Western Cape Government
Health

Manual for Interns and Doctors 2012

Tygerberg Hospital

Manual
for Interns and Doctors

Tygerberg Hospital

2012

CONTENTS

WELCOME TO TYGERBERG HOSPITAL

To all new doctors: Interns and Medical Officers

On behalf of the Management of Tygerberg Hospital, I wish to extend a very warm welcome to you, our new Interns and Medical Officers. It is of great significance to us, that you have chosen Tygerberg Hospital to further your medical careers.

Tygerberg Hospital is a large and complex organisation, with an establishment of approximately 4 000 staff members. The prospect of working here may seem daunting, but be assured that we will endeavour to make your stay pleasant and provide you with the necessary support.

If you require any assistance, please feel free to contact my office or anyone on the Management team.

Best wishes with your medical career. I trust this manual will be of use to you.

Dr DS Erasmus
Chief Director: Tygerberg Hospital

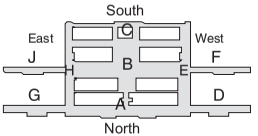
Vision, Mission and Values

The Western Cape Department of Health's vision statement is “Quality health for all”.

The Department's mission is to provide equitable access to health in partnership with the relevant stakeholders within a balanced and well managed health system.

The overarching values identified by the Provincial Government of the Western Cape are:
(1) Caring;
(2) Competence;
(3) Accountability;
(4) Integrity; and
(5) Responsiveness.

The core values that will be reflected in the way in which the vision and mission are achieved are:
(1) Intergrity;
(2) Public accountability;
(3) Innovation;
(4) Openness and transparency;
(5) Commitment to high quality service;
(6) Respect for people; and
(7) Excellence.



Colour Key

Surgical (492 beds)

Gynae/Obstets (144)

Paediatric (317)

Medical (235)

Oncology (47)

Psychiatric wards (42)

Private beds (26)

Day Surgery (20)

Non-clinical/support areas

(TOTAL 1310 beds)

C South Passage (Outpatients)

11	HR Skills Training Airconditioning workshop
10	Nuclear Medicine
9	NHLS
8	Dermatology OPD, Occupational Health, Staff clinic
7	Ophthalmology OPD
6	Urology OPD
5	ENT OPD
4	X-rays
3	Paediatrics OPD
2	Gynaecology OPD
1	Trauma
G	Parking, Workshops, Transit Lounge
LG	Cleaning services, Workshops

C North Passage (Outpatients)

11	H.R. H.I.S. Rollout
10	NHLS
9	NHLS
8	Medical OPD (Cardiology)
7	Medical OPD (special clinics)
6	Orthopaedic OPD
5	Surgical Special Investigations
4	X-Rays
3	Obstetrics/Colposcopy/Infertility
2	Labour Wards C2A (25) + HC (4) (29)
1	Trauma CIDE (23), Resus (4 + 2 trolleys) (29)
G	Medical Records, Dispensary, I.T.
LG	Technical Workshops, Vacolitre store, Tel.Exchange

Tygerberg Hospital

January 2012

X Block (Gene Louw)

H2X	Oncology	26
H1X	Oncology	21

*** Ward changes in 2012:**

Psychiatry Adolescent Unit will open in GLG

Khayelitsha wards JG, J1 & J3 will be vacated

Source Isolation will be opened in D10

Protective Isolation/Haematology Unit will be opened in D8

J (wards)

8	KIDCRU	
7	Trauma Surgery	32
6	Orthopaedics	29
5	Obstetrics Post Natal	23
4	Gynaecology	34
3	Khayalitsha L1 ward*	
2	Obstetrics Post Natal	29
1	Khayalitsha L1 ward*	
G	Khayalitsha L1 ward*	
LG	Psychiatric OPD (Adult)	

B/C (theatres)

8	Cardiology (C8DT)
7	Gastroenterology
6	Urology (C6AT)
5	Burn wounds & Absc (C5BT), Day Surgery 20 (C5BE)
4	Angiography & special investigations
3	Theatres (Gynae S/T), Eyes (Y/Z), Orthopaed (W/Z)
2	Theates (Obstetrics)
1	Theatres A-J (Neuro, Plast, Gen, Emerg, Thorax etc.)
G	Occupational Therapy, CSSD
LG	Kitchen

F (wards)

4	Orthopaedics	32
3	Isolation (4)	
2	Obstetrics	34
1	Medical Emergency	26
G	Gynaecology	24
LG	Psychiatry OPD (Child)	

G (wards)

10	Paediatrics	30
9	Paediatrics	30
8	Neonatal HC	30
7	Paed. Infectious Disease	23
6	Paediatric Orthopaedics (LM)	35
5	ENT	19
4	Paediatric Surgery	25
3	Paediatric Oncology	18
2	Paediatrics (neonatology)	38
1	Paediatrics (neonatology)	36
G	Paediatric Emergency	20
LG	Psychiatry - Adolescent Unit*	15

A (ICUs)

10	Metabolic	15		Metabolic
9	Vacant		26	Paediatric ICU
8	Internal Medicine	28	24	Derm(12), Neuro(12)
7	Nephrology HC + ICU	9		Nephrology
6	Cardiology HC	16	8	Cardiology ICU
5	Vacant/Decant		20	MedHC 13, RespICU 7
4	Neuro HC 18, ICU 12	30	31	Neurosurg+Thorax (9)
3	Orthopaedics	31	31	Orthopaedics
2	Thoracic ICU + HC	12	12	Thoracic Surgery
1	Burns	22	12	Surgery ICU (2 HC)
G	Offices (Nursing)			Offices (Nursing)
LG	Psychology			Offices (Services)

D (wards)

10	Internal Medicine*	30
9	Internal Medicine	29
8	Internal Medicine*	28
7	Ophthalmology	32
6	Urology	32
5	Head/neck/brst(17) Abd.(14)	31
4	Private ward (26) Cardiac (3)	29
3	Plastics/Maxillo Facial	24
2	Abdominal surgery	31
1	Vasc. surg	22
G	Psychiatry (higher functioning)	22
LG	Psychiatry (lower functioning)	20

Admin building

Updated 10-10-2011 R Thomson

SENIOR MANAGERS

Chief Director
Dr DS Erasmus

Chief Operational Officer and Director Clinical Services
Dr PE Ciapparelli

Managers: Medical Services
Dr S Moeti
Dr AJA Müller
Dr RR Thomson
Dr MA Mukosi

Manager: Medical Services and Intern Curator
Dr K Maart

Director: Finance
Mr MT Salie

Deputy Director: Administration
Mr PJ Wolfaardt

Deputy Director: Nursing Services
Ms RM Basson

BACKGROUND INFORMATION

With only three medical schools in South Africa in 1956, concern existed that capacity for adequately training medical staff was insufficient. Proposals were made to establish a fourth medical school which, it was felt, would be best supported at Stellenbosch University.

Initially, Karl Bremer Hospital, on the border of Bellville and Parow, was used as the new school's tertiary hospital for practical aspects of training. This small hospital was, however, hopelessly inadequate and, in 1963, work began on the new Tygerberg Hospital and associated dental hospital. The structure included faculty buildings, two nursing colleges, nurses' and doctors' residences, workshops, laundries, crèches, research facilities for animals, and parking for cars, all covering an area of 100 hectares.

Structural features

The main hospital building was designed with a floor area of some 224 843 m^2. This building is 300m long from east to west and 135m wide from north to south. It is 12 storeys high, with ±40km of passages. The main building contains 53 lifts, each with a 30-passenger capacity. The main stores, the main kitchen and the central supply department (CSSD) are located at lower levels in a centrally situated block and are accessible from a vehicular off-loading and distribution centre.

Statistics

In 2010, 368 679 inpatients days with 81 705 admissions and 365 208 outpatients visited Tygerberg Hospital, i.e. an average of 30 434 outpatients and 6 808 inpatients per month and average of 18 245 admissions a month. The main kitchen prepares in excess of 3 500 meals per day.

Facilities

Tygerberg Hospital has been providing highly specialised health services locally and abroad for over 30 years and continues to strive for and contribute to healthcare in the Western Cape and South Africa as a whole.

Inpatient facilities

At present, 1 310 beds are in use, as per the Comprehensive Service Plan.

Facilities and resources are provided for numerous specialised services, which are important to lower levels of care, together with research and post-graduate training. Units have been carefully designed for these purposes. The total number of beds

includes carefully situated special ward units for medical and surgical intensive care, organ transplantation, respiratory care, renal dialysis and metabolic studies.

The main operating facilities comprise 28 operation theatres, including 6 special investigation theatres, as well as 6 recovery areas. These facilities occupy a portion of a centrally positioned block within the main hospital building.

The Gene Louw Building was officially opened in 1986 and is linked to the hospital by an underground tunnel. It houses the Oncology Department and is involved in highly specialised treatment and care for oncology patients. There is provision in this building for 47 inpatients.

The provincial paedo-audiological centre, named the Carel du Toit Centre, for hearing-impaired children, functions in conjunction with the Ear, Nose and Throat Department. It is located on the premises of the hospital and compares favourably with the best in the world.

The Tygerberg Radiation Casualty Facility (TRCF) is a dedicated unit for the treatment of all radiation casualties in the Western Cape and surrounding provinces. (Koeberg Nuclear Power Station is situated 45km from the hospital.) The facility is fully equipped with an operating theatre, ward accommodation, an isolated sewerage system and radiation monitoring equipment. Tygerberg Hospital is the only hospital in the Western Cape that is equipped to handle nuclear accident casualties.

Emergency facilities

The Diana, Princess of Wales Trauma Unit has access routes that are independent of the patient entrances. Apart from its reception, examination and resuscitation areas, this unit has 28 observation beds, dedicated theatres and a 6-bed acute intensive care unit.

Also independently accessible is the maternity section, with 15 first-stage sections, 8 delivery rooms and 2 main operating theatres.
A heliport near the western ambulance deck provides access to emergency cases arriving by helicopter. This heliport has recently been updated and relocated south of the previous area.

Outpatient facilities

It was accepted at the outset that each department should have its own outpatient section situated on the same floor as the inpatient wards of that department. This is especially suited to consultation and training.

Operating theatres

The main outpatient theatre block consists of 14 theatre suites. There are specialised theatres for emergency surgery, endoscopy and imaging and minor procedures. The outpatient block also houses the Diagnostic Radiology Service for both inpatients and outpatients, as well as the National Health Laboratory Service (NHLS).

UNIQUE SERVICES AT TYGERBERG HOSPITAL

- Carel du Toit Centre for the Hearing-impaired
- Centre for Mental Health
- Clinical Nutrition and Vitaminology Service
- Clinical Retinal Laboratory
- Cochlear Implant Unit
- Complex Craniofacial Surgery Unit
- Complex Radiation and Oncological Therapy
- Department of Endocrinology and Metabolism
- In-vitro Fertilisation
- Kidney Transplant Unit
- Laboratory of Human Genetics
- Neonatal Intensive Care Unit
- Neuro-Psychiatry Unit
- Open Heart Surgery Unit
- Perinatal Mortality Unit
- Poison Information Centre
- Post-natal Stress Disorder Unit
- Specialised Pulmonary Function Laboratory
- Tuberculosis Clinical Work Unit
- TygerBear Social Work Unit
- Day Surgery Unit (02/2000)
- MRI
- Oncology
- Adult Burns Unit (the only one in the Western Cape)
- Hyperbaric Oxygen Facility

HEALTH CARE 2010

The Health Care 2010 plan was devised as a Western Cape provincial strategy to address inequities across levels of care within the public healthcare sector. The service model of this plan, the Comprehensive Service Plan (CSP), is based on the philosophy that every patient should have access to healthcare that is delivered at the appropriate level by healthcare workers who possesses the right skills mix and at the right cost to the taxpayer.

To achieve this objective, the funding streams to the various levels of care were separated to ensure greater accountability at each level. Since level 2 and level 3 services will henceforth be funded out of separate budgets, with separate reporting mechanisms, it has become necessary to separate the services physically.

This is easier at the regional than at the central hospitals, where there is a complex mix of levels 2 and 3. To allow for the process of physically separating level 2 and 3 services. separate level 2 wards have been designed at Tygerberg.

Levels of care are based on the highest level of the medical practitioner who would be required to deliver the care:
Level 1: General practitioners/family physician/Medical Officer
Level 2: General specialist, e.g. physician, surgeon, paediatrician
Level 3: Subspecialist e.g. cardiologist. neurologist, haematologist

LABORATORY COST CONTROL MEASURES

Laboratory costs are among the biggest expenditure items at TBH. **Hospital Notice 52/2009** provides detailed information on restrictions to save costs without compromising patient care. The control measures can be summarised as follows:

Adequate labelling of specimens and forms:
Patient name, folder number, location, doctor's name, tests required.

Motivation by consultant:
Certain tests must be approved on the lab request form by a consultant, who must sign and print his/her PERSAL number in the block at bottom left.

The tests to be motivated by a consultant include:
Urea ordered from OPD (except Renal Division). In–patients – use Creatinine instead.

FBC requested after initial screen. Order only relevant components, e.g Hb & WCC. Do Ward Hb wherever possible instead of ordering from NHLS.

CRP – do not repeat more than every 24 hours for neonates. Older children and adults consultant signature needed unless ordered from ICU.

Thyroid tests – T4 tests will only be accepted if sent from Endocrine OPD or endocrinologist, Gynae endocrinology, Nuclear Medicine or Oncology. All other thyroid screen requests will result in TSH only being done.

Liver Function tests – screen request will result in only Total/Conjugated Bilirubin, ALT, ALK Phos being done unless motivated by a consultant. LFTs not to be repeated more than twice weekly unless specific motivations provided.

Cardiac markers – Troponin T limited to patients with acute coronary syndrome.

HDA1C – Not to be repeated more frequently than 6 monthly.

Lipogram – to be done not less than 6 months after stroke or cardiac infarct and not repeated more often than 6 monthly.

Mg, Ca, P – limited to severe malnutrition, renal failure, hyperparathyroidism, malignancy investigations.

Other restrictions:
ARV, PMTCT testing – identify clearly if for ARV or PMTCT programmes (they are funded separately).

Urine MC&S – use "dipstix" or ward microscopy rather than send to NHLS.

Requests that do not comply WILL BE REJECTED found by the Gatekeeper. Contact her on **pager 0729** if required. She can also check if a test has been done recently at another hospital (thus avoiding unnecessary repeats).

PERSONNEL MATTERS

Interns' registration

Like all doctors, interns must be registered with the Health Professions Council of South Africa (HPCSA). Appropriate proof of your registration must be handed in at the Professional Personnel Office. If you are not registered as an intern, your intern training will not be recognised.

Please note: Registration as an Intern is arranged in October/November in your SI year. It is your own responsibility to register.

Certificates and forms

The following certificates (or certified copies thereof) must be handed in at the Personnel Office immediately if you have not submitted them before assuming duty:

- registration as intern
- personal information
- bank form for payment of your salary
- degree certificate (or copy)
- application form Z.83
- Tax number(Registration at SARS)

Please note: In terms of Section 34(2) of the Doctors, Dentists and Pharmacists Act, an intern may perform any action that a doctor may perform only within the boundaries of the hospital where he or she has been appointed as intern.

Name tags

A name tag must be obtained as soon as possible as all healthcare workers need to be clearly identified when on duty. Name tags are obtained at the Photocopy Room, A-Lower level.

Rubber stamps

Every doctor will receive a rubber stamp, with a name and Persal number on it. This stamp should be used every time a doctor signs a prescription and orders blood products or blood tests. Failure to use this stamp may result in a request being declined.

Please note: Rubber stamps will be made freely available by the hospital but it remains the doctor's responsibility to safeguard it. Replacement of a lost stamp will be at the doctor's' expense.

Call radios
Each person who is allocated a call radio must sign for it and remains responsible for this valuable device. Mr Rautenbach (ext. 5584), our telecommunications technician, will explain the procedure when you collect your device. Please ensure that your call radio remains charged if it's a rechargeable device.

Holiday leave
Holiday leave of 22 days is granted during your intern year and should preferably be taken in two periods of 11 days each. Leave is arranged with your superior and an official application form (obtainable from the Personnel Office in the administration building) must be completed in good time and handed in at the relevant department. Your holiday leave must suit the department's activities and not vice versa.

Please note: If you take leave without the consent of the Head of Department or his or her nominee, you will forfeit your salary for that period and your training term will be extended.

Sick leave
You must notify the head of the unit to which you have been allocated if you have to take sick leave. If sick leave lasts longer than two days, a medical certificate must be handed in as soon as you return to work.

Accommodation
Lodging of interns who live in single quarters is included in the price of accommodation. Personnel who live in flats are free to prepare their meals at their own expense, in which case only accommodation costs will be deducted.

PROTOCOLS

Sharp Injury Control

A complete protocol is available in every ward.

1. Wash the lesion thoroughly with soap and water.
2. Immediately notify the ward sister/registrar/consultant of the injury.
3. Have blood drawn from the contact, if known (full 10ml clotted), and take it with you. The patient's doctor is responsible for the drawing of the blood with informed consent.
4. Complete the “Sharps Injury Notification” form and take it and the blood with you.
5. Nursing and housekeeping staff must be in possession of a TH 100 referral form.
6. Report immediately to the Occupational Health Clinic at C8A West (weekdays 07:00–16:00) or F1 (after hours). Prophylaxis must be started within 1 to 2 hours (max. 24 hours).
7. You will receive counselling and your contact's blood will be sent for HIV and Hepatitis B testing, and a decision on the necessity of retroviral prophylaxis (according to risk and contact HIV result) will be made.
8. An IOD 1st Medical Report must be filled in by the doctor who sees you. This form must be delivered to the IOD office in H6, Room 131, in Outpatients within 24 hours.
9. Sign the prophylaxis consent form if prophylaxis is necessary.
10. Report to Occupational Health for follow-up on the first working day after the injury.

Please contact Occupational Health (ext. 6173) or the Adult Paediatric Infectious Diseases consultant through the hospital exchange with regard to any problems.

Hepatitis B immunisation

Hepatitis B immunisation is available at Personnel Health for staff who work in high-risk areas. Heads of Department must motivate applications for immunisation. Immunoglobin treatment is available to staff who have been exposed to Hepatitis B infection due to contact with infected blood or body fluid. Such persons may report to Personnel Health or the Personnel Clinic (8th floor west, ext. 6181).

HINTS FOR SUCCESSFUL PRACTICE

Speed service

All doctors who leave the hospital premises must inform the telephone exchange as well as the radio room where they can be found and the names of their

replacements. Services may not be swopped without the consent of the responsible Head of Department or his or her nominee. Each department has its own accommodation arrangements.

Emergencies
An emergency requires immediate attention, whether it is your patient or not. See all patients allocated to you, regardless of medical fund, injury on duty, etc. You should not argue with patients about such matters.

Patients should not be turned away from admission areas. However, patients who arrive by ambulance may be turned away.

Malpractice
You should never refuse to see a patient. Arrange with a colleague to see the patient if you are unable to do so. You are advised to take out cover for professional liability in case of malpractice.

Intravenous administering of liquids or blood by a nursing practitioner
If a nursing practitioner is requested to administer liquids or blood intravenously, it is implied that the doctor has ascertained the ability of the nursing practitioner to do so and that the doctor bears full responsibility for any consequences.

Equipment
Moving equipment from one division/ward to another is not permitted. Treat all equipment with respect and care.

Clinical Executive Officer on duty after hours
The operator at the telephone exchange (021 938 4911/or dial 9 internally) will contact the Medical Superintendent on duty.

Patient information
Patient information is confidential and may only be discussed in the multi-professional team set-up. You are not permitted to speak to the press. You may contact the Public Relations Office at ext. 5454 or the Clinical Executive Officer on call.

Media liaison
You may under no circumstances address the media. If you are contacted by or wish to convey something to the media, please contact the Public Relations Office in the administration building, Room 9, ext 5454/5608.

Theatre clothing
Management is aware of the increasing tendency of doctors and medical students to wear theatre attire outside the theatre complex and even outside the hospital. This behaviour is in breach of infection control measures of the hospital. All personnel leaving the theatre complex must put on their normal clothing even if they merely visit a ward. Supervisors must please ensure that this instruction is adhered to.

Special instructions
Upon being appointed, all interns must become familiar with the special instructions and procedures laid down by the departments to which they belong.

File summary in wards (Clinical Assistants)
Complete your summaries within 14 days after the patient has been discharged. If you do not, and the file is sent to the Medical Reports Office without the summary, you will have to do the summary there.

File covers
Do not remove file covers from wards or clinics. The medical records section is willing to draw files for research purposes. Contact your Clinical Executive Officer concerning outpatients.

Black ink pens
Use only a black ink pen as writing in coloured ink is not visible on microfilm.

Medical Reports Office
The purpose of this office is to provide information on medical records on request to the South African Police Services (SAPS), patients, attorneys and the Road Accident Fund. It is crucial that full notes on the patient's condition and treatment are recorded. Dates and times are very important. Completing the forms provided by the Medical Reports Office, and making statements to SAPS when necessary are also part of doctors' duties.

Non-smoking policy
In accordance with the non-smoking policy of the Provincial Government of the Western Cape (PGWC), a designated smoking area within the building may be established solely at the discretion of the Head of Department.

Nursing Services
PROTOCOL: OBTAINING PERMISSION FOR MEDICAL INTERVENTIONS

1. A medical practitioner is responsible for obtaining informed permission from the patient.
2. The pracitioner must ensure that the patient understands the extent and possible consequences of the intervention.
3. No nursing practitioner or student may obtain permission on behalf of a medical practitioner.
4. The nursing practitoner may only act as a witness and must be present when the medical practitioner has been obtained.
5. Permission must be obtained as soon as possible, after admission of the patient, from the relevant medical practitioner.
6. Permission and accepting possible risks must be cofirmed voluntarily by the patient.
7. The person who grants permission must have the legal capacity to do so.
8. The responsibility of ensuring that lawful permission for an intervention does exists, rests with the person undertaking the intervention.
9. Although it is a medical practitioner's duty to obtain permission, it is the nursing practitioner's duty:
   - to bring it to his/her attention that permission should be obtained timeously
   - to avail himself/herself of that fact that the patient has been properly informed i.r.o. the procedure to be conducted
   - to act as a witness in the presence of the medical practitioner
   - on the day of the intervention, to check that the permission has been completed, before the premedication is administered
   - if permission has not been obtained timeously and any deviations or cancellations occur, immediately to inform the relevant medical practitioner and ward staff, the patient, the anaesthiologist and theatre staff
   - if any doubt exists i.r.o. the validity of the permission form, to discuss it with the relevant medical practitioner, and if any problems are experienced, to contact the Medical Superintendant.
10. Validity of permission forms:
    - Permission forms must be valid, particularly after six months or after administration of anaesthetic.
    - For cases requiring more than one anaesthetic, e.g. burn wounds or plastic surgery, permission has to be obtained for each operation.
    - Informed permission has to be obtained for each operation, in other word one permission form does not cover multiple operations when the procedure requires anaesthesia.
11. Persons who are permitted to give permission, are referred to notice 38/2002 and 71/2002.

PROCEDURES

Dental services

Only inpatients of Tygerberg Hospital may be referred, at certain hours, to Dentistry. The file may be moved with the patient.

Please note: No outpatients are referred to Dentistry at the hospital's expense. Such patients are free to make their own appointments.

Deaths

Refer to Tygerberg Hospital notice 81/2006.

CONSENT FORMS FOR OPERATIONS

See CPA circular no. H12/1986.
Tygerberg Hospital notices 81/2002 and 71/2002 are available in all wards.

Role of the doctor

The doctor is required to inform the patient fully, ignorance on the part of the patient being assumed. The doctor is the person best equipped to explain to the patient the nature and purpose of the operation and possible complications, and to ensure that the consent form is properly completed.

Role of the nursing practitioner

It is the duty of the nursing practitioner to check whether consent has been granted and to notify the doctor and anaesthetist without delay if the consent form has not been properly completed, or if the patient has crossed out anything on the form.

Role of the anaesthetist

If the anaesthetist notices that the consent form is incomplete, he or she must immediately bring this to the attention of the doctor and the nursing practitioner.

Persons older than 18

If of sound mind, persons over the age of 18 may give consent themselves. In the case of married couples, a spouse may refuse consent if the marriage partner's reproductive capacity is involved unless the intervention is essential on medical grounds, or the parties are estranged.

Unconscious or incapacitated patients

If a doctor regards the intervention as an emergency measure, the Medical Superintendent's consent must be obtained before an intervention at the hospital

may be performed on unconscious or incapacitated patients. The consent form must be signed by the Clinical Executive Officer at the first possible opportunity.

Persons younger than 18
Consent must be given by the parent or guardian of persons under the age of 18. Where parents refuse to give consent or the parents or guardians cannot be traced to grant consent for an elective procedure, ministerial consent must be obtained. The social worker allocated to the ward must arrange this. (See notice 81/2003.) If married, a woman may give consent herself (regardless of her age).

In an emergency, the Medical Superintendent may give consent after obtaining the opinion of the doctor in question if it is not possible to contact the parents/guardian.

Please note: The doctor must personally contact the Clinical Executive Officer and prove on clinical grounds that the procedure was an emergency measure, i.e. that the patient's life was in immediate danger or the patient might have suffered long-term damage or become disabled.

Mentally ill patients
Consent from patients who have been admitted because of psychiatric illness, even when involuntarily, should be managed in exactly the same way as other cases. As in other cases, the patient's ability to give informed consent for a procedure should be assessed.

Most psychiatric patients are able to give consent for routine procedures. If in doubt, the opinion of a psychiatrist may be sought and, if necessary, consent may then be obtained from the appropriate relative or guardian. If reasonable efforts to trace a relative or guardian prove unsuccessful, consent may be obtained from the Clinical Executive Officer of the provincial hospital where the patient has been admitted.

For emergency procedures, the same protocols apply as in the case of other patients.

Expiry of consent
For practical purposes, a valid consent form is regarded as having expired after 30 days or after the administration of a single anaesthesia. (This is not a legal requirement.)

Consent for follow-up operations
In cases that may require anaesthetics more than once, e.g. burn wounds or plastic surgery, consent must be obtained for each follow-up operation. If follow-up

procedures are expected in the case of minor children from remote areas, consent for each procedure must be arranged in advance with the parents or guardians.

MAKING BEDS AVAILABLE

Each department manages its own beds. The Clinical Executive Officer does not admit or discharge patients. Medical staff responsible for the patient, as determined by the Head of Department, must make arrangements regarding the availability of a bed.

Emergency admissions receive preference. If a department's beds are filled with emergency admissions, beds may be borrowed from other departments in the division, if available.

Keep a theatre list for cold procedures, examinations or treatment.

Admission of patients

All staff are requested to note that:

1. bed status is electronically updated and bed utilisation can be checked immediately at all times by consulting the computer terminals.
2. a print-out of bed status is available at any time upon request from Registration (west side, ground floor).
3. the after-hours nursing manager has a terminal, as well as a printer.

If a bed is available, the doctor arranges admission of his/her patient to the ward concerned.

To check whether there is a bed available in his/her ward, department or division, a doctor may (a) contact the ward sister, (b) request a printout from Registration, (c) consult the bed statistics made available after 16:00 at the after-hours office (ext. 4056), (d) consult the bed managers during normal working hours (bleep 747 or 189).

When a vacant bed is found outside his or her ward, the doctor is expected to arrange at registrar level for the utilisation of such a bed. Such beds, if utilised, should be vacated before 10:00 the next morning.

If, after following the above procedures, the doctor has not found a vacant bed, the following protocol for full beds needs to be followed:

Step 1: Identify all patients for discharge and/or transfer to secondary hospitals of origin or post-acute beds in the Peninsula (Conradie Hospital). If the patient is

in bed only because he or she is waiting for transport, liaise with patient transport. Self-sufficient patients other than minors are permitted to overnight at the Lower Ground Protea Court patients' overnight facility. Appropriate patients (e.g. ambulant patients awaiting transport or medication) should be discharged to the transit lounge).

Step 2: If enough beds are still unavailable, borrowing beds from other disciplines may be considered. The Nursing Services Manager of other disciplines in the division concerned must be contacted to provide information about vacant beds.

No further cold admissions may take place at this stage or transfers accepted from referring hospitals, clinics or doctors. However, this does not mean that the hospital is closed. No cases arriving at the hospital by ambulance or private transport must be turned away. The hospital is closed owing to over-utilisation only when all beds in all sections are full within reasonable limits.

Once vacant beds have been identified, the designated officer with authority to relinquish the beds grants consent to loan the bed for a specific period. Within the limits of fairness, the officer may not refuse to grant consent. The bed must, however, be vacated by the time specified when the bed is loaned.

Inform the Clinical Executive Officer of the discipline in question to ensure that sisters at referring hospitals are notified that referrals from referring entities will be channelled to them for a specific period.

Step 3: If the borrowed bed cannot be vacated by the specified time, and no bed can be identified by returning to step 1, another discipline may be approached for a bed on loan.

Step 4: If step 3 is unsuccessful, discharge all pre-operative cold cases. Theatre time that becomes available in this way can be used to operate on and move out emergency and semi-emergency cases.

All pre-booked cold admissions that are cancelled should be notified in good time where possible. Cold cases can be re-scheduled in advance for procedures, even if it means long waiting lists. When bed utilisation decreases, waiting lists can be reduced by admitting more cold cases.

Doctors must follow the guidelines set out above strictly and should not contact the matron before having done their homework. Hospital management will deal with complaints about transgressions of the above procedures.

HEALTH CARE IS COSTLY

WASTAGE IS MORE COSTLY

Working more cost effectively = More patients saved !!

GENERAL INFORMATION

Air-conditioning
All windows need to remain closed to ensure an effective air-conditioning system.

How to obtain a parking disk
Disks authorising the holder to park in demarcated parking areas are issued for areas F and G (in the case of general practitioners not living in) and L (in the case of general practitioners living in). Interns must display the disk on the front windscreen of their vehicle. Disks can be obtained from Enquiry Office West (F and G) and Security Office West (L). They have to be collected in person, and particulars such as vehicle registration number are required. Parking disks are not transferable.

Fines
A fine will be imposed for parking in any other area, or on yellow lines, or across more than one parking space, or in such a way as to obstruct traffic flow or the parking of other vehicles or to prevent the removal thereof, or in violation of any rules issued by the Clinical Executive Officer. Copies of the parking rules are available from Enquiry Office West.

Doctors who are living in have parking at the doctors' quarters and are kindly requested to keep their cars parked there.

Telephones/kiosks
There are public phones situated throughout the hospital, at the entrance to wards as well as at all main entrances. Telephones cards are sold at the various kiosks at the main entrances. Most kiosks are open until 15:30.
The number for the Tygerberg Hospital switchboard is 021-938 4911; alternatively, you may dial 9 internally.

Postal and banking facilities
These facilities are situated south of the hospital.

Please note: Official envelopes may not be used for personal mail even if you use a stamp.

Cafeteria
The cafeteria is situated at the lower level of the administration block and may be reached through the linking corridors that lead to the university. The Internet Café is situated in the same area and is open to all PGWC staff members.

ANNEXURE A
HOUSE RULES

To ensure that your stay at Tygerberg Hospital is memorable and pleasant, it is important that you observe the following rules. They apply to all premises leased on the grounds of Tygerberg Hospital. It is suggested that you read them before you sign the lease agreement.

1. ON ARRIVAL

(a) Report to the office of the Housekeeper.
(b) Acknowledge receipt of your room / flat key.
(c) Ensure that equipment in the leased premises is in working order and that all items on the inventory list are checked before you acknowledge receipt thereof.

2. PERSONAL BELONGINGS

(a) Insuring personal belongings is your own responsibility.
(b) It is strongly recommended that personal items be clearly marked.

3. ELECTRICAL MATTERS

(a) Use of the following electrical items is permitted subject to approval of each item:
- kettles
- hair dryers
- asbestos or fan heaters
- television sets and radios
- microwave ovens
- two-plate stoves
- small refrigerators
- toasters

(b) Only three-point plugs are allowed and no more than three (3) power sources may be used simultaneously.

(c) The following items are not allowed on the leased premises
- washing machines
- tumble dryers
- open flame heaters
- electric frying pans
- satellite dishes
- internet links

4. OCCUPATION OF THE LEASED PREMISES

a) The leased premises must be used for accommodation only
b) Subletting of the property is prohibited.
c) The premises must be kept neat and tidy at all times.
d) The PGWC cannot accept responsibility for theft of property or other losses.
e) Tenants should ensure that their rooms/flats are locked whenever they are not physically occupying the same.
f) Tenants are responsible for the cleaning of their rooms/flats. Refuse bins must be empted in the garbage containers provided.
g) Only press-stick may be used to fix photographs and pictures to walls.
h) Under no circumstances may PGWC furniture be damaged or removed from the leased premises.
i) To prevent wind damage, it is suggested that window latches and locks be closed when tenants leave their rooms / flats. Negligence may result in your being held accountable for damages.
j) No alteration of any kind may be made to the property.
k) The PGWC / Management of Tygerberg Hospital or any representative they appoint may inspect the leased premises at any reasonable time.
l) Any substance abuse or other unacceptable behaviour will result in disciplinary action and a request to the tenant to vacate the leased premises.
m) No item or product / substance that can cause damage or endanger the safety of other tenants, personnel or the public may be kept or stored in the leased premises.
n) This lease agreement entitles the tenant to occupy only the room / flat specified. Under no circumstances may the rooms or flats of other tenants be occupied or visited without their express permission.
o) For inventory control and health and safety reasons, the leased premises will be inspected once a month.
p) No alcohol may be brought into or consumed in the residence.

5. LINEN / WASHING

(a) Tenants are to provide their own linen, bedding, towels and curtains.
(b) Washing facilities are available.
(c) No hospital linen may be used.

6. BATHROOMS AND TOILETS

(a) Bathrooms and toilets are cleaned daily by contracted staff.
(b) Tenants must ensure that these areas are left in a clean and neat condition after they have been used.

7. USE OF TELEPHONES AND THE RECEIVING AND MAKING OF CALLS

Public telephones are located within the residence. Tenants should always be mindful of the fact that long telephone conversations infringe the right of others to use these facilities.

8. VISITORS (GUESTS)

(a) Visitors are allowed on the leased premises only if accompanied by the tenant.

(b) Visitors will not be allowed to overnight.

9. PARKING

(a) Tenants and visitors must park in designated parking areas only.

(b) Tenants may apply for undercover parking, which is subject to a monthly fee. Details can be obtained from the Housekeeper.

10. SWIMMING POOL

The rules regarding the use of this facility can be obtained from the Housekeeper.

11. ON DEPARTURE

(a) **An inventory of** all the equipment and items on the leased premises is required on departure. All losses / breakages must be reported to the Housekeeper who will take the necessary action.

(b) Tenants must leave their forwarding addresses and telephone numbers with the Housekeeper to enable further communication if necessary, and to ensure that mail can be directed to them after their departure.

UNDER NO CIRCUMSTANCES MAY THESE RULES BE REMOVED FROM THE LEASED PREMISES.

LEASE AGREEMENT

Entered into by and between

The Provincial Government of the Western Cape – Tygerberg Hospital **(thereafter referred to as the LANDLORD)** at Private Bag X3, Tygerberg, 7505 **(address)**

AND

(Full name and surname of Tenant (hereafter referred to as the TENANT)

(Identity Number or Passport number (if the latter includes an expiry date)]

Description of leased "PREMISES" at Tygerberg Hospital: ----------

(Please complete alternate contact details)

Physical address: ----------

Postal address : ----------

Telephone No. : ----------
(Cell, home, work, etc)

E-mail address : ----------

TERMS AND CONDITIONS

1. DURATION

1.1 This lease shall commence on _____ (day) _____ (month) _____ (year) and shall lapse on the _____ (day) _____ (month) _____(year). This agreement therefore terminates on the _____ (day) _____ (month) _____(year), unless an earlier date is agreed to.

2. RENTAL

1. The rental for the PREMISES shall be R _____ (subject to periodic adjustments) per month.

2. The rental will be recovered from the TENANT'S salary/paid to the Accounts Section at the Hospital Administration on or before the first day of every week/month (delete what is not appropriate) should the TENANT be employed by Tygerberg Hospital. Direct advance payments MUST be made in advance by those TENANTS NOT employed by Tygerberg Hospital

3. The TENANT shall pay to the LANDLORD a deposit to the amount of R _____ upon the signing of this lease agreement and receipt of the keys to the leased PREMISES. Under no circumstances shall the TENANT be allowed to offset the last months' rental against the deposit paid.

4. The LANDLORD shall be entitled to increase the rental at any time on receipt of notification of a rental increase as approved by the Head: Health.

3. USE OF PREMISES

The unit shall only be occupied by the TENANT. The LANDLORD reserves the right to have TENANTS share a unit.

The TENANT shall have the right of reasonable use, having regard to the rights of all other lessees and/or other occupiers of the LANDLORD, of the common areas, toilets and other conveniences and facilities provided by the LANDLORD. The TENANT shall use the PREMISES only for residential purposes.

The TENANT shall not be entitled to sub-let the PREMISES or cede any of its right hereunder.

The TENANT shall not be entitled to alter or add to the PREMISES any installations therein contained without prior written consent of the LANDLORD.

The TENANT shall not affix objects to the PREMISES by means of nails, screws or otherwise without the written consent of the LANDLORD. The TENANT shall not be entitled to change the locks to any doors to the PREMISES or in respect of the furnishings/equipment therein.

4. SERVICES

4.1 Inclusive Rental

The rental includes the TENANT'S right to use of the furnishings/equipment and services hereinafter provided for, save to the extent that this agreement expressly provides for the payment of additional charges therefore.

4.2 Furnishings/Equipment

4.2.1 The TENANT shall be entitled to use the furnishings/equipment situated on the PREMISES and detailed on "Annexure A" hereto, for the duration of this agreement.

4.2.2 Ownership of the furnishings/equipment used by the TENANT in terms of 4.2.1 shall at all times remain vested in the LANDLORD.

4.2.3 The TENANT shall use the said furnishings/equipment with such care as to ensure that it remains at all times in good order and repair, fair wear and tear only expected, and shall at the termination hereof return such furnishings/equipment to the LANDLORD in like good order and condition, fair wear and tear only expected.

4.3 Telephone

4.3.1 If the PREMISES are supplied with a telephone extension, the TENANT will be required to pay the full rental and usage fee as charged by Telkom. The TENANT also acknowledges that this service can be removed at any time.

4.3.2 All outgoing calls made by the TENANT on the PREMISES shall be charged by the LANDLORD to the TENANT.

4.3.3 The TENANT shall not be entitled to install or otherwise use direct telephone or other communication systems from the PREMISES other than via a cell phone.

4.3.4 If the TENANT fails to pay any amount due to the LANDLORD in respect of telephone charges, rental or any other amount in terms hereof, the LANDLORD shall be entitled to refuse the TENANT the use of the telephone services herein provided for.

5. LIMITATION OF LIABILITY

The TENANT shall:

5.1.1 have no claim of any nature whatsoever against the LANDLORD for any loss, damage or injury which it may directly or indirectly suffer (except where caused through the gross negligence of the LANDLORD) by reason of any latent or patent defect in the PREMISES or any damage or destruction to the PREMISES, furnishing and/or equipment; theft from the PREMISES; and, defect or disrepair of the PREMISES and/or the furnishings/equipment.

5.1.2 not be entitled to withhold or defer payment of any amounts due in terms hereof.

5.1.3 under no circumstances have any claims against the LANDLORD for consequential loss, however caused

6. BREACH

6.1 If the TENANT fails to make a payment of any amount due in terms hereof or commits any other breach of this agreement and does not remedy the latter mentioned breach within 3 (THREE) days of being asked to do so, then the LANDLORD shall be entitled to terminate this agreement, eject the TENANT from the PREMISES and retake possession of the furnishings/equipment used by the TENANT in terms hereof. If the TENANT disputes the LANDLORD'S right to terminate this agreement and remains in occupation then the LANDLORD shall be entitled to continue to receive payment of the rental and other amounts due in terms hereof without prejudice to its contention that this agreement has been terminated.

6.2 The TENANT shall pay interest on all amounts overdue in terms of the lease at overdraft rate as determined by the Head: Health. The interest shall be calculated from the due date of such amount to the actual date of payment thereof.

7. WHOLE AGREEMENT

This agreement constitutes the whole agreement between the parties and no variation hereto shall be of any force or effect unless reduced to writing and signing by the LANDLORD and the TENANT. No consensual termination of this agreement shall be of any force of effect unless reduced to writing and signed by the LANDLORD and the TENANT.

8. NON-WAIVER

No relaxation or indulgence which any of the parties may afford to the other/s shall in any way prejudice or be deemed to be a waiver of the rights of the indulgent party

and shall not preclude or stop the indulgent party from exercising all or any of its rights hereunder and, in particular but without limiting or derogatory from the a foregoing, any cancellation hereof or accrued right of cancellation hereof.

9. JURISDICTION

The TENANT consents to the jurisdiction of the Magistrate's Court or otherwise competent jurisdiction in respect of any action or proceeding which may be brought against it by the LANDLORD; provided that the LANDLORD shall be entitles to bring proceeding which would, but for the aforegoing, fall outside the jurisdiction of the Magistrate's Court.

It will be the responsibility of the TENANT to adhere to the House Rules contained in "Annexure A" attached to this lease agreement. A breach of any of the conditions outlined in either of these documents (i.e. this lease agreement or the House Rules) WILL RENDER THIS AGREEMENT NULL AND VOID. The TENANT also acknowledges that the House Rules may be amended by the LANDLORD when considered necessary.

THUS DONE AND SIGNED AT _____(PLACE)

THIS DAY OF_____ (DAY) _____ (MONTH) _____ (YEAR)

FULL NAME & SIGNATURE OF TENANT:

_____

WITNESSES (NAME & SIGNATURE):

1. _____

2. _____

ANNEXURE B
PARKING

Security
Although a level of security is provided on site, Tygerberg Hospital accepts no responsibility for damage to, or loss, or theft from vehicles when driven or parked on site, or for theft of a vehicle.

General
Staff and official visitors must park only in the clearly defined and marked parking spaces. Failure to do so will result in warnings or fines being issued.

All members of staff wishing to park within the hospital grounds are required to apply for a parking permit in advance of using any of the designated parking areas. Parking permits entitle staff to use an available space but do not guarantee that one will be available.

Staff must park in the spaces that are provided regardless of convenience or distance from working location. Cars that are parked in area other than clearly defined parking spaces will be subject to parking enforcement measures.

Warning stickers / fines
Staff are liable to receive a warning sticker if they:
- park in a non designated area, including patient parking areas or on yellow/red lines, grass verges, loading/restricted bays, or such a way as to block fire exits, etc.
- fail to display a valid permit/disc for the car park/area they are parked within
- take up more than one clearly defined parking space.

Warning stickers are issued by site security. They remain active from the date of the offence for a period of 12 months. Any person who receives 3 warnings and or fines within a 12 month period will have his/her parking privileges revoked.

Blue badge holders (disabled persons)
To ensure that all roadways are accessible at all times, the hospital does not allow any vehicle to be parked on yellow/red lines or other non designated areas. Specific parking spaces are provided for disabled persons as close as possible to the entrances to the hospital. Able-bodied persons are not to use these parking bays.

Staff who has a disability that directly affects their mobility will be issued on application with a blue parking disc. However, they must apply for such disc and pay

the prescribed monthly fee. Where necessary, the Occupational Therapy Division will be called upon to make an assessment of individual needs before a permit is issued.

Issue of permits
Application forms for parking discs are available from the Security Office on Ground floor, E-Passage during office hours.

Parking permits / discs are issued every two years. Information and publicity regarding reissue days will be forwarded per internal circular in advance. Special reissue sessions will be held for night staff to ensure that all employees have an opportunity to collect their permits.

Please note:
- Any permits that cannot be collected during the reissue sessions must be collected from the Security Office on Ground Floor, E-Passage during office hours.
- New permits will not be issued unless old permits are returned.
- Permits must be collected personally. Staff members are required to present their hospital ID cards when collecting their permits.
- Collection of the parking disc / permit signifies acceptance of the full terms of this parking policy.

Responsibility of permit holder
Once the permit is issued, it is the responsibility of the permit holder to ensure the following:
- a valid permit is displayed
- all details recorded on the permit are correct and, in particular, vehicle registration numbers are correct at all times
- the permit is clearly displayed on the windscreen of the vehicle
- the full permit is not obscured and is clearly visible at all times

Failure to display a valid permit in the above manner, regardless of reason, will be subject to parking violation measures.

Change of vehicle
Should a member of staff change his / her vehicle or the registration number of the vehicle, a change of vehicle form must be completed and returned to the Security Office. A replacement permit will be issued confirming the new details. The old parking permit must be returned in exchange for the replacement permit.

Photocopies or forged permits
Photocopied or forged parking permits are strictly prohibited. The use of fraudulent

permits is seen in a serious light. Disciplinary action may be taken against staff members who are found to have photocopied or forged a permit.

Lost permit
It is the responsibility of the permit holder to ensure that the permit is kept safe. Should a permit be lost, an administration fee may be charged (dependent on circumstances) for the issue of a replacement permit.

Permit allocation
Parking permits are issued to staff who are eligible to park in the designated staff areas of the car parks. Allocation of permits is monitored to ensure parking spaces are effectively utilised.

Staff who live on site are also expected to apply for a parking permit and will be charged the monthly fee.

Long term contract staff are expected to apply (and pay) for a parking permit. The number of permits issued is limited.

Yellow permits
As of August 2010, the charge for issuing a yellow parking permit is R6.00 per month. The charge will, however, be reviewed on a regular basis.

Current permit holders
All current permit holders are required to apply for a new permit by 31 December 2010.

CLINICAL DEPARTMENTS

Department of Anaesthesiology and Critical Care
Head: Prof AR Coetzee

New general practitioners at operative sections should note the following with regard to routine examination of patients to be prepared for operative treatment.

Patient's history
The record of the patient's history must include:

- Previous illnesses
- Family conditions (e.g. porphyria, muscle conditions. Malignant hyperthermia)
- Previous operations and anaesthesia, with details of complications
- Recent treatment including steroids, antihypertensive substances, Clonidine, B-adrenergic blockers, cardiotonics, psycholeptics – particularly MAO inhibitors and tricyclic substances, anti-bloodclotting therapy, barbiturate, opiate, diuretics, metformin and phenformin and aspirin or other platelet inhibitors.
- Social habits: smoking, alcohol, drugs
- Exercise capacity.

General examinations

- Body length and mass must be routinely measured upon admission.
- Respiratory and circulatory problems are the most common causes for cancellation of patients and need special attention.
- Haemoglobin below 10g/dl is unacceptable for routine surgical patients and should be above 12g/dl before major interventions.
- Airway deviations, acute infections, or a history of upper airway infection in the previous 6 weeks influence the anaesthetic technique. This is of special importance in children.
- Mouth sepsis is a contra-indication for chest and upper abdominal surgery.
- Patients with previous injuries may not be able to assume normal operating positions.
- Hand and forearm veins are routinely used for anaesthetics and blood specimens should therefore be drawn from the cubital fossa.
- Urine analysis and a blood glucose test must be done as part of *clinical examination.*

Special examinations
Examination of blood urea, creatinine, albumin and glucose is routine in all patients older than 60 years.

ECG is performed routinely on all patients older than 45 years. In patients under 45 years, the ECG is performed on clear pre-operative indications, including but not limited to:

- congenital heart problems
- history of myocardial infarction and angina
- rhythm disorders on clinical examination
- heart failure
- hypertension – 150/100 mmHg and higher

X-Rays (Both PA and lateral) of the chest are routinely required in every patient older than 60 years. In patients younger than 60, they are required only with a valid clinical indication, including but not limited to:

- where clinical examination indicates lung pathology
- before any thoracotomy
- haemoptysis
- where active lung pathology was previously diagnosed
- chest injuries that have not stabilised
- clinical diagnosis of cardiomegaly

Lung function tests are performed where expiratory vital capacity, determined by auscultation, exceeds 4 seconds and or in significant chronic obstructive lung disease and for heavy smokers.

Blood gases tests are performed in patients whose respiratory sifting tests so indicate, in patients with metabolic disorders of any kind, patients suffering from shock; and patients in heart failure.

Electrolytes, blood glucose and blood ureum and creatinine should be taken in the following cases:

- where the metabolism and fluid balance may be affected by vomiting, fever, dehydration, underfeeding, advanced age, or by any form of shock
- all patients being treated or recently treated with cortisone, diuretics and cardiotonics
- all patients who suffer from diabetes mellitus, thyroid gland, adrenal or other endocrine, cardiovascular and renal disorders

Special anaesthetic techniques

Children

Children should not be deprived of food for long periods and should, where possible, be booked first on a surgical list (for a predetermined time). Loading with

appropriate liquids is compulsory (see the standard instruction for preoperative fasting as issued by Management).

Diabetics

Patients taking oral medication or insulin could become hypoglycemic if deprived of food before an operation. Cover any food deprivation period with intravenous glucose and consult Anaesthesiology concerning treatment.

Blood pressure control

Deliberate control of blood pressure may be essential for ear-nose-and-throat, plastic, and neurosurgery. ECG, blood-gas and electrolyte readings and a haemoglobin of at least 12g/dl are required regardless of the patient's age.

Indications of brain damage, ischemic heart disease, kidney disorders serve as contra-indications for this technique.

Anaemic patients

Packed erythrocytes are administered 24 hours before the operation to increase the haemoglobin to above 10g/dl. When the operation is not urgent, intravenous iron and appropriate vitamins may well be suitable and less expensive.

Problem patients

If there is an expectation that the general condition of the patient or the extent and nature of the surgery may create special problems, the consultant of the day, Anaesthesiology and Critical Care, R2 (ext. 5142), should be notified in writing on a referral form at least 48 hours before the planned operation. This is the minimum warning period in which reaction to the anaesthetist's examination, special tests and treatment is possible. Anaesthesiology staff members will then examine the patient and suggest special examinations or treatments.

Avoid unnecessary cancellation before an operation by discussing problem patients well beforehand with your Anaesthesiology colleagues.

General rules for operations

Operation lists

- Bookings on operation lists must reach the R2 theatre offices by 13:00 the previous day. Late bookings and changes to lists are not accepted, unless directly arranged with the anaesthetist concerned or the medical superintendent responsible for theatres. Bookings for Monday must be handed in on Friday.

- Longer procedures must be placed at the beginning and shorter procedures at the end of the list.
- All the details on the booking list must be provided. This includes the estimated time for booked procedures.
- The clinical examination and all results of special examinations must be available at 13:00 in the patient file in the ward on the day before the operation. If the necessary particulars are not available it may be impossible to accept the patient for anaesthesia.

Blood transfusion

Find out expected blood loss from the doctor and discuss the number of units needed or group and place on reserve. Packed erythrocytes are used when less than 4 units will be administered. If problems are encountered with the booking of blood, the anaesthetist should be warned before the induction of anaesthetics.

Cancellation

Cancellation of bookings is inevitable when:

- the patient has not been properly examined
- a problem patient has not been referred to Anaesthesiology and Critical Care in time
- a problem patient has not been correctly prepared for the particular type of operation
- too many patients have been booked for a particular operation session (it is unfair to patients and the anaesthetic staff to overlook lists. A certain amount of overbooking is accepted due to logistical problems in the hospital, but these must be kept to a minimum).

General practitioners working in Anaesthesiology Critical Care

According to the rules of the Health Professions Council of South Africa, all general practitioners must rotate in Anaesthesiology for 2 months. The purpose of compulsory anaesthetic rotation is to attain skills in basic anaesthetia techniques, gain practical experience in anaesthetia and to recognise patients at risk.

Interns report to theatre at 07:30, attend pre-medications, and perform emergency service. Your active and disciplined participation, as certified by the supervisory doctor, is necessary for the Head of Department to sign the Health Professions Council's documents.

Any administering of anaesthetics by an intern must take place under the direct supervision of a member of the department or a suitably qualified registered practitioner.

Department of Family Medicine, Primary Care and Mental Health
Head of Department: Prof B Mash

This rotation is organised by Family Medicine and Primary Care

Head of Division: Prof Bob Mash
F337, 3rd Floor, Fisan Building, Medical School
Telephone: 021-938 9170
E-mail: rm@sun.ac.za

Intern Curator: Prof Julia Blitz
3rd Floor, Fisan Building, Medical School
Telephone: 021-938 9925
Fax: 021-938 9704
E-mail: juliablitz@sun.ac.za

Administration of intern rotation: Ms Nicole Cordon-Thomas
3rd floor, Fisan Building, Medical School
Telephone: 021-938 9061
Fax: 021-938 9704
Email: nicolec@sun.ac.za

The rotation uses a number of community and hospital-based teaching sites. The contact details for these sites are listed below:

Community Health Services

Khayelitsha Community Health Centre
Facility manager: Ms Notshe 021-361 3470 (w); 076-368 3906(c)
Email: funotshe@pgwc.gov.za
Family Physician: Dr S Govender: 083-680 8716
Email: govender@sun.ac.za

Elsies River Community Health Centre
Facility Manager: Ms R Kasker 021-931 6023
Email: rkasker@pgwc.gov.za

Family Physician: Dr M Bello 072 488 9471/021-931 7822
Email: mbello@pgwc.gov.za
Bishop Lavis Community Health Centre
Facility Manager: Ms R Carelse 079-731 4441
Email: racarels@pgwc.gov.za

Secretary: Ms Sarah Parker 021-934 6050/6129
Macassar Community Health Centre
Facility Manager: Ms C Alexander 021-857 3502
Email: clalexan@pgwc.gov.za
Family physician: Dr C Bezuidenhout 073-516 0440
Email: cbezuid@mweb.co.za

Eerste River District Hospital
Superintendent: Dr Tim Visser 021-902 8001
Email: tavisser@pgwc.gov.za
PA: Gaenor Erasmus 021-902 8001
Email: dagarden@pgwc.gov.za

Khayelitsha District Hospital
Dr Fanie Serfontien 084-208 7798
Email: fanieserfontein@gmail.com

Psychiatry

Acting executive head: Prof. S Seedat
2nd floor, Medical School
Telephone: 021-938 9227

Stikland Hospital
Old Paarl Road, Bellville
Dr Liezl Koen 083-285 7558
Contact details: 021-940 4455/940 4564/940 4400
Email: liezlk@sun.ac.za

Tygerberg Hospital
Francie van Zijl Ave, Parow Valley
Dr Gerhard Jordaan
Contact details: 021-938 9505
Email: gpj2@sun.ac.za

Community Psychiatry
Dr Surita van Heerden 021-918 1627/083 450 7403
Email: mvheerde@pgwc.gov.za
Dr Helena Lategan bhlategan@mac.com

Department of Forensic Medicine
Head: Prof SA Wadee
Consultants: Dr JJ Dempers, Dr EH Burger

For any medico-legal queries, feel free to consult this division.
Call: 021-938 9325/ 021-938 9516 or 71 9325/71 9516

Death notification form (DHA-1663)
This is completed only in cases of natural death and stillbirth. Complete the death notification form as soon as possible after death and definitely before you leave the hospital. Use only capital letters and a black pen. Please avoid abbreviations, and make sure that the underlying cause of death is recorded in the lowest completed line in the "Medical cause of death "section.

Please note:

- Sections A, B and F may be completed by the ward staff, and sections D and G by the clinician. However, the doctor is responsible for the full completion of the form.
- If a diagnostic autopsy is requested from the Anatomical Pathology, only sections A, B and F are completed, with the necessary request forms (see "Anatomical Pathology" in the Specimen Sampling Manual at the back of this booklet). All of these forms must accompany the body to the mortuary. In the case of a stillbirth, the DHA-1663 may be completed by a registered nurse.
- If a person dies from unnatural causes, the form for referral to Forensic Pathology (FPS100) must be completed, and must accompany the body to the Forensic Pathology Services Laboratory. Since the autopsy cannot be performed until the forms are completed, it is of the utmost importance that the treating clinician completes the form as soon as possible to avoid distress to the family. This form must be completed by a senior clinician that was involved in the treatment of the patient. The DHA-1663 will be completed by a member of Forensic Pathology after the autopsy is completed.

Procedure-related deaths
According to the Health Professions Act, 1974 (Act 56 of 1974), "the death of a person undergoing, or as a result of, a procedure of a therapeutic, diagnostic or palliative nature, or of which any aspect of such a procedure has been a contributory cause, shall not be deemed to be a death from natural causes".

If a death can in any way be related to a procedure, it is prudent to discuss the case with the forensic pathologist on call, or to refer the case immediately. Form GW7/24 must be completed as soon as possible by the surgeon, anaesthetist and nurse

involved, and must be sent to Room 37, E corridor, on the fourth floor.

'Dead on arrival'
Confirm that the patient is dead and complete the Dead on Arrival form. Please attend to these patients immediately because ambulances must always be made available for other service duties and should not be held up unnecessarily.

Please note: The Dead on Arrival form is not the same as the Death Notification form (DHA-1663). Before the DHA-1663 can be completed, the circumstances surrounding the death must be ascertained from ambulance personnel and family members of the deceased. If the patient has been treated at Tygerberg Hospital before, and the clinical appearance, history and hospital notes are in accordance with the circumstances of the death, the DHA-1663 may be completed. The information used in this process should be recorded briefly in the hospital folder.

Classification of unnatural deaths

Deaths due to the application of violence and the complications thereof:
- physical, chemical and thermal violence
- injury caused by nature e.g. dog bite, bee sting anaphylaxis
- complications of injury e.g. tetanus or rabies after dog bite; gas gangrene or necrotising fasciitis after gunshot wound, stab wound
- pneumonia or pulmonary embolism after traumatic injury

Procedure-related deaths:
A procedure-related death is the death of a person undergoing, or as a result of, a procedure of a therapeutic, diagnostic or palliative nature, or of which any aspect of such a procedure has been a contributory cause. This definition is not limited to the 24-hour period after the procedure and may include less radical surgical procedures such as tooth extractions, cardiac catheterisation or bronchoscopy.

Sudden, unexpected deaths
- sudden death in adults without any obvious cause
- so-called cot deaths (Sudden Infant Death Syndrome).

Acts of omission or commission
- any death, including deaths that would otherwise be classified as “natural”, where it is suspected that the death was due to negligent care by medical staff or any other person.

Department of Gynaecology and Obstetrics
Academic Head: Prof G Theron, (phone extension: 4661)
General-specialist head: Dr GS Gebhardt (x4638) (duty rosters, leave)
Intern Co-ordinator: Dr Haynes van der Merwe, (x5696)

Documentation regarding your responsibilities will be supplied by Ms Terblanche (x4432) when you join the department. The duty rosters, information and protocols will be supplied electronically before you join the department. Please send your contact details (cell phone and email address) to Dr Gebhardt (ggebhard@pgwc.gov.za) before you start with your rotation.

Working (office) hours are from 07:30–16:00 and all clinics and ward rounds start strictly at 07:30. Information on the after-hours duties and academic ward rounds that must be attended will be supplied when you start.

Please note that attendance at the following weekly meetings is compulsory:

- Mondays, 15:00. Departmental Morbidity and Mortality meeting in ward F3
- Tuesdays 15:00. Obstetrics Monitoring and Evaluation (audit and protocol) meeting.
- Thursdays 13:00. Perinatal Morbidity and Mortality meeting in ward F3
- Every second Tuesday of the month at 07:15. Monthly meeting with the intern co-ordinator.

Attendance of the postgraduate meeting on Fridays at 14:15 in the Genetics Seminar Room, 2nd floor, Medical School is voluntary.

Department of Medicine
Executive head: Prof. MR Moosa

Secretary: Mrs L Horn (A5 West, Room 37; phone extension x4944)

We look forward to welcoming you to the department where you will form a very valuable member of the clinical team. We pride ourselves in providing excellent clinical services even under challenging conditions. Remember that you are part of a team and should not hesitate to consult your registrar or consultant under whose guidance you will be working. The department's intern supervisors are Dr C Bouwens (bleeper 0840) and Dr W Visser (082 880 1940). You are welcome to discuss with them any problems you may have. Additional information on the department is provided in the registrar guide drawn up by Dr Manie, which is available from the departmental secretary.

During your rotation in Medicine, you may be allocated to work in one of the firms, A5 (High Care) and/or be assigned to do the Emergency Unit (F1)/relief slot. Although the work is demanding it is very rewarding and if you participate actively you will derive great benefit from your experience. After completing your time in the department, you will receive a formal evaluation. This evaluation may be invaluable should you apply for a position in Medicine.

Patient care
Your duties in respect of general patient care include the following:

1. **Patient care**
   Evaluation and admission of patients to F1, general wards and the High Care ward (A5 west) as well as the daily follow-up care of these patients. You are requested to discuss any problems with the supervising medical officer, registrar in F1 or the medical firm in question. You are responsible for making admission notes as well as keeping follow-up notes and assisting with writing discharge summaries. From time to time you may have to assume greater responsibility in the ward should your registrar not be available.

2. **Student supervision**
   Students will work under your supervision and you will have to ensure that the overall standard of patient evaluation, patient care and the ward work of the students are satisfactory. You are furthermore expected to assist with supervision of students' documentation and to make an input into the allocation of marks at the end of students' rotation in your firm.

3. On-call duties

Each medical firm is on call one weekday per week and on average five weekends per three-month block. On your weekday call you are also expected to provide cold cover for the general wards as per roster. Additional telephonic cover must be provided by the registrar and intern in the firm on non-call days. Therefore, emergency numbers (home / cell) should be provided to the sister in charge of the ward. A weekend call entails 24-hour duty in F1, which may be on a Friday, Saturday or Sunday, as per call roster.

4. Outpatients

In addition to your inpatient duties, you are required to render service in Medicine's outpatient department (MOPD). On the days that you are scheduled to attend MOPD, please ensure that you complete your ward duties as early as possible because you are expected to start in MOPD no later than 09:00.

5. Procedures

You will be afforded the opportunity to learn various procedures. These include venesection, placing drips, central venous catheters, passing nasogastric tubes, performing gastric lavages, lumbar punctures, lymph node aspirations, draining ascitic fluid, and inserting intercostal drains. Procedures are to be performed under supervision except where competence has been adequately demonstrated to your supervisor.

5. Academic obligations

Interns who show initiative, participate actively in academic discussions and are present at academic meetings will greatly enhance their final assessment from the department. As a member of an academic department, you are expected to attend the following meetings:

6.1 Mondays, 08:00. Business meeting at the Medical School, compulsory for all members of the department. Interns are expected to report briefly at the meeting on all mortalities that occurred the previous week. (Please ensure that the designated mortality forms are completed. The use of designated M&M forms is obligatory.)

6.2 Mondays 16:00. Post-mortem discussion in E10 seminar room.

6.3 Thursdays 16:00. Academic meeting, Medicine faculty.

6.4 A grand round specifically for the interns in General Internal Medicine takes place every Wednesday at 14:00, starting in A5 West and is led by a senior registrar in the department. Its purpose is to further improve the clinical skills of interns. The name of the registrar leading the round is announced at the Monday business meeting.

7. Leave arrangements

Leave is granted according to a leave schedule, which is available from the departmental secretary. Leave arrangements should be discussed with the firm or head of the unit in question and with Dr C Bouwens during your first month of assuming duty or as soon as possible thereafter. Contact Dr Bouwens if you wish to make other arrangements.

8. Cost-effective medicine

Practising cost-effective Medicine without compromising quality cannot be overemphasised. Always think twice before requesting test. Less is often more.

For example, do not do an FBC when all you need is a platelet count. Do not do a U+E when all you need is potassium. Do not repeat tests done at other hospitals unless absolutely necessary. Switch from IVI to oral Rx whenever possible. Students should also be supervised in this regard

9. Statistics

Weekly statistics on each medical firm are handed in every Thursday to the departmental secretary. Statistics must be handed in before 12:00. Statistics forms are available at the departmental office.

We hope that you find the time you spend in the department enjoyable and rewarding

Department of Medical Imaging and Clinical Oncology

RADIODIAGNOSIS
Head: Prof Richard Pitcher

Application forms must be completed in full. If the radiologist on duty in any modality cannot be contacted for arrangement of an urgent examination, the on-call radiologist can be contacted through the Tygerberg Hospital exchange (ext. 6666).

General enquiries

Between 08:00 and16:00 weekdays:
C4B X-Ray Unit appointments: ext. 5913
Reception: ext. 5900
Assistant director Radiography: ext. 5918
Chief radiographer: ext. 5149 or radio 0861

After 16:00 and over weekends:
C1A X-Ray and Mobile Unit radiographers: ext. 5233 / 5378
Radiologists: ext. 5868

Referral of patients
Non-urgent plain-film radiography

Inpatients
Send request form only. The Radiodiagnosis will send for the patient.

Outpatients
Send patient, request form and previous X-Rays to X-Ray Reception H4 East.

Urgent plain-film radiography

Inpatients
Send request form, marked URGENT.

Outpatients
Send patient, request form and previous X-Rays to X-Ray Reception H4 East.

Emergency services (F1 and C1D)
Send request form to C1A X-Rays. Radiodiagnosis will send for the patient.

Trauma patients
Send patient to C1A X-Rays.

Special examinations
Arrange non-urgent bookings telephonically at ext. 5913.

Inpatients
Send request form to booking office – tube H4 (after hours to E1). Radiodiagnosis will send booking date and instructions for preparation to the ward.

Outpatients
Send patient, request form and previous X-Rays to Radiodiagnosis Reception H4 East for booking, so that instructions for preparation can be explained to the patient.

Please note:
- 08:00–16:00: Contact the radiologist on duty at the specific imaging modality required.
- 16:00–24:00: Contact the radiologist on duty at ext. 5868, or through exchange at ext. 6666.
- Preparation for special examinations is available at H4 East Reception (after hours at C1A X-Rays).
- Children undergoing anaesthesia for CT or MRI examinations will require consent of parent or guardian.
- Patients undergoing arteriograms or biopsies must sign consent.

Mobile examinations
Arrange telephonically at ext. 5233/5378.

Ultrasound service
Normal hours
Urgent inpatients cases
Urgent cases: Arrange urgent cases telephonically with the radiologist/ sonographer at ext. 5095

Inpatients
Arrange telephonically at ext. 5641. Request forms are placed in the patient file.

Outpatients
Arrange telephonically at ext. 5641
Patients are then sent to Ultrasound with their request form to collect preparation.

After hours
Contact the radiologist on duty at ext. 5868.

Neurovascular radiology
Normal hours
Arrange bookings telephonically at ext. 5924.

After hours
Contact the radiologist on duty at ext. 5868 then send request form via L4 tube.

X-Ray examinations or screening in main theatres
Normal hours
Examinations to be arranged the day before at ext. 5924/5279.
Confirm the time of the theatre procedures.
Check for availability of C-arm before anaesthetic is administered.
Urgent cases need prior arrangement at ext. 5924/5279.

After hours:
Book telephonically at ext. 5378/5233.

Computer tomography(CT)
Normal hours
Urgent cases to be arranged telephonically with the radiologist on duty: Ext. 4768/5931.

Inpatients
Send request form to C4B.

Outpatients
Arrange appointment telephonically at ext. 5599/5798. Put request form in patient folder and send patient.

Head CTs: Send only request form
Body CTs: Send patient, request form and X-rays from outside hospitals to CT. All body CTs have to be approved.

After hours
Contact radiologist on duty at ext. 5868.

Please note:

- Parents or guardian must give written consent for children under the age of 18.
- X-Ray examinations may be requested by doctors only.
- Accurate and complete clinical information must be provided on the request form.

MRI requests

MRI request forms are available at clinics and wards. It is crucial that these forms are completed in full and countersigned by the appropriate requesting consultant. All MRI have to be approved by the radiologist on duty at the MRI Department (ext. 5933/5099).The X-Ray packet of the patient should accompany the request form.

For CT and MRI please note:

- U+E results required for all patients > 65 and added risk factors for renal disease.
- IV line for all inpatients.
- The requesting clinician is required to obtain consent from the parent or guardian for any child under the age of 18 for anaesthesia to be administered during the imaging procedure.

NUCLEAR MEDICINE DIVISION
Head: Prof A Ellmann

Gold Avenue, 10th Floor, Tygerberg Hospital

Enquiries

Bookings: ext. 4268
Results: ext. 4265, Room 41
Reception (patients): ext. 4261
Enquiries after 16:00 and over weekends: Registrar / consultant on call (information at radio room, ext. 6666)

Completion of referral forms

Referral forms must be completed in full because procedures and treatment may influence the interpretation of studies.

Routine appointments

Non-urgent examinations
Inpatients: Send only the request form. Nuclear Medicine will contact the patient as soon as space is available.
Outpatients: Send the patient with fully completed referral form to the appointment area of Nuclear Medicine.

Urgent examinations
Contact the registrar on call (ext. 4268 / 4265 or after hours at the radio room on ext. 6666).

Special examinations

Myocardial-perfusion studies
All patient appointments must be arranged by the referring doctor specifically with the responsible registrar (bleeper 0998, information available at ext. 4265/4268).

The patient's full history, current medication and contact information, including a telephone number where the patient can be reached, must be available when the appointment is made.

Patient information brochures should be provided to patients. If not available in your department/ward, they can be collected from Nuclear Medicine.

Cerebral-perfusion studies
Appointments must be made preferably by the referring doctor, specifically with the responsible registrar (information available at ext. 4265/4268). Only a limited number of studies can be performed per week. Please make the appointment in good time.

Ventilation and perfusion lung scintigram
A lung scintigram can be properly interpreted only if a recent chest X-Ray (<24 hours old) is available.

Kripton-81m for ventilation studies is available on Tuesdays and Thursdays only. On other days Tc-99m aerosol is used as ventilation agent (often not optimal in patients with chronic obstructive airway disease). This service is available after hours and on weekends.

Treatment of hyperthyroidism

Treatment of patients suffering from hyperthyroidism will be considered only after the patient has been evaluated at Nuclear Medicine, after a thyroid scintigram has been done, and after thyroid functions are known.

Please book individual patients with the registrar responsible for the Nuclear Medicine thyroid clinic (information available at ext. 4265/4268).

Position-emission-tomography (PET) studies

All patient appointments must be arranged by the referring doctor, specifically with the responsible registrar (bleeper 0999, information is available at ext. 4265/4268). The patient's full history, weight, current medication and contact information, including a telephone number where the patient can be reached, must be available when the appointment is made.

General remarks

1. Nuclear Medical examinations on children are performed with the consent of the nuclear physician, who has been given full authority by the chief executive officer. Parents, therefore, do not need to sign consent.
2. Nuclear Medicine examinations may be requested only by doctors.
3. If you are unsure about patient preparation or want to find out whether there is a Nuclear Medicine examination that could help with a certain problem, please contact ext. 4265 / 4268 or one of the doctors.
4. Some examinations such as whole-body iodine studies, MIBG and adrenal-gland cortex scintigrams, octreotide studies, thallium studies, labelled-white-cell studies and PET studies, and most haematological studies must be discussed with the Nuclear Medicine doctor.
5. Please provide a full history as far as possible.

Department of Psychiatry
Acting executive head: Prof. S Seedat

Intern *managers*
Overall intern co-ordinator
Dr Surita van Heerden 021-940 4400 / 083-450 7403

Stikland Hospital
Old Paarl Road, Bellville
Dr Srinka Flegar 021-940 4473 / 021-940 4400

Tygerberg Hospital
Psychiatry, 2nd Floor, Faculty of Health Sciences
Dr Gerhard Jordaan 021-938 9023

Community Psychiatry
Dr Surita van Heerden 021-940 4400 / 083-450 7403
Dr Helena Lategan 021-370 1111 / 083-368 0190

An introduction to the rotation will be held, details of which will be communicated to you prior to starting the Family Medicine / Psychiatry rotation.

Learning outcomes
Learning outcomes for this rotation are defined in detail by the HPCSA and can be summarised as follows:

- to manage undifferentiated condition in primary care, provide chronic care and be exposed to aspects of palliative and forensic medicine
- to manage typical conditions seen in a district hospital
- to manage common mental-health problems in primary care and community psychiatry
- to manage acute psychiatric emergencies in primary care and in hospital
- to have opportunities for collaboration with other primary healthcare workers, such as nurses and allied health professionals
- to integrate the experience, knowledge and skills gained in all other domains.

Length of rotation
One month in an acute psychiatry ward and 2 sessions per week (of 4 hours per session) in a community psychiatry clinic during the four-month Family Medicine rotation.

Psychiatric hospital

Interns work at one location (either Stikland Hospital or the psychiatric wards of Tygerberg Hospital) for a month under the supervision of psychiatric registrars and consultants and will participate in the following: consultations with patients in the full spectrum of psychiatric illnesses ward rounds, and after-hours work at the hospital.

Community Psychiatry clinic

Interns work in one clinic for the entire four-month period and attend two sessions per week. In the first session they assess new referrals together with psychiatric nurse and, in the second session, present these patients to the psychiatric registrar. Clinic sites will be allocated at the discretion of the consultants and will cover all CHCs in the Northern and Eastern metropole, including Somerset West, Khayelitsha and Strand.

Surgical Department

Specific information is listed under the respective sections.

GENERAL SURGERY
Head: Prof BL Warren

Interns will receive a 12-page booklet on departmental protocols at the start of their surgical rotation. Registrars and medical officers may receive protocol manuals for Trauma and ICU rotations.

Interns' duties:
Interns rotate on the surgical gastroenterology service and the so-called “cocktail” units of the surgical interest groups.

1. Admission of patients to general wards, C1DE and special units, as well as the daily care of these patients. You are requested to discuss any problems with the clinical assistant or duty group in question. You may request basic special examinations at your own discretion, but you are expected to discuss advanced examinations with the senior members of your team. You are responsible for taking the admission notes, as well as keeping the follow-up notes. Where students take these notes, you are responsible for checking that they are correct and must counter-sign the notes. You must also write an appropriate discharge summary to give to the patient on discharge, containing the relevant clinical information about the admission.

2. Student interns and other students work under supervision and you have to ensure that the standard of patient evaluation and general ward work of students are satisfactory. Your opinion may be sought when marks are allocated to students in your duty group.

3. Emergency firm services are scheduled weekly and on Saturdays and Sundays according to the duty roster. Interns are responsible for initial assessment and management of incoming patients in C1DE or the “cocktail” admission units. After-hours cover of ward patients is the responsibility of the intern on call, in conjunction with the patient's treating registrar. You may on occasion be requested to adapt to changes in the duty and training programmes of the department's service units.

Academic obligations
As a member of an academic department, you are expected to attend the following meetings, as well as other meetings scheduled as per the service where you rotate. Your active participation in discussions is expected.

1. Mondays, 13:00. Surgical gastroenterology X-Ray meeting for staff on this rotation. Compulsory for all members of the department.

2. Tuesdays, 13:00. Abdominal Surgery GIT meeting.

3. Wednesdays 14:00. Personnel meeting, M&M meeting, academic discussion and teaching ward round, or other activities as listed in the departmental programme.

Leave arrangements
Leave is granted according to a leave schedule. You will be on leave for either the first or last two weeks of the month during a Surgical Gastroenterology rotation. Contact Dr Baatjes if you need to make other arrangements, which will be granted in special circumstances only.

GENERAL SURGERY SERVICES

Surgical gastroenterology
This service manages all GIT and soft tissue septic surgical pathology and is truly a general surgical service. There are four service units, which share on-call duties.

Burns
Tygerberg Hospital houses the regional Adult Burns Unit, where one intern will rotate at all times.

Surgical intensive care (A1)
A 12-bed ICU which offers the opportunity for tertiary surgical services.

Head, neck, mamma and thyroid surgery ("surgical oncology")
Manages mainly breast and thyroid disease, but also head and neck tumours, melanoma and soft-tissue sarcoma.

Paediatric surgery
A comprehensive paediatric surgical service for neonatal patients and infants which currently also manages paediatric trauma. Special interest in Hirschprung's disease.

Trauma Service and Surgical Unit
Trauma Service manages all initial assessment, stabilisation and resuscitation of the injured while the Surgical Unit co-ordinates complex multi-trauma patient care and manages abdominal, vascular and neck soft-tissue trauma as well as post-ICU trauma care and the management of crush syndrome.

Vascular Surgery and Vascular Laboratory
A sub-specialist unit that manages all acute non-trauma and chronic arterial disease (occlusive and aneurismal) and complex venous disease. Also manages delayed-presentation vascular trauma (over a month post-injury).

SURGICAL DIVISIONS

Anaesthesiology
Head: Prof AR Coetzee

Cardiothoracic Surgery
Head: Prof GJ Rossouw

Neurosurgery
Head: Prof HB Hartzenberg

Ophthalmology
Head: Prof D Meyer

Otorhinolaryngology
Head: Prof J Loock

Orthopaedics
Head: Prof GJ Vlok

Plastic Reconstructive Surgery
Head: Prof FR Graewe

Urology
Head: Prof C Heyns

Department of Paediatrics and Child Health

PAEDIATRICS SECTION
Head: Prof M Kruger

The documents you will be given at the beginning of the year:

- Map of the hospital
- Information on the issue of bleepers
- Information on access-control cards/discs

The documents you will receive when you assume duty in Paediatrics include:

- A page to complete listing your personal details – to be handed in to Paediatrics' secretary:

- Information sheet for new doctors (Paediatrics), which includes guidance/information on:
  - Primary staff members and their contact details
  - On-call duties & rosters
  - Handover ward rounds
  - Sleeping arrangements on calls
  - Functioning within the wards
  - Needlestick injuries
  - Departmental meetings

- Rules regarding leave

- Hand-outs on managing common conditions:
  - Convulsive disorders
  - Indications for blood cultures
  - CSF examination
  - ARV therapy guidelines
  - Indications for perinatal post-mortem examination
  - Admission criteria for ward G1
  - Guidelines for doctors working in G-Ground outpatient/emergency ward
  - Investigation guidelines for Paediatric Emergency

- Neonatology handbook for doctors – available for sale at secretary's office, C3A

Unit for Infection Prevention and Control
Head: Prof S Mehtar

Standard precautions

Standard precautions (SP) are minimum IC procedures for the care and protection of patients and healthcare workers based on risk assessment.

- Wash and dry hands thoroughly:
  - before each patient contact
  - after removing gloves
  - if hands are visibly contaminated with organic matter. Alcohol rub may be used in the absence of visible contamination, for rapid hand disinfection.
- Use protective clothing appropriate use for each indication:
  - gloves: all contact with blood or body fluids
  - surgical masks: aerosols or splash contamination of mucous membranes and face from blood or body fluids
  - visors: to protect eyes from splash contamination
  - plastic aprons: to prevent contamination from blood or body fluids.
- Do not re-cap needles.
- The *user* of a sharp instrument is responsible for discarding it immediately and carefully in a puncture-proof container.
- Thorough cleaning of clinical equipment is essential before sterilisation or disinfection.

Procedure	Hand disinfection	Gloves	Apron	Mask	Eye protection
IV cannulation	✓	✓			
Wound dressing	✓	Aseptic technique			
Insertion of NG tube	✓	✓			
Insertion of airway	✓	✓		✓	✓
Dental procedures	✓	✓		✓	(high speed drills) ✓
Suturing	✓	Sterile ✓	✓	✓	
CVP lines	✓	Sterile ✓		✓	✓
Insertion of urinary catheter	✓	Sterile ✓	✓		
Fibre-optic procedures	✓	✓	✓	✓	✓
Delivery (labour)	✓	✓	✓	✓	✓
Surgery (clean and dirty)	✓	Sterile ✓	✓	✓	✓

BOX WITH RED PLASTIC BAG:

- Any clinical waste that was in contact with a patient, e.g.:
- Used bandages & dressings
- Urinary catheter & drainage bags
- IV admin sets
- Abdominal swabs
- Used syringes
- Theatre dressings
- Sputum holders
- Suction catheters
- Airways, ET tubes etc.
- Trochars
- Linen savers (blood, vomit)
- Used gloves
- Dialysis sets

NOTE:

Safe & responsible discarding/handling of waste is the responsibility of all staff members

SHARPS CONTAINER:

- Hyperdermic needles
- Stilettes
- Broken vials
- Blades
- Lancets

Broken glass (bottles, crockery) should be put in a separately sealed box and sent with ward waste.

TRANSMISSION BASED PRECAUTIONS

Airborne precautions, e.g. for tuberculosis, measles, chicken pox
Droplet precautions, e.g. for diphtheria, streptococcal pharyngitis, scarlet fever, meningococcal infection, influenza, mumps, parvovirus, rubella, adenovirus, mycoplasmal pneunania, pertussis, pneumonic plague
Contact Precautions, e.g. for highly resistant organisms, clostridium difficile, shigella, scabies, pediculosis, impetigo

	AIRBORNE PRECAUTIONS	DROPLET PRECAUTIONS	CONTACT PRECAUTIONS
	Private room. Negative air pressure, 6–12 air changes per hour. Discharge of air outside or high- efficiency filters before circulation. Door closed.	Private room – door may be open. If not possible, space beds at least 1 metre apart. No special ventilation.	Private room if possible, or place patients together who have active infection with the same micro-organism.
RESPIRATORY PROTECTION	Wear a mask (ideally a particulate respirator) when entering room of patient with known or suspected infectious pulmonary tuberculosis and when disposing of secretions from such a patient. Susceptible persons working with such patients should wear a mask. Persons immune to measles and chicken pox need to wear a mask.	Mask to be worn when working within 1 metre of the patient.	As for standard precautions.
GLOVES AND HAND-WASHING	As for standard precautions.	As for standard precautions.	Wear gloves when entering patient's room, or making any contact with the patient, equipment or a contaminated surface. Remove gloves before leaving patient's environment and wash/disinfect hands.

	AIRBORNE PRECAUTIONS	DROPLET PRECAUTIONS	CONTACT PRECAUTIONS
GOWN/ PLASTIC APRON	As for standard precautions.	As for standard precautions.	Single plastic apron per patient. Change daily or when soiled.
PATIENT TRANSPORT	Limit the movement of and transport patients for essential purposes only. If transporting is necessary, patient must wear a mask.	Limit movement and transport patients for essential purposes only. If transported, patient must wear a mask.	Limit overall movement and transport patients for essential purposes only.
PATIENT-CARE EQUIPMENT	As for standard precautions.	As for standard precautions.	Dedicate use of equipment to a single patient. If not possible, clean and disinfect before use on another patient.

NB: Please access the IPC manual on the I-drive of the TBH computers. The IPC survival kit consisting of a bag, a set of z-cards with the core elements of IPC and 50 ml alcohol hand rub is available at the Unit for Infection Prevention and Control, in the H-corridor on the 9th floor of TBH. Our telephone number is 021 938 505

AUXILIARY SERVICES

Human Nutrition
Head: Prof R Blaauw (021-938 9259)
Assistant Director: Ms C Schübl (021-938 4351)

3rd Floor, Medical School and 10th Floor, A Block, Tygerberg Hospital.

Head of Clinical Firms
Mrs N Esau 021-938 5168
Mrs M du Plessis 021-938 5151

Heads of Food Service Administration Firm
Ms N Fredericks 021-938 5612
Mrs M Marais 021-938 9136

Head of Community Nutrition Firm
Ms L Du Plessis 021-938 9175

Nutrition Support nursing sister
Sr S Boje (nee Kinnear) 021-938 4105/Radio 0538)

Dietician on call
Radio 0012 (adults)
Radio 0182 (paediatric)

Secretaries
Tygerberg Hospital 021-938 4477
University of Stellenbosch 021 938 9259

Work hours
Monday to Friday: 07:30–16:00
Saturdays, Sundays & Public Holidays: 07:30–11:30
During weekends and public holidays the dietician on call may be paged via the radio room (ext. 6666) at the above times. Only referrals for tube feeds will be seen over weekends and public holidays. No consultations or tube-feed discharges can be done over weekends and public holidays.

Role of the dietician
The dietician is responsible for the overall nutritional management of adult and paediatric patients on normal or therapeutic diets, and for providing nutritional

support in the form of total enteral or total parenteral nutrition to patients on an indication basis.

Furthermore, the dietician provides nutritional instruction on dietary modifications for patients with special nutritional needs or with disease-specific diets.

The following criteria should be used when referring to the dietician for assessment and nutritional management:

- BMI <18.5 kg/m2 (adults)
- BMI >30 kg/m2 (adults)
- Growth faltering or failure to thrive (children) – downward crossing of two or more centiles
- Weight loss of 10% over last 3–6 months in adults
- Inadequate oral intake
- Patients requiring artificial feeding
- Patients requiring special diets
- Uncontrolled and new diabetic patients
- Hypertensive patients
- Patients with high cholesterol, high triglycerides, high blood glucose levels
- Newly diagnosed and/or malnourished HIV patients
- Patients on ARVs
- Patients not gaining weight on the Nutrition Therapeutic Programme (NTP)
- patients with micronutrient deficiencies
- Complications impacting on a patient's ability to eat, e.g. nausea, loss of appetite
- Lactating mothers experiencing difficulty with breastfeeding (can also be referred to a lactation consultant, midwife or infant- feeding counsellor)
- critical care patients (ICU and high care)
- Total Parenteral Nutrition (TPN)
- Eating disorders
- Renal patients (CRF, CAPD, haemodialysis, renal transplant, ARF, nephrotic syndrome)
- Abdominal surgery
- Metabolic complications
- Oncology patients
- Liver disease
- Thermal injury
- Severe malnutrition (oedematous malnutrition)
- Refeeding syndrome
- GIT diseases (e.g. peptic ulcers, inflammatory bowel disease)
- Preterm infants/Low Birth Weight (LBW)
- Trauma surgery

In addition, dieticians may themselves identify patients requiring nutritional support or consultation.

Procedure for requesting dietary services
Nutritional status evaluation, dietary consultation and/or Total Enteral Nutrition (TEN) support of inpatients will be attended to only at the request of a doctor by means of a written referral. Referrals must be made on admission of the patient or as soon as a diagnosis has been made.

Referrals should, as far as possible, contain the following information:
- The immediate clinical problem
- A diagnosis if available
- Supporting clinical and laboratory data
- Prescribed medication

The dietician must be notified in advance of a patient's referral and discharge. Liaison with the dietician may take place during ward rounds, ward visits or by telephone.

On-call system
Radio 0012 (adults) or 0182 (paediatric)

Adults
This service is available only for outpatients who live far from the hospital, patients in ward F1, C1E, C2A and all newly diagnosed diabetic cases. All other outpatients referred to the dietician must be sent with a referral – with the diagnosis and all the comorbidities – and 3 stickers to A10 West, room 150. The patients will either be seen by the dietician on call or be booked for the department's outpatient clinic, depending on the diagnosis.

The department runs a health-and-lifestyle clinic where patients referred for weight loss or those with diabetes are booked at the department's outpatient clinic for group consultations consisting of three sessions over a period of six weeks. The first two sessions consist of dietary guidelines and practical advice and the third session is an exercise session with the Physiotherapy department.

Patients referred for conditions other than overweight/obesity or diabetes and who cannot be seen immediately by the dietician on call will be booked for an individual session at the department's outpatient clinic. The Health and Lifestyle Clinic is held at 14:00 on Tuesdays for the overweight group and Thursdays for the diabetes group.

Paediatric
This service is available for paediatric patients referred from C3A and GGr. Only patients requiring specialised nutritional management (e.g. severely malnourished children not yet on the Nutrition Supplementation Programme (NTP), children with biliary atresia and cystic fibrosis) should be referred. Patients requiring routine nutritional management (e.g. obesity) should be referred for management at community clinic level.

Please note: The dietician on call may not always be available immediately owing to other on-call consultations or other clinical duties.

Discharge on tube feeding or supplements
Patients requiring enteral feeding via a nasogastric tube can be referred to the community for continued enteral support after the patient has reached full feeds. The dietician must be notified in advance of such a discharge to ensure that the necessary referral letters and products (maximum 7 days' supply) are provided and training of the caregiver is carried out. Only *Ensure* (adults) or *Pediasure* (paediatrics) are issued as enteral feeds on discharge. NOTE: Tube-feed or supplemental drinks discharges can be done over weekends or public holidays.

No specialised products can be supplied. (Currently, such products are not issued at Tygerberg Hospital because of limited financial resources and low stock levels.) In ***exceptional*** cases, products are issued to state-dependent patients on the prescription of a doctor and an authorisation letter from Management (which must be attached to the prescription) after the dietician has consulted with the patient.

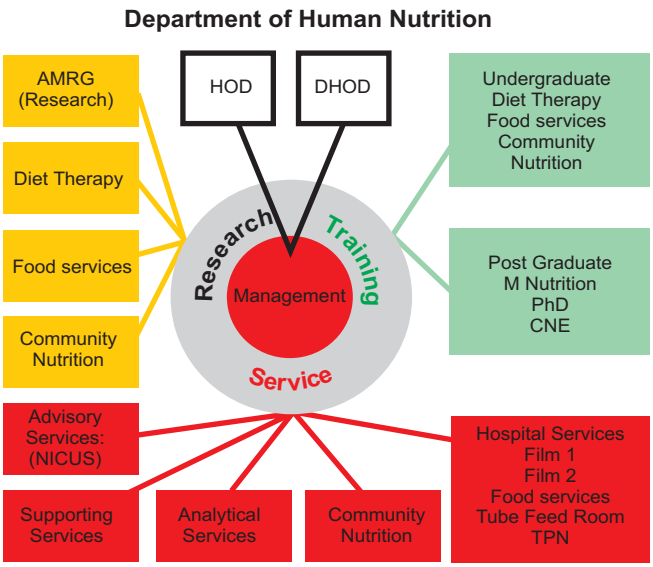
Adult and paediatric patients who are severely underweight may be placed on the Nutrition Therapeutic Programme (NTP) if they qualify according to specific and fixed criteria. Patients must be referred to the dietician, who will assess them and determine whether they qualify for the NSP. The dietician will complete the necessary referral letter and provide nutritional counselling and a starter pack with NSP products.

Patients who are already on the NTP in the community should not be referred again to the dietician for another NTP referral. (Patients who need such products upon discharge receive a letter addressed to their nearest day hospital or clinic. The letter indicates whether the patient needs the products as total feeding or only as supplementation, as well as the period for which this support/supplementation is required.)

Total Parenteral Nutrition (TPN)

All such referrals are dealt with by the Nutrition Support Team. Please contact the nursing sister of the Nutrition Support Team (radio 0538) after completing the referral, which must be posted to Ward A10. The Nutrition Support Team will then evaluate the patient and recommend the appropriate route for nutritional support. Such referrals are replied to speedily in most cases and within 24 hours of receipt in all cases.

SCHEMATIC DIAGRAMME OF THE STRUCTURE OF THE DEPARTMENT



NICUS: Nutrition Information Centre at the University of Stellenbosch
HOD: Head of Department; DHOD: Deputy Head of Department

Occupational Therapy Division
Assistant Director: Mrs F. Peters (phone ext. 5962)

Tygerberg Hospital, Ground Floor, B-Block
Reception: ext. 5062 or tube number T5
Bleepers
Child Psychiatry: 612
Adult Psychiatry: 097
Burns: 335
Paediatrics: 0183
Neurosurgery & Neurology: 104

The following clinical areas are covered by Occupational Therapy:

- Neurology and Neurosurgery
- Surgery (burns, plastics, orthopaedics, rheumatology, pressure- garment therapy, amputations & lymphoedema management)
- Paediatrics
- Work Assessment
- Psychiatry(child and adult).

Referral procedures

Use Tygerberg Hospital's standard referral form. Please add the name and contact number of the referring doctor and date all referrals. The following information must be included:

- Patient's name
- Patient's age
- Patient's address and contact telephone number
- Patient's Diagnosis
- Any relevant or significant history
- Specific problems
- Intervention required

Please refer timeously.

Treatment offered

- Work assessments
- Cognitive and perceptual treatment
- Splinting
- Assistive devices e.g. wheelchairs, transfer boards, bath boards, tap turners and instruction on the use thereof
- Educating / counselling caregivers

- Facilitating independent occupational functioning, e.g. dressing, eating, personal hygiene.
- Life skills training, e.g. stress management, goals planning, and communication skills
- Behaviour modification
- Preventing deformities
- Mobilisation
- Developmental assessments and treatment thereof

Pharmacy

Enquiries: ext. 4916/4915/4917 (after hours: ext. 4915 only)

Hours

Outpatients
Monday–Friday: 08:00–16:30; Saturday, Sunday, and public holidays: 09:00-12:30(closed on Christmas Day)

Inpatients
Monday–Friday: 08:00–13:00, 13:30–14:30 (only antibiotics requests until 16:00); Saturday, Sunday, and Public Holidays: 09:00–11:30 (closed on Christmas Day)

The pharmacist on call is available after hours. In an emergency you may contact the pharmacist via the after hours nursing manager on duty.

Prescription requirements
You are required to meet the following requirements (in accordance with the Medicines and Related Substances Act, 1965 [Act 101 of 1965] as amended and provincial regulations):

- Supply the patient's name, surname, hospital number, date of birth and weight, especially for children.
- Always ensure that you use a TBH prescription sheet with the patient's correct name and folder number, as well as the correct name of the clinic/ward where applicable. Each clinic/ward/theatre has their own budget and it is important to ensure that the correct ward/clinic or theatre names are added to the prescription sheet for financial-control purposes.
- Use the generic name of the medicine (no brand names), the strength, dose and dose interval, the route of administration and period of treatment (maximum 28 days for chronic medication at one time). Write the prescription in legible handwriting and do not use any abbreviations, either Latin or otherwise.
- The signature of the doctor must appear on the prescription, as well as his/her name in print, his/her Persal number and radio- call numbers. You may apply for a stamp with your information at ext. 5752 (Ms Bindeman) and stamp each prescription.
- A prescription for chronic medication may be repeated for a maximum of 5 times, i.e. the original issue plus 5 repeats, giving a total of 6 issues on a prescription.
- Schedule 1– 4 medicines may be repeated for a maximum of 5 times only.

- After Schedule 5 items are repeated 5 times, a psychiatrist must evaluate and decide whether the prescription should be repeated. Except for the Neurology and Psychiatry departments, benzodiazepines are only allowed once, and for a maximum of 14 days.
- Schedule 6 items may not be repeated. The prescription must be re-written each time. Schedule 6 prescriptions (e.g. morphine) require that the total quantity of the medication that is requested should not exceed 30 days' supply (28 days in the public sector) and that the final volume of liquid or number of tablets should also be written out in words. The doctor must add his name in print below the signature as well as his qualifications.

If you refer a patient to a community-service centre the following must appear on the referral prescription:

- Patient's name, address, and folder number
- Correct name of the institution to which the patient is being referred
- Full diagnosis, with a corresponding diagnosis on the form for each medication
- Correct generic medicine names, dosages, dosage intervals and the amount of repeats for each item (abbreviations, e.g. HTZ for Hydrochlorothiazide, are not allowed.
- Original date of the prescription
- Patient's follow-up date at Tygerberg Hospital. This must be in multiples of 28 days according to the number of repeats, e.g. for 1 issue with 3 repeats the follow-up date is 4 x 28 days from the original date of the prescription. (If you deviate from this, the patient will either run out of medication or receive an oversupply of medication. Use the 28-day calendar.)
- Only medicine that is open for referral may be referred out.
- Medicine that is classified as general may be prescribed by any doctor; medicine that is classified as specialist initiated must started by a specialist in a particular field and the patient may be transferred to the periphery for follow-up repeats and continued management, medicines that are classified as specialist only may only be referred to the periphery) for a maximum of 5 months (6 issues, 1 at TBH and 5 in the periphery) after which the patient has to return to TBH for re-evaluation and a new prescription. Patients have to return to TBH for re-evaluation and a new prescription. Patients on medicines classified as tertiary hospital only may not be referred. Where such patients cannot return to TBH, an agreement must be reached with the pharmacy to assist with the process, whereby the patient, the pharmacist of the nearest hospital in the periphery and the TBH pharmacy work together in the best way to get the medicine to the patient. In these cases there must be repeat prescription in the patient's folder at TBH.

- Ms Suzette Fourie at 021 938 4917 has to be contacted to assist with arranging this process.

Availability and purchase of medicine

Medication available from government is subject to certain restrictions. Information is given in the Provincial Code List. (Every Head of Department has a copy.)

Please note:

- Any substances that do not appear in the Provincial Code List may be requested on an Individual Request Form, accompanied with a full motivation, which will be discussed by the medicine committee before a purchase is approved.
- If a product is not registered in South Africa, the Pharmacy will not stock it unless prior approval has been given by the Medicines Control Council(MCC) in Pretoria in terms of the Section 21 requirements and Hospital's Pharmaceutics and Therapeutics committee for a specific patient. Special request forms (Section 21 request forms of the MCC) are available from Pharmacy or from the internet. Such requests are based on an agreement between the doctor, the patient and the MCC only.
- A medicine that is not available at Tygerberg Hospital will definitely not be available at the community centres, which have an even more limited range of medicines.
- An emergency cupboard containing medication for inpatients is available for after-hours emergencies. Access to this is available only through the after-hours nursing manager on duty. Any medication removed from the cupboard must be recorded on the appropriate forms available in the emergency cupboard.
- Because the hospital has a limited budget for medication, you are seriously requested to prescribe medicine in a responsible manner to give each patient an equitable chance of being treated.
- Inpatients should be assessed regularly. Please change intravenous antibiotics to the oral form as soon as possible. This will avoid unnecessary costs from intravenous administration sets, needles and vacoliters, and saves valuable nursing time.
- Before a prescription for chronic medicine is re-written, patients should be consulted to determine whether they have indeed taken their medicine to date and what supply they still have at home. The availability of unused medicine is one of the most frequent reasons for poisoning in children. It is important to know if a patient is compliant before you make a dosage adjustment.
- If uncertainty exists as to the availability, dosage or cost of a medicine, Pharmacy should be contacted at the numbers given above.

Physiotherapy Division
Assistant Director: Ms A Swart (Ext.4576)

B5, West, Tygerberg Hospital; ext. 5152 (messages will be conveyed)

Working hours
Monday to Friday 07:30–16:00
After hours
An emergency after-hours service is available.
After-hours physiotherapy is available for chest patients according to policy 61/2006, which is available in all wards.

Weekend services
Physiotherapy in ICU: as per policy 61/2006.
Ward physiotherapists will place patients whom they think require weekend chest physiotherapy on the weekend list. If you feel a patient requires weekend treatment please discuss with your ward physiotherapist or refer on Friday.

Referrals
New referrals must reach the department by 12:00 on weekdays. They should be comprehensive and must include suspected/confirmed infectious/communicable diseases at all times. When referring, keep the following in mind:
- Contra-indications for physiotherapy: critically low platelet count, haemodynamic instability, and active haemoptysis
- Precautions for physiotherapy: fractures, osteoporosis, haemodynamic instability, low HB/HGT, raised intracranial pressure, low platelet count, malignancy – precaution to most electrotherapy modalities and certain chest physiotherapy techniques, fat and pulmonary emboli
- Appropriate and adequate analgesics should be prescribed.
- Inhalation therapy must be prescribed by the doctor and administered by nursing staff.

Physiotherapy services
Inpatient and outpatient services are available for:
- Respiratory therapy
- Musculoskeletal therapy (ROM, strengthening, rehab, including hydrotherapy, pain relief, etc.)
- Paediatric neurodevelopmental therapy
- Adult neurology – rehabilitation.

Services not provided:

- Sputum induction
- Routine mobilisation
- Manufacturing of splints
- Routine suctioning
- Wheelchairs (provided by Occupational Therapy).

Outpatient referrals

(Only for patients living in the direct catchment area of TBH)

Procedure when referring a patient for OPD:

- Leaving a detailed referral in the medical folder
- Phone Physiotherapy reception for an appointment.

If it is not possible to give the patient an appointment, the patient will be placed on a waiting list. Outpatients will not be treated at TBH if they arrive without an appointment arranged by Physiotherapy. Please do not provide patients with random appointment dates.

Urgent OPD referrals should be discussed with the appropriate OPD physiotherapist.

Inpatient services

Physiotherapy services are available in all TBH wards. In most wards there is a specific physiotherapist allocated to that ward, except for Orthopaedics, which is allocated according to the doctor's firm. Please identify and refer patients for physiotherapy as soon as possible.

Physiotherapy students from UWC and US shadow and do clinical rotations in Tygerberg Hospital. Do not refer patients to physiotherapy students; the appropriate therapist must be contacted.

Outpatient referrals

Leave the referral in clerk's office/ward arrangement and phone Physiotherapy at ext. 5152. Do not send referrals via the tube system as these referrals are often lost or arrive late.

TBH physiotherapists will answer the written referral and replace it in the patient's medical folder.

Referrals that are communicated late in the afternoon may be attended to only the following day. Because the office for Mobility Assistive Devices (MADs) closes at 12:00 on Fridays, early referral is essential for same-day discharge.

Services available outside of TBH

Rehabilitation at an inpatient centre
The following inpatient centres are available:

- Western Cape Rehab Centre (WCRC) in Mitchells Plain – inpatient centre for spinal, neurology and amputation patients; limited nursing care
- Conradie Care Centre in Pinelands – semi-private centre for more chronic patients; also provides rehabilitation
- Booth Memorial – semi-private, more long-term facility; limited nursing care

Neurology patients may be referred for inpatient therapy at a specialised centre. Referrals to these centres are co-ordinated by the social worker. If there is uncertainty as to the patient's suitability, please discuss the case with the physiotherapist concerned. There is a screening process and patients are admitted for a limited period only before being referred to their closest community health centre.

Outpatient physiotherapy services
Patients should be referred to their closest day hospital/community health centre/other secondary hospitals/private practices (in the case of patients with medical aid) where services are available. Details of available physiotherapy services can be obtained from Physiotherapy reception ext. 5152.

Detailed referrals should accompany the patient because the therapists at other centres do not have access to the patient's folder or X-Rays etc.

Patients will be seen by appointment only – no walk-in patients are treated on the same day.

Home-based care
Referral for home-based care is usually done by the ward sister when the patient is discharged.

MAD (Mobility Assistive Devices) services
Ms Essie Jacobus is the staff member in attendance at ext. 4783. (The office closes at 12:00 on Fridays).

Tygerberg Hospital does not provide Mobility Assistive Devices to private patients and prison inmates. (Contact numbers for alternative sources are available from the physiotherapist or the yellow pages). Old-age homes often have their own stock.

The issuing of mobility assistive devices is the responsibility of the discharging hospital. Wooden crutches, aluminium crutches, frames, and walking sticks are ordered by the physiotherapist or ward sister.

Wheelchairs
The Occupational Therapy manages wheelchair assessments as well as the wheelchair waiting list. The issuing of wheelchairs is the responsibility of the discharging hospital.

TED stockings
The ward sister/doctor can order TED stockings by using the TH580 MAD requisition form. Guidelines regarding size are provided on the form. Physiotherapists are not involved in the ordering or fitting of TED stockings.

Slings and braces
Doctor to order and fit.

Orthotics and prosthetics
Ankle foot orthoses (AFOs) and other orthoses can be ordered by using the orthotics-and-prosthetic requisition book and sending the request to the Conradie Orthotic and Prosthetic Centre through the MAD Office.

Splints
Occupational Therapy makes splints. They can be contacted at ext. 5062.

Speech Therapy and Audiology
Assistant director: Ms Haley Elliott

Tygerberg Hospital, 5th floor, Gold Avenue
5089 or leave message at reception

Reception: 4825/4522
Bleeper: 0044
Email: huelliott@pgwc.gov.za

Role of speech therapist and audiologist
A speech therapist performs the function of assessment and remediation of speech, language-learning and feeding/swallowing disorders for adult and paediatric in- and outpatients. An audiologist is responsible for assessing hearing status in adults, children and infants, including appropriate follow-up and management, (e.g. hearing aid fitting).

Referral procedures
- Use Tygerberg Hospital's standard referral form.
- Please add the name and contact number of the referring doctor.
- Please date all referrals
- Ward patients: Please contact the department telephonically or via bleeper and provide the patient's name, ward and the reason for referral. Complete the referral form and place it in the patient's hospital file.
- Outpatients: Please contact the department telephonically or via bleeper in order to make an appointment. Please complete the referral form and send it to the department, indicating the date of the outpatient appointment on the form.
- *Please refer timeously, when in doubt – refer!*

For referrals please include the following patient information:
- Patient's name.
- Patient's age.
- Patient's address and contact telephone number.
- Patient's diagnosis.
- Any relevant or significant history.
- Specific problems.
- Intervention required.

Clinical areas: Evaluation and Treatment

Speech Therapy

- Neurological Disorders, including CVA and traumatic brain injury
- Voice disorders
- Stuttering
- Early communication intervention (0–3 years)
- Preschool speech and language disorders
- Feeding and swallowing disorders (children and adults) including modified barium swallow / video fluoroscopy
- Craniofacial abnormalities, including cleft lip and palate
- Head and neck cancer
- Autistic Spectrum disorder

Audiology

- Diagnostic testing: children and adults.
- Neonatal infant hearing screening (in- and outpatients).
- Electrophysiological testing (auditory brainstem response, auditory steady-state response testing).
- Hearing-aid fitting (children and adults).
- Aural rehabilitation.
- Cochlear implants.

Social Work Division
Head: Mrs MN de Jager

Central office at Room 37, E7 West, Tygerberg Hospital
Telephone: 021-938 4164/021-938 5684

The social care and re-adjustment of a patient forms an important component of the extensive treatment offered at Tygerberg Hospital, based on the World Health Organisation's definition of health as a condition of "mental, physical and social welfare".

As a professional member of the medical team, the medical social worker gives professional attention to the psycho-social problems of both inpatients and outpatients, particularly those whose problems are connected with or arise from illness and/or hospitalisation. Among these are:

- impact of loss of work or protracted absence on the maintenance of the patient and his/her dependants owing to illness or permanent disability
- accommodation problems resulting from loss of income
- future care of the patient and/or dependants necessitated by protracted illness or disability
- family and marriage problems
- alcohol abuse, alcoholism, drug dependency
- emotional disorders, fears, worries, uncertainty and unrealistic attitudes owing to the social implications of the illness
- unwanted pregnancies
- child abuse, sexual molestation of children and nutritional deficiency illnesses. (In terms of the Child Care Act (38 of 2005), all persons in whose care and treatment children are kept, are compelled to report any incidence of these problems.)
- abuse and neglect of the elderly
- HIV/AIDS counselling (pre-test and post-test)
- adjustment problems owing to chronic illness.

Where appropriate, the social worker also makes an important contribution to the medical rehabilitation of patients. As far as possible, the co-operation of statutory and private welfare organisations and community resources is sought to offer specific services to the patient and his/her dependants or relatives.

Referral procedure
A written referral to the social worker should, as far as possible, be made with the knowledge of the patient and his/her family. In the case of children or any other

person at risk or in situations of danger/lethality, a referral may be made without consent.

Written referrals

Written referrals should contain the following information:

- identification particulars such as name, file number, address of patient
- immediate clinical problem or a possible diagnosis
- reason for referral
- treatment plan or possible discharge date.

No verbal referrals can be accepted. The social worker is responsible for filing written feedback in the medical file.

Liaison with the social worker may take place during ward rounds, team meetings, ward or clinic visits and by telephone. Particulars regarding social service delivery at a specific ward or clinic are generally available from the ward or clinic clerk. The Social Work department may also be contacted directly. All social workers can be reached by radio.

Activities are organised on the basis of the allocation of a social worker to each clinical department. Owing to a shortage of staff, however, it is not possible to allocate full-time social workers to each department and, consequently, some social workers have to serve in more than one hospital department.

Social workers also render a telephone consultation service after hours, on public holidays and over weekends while a consultation service is available after working hours. The social worker on call can be contacted via the hospital's telephone exchange.

NHLS TYGERBERG BUSINESS UNIT

INTERNS MANUAL

2011–2012

CONTENTS

INTRODUCTION

This specimen-sample manual is intended as a guide for all people taking specimens that are sent to the National Health Laboratory Service – Tygerberg Coastal. The manual covers phlebotomy instructions as well as correct sampling procedures for various other sample types.

Please read the following instructions carefully before taking samples. Remember that all diagnostic information from our laboratories is dependent on the quality of specimens received.

GENERAL INSTRUCTIONS

This manual should be used as a training document and should be read and signed by all people who are responsible for taking samples that are to be sent to NHLS TBH. Each doctor has a Persal number. Please write your number after your signature.

1. Ensure that the correct procedure for the positive identification of the patient has been followed before taking any samples from a patient.
2. Samples will not be processed by the laboratory if they are not labelled correctly.
3. Do not pre-label samples – this may lead to erroneous labelling at times.
4. Ensure that laboratory specimens are stored out of direct sunlight.
5. Ensure that the correct sample container – with correct anticoagulant (where relevant) is used. All the necessary information required is covered in this manual.
6. Ensure prompt, adequate mixing of blood samples taken into anticoagulant tubes (purple/blue top). These samples should be mixed adequately by gently inverting at least 8 times – do not shake. Failure to mix adequately may result in the sample's clotting, rendering it unsuitable for analysis.
7. Ensure that samples are stored safely for transport and handling.
8. Ensure that samples are not at risk of leaking or breaking, because the laboratory will not process these samples.
9. Check blood tubes for cracks before taking and sending samples.
10. Check expiry dates on tubes before taking specimens into tubes.
11. Ensure that safety and infection-control procedures are followed at all times.
12. Take note of the special precautions and storage instructions for certain tests. These are detailed under the relevant department doing the test.
13. If a test requested is not covered in the sampling manual, please phone the laboratory for special instructions regarding correct specimen containers,

special sampling procedures and requirements/precautions need to be taken.

14. Please read the instructions at the beginning of each discipline's section for individual tests, because each department may have different instructions which need to be adhered to when taking certain samples types.
15. Any after-request tests (tests not requested on the original request form) must be telephonically requested with the relevant laboratory and a new request form must be faxed to the laboratory stating which additional tests are required. The laboratory will inform you if the after-request can be carried out.
16. If in doubt regarding any aspect of our service, please feel free to contact the laboratory at any time.

Following these instructions will ensure that a high-quality service can be maintained by the NHLS to the benefit of our clients as well as the patients.

ROUTINE VENIPUNCTURE AND SPECIMEN HANDLING

The venipuncture procedure is complex, requiring both knowledge and skill. Each phlebotomist generally establishes a routine that is comfortable for her or him.
The following procedure is essential for successful collection:

- Identify the patient.
- Assess the patient's physical disposition (i.e. diet, exercise, stress, and basal state).
- Check the request form for requested tests, patient information, and any special requirements.
- Prepare the equipment, the patient and the puncture site.
- Select a suitable site for venipuncture.
- Perform the venipuncture.
- Collect the sample in the appropriate container.
- Label the collection tubes at the bedside or drawing area.
- Assess the need for sample re-collection and/or rejection.
- Recognise complications associated with the phlebotomy procedure.
- Send the specimens with the request form promptly to the laboratory.

1. Patient identification

Verbal identification

- Greet the patient and identify yourself.
- Ask the patient to state his/her full name and date of birth.
- Patients should be asked to state their names themselves. (Never ask, for example, “Are you John Tlale?”).

- If you are uncertain of the patient's identity, ask the patient to spell his/her name.
- Remember that many patients, particularly in the outpatients' setting, have a tendency to say yes to everything.

Verifying identification

Any of the following may be used to verify identity:

- identity book
- wrist band (wards): all information on the wristband should match the details provided on the request form

  Note: a wristband lying on the bedside table may not be used for identification.
- ankle band (paediatric and neonates)
- Hospital/clinic card or book: should be inspected to confirm the patient's name, hospital number, date of birth and doctor.

A bed number on the request form cannot be used to identify ward patients.

2. Completing the request form

A request form must accompany each sample submitted to the laboratory (or one form if multiple tests are requested on a patient). For the specimen to be processed, this completed request form must contain the following information:

- patient's surname and first name
- patient's hospital number, clinic number or ID number
- patient's date of birth and sex
- requesting physician's complete name
- contact number (if urgent)
- name of the person who took the specimen
- date and time of collection
- source of specimen
- diagnosis
- the test(s) requested.

3. Labelling the sample

A properly labelled sample is essential to ensure that the results of the test match the patient. It is essential that the specimen label contains:

- patient's surname and first name
- patient's hospital number, clinic number or ID number.

Where available, the addressograph sticker should be used.

Please note: The laboratory will not process unlabelled specimens.

4. Order of draw

Blood collection tubes must be drawn in a specific order to avoid cross-contamination of additives between tubes. The recommended order of draw is:

- **First:** blood culture bottles (**yellow-black stopper**)
- **Second:** non-additive tube (**red stopper or SST**)
- **Third:** coagulation tube (**light-blue stopper**). A light-blue stopper (sodium citrate) tube is never the first tube drawn. If a coagulation assay is the only test ordered, draw a non-additive tube (**red stopper or SST**) first, and then draw the light-blue stopper tube.
- **Last draw:** additive tubes in this order:
    - o Heparin (**dark-green stopper**)
    - o Oxalate/fluoride (**light-grey stopper**)
    - o EDTA (**lavender stopper**)

Note: Tubes with additives must be thoroughly mixed (by gentle inversion and not shaking). Erroneous test results may be obtained when the blood is not thoroughly mixed with the additive, especially tests for haematology. Overzealous mixing also results in haemolysis. Certain tests cannot be performed accurately in the presence of haemolysis.

5. Venipuncture site selection

Although the larger and fuller median-cubital and cephalic veins of the arm are used most frequently, wrist and hand veins are also acceptable for venipuncture.

Certain areas are to be avoided when choosing a site:

- Extensive scars from burns and surgery: it is difficult to puncture the scar tissue and obtain a specimen.
- The upper extremity on the side of a previous mastectomy: test results may be affected because of lymphedema.
- Haematoma: may cause erroneous test results. If another site is not available, collect the specimen distal to the haematoma.
- Intravenous therapy (IV)/blood transfusions: fluid may dilute the specimen, so collect from the opposite arm if possible. Otherwise, satisfactory samples may be drawn below the IV by following these procedures:

o Turn off the IV for at least 2 minutes before venipuncture.

- o Apply the tourniquet below the IV site. Select a vein other than the one with the IV.
- o Perform the venipuncture. Draw 5ml of blood and discard before drawing the specimen tubes for testing.
- o Cannula/fistula/heparin lock: hospitals have special policies regarding these devices. In general, blood should not be drawn from an arm with a fistula or cannula without consulting the attending physician.

- o Oedematous extremities: tissue fluid accumulation alters test results.

Procedure for vein selection

- Palpate and trace the path of veins with the index finger. Arteries that pulsate are most elastic and have a thick wall. Thrombosed veins lack resilience, feel cord-like, and roll easily.
- If superficial veins are not readily apparent, you can force blood into the vein by massaging the arm from wrist to elbow. Tap the site with index and second finger, apply a warm, damp washcloth to the site for 5 minutes, or lower the extremity over the bedside to allow the veins to fill.

6. Performance of a venipuncture

Approach patients in a calm, friendly manner. Provide for their comfort as much as possible, and gain their cooperation.

- Identify the patient correctly.
- Fill out the appropriate request form properly, indicating the test(s) ordered.
- Verify the patient's condition. Fasting, dietary restrictions, medications, timing, and medical treatment are all of concern and should be noted on the lab request slip.
- Position the patient. The patient should sit in a chair, lie down or sit up in bed. Hyperextend the patient's arm.
- Apply the tourniquet 3–4 inches above the selected puncture site. Do not place too tightly or leave on for more than 2 minutes.
- The patient should make a fist without pumping the hand.
- Select the venipuncture site.
- Prepare the patient's arm using an alcohol prep. Cleanse in a circular fashion, beginning at the site and working outwards. Allow to air dry.
- Grasp the patient's arm firmly using your thumb to draw the skin taut and anchor the vein. The needle should form a 15–30º angle with the surface of the arm. Swiftly insert the needle through the skin and into the lumen of the vein. Avoid trauma and excessive probing.
- When the last tube to be drawn is filling, remove the tourniquet.
- Remove the needle from the patient's arm using a swift backward motion.
- Press down on the gauze once the needle is out of the arm, applying adequate pressure to avoid the formation of a haematoma.
- Dispose of contaminated materials/supplies in the designated containers.
- Mix and label all appropriate tubes at the patient bedside. Label the tubes with the patient's name and hospital/clinic number.
- Place specimens in the appropriate collection box for delivery to the laboratory.
- For an urgent specimen, request a messenger to collect the specimen immediately.

7. Performance of a fingerprick

- Follow the procedure as outlined above for greeting and identifying the patient. As always, fill out the appropriate request slip properly, indicating the test(s) ordered.
- Verify the patient's condition. Fasting, dietary restrictions, medications, timing, and medical treatment are all of concern and should be noted on the lab request slip.
- Position the patient. The patient should sit in a chair, lie down or sit up in bed. Hyperextend the patient's arm.
- The best locations for fingerpicks are the third and fourth fingers of the non-dominant hand. Do not use the tip of the finger or the centre of the finger. Avoid the side of the finger where there is less soft tissue, where vessels and nerves are located, and where the bone is closer to the surface. The second (index) finger tends to have thicker, callused skin. The fifth finger tends to have less soft tissue overlying the bone. Avoid puncturing a finger that is cold or cyanotic, swollen, scarred, or covered with a rash.
- Using a sterile lancet, make a skin puncture just off the centre of the finger pad. The puncture should be made perpendicular to the ridges of the fingerprint so that the drop of blood does not run down the ridges.
- Wipe away the first drop of blood, which tends to contain excess tissue fluid.
- Collect drops of blood into the collection device by gently massaging the finger. Avoid excessive pressure that may squeeze tissue fluid into the drop of blood.
- Cap, rotate and invert the collection device to mix the blood collected.
- Have the patient hold a small gauze pad over the puncture site for a couple of minutes to stop the bleeding.
- Dispose of contaminated materials/supplies in designated containers.
- Label all appropriate tubes at the patient's bedside. Label the tubes with the patient's name and hospital/clinic number.
- Place specimens in the appropriate collection box for delivery to the laboratory or deliver the specimens promptly to the laboratory.

8. Additional considerations

How to prevent a haematoma

- Puncture only the uppermost wall of the vein.
- Remove the tourniquet before removing the needle.
- Use the major superficial veins.
- Make sure the needle fully penetrates the uppermost wall of the vein. (Partial penetration may allow blood to leak into the soft tissue surrounding the vein by way of the needle bevel.)

- Apply pressure to the venipuncture site.

How to prevent haemolysis

- Mix tubes with anticoagulant additives gently 5–10 times.
- Avoid drawing blood from a haematoma.
- Avoid drawing the plunger back too forcefully and, if using a needle and syringe, avoid frothing the sample.
- Make sure the venipuncture site is dry.
- Avoid a probing, traumatic venipuncture.

Indwelling lines or catheters

- Indwelling lines or catheters are a potential source of test error.
- Most lines are flushed with a solution of heparin to reduce the risk of thrombosis.
- Discard a sample at least 3 times the volume of the line before a specimen is obtained for analysis.

Haemoconcentration

An increased concentration of larger molecules and formed elements in the blood may be due to several factors:

- prolonged tourniquet application (should be no more than 2 minutes)
- massaging, squeezing, or probing a site
- long-term IV therapy
- sclerosed or occluded veins

Prolonged tourniquet application

- Primary effect is haemoconcentration of non-filterable elements (i.e. proteins). The hydrostatic pressure causes some water and filterable elements to leave the extracellular space.
- Significant increases may be found in total protein, aspartate aminotransferase (AST), total lipids, cholesterol and iron.
- Prolonged application affects packed cell volume (PCV) and other cellular elements.

9. Patient preparation factors

Therapeutic drug monitoring

Pharmacological agents have different patterns of administration, body distribution, metabolism, and elimination that affect drug concentration as measured in the blood. Many drugs will have "peak" and "trough" levels that vary according to dosage levels and intervals. Check for timing instructions to draw the appropriate samples.

Effects of exercise
Muscular activity has both transient and longer-lasting effects. The creatine kinase (CK), aspartate aminotransferase (AST), lactate dehydrogenase (LDH) and platelet count may increase.

Stress
Stress may cause transient elevation in white blood cells (WBCs) and elevated adrenal hormone values (cortisol and catecholamines). Anxiety that results in hyperventilation may cause acid-base imbalances and increased lactate.

Diurnal rhythms
Diurnal rhythms are body fluid and analyte fluctuations during the day. For example, serum cortisol levels are highest in early morning but decrease in the afternoon. Serum iron levels tend to drop during the day. You must check the timing of these variations for the desired collection point.

Posture
Postural changes (e.g. supine to sitting) are known to vary lab results of some analytes. Certain larger molecules are not filterable into the tissue; therefore they are more concentrated in the blood. Enzymes, proteins, lipids, iron, and calcium are significantly increased with changes in position.

Other factors
Age, gender, and pregnancy have an influence on laboratory testing. Normal reference ranges are often noted according to age.

10. Safety and infection control
Contact with sick patients and their specimens makes it is important to follow safety and infection-control procedures.

Protecting yourself
Practise universal precautions:
- Wear gloves and a lab coat or gown when handling blood/body fluids.
- Change gloves after each patient or when contaminated.
- Wash hands frequently.
- Dispose of items in the appropriate containers.
- Dispose of needles immediately upon removal from the patient's vein. Do not bend, break, recap, or re-sheath needles to avoid accidental needle puncture or splashing of contents.
- Clean up any blood spills with a disinfectant such as freshly made 10% bleach.

If you stick yourself with a contaminated needle:

- Remove your gloves and dispose of them properly.
- Squeeze puncture site to promote bleeding.
- Wash the area well with soap and water.
- Record the patient's name and ID number.
- Follow your institution's guidelines regarding treatment and follow-up.

Note: The use of prophylactic zidovudine following blood exposure to HIV has shown effectiveness (about 79%) in preventing seroconversion.

Protecting the patient

- Place blood collection equipment away from patients, especially children and psychiatric patients.
- Practise hygiene for the patient's protection. When wearing gloves, change them between each patient and wash your hands frequently.

11. Troubleshooting guidelines

Incomplete collection or if no blood is obtained

- Change the position of the needle. Move it forwards (it may not be in the lumen) or backwards (it may have penetrated too far).
- Adjust the angle (the bevel may be against the vein wall).
- Loosen the tourniquet (it may be obstructing blood flow).
- Try another tube (there may be no vacuum in the one being used).
- Re-anchor the vein. Veins sometimes roll away from the point of the needle and puncture site.

Blood stops flowing into the tube

- The vein may have collapsed. Re-secure the tourniquet to increase venous filling. If this is not successful, remove the needle, take care of the puncture site, and re-draw.
- The needle may have pulled out of the vein when switching tubes. Hold equipment firmly and place fingers against patient's arm, using the flange for leverage when withdrawing and inserting tubes.

Problems other than incomplete collection

- If a haematoma forms under the skin adjacent to the puncture site, release the tourniquet immediately and withdraw the needle. Apply firm pressure.
- If the blood is bright red (arterial) rather than venous (dark red), apply firm pressure for more than 5 minutes.

12. Blood collection on babies

- The recommended location for blood collection on a newborn baby or infant is the heel.
- Pre-warming the infant's heel (42C for 3–5 minutes) is important to obtain capillary blood for blood-gas samples. Warming greatly increases the flow of blood for collection of other specimens. However, do not use too high a temperature warmer as a baby's skin is thin and susceptible to thermal injury.
- Clean the site to be punctured with an alcohol sponge. Dry the cleaned area with a dry cotton sponge. Hold the baby's foot firmly to avoid sudden movement.
- Using a sterile blood lancet, puncture the side of the heel. Do not use the central portion of the heel because you might injure the underlying bone, which is close to the skin surface. Do not use a previous puncture site. Make the cut across the heel print lines so that a drop of blood can well up and does not run down along the lines.
- Wipe away the first drop of blood with a piece of clean, dry cotton. Since newborns do not often bleed immediately, use gentle pressure to produce a rounded drop of blood. Do not use excessive pressure or heavy massaging because the blood may become diluted with tissue fluid.
- Fill the capillary tube(s) or micro-collection device(s) as needed.
- When finished, elevate the heel, place a piece of clean, dry cotton on the puncture site, and hold it in place until the bleeding has stopped.
- Be sure to dispose of the lancet in the appropriate sharps container. Dispose of contaminated materials in appropriate waste receptacles. Remove your gloves and wash your hands.

LIST OF TUBES USED FOR PHLEBOTOMY

Collection Tube	Additive	Mode of Action	Uses
Red top (Plain) 	None	Blood clots and the serum are separated on centrifugation	Not supplied, please use Gold top
Yellow 	None	Serum Separator Tube (SST) contains a gel at the bottom to separate blood from serum on centrifugation	Chemistry, immunology and serology
Purple 	EDTA liquid	Forms calcium salts to remove calcium	Haematology (FBC), blood bank (Cross Match), CD4 counts and viral loads. Invert 8 times to prevent clotting and platelet clumping. Chemistry homocysteine, PTH on ice, HbA1C, red-cell folate
Light Blue 	Sodium citrate	Forms calcium salts to remove calcium	Coagulation tests (INR and PTT), full draw required. Invert 8 times to prevent clotting and platelet clumping. Note: PTT stable for 6 hrs. after drawn must reach lab within at least 4 hrs. after drawn in ward.
Dark Green 	Sodium heparin or lithium heparin	Inactivates thrombin and thromboplastin	For lithium level: use sodium heparin For ammonia level or Trop-T: use sodium or lithium heparin
Light grey 	Sodium fluoride and potassium oxalate	Anti-glycolytic agent preserves glucose up to 5 days	Glucoses, requires full draw (may cause haemolysis if short draw)
Black 	Sodium citrate (buffered)	Forms calcium salts to remove calcium	Westergren Sedimentation rate (ESR), requires full draw

DIVISION OF ANATOMICAL PATHOLOGY

Head: Prof CA Wright
Telephone: 021 938 4048/1
Emergency no.: 082 326 8772

Secretary: Elke van Wyngaardt: 021 938 4041

Consultants

Prof Johann Schneider(Executive Head Pathology)	021-939 4965
Prof Juanita Bezuidenhout	021-938 4211
Dr William Bates	021-938 5553
Dr Leocardea Schroeter	021-938 4044
Dr Pawel Schubert	021-938 5349
Dr Mercia Louw (Head of Cytopathology)	021-938 4045
Dr Debbie Maartens	021-938 6163
Prof Peter Wranz	021-938 4046
Prof Richard Hewlett (Head of Neuropathology)	021-938 9689
Prof Dan Zaharie	021-938 9535
Prof ROC Kaschula	021-938 4947

Results
021 938 4330/4904/4931

Enquiries
Histology: 021-938 5226
Cytology: 021-938 4200/ 938 4202

There are four main subdivisions of the service:
1. Surgical diagnoses – including biopsies and other tissue specimens
2. Autopsies
3. Cytology, including gynaecology and non-gynaecological exfoliative and fine-needle aspirations biopsy
4. Oral and Maxillofacial Pathology

1. Surgical Diagnoses

Routine services
The division provides a daily service. Specimens are received from the theatres, wards, clinics and other institutions. Specimens are received daily from 07:30–15:15. If specimens need to be received after these times, please contact the registrar on call.

Depending on the size of the specimen (which has an influence on the fixation time), the specimen will be trimmed and processed between 2 to 24 hours of receipt. The process includes dehydration of the specimen and impregnation with paraffin wax. It is usually completed in 13 hours.

The specimen is then sectioned, stained and sent to the registrar for provincial evaluation. As soon as possible thereafter the specimen is examined by the registrar and consultant and the report is sent for typing.

The time span from receipt of the specimen to final posting of the report varies from 48 to 72 hours.

Please note:

- Anatomical Pathology request forms must be legibly and completely filled out to be accepted by the division. Failure to do so will inevitably lead to delays in processing of the specimen. The request forms are available from Division of Anatomical Pathology.
- All specimens are received at Specimen Reception, which operates from 07:30–16:00 daily. (See emergency service).
- Immediate fixation in 10% formal saline (formalin) is essential for the preserving of tissue. Remember: the volume of formalin should be 10 times the volume of the specimen.
- Formalin is available in theatres, wards, clinics and at the reception area of Anatomical Pathology.

Availability of report

Factors influencing the speedy availability of the report include:

- size of the specimen – adequate formalin fixation of large specimens may need 24 hours.
- specimens lost in theatres or elsewhere in the hospital
- special stains needed to elucidate specific characteristics of the tissue (may delay diagnoses for at least 24 hours)

Special services

(Bleep registrar/pathologist on call.)

- Immunofluorescence Laboratory (ext. 5676)
  Fresh unfixed tissue wrapped in a swab moistened with normal saline in a sealed container must be sent immediately and be clearly marked “For Immunofluorescence examination – fresh unfixed tissue”.
- Electron microscopy (EM) (ext. 4213)
  2 or 3 small (5mm x 1cm) blocks of a representative, well-preserved area of

tissue which has been fixed in glutaraldehyde. Glutaraldehyde is obtainable in theatres and from the EM lab.

Expedited diagnoses

An expedited diagnosis may be arranged by the registrar or consultant, with the pathologist on emergency duty (bleeper or ext. 4200) on the day prior to the diagnosis, for a telephonic result by 10:00 on the day after receipt of the specimen.

Emergency diagnoses

Very urgent specimens that need a diagnosis within 4 – 6 hours must be arranged with the registrar/consultant on emergency duty at Anatomical Pathology. The consultant, registrar and technologist on emergency call are all available on bleepers (number available from the telephone exchange).

During working hours, contact the registrar/consultant on call in Anatomical Pathology on the pager.

After hours, contact the registrar/consultant on call at Anatomical Pathology on the pager or home number/cell, which is obtainable from the telephone exchange at the hospital.

Frozen-section diagnoses

The surgeon who requires an intra-operative diagnosis usually requests this investigation.

All routine frozen sections as well as emergency frozen sections must be arranged with the registrar/consultant on emergency duty at Anatomical Pathology, who will ensure that the emergency team (registrar and technologist) is ready to receive the specimen.

Routine frozen sections should be arranged the day before the operation is undertaken with the registrar/consultant on emergency duty at Anatomical Pathology.

Reports

It is the policy of the department to issue printed reports wherever possible in order to:

- ensure that faulty information is not transmitted telephonically (This has a direct impact on the well-being of the patient.)
- obviate differing interpretations by different clinicians of telephonic messages
- restrict to an absolute minimum unnecessary time-wasting and duplication of enquiries as well as to restrict telephonic enquiries to the absolute minimum.

The clerk at Specimen Reception may under no circumstances issue telephonic reports. Copies of the printed report may be requested and fetched from the clerk at Specimen Reception. Should a report not be available, the clinician is free to contact the registrar to whom the case has been assigned.

Reports are posted daily and should be available on the Dislab Computer System in the wards. Telephonic enquiries: 021 938 4330/4904/4931).

2. Autopsies

To avoid confusion as to the correct manner in which to request an autopsy and to obviate problems that may be encountered during the performance of such a procedure, it is suggested that the following guidelines, be followed. Forensic Pathology has approved these guidelines.

In the event of a "natural death" (see Forensic Medicine), an autopsy can be requested for academic purposes or to determine the exact cause of death.

Autopsy request

The following must be sent to reception (ext. 5226) as soon as possible after the autopsy has been requested.

- The folder, X-Rays and other relevant test results of the deceased patient
- "Notification/Register of Death/Still birth" (B1 1663).The ward staff completes the entire form except sections D and G. If sections D and G are accidentally completed by the clinician, and the request for an autopsy from Anatomical Pathology is made at a later stage, the body might already have been handed over to the family or undertaker.
- Consent from Family (Form 3: closest relative). If no person is available to grant consent, please contact the clinical executive officer on call. The clinical executive officer can then give written consent for such a post mortem. If telephonic consent is obtained, 2 witnesses must also sign the form. Faxed consent is acceptable, with 2 witnesses.
- Form 2, completed by the clinician requesting the autopsy (preferably the consultant or registrar) so that the department knows to whom the report is to be sent.
- Post-mortem examination request form, with a relevant summary of the clinical picture. The more precise and relevant the information provided, the more specific the post-mortem examination directed at solve any problems.

The above forms (TH 310/10.89 5010780/TH 9/2/93 5008778/TH 10/2.93 5008786/TH 11/2.93 5008794) should be available in every ward and can be obtained from the photocopy room, by the ward clerks.

Should there be any uncertainty or problems regarding the nature of the death, please contact the forensic pathologist on emergency duty.

Attendance at autopsies

Arrangements can be made between the pathologist on call and the clinician involved. There is a discussion of all adult autopsies daily at 12:15 in the mortuary.

Rejection of autopsies

Autopsies are occasionally rejected at the discretion of the consultant on call or head of discipline. No autopsy is indefinitely rejected and further motivations will always be considered in these cases.

3. Cytology

Please note that Cytology has its own separate request form (CYT1.2) and requires the following information:

- name of patient
- ID no. / date of birth
- location/ward
- date of collection of specimen
- referring doctor
- nature/origin of specimen
- adequate history including previous treatment e.g. previous
- radiotherapy
- previous histology and cytology reference numbers.

Please note that the laboratory is legally entitled to return specimens which do not have these details legibly supplied.

Specimens can be delivered to Room 2351 in Cytology on the 10th floor, E-passage or to the Core Lab on the 9th floor in TBH complex.

Please discuss urgent cases with the laboratory (ext. 4202/4200) or pathologists (ext. 4045/6163/5349) because these will only be done by prior arrangement. Contact the laboratory or the pathologists before taking the sample – to ensure optimum handling of the specimen (See Addenda to this section). For after-hours call-outs, call the radio room at 6666 for pathologist on call.

- For **urgent cases** make sure that the request form contains a **contact number** as well as the **time/date** by when the result is required.
- **If more than one investigation** is to be done (e.g. pleural fluid for Cytology and TB culture), please submit **separate specimens and request forms** (where possible).
- It is very important that slides prepared by the clinician, e.g. cervical smears, brushings and FNAs are fixed promptly and correctly to optimize cytodiagnosis. Please see Addendum 1 for the correct fixation of specimens.
- **Slide holders** are available on request from the **Cytology Laboratory, all other clinics** may order **slide mailers** and **request forms, free of charge**, from **NHLS, Green Point** (stores).

Order forms available from the lab or green Point stores.

Tel: 02- 417 9322/9324
Fax: 021-421 3501

Take note of the following when labeling slides:

- Please write **FULL NAME, SURNAME, FOLDER NUMBER** or **DATE OF BIRTH** and **LOCATION**
- Please use standard slides with **frosted end** for labelling.
- Please label with **PENCIL ONLY** on frosted end (use diamond pen to scratch name on non-frosted slides).
- **NEVER** use **STICKERS** or **INK** to label slides as they do not withstand the staining process.
- Name and smear should be on the **same side** of the slide.
- Please **do not** send an **unlabelled slide** in a **labelled container**.

Cytological Tests According to Organ System

Female genital tract

1. cervical smear
2. vaginal smear
3. vault smear
4. endocervical smear
5. endometrical smear
6. vulvar smear .

Please state clearly on the requisition form:

- date of last menstrual period (LMP)
- if patient is currently pregnant
- years menopausal
- relevant history, e.g. previous procedures (e.g. cone biopsy, radiation treatment) and date of these procedures, or previous conditions e.g. atypia or carcinoma
- appearance of the cervix.

Collection notes:

- Please use standard glass slides with **frosted end** for labeling.
- Spray-fix I**MMEDIATELY** after taking smear (within 10 seconds).
- **Please see above notes on labeling slides.**
- Allow smears to dry before packing for transporting to the lab.
- Please **do not use** the Cytology request form to **directly wrap** the Papsmear slides, as this poses an infection risk.
- **Slide holders** are available on request from the **Cytology laboratory; all other clinics** may order **slide mailers** and **request forms, free of charge,** from **NHLS, Green Point** (stores).

Order forms available from the lab or Green Point stores.

Tel: 021-417 9322/9324
Fax: 021-421 3501

Respiratory system

1. sputum
2. bronchial brushings
3. bronchiolar-alveolar lavage (BAL)
4. bronchial washings
5. tracheal aspirates
6. pharyngeal brushings
7. antral aspirated/ sinus washings
8. nasal smears.

45-ml screw-top


15-ml tube

Collection and fixation notes:

- Please submit sputum after an **early morning deep cough** to ensure that sputum, and not saliva, is collected.
- Containers with fixative (Carbowax) are available at reception, Room 2371 on the 10th floor, E-passage.
- For outside clinics, use plastic specimen container and fix these fluids with an equal amount of 50% to 70% alcohol.
- If multiple specimens were collected by use of different techniques or from different sites, please make sure that the **specimen type** is **clearly marked** on the container.
- The 45-ml screw-top container is used for sputa, while smaller amounts like bronchial lavages are normally collected in the 15 ml screw-top tubes.

Fluids

1. pleural
2. peritoneal
3. pericardial
4. hydrocele
5. cerebrospinal fluid
6. cyst fluid
7. peritoneal washings

75-ml screw-top

15-ml tube

Collection notes:

- Please ensure that the fluids reach our laboratory as soon as possible – in case of a **delay of more than 24 hours,** please add **equal amount of 50% alcohol (please indicate if alcohol was added).**
- **Cerebrospinal fluid** must reach the lab (Room 2371) preferably within **4 hours** after tap to prevent cellular degeneration. If not possible, fix with **equal amount of 50% alcohol.**
- For small amounts of fluid, 15-ml screw-top tubes are used, while the 75-ml screw-top container is used for larger amounts.
- Please send full volume of fluid drained. If a litre bottle is used, please ensure it is sealed properly, especially for glass bottles.

Gastrointestinal tract

1. oesophageal brushing
2. gastric brushings
3. duodenal brushings
4. pancreatic-duct aspirates

5. bile duct aspirates/brushings
6. colonic brushings

Collection notes:

- It is very important that the slides are **fixed immediately** (within 10 seconds) with cytological spray fixative to prevent degeneration of cells. See Addendum 1 on correct fixation of specimen.

Urogenital tract

1. voided urine
2. catheterized urine
3. ureteric urine
4. renal-cyst aspirate
5. renal-pelvis brushings
6. urethral smear.

75-ml screw-top

Collection notes:

- Please state clearly if the patient has recently:
- undergone catheterization
- undergone cystoscopy
- undergone retrograde radiography.
- Cells in urine deteriorate rapidly. Specimens must reach the lab within **2 hours**; if this is not possible an **equal amount of 50% alcohol** may be added.
- Please note that early morning urine and 24-h urine collections are unsuitable for cytodiagnosis (midstream collection is most suitable).
- Urine is normally collected in 75-ml screw-top containers.

The breast

1. nipple discharge
2. nipple smears
3. breast aspirate
4. cyst aspirates

Collection notes:

- Spray-fix **immediately** (within 10 seconds).
- If **more than 2 smears** are made, one could be left unfixed for Giemsa's stain, but should be clearly **marked "unfixed on slide.**

Other fine-needle aspirations (FNA)

1. Superficial palpable lesions
2. Impalpable/deep/image-guided FNAs

Collection notes:

- Spray-fix immediately (within 10 secs).
- If **more than 2 smears** are made, one could be left unfixed for Giemsa's stain, but should be clearly **marked "unfixed" on slide.**
- Slides may be sent by porter or via specimen depot.

See Addendum II on FNA

Cytology FNA Clinic

Patients may be sent to the FNA clinic for aspiration of superficial, palpable lesions.

- Appointments are not necessary
- The clinic is located in Room 171 on the 10th floor, East side. There are signs that can be followed in the Green Passage.
- The clinic operates 10:00 – 13:00, Monday to Friday, on a first-come-first-served basis.
- **Please remind the patients** to bring their referral letters and patient files.

Impalpable/deep/image-guided FNAs (on-site theatre FNAs)

- Cytology offers an on-site staining and diagnostic service for adequacy of aspiration from deep-seated lesions in wards, CT-scan, sonar, bronchoscopy and surgical theatres.
- Dial ext. 4045, 5349, 4048 or 6163 to request this service.

Miscellaneous

1. tumour imprints
2. lymph-node imprints
3. skin smears
4. tzanck smears
5. ulcer smears
6. tissue imprints
7. diaphragmic wipes

Collection notes:

- Adequate and rapid fixation is essential.
- Please note that material on a swab is not suitable for cytology.

Reports

- It is the policy of the department to issue printed reports wherever possible.
- Clerks may under NO circumstances issue telephonic reports. Reports can be faxed to the requester.

Reasons for this are as follows:

- To ensure that faulty information is not transmitted telephonically, this has a direct impact on the well-being of the patient.
- To obviate differing interpretations by different clinicians in telephonic messages.
- To restrict to an absolute minimum unnecessary time-wasting and duplication of enquiries as well as to restrict telephonic enquiries to the absolute minimum.

Telephonic results: Tel 021 938 4330/4904/4931

REPORTS ARE POSTED DAILY AND SHOULD BE AVAILABLE ON THE DISA LAB WARD ENQUIRIES COMPUTER IN THE WARDS.

Special stains

Special stains are available, e.g. Ziehl-Neelson for TB, silver stains for fungi, etc.

Other special investigations available include immunocytochemistry and flow cytometry.

Addendum I

PROPER FIXATION TECHNIQUE

1. Air-drying of a specimen causes distortion and loss of cytoplasmic density. Crisp nuclear chromatic patterns are lost and the cytoplasm cannot be coloured properly. Hence **rapid fixation** is a vital step in cytological preparations.

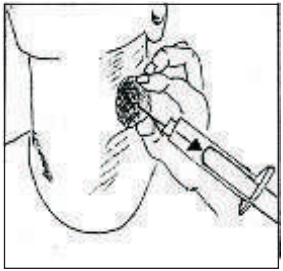
   When the clinician is preparing a slide e.g., Pap smear or bronchial, oesophageal or gastric brushings, the smear should be made in one direction with one motion and the doctor should avoid the same area twice. **All prepared slides should be sprayed with cytological fixative immediately** to prevent specimen degeneration.
2. Please use Cytology slides only, with a ground glass edge to prevent traumatization of cells.
3. Check expiry date on spray fixative.

Addendum II

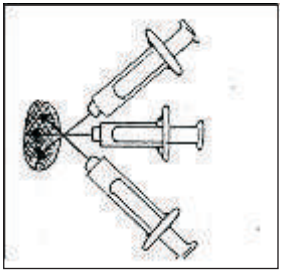
METHOD OF FINE-NEEDLE ASPIRATION
(For Cytology)

Materials:

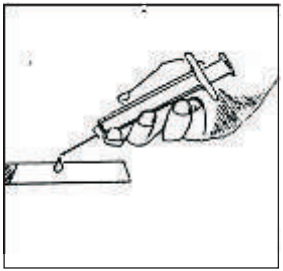
- 22 or 23 gauge needle
- 10 cc syringe
- clean glass slides (2–4 slides, with frosted ends)
  (4=2 Pap (fixed) + 2 unfixed – (air-dried)
- slides clearly labelled with patient's details
- cytology spray fixative
- HB pencil
- Alcohol swabs



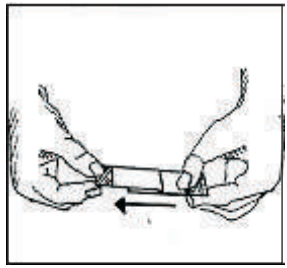
Method: (see drawings)



- Use pencil to ensure that patient's details are clearly identifiable on each slide.
- Clean area on skin with alcohol swab.
- Ensure that all air is expelled from syringe and that plunger moves smoothly.
- Attach needle to syringe.
- Fix target lesion between thumb and forefinger.
- Push needle through subcutaneous tissue into lesion.
- Apply 1–2mm constant suction while aspirating, moving needle firmly in different directions. Aspirate until material is present in hub of needle.
- Equalise pressure before pulling needle out by releasing all pulling action on plunger.
- Place sterile swab on area and pull out.
- Remove needle from syringe,



aspirate 10 cc air into syringe, re-attach needle and firmly push plunger down, with tip of needle on glass slide, 1 cm from frosted end.



- Place another slide onto expressed material, without pressure, allow the material to disperse.
- Firmly and slowly pull slides apart in a horizontal direction. **NB!** IMMEDIATE FIXATION IS ESSENTIAL FOR OPTIMAL CELLULAR DETAIL.
- Shake and hold spray fixative can 30 cm away from slide. Spray-fix one slide immediately.
- Allow other slide to air-dry.
- More than one pass is necessary if insufficient material was obtained. Repeat procedure.
- Complete cytology request form as comprehensively as possible.
- Detailed sketches are essential to facilitate diagnosis.

Addendum III

HOW TO TAKE THE PERFECT PAP SMEAR

1. Get everything ready.
2. Label slides and forms.
3. Do smear first – before PV.
4. Spread labia.
5. Insert speculum dry or moisten with saline (not tap water).
6. Visualise external os.
7. Swab cervix free of blood/discharge.
8. Scrape full circumference firmly.
9. Lay spatula flat on the side.
10. Spread along the length of the slide.
    Should you make use of a cervibrush:
    - Insert into os.
    - Turn clockwise 360°.
    - Roll onto slide.
11. Spray fix immediately (within 10 seconds).
12. Allow slide to dry (after fixation) before packing to send off.

4. Oral and Maxillofacial Pathology

(In association with Anatomical Pathology and the Tygerberg Oral Health Centre of the University of the Western Cape)

NHLS Head of Discipline: Prof. JJ Hille

The discipline of Oral and Maxillofacial Pathology is a specialty of both Dentistry and Pathology. It deals with the nature, identification, and management of diseases affecting the oral and maxillofacial regions. It is a science that comprehensively investigates the causes, processes and effects of these diseases. The practice of Oral and Maxillofacial Pathology includes the diagnosis of diseases using clinical, radiographic, microscopic, biochemical and other examinations, and the management of patients. As such, this discipline not only adds special value to Anatomical Pathology and the other pathology disciplines, but also to the clinical disciplines of Maxillofacial and Oral Surgery, Oral Medicine and Dermatology in the management of complex oral mucosal diseases, and to General Surgery, Ear-Nose-Throat Surgery and Oncology in head- and neck-cancer management.

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The discipline offers the following service:

1. Surgical Pathology diagnoses – including biopsies and other tissue specimens (e.g. resections) from the oral cavity, jawbones, and surrounding anatomical regions. Kindly refer to the description of the routine diagnostic service in Anatomical Pathology for further details and the array of special services. Please submit whenever possible a (panoramic) radiograph and/or CT scans for accurate diagnosis of bone lesions. Note that frozen sections on bony specimens are not possible.
2. Microscopic examination of oral mucosa surface brushings to detect fungal infection and bacterial overloads. Kindly sample with a cervibrush and submit exfoliative smears (on glass slides fixed with cytospray or alcohol) to the Anatomical Pathology Laboratory with the specific request to stain for PAS.
3. On-site clinical and radiological consultations in oral mucosal diseases and jaw lesions on request (see contact details below).
4. Punch and/or scalpel biopsies, surface Cytology sampling for oral mucosal lesions and fine-needle aspirations, or core-needle bioppsies of oral deep

soft tissues can be performed under local anaesthesia in the FNA clinic on the 10th floor with prior arrangement (see contact details below).

Staff:
Consultants:
Prof. JJ Hille (x6159 or 082-5560 703)
Prof. VM Phillips (021-937 3161) **NB:** Forensic Odontology
Registrar: x4449 or tel. 021-937 3158

All urgent specimens must be arranged with the laboratory.

CHEMICAL PATHOLOGY LABORATORY

9th floor, Tygerberg Hospital

Head: Prof. RT Erasmus, ext. 4107

Consultants

Dr C Meyer	ext. 4168
Dr A Zemlin	ext. 4254
Dr M Hoffman	ext. 4165
Dr M Rensburg	ext. 4927

Registrars

Dr C Hudson	ext. 4174
Dr N Vanker	ext. 4927
Dr V Keti	ext. 4174

Consultations

Monday – Friday (8:30 – 16:00); ext. 4330; after-hours ext.4936
Saturday – Sunday (10:00 – 14:00)
Urgent requests: Monday – Sunday, 24 hrs, ext. 4934

Results/Information

After hours and weekends only: ext. 4936
Hormones: ext. 6616
Protein electrophoresis: ext. 4258
Urine and stool investigations: ext. 4171
Any test not listed: ext. 4330/4934
Call Centre: 7:30 – 17:00, ext. 4330, 4931, 4904

General instructions

- **Blood-gas specimens:** arterial blood, not in contact with air, on ice, replace needle with cap, send to lab as soon as possible.
- **Creatinine clearance:** clotted blood must be taken at the same time as 24-hour urine collection, i.e. during collection period. Include mass and height.
- **Porphyrins:** urine and stool; light-sensitive specimens – transport container in black bag. Please send 15 ml EDTA blood (purple-top tube) for genetic tests with each request.
- **Bence-Jones protein:** send 50 ml fresh urine in azide container (obtain container from laboratory).
- **Neonatal bilirubin:** protect against light.

- **24-hour urine collection:** obtain container from lab for the specific test different substances require different preservatives. Do not discard fluid (preservative) in bottle. Follow instructions on label or from lab.
- **VMA, HVA, NMA determination:** avoid the following for 3 days prior to collection: coffee, tea citrus fruits, vanilla-containing compounds, drugs: chlorpromazine, methyldopa, naladixic acid.
- Send all specimens to lab as soon possible.
- Request forms must be completed in detail.
- Over weekends and public holidays, specimens must reach the lab before 11:00 (only limited personnel).

Index of tests

1. urea and electrolytes
2. liver function tests
3. blood gasses
4. calcium magnesium and phosphate
5. iron studies
6. trace elements
7. enzymes / special proteins
8. cardiac markers
9. electrophoresis
10. lipogram
11. hormones
12. tumor markers
13. CSF investigations
14. Tests on urine and stool
15. Fluids
16. Other tests
17. Tests sent to other laboratories (See note 2, below)
18. Steatocrit (stool).

Please note:

1. Only certain adult reference values currently in use at TBH are provided. Reference values can change depending on the technique used to analyse the specimen. Some reference values are age dependent. If further information is required, please contact the laboratory.
2. Specimens can be sent to other laboratories. Please contact the laboratory for any tests not mentioned on the list.

1. Urea and electrolytes

Sodium	Yellow	135 – 147 mmol/l
Potassium	Yellow	3,3 – 5,3 mmol/l
Chloride	Yellow	99 – 113 mmol/l
Urea	Yellow	2,6 – 7,0 mmol/l
Creatinine	Yellow	60 – 120 µmol/l

2. Liver functions

Total protein	Yellow	60 – 85 g/l
Albumin	Yellow	35 – 52 g/l
Total bilirubin	Yellow	0 – 21 µmol/l
Conjugated bilirubin	Yellow	0 – 6 µmol/l
Aspartate Transaminase (AST)	Yellow	8 – 20 U/l
Alanine transaminase (ALT)	Yellow	5 – 40U/l
Gamma-Glutamyltransferase (GGT)	Yellow	1 – 24U/l
Alkaline phosphatase(ALP)	Yellow	40 – 120
Lactate Dehydrogenase (LDH)	Yellow	100 – 190 U/l

3. Blood gasses

pH	Heparin, on ice	7,37 – 7,43
pCO2		4,50 – 6,10 kPa
pO2		11,00 – 15,00 kPa
HCO3		21,0 – 25,0 mmol/l
Base excess		-4 to + 2 mmol/l
O2 Sat		95 – 98%

4. Calcium, magnesium and phosphate

Calcium (corrected)	Yellow	2,05 – 2,56 mmol/l
Magnesium	Yellow	0,65 – 1,10 mmol/l
Phosphate	Yellow	0,80 – 1,40 mmol/l

5. Iron studies

Iron	Yellow	10 – 30µmol/l
Transferrin	Yellow	2,0 – 3,6 g/l
% saturation (Fe)	Yellow	20 – 50

6. Trace elements

Copper	Yellow	0 – 0,47 µMol/l
	Urine-24 h Mineral free	10 – 26 µMol/l
Zinc	Plain plastic	40 – 34 µMol/l

7. Enzymes

Haptoglobin	Yellow	0,30 – 2,00 g/l
Beta-Microglobulin	Yellow	1,0 – 3,0 mg/l
Caeruloplasmin	Yellow	0,20 – 0,60 g/l
CRP	Yellow/green (lithium heparin)	<10mg/l
Alfa-1 antitrypsin	Yellow	19 yr to adult 0,90–2,00 g/l
ADA	Pleural fluid	<25U/l values >60 suggestive of TB, septic effusion, lymphoma, leukaemia, TB
	Pericardiac fluid	
	Ascites fluid	
	CSF	<4 U/l >6 U/l suggestive of TB meningitis
Pyruvate	Whole-blood lithium heparin	30 – 80 µmol/l

8. Cardiac markers

CKMB	Yellow	>3% suggestive of cardiac origin
Troponin I	Yellow	0,00 – 0,07 g/l <0,07: normal 0,08 – 1,5: high risk >1,5: possible infarct
Creatine kinase (CK)	Yellow	26 – 140 U/l

9. Electrophoresis

Immunoglobulin G	Yellow	
Immunoglobulin M	Yellow	
Immunoglobulin A	Yellow	
Serum Electrophoresis	Yellow	
Urinary Electrophoresis	Urine	
Immunofixation	Yellow	
Immunofixation	Urine	

10. Lipogram

Total cholesterol	Yellow	≤ 5,0 mmol/l
Triglycerides	Yellow	≤1,5 mmol/l
HDL	Yellow	≥ 1,2 mmol/l
LDL	Yellow	≤ 3,0 mmol/l

11. Hormones

Cortisol (nmol/l)	Yellow	Adults: 07h00–09h00: 120 – 620 nmol/l 15h00 – 17h00: 85 – 460 nmol/l 24-h urine cortisol: 80 – 590 nmol/l
Estradiol (pmol/l)	Yellow	
FSH (IU/l)	Yellow	
Free T3	Yellow	3,1 – 6,6 pmol/l
Free T4	Yellow	10,3 – 21,9 pmol/l
LH (IU/l)	Yellow	
Progesterone (nmol/l)	Yellow	
Prolactin (µg/l)	Yellow	
TSH	Yellow	0,35 – 4,5 mIU/l
Testosterone	Yellow	
B-HCG	Yellow	<5 IU/l: negative
PTH	Purple on ice	1,2 – 8,5 pmol/l
Insulin	Yellow	3,0 – 25,0 mIU/l

12. Tumour markers

AFP	Yellow	0,0 – 8,0 µg/l
CEA (g/l)	Yellow	Non-smokers: <2,5 Smokers: 2,6 – 10
PSA	Yellow	0,0 – 4, µg/l

13. CSF investigations

CSF – Protein	Sterile tube	0,15 – 0,45g/l
CSF – Glucose	Grey tube	2,2 – 3,9 mmol/l
CSF – Chloride	Sterile tube	120 –130 mmol/l
Blood brain studies: CSF/IgG index	Serum/ CSF in a sterile tube	0 – 0,70 mg/g
Albumin index		0 – 9,0 mg/g
CSF ADA		<4 U/l normal >6 U/l suggestive of TB meningitis

14. Tests on urine and stool

Apt test	Bloody stool//vomitus/mucus or blood-stained diaper; collect in glass or plastic container	Distinguish between foetal and mother's blood	
Amylase (urine)	Urine	0 – 650 U/l	
Bicarbonate (Tot. CO2-content)	Urine – random	Interpretation depends on serum value	Urine. Fill a 10-ml sterile container. Seal securely. Send immediately on ice.
Calcium	Urine 24 h	Male 2,5–7,5 mmol/day	
Creatinine clearance	Urine 24 h Blood gold tube	Male 85 – 125 ml/min Female 75–115 ml/min	Complete collection required.
Copper	Urine 24 h	10 – 26 uMol/l	

Fat globules – Sudan staining	Random stool in sterile tube	N: 2,5 fat droplets per high power field Steatorrhea: >26 fat droplets	
Steatocrit	Random stool, not 24 hour. 40 –50ml urine container to be used to collect sampling	Adults: 0 – 25%	
5-hydroxy-indoleacetic acid (5-HIAA)	Urine 24h or random specimen	Screening: absent	
Homovallinic acid (HVA)	Urine 24 h	>5 yr 0 – 12 µmol/mmol	Container with 12 ml concentrated HCl and 4 ml H2O as preservative. Store during collection in a fridge at 4 – 8ºC. Patient must avoid vanilla containing food. Repeat collection on 3 consecutive days.
Magnesium	Urine 24h	3–5mmol/day	
Metanephrine and normetane-phrine (normet)	Urine 24h	>15yr <5 µmol/24h	Container with 12 ml concentrated HCl and 4 ml H2O as preservative. Store during collection in a fridge at 4 – 8ºC. Patient must avoid vanilla-containing food. Repeat collection on 3 consecutive days.
Myoglobin	Random urine	Negative	Urine must be fresh and reach the lab within 2 hours after collection

Occult blood	Stool random	Negative	Special diet free of myoglobin and haemoglobin must be followed for 3 days prior to the collection.
Osmolality	Random urine	50 – 1200 mOsm/kg H2O – Interpretation depends on serum osmolality	
pH	Random urine	±6	Send immediately on ice to the laboratory
Porphyrins	Stool (random)	Screen: negative	Specimen must be wrapped in dark paper to protect against light
Porphyrins and precursors: Porphobilino-gen (PBG)	10 ml fresh urine	Negative	Specimen must be wrapped in dark paper to protect against light.
Reducing substances	10 ml fresh urine in sterile tube	Absent	
Reducing substances	Stool in sterile tube	To 1+	
Specific gravity (SG)	Random urine	Adult: 1,002–1,030	
Tubular reabsorption of phosphate (TRP)	24-h urine	85% – 95%	
TmPO4/GFR	24-h urine	Adults 1,0–1,68	
Urea	24-h urine	250–500 mmol/day	
Uric acid	24-h urine	1,5–4,4 mmol/day	
Urobilinogen	Random urine	Absent to trace	

Vanillylmandelic acid (VMA)	Urine 24 h	>15 yr 0 – 40 µmol/24h	Container with 12 ml concentrated HCl and 4 ml H2O as preservative. Store during collection in a fridge at 4 – 8ºC. Patient must avoid vanilla-containing food. Repeat collection on 3 consecutive days.

15. Determination on fluids

Pleural fluid Ascites fluid	Exudate: Fluid/ serum protein ratio >0,5 Fluid / serum LD ratio >0,6 Fluid LD >200 U/l	
ADA	Pleural fluid	<25 U/l values >60 suggestive of TB, septic effusion, lymphoma, leukaemia, TB
	Pericardiac fluid	
	Ascitis fluid	
	CSF	<4 U/l/ >6U/l suggestive of TB meningitis

16. Other tests

Homocysteine	EDTA purple top	Fasting 2,1 – 15,7 µmol/l Post: 15,0 – 42,2 Homocysteine increase: 8,3 – 27,7
IgE	Yellow	0,0 – 378 kU/l
Lithium	Yellow	0,5 – 1,2 mmol/l
Amylase (serum)	Yellow	0 – 17 U/l
Amylase (urine)	Urine	0 – 650 U/l
Uric acid	Yellow	0,15 – 0,35 mmol/l

HbA1c	EDTA tube on ice purple top	<6% (N) non-diabetic <7% target value
		>8% Additional action
Porphyrins	Blood (heparin tube)	Negative Specimen must be protected against light.
Transketolase	Blood (Li Heparin – green tube)	On ice (blood to be drawn prior to administration of thiamine)

17. Tests sent to other laboratories

ACTH	5ml EDTA blood on ice	Sent on ice. Sent to Johannesburg
Acetyl choline receptor antibody	5ml Clotted blood	Sent to GSH
ACE (Angiotensin converting enzyme)	5ml Clotted blood	Sent to Johannesburg
Aluminium	10ml Clotted blood	Mineral-free tube. Sent to Johannesburg. Avoid antacids containing aluminium.
BETA-2- microglobulin	5ml Clotted blood	Sent to TBH / Chem TBH
Ca 125	5ml Clotted blood	Sent to GSH
Ca 199	5ml Clotted blood	Sent to GSH
Ca 153	5ml Clotted blood	Sent to Johannesburg
Ca 724	5ml Clotted blood	Sent to Johannesburg
Ceruloplasmin	5ml Clotted blood	Sent to Johannesburg
Calcitonin	5ml Clotted blood	Sent to Johannesburg
C-peptide	5ml Clotted blood	Sent to Johannesburg
DHEAS	5ml Clotted blood	Sent to GSH
Faecal elastase	Stool	Sent to Pretoria Academic
Gastrin	5ml Clotted blood	Sent to Johannesburg
Growth Hormone	5ml Clotted blood	Sent to Johannesburg
LEAD	Heparin blood/urine	Sent to Johannesburg
Renin Aldosterone	EDTA Yellow	Sent to GSH
	NB: Submit these samples together.	

Selenium	5 ml Clotted blood	Mineral-Free tube Sent to Johannesburg
SHBG	5 ml Clotted blood	Sent to GSH

HAEMATOLOGY LABORATORY

9th floor, Tygerberg Hospital
Head of Department: Prof Akin Abayomi, 021-938 5348

Consultants: 021-938 4399/6358/5692
Registrars: 021-938 4613/4089
Clinical haematologist: 021-938 5888

Haematology offers a wide range of routine and specialised investigations to help with the diagnosis and treatment of patients. The department comprised 5 different sections:

- Routine Laboratory: 021-938 5750
- Coagulation Laboratory: 021-938 4615
- Bone Marrow Laboratory: 021-938 4122
- Haemolytic Studies Laboratory: 021-938 4615
- Antenatal Blood Grouping Laboratory: 021-938 6081

Request forms
Please provide the following information in legible handwriting:

- patient's name, surname, date of birth and folder number
- ward number, clinic code, date and time of specimen collections
- initials and name of doctor to be contacted if abnormal results are obtained
- relevant clinical information
- relevant therapy, e.g. warfarin and heparin.

Specimens
Specimen tubes (C9 Core Lab, ext. 5159/5074): All specimens are received here. Urgent FBCs and coagulation tests must be arranged telephonically. Any results not available on the ward computers may be obtained at the above telephone numbers.

Specimen types

EDTA	Purple-topped tube (routine FBC)
Sodium citrate	Light-blue-topped tube (coagulation)
Sodium citrate	Black-topped tube (ESR)
Clotted blood	Yellow

If a patient identification sticker is used on a specimen tube, it must be shortened and pasted lengthwise to ensure blood-level visibility. Stickers wrapped around the tube will damage the automated cell counter's conveyer belt.

1. Routine Laboratory (C9B Core Lab, ext. 5750)

Investigation	*Specimen Type*
Full blood count	5 ml EDTA blood
Differential WBC count	5 ml EDTA blood
Reticulocyte count	5 ml EDTA blood
Peripheral blood smear	5 ml EDTA blood
(All the above can be done on one 5-ml EDTA blood specimen)	
Lamellar body count	2ml amniotic fluid (sent in plain tube)
Erythrocyte sedimentation rate (ESR)	2 ml sodium-citrate blood (black)

2. Coagulation Laboratory (Core Lab, ext. 4615)

Investigation	*Specimen Type*
Clotting profile: INR and PTT	2,7 ml sodium citrate
DIC screen: D-dimer (FDP) monomers	2,7 ml sodium citrate
Fibrinogen	2,7 ml sodium citrate
Thrombin time, with and without protamine sulphate	2,7 ml sodium citrate
(All the above can be done on one 2,7 ml sodium citrate blood specimen)	

Investigations for hypercoagulability

Investigation	*Specimen Type*
Protein C, protein S and Antithrombin	2,7ml sodium citrate
Protein C resistance	2,7ml sodium citrate
(The above four investigations can be done on two 2,7 ml sodium- citrate blood specimens)	
Factor V Leiden	5 ml EDTA blood

Screening for lupus anticoagulant: 2, 7 ml sodium citrate.
(Investigations are done in batches and not on a daily basis.)

Investigations for bleeding tendency

Investigation	*Specimen Type*
Bleeding time	Arrange with laboratory
Platelet aggregation studies	Arrange with pathologist
Clotting factor levels	2, 7 ml sodium-citrate blood Arrange with laboratory.
Screening for clotting factor inhibitors	2, 7 ml sodium-citrate blood Arrange with laboratory.

Please note: specimens must reach the Coagulation Laboratory within 8 hours of venipuncture.

3. Haemolytic Laboratory (Core Lab, ext. 4615)

Investigation	*Specimen Type*
Direct and indirect Coombs' test	2 ml clotted blood
Haptoglobin	2 ml clotted blood
Cold agglutinins and cryoglobulins	Arrange with the laboratory before 09:00
Osmotic fragility	5 ml EDTA blood (only Mondays to Thursdays) before 12:00
G6PD screening test	5 ml EDTA blood
Hb electrophoresis	5 ml EDTA blood
Sickling Test	5 ml EDTA blood
Malaria	5 ml EDTA blood

4. Nutritional anaemias

Investigation	*Specimen Type*
Serum vitamin B12	5 ml clotted blood
Serum folate	5 ml clotted blood
Serum ferritin	5 ml clotted blood
RBC folate	5 ml EDTA blood
The above are done on a weekly basis.	

5. Bone Marrow Laboratory (Room 59, C9A, Gold Ave, ext. 4122)

Bone-marrow investigations are done on a daily basis. They comprise a bone marrow aspirate and one or more trephine biopsies. This is a surgically invasive procedure. The patient therefore needs to give written consent for the procedure.

Children and adults are usually done under local anaesthetic. Outpatients need to be admitted to the hospital by the duty firm prior to the procedure. Haematology outpatients are admitted via the X-Block.

Premedication must be given one hour before the procedure. The ward sister will be informed telephonically of the time that this must be given. An appointment must be arranged with the laboratory. The referring doctor must then consult the relevant pathologist and confirm the appointment. The procedure will only be done if a completed request form (TH333) is received.

The referring doctor is responsible for:
1. consent for the procedure
2. premedication
3. request form
4. safe discharge of the patient after the procedure.

Neutrophil alkaline phosphatase (NAP)
Arrange with laboratory – fresh blood from a fingerprick is required.

CSF cytospin
Fresh, warm CSF specimen kept at 37°C, delivered by hand immediately after the lumbar puncture, is required.

Buffy preparation
5 ml EDTA blood is required. This is done only if WBC count is <4000 per µl or <4 x 109/µl.

Haemosiderin in urine
Fresh urine specimen in an ordinary urine-specimen container.

Flow cytometry for immunological markers
Arranged by the referring doctor with the pathologist.

6. Blood Grouping Laboratory
(Room 205, C9A, Gold Ave, ext. 6081/6082)

Investigation	*Specimen Type*
Antenatal tests	5 ml EDTA blood
Postnatal tests	5 ml EDTA maternal blood 5 ml EDTA cord blood
Cordiocentesis	Arrange with laboratory
Amniocentesis	Arrange with laboratory

7. After-hours emergency investigations (routine and coagulation)
Contact the technologist on call via the pager service. Only investigations arranged in this manner will be done after hours (bleeper 482).

Please note: Coagulation specimens must be processed within 8 hours following venipucture. The laboratory's tube station is monitored 24 hours a day and specimens can be sent directly to the laboratory (tube C9).

MICROBIOLOGY LABORATORY
C passage, 9th Floor, Eastern side, Tygerberg Hospital

Head of Medical Microbiology & Immunology: Prof. E. Wasserman, ext. 4032
Head of Immunology: Dr Monika Esser, ext. 5228
Consultant on call: bleeper number 438

Consultants
Prof. A. Forder: ext. 4035
Dr Heidi Orth: ext. 4021
Dr Rena Hoffmann: ext. 4008

Registrars
Dr Riezaah Abrahams: ext. 4009
Dr Siseko Martin: ext. 4009
Dr Zukile Gqada: ext. 5193
Dr Preneshni Naicker: ext. 5193

Laboratories
Reception: ext. 4012
Microbiology: ext. 4006/7
Blood cultures: ext. 4026
TB: ext. 4031
Immunology: ext. 4001/4018

General instructions
1. All diagnostic information from the Microbiology Laboratory is contingent on the quality of the specimen received. Consequences of a poorly collected and/or poorly transported specimen include: i) failure to isolate the causative micro-organism, and ii) recovery of contaminants or normal microbial flora which may be misleading and may result in improper treatment of the patient.
2. Safety considerations with regard to the handling of specimens:
    - Treat all specimens as potentially hazardous.

- Do not contaminate the external surface of the collection container and/or its accompanying paperwork.
- Minimise direct handling of specimens in transit from the patient to the laboratory. Ideally, specimens should be placed in sealable plastic bags with a separate pouch for the specimen request form.

3. Please ensure that samples are correctly labelled and that the request form is filled in with all the relevant data.
4. The points listed below each specimen type enable clinicians and nursing staff to take a good-quality specimen.
5. Please contact the laboratory if in any doubt as to the collection or transport of a specimen.

1. Faecal specimens

Faecal-specimen collection

- Specimens should be submitted to the laboratory in a sterile screw-cap jar as soon after collection as possible (i.e. within 1 to 2 hours). Care should be taken to ensure that the specimen is not contaminated with urine. Rectal swabs should be submitted to the laboratory in a suitable transport medium (e.g. Cary-Blair, Amies or Stuart transport medium). The single most important requirement is a freshly passed stool specimen because acid metabolites in stored specimens may be detrimental to enteropathogenic bacteria. In some instances, the collection of a rectal swab instead may be necessary if it is impossible to obtain a stool sample, particularly in neonates or in severely debilitated adults.
- Sample portions containing pus, blood or mucus when submitting the specimen. A pea-sized quantity is sufficient for bacteriological processing.
- If there is a long delay in transit to the laboratory, stools submitted for *Clostridium difficile* testing should be kept refrigerated.
- Submit rectal biopsy specimens in a sterile screw-cap jar with a small amount of sterile water/saline to prevent desiccation. Specimens for microbiological processing *must not be submitted in formalin*.

Guidelines for preparing and placing of stool specimen in transport medium

A small amount of stool can be collected by inserting a sterile cotton swab into the stool and rotating it. If mucus is present, it should be sampled with the swab. Immediately insert the swab into transport medium. The swab should be pushed completely to the bottom of the tube of transport medium and the top portion of the stick touching the fingers should be broken off and discarded. Recap and tighten firmly.

Collection of rectal swabs

Rectal swabs may be collected as follows: moisten the swab in sterile transport medium, insert through the rectal sphincter 2 – 3cm (1–1.5 inches) and rotate, withdraw and examine to make sure there is some faecal material visible on the swab. Immediately insert the swab into cold transport medium as described in above paragraph. Place the tube in a refrigerator or cold box if there will be a delay in transport.

Specimens of doubtful value

- unpreserved stool samples >2 hours old
- dry rectal swabs or biopsy samples
- multiple specimen collections on the same day.

Routine MC&S includes microscopy of a wet mount preparation, culture for **Salmonella, Shigella** and Campylobacter, and sensitivity testing. The wet mount preparation is examined for red and white blood cells and parasites.

Cultures for *Yersinia enterocolitica* will only be routinely done if white and red blood cells are seen in the wet preparation. Bloody stools are screened for E. *coli* 0157.H7 or tested when haemolytic uremic syndrome is suspected. Watery stools are cultured for *Vibrio cholerae*. A modified acid-fast stain is performed to identify *Cryptosporidium parvum*. It is routinely done on all stools in this laboratory.

2. Urine specimens

Urine is normally a sterile body fluid. However, unless it is collected properly, it can become contaminated with micro-organisms from the perineum, urethra or vagina. The following guidelines are provided to ensure proper specimen collection and subsequent prompt delivery of urine samples to the laboratory.

Urine-specimen collection

Midstream urine specimens (MSU)

The person obtaining the urine specimen should wash his/her hands with soap and water, rinse, and dry them. If the patient is collecting the specimen, he/she should be given detailed instructions, including diagram or a pictorial display.

- Females: Cleanse the urethral opening and the vaginal vestibule area with clean gauze pads soaked with sterile saline or sterile water. Do not use disinfectants to clean the genitalia. Hold labia apart during voiding.
- Males: Cleanse the penis, retract the foreskin (if not circumcised), and wash with sterile saline. Keep foreskin retracted during voiding (to minimise contamination with skin flora).

- Both females and males: Allow a few millilitres of urine to pass (*do not stop the flow of urine*) and collect the midstream portion of urine in a wide-mouthed sterile container.

Collect voided urine directly into a sterile container; do not use a urinal or bedpan for collection.

Catheter urine

- Indwelling urinary catheter specimens are the most unsatisfactory of all urine specimens, because these catheters are often colonised and therefore bacterial cultures are difficult to interpret.
- Do not collect sample from a drainage bag.
- Collect sample from the sampling port with a syringe and needle using an aseptic technique.

  Method:
  - o Clamp catheter tubing below port
  - o Clean sampling port with at least 2 separate 70% alcohol swabs
  - o Insert needle obliquely into port and aspirate urine.
  - o Transfer to sterile container and mark correctly: “Indwelling- catheter urine specimen”.
- A straight (non-indwelling) catheter can be used by a physician to obtain urine directly from the bladder. This procedure is not routinely recommended because there is a risk of introducing micro-organisms into the bladder. It should be done aseptically if necessary.
- Urine from an ileal conduit must be collected after removal of the external device and insertion of a catheter into the cleansed stoma.
- Urine collected by suprapubic needle aspiration of the bladder avoids contamination associated with the collection of voided urine. This is the preferred method for infants and for patients for whom the interpretation of results of voided urine is difficult.
- Foley catheter tips are unacceptable for culture.

In addition to routine information it is essential that the patient's specimen label accurately reflects:

- mode of specimen collection (e.g. MSU, suprapubic aspirate, etc). Please note that urine samples obtained by suprapubic aspiration and at cystoscopy are processed differently in the laboratory compared to, for example, conventional MSU specimens and it is therefore essential to inform the laboratory about the mode of specimen collection so as not to compromise the accuracy of results.

- patient's diagnosis or other underlying factors that may influence laboratory decisions on how to process the specimen further (e.g. prolonged incubation for fastidious organisms) should be indicated.

Timing of urine-specimen collection

- Obtain early-morning specimens whenever possible because of increased bacterial counts after overnight incubation in the bladder.
- Do not force fluids in order to have the patient void urine. Excessive fluid intake will dilute the urine and may decrease the colony count to <105 CFUs/ml.
- For Schistosoma haematobium (Bilharzia), send 3 terminal urine specimens for optimal detection of ova.

Urine-specimen transport

- Transport urine to the laboratory as soon as possible after collection.
- Urine specimens must be submitted for culture within 2 hours after collection, or refrigerated and cultured within 24 hours whenever possible.
- All specimen containers must be closed tightly to prevent leaking. If sample has grossly leaked from the container, the specimen will be rejected for processing.

3. Sterile body fluids including CSF

Cerobrospinal fluid (CSF)

Please note: CSF must be collected prior to antimicrobial therapy.

Collection of cerebral nervous system (CNS) specimens

CULTURE	OPTIMAL VOLUME (ml)[a]	COMMENTS
Bacteria	1	Send cloudiest CSF specimen to microbiology laboratory immediately
Fungi	5 – 10	Culture for *Cryptococcus* spp. is more sensitive if a higher volume of CSF is processed
Mycobacteria	5 – 10	*Mycobacterium tuberculosis, Mycobaterium avium-intracellulare* complex
Anaerobes	N/A	Brain abscess pus or central nervous system (CNS) biopsy specimens.

[a] Amounts are guidelines. Greater volumes increase the chance of organism recovery.
N/A: not applicable

- Sterile tubes without clot-activator material aspirated from a brain abscess should be immediately transported to the laboratory.
- CSF specimens should be transported to the laboratory promptly. Failure to do this may result in the non-viability of fastidious organisms and in overgrowth by more hardy bacteria.
- If prompt delivery is not possible, specimens should be kept at room temperature and never refrigerated - organisms such as Neisseria meningitidis and Haemophilus influenzae are sensitive to chilling.

Routine examination of CSF involves:

- direct cell count
- Gram stain
- India ink stain (for Cryptococcus)
- culture (bacteria)
- sensitivity testing on bacteria cultured
- other investigations: TB culture, cryptococcal antigen, and syphilis serology are performed only when clearly indicated on request form.

Interpretation of CSF Results

Condition	Macro-scopic appearance	Cell count (per mm^3)	Erythro-cytes	Protein (g/l)	Glucose (mmol/l)
Normal	Clear	0 – 5 lymphocytes (0 – 30 cells in neonate, mainly neutrophils)	None	0,15 – 0,4 (0,15 –1,5 in neonate)	2,2–3,3 (60% of blood glucose)
Bacterial meningitis	Turbid	100 – 2000 neutrophils	None	0,5 – 3 ⇧⇧	0 – 2,2 ⇩
Viral meningitis	Clear or slightly turbid	15 – 500 lymphocytes	None	0.5 – 1 ⇧⇧	Normal
Tuberculous meningitis/ Cryptococcus*	Clear or slightly turbid	30 – 500 lymphocytes plus neutrophils	None	1 – 6 ⇧⇧⇧	0 – 2,2 ⇩
Bloody tap or recent haemorrhage	Bloody or xanthochromic	Variable	High	⇧ due to blood	Normal

*All parameters may be completely normal in the severely immunocompromised patient with cryptococcal meningitis

Other sterile fluids

Commonly submitted fluids

- joint or synovial fluid
- pleural fluid
- thoracocentesis fluid
- empyema fluid
- peritoneal fluid
- ascites fluid
- paracentesis fluid
- pericardial fluid
- culdocentesis fluid.

Specimen collection

- Specimens should be collected with as little contamination from indigenous microbial flora as possible to ensure that the sample will be representative of the infected site.
- Sterile equipment and aseptic technique must be used to collect specimens to prevent introduction of micro-organisms during invasive procedures.
- If a specimen is to be collected through intact skin, cleanse the skin first. For example, use 70% alcohol followed by an iodine solution (1–2% tincture of iodine or 10% solution of povidone-iodine). *Prevent burn by tincture of iodine by removing excess after the specimen has been collected.*
- In addition to routine information it is essential that the patient's specimen label accurately reflects:
  - o the specific body site from which the specimen was taken
  - o a provisional diagnosis.
- Collect specimens in a sturdy, sterile, screw-cap, leak-proof containers with lids that do not create an aerosol when opened.
- Although small clots will occasionally form in some fluids, adding anticoagulant is not recommended; citrate or EDTA inhibits some organisms. If anticoagulant must be used, heparin should be the choice.
- Although in the past the use of blood bottles for fluid collection was not recommended, recent studies suggest that the larger the sample volume that can be cultured the more likely the recovery of low numbers of organisms in fluids such as ascites fluid will be. However, as with any broth system, the fastest- growing organism is often the only one isolated, jeopardising the recovery of slow growers. When a broth is used, no direct smear information is available and therefore no assessment of the initial distribution of organisms or inflammatory cells can be made. A smear can be prepared, however, at the time of specimen collection and submitted with the broth medium.

Transport of syringes

Specimens obtained by a doctor using needle aspiration should be transferred to a sterile container prior to transportation to the laboratory. Alternatively, and only if transferring it from the syringe will compromise the specimen, the doctor should remove the needle, using a protective device to avoid injury, and cap the syringe with a sterile cap prior to transporting it to the laboratory. It is essential that the specimen be submitted to the laboratory immediately after collection.

Transportation of swabs

Swabs are the least desirable sample for culture of body fluids and their use should be discouraged. Protection of anaerobes from ambient oxygen is impossible. A good direct smear cannot be made and the quantity of sample may not be sufficient to ensure recovery of a small number of organisms. If a swab is taken, it is essential that it be placed in an anaerobic transport medium.

4. Blood cultures

We recommend that a minimum of 2 blood cultures from different sites be submitted in order to acquire the optimal volume of blood and to facilitate the interpretation of results.

Anaerobic blood cultures are not routinely necessary.

a) Procedure

Site selection

The phlebotomist should:

- select a different site for each blood sample
- avoid drawing blood through indwelling intravenous or intra-arterial catheters. If blood cultures have been obtained from intravascular catheters, they should be labelled as such, and one set of blood cultures should also be obtained by venipuncture at the same time in order to help assess positive blood cultures from catheters.

Site preparation

- Vigorously cleanse the venipuncture site with 70% isopropyl or ethyl alcohol and wait until dry.
- Apply 2% tincture of iodine or povidone iodine in ever-increasing circles, starting at point where venipuncture is to be made. Note: A contact time of 1,5 – 2 minutes after swabbing is necessary for optimal disinfection.
- Do not touch the venipuncture site after preparation and prior to phlebotomy.

Disinfecting blood-culture bottles

- Disinfect the top of the bottle or tube with alcohol and allow top to dry.

Collection of blood

- Using a syringe and needle insert the needle into the vein, and draw blood. Do not change needles before injecting the blood into the culture bottle because of risk of needlestick injury.
- After the blood is inserted into the blood-culture system, mix well to avoid clotting.
- Use a new needle if vein is missed.
- Add sufficient volume of blood to attain a 1:10 ratio of blood to medium (the volume of blood required is indicated by the manufacturer on the bottle).
- After phlebotomy, cleanse the site with 70% alcohol to remove remaining iodine, which can cause irritation in some patients. Cover puncture-wound appropriately.

b) Specimen volume

Note: The volume of blood is critical because the number of organisms in the majority of bacteraemia is low, especially if the patient is on antimicrobial therapy. In infants and children, the number of micro-organisms during bacteraemia is higher than in adults; therefore less blood is required for culture.

Recommended volume per bottle: (see label on bottle)

- children: ideally, 3–5ml of blood per bottle
- neonates: 1–3ml of blood per bottle
- adults: Ideally 10ml blood per culture bottle (aerobic).

c) Blood cultures: recommended number and timing

- A minimum of 20ml (one set consisting of two aerobic bottles) is recommended in order to get an optimal yield from blood cultures. It may be desirable to collect sets over 3 consecutive days in patients who have been on antimicrobial therapy.
- Fever of unknown origin (occult abscess, typhoid fever, or brucellosis): Obtain separate samples initially. It is recommended that a further 2 samples be obtained during temperature spike, ideally after 24–36 hours of the initial samples. The increase in positive cultures beyond 4 cultures is very minimal.
- Suspected endocarditis – collection of blood cultures does not have to coincide with fever spikes due to continuous bacteraemia.

Bottle Types

BOTTLE	USE	BLOOD VOLUME
Standard aerobic culture bottles **blue cap** (available in wards)	Generally used in bacteraemia and fungaemia cases	Optimal blood volume per bottle for culture: 8–10ml
Paediatric culture bottles **pink cap** (obtainable from lab)	Aerobic, used for low-volume specimens such as for neonates	Optimal blood volume per bottle for culture: 1–3ml
Resin-containing aerobic culture bottles: **grey cap** (obtainable from the lab)	Resin bottles absorb antibiotics and the inhibiting components out of the blood, enhancing the recovery of micro-organisms	Optimal blood volume per bottle for culture: 8–10ml
Myco/F lytic (Mycobacteria, fungi) **red cap** (obtainable from lab)	Generally used in cases of disseminated TB, M. *avium-intracellulare* and systemic fungal infections. Candida and Cryptococcus grow well in standard aerobic bottles.	Optimal blood volume per bottle for culture: 1–5ml

Duration of incubation

Tygerberg Hospital incubates blood cultures for 5–7 days using an automated system. When fastidious organisms are suspected as a cause of sepsis or infectious endocarditis, e.g. HACEK organisms *(Haemophilus aphrophilus/ paraphrophilus, Actinobacillus actionmycetemcomitans, Cardiobacterium hominis, Eikenella corrodens* and *Kingella kingae),* the laboratory should be notified of this possibility so that the blood culture can be incubated for a longer time (21 days). Suspected Brucella is incubated for 28 days, and suspected TB and fungi are incubated for 42 days before the culture is regarded as negative.

d) Quality control

Media

- Check the expiry dates of each batch of blood-culture bottles used.
- Uninoculated blood-culture bottles should be stored in a cool dark place.
- Examine bottles for turbidity and/or change of colour before adding any blood.
- Discard any bottles showing abnormal characteristics.

Labelling and transport

Please ensure that all blood culture bottles are labelled correctly, and not over bar code and not over the bottom of the bottle (a machine does the reading at the bottom of the bottle). Complete the request form with the relevant required data. All specimens should be transported to the laboratory promptly. Failure to do this may result in the death of fastidious organisms and overgrowth by more hardy bacteria.

Intravascular catheter-tip culture

- Cleanse skin around catheter site with alcohol.
- Aseptically remove catheter and slip 5cm of the distal tip of catheter directly into sterile tube.
- Transport directly to microbiology Laboratory to prevent drying.
- Acceptable IV catheters for culture: central, CVP, Hickman, Broviac, peripheral, arterial, umbilical, hyperalimentation, Swan-Ganz.

5. Pus swabs including burn swabs

Specimens should be collected prior to the administration of antimicrobial therapy. The quality of the specimen is very important in order to isolate the causative pathogen(s) and so as not to colonise flora or contaminants.

a) Superficial wounds

Aspirates

- Syringe aspirates (3- to 5-ml syringe with 22- to 23-gauge needle) are preferable to swab specimens.
- After adequately decontaminating the surface of the wound (e.g. with 70% alcohol and then with 10% povidone-iodine solution) and, after allowing the disinfectant to dry, collect the specimen.
- The deepest portion of the lesion should be aspirated. If a vesicle is present, collect both fluid and cells from the base of the lesion.
- If the initial aspiration fails to obtain material, inject sterile, non-bacteriostatic 0.85% NaCl subcutaneously and repeat the aspiration attempt. If no material is obtained, rinse the needle and syringe with broth by drawing the culture medium through the needle into the syringe. In the past, it has been permissible to use the aspirating syringe as the transport container provided the needle was capped. This practice is no longer acceptable because of the increased possibility of needlestick injuries. If a delay in processing of more than 30 minutes is anticipated, the specimen should be transferred to an anaerobic transport container.

Pus swabs

If material cannot be obtained with a needle and a syringe, and a swab must be used, it may be necessary either to separate the wound margins with the thumb and forefinger of one hand (wearing a sterile glove) and take a deep swab or make a small opening in a closed abscess with a scalpel blade before extending the tip of the swab deeply into the depths of the lesion with the other hand. Care should be taken not to touch the adjacent skin margins. The swab should then be placed onto the appropriate culture media as soon as possible after collection; alternatively, it can be placed immediately into a suitable transportation medium (e.g. Amies or Stuart). Dry swabs are unacceptable.

b) Ulcers and nodules

- Clean the area with 70% alcohol and then a 10% povidone iodine solution.
- Remove overlying debris.
- Curette the base of the ulcer or nodule.
- If exudate is present from the ulcer or nodule, collect it with a syringe or a sterile swab.

c) Burn specimens

The surfaces of burn wounds will become colonised by the patient's own microbial flora or by environmental organisms. When the organism load is large, infection of underlying tissue may occur, and bacteraemia may ensue. Cultures of the surface alone are misleading; therefore biopsies of deeper tissues after debridement are often indicated. Clean the surface of the wound with sterile saline or water before collecting specimens. Blood cultures should be taken if septicaemia is suspected.

d) Deep wounds, aspirates, and tissue specimens

Bite wounds

Aspirate pus from the wound or obtain it at the time of incision, drainage, or debridement of the infected wound.

Bone

Obtain bone specimen during surgery. Submit in sterile container without formalin. Specimen may be kept moist with sterile 0.85% NaCl.

Deep wounds or abscesses

Disinfect the surface with 70% alcohol and then with an iodine solution (e.g. 10% solution of povidone iodine). Aspirate the deepest portion of the lesion, avoiding

contamination by the wound surface. If collection is done at surgery, a portion of the abscess wall could also be sent for culture.

Punch skin biopsies

Disinfect the skin surface with 70% alcohol and then with 10% povidone iodine solution. Collect a 3 – 4mm sample with a dermal punch. Submit for microbiological analysis in a sterile container without formalin.

Soft tissue aspirate

Disinfect the surface with 70% alcohol and then with 10% povidone iodine solution. Aspirate the deepest portion of the lesion or sinus tract. Be careful to avoid contamination by the wound surface.

Throat (pharyngeal specimens)

- Do not obtain throat samples if epiglottis is inflamed, as sampling may cause serious respiratory obstruction.
- Depress tongue gently with tongue depressor.
- Extend sterile swab between the tonsillar pillars and behind the uvula. (Avoid touching the cheeks, tongue, uvula, or lips.)
- Sweep the swab back and forth across the posterior pharynx, tonsillar areas, and any inflamed or ulcerated areas to obtain sample.
- Throat swabs are processed for the recovery of beta-haemolytic Streptococci only. Staphylococci may cause tonsillar abscess – please send pus for culture.
- Indicate on request form if diphtheria is suspected, in which case a sample of the pseudomembrane should be collected rather than a swab.

Nasal swabs

- These are submitted primarily for the detection of staphylococcal carriers.
- After moistening the swab with sterile water or saline, insert the swab into the nose until resistance is met at a level of the turbinates (2 cm).
- Rotate the swab against the nasal mucosa.
- Repeat the process on the other side with the same swab. Nasal swabs are not suitable for the detection of the etiologic agents of sinusitis. A needle aspirate of the sinus is the specimen of choice.

***Swabs for the culture of* B. pertussis**

Contact lab to obtain special agar medium (charcoal-cephalexin plates) and "calcium-alginate" swabs for the collection of pernasal specimens.

To take a pernasal swab: insert the swab in the nasal passage, aiming towards the

midline and down. Follow the floor of the nasal passage for ~5 cm (depending on the age of the patient) until progress is blocked by the posterior wall of the nasopharynx. Take >1 swab on consecutive days for optimal results. Plates are incubated for 7 days. Alternative: nasopharyngeal aspirate.

Other upper-respiratory-tract specimens that may be submitted to the laboratory by a clinician are sinus aspirates and tympanocentesis fluid.

e) Specimen collection for sexually transmitted diseases: general recommendations

Cervical swabs
The cervix should be visualised via speculum examination and normal or inflammatory discharges should be removed with swabs. For chlamydia and gonorrhoea, the collection swab should be inserted 2 –3cm into the endocervical canal and rotated against the walls of the canal to dislodge columnar epithelial cells. The swab is rolled onto a slide for microscopic examination or placed into appropriate transport or storage medium (Amies transport medium for GC and chlamydia) for the subsequent diagnostic test required.

Please note: Vaginal swabs are not suitable for the isolation of *Neisseria gonorrhoea* and chlamydial antigen detection.

Rectal swabs
Insert the swab 2 – 3cm into the anal canal, press laterally then rotate to obtain columnar epithelial cells with minimal faecal contamination. Process as for cervical swabs.

Urethral swabs
A thin cotton or Dacron swab on a wire shaft is inserted 2 – 4 cm into the urethra, rotated and used to prepare smears for microscopic examination or placed into appropriate transport media.

Eye specimens
Use conjunctival scrapings (using spatula or No. 15 blade scalpel without touching lashes or lids) or sterile cotton swabs to sample the discharge or lower conjunctival surface. Two swabs are preferred (one for Gram stain and one for culture.) Put directly onto blood agar, chocolate agar, or put in appropriate transport media. If gonococcal or chlamydial conjunctivitis is suspected, send specimen in Amies transport medium.

Ear-swab cultures

Ear swabs are only useful for isolation of pathogens causing otitis externa. The flora of the external meatus bears no relation to that behind the eardrum. Ear swabs are taken from just inside the external meatus. The most common pathogens are S. aureus and Pseudomonas auruginosa. Most cases respond to keeping the ear clean and dry. For the isolation of pathogens causing otitis media, fluid from behind the eardrum should be aspirated for culture.

Transport

- All specimens should be transported to the laboratory promptly. Failure to do this may result in the death of fastidious organisms and overgrowth by more hardy bacteria.
- If prompt delivery is not possible, specimens should be refrigerated at 4 – 8°C.
- Syringes: Specimens obtained by a doctor using needle aspiration should be transferred to a sterile tube for transport to the laboratory. Alternatively, and only if transferring it from the syringe will compromise the specimen, the doctor should remove the needle using a protective device to avoid injury, and cap the syringe with a sterile cap before transporting it to the laboratory. It is essential that the specimen be submitted to the laboratory immediately after collection.

Anaerobic cultures

A foul-smelling discharge may indicate anaerobic infection.

Most anaerobes are susceptible to amoxicillin-clavulanate (Augmentin), clindamycin and metronidazole. No disk-sensitivity testing is performed on anaerobes, but the report will indicate whether an anaerobe produces beta-lactamases (indicating resistance to penicillins).

Aspirated pus for anaerobic culture can be sent in a syringe (needle removed) or sterile tube, and tissue in a sterile container with or without sterile saline.

IUCDs (intra-uterine contraceptive devices) can be sent in a sterile container for culture of Actinomyces.

Pus swabs are not acceptable for anaerobic cultures except when sent in anaerobic transport medium. These specimens should not be refrigerated.

6. Fungal culture

Collection

Skin

Epidermal scales are collected by scraping the affected areas with a blunt, banana-shaped scalpel. Material from the active periphery of lesions is taken for examination. In paronychial infections, the nail fold should be moistened with sterile water and a dental probe used to remove material from under the nail fold. Roofs of vesicles are snipped off with sterile scissors for examination. It is not necessary to pre-clean skin with 70% ethanol unless ointments or other topical medications have been recently applied.

Nails

Whole thicknesses of affected nails are clipped off using nail clippers. Subungual debris is scraped out with a blunt scalpel or dental probe and often contains much fungus.

Hair

Scalp and other hair-bearing areas should be examined under a Wood's lamp. Fluorescent hairs (bright green in *Microsporum* infections, dull green in favus or hair stumps should be plucked out with sterile forceps. If no fluorescence is noted, lustreless hairs or stumps of hairs broken off at follicular level should be plucked out.

Skin scrapings should also be taken from suspect areas (hair stumps are often extracted by this method). Scalp samples (especially for mass screening) can be obtained using individually bagged plastic massage brushes, velvet squares or even swabs.

Transport

Specimens should be sent dry in specimen jars to prevent overgrowth of contaminating fungi. Spores of fungi in these specimens will remain for many weeks to several years when maintained in a dry condition.

Subcutaneous fungal lesions

Send biopsy tissue or aspirated pus in sterile container.

Sputum, bronchial washings, transtracheal aspirates, etc.

Collect into sterile containers and transport to the laboratory **without delay.** Refrigeration will rapidly kill the yeasts of *Histoplasma capsulatum*, therefore this is

not advised when histoplasmosis is suspected.

Bone marrow

Bone marrow should be aspirated into a BACTEC Myco/F-Lytic bottle (red cap) or BacTAlert-FA bottle (green cap), for fungal cultures.

7. Infections of the respiratory tract

- Pharyngitis, pertussis and laryngitis: see pus-swab section.
- Epiglottitis: culture of the throat is not indicated. Touching the inflamed epiglottis may precipitate the complete obstruction of the airway.
- Sinusitis: the specimen of choice is a needle aspirate of the sinuses. No specimen other than an aspirate is recommended. Submit only swabs because aspirates of tissue cannot be obtained.

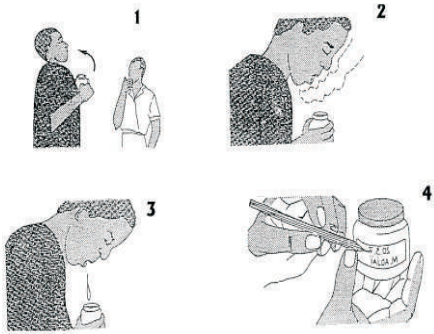
Sputum and lower respiratory tract

Infections of the lower respiratory tract are a major cause of morbidity and mortality. Diagnosis of these infections is frequently complicated by the contamination of specimens with upper-respiratory-tract secretions during collection. Specimen quality is judged microscopically. A properly collected specimen should contain minimal numbers of squamous epithelial cells and significant numbers of neutrophils with bacterial infection.

Specimen collection

Specimens include sputum, tracheal aspirates, bronchial washings, bronchial brushes, bronchial-biopsy specimens, bronchoalveolar-lavage fluid, transtracheal aspirate, lung aspirate and lung-biopsy specimens.

- It is best to obtain a sputum specimen early in the morning, before the patient has eaten or taken medication.
- Collecting a good sputum specimen is not easy and requires that the patient be given clear instructions and an explanation of the difference between sputum and saliva/spit.
- It is important to remember that aerosols containing TB bacteria may be produced when the patient produces a sputum specimen.
- It is best for the patient to produce a specimen either outside in the open air or away from other people.
- Patients should not produce sputum in confined spaces such as toilets.
- The person supervising the sputum collection should stand behind the patient to avoid breathing in any aerosols that may be created when the patient coughs.



The following instructions should be followed when collecting sputum samples:

1. The patient should rinse his/her mouth with water, then take two deep breaths, holding the breath for a few seconds after each inhalation and then exhaling slowly.
2. The patient should hold the specimen container to the lower lip and gently release the specimen from the mouth directly into the container and avoid spills.
3. The specimen container is then capped and clearly labelled.
4. The specimens should be transported to the laboratory as soon as possible after collection. Do not freeze specimens.

***Procedure for induction of sputum for the isolation of* Pneumocystis jirovecii**

1. Patient should preferably not have eaten for 8 hours.
2. Patient should brush teeth with water, rinse thoroughly and gargle several times.
3. Patient inhales 20 – 30ml of hypertonic saline (3 – 5%) in a fine mist generated by an ultrasonic nebuliser over 10 – 20 minutes.
4. Patient is encouraged to take several deep breaths and cough deeply.
5. Collect sputum in sterile containers.
6. Sputum collected initially should be sent for TB and AFB, fungal culture and MC&S.
7. Later specimens are more likely to be representative of distal respiratory tract secretions and should be sent for *Pneumocystis jirovecii* examination.

An indirect immunofluorescence test is done – see "Serology Laboratory".

Guidelines for proper specimen transport

All specimens should be transported to the laboratory promptly. Failure to do this may result in the death of fastidious organisms and in overgrowth by more hardy bacteria. If prompt delivery is not possible specimens should be refrigerated at 4 – 8OC.

TB LABORATORY

Tel: 021-938 4031

Proper collection procedures are imperative for accurate laboratory analysis. The quality of specimens collected and the proper transport of those specimens to the laboratory are critical to successful isolation of etiological agents.

General guidelines for specimen collection for TB analysis

- Use ***only*** sterile, screw cap, leak-proof, disposable plastic containers for specimen collection.
- Do not use waxed containers as they may produce false-positive smear results.
- Label the container with the patient's name, specimen type and date and time of collection.
- Collect initial specimens before antituberculous medication is started.
- Swabs are not recommended for the isolation of Mycobacteria.
- Collect sufficient material for the tests requested (see table below).
- Do not use any fixatives or preservatives.
- The specimen should be transported to the lab as soon as possible after collection. If this is not possible, the specimens should be refrigerated to inhibit the growth of unwanted micro-organisms.
- *Do not freeze specimens.*
- Mycobacteria are killed by ultraviolet light; therefore specimens ***should not*** be placed anywhere where they may be exposed to direct sunlight or become too hot.

Sputum microscopy and culture

Acid-fast microscopy is done on all sputum specimens where TB microscopy is requested. TB culture is not routinely done on sputa, except in children <15 years.

Motivate if TB culture and sensitivity testing is required, e.g. suspected MDR TB or no response on anti-TB therapy. If 3 consecutive sputum specimens are negative for acid-fast bacilli and TB is still clinically suspected, send 2 more sputum specimens on 2 consecutive days for TB culture.

Please note: the laboratory will not process leaking specimens.

Specimen requirements for mycobacterial isolation and acid-fast stains

Specimen Type	Specimen Requirements	Specimen Instructions	Unacceptable Specimens
Abscess contents, aspirated fluid	As much as possible in sterile container	Cleanse skin with alcohol before aspirating sample. Collect sample on swab, and place in transport medium only if volume is insufficient for aspiration by needle and syringe.	Dry swab
Blood	5 ml inserted directly into BACTEC Myco/F-Lytic bottle (**red cap**) or BacT/Alert-MB-bottle (**black cap**) (obtainable from Core Lab reception)	Disinfect site as for routine blood culture. Mix tube contents immediately after collection.	Blood collected in EDTA, citrate, oxalate or fluoride tubes – these inhibit mycobacterial growth even in trace amounts
Body fluids (pleural, pericardial, peritoneal etc.)	As much as possible (10 –15 ml minimum) in sterile container	Disinfect site with alcohol if collecting by needle and syringe. Since many of these fluids may contain fibrinogen, it may be necessary to add anti-coagulant (heparin) to collection container.	
Bone	Bone in sterile container without fixative or preservative		Specimen submitted in formalin

Bone marrow	As much as possible in BACTEC Myco-F-lytic bottle (**red cap**) or BacT/Alert-MB bottle (**black cap**) (obtainable from Core Lab reception)	Collect aseptically. Mix tube contents immediately following collection.	
Broncho-alveolar lavage or bronchial washings	≥ 5 ml in sterile container	Avoid contaminating bronchoscope with tap water. Saprophytic mycobacteria may produce false-positive culture or smear results.	
Bronchial brushing	Sterile container		
CSF	≥ 5 – 10ml in sterile container	Use maximum volume attainable.	
Fine needle aspirate	Submit dry, unfixed slide and aspirate in a sterile container or directly inoculated a specific Myco/F-Lytic blood-culture bottle (only supplied to Cytology clinic)	Make smear of aspirate on a clean dry slide. Air dry. Do not use any fixative.	Slide sprayed with fixative
Gastric lavage fluid	≥ 5–10ml in sterile container. Collect in the morning soon after patient awakens in order to obtain sputum swallowed during sleep.	Collect fasting early-morning specimen on 3 consecutive days. Use sterile saline. Adjust to neural pH with 100 mg of sodium carbonate immediately following collection.	Specimen that has not been pH-neutralised

Specimen Type	Specimen Requirements	Specimen Instructions	Unacceptable Specimens
Lymph node	Node or portion in sterile container without fixative or preservative	Collect aseptically. Select caseous portion if available. Do not immerse in saline or other fluid and do not wrap in gauze.	Specimen submitted in formalin
Skin -lesion material	Submit biopsy specimen in sterile container without fixative or preservative. Submit aspirate in sterile container.	Swabs in transport medium (Amies or Stuarts) are acceptable only if biopsy sample or aspirate is not obtainable. For cutaneous ulcer, collect biopsy sample from periphery of lesion, or aspirate material from under margin of lesion.	Dry swab
Sputum	5 – 10ml in sterile, wax-free, disposable container. Collect an early-morning specimen from deep, productive cough on at least 2 consecutive days. Do not pool specimens.	For expectorated sputum, instruct patient on how to produce sputum specimen as distinct from saliva or nasopharyngeal discharge. Have patient rinse mouth with water before collecting specimen to minimise contaminating specimen with food particles, mouthwash, or oral drugs, which may inhibit the growth of Mycobacteria. For induced sputum, use sterile hypertonic saline. Avoid sputum contamination with nebulizer reservoir water. Saprophytic Mycobacteria in tap water may produce false-positive culture or smear results. Indicate on request if specimen is induced sputum, as these watery specimens resemble saliva and risk rejection as inadequate.	24-hour specimens

Stool	≥ 1 g in sterile, wax-free, disposable container	Collect specimen directly into container, or transfer from bedpan or plastic wrap stretched over toilet bowl. Wax from container may produce false-positive smear.	Frozen specimen. Utility of culturing stool for acid-fast bacilli remains controversial.
Tissue biopsy sample	1 g of tissue, if possible, in sterile container without fixative or preservative	Collect aseptically. Select caseous portion if available. Do not immerse in saline or other fluid and do not wrap in gauze. Freezing decreases yield.	Specimen submitted in formalin
Trans-tracheal aspirate	As much as possible in sterile container		
Urine	As much as possible (minimum – 40 ml) of first morning specimen obtained by catheterisation or of midstream clean catch in sterile container. For suprapubic tap, as much as possible in sterile container.	Collect first-morning specimen on 3 consecutive days. Only one specimen per day is acceptable. Organisms accumulate in bladder overnight, so first-morning void provides best yield. Specimens collected at other times are diluted and are not optimal.	24-hour pooled specimens, urine from catheter bag. Specimens of <40 ml unless larger volume is not obtainable.
Wound material	See biopsy or aspirate	Swabs are acceptable only if biopsy or aspirate is not obtainable. If used they must be placed in transport medium (Amies or Stuart). Negative results are not reliable.	Dry swab

IMMUNOLOGY

Routine (Nephelomentary) Laboratory: 021-938 4001
Syphilis Laboratory: 021-938 4001
CD 4 Laboratory: 021-938 5278
Elisa: 021-938 4018
Immunoflorescence test: 021-938 6238
Laboratory Manager: 021-938 5564

Test	Comments	Sample	Schedule
1. Nephelometry			
C3		Clotted blood	Daily
C4		Clotted blood	Daily
Anti-streptolysin O	ASOT and DNASB always done together	Clotted blood	Daily
Anti-DNase B		Clotted blood	Daily
Rheumatoid factor		Clotted blood	Daily
Widal		Clotted blood	Daily
Yersinia		Clotted blood	Daily
Thyroid Ab's		Clotted blood	Weekdays
2. Syphilis and immunofluorescence			
RPR	Screening test for syphilis before specialised tests done	Clotted blood/ EDTA (for screening only)	Daily
VDRL	Only on CSFs	CSF	Weekdays
FTA	Done after RPR/VDRL screen	Clotted blood/only/CSF	Weekdays
Bilharzia		Clotted blood	Weekdays (can be batched)
Coxiella		Clotted blood	Weekdays
Legionella IFA		Clotted blood	Weekdays
Mycoplasma IFA		Clotted blood	Weekdays
Rickettsia IFA		Clotted blood	Weekdays
Pneumocystis carinii IFA		Tracheal aspirates/ sputa, etc.	Weekdays
Anti-nuclear factor IFA	Lupus screening test	Clotted blood	Weekdays

Anti-double stranded DNA	Done after ANA screen	Clotted blood	Weekdays
Anti-neutrophil cytoplasmic Ab's		Clotted blood	Weekdays
Centromere Ab's ANA screen		Clotted blood	Weekdays
Liver/Kidney microsomal Ab's		Clotted blood	Weekdays
Mitochondrial Ab's		Clotted blood	Weekdays
Smooth muscle Ab's		Clotted blood	Weekdays
Parietal call Ab's		Clotted blood	Weekdays
Glomerular basement membrane Ab's		Clotted blood	Weekdays
Anti-endomesium Ab's	Replaced by TTG test	Clotted blood	Discontinued

3. Immonochemistry			
Anti-cardiolipin Ab's		Clotted blood	Weekly
Anti-glutamate carboxylase Ab's GAD/IA2 Antigen combination test	Type 1 diabetes mellitus autoimmune disease	Clotted blood	Weekly
Anti-cyclic citrullinated peptide	Confirmatory test for RA	Clotted blood	Weekdays
Entamoeba IgG		Clotted blood	Weekdays
Jo-1 Ab's		Clotted blood	Weekdays
Brucella IgM/IgG		Clotted blood	Weekdays
Complement (total)	Must arrive on ice.	Clotted blood	Weekly
Tissue-transglutamase Ab's gliadin test	Replacement for endomesium and gliadin test	Clotted blood	Weekdays
Factor B, Factor H, Factor I, Properdin	Only C6-referred to JHB NHLS	Clotted blood Clotted blood	Discontinued
C3 nephritic factor	Screened with C3-C3 should be drastically reduced	Clotted blood	No functional test available currently
Cysticercus		Clotted blood	Weekdays

Echinococcus		Clotted blood	Weekdays
Extractable nuclear antigen Ab's – RNP/Sm Ab's	Done as part of ANA screen or part from ANA screen	Clotted blood	Weekdays
Histoplasma precipitin		Clotted blood	Weekdays
Leptospira IgM		Clotted blood	Weekdays
Scl-70 Ab's		Clotted blood	
Toxocara		Clotted blood	Weekdays
Toxoplasma IgG/IgM		Clotted blood	Weekdays
Haemophilus influenza Ab's	Vaccination studies	Clotted blood	
Streptococcus pneumonia Ab's	Vaccination studies	Clotted blood	Weekdays
Clostridium tetanus Ab's	Vaccination studies	Clotted blood	Weekdays
Corynebacterium diphtheriaen Ab's	Vaccination studies	Clotted blood	Weekdays
Bordetella pertussis Ab's	Vaccination studies	Clotted blood	Weekdays

4. Cellular immunology			
T, B & NK cell counts	Done on Bronchoalveolar lavage	BAL	Prior arrangement with laboratory
CD3/CD4/CD8 counts	Done on all non-ARV samples	EDTA blood	Daily
T, B & NK cell counts	Done on samples when requested-specialised markers for immune monitoring	EDTA blood	Daily
PLG-CD4	Done on all ARV classified patients as well as non-ARV patients: CD4 count only	EDTA blood	Daily
HLA B27		EDTA blood	Daily

Lymphocyte proliferation	PHA:T-cell mitogen only	EDTA blood	Prior arrangement with the laboratory
	Con A: T-cell mitogen only	EDTA blood	Prior arrangement with the laboratory
	Prot A: B-cell mitogen only	EDTA blood	Prior arrangement with the laboratory
	Pwm: T-cell dependent B-cell mitogen	EDTA blood	Prior arrangement with the laboratory
	Candida: T-cell antigenic stimulant	EDTA blood	Prior arrangement with the laboratory
Respiratory burst		Heparin blood	Prior arrangement with the laboratory
Phagocytosis		EDTA blood + clotted blood	Prior arrangement with the laboratory
Bacterial killing		EDTA blood + clotted blood	Prior arrangement with the laboratory
Chemotaxis		EDTA blood + clotted blood	Prior arrangement with the laboratory

Note: Lymphocyte proliferation tests, neutrophil-function tests, LADRC, CD40L, and BAL must be pre-arranged and booked for a specific day. The blood must reach this lab before 09:00 on the day for which it was booked. Blood should not be more than 6 hours old.

The blood must be freshly taken and immediately transported to us. No tests can be done on old blood. Control samples may be requested for some of the specialised tests.

5. Referred tests			
Acetylcholine receptor Ab's		Clotted blood	Sent to GSH
C1 esterase inhibitor	Functional assay available at a later stage	Clotted blood	Screening test done at JHB NHLS.
C' fractions	Only C6 screen available	Clotted blood	Referred to JHB NHLS.
IgG subclasses		Clotted blood	Done at JHB NHLS

Avian precipitins		Clotted blood	Referred to GSH
Chlamydia	Antigen detection	Chlamydia swab	Referred to GSH
Fungal precipitins		Clotted blood	Referred to GSH

Leukocyte adhesion receptor		Heparin blood	Referred to external service provider
CD40 ligand		Heparin blood	Referred to external service provider
Gliadin test		Clotted blood	Referred to JHB

VIROLOGY LABORATORY

Results and Reception	021-938 9557
Serology and Isolation	021-938 9348
Molecular	021-938 9555
Pathologist	021-938 9691
Registrars	021-938 9347
Tygerberg Hospital	021-938 4911
Virologist on call	pager 0589

1. Molecular Laboratory

Please refer to the table for a list of nucleic and acid-detection tests offered by the Virology Laboratory. If you require any tests that are not listed, please phone the laboratory for discussion. Unless otherwise indicated, all tests listed are performed and results sent out daily.

Test	**Sample Type**	**Special Information**
HIV1 DNA(+ RNA) PCR	EDTA blood, dried blood spot	Daily
HIV1 Viral Load	EDTA blood or PPT (EDTA)	Daily
HIV1 resistance genotyping	EDTA blood (2 tubes)	Weekly
HIV2 PCR	EDTA blood	Referred
HTLV I DNA PCR	EDTA blood	Referred
Influenza A/H1N1 (Novel) 2009	Respiratory samples and swabs	Twice weekly
HSV PCR	CSF	Referred
VZV PCR	CSF	Referred
EBV PCR (quantitative)	EDTA blood	Referred

EBV PCR (semi qualitative)	EDTA blood	Referred
CMV PCR (quantitative)	CSF, EDTA blood, urine, amniotic fluid	Referred
CMV PCR (semi-qualitative)	CSF, EDTA blood, urine, amniotic fluid	Referred
HBV PCR (qualitative)	EDTA blood	Referred
HBV viral load	EDTA blood	Referred
HCV PCR (qualitative)	EDTA blood	Referred
HCV PCR (semi-qualitative)	EDTA blood	Referred
HCV genotyping	EDTA blood	Referred
JC polyomavirus PCR	CSF	Referred
BK polyomavirus PCR	Urine	Referred
Rubella PCR	Urine, amniotic fluid	Referred
Parvovirus PCR	EDTA blood	Referred
Enterovirus PCR	CSF	Referred

2. Serology Laboratory

Results and Reception: 021-938 9557
Serology: 021-938 9348

Please refer to the table for a list of serological tests offered by the Virology Laboratory. If you require any tests that are not listed, please phone the laboratory for discussion. Unless otherwise indicated, all tests listed are performed and all results sent out daily.

Ideally 5ml clotted blood (yellow top) should be sent for serological tests. The actually required minimum volume depends on the number of tests requested.

Generally, the presence of IgM antibodies indicates recent or active infection and of IgG antibodies past or on-going infection (depending on virus) and/or immunity (following immunisation or infection).

Test	**Special Instructions**
HIV ELISA (4th generation)	Daily
Rapid HIV (screening))	After–hours requests: samples are sent to Chemical Pathology
Hepatitis A total antibodies	Daily
Hepatitis A IgM	Daily
Hepatitis B immunity (HBsAb)	Specify “immune status only”
Hepatitis B active infection	Extended markers are done if indicated

Hepatitis C	Daily
CMV IgG	Daily
CMV IgM	Daily
Herpes simplex IgG/	Weekly
Herpes simplex IgM	Weekly
Varicella IgG	Daily
Varicella IgM	Weekly
EBV VCA IgG	Weekly
EBV VCA IgM	Weekly
Measles IgG	Daily
Acute measles (not SSPE or immunity)	5ml clotted blood (must be accompanied by urine sample or throat swab – see under "Isolation Laboratory"). This is a disease for which a suspected case is notifiable. Please send with completed EPID form. The specimen is referred to the reference laboratory.
Mumps IgG	Daily
Mumps IgM	Weekly
Rubella IgG	Daily
Rubella IgM	Daily
Coxsackie B1 - 6 titres	Weekly
Polio 1 – 3 titres (immunity)	As required
HTLV total antibody	Referred
Parvovirus IgG	Referred
Parvovirus IgM	Referred
Injury-on-duty (IOD) protocol	Only specimens sent via E8 Occupational Health (and F1 after-hours) will be treated as IOD specimens. HIV and Hepatitis-C status is tested on the contact, and Hepatitis-B immunity is tested on the staff member. Further testing is done as indicated by the results, or at the request of Occupational Health. Post exposure prophylaxis (using the antiretroviral starter pack) should be started immediately if and when indicated.

3. Isolation Laboratory

Results and Reception: 021-938 9557
Isolation: 021-938 9348

Please refer to the table for a list of virus isolation and detection tests offered by the Virology Laboratory. If you require any tests that are not listed, please phone the laboratory for discussion. Unless otherwise indicated, all tests listed are performed and results sent out daily.

Test	Sample Type	Special Information
Rotavirus / Adenovirus 40/41	Stool	Rapid test
Enterovirus culture	Stool, respiratory sample, CSF	
Enterovirus typing	Done on laboratory isolate	Done if enterovirus culture is positive
CMV pp65 antigenaemia	5ml EDTA blood	Specimens older than 48 hours will not be processed.
RSV rapid test	Respiratory sample	If positive, shell-vial culture will not follow unless specifically requested.
Respiratory virus shell–vial culture	Respiratory samples	The following viruses are included in this screen: • CMV • RSV • Influenza A/B • Parainfluenza 1/2/3 • Adenovirus • Human Metapneumovirus
Adenovirus direct immunofluorescence with shell-vial culture	Respiratory samples containing adequate epithelial cells	If positive, shell-vial culture will not follow.
RSV direct immunofluorescence with shell-vial culture	Respiratory samples containing adequate epithelial cells	If positive, shell vial culture will not follow.
CMV direct immunofluorescence with shell-vial culture	Respiratory samples containing adequate epithelial cells	This should be specified because it is not routinely done. If positive, shell- vial culture will not follow.

Adenovirus shell- vial culture	Respiratory samples, urine, conjunctival swabs	
CMV shell-vial culture	Respiratory samples, urine, biopsy tissue	
Herpes simplex shell -vial culture	Swabs, aspirates, CSF, urine	
Varicella shell-vial culture	Swabs, aspirates, respiratory samples	
Mumps shell-vial culture	Respiratory sample, urine, CSF	
Acute measles	Urine sample or throat swab (must be accompanied by 5ml clotted blood – see under "Serology Laboratory")	Please send with completed EPID form. This is a disease for which a suspected case is notifiable, and is referred to the reference laboratory.
Acute Flaccid Paralysis	2 x stool samples taken 24 hours apart	Please send with completed EPID form. This is a disease for which a suspected case is notifiable, and is referred to the reference laboratory.

4. Special Pathogens

Acute-measles protocol

Case definition

- fever
- maculopapular rash
- cough or runny nose or conjunctivitis

Suspected-measles notification and testing protocol

- Clotted blood and urine (or throat swab) must be sent to the laboratory.
- Contact the infection Control Unit/nursing sister for the relevant forms.
- A case investigation form must be filled in and sent with the specimens.
- A notification form GW17/5 must be filled in.
- An EPID number must be obtained when the case is telephonically reported to EPI-WCP at 021 483 5691/3156.

Acute-flaccid-paralysis (AFP) protocol

Case definition:

- acute flaccid paralysis (including Guillian-Barré syndrome)
- under 15 years of age, no apparent cause
- any age, polio-diagnosed by medical officer.

Acute-flaccid-paralysis notification and testing protocol

- Stool must be sent to the laboratory, followed by another specimen 24 hours later.
- Contact the Infection Control Unit/Nursing sister for the relevant forms.
- A notification form GW17/5 must be filled in.
- An EPID number must be obtained when the case is telephonically reported to EPI–WCP at 021 483 5691/3156.

Other special pathogens

Please contact the virologist at the laboratory or via the pager system to discuss the case before sending specimens. In some cases, the reference laboratory will need to be notified in advance. Most cases of suspected viral haemorrhagic fever are due to other causes, and a clinical consultation may provide better information for both clinician and pathologist.

Virus	Sample Type	Special Information
Rabies	Saliva, brain biopsy, CSF, clotted blood	Consult with pathologist
Viral haemorrhagic fevers	5ml EDTA blood and 5 ml clotted blood	Consult with pathologist
Arboviruses	Various	Consult with pathologist

National Institute for Communicable Diseases (NICD), Special Pathogens Unit, Johannesburg: 011-386 6400
Rabies hotline for medical advice: 011-882 9910
Viral Haemorrhagic Fever hotline: 082-883 9920

5. Guide to appropriate specimens

General instructions

- All diagnostic information from the Virology Laboratory is contingent on the quality of received specimen. A poorly collected and/or poorly transported

specimen can result in:
  - failure to isolate the causative virus, and/or contamination with bacteria or fungi
  - haemolysis of blood samples.
- Safety considerations with regard to the handling of specimens:
  - Treat all specimens as potentially hazardous.
  - Do not contaminate the external surface of the collection container and/or its accompanying paperwork.
  - Minimise direct handling of specimens in transit from the patient to the laboratory. Ideally, specimens should be placed in plastic sealable plastic bags with a separate pouch for the specimen-request form.
- Please ensure that samples are correctly labelled and that the request form is filled in with all the relevant data.
- The points listed below each specimen type are to enable clinicians, nursing staff and patients to take a good-quality specimen.
- Clinicians, nursing staff and patients are responsible for ensuring that these guidelines are followed.
- Please contact the laboratory if in any doubt as to the collection or transport of a specimen.

Guidelines for proper specimen transport

- All specimen containers must be closed tightly to prevent leaking, because leaking specimens will compromise the quality of the results. *If sample has grossly leaked from the container, the specimen will be rejected and not processed.* If the specimen has leaked slightly, decontaminate the outside of the container with 70% alcohol prior to transport.
- Specimens must be transported to the laboratory promptly. Failure to do this may result in the death of fastidious organisms and in overgrowth by more hardy bacteria.
- If prompt delivery is not possible, specimens should be refrigerated at 4 – 8° C.
- The longer the delay in reaching the laboratory, the lower the yield of virus will be, and the less sensitive the culture.

Guidelines for blood specimens

- Please consult the list of tests to see which type of blood specimen is required.
- In general, only two types of blood specimens are used – clotted blood for Serology, and EDTA blood for other assays.
- Post-mortem blood samples are often haemolysed. Moderately haemolysed specimens might still be testable, but severely haemolysed specimens are often not suitable for testing.

Sputum and respiratory-tract specimens

Specimens include sputum, tracheal aspirates, bronchial washings, bronchial brushes, bronchial biopsy specimens, bronchoalveolar lavage fluid, trans-tracheal aspirate, lung aspirate and lung biopsy specimens.

Diagnosis of upper-respiratory-tract infections is often complicated by the contamination of specimens during collection.

Throat (pharyngeal specimens):

- Do not obtain throat samples if epiglottis is inflamed, because sampling may cause serious respiratory obstruction.
- Depress tongue gently with tongue depressor.
- Extend sterile swab between the tonsillar pillars and behind the uvula. (Avoid touching the cheek, tongue, uvula, or lips).
- Sweep the swab back and forth across the posterior pharynx, tonsillar areas, and any inflamed or ulcerated areas to obtain sample.
- Nasopharyngeal swabs:
  - Carefully insert a swab through the nose into the posterior nasopharynx, and rotate the swab.
- Nasopharyngeal aspirtes:
  - Attach syringe to tube and fill 5-ml syringe with saline or viral transport medium. Instil saline into nostril and aspirate specimen into container containing virus transport medium.

Urine specimens

Urine is normally a sterile body fluid. However, unless it is collected properly, it can become contaminated with micro-organisms from the perineum, urethra or vagina. The following guidelines are provided to ensure proper specimen collection and subsequent, prompt delivery of urine samples to the laboratory. Urine specimens must be submitted for culture within 2 hours after collection, or refrigerated and cultured within 24 hours whenever possible.

Midstream Urine Specimen (MSU):

- The person obtaining the urine specimen should wash his/her hands with soap and water, rinse, and dry them. If the patient is collecting the specimen, he/she should be given detailed instructions, including diagram.
- *Females:* Cleanse the urethral opening and the vaginal vestibule area with clean gauze pads soaked with sterile saline. Hold labia apart during voiding.
- *Males:* Cleanse the penis, retract the foreskin (if not circumcised), and wash with sterile saline. Keep foreskin retracted during voiding (to minimise

contamination with skin flora).

- *Both females and males:* Allow a few millilitres of urine to pass (*do not stop the flow of urine*) and collect the midstream portion of urine in a sterile container. In circumcised men, cleaning the pero-urethral area does not improve the detection of bacteriuria and is therefore not necessary.
- Collect voided urine directly into a sterile container; do not use a urinal or bedpan for collection.

Catheter urine:

- A straight (non-indwelling) catheter is used by a physician to obtain urine directly from the bladder.
- Avoid contamination during urine collection from indwelling catheters.
- This procedure is not routinely recommended because there is a risk of introducing micro-organisms into the bladder.
- Urine from an ileal conduit must be collected after removal of the external device and insertion of a catheter into the cleansed stoma.
- Urine collected by suprapubic-needle aspiration of the bladder avoids contamination associated with the collection of voided urine. This is the preferred method for infants and for patients for whom the interpretation of results of voided urine is difficult.

Faecal specimens

- Acceptable specimens: Specimens should be submitted to the laboratory in a sterile screw-cap jar as soon after collection as possible (i.e. within 1 – 2 hours). Care should be taken to ensure that the specimen is not contaminated with urine. The stool should be a freshly passed stool specimen.
- A 1 – 2g is sufficient for virological processing (do not overfill).
- Submit rectal biopsy specimens in a sterile screw-cap jar with a small amount of sterile water to prevent desiccation. Specimens for virological processing must not be submitted in Formalin.

Sterile body fluids including CSF

Cerebrospinal fluid (CSF)

- Collection considerations for central-nervous-system (CNS) specimens

Assay	Optimal volume	Comments
Culture	1 – 2ml	
PCR	1 – 2ml	
Serology	1 – 2ml	Not ideal specimen for Serology

- Volumes are guidelines. Greater volumes increase the chance organism recovery.
- CSF should not be added to viral transport medium.
- The laboratory processes all CSF specimens, irrespective of the volume received.
- In addition to routine information, it is essential that the patient's specimen label accurately reflects:
    - the specific body site from which the specimen was taken
    - provisional diagnosis.
    - the ideal tubes for CSF specimens are tubes with no additives or clotting activators.

Other sterile fluids

Vesicle fluid:

- Vesicle fluid should be aspirated using a sterile technique, and transferred to a viral transport medium. Transport medium can be drawn up into the syringe and then expelled to flush the syringe and ensure that a maximum amount of vesicle fluid is obtained.
- In the past, it has been permissible to use the aspirating syringe as the transport container provided that the needle was capped. This practice is no longer acceptable because of the increased possibility of needle-stick injuries.

Other fluids:

Contact the virologist to discuss the clinical case and possible tests.

Swabs

If a swab is taken it is essential that it be placed in a viral transport medium. The swab should be placed into the bottle, and the shaft broken off. Swabs for virological testing must not be put into the gel medium used for bacterial culture – viral transport medium must be used instead.

Respiratory swabs

- Swabs for viral culture can be taken from the nasopharynx or oropharynx.
- Multiple swabs taken from the same patient can be pooled in a single container of viral transport medium.

Swabs of ulcer bases

- Specimens should preferably be collected prior to the administration of antiviral therapy.

- Remove overlying debris.
- Vigorously swab or curette the base of the ulcer. Ulcer scrapings can also be sent for culture.
- If exudate is present from the ulcer, collect it with a syringe or a sterile swab.

Tissue specimens

Biopsies and tissue specimens
Tissue should be sent in viral transport medium. If this is not available, use sterile water or saline. Do not use formalin.

Fine-needle aspiration
Specimens obtained by a doctor using needle aspiration should he transferred to a viral transport medium prior to transport to the laboratory. Alternatively, and only if transferring it from the syringe will compromise the specimen, *the doctor should remove the needle* using a protective device to avoid injury and cap the syringe with a sterile cap prior to transporting it to the laboratory.

If the latter procedure is followed it is essential that the specimen be submitted to the laboratory immediately after collection.

Specimen collection for sexually transmitted diseases
- Cervical swabs: The cervix should be visualised via speculum examination and normal or inflammatory discharges should be removed. Swabs for herpes simplex virus (HSV) should be collected from the ectocervix.
- Genital ulcer: Swabs should be used to obtain specimens from the ulcer base and placed into appropriate transport medium. If vesicles are so also present in the same area, vesicle fluid may be collected after lancing the vesicle.
- Vesicles: Vesicle fluid may be collected after lancing the vesicle, or aspirated from the vesicles.

FORENSIC MEDICINE

Head of Discipline (and all personnel): 021-938 9325/ 021-931 8043
On call registrar: **Pager number 444 (Tygerberg Hospital)**

No tests are performed at Forensic Medicine and Pathology. Most blood specimens are sent to the Woodstock Police testing facility to maintain the chain of evidence. It is of the utmost importance that clinicians maintain the chain of evidence in all cases where medico-legal intervention is anticipated. For example, where blood is taken from a patient for ethanol concentration determination or projectiles are collected during surgery in gunshot cases.

For practical guidelines regarding the maintenance of the chain of evidence during evidence collection, please contact Forensic Medicine or the doctor on call at the above numbers.

HUMAN GENETICS LABORATORY

Telephone: 021-938 4217/9089/4760

General instructions

Anticoagulation samples
Please ensure prompt, adequate mixing of blood samples with anticoagulants. A sample should immediately be mixed with an **anticoagulant** by gently inverting the bottle at least 8 times – do not shake. Failure to mix adequately may result in the sample's clotting, which will render it unsuitable for analysis. Vigorous shaking, on the other hand, will cause haemolysis of sample.

Coagulation samples
- A full draw is critical – the correct anticoagulant/blood ratio is essential for accurate results.
- Please ensure that coagulation specimens reach the laboratory within 24 hours.
- Paediatric/neonate tubes are available from the lab- please phone the lab stores (ext. 2207/2238) to place your order. These tubes are commercially available if you are outside the laboratory's service area.
- Haemolysis must be avoided.
- Send coagulation specimens at room temperature unless otherwise advised by the laboratory.

Safety considerations with regard to the handling of specimens:
- Treat all specimens as potentially hazardous.
- Do not contaminate the external surface of the collection container and/or its accompanying paperwork.
- Minimise the direct handling of specimens in transit from the patient to the laboratory. Ideally, a specimen should be placed in a sealable plastic bag with a separate pouch for the lab request form.
- Please ensure that samples are correctly labelled and that the request form is filled in with all the relevant data.
- The points listed below each specimen type enable clinicians, nursing staff and patients to take a good-quality specimen.
- Clinicians, nursing staff and patients are responsible for ensuring that these

guidelines are followed.

- Please contact the laboratory if in any doubt as to the collection or transport of a specimen.

All specimen containers must be closed tightly to prevent leaking. If sample has grossly leaked from the container, the specimen will be rejected for processing. If the specimen has leaked slightly, decontaminate the outside of the container with 70% alcohol prior to processing.

If any of the tests that you require are not listed in the table below, please phone the laboratory for special instructions. Tests listed below are the common human genetic diagnostic tests available.

List of Tubes Used for Phlebotomy

Collection tube	Additive	Mode of action	Uses
Purple 	EDTA liquid	Forms calcium salts to remove calcium	DNA extraction – invert 8 times to prevent clotting and platelet clumping
Dark Green 	Sodium heparin or lithium heparin	Inactivates thrombin and thromboplastin	Blood culturing for chromosome analysis – invert 8 times to prevent clotting and platelet clumping
Sterile (Greiner or Falcon)	10–15 ml of amniotic fluid		Amnion fluid culturing for chromosome analysis
Sterile	5–8 ml HBSS or Transport medium	Preserves solid tissue	Solid tissue culturing for chromosome analysis or solid tissue for DNA extraction
Sterile	5–8 ml HBSS with heparin		Chorionic illus for chromosome analysis or for DNA extraction

LISTS OF TESTS

Test	Sample type	Special Instructions
Chromosome Analysis (Karyotype)		
Blood (peripheral & umbilical)	2ml heparinised blood (green top)	
Amniotic fluid	10–15ml amniotic fluid in sterile Falcon or Greiner tube	
Chorionic villus	Sterile tube with heparin and HBSS or transport media	Obtain tube with specific heparin concentration from laboratory
Solid tissue (e.g. product of conception, skin biopsy, etc.)	1 cm^2 solid tissue in sterile tube with 5ml HBSS or transport media	Obtain tube from laboratory
Fanconi Anaemia	5ml heparinised blood (green top)	
Fluorescent in situ hybridisation (FISH) with: Down's-syndrome probe Edward's- syndrome probe Patau-syndrome probe Sexing probe Williams-syndrome probe DiGeorge-syndrome probe Angelman-syndrome probe Smith-Magenis syndrome probe Prader-Willi syndrome probe	5ml heparinised blood (green top)	
Molecular Genetics (DNA test)		
Spinocerebellar ataxia (SCA) Friedreich's ataxia Huntington's disease Retinal degenerative disorder Becker muscular dystrophy Duchenne muscular dystrophy Myotonic dystrophy Mitochondrial disease	5 ml EDTA blood (purple top)	

Charcot-Marie-Tooth Dentatorubral-pallidoluysian Atrophy Cystic fibrosis Galactosaemia Familial adenomatous polyposis (FAP) Hereditary non-polyposis colorectal cancer (HNPCC) Familial breast cancer (BRACA1/2) Haemophila A Fragile -X syndrome Spinal muscular atrophy (SMA) Polycystic kidney disease	5 ml EDTA blood (purple top)	
Diagnostic test for rare genetic diseases		http://www.doh.gov.za.docs/index.html or consult the laboratory

Sterile amnion fluid, solid tissue and chorionic villus

Collection considerations for amnion-fluid specimens

Culture/Test	Optimal Volume (Ml)	Comments
Amniotic fluid / chromosome analysis or DNA extraction	10 – 15ml	Send specimen to Human Genetics Laboratory immediately.
Amniotic fluid/FISH analysis	10 – 15ml	Send specimen to Human Genetics immediately
Solid tissue / chromosome analysis or DNA extraction	0,5 m² in 5 – 8ml transport medium	Send specimen to Human Genetics immediately.
Chorionic villus / chromosome analysis or DNA extraction	In 5 – 8 ml transport medium with heparin	Send specimen to Human Genetics immediately.

If prompt delivery is not possible specimens should be refrigerated at 4 – 8C.

Specimen collection

- Specimens should be collected with as little contamination from indigenous microbial flora as possible to ensure culture growth.

- Sterile equipment and aseptic technique must be used to collect specimens to prevent introduction of micro-organisms during invasive procedures.
- If a specimen is to be collected through intact skin, cleanse the skin first. For example, use 70% alcohol followed by iodine solution (1 – 2% tincture of iodine or 10% solution of povidone-iodine). Prevent burn by tincture of iodine by removing excess after the specimen has been collected.
- In addition to routine information it is essential that the patient's specimen label accurately reflects:
  - o the specific body fluid the specimen contains
  - o provisional diagnosis and reason for referral.
- Collect specimens in sturdy, sterile, screw-cap, leak-proof containers with lids that do not create an aerosol when opened.
- Although small clots will occasionally form in some fluids, adding anticoagulant is not recommended; citrate or EDTA inhibits growth. If anticoagulant needs to be used, heparin should be the choice.

Transport

Fluid specimens can also be transferred to a sterile tube without preservative. The specimen should be submitted to the laboratory without delay so as not to compromise the recovery of anaerobic organisms.

Blood cultures

Collection procedure

Quality control:

- Check expiry dates of tubes used/
- Tubes should be stored in a cool dark place.

Discard any tubes showing abnormal characteristics.

Site selection:

The phlebotomist should:

- select a different site for each blood sample
- avoid drawing blood through indwelling intravenous or intra-arterial catheters.

Site preparation:

- Vigorously cleanse the venepuncture site with 70% isopropyl or ethyl alcohol.
- Do not touch the venepuncture site after preparation and prior to phlebotomy.

Collection of blood:

- Using syringe and needle, insert the needle into the vein, and withdraw blood. Do not change needles before injecting the blood into the tube.
- After the blood is inserted into the tube, mix well to avoid clotting.
- Use a new needle if a vein is missed.
- After the phlebotomy, cleanse the site with 70% alcohol and cover the puncture-wound appropriately.

Specimen volume

Recommended volume:

- Babies (<6 months): Ideally, 1–2ml of blood should be drawn per venipuncture. However, a minimum of 0.25ml x 2 is required per test.
- Children (>6 months – 12 years): Ideally, 1 – 3ml of blood should be drawn per venipuncture. However, a minimum of 0, 3 ml x 2 is required per test.
- Adults (>12 years): Ideally 5ml blood per tube. However, a minimum of 0, 35 ml x 2 is required per test.

Labelling and transport

Please ensure that all tubes are labelled correctly and that the request form is completed with all the relevant required data. All specimens should be transported to the laboratory promptly. Failure to do this may result in no growth in culture and no results.

TYGERBERG HOSPITAL EXTENSION LIST
(For direct calls add 021 938 with the extension no)

WARD	SR	SECR
A1W Surgical	6040	6037
A1East Burns	4751	5068
A2 East Thoracic	6055	5950
A2 West Thoracic	5951	5950
	5879	
A3W Orthopaedics	5970	5971
A3 East	5854	5855
A4W Neuro Surgery	5176	5175
A4 East	6302	5077
	5669	
A5 West Lung	5775	5773
A5 East	5761	5754
A5 West Int	5793	5773
Medicine	5792	5754
A6 West Heart	5778	5781
A6 West Int	6050	5781
Medicine	5768	
A7 West Nephro	5557	5666
A7 East	4491	5559
	4680	
A8 West Neurology	6060	6061
Derma		
A8 East	6063	6062
A9 West	6052	6056
Peadiatrics		
A9 Wes Int	6057	6058
Medicine		
A10 Wes Endocrine	4583	5432
A10 East	4257	5125
	4584	
C1AW Trauma	5132	5133
	5135	5911
C1DE Int Medicine	5941	4625
C1DW Int Medicine		5978
C2A Labour Ward	5965	4728
		4707
C2B Obstetrics	4345	

WARD	SR	SECR
C3A Wes Paeds	4541	4539
C5 Plastics, Vascular		5221
C5 Abdomen		5215
Day Surgery	6611	6619
B1 Thoracic	6018	
Theatre		
Burns Unit	4841	
Theatre		
C2A Theatre	4713	
C3B Theatre	6442	
Cardio Theatre	4339	
DLG Psychiatry	5870	5869
DG Surgical	5907	4869
D1 Vascular	4864	4866
D2 Surgery	4465	4764
D3 Plastic Surgery	4777	4766
D4 Private	5073	4566
D5 Head, Neck & Breast	5838	4064
D6 Urology	4364	4367
D7 Eye	4463	4466
D8 Int Medicine	5386	5388
D9 Int Medicine	5383	5385
D10 Int Medicine	5972	5975
FLG Children	4571	4573
FG Gynae	4412	6078
F1	6511	5614
F2 Obstetrics B	4645	4646
F2 Obstetrics M	4649	
F3 Congo	5990	4940
F4 Orthopaedics	4155	4639
GLG Psychiatry	5583	5064
GG Paediatrics	6378	6722
G1 Paediatrics	6573	6570
G2 Paediatrics	4552	4556

WARD	SR	SECR
G3 Paediatrics	4564	4474
G4 Paediatric Surgical	4660	4664
G5 Paediatrics	4131	5052
G6 Paediatrics	4472	5634
G7 Paediatrics	4667	5007
G8 Paediatrics	4723	
G9 Paediatrics	5635	5120
G10 Paediatrics	5004	4470
		4532
JLG Psychiatry	5121	5113
JG Khayelitsha	4407	5108
J1 Khayelitsha	6533	5104
J2 Obstetrics B	5114	5028
J3 Khayelitsha	5109	5021
J4 Obstetrics	5105	5015
J5 Obstetrics B	5029	4157
J6 Orthopaedics	5017	
J7 Surgical	5011	
J8 Peadiatrics	4302	6066
Cardiac Arrest	4844	
Carel du Toit	5312	

DEPARTMENT	EXT NO
Patient Enquiries West	4785/4786
Patient Transport East	5653/5492/
PA Transport	4243/5471
Tube System	5072/5136
X-Rays C1A	5233/5378/
	5868
Medical reporting	5200/5866
Medical Records	4518/4512

DEPARTMENT	EXT NO
Security	
Control Room	5165
Emergency	4282
Phone Threats	5088
Crèche	5143
Patient Hospital School	5261
CT Scan	5599/5798
Main Kitchen	5291/4759
Night Matron	4056/4655
Revenue (Hosp. Fees)	5852/5857
X-Blok Wards	4439/5939
Mortuary	5469
Mortuary SAPS	6327
	931-4232
SAPS	4982
	933-3787/8
Resuscitation	4072/6286
Feedem Cafeteria	6310
	933-1362
T.B.H. Fax	931-1451
Medical School Fax	931-7810

CLINICS

Abdominal Surgery	5215
Allergies	5524
Allergies children up to 12 years	4539
Andrology	4940
Andrology Lab	4445
Angiogram	5924
Asthma	5524
Barium Meal	5900
Breastfeeding	4441
Burns	5221
Cardiology	4111
Cervix	4428
Coagulation	4615
Dermatology	4068
Diabetic Training	4024
Diabetic	5536
Dietician	4939
Ear, Nose & Throat	4828
Echo Cardiology	4332
Endocrinology	5536
Epilepsy	5541
Evaluation	5061
Eye surgery	5509
Family Medicine	5171
Family Planning	4447
Gastro	5531
Geriatrics	5527
Gynaecology	4437
Hand Clinic	5333
Hearing & Speech	4825
Head, Neck & Breast	5210
High Risk	4424
Infertility	5173
Interns	5443
Liver Clinic	5524
Lung Functions	5753
Lung Functions Tech	5789
Mammograms	4547
Nephrology (Kidneys)	5524
Nuclear Medicine	4268
Neurosurgery and Children	5221
Neurophysiology	5500
Neurology	5541
Obstetrics – New	5094
Obstetrics – Follow up	4424
Obstetrics - Midwife	4424
Orthopaedics	5317
Paediatrics	4539
Paediatric Surgery	5215
Paediatric- Audiology	4825
Plastic Surgery	5221
Psychiatry (Children)	4573
Psychiatry (Adults)	5120
Radio-isotope	4268
Respiratories	5524
Rumatology	5527
Sonar – Stomach	5641
Sonar - Surgery	5641
Sonar - Obstetrics	5572
Stress Tests	5781
Special Clinics	5541
Stoma	5976
Thoracic Surgery	5215
Tube feeding	4075
Urology	5310
Urology Gynaecology	4437
Vascular	5221
Virology - Results	71-9348
Virology	6210
LABORATORIUMS	
Anatomy's	4040
Andrology	4883
Anti-Coagulation	4615
Bone marrow	4122
Blood Grouping	6081/2
Blood Bank	4900/1

Cardiology	4339
Chemical Pathology	4934/6
Coagulation	4202
Genetics	4760
Hematology	5750
Histology	4040
Immunology	5278
Microbiology	4011
Serology	4001
Cytology	4202
Toxicology	6168
Virology	71-9354

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Western Cape Government

Health