



Haematology User Handbook

North Kent Pathology Service
and the Pathology Directorate of
Dartford and Gravesham NHS Trust

Timely, Accurate Results; Providing Effective Care

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1. GENERAL INFORMATION

There are two interdependent related Haematology services:

1. Clinical Haematology (Adult Medicine Directorate)

Consultant Haematologists manage patients via outpatient clinics and as inpatients.

2. Laboratory Haematology (Pathology Directorate)

Diagnostic laboratory work supports the clinical service with diagnosis and analysis, with Consultant Haematologists having clinical responsibility for the laboratory service.

Diagnostic laboratory work is undertaken by Biomedical Scientists (BMS) and Healthcare Scientific Support Workers (HSSW).

Darent Valley Hospital Haematology Department comprises three main sections:

- Automated Haematology for haematology and coagulation investigations.
- Specialist Haematology which includes haemoglobinopathy screening and peripheral blood morphology.
- Specialist Coagulation which includes thrombophilia analysis.

The Haematology department participates in National External Quality Assessment Schemes (NEQAS) for all tests wherever possible.

The main (Hub) laboratory is located on the third floor, East Wing of Darent Valley Hospital.

The sister (Spoke) laboratory is located on the fourth floor, red zone of Medway Maritime Hospital.

All doors to the Pathology Department are locked at all times. Entry is for authorised personnel only. All other personnel must report to Pathology Reception.

1.1. LOCATION

The Haematology department operates on two sites:

Haematology Department

Darent Valley Hospital
Darenth Wood Road
Dartford
DA2 8DA

Haematology Department

Medway Maritime Hospital
Windmill Road
Gillingham
ME7 5NY

1.2. OPENING HOURS

Routine Working Hours

The department opening hours for each location can be seen below:

Darent Valley Hospital	Pathology Reception	Central Specimen Reception	Haematology Laboratory
	Monday - Friday	Monday - Friday	Monday – Friday
	09:00 – 17:00	09:00 – 17:00	09:00 – 17:00

Medway Maritime Hospital	Pathology Reception	Central Specimen Reception	Haematology Laboratory
	Monday - Friday	Monday - Friday	Monday – Friday
	09:00 – 17:00	09:00 – 17:00	09:00 – 17:00

Out of Hours Service

The Haematology Department operates an out of hours Service on both sites for the acute service users outside of the routine working hours stated above for urgent samples and clinical advice.

Out of Hours Service	Week Days	Weekends	Bank Holidays
	17:00 – 09:00	Continual Out of Hours cover	Continual Out of Hours cover

1.3. DEPARTMENTAL KEY PERSONNEL

Pathology Management

	Secretary / PA	Direct Line
Associate Director of Operations	(01322) 428488	(01322) 428499
Clinical Director	(01634) 830000 Ext. 5214	
Business Operations Manager		(01322) 428490
Pathology Quality and Governance Manager		(01322) 428476
Head of Blood Sciences		(01322) 428492
Scientific Lead		(01322) 428480

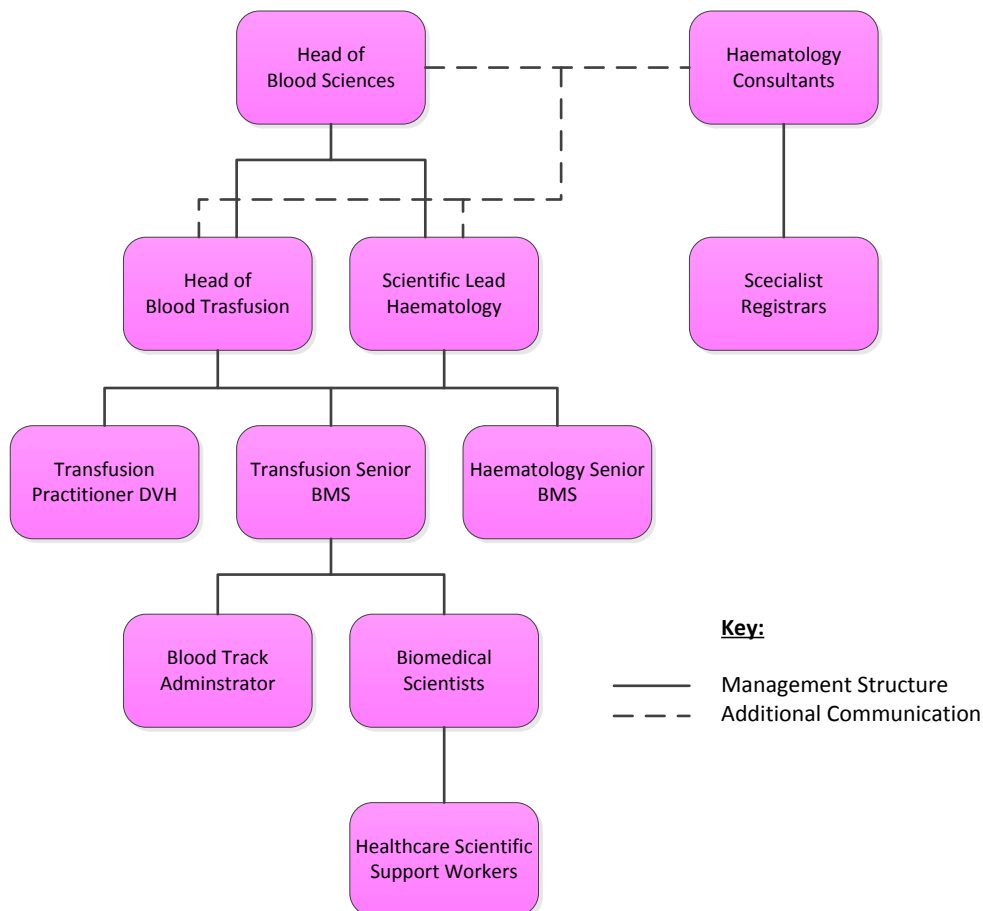
Darent Valley Hospital Consultants

	Secretary / PA
Dr Joy Gilani – <i>Consultant Haematologist</i>	(01322) 428507
Dr Ralph Ezekwesili – <i>Consultant Haematologist</i>	(01322) 428507
Dr Kawai Yip – <i>Consultant Haematologist</i>	(01322) 428507

Medway Maritime Hospital Consultants and Specialty Doctors

	Secretary / PA
Dr Maadh Aldouri – <i>Consultant Haematologist</i>	(01634) 830000 Ext. 5214
Dr Vijay Dhanapal – <i>Consultant Haematologist</i>	(01634) 830000 Ext. 5219
Dr Sarah Arnott – <i>Consultant Haematologist</i>	(01634) 830000 Ext. 5219
Dr Jill McCormick – <i>Consultant Haematologist</i>	(01634) 830000 Ext. 5214
Dr Himali Mendis – <i>Speciality Doctor</i>	(01634) 830000 Ext. 5592

1.4. ORGANISATIONAL CHART



1.5. LABORATORY VISITS

A successful pathology service depends on the quality of the relationship it has with its Users and so the Department welcomes visits to meet the staff.

To make an appointment please contact the Haematology Scientific Lead on (01322) 428480.

All visitors to Pathology must report to Pathology Reception where they will be met by the reception staff who will inform laboratory personnel of their arrival. All visitors must sign in the visitors' book on arrival and departure from the department and will be issued with a visitor's badge which must be returned when they leave.

1.6. INFORMATION GOVERNANCE

Receipt of a recognised test request assumes that the patient has agreed that the test may be carried out, together with any follow-on tests required, and that information may be shared with healthcare professionals and statutory bodies as required. In accordance with legal requirements the department adheres to the Data Protection Act 1998 for all patient information and follows the guidelines laid out by the Royal College of Pathologists for the retention and disposal of laboratory records and specimens (5th edition 2015). Further information on this topic is available from the department upon request.

1.7. COMPLAINTS

Complaints regarding the service must be made in the first instance to any of the personnel listed on page 5. If you feel the need to take any matter further a written complaint must be made to Complaints Manager, Darent Valley Hospital or via email to dgn-tr.complaints-dvh@nhs.net.

2. SAMPLE COLLECTION

2.1. REQUESTING TESTS

A Trust Order Comms system at Darent Valley Hospital has been developed for pathology requesting along with an equivalent system for GP practices. Where Order Comms is available, it must, be used for all Haematology requests, where possible.

The information on all request forms and accompanying specimen bottles must correspond and minimum acceptance criteria are set out in **2.6 Sample Labelling**.

Each section of the request form must be completed, including patient's details, clinical summary section must include relevant patient information e.g. warfarin therapy and foreign travel.

The sections regarding the Requester and person taking the blood samples must be signed and dated. Incomplete forms may cause delays in availability of results as samples may be delayed or not processed.

All samples not meeting these criteria will be rejected and discarded.

If further Haematology tests are required on a sample already received by the laboratory the requestor must contact the laboratory and the test be requested verbally to be followed by a further request form to confirm this request. If further samples are required, the requestor will be informed at the time of receipt. Additional tests can usually only be accepted on the same day as the original sample collection.

2.2. URGENT REQUESTS

If a request is clinically urgent, please contact the laboratory and give the appropriate information to ensure priority is afforded. The samples must be clearly marked as urgent and kept separately from other samples being delivered at the same time.

Out of hours tests must only be those required for the immediate care of the patient. The out of hour's service is available to acute care only.

2.3. VENOUS BLOOD COLLECTION

An evacuated blood collection system is used to collect venous blood samples within the Trust by trained individuals. For Vacurette Sample bottle information and draw order, please see Appendix iii

*If taking blood using a syringe and needle **DO NOT** transfer the blood into a vacutainer by using the vacuum to draw the blood into the bottle as this can haemolyse the sample.*

Additional information can be found in the Primary Sample Collection and Handling Procedure available on the Darent Valley Hospital Staff Intranet and external internet pages.

2.4. POTENTIALLY INFECTIOUS AND HIGH RISK SAMPLES

All samples, but particularly those from patients suspected of having certain blood borne and other infectious diseases constitute a hazard to portering and laboratory staff handling them.

Staff are reminded to consider all samples as potentially high risk and therefore must wear gloves when handling blood, body fluids and tissue samples.

If a patient is in a particularly high risk group (e.g. viral haemorrhagic fever, SARS, anthrax), the laboratory must be contacted for further advice prior to the sample being collected and sent to the laboratory.

The Haematology laboratory can only accept and process samples up to Category 2 risk rating.

2.5. SAMPLE VOLUME AND APPROPRIATE CONTAINERS

Please refer to Section 4 for volumes and type of vacutainer to use. (Note the list is not exhaustive of all haematological referral assays available, for rarer tests please contact the laboratory directly).

Additionally:

- For immunosuppressive drug levels:
Date/time of last dose and date/time of sample collection **MUST** be given. Samples from requests without this information may be discarded.

2.6. SAMPLE LABELLING

Sample bottles **must not** be pre labelled before blood is drawn.

All samples and request forms, if used, must have the following patient information:

- Patient surname
- Patient first name
- Patient date of birth
- Patient NHS number (if patient has one) or Hospital (PAS) registration number
- Date and time of sampling
- Location (Ward, GP name with address)
- Signature of person taking the sample

(This is auditable proof of location and phlebotomist i.e. the use of order comms trace the member of staff who printed the labels which in Trust policy is the person who takes the blood and details the location the sample was taken. For non-order comm requests, the initials of the staff member who took the blood must be on the sample alongside the location).

NHS numbers or Hospital (PAS) numbers must always be used when available, as this aids successful allocation and maintenance of a single patient file on the laboratory computer system, which in turn aids effective and speedy result retrieval for users.

Positive patient identification is **essential** and in-patients must, additionally, have their wristbands checked before blood is drawn.

Samples received without full patient I.D. may be discarded and the appropriate doctor/ward informed via the electronic reporting system.

Further information can be found in the Sample Acceptance and Rejection Policy located on the Darent Valley Hospital Staff Intranet and External Internet sites.

General Information

Printed labels for application to patient samples are automatically generated when using Order Comms. Other printed labels may be used on haematology samples and request forms, providing they contain the appropriate information and are in the correct format. Check with the Laboratory before introducing printed labels to ascertain their suitability.

Labels must be attached along the sample tube, not around it as this interferes with the operation of centrifuges and analysers. Samples with incorrectly placed labels may be rejected.

All sample containers must be properly closed and packed in a dedicated sample bag, with the request form in the attached unsealed pouch. A new request form is required for 'add on' tests.

2.7. SAMPLE REJECTION

As a matter of quality assurance and good risk management any sample arriving in the laboratory unlabelled will be discarded. The requesting doctor will be informed via the electronic reporting system when possible (if all samples are unlabelled, a report cannot be made as the patient identity is completely obscure).

Samples may also be rejected for the following reasons:

- a) The sample is insufficient for testing
- b) The sample labelling requirements (see section 2.6) are not met
- c) The sample is haemolysed /clotted (for EDTA investigations)
- d) The sample is underfilled (for Citrate investigations)
- e) The sample is too old to process for particular assays
- f) The incorrect specimen type is sent to the laboratory
- g) There is any doubt over the specimen origin.

3. TRANSPORTATION OF PATHOLOGY SAMPLES

3.1. SENDING SAMPLES TO THE LABORATORY

Samples for the Blood Transfusion Department can be sent to the laboratory in one of three ways:

- By Pneumatic Air Tube delivery
- By the Hospital Portering Service
- By Courier Service

Pneumatic Air Tube Delivery

There are a variety of locations throughout the Hospital that have the facility to send suitable Pathology samples to the laboratory using the Pneumatic Air Tube delivery system. These include:

- Phlebotomy Outpatients,
- Accident and Emergency
- Intensive Care Unit
- Delivery Suite
- Rosewood Ward
- Antenatal
- Redwood Ward
- Cherry Ward
- Pine Therapy Unit

The pneumatic air tube system is operated by Serco. When unavailable, samples must be sent via portering services and the Serco Help Desk contacted on 8888 to report pneumatic tube failure. All sample containers must be properly sealed; samples must be in individual sample bags with corresponding request form.

The pneumatic air tube system is for transport of pathology samples only. The sample(s) must be secured in the air tube carrier pod.

- The pneumatic air tube system must NOT be used for:
- Blood components including used blood/FFP/platelets etc.
- Histology specimens
- Blood culture bottles
- Known high risk samples (e.g. viral haemorrhagic fever cases) or suspected emerging diseases
- Blood gas samples
- Ad hoc documentation.

Instructions for use of the system are located at pneumatic tube stations.

Hospital Portering Service

In all other areas of the hospital, samples are sent to Pathology via portering services x8888. All sample containers must be properly sealed; samples must be in individual sample bags with corresponding request form.

Courier Service

Samples from local GP surgeries and from Queen Mary's Hospital (QMH) are collected by Courier and delivered to the Pathology Department.

3.2. SAMPLE SPILLAGES AND LEAKS

Sample bags containing leaking containers will be discarded and rejected on via a report on the LIMS. If the leak has contaminated the inside of the air tube carrier, the carrier will be taken out of service and decontaminated appropriately by Pathology staff.

If a leak has contaminated the outside of the air tube carrier, the air tube system will be closed down by Serco in order that a decontamination procedure may be carried out.

All areas with an air tube station will be notified by Serco to ensure other arrangements for sample transportation can be put in place.

Once the decontamination process is complete and the air tube system is working, users will be notified by Serco.

3.3. SAMPLE REFERRAL

Samples for referral to another hospital must always be sent via the Pathology Laboratory. This will ensure correct packaging to meet regulatory requirements and provide an audit trail for each sample.

4. TEST REPERTOIRE

4.1. HAEMATOLOGY TESTS

Test Name	Sample Type	Reference Range	Turn Around Time	Comments	UKAS Accredited
BCR-ABL	4ml EDTA bottle x4 (Cap Colour – Lavender)	None applicable	14 working days	Referral Laboratory is Viapath	Referral lab
Blood Film	4ml EDTA bottle (Cap Colour – Lavender)	None applicable	3 working days	* Can use FBC sample This can only be added on up to one day from taking the FBC sample	Yes
Bone marrow investigation	Bone Marrow Slides	None applicable	21 days	By arrangement with Haematologist Referral Laboratory is Viapath	Referral lab
Cell Markers	Bone Marrow in Medium	None applicable	21 days	By arrangement with Haematologist Referral Laboratory is Viapath	Referral lab
Cyclosporin	4ml EDTA bottle (Cap Colour – Lavender)	Patient dependant	14 working days	Referral Laboratory is Viapath	Referral lab
Cytogenetics/ Chromosome Studies	4ml Lithium Heparin Bottle (Cap Colour – Dark Green)	None applicable	10 working days	Referral Laboratory is Viapath Results are returned directly to requestor	Referral lab
Full Blood Count	4ml EDTA bottle (Cap Colour – Lavender)	Refer to Appendix i	Inpatient: 4 hours GP/outpatient: 24 hours	Note: for Antenatal booking bloods a red top 4 ml EDTA is to be used	Yes
Erythropoietin	6ml plain bottle (Cap Colour – Gold)	5-25u/l	14 working days	Referral Laboratory is Viapath	Referral lab
ESR	4ml EDTA bottle (Cap Colour – Lavender)	Refer to Appendix i	24 hours	* Can use FBC sample This can only be added on the same day as taking the FBC sample	Yes
Fragile X	4ml EDTA bottle (Cap Colour – Lavender)	None applicable	10 working days	Referral Laboratory is Viapath Results are returned directly to requestor	Referral lab
G6PD (Glucose 6 Phosphate Dehydrogenase)	4ml EDTA bottle (Cap Colour – Lavender)	6.8-20.6 iu/gHB	14 working days	Referral Laboratory is Viapath Please note that this test is affected if a transfusion was given within the last 3 months.	Referral lab

Test Name	Sample Type	Reference Range	Turn Around Time	Comments	UKAS Accredited
Haemoglobinopathy Screening	4ml EDTA bottle (Cap Colour – Lavender)	Hb F: < 1% for adults, could be higher for children up to 1 year old. Hb A ₂ : 2.2 – 3.5	3 working days	* Can use FBC sample. Test is used for antenatal Haemoglobinopathy screening programme, please ensure Family Origin Questionnaire is completed when sending for this reason. Note that for Antenatal booking bloods only a red top 4 ml EDTA is to be used This can only be added on up to two days from taking the FBC sample Note that this test is affected if a transfusion was given within the last 3 months.	Yes
Haemoglobin Electrophoresis Confirmation	4ml EDTA bottle (Cap Colour – Lavender)	None applicable	14 working days	Referral Laboratory is Viapath	Referral lab
Haptoglobin	6ml plain bottle (Cap Colour – Gold)	0.8-2.2 g/L	14 working days	Referral laboratory is Viapath	Referral lab
HLA B27 Typing	4ml EDTA bottle (Cap Colour – Lavender)	None applicable	21 working days	Sent to the H&I Laboratory at NHSBT Tooting.	Referral lab
JAK-2	4ml EDTA bottle x2 (Cap Colour – Lavender)	None applicable	14 working days	Referral Laboratory is Viapath	Referral lab
Karyotyping	4ml Lithium Heparin Bottle (Cap Colour – Dark Green)	None applicable	21 days	Provided by Integrated service between Guy's regional genetics centre from Guy's and St Thomas' NHS Trust and Viapath Results are returned directly to requestor	Referral lab
Malaria antigen test	4ml EDTA bottle (Cap Colour – Lavender)	None applicable	24 hours	* Can use FBC sample All positive results are telephoned same day where possible. Please give countries visited, recent malaria prophylaxis and contact number where possible This can only be added on up to one day from taking the FBC sample	Yes

Test Name	Sample Type	Reference Range	Turn Around Time	Comments	UKAS Accredited
Malarial parasites (film investigation)	4ml EDTA bottle (Cap Colour – Lavender)	None applicable	48 hours	* Can use FBC sample All positive results are telephoned same day where possible. Please give countries visited, recent malaria prophylaxis and contact number where possible If required, the referral laboratory used is University College London Hospital This can only be added on up to one day from taking the FBC sample	Yes
Monospot (Glandular Fever)	4ml EDTA bottle (Cap Colour – Lavender)	None applicable	3 working days	Can use FBC sample	No
Mycophenolic Acid (MPA)	4ml EDTA bottle (Cap Colour – Lavender)	Please contact the laboratory to discuss	14 working days	Referral laboratory is Viapath	Referral lab
Paroxysmal Nocturnal Haemoglobinuria (PNH)	4ml EDTA bottle (Cap Colour – Lavender)	None applicable	14 working days	Referral laboratory is Viapath	Referral lab
Pyruvate Kinase	4ml EDTA bottle (Cap Colour – Lavender)	11.0-19.0IU/g HB	14 working days	Referral laboratory is Viapath Please note that this test is affected by transfusion within the last 3 months	Referral lab
Reticulocytes	4ml EDTA bottle (Cap Colour – Lavender)	Refer to appendix i	24 hours	* Can use FBC sample This can only be added on up to two days from taking the FBC sample	Yes
Sickle cell screen	4ml EDTA bottle (Cap Colour – Lavender)	None applicable	3 working days	* Can use FBC sample Sickle Cell Screen available in 20 minutes in urgent cases. Please discuss with laboratory before sending sample if urgent.	Yes
Tacrolimus (FK506)	4ml EDTA bottle (Cap Colour – Lavender)	No established therapeutic range. Please contact the referral laboratory to discuss	14 working days	Referral Laboratory is Viapath	Referral lab
Sirolimus	4ml EDTA bottle (Cap Colour – Lavender)	No established therapeutic range. Please contact the referral laboratory to discuss	14 working days	Referral Laboratory is Viapath	Referral lab

4.2. HAEMOSTASIS TESTS

Test Name	Sample Type	Reference Range	Turn Around Time	Comments	UKAS Accredited
Antiphospholipid Screen	6ml plain bottle (Cap Colour – Gold)	IgG & IgM aCL cut-off 10 G/MPL ● low positive 10 – 15 ● moderate positive >15 <80 ● high positive >80 GPL U/ml (IgG) MPL U/ml (IgM)	6 Weeks	Anti Cardiolipin antibodies (IgG +IgM)	No
Antithrombin III	3.5ml citrate bottle (Cap Colour – Light Blue)	85 – 130 iu/dl	14-21 days		Yes
Anti Xa	3.5ml citrate bottle (Cap Colour – Light Blue)	0.4 - 0.7 (UFH) 0.5 - 1.0 (LMWH) 0.8 - 1.2 (fondaparinux)	21 working days	For Low Molecular Weight Heparin monitoring	No
APTT	3.5ml citrate bottle (Cap Colour – Light Blue)	Refer to Appendix i	4 hours	Used to monitor heparin Please state if patient is on anticoagulants	Yes
Bethesda assay	3.5ml citrate bottle (Cap Colour – Light Blue) 6ml plain bottle (Cap Colour – Gold)	Not detected NBU/ML	21 working days	Referral Laboratory is either: ● Viapath ● Kent and Canterbury	Referral lab
Clotting Screen	3.5ml citrate bottle (Cap Colour – Light Blue)	Refer to Appendix i	4 hours	Includes: PT/INR, APTT/APTT ratio, Q-fibrinogen.	Yes

Test Name	Sample Type	Reference Range	Turn Around Time	Comments	UKAS Accredited
D-Dimers	3.5ml citrate bottle (Cap Colour – Light Blue)	Refer to Appendix i	4 hours	An audit form is required for D-Dimer tests for suspected venous thromboembolism at Darent Valley Hospital. This test is not advisable in some clinical situations as misleading results may be seen e.g. during pregnancy or for patients currently taking anticoagulants. D-Dimer tests have not been commissioned by primary care.	Yes
Derived Fibrinogen	3.5ml citrate bottle (Cap Colour – Light Blue)	Refer to Appendix i	4 hours		Yes
Factor Assays (II, V, VII, VIII, IX,X, XI, XII)	3.5ml citrate bottle (Cap Colour – Light Blue)	FII 50 - 150 IU/dl FV 50 - 150 IU/dl FVII 50 – 150 IU/dl FVIII 50 – 150 IU/dl FIX 50 – 150 IU/dl FX 50 – 150 IU/dl FXI 57.9 - 118.5 IU/dl FXII 50 - 150 IU/dl PK 50 - 150 IU/dl	3-4 weeks	Referral Laboratory is either: <ul style="list-style-type: none"> • Viapath • Kent and Canterbury Note: send one sample per factor assay	Referral lab
Factor V Leiden	4ml EDTA bottle x2 (Cap Colour – Lavender)	None applicable	21 working days	Referral laboratory is Viapath	Referral lab
Free Protein S	3.5ml citrate bottle (Cap Colour – Light Blue)	61 – 133%	6 Weeks	Note: cannot be performed on patients taking oral anticoagulants	Yes
Heparin Induced Thrombocytopenia (HIT Screen)	3.5ml citrate bottle (Cap Colour – Light Blue) 6ml plain bottle (Cap Colour – Gold)	Negative	21 working days	Referral Laboratory is either: <ul style="list-style-type: none"> • Viapath • Kent and Canterbury 	Referral lab
Inhibitor Screen	3.5ml citrate bottle (Cap Colour – Light Blue)	Not detected BU/ML	14-21 days	Referral Laboratory is either: <ul style="list-style-type: none"> • Viapath • Kent and Canterbury 	Referral lab

Test Name	Sample Type	Reference Range	Turn Around Time	Comments	UKAS Accredited
Lupus Anticoagulant	3.5ml citrate bottle x2 (Cap Colour – Light Blue)	dRVVT screen 0.85 – 1.17 dRVVT confirm 0.90 – 1.10 dRVVT mixing test screen 0.90 – 1.07 dRVVT mixing test confirm 0.98 – 1.10 Ratio	14-21 days	Note: cannot be performed on patients taking oral anticoagulants	Yes
Prothrombin G20210A mutation	4ml EDTA bottle x2 (Cap Colour – Lavender)	None applicable	6 Weeks	Referral laboratory is Viapath	Referral lab
Prothrombin Time + INR	3.5ml citrate bottle (Cap Colour – Light Blue)	Refer to Appendix i	4 hours	Used to monitor warfarin. Please state if patient is on anticoagulants	Yes
Protein C	3.5ml citrate bottle (Cap Colour – Light Blue)	70 – 140 iu/dL	6 Weeks	Note: cannot be performed on patients taking oral anticoagulants	Yes
Q-Fibrinogen	3.5ml citrate bottle (Cap Colour – Light Blue)	Refer to Appendix i	4 hours	This is done only if the derived fibrinogen is <1.5g/L.	Yes
Thrombophilia Screen	3.5ml citrate bottle x3 (Cap Colour – Light Blue) 6ml plain bottle (Cap Colour – Gold)	Refer to individual tests	6 Weeks	Includes: Lupus Anticoagulant, Anti cardiolipin antibodies, Free Protein S, Protein C and Antithrombin	Yes
Von Willebrands Screen	3.5ml citrate bottle x2 (Cap Colour – Light Blue)	VWFAG: 50 – 160 iu/dL VWF: 50 – 200 iu/dL	6 Weeks	Referral Laboratory is either: <ul style="list-style-type: none"> • Viapath • Kent and Canterbury Includes: Von Willebrand activity, antigen, Collagen binding assay Ristocetin cofactor (RICOF)	Referral lab

4.3. HAEMOSTASIS TESTING CONSIDERATIONS

Thrombophilia Studies

Requests for these tests must be discussed with a Consultant Haematologist, prior to submission of specimens in order for appropriate testing to be instigated, as well as clinical follow up where necessary. Where Consultant advice has not been sought prior to submission of specimens for thrombophilia testing, the Laboratory may reject the request and refer the user to Clinical Haematology Consultant. Antiphospholipid antibody screening, such as in cases of repeated miscarriage, will be accepted if requested directly by a Consultant.

Please note: Protein C, Protein S and Lupus Anticoagulant test are not available for patients on oral anticoagulants.

Appropriate Timing of Sample Collection

Pro-thrombotic testing is best performed when the coagulation system is in a steady-state, and is best avoided:

- In an acute thrombotic state
- During anticoagulant treatment
- During pregnancy or the puerperium
- When taking oestrogen containing contraceptive pills or hormone replacement therapy.

There will be occasional situations where testing during the above is beneficial, but these must be discussed with Haematology medical staff to ensure that the interpretation made and advice given is valid.

5. CONSULTANT CLINICS AND ADVICE

The following clinics are held at Darent Valley Hospital. Further information can be found on the Trust website www.dvh.nhs.uk and www.medway.nhs.uk and the DVH Trust intranet site ADAGIO.

- Anticoagulant Clinics (DVH only)
- Haematology Clinics
- Thrombophilia Clinic

Haematology Consultants, Transfusion Specialist Practitioner and Registrar are happy to discuss and advise on clinical matters with a patient's medical/ surgical staff and General Practitioners. They are contactable via switchboard at either site.

The Nurse Practitioner for anticoagulation can only give advice on Darent Valley Hospital patients.

6. APPENDICES

6.1. Appendix i – Reference Ranges and Critical Values

Haematological Values for Normal Adults (expressed as a mean \pm 2SD (95% range))

Assay	Gender and/or Age	Reference Range	
White blood cell (WBC) count	Men and women	4.0 - 10.0 x10 ⁹ /L	
Haemoglobin (Hb)	Men	150 \pm 20 g/L	
	Women	135 \pm 15 g/L	
Red blood cell count	Men	5.0 \pm 0.5 x 10 ¹² /L	
	Women	4.3 \pm 0.5 x 10 ¹² /L	
Haematocrit (Hct) or Packed cell volume(PCV)	Men	0.45 \pm 0.05 L/L	
	Women	0.41 \pm 0.05 L/L	
Mean Cell Volume (MCV)	Men and women	92 \pm 9 fL	
Mean Cell Haemoglobin (MCH)	Men and women	29.5 \pm 2.5 pg	
Mean cell haemoglobin concentration (MCHC)	Men and women	330 \pm 15 g/L	
Red cell distribution width (RDW) as a coefficient of variation (CV)	Men and women	12.8 \pm 1.2%	
Platelet (PLT) count (x10 ⁹ /L)	Men and women	280 \pm 130 x10 ⁹ /L	
Reticulocyte count (x10 ⁹ /L)	Men and women	50 - 100 x 10 ⁹ /L	
Differential white cell count	Neutrophils	2.0 – 7.0 x 10 ⁹ /L	
	Lymphocytes	1.0 – 3.0 x 10 ⁹ /L	
	Monocytes	0.2 – 1.0 x 10 ⁹ /L	
	Eosinophils	0.02 – 0.5 x 10 ⁹ /L	
	Basophils	0.02 – 0.1 x 10 ⁹ /L	
Erythrocyte sedimentation rate (ESR) (mm in 1 hour at 20 \pm 3°C)	Men	17 – 50 yr	\leq 10
		51 – 60 yr	\leq 12
		61 – 70 yr	\leq 14
		> 70 yr	\leq 30
	Women	17 – 50 yr	\leq 12
		51 – 60 yr	\leq 19
		61 – 70 yr	\leq 20
		> 70 yr	\leq 35

Haematological reference ranges for children (expressed as a mean \pm 2SD (95% range))

(Dacie & Lewis 12th edition)

Assay	1 Year	2-6 Years	6-12 Years
Haemoglobin (Hb) (g/L)	126 \pm 15	125 \pm 15	135 \pm 20
Red blood cell count ($\times 10^{12/L}$)	4.5 \pm 0.6	4.6 \pm 0.6	4.6 \pm 0.6
Haematocrit (Hct) or Packed cell volume(PCV) (L/L)	0.34 \pm 0.04	0.37 \pm 0.03	0.40 \pm 0.05
Mean Cell Volume (MCV) (fl)	78 \pm 6	81 \pm 6	86 \pm 6
Mean Cell Haemoglobin (MCH) (pg)	27 \pm 2	27 \pm 3	29 \pm 4
Mean cell haemoglobin concentration (MCHC) (g/L)	340 \pm 20	340 \pm 30	340 \pm 30
Reticulocyte count ($\times 10^9/L$)	30 – 100	30 – 100	30 - 100
Platelet (PLT) count ($\times 10^9/L$)	200 – 550	200 – 490	170 - 450
White blood cell (WBC) count ($\times 10^9/L$)	11 \pm 5	10 \pm 5	9 \pm 4
Neutrophils ($\times 10^9/L$)	1.0 – 7.0	1.5 – 8.0	2.0 – 8.0
Lymphocytes ($\times 10^9/L$)	3.5 – 11.0	6.0 – 9.0	1.0 – 5.0
Monocytes ($\times 10^9/L$)	0.2 – 1.0	0.2 – 1.0	0.2 – 1.0
Eosinophils ($\times 10^9/L$)	0.1 – 1.0	0.1 – 1.0	0.1 – 1.0

Biological Reference Intervals for coagulation tests:

Reference ranges provided by Werfen to be used with IL TOP analyser.		
Prothrombin Time (PT)	Men and women	9.4 – 12.5 secs
International Normalised Ratio (INR)	Men and women	0.8 – 1.2
Activated Partial-thromboplastin time (APTT)	Men and women	25.1– 36.5 secs
Activated Partial-thromboplastin Ratio (APTR)	Men and women	0.9 – 1.2
Derived Fibrinogen	Men and women	2.8-4.7 g/l
Quantitative Fibrinogen (Replaces Clauss)	Men and women	1.92 – 3.98 g/l
The cut off for Venous Thrombotic Episode (VTE) is a D-Dimer level		243 ng/ml

Newborn and neonatal reference ranges are available attached to the electronic reports.

References: Dacie & Lewis 12th edition

Critical Values

These values must be acted on immediately and phoned through to the requesting clinician/ward or Consultant Haematologist if unexplained first time patients.

- WBC total <1.0 or >40.0 x10^{9/L}
- Neutrophils <0.5 x10^{9/L}
- Haemoglobin <70 or >180 g/L
- Platelets <50 x10^{9/L}

The below coagulation results must be telephoned to the ward on each occasion that they occur:

- ALL INR results above 5.0
- ALL APTTR results above 3.0.
- ALL fibrinogen results less than 1.0 g/L

6.2. Appendix ii – Factors affecting sample quality and interpretation of results

Causes of misleading results relating to sample collection

- Physical activity (including fast walking) within 20 minutes
- Smoking
- Stress
- Dehydration
- Drugs or dietary supplement administration within 8 hours
- Time (diurnal variance)
- Posture (lying, standing or sitting)
- Haemoconcentration from prolonged tourniquet pressure
- Excessive negative pressure when using syringe
- Incorrect tube type
- Capillary or venous blood
- Insufficient or excess anticoagulant
- Inadequate mixing of sample
- Inadequate sample storage conditions (temperature)
- Delay in transit to the laboratory

Factors which may affect laboratory results

- Sample quality (under filled, over filled, clotted including fibrin clots)
- Labile properties of assayed components
- Interference (lipaemia, ictericia, haemolysis)
- Centrifugation
- Interactions with anticoagulants (eg platelet clumping in EDTA)
- Pregnancy

It may be necessary under certain circumstances for the laboratory to request a repeat sample for confirmation of abnormal or equivocal results

References: *Dacie & Lewis 12th edition*

6.3. Appendix iii – Vacuette Selection Chart and Order of Draw

















VACUETTE® SELECTION CHART

Dartford and Gravesham NHS Trust



Blood cultures must be taken first - Use winged blood collection system.

Fill aerobic bottle first and then anaerobic bottle. Invert bottles to thoroughly mix specimen

	Item Number	Cap Colour	Volume	Cap Ring Colour	Tube Contents	Tests	Special Instructions
1	454334	 Blue	3ml		Trisodium Citrate	Haematology: Anti-thrombin III, Anti Xa level, APTT, Coagulation screen, D Dimers, Factor VIII, Protein C, Protein S, Prothrombin Time / INR, Lupus A/C, Clotting Factor Assays, IWD Screen (5 Tubes)	For clotting assays, one sample is required for each assay requested.
	456018	 Gold	5ml		Clotting Accelerator and Separation Gel	Biochemistry: Group 1: Renal, Liver & bone profiles, Lipids, CRP, LDH, Paracetamol, Salicylate, Alcohol, GGT, CK, Iron, Theophylline, Bicarbonate, Uric acid, Bile acid, Lithium Group 2: Thyroid profile, Fertility tests, Ca19-9, Ca 125, CEA, AFP, Haematinics, Troponin, Digoxin, Antibiotic assays, Phenobarbitone, Phenytoin, Carbamazepine, Cortisol, PSA, HCG Group 3: Protein electrophoresis, C3, C4, Immunoglobulins, Osmolality, ACE, TPO, SHBG, HGH, Ca 15-3 Haematology: Anti-cardiolipin antibodies, B2 Microglobulin, B12 & Folate, Erythropoietin level, Ferritin, Serology: Ante-natal screening, HIV, Hepatitis [A, B, and C], CMV, Toxoplasma, Varicella	Each group requires a separate sample
3	454083	 Green	4ml		Li Heparin and Separation Gel	Biochemistry: Aldosterone, Homocysteine, Mercury, Renin, Ammonia Serology: IGRA (2 tubes)	
4	456080	 Navy Blue	6ml		Sodium Heparin	Biochemistry: Trace elements	
5	454209	 Lavender	4ml		EDTA	Haematology: BCR-abl, Blood film, CD4/CD8 count, Cell Markers (10ml), Cyclosporin, ESR, Factor V Leiden, FK 506, Fragile X, Full blood count, Haemoglobinopathy screen, HLA B27, Malarial parasites / screen, Paul Bunnell / Monospot, Prothrombin Gene Mutation, Red Cell Folate, Sickle test, Viscosity, MTHFR, JAK2 (2 tubes) Serology: HIV Viral Load (3 tubes)	BCR-abl - four sample tubes are required, Paul Bunnell / Monospot - must have FBC, one sample for both
6	454087	 Lavender	2ml		EDTA	Biochemistry: Hba1C, Carboxyhaemoglobin, Lead	
7	456052	 Pink	6ml		EDTA for Crossmatch	Transfusion: Blood Group & antibody screen Biochemistry: BNP testing	For all enquiries about Transfusion requests please phone Ex 8501
8	456277	 Grey	2ml		NaF/EDTA	Biochemistry: Glucose (GTT), Lactate	



IMPORTANT: Hold tube in place with the thumb until filled to the required level

Other information if required: Haematology – Phone 8506 if test not listed or if there is uncertainty ONE sample only sufficient – unless specified.



Multi Sampling Needle
21 Gx1.5 4500076
KFK 228
22 Gx1.5 4500075
KFK 230



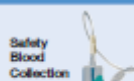
VISIO PLUS 'Flashback' Needle
21 Gx1.5 4500040
KFK 023
22 Gx1.5 4500041
KFK 017



Tube Holder
450209
KFK 322



QUICKSHIELD
450230
KFK 287



Safety Blood Collection Set: with Luer Adapter and Holder
KFK137 KFK138



Holder
450281
KFK 111



Blood Transfer Unit
450225
KFK373



Blood Culture Safety Blood Collection Sets
KFK 416
KFK 417

VADM VERSION 2.
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 greiner blo-one