimens of serum.

## **Throat Swabs**

Throat swabs in transport media must be well rubbed over the fauces, particularly the tonsillar area, and any membrane if present; they should not touch the tongue or teeth. If diphtheria or Vincent's stomatitis is suspected, this should be mentioned on the request form.

## Tissues

Biopsy specimens etc, for culture should be sent in a 60ml dry sterile container or a sterile universal container. Formalin, of course, must not be added. As a wide variety of pathogens, which are difficult to isolate, may be found in such specimens, it is often useful to discuss the case with a Consultant Microbiologist.

## Urine

Detection of infection of the urinary tract depends on the assessment of numbers of bacteria present. (Presence of pus cells is not a reliable criterion). Normal urine should not contain more than 10,000 bacteria per ml (usually many fewer); these are contaminants from urethra and skin that entered the urine as it was passed. Infected urine generally has more than 100,000 bacteria per ml. For these criteria to hold, urine must be cleanly collected and examined when fresh. In addition the nature of the bacteria isolated may be considered; commensals such as lactobacilli are of no significance.

The urine must be received in the Pathology laboratory in a sterile universal within two hours of being passed. Urinary organisms multiply at room temperature and cells may undergo lysis. If further delay is inevitable the urine must be refrigerated at 4°C. This will prevent bacterial multiplication but may not preserve cells. If neither of these courses is possible, at least 20 ml of urine (enough to reach the "fill line" marked on the universal container) may be passed into a boric acid container (red capped universal) and sent to the Pathology laboratory as soon as possible. The mode of collection of the urine (mid-stream or clean specimen or catheter specimen), the date and time of collection and any antimicrobial therapy must be stated on the request form, so that the findings may be interpreted.

For examination for tubercle bacilli three early morning urines (complete specimen rather than mid-stream) are required.

## Virus Isolation/PCR

Virus isolation has largely been replaced by PCR. If viral culture is required please discuss this with a Consultant Microbiologist.

The following tests are available.

EYEPCR for Eye swabs – includes Herpes, enterovirus and adenovirus.

CSFPCR for CSF– includes Herpes, varicella and enterovirus.

Respiratory virus PCR for Nasopharyngeal aspirates

Herpes PCR for genital and skin swabs.

CMVPCR for urines from children under 3 months of age.

Other viral PCR e.g. CMV and EBV from blood are available but should be discussed with a consultant microbiologist.

Swabs.

1) Viral culture swab similar to the normal bacteriology swab but with a small sponge in the bottom of the tube rather than the black charcoal media. These can be ordered from the Pathology laboratory on the consumable stock request form, and are suitable for most purposes.

Urine, faeces, C.S.F., biopsies and Post-mortem material should be sent without delay to the microbiology department. They should therefore be taken at times when suitable transport can be ensured. If no transport is available, samples may be stored for a day at 4°C. The chance of isolating a virus is much greater if the specimen reaches the laboratory immediately after it is taken.

1. Enteroviruses. Coxsackie, Echo and polio-viruses can be detected in faeces, throat swabs, C.S.F. and post-mortem intestinal contents, brain or cord. Isolation is more successful from faeces than from other specimens mentioned.
2. Mumps virus can be detected in C.S.F. or throat swabs.
3. Respiratory viruses. Influenza, parainfluenza and respiratory syncytial viruses and rhinoviruses can be detected in throat swabs (nose swabs alone are of little value), or from post-mortem lung or trachea. Adenoviruses may be isolated from throat swabs, faeces, mesenteric glands, eye swabs or post-mortem lung.
4. Herpes simplex virus can be detected in swabs from mouth ulcers, eye lesions or skin lesions. Brain biopsies or crusts from skin lesions should be placed in a 60 ml sterile container or a sterile universal.
5. Rubella virus can be isolated from throat swabs. Urine is less satisfactory.
6. Cytomegalovirus can be isolated from urine or throat swabs. This is more frequently successful than finding inclusions.

Electron Microscopy. Vesicle fluid, or crusts if this cannot be obtained, can be examined for the diagnosis of orf and varicella/zoster, and for the rapid diagnosis of herpes simplex and vaccinia. Brain biopsies can be examined for herpes simplex virus. Warts (in a dry sterile container) can be examined for wart virus.

Hepatitis B antigens (Australia antigen) and antibodies.  
See Hepatitis B

Respiratory Syncytial Virus (RSV). A rapid antigen test is available during the normal working day and until 5:00 pm Saturday and Sunday.  
Send nasopharyngeal aspirate specimen in saline.

## Histopathology Reception & Mortuary

### Contact Numbers

Burton Hospitals	01283 566333
Histology Fax	01283 593010
Microbiology (Mortuary)	Burton Hospital Ext 4104
Pathology Service manager	Burton Hospital Ext 4104
Histology Reception	Burton Hospital Ext 4042
Office	Burton Hospital Ext 4056
Senior Mortuary Technician Mortuary Technician	Burton Hospital Ext 4086
Mortuary Fax	01283 593118

### Routine Laboratory Service

The Histology Reception is open from 7.30am – 4.30pm Monday to Friday.  
The Mortuary is open from 8.00am – 4.30pm Monday to Friday.

### On Call Service

The mortuary has a member of staff on call to deal with emergencies only. Please contact the hospital switchboard.

### Histology Reception service

The Histology Reception is available between 7.30am and 4.30pm to receive specimens from its users and to ensure the specimens are packaged and ready for transport to Derby City hospital either on the 11.00am or 5.00pm courier run.

### Mortuary Service

#### Collection by Undertakers

Collection of bodies is by appointment only between 8.00am-9.00am and 2.00pm-4.00pm. To make an appointment please ring ext 4086 between these hours.

#### Viewings

Viewing of a body is by appointment only. To make an appointment please ring ext 4086 between the hours 8.00am-9.00am and 2.00pm-4.00pm.

#### Release of bodies

Release of bodies to persons other than Undertakers will only be by prior appointment. Please ring 4086

### Receipt Of Specimens

See general section.

## Transport of Specimens

See general section.

## Request form and specimen labelling

It is essential that all specimens requiring Histological investigation are placed immediately in fixative i.e. formalin.

The container MUST be clearly labelled with patient's name date of birth and specimen type. The container must always be, where possible, at least three times the size of the specimen and contain at least twice the specimen volume of formalin. Failure to meet these guidelines could cause poor fixation and may mean that the tissue begins to autolyse. These factors may affect final diagnosis.

Urgent biopsies should be clearly labelled as such. The reason for urgency and the date the report is required must be stated on the request form.

All specimens must be accompanied by a fully completed and signed request form or a complete order-entry request form. The minimum information required is:

- Patients Name & Address
- Date of Birth
- Hospital number if possible -/or NHS Number
- Consultant/GP's Name and address
- Type of specimen, site taken from and any important information.
- Clinical details including clinical history.
- Date sample taken
- Signature

All requests where there is incompatibility or incompleteness of name, date of birth, name of consultant, or those that have no information or are not signed may be returned to sender for checking or completing.

## Frozen Sections

Requests for frozen sections should, wherever possible, be made at least 24 hours in advance. This is to ensure that the required staff are available.

Specimens for frozen section should be sent fresh, without fixative, and with a fully completed request form. The name of the doctor and the number on which to contact him/her with the result must be clearly marked on the accompanying form.

Any specimen requiring a frozen section must NEVER be left unattended in reception, it must always be handed directly to a member of the histology reception team.

Tissue from which there is danger of infection e.g. from patients suffering from T.B., Hep.B, HIV, should not be sent for frozen section. If any tissue sent for frozen

section is suspected of being infectious, histology reception should be informed immediately.

## **Fresh Specimens**

For fresh specimens please contact the histology reception. These will be sent to Derby for processing on the 11.00am daily transport.

## **High Risk Specimens**

See general section.

\* Please ring the histology reception to inform them of the nature of the specimen.

\*\* See above protocol for Frozen Sections

## **Formalin Supply and Usage**

All formalin to be used for fixation of specimens will be supplied by histology reception. All containers will be clearly labelled. This formalin must UNDER NO CIRCUMSTANCES be diluted. This would cause lack of fixation and could fail to sterilize the specimen.

## **Cytogenetics**

1. Specimens requiring Cytogenetic investigation should be sent directly to:

Birmingham Women And Childrens Hospital  
Edgbaston  
Birmingham B15 2TG

2. Place in a dry pot.
3. Label "foetus required for dignified disposal"
4. Doctor to complete Cytogenetics form and attach to the pot.
5. Place pot in sealed plastic bag
6. Phone porters to arrange transport to "Birmingham Women and Children's Hospital"
7. Contact cytogenetics dept at the Women's to let them know that the specimen is on it's way Tel: hash 6103

The lab at the Women's hospital is open Mon - Sat and will accept samples on a Saturday.

## **Immunology**

These specimens should be sent either as fresh frozen samples or in normal saline directly to the appropriate hospital according to the submitting specialty's departmental protocols and not to histology reception.

## Non-Gynaecological Cytology

All specimens should be clearly labelled and accompanied by a fully completed request form. Specimen and form must be sent in the polythene 'mini-grip' transport bags, available from the Pathology laboratory, and must be sent without delay.

- 1.SPUTUM. Deep cough specimens and not just saliva are required. 3 consecutive early morning specimens are recommended for optimal diagnosis. Please send the specimens in a 60ml container.
- 2.URINE Freshly voided in a sterile 25ml plastic universal container.
- 3.PLEURAL, ASCITIC, OVARIAN CYST, PERITONEAL ETC. Send 25ml of fluid in a sterile plastic universal container. Other fluids such as breast cysts and joint aspirates should be sent in the same way, but the whole specimen must be sent.
- 4.BRONCHIAL WASHINGS. Send the wash-out fluid, unfixed, in a 25ml sterile plastic universal container.
- 5.BRONCHIAL BRUSHINGS 2 fixed slides should be sent, clearly labelled with patient's name and date of birth.
- 6.FINE NEEDLE ASPIRATIONS Send prepared smears - at least one rapidly air-dried and one fixed, clearly labelled with patient's name, date of birth, and whether fixed or air-dried. The used needle should be washed out with approx. 10ml Cytospin fluid (or similar) into a plastic 25ml universal container, available from Histology reception.
7. CSF. It is most important that histology reception is informed when a CSF is to be sent, as it is vital that the specimen is received and processed within 10 minutes of collection.
8. SYNOVIAL FLUID for crystal analysis. Up to 25ml of fluid collected in a sterile plastic universal container. These specimens need to be prepared within two hours of collection.

CSF and SYNOVIAL FLUIDS for non gynae should only be taken during routine working hours and brought directly histology reception and handed to a member of staff. They should not be refrigerated.

Other non-gynae specimens may be taken outside of routine working hours but should be refrigerated until they can be brought to histology reception.

## **Specimens for Semen analysis**

### **Vasectomy & Fertility tests**

These are now being carried out by the centre for reproductive medicine and all enquiries should be directed to this department on 01283 593102 (voice mail) or ext 2387.