96444.353 Directory of Services SLS NV (with MMB Sample Collection Guideline)

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Directory of Services SLS NV with MB Sample Collection Guideline

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Table 2 overview of blood collection order of tube type per department or test updated – color of tubes were also updated	15-12-2023
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Table 4 Important Telephone numbers updated	15-12-2023
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Chapter 9 Directory of test Microbiology updated	15-12-2023

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- 96444.380 Governance Structure Code and Continuity of services

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ST. MAARTEN LABORATORY SERVICES

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1 Subject

The purpose of this document is to give the scope and provide general information for all the different users of the St. Maarten Laboratory Services NV. It also provides information on SLS testing package, general information about test requirements, transport and storage conditions for the different tests, logistical information, and opening hours of the different facilities.

Also, the reference values of the various tests used by the SLS NV.

2 Definition and common terms

AB	After Breakfast
CCH	Clinical Chemistry & Hematology department Main Building
CITO or STAT	Emergency testing
CSF	Cerebral Spinal Fluid
EDTA	Ethylene Diamine Tetra acetic Acid
ENT	Ear Nose Throat
ESR	Erythrocyte Sedimentation Rate
GTT	Glucose Tolerance Test
ID	Identification Document
LIS	Laboratory Information System
MB	Main Building
PPA	Pre- & Post Analytical Department
RT	Room Temperature
SMMC	Sint Maarten Medical Center
SOP	Standard Operating Procedure
SZV	Sociale Ziektenkosten Verzekering
TAT	Turn Around Time
TDM	Therapeutic Drug Monitoring
TB	Tuberculosis
ZVK/RCN	Ziektekosten Verzekering/Rijks Caraibisch Gebied Nederland
Up	Urine portion
24-U	24-hour Urine collection

3 Procedure

SLS NV was established in 2008 as a limited government-owned organization. Its main tasks are through the four different departments; Pre and Post Analytical, Clinical Chemistry and Hematology, Microbiology and the Environmental department that provide medical laboratory-based services (both inpatient and outpatient) to the St. Maarten Medical Center, outpatient services to primary care physicians, specialist, and midwives. SLS NV also serves the neighboring islands of Saba and St. Eustatius.

SLS NV also has a crucial role as the Public Health Laboratory for St. Maarten and performs water (and wastewater) quality testing. Part of being the Public Health Laboratory also signifies sending on regular intervals demographic and laboratory-based surveillance data to the Public Health Department of St. Maarten.

3.1 PPA Department

The PPA department is a core department in SLS which provides crucial services to both in- and outpatient clients. These services include but not limited to the following:

a. to collect samples from patients
b. to prepare samples for packaging and shipping toe referral laboratories.
c. to distribute results to all applicants when available.

3.1.1 Phlebotomy Centers

In total, SLS NV has eight (8) outpatient phlebotomy centers; listed in table 1 with location and opening hours.

Table 1: Outpatient list with location and opening hours

	Location/Service	**Opening Hours**
1	Hamster drive (Main building)	7:00 am to 15:30 pm, Monday to Friday and Saturdays from 7:30 am to 11:30
2	Outpatient Clinic, SMMC	7:30 am to 15:00 pm, Monday to Friday
3	Betty's Estate	7:30 am to 11:30 am, Monday to Friday
4	Dutch Quarter	7:30 am to 11:30 am, Monday to Friday
5	Simpson Bay	7:30 am to 11:30 am, Monday to Friday
6	Maho	8:00 am to 12:00 pm, Monday to Friday
7	Philipsburg	7:30 am to 12:00, Monday to Friday
8	Cole Bay	8:00 am to 12:30, Monday to Friday

Patients visiting any outpatient phlebotomy center should bring the following:

- A valid proof of ID
- The laboratory request form signed by a physician or the Requisition number (online ordering)
- If it's a self-test request patient, no need to have a signed lab form
- A valid insurance card (Not valid for SZV)

All insurances, cash (or card) are accepted. For self-request lab forms, only cash or card is accepted as method of payment. The phlebotomy facility at the SMMC outpatient area give service to patients referred by specialists in the outpatient clinic. This service is reserved for only cito requests but also for elderly patients, pregnant women, and immobile patients. All other patients, in which there is no cito requests and do not belong to the abovementioned categories should visit the main building lab at Hamster Drive 1G or any other location convenient for them.

3.1.2 Procedure for *clinica*l requests

SLS NV provides SMMC with two (2) phlebotomy rounds on weekdays and one (1) phlebotomy round during weekends. If there are requests that is urgent after these rounds, the SMMC personnel of each ward is responsible to withdraw the sample and deliver it to the laboratory according to procedure.

3.1.3 Phlebotomy rounds

SLS NV provides SMMC with two (2) phlebotomy rounds during the week; at 09:00 and at 11:00, and one (1) round in the weekend at; 10:00. The laboratory request forms for the morning round should be delivered at the front office of SLS NV in SMMC the date prior to the draw no later than 15:00 in the afternoon. Newly admitted patients in the night or patients who are unstable will also be included in the morning draw providing that the request form is submitted to the lab before 08:30 on the same day.

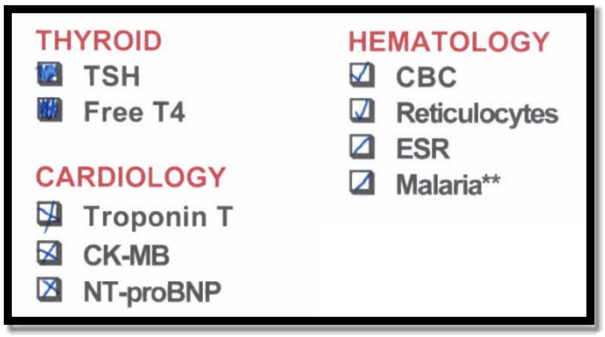
3.1.4 The Laboratory request form

The laboratory will only process laboratory request forms that are completely and correctly filled in, signed/initialed by an authorized applicant (physicians, specialists or midwife). In addition, the laboratory request form must provide all relevant (correct) information including:

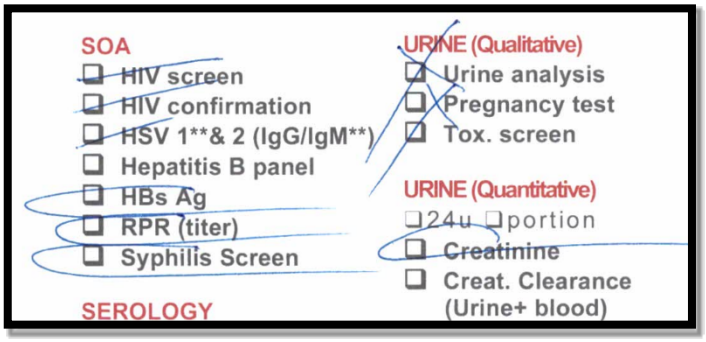
- Signature and/or stamp of applicant
- Must fill in patient information (name, surname, date of birth (dd/mm/yyyy), gender, patient number, etc.)
- Date and/or time of blood (sample) collection
- Clinical Indication (if applicable)
- Ward (if applicable)
- The required tests (please tick off or circle the requested test clearly)

Example of how Lab forms should be filled in

DO's



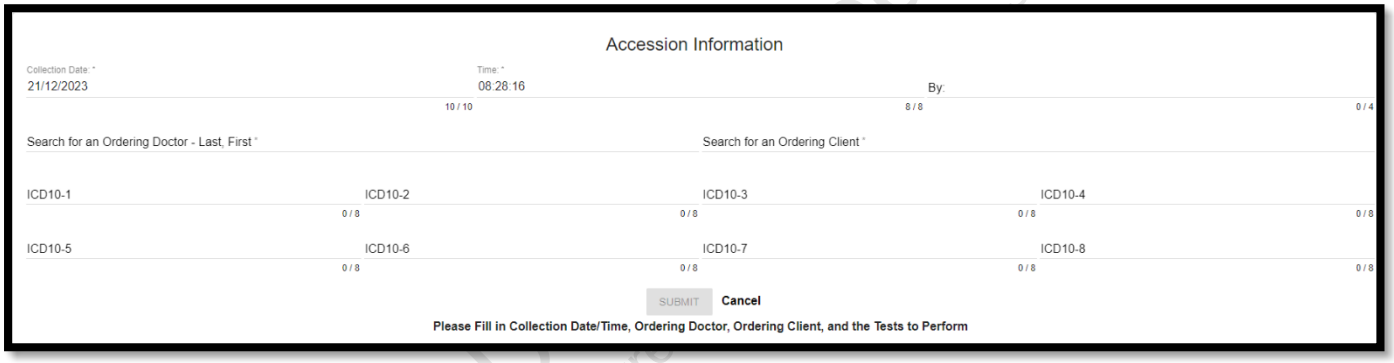
DONT's



For more information, see the Appendix "Criteria for accepting and refusing materials".

3.1.5 Laboratory Online ordering

Physicians can also request lab tests via SLS's online ordering platform on SchuyNet. All required fields must be filled in. Requisition number will be generated for the patient once the request is completed.



3.2 Phlebotomy details

To limit interferences/carry-over of anti-coagulant from one tube to the other tube type (when drawing multiple tubes), it is advised to maintain the sequence of drawing samples as indicated in **table 2** of the different tube types for various lab tests. It is very important to collect the correct volume of blood into the tube (especially the **Light blue top tubes**) as the ratio of the anti-coagulant to blood volume can influence the test results.

After blood collection, make sure that all samples are properly mixed by gently inverting the tube (3-8 times), **DO NOT SHAKE**, to avoid unnecessary clot. Always label tubes with **patient's full name and date of birth** when submitting blood samples for laboratory testing.

Example 1: A request for routine chemistry and serology in the same accession, collect two (2) serum tubes.

Example 2: A request for blood count and blood group in the same accession, collect two (2) EDTA tubes.

3.2.1 Blood typing

If a patient's blood type has not been performed previously **(unknown)**, two (2) independent EDTA tubes **from two different draw moments** must be sent to the lab for blood typing. These tubes should be ideally drawn at two different times. Consider the result of the blood type, as "provisional" if the blood type has only been performed once. If the blood type was performed twice, it will be noted as "definitive". For details on which tube is necessary for which tests, please see **Appendix #1.**

3.2.2 Patient – and sample identification

Outpatient

Identification of all patients occurs in a uniform and accurate way before a blood sample is collected. Identification of an outpatient occurs via a photo-ID that must be valid together with a valid insurance card (Not applicable for SZV patients – Validity of Insurance is done via the Hecina portal).

Inpatient

For hospitalized patients, correct identification means that the patient must have a wristband bearing minimally first and last name, and birth of date, to verify when the phlebotomist or technician ask their name and date of birth. If a patient is non-communicable or cannot identify him/herself, the phlebotomist/technician will ask the nursing staff of the SMMC ward to identify the patient before blood collection occurs. In urgent cases if a patient cannot be identified and/or has no ID, the emergency procedure will be applied. The **emergency procedure** is as follows; the request form will be filled in under the name: "Jane Doe" if female and "John Doe" if male with a date of birth-- current date of the day (dd/mm/yyyy).

ZVK patients

For clients insured by ZVK (clients from Saba, St. Eustatius and Bonaire), their ID-card is used as an insurance card. Patients insured by **ZVK**, and **under the age of 12**, will provide a "letter of proof of insurance stamped by ZVK". Newborn baby (0-1 yr.): insurance certification by insurance card or a birth certificate and ZVK insured baby: falls direct under mother/father insurance.

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Table 2: An overview of blood collection order of tube type per department or test and cytology

Tube Type	**Tests/Department**	**Number of Inversions** *[17]	**Remark**
Culture Bottles 	Blood culture Microbiology	8-10	Always draw 2 sets (4 bottles) Endocarditis: 3 sets.
1 citrate tube  (Light blue top)	Coagulation including D-dimer (SMMC)	3-4	***Citrate tube must be filled till the marking (approx. 3/4) indicated on the tube!***
1 tube without gel  (red top with black ring)	Acetaminophen (Paracetamol) (SMMC)	0	special request
1 gel tube  (red top with yellow ring)	"Routine" Clinical Chemistry (Main Building)	8-10	Maximum fill (5 ml)
1 gel tube  (red top with yellow ring)	Serology/Allergy Dept. (Main Building)	8-10	ELISA/auto-immune/allergy
1 gel tube  (red top with yellow ring)	Cobas e411 (SMMC)	8-10	Tumor markers/ cardiac markers/cortisol/PTH
1 heparin-plasma  (green or grey top)	Lactate SMMC	8-10	
3 ml venous blood Blood gas 	pH, bicarbonate and pCO_2 (SMMC)	8-10	Sample analyzed within 15 minutes (max 30 minutes). Care should be taken not to mix with air bubbles
Lithium Heparin  (Light Green)	Methylmalonic acid + Free T3	8-10	These are sent out to RDGG

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1 EDTA tube  (purple top)	CBC + ESR (SMMC + Main Building)	8-10	Sample should be analyzed within 4 hours
1 EDTA tube  (purple top)	HbA1c + HB profile (Main Building)	8-10	
1 EDTA tube  (purple top)	Crossmatch/Blood group (SMMC)	8-10	
2 K_2EDTA and gel for plasma separator (pearl top)  or 3 EDTA tubes (purple top) 	HIV/HBV, HCV Viral Load	8-10	
1 Flouride/ Oxalate (grey top) 	For Poli clinical glucose testing (Main Building)	8-10	
1 Trace element (Dark Blue top) 	Aluminum, Zinc, Copper	8-10	
ThinPrep (surepath vial with conservative) for PAP smear	Analytisch Diagnostisch Centrum (ADC) (through the distribution center)	N/A	Sample stable for 2-4 weeks
Histology vials (with buffered formalin): for histological exams	Reinier de Graaf Gasthuis, RDGG (through the distribution center) **OR** **ADC**	N/A	Sample stable for 2-4 weeks

3.2.3 Phlebotomy procedure

Phlebotomy should take place by standardized conditions. Take special attention for the different pre-analytical aspects that could affect the blood collection and the test result. It is desirable to perform venipuncture when the patient is in a "comfortable" and “ideal” situation. Preference is to collect samples in the morning, using reference values based on samples taken in the morning. Trained phlebotomists and lab technicians will perform the blood collection according to SLS’ phlebotomy procedures.

3.2.4 The blood samples

Third parties can deliver collected blood samples to the main building lab, after following the correct order of blood collection (see table 2). Identify the sample correctly (with full name and D.O.B.) with a properly completed filled in laboratory request form and transported under the appropriate conditions. For the correct sampling/transport conditions, see **Appendix 2** "List of laboratory tests SLS NV". Transportation of samples must be under special conditions such as time of transportation and temperature (see appendix 2).

3.2.5 Referral tests

Tests that are not listed in Appendix 1 will be sent to ISO15189 accredited external laboratories. For clinical chemistry tests (majority blood), please refer to the online test guide from Reinier de Graaff Gasthuis (RDGG), The Netherlands (www.labgids.nl). For laboratories that are accredited by their National Accrediting Body, the SLS Quality officer will verify the status of all referral laboratories by going in the accreditation website (RvA) or SLS NV will request a proof of their accreditation status each year in the month of January.

3.2.5.1 Tests not covered by SZV

SZV insurance does not cover all tests, for e.g., DNA, Genetic and some molecular testing (specialty tests). Please see **Appendix 3** for some tests which requires SZV approval first. All other tests not mentioned in the SZV contract require approval from SZV via their Hecina portal. The specialists must send an email to the clinical chemist/microbiologist to inform of the “special” tests being requested. Once SZV approves, the sample can be sent abroad for testing.

3.3 Clinical Chemistry and Hematology (CCH) Department

The Clinical Chemistry and Hematology department is after PPA, the core department of SLS NV. CCH Department is located in the SMMC (STAT LAB) and in the Main Building of SLS NV (routine testing/CORE Laboratory). The CCH Department performs most of the tests submitted by applicants, and sometimes some tests need special procedures for specific request.

3.3.1 Fasting procedure

Explain to the patient verbally (by physician) that he/she needs to be in a fasting state from the night prior to the collection date. The latter implies that the patient has not consumed any calories for a minimum of 8 hours. This means that the patient may only drink water up until the time of blood collection.

3.3.2 Timed urine (24-hour) collection

The physician should explain to the patient, to be able to get a good picture of his/her health, why and how the urine produced in a period of 24 hours needs to be collected. The physician should make the patient aware about the importance of correct and complete collection and that incomplete collection of the urine may lead to an inadequate material that can lead to a wrong result. The patient will receive a special container from the laboratory for urine collection. The container should be stored during the collection in a cool place, to prevent degradation of the measured metabolites. To minimize the risk of interference of medication with certain laboratory tests, the physician may request the patient to stop certain medications during this collection period. For more information about interference of medication, please contact the laboratory specialists.

See *96444.72 Procedure for 24-hour urine collection*

3.3.3 Clean catch or midstream urine collection and First-catch Urine

The physician or SLS employee should explain to the patient how to obtain this sample and give the instruction information to the patient.

See *96444.7658 Collection of First Catch Urine for CTNG*

96444.1653 / 1655 / 1657 Procedure for collecting a Mid-stream Urine

3.3.4 Crossmatch/Compatibility testing

SLS NV performs the crossmatch/compatibility test on request when necessary.

- *Unknown blood type:*
  If the blood type and indirect Coombs is unknown, first fill in the lab request form to collect blood and perform the tests. The technician will give the result to the ward and the ward will fill in the Blood bank request form with the number of units needed with the blood type. The laboratory will request a primary and a secondary sample to confirm the blood type of the patient. The Blood bank will fill in the request form with the information needed for the lab to perform the cross match and will bring the request form to the lab.

- *Known blood type:*
  If the blood type is known and considered definite (analyzed 2x) , only fill in the Indirect Coombs on the request form. The ward needs to fill in the blood type on the Blood bank request form with the number of units needed and sample collection time. The Blood bank will fill in the request form with the information needed for the lab to perform the crossmatch and will bring the request form to the lab.

*Blood Request forms must be filled in completely and correctly and submitted to the Blood bank.

3.3.5 Function tests (Clinical Setting)

Performance of function tests to either include or exclude imbalance of various hormonal pathways are performed in a clinical setting with the exception to the glucose tolerance test (GTT).

3.3.6 Priority Tests (CITO/STAT)

The treating specialist, house officer, his assistant, or head nurse of the medical ward must sign the very urgent emergency requests (STAT) form. For STAT Microbiology tests, see paragraph 3.4. The lab will handle such requests as quickly as possible and with priority. Although not all tests are STAT, there are a limited number of tests that are on the STAT list (**see table 3)** . With the exception of therapeutic drug monitoring (TDM) tests, performed "as needed/upon request", no other tests can be requested as STAT. This limitation is needed to limit the burden of the shift personnel so they can focus on those tests that have immediate treatment consequence for the patient. If the physician wants to perform further additional research, the medical ward personnel, needs to provide the laboratory with a new request from, preferably for the next morning/phlebotomy round. If the requesting person wishes to deviate from the emergency list, this should be in consultation with the laboratory specialist.

3.3.6.1 STAT/CITO for Emergency Room (ER)/Intensive Care Unit (ICU)

STAT laboratory tests and services are those that are needed immediately to manage medical emergencies. STAT test requests are given the highest priority by the Laboratory for processing, analysis, and reporting. If less urgent tests are also ordered STAT, a backlog may develop and each specimen will be processed in order of receipt, thereby delaying the reports for true emergencies.

All laboratory requests of the ER department or the Intensive Care Unit (ICU) are treated as a STAT request. The emergency room personnel are expected to give the lab results to the medical ward once the patient is being admitted to the ward to avoid unnecessary blood collection.

3.3.6.2 The STAT Testing List

Table 3: STAT testing list

Clinical Chemistry		
Alkaline phosphatase	Calcium	Natrium (Sodium)
Amylase	Chloride	Total Protein
Ammonia	CPK	Troponin (high-sensitivity)
ASAT	CRP	TSH
ALAT	CK-MB	Urea
Albumin	FT4	
Alcohol in serum	Gamma-GT	
Bilirubin	Haptoglobin	
Glucose	Kalium (Potassium)	
Blood gas	Creatinine	
NT-proBNP	Lactate	
CSF (gluc, TP)	LDH	
b-HCG (quant.)	Magnesium	
Toxicology		
Lithium		
Hematology/Coagulation		
APTT	Crossmatch/Compatibility Testing	Sickle cell (screening)
CBC (incl. hemoglobulin, thrombocytes, white blood cells, hematocrit)	Leukocyte diff: special indications	
Blood group/Rhesus	Liquor (CSF) (cells count)	
D-Dimer	PT of INR-test	
Urine		
Amylase	Potassium	Urea/BUN
Chloride	Creatinine	Urinalysis screen (multistix)
Protein (UPRO)	Sodium	Urine sediment (after positive stix)
Protein/Creat Ratio	Drugs of abuse screen	Pregnancy Test (qualitative)
Microbiology tests done at Clinical Chemistry		
Malaria antigen		
HIV Ab/Ag combo	HBs-Ag	Anti-HBs (acc. exposure)
Microbiology tests (see 3.4)		
Liquor (CSF) gram + culture	Other punctate, biopsy etc. gram + culture	COVID PCR (med evacuations) ^

NOTE: the quantitative CRP determination has greatly replaced the ESR test that has become obsolete in an EMERGENCY setting and there is certainly no urgent indication for this test. Moreover, ESR also takes more time.

NOTE: CITO/STAT testing of HIV, HBV and Malaria antigen are performed by Chemistry dept.

NOTE: COVID-19 PCR is available for CITO/STAT testing for MEDEVAC situations only. Patient and company can be tested, SMMC swabs the person to be tested, on-call microbiology technicians run the PCR.

^ Covid samples will be ran on the GeneXpert

3.4 Medical Microbiology Department

The Medical microbiology department is in the Main Building of SLS NV and performs microbiology testing in a wide range of areas including the PCR-based tests. A certified medical microbiologist specialist guides the department professionally.

This department performs tests in blood, urine, feces, sputum, wound culture, CSF and other body fluids while applying conventional techniques for (bacterial) identification and susceptibility testing. Fecal testing is done by the microbiology department for processing of occult blood samples.

The microbiology department works 7 days/week and maintains short-turnaround time, to limit the need for many CITO requests. The microbiology department also has an on-call function. The microbiologist can be contacted by the specialist or house officer during off-hours for urgent consultation and the requests for CITO testing. Only CITO requests that bare consequences for patientcare are accepted for CITO processing, e.g.: the start of antibiotics is withheld briefly in await of CITO results. Without clinical consequences, CITO requests are downscaled to regular processing by the microbiologist. Tests that are not performed by the Microbiology department are sent to ISO15189 accredited external laboratories.

3.5 Environmental Department

Part of SLS NV responsibilities as a Public Health Laboratory is to guarantee the quality of drinking water and wastewater.
The water-testing department is located in Simpson Bay and performs testing of:

- drinking water
- commercially produced ice cubes
- wastewater for several private companies, e.g., SMMC, hotels and others.
- Mold

The main client is the water & electricity company that send samples daily. There is a close cooperation with the Inspectorate of Health since SLS NV has the obligation to inform the Inspectorate when a sample has test results outside limits as established by local laws. All performed tests are according to NEN-ISO standards. This department is accredited according to the NEN-ISO 17025 standard.

3.6 Environmental awareness and biological hazard disposal

The SLS NV processes the biohazard waste in accordance with current laboratory procedures. This means that patients' samples will be disposed after a week of storage (or waste from the microbiology or water department). Samples will first be processed and destroyed in a medical waste autoclave and then placed in separate lockable "burn up" waste containers. A local company transports these containers for disposal. There is strict separation of non-organic waste from biological waste.

3.7 Retention time of samples and laboratory documents

The laboratory has a procedure that specifies how long analysis material and/or documents should be stored. The retention time depends on the type of test and/or the frequency of analysis thereof. The procedure "Document and samples retention time" is available for viewing at the laboratory.

4 Responsibilities

The director of the laboratory is responsible to authorize changes and/or modifications in this document. The quality officer is responsible for document control and management. The user is responsible to use this document as a guideline for the services that SLS NV offers.

5 Comments

5.1 Use of laboratory testing in general and limitations thereof

Laboratory tests are a tool for the physician to receive an overall picture to make a correct diagnosis, as well as, to screen and/or monitor the patients. As with any diagnostic tests, the testing is never 100% sensitive and/or specific. Therefore, a proper question is a crucial step in an adequate way to interpret the laboratory results.

In addition, the physician must consider the prevalence of diseases studied to get a priori probability to be able to assess a detection of a disease condition. The latter affects both the positive -as negative predictive value of a test.

5.2 Use of reference ranges and values

As previously mentioned, reference values are determined in a reference population. This is done in samples that have been taken, especially in the morning hours in a well-defined group of donors. Some reference values are taken from literature since these are derived from international guidelines. In addition, there are several reference values that are determined in our laboratory. These reference areas represent the so-called 95% interval. In other words, 5% of the values found in a laboratory test are "increased or decreased" values. These do not necessarily have to indicate a pathology but may be a static phenomenon possible. This also emphasizes the need sparingly to deal with laboratory test requests since the non-indicated request testing can lead to abnormal results that may cause unnecessary unrest/anxiety for the patient. See appendix 2 Reference values used by SLS NV.

5.3 Phone-in requests for (additional) laboratory tests

Under certain conditions, a physician may decide to order additional tests (i.e. by phone or via email) to complete the diagnosis. However, in case one wishes to do so, for these additional tests a new laboratory request form shall be sent to the lab. It is advisable to limit these phone-inn requests to minimize the disruption of the workflow.

5.4 Reflex training

The laboratory reserves the right to perform so-called reflex testing to further assist the physician in his/her diagnosis. These are automated tests that are requested when the results of one (or more) tests exceeds laboratory established limits. The clinical chemist or the medical microbiologist has the authority to request additional/further testing based on initial results to complete the diagnostic work-up and to be able to advice the doctor better about the interpretation of the results.

5.5 Patient information safety

SLS NV highly respects the nature and the importance of patient information and/or test results. Furthermore, SLS NV is appointed by law (LB AB 2013, GT# 317) as the Public Health Laboratory for country St. Maarten and therefore is mandated by law to adhere to strict code of patient confidentiality. Also stipulated in the individual labor agreements/contracts and in the Collective Labor Agreement. Physicians that have web-based access to laboratory information are also obligated to sign a "Schuynet user agreement" which also deals with confidentiality issues. The LIS is only accessible through a username and password and protected from any unauthorized person accessing the LIS.

Test results are sent to the requesting physicians via a secure email – zorgmail.

Patient Portal

Patients can also access their results via a secure network – Schuynet patient portal. Complaint registration

SLS NV has a complaint procedure whereby any client can file a complaint. Registration is done by the clients via our website (www.sls.sx) or can be called through, or verbally given to any staff (then the staff will register it) and is handled by the Quality officer using a standardized procedure (CARE™). Complaints are analyzed, categorized and corrective actions are taken accordingly. The client will be informed of the actions taken and a control mechanism is built in to ascertain whether the action taken has eliminated the root cause or that the risk for the complaint has been reduced to acceptable levels.

5.6 Patient Portal

Patients can also access their results via a secure network – Schuynet patient portal.

5.7 Complaint Registration

SLS NV has a complaint procedure whereby any client can file a complaint. Registration is done by the clients via our website (www.sls.sx) or can be called through, or verbally given to any staff (then the staff will register it) and is handled by the Quality officer using a standardized procedure (CARE™). Complaints are analyzed, categorized and corrective actions are taken accordingly. The client will be informed of the actions taken and a control mechanism is built in to ascertain whether the action taken has eliminated the root cause or that the risk for the complaint has been reduced to acceptable levels.

5.8 Medical Microbiology Directory of Services

For information regarding pre-analytical and analytical testing in the medical microbiology department, please refer to the MB Sample collection guidelines – in Chapter 9

5.9 Important telephone numbers

Table 4: Important Telephone numbers

Laboratory Director/Clinical Chemist	5422518 ext 1015 5865522 (mobile)
Clinical Microbiologist	+ 5999 5222590 (mobile)
Main Building (Hamster drive)	5422518 ext 1000
Supervisor Pre-and Post Analysis (PPA)	5422518 ext 1003
Coordinator PPA	5422518 ext 1006
SLS SMMC front office	5422518 ext 1020 or 5429210 direct
Betty's Estate Phlebotomy center	5422518 ext 1023
Dutch Quarter Phlebotomy Center	5422518 ext 1021
Simpson Bay Phlebotomy Center	5422518 ext 1022
Maho Phlebotomy Center	5422518 ext 1024
Supervisor Clinical Chemistry (CCH)	5422518 ext 1016
Chemistry/Hematology workbench SMMC	5422518 ext 1012 or 5429210 direct
Clinical Chemistry SMMC- **ON CALL**	**5201021 (mobile)**
Clinical Chemistry Main Building	5422518 ext 1025
Medical Microbiology Department	5422518 ext 1019
Medical Microbiology Department- **ON CALL**	**5807137 (mobile)**
Environmental Testing Department	5422518 ext 1031
Finance Administration	5422518 ext 1008
Supervisor Environmental	5422518 ext 1032
IT Department	5422518 ext 1004
Quality Officer	5422518 ext 1018
Facility Officer	5422518 ext 1041

6 Accompanying form/document

- 96444.367 Document and sample retention time
- 96444.1362 Criteria for accepting and rejection samples
- 96444.410 Sample preparation and distribution
- 96444.46 Phlebotomy procedure
- 96444.72 Procedure for 24-hour urine collection
- 96444.7658 Collection of First Catch Urine for CTNG
- 96444.1653 / 1655 / 1657 Procedure for collecting a Mid-stream Urine

7 Cross reference of Reference values

1. Internal research/method comparison/reference range verification

2. Derived from the Instructions for use

3. NECP (National Educational Cholesterol Program, USA)

4. American Diabetes Association (ADA) guideline

5. Norm/by convention

6. Tietz textbook of Clinical Chemistry, 3rd Edition, Burtis Eds.

7. KDOQI guidelines

8. www.acog.org

9. Clinical application of blood gases, 5th Edition. Shapiro BA, Eds.

10. St. Maarten Water Ordinance Law

11. www.fnt.nl (federatie Nederlandse trombosediensten)

12. Clinical utility of biochemical analysis of CSF. Clin Chem.41/3, 343-360, 1995.

13. Essential Haematology, Hoffbrand and Pettit, 3e editie, 1997

14. Vitamin D Deficiency. MF Holick. NEJM 2007;357: 266-281.

15. Pediatric Reference Ranges. Soldin et al Eds. 3rd Edition, 1999

ST. MAARTEN LABORATORY SERVICES

Directory of Services SLS NV

Appendix 1: Directory of Test SLS NV

Clinical Chemistry & Hematology Department Test list

Test	Tube Type	Vol. (mL)	Location	Frequency	Remarks	Sample Stability (2-8 °C)
Allergy screening (Inhalation + Foodmix screening)	 Serum	5	Special Chem	1x/week	Freeze sample	2 weeks
Acetaminophen (Paracetamol)	 Serum	5	CCH SMMC	Upon request	May be requested as CITO to exclude overdose	48 hours
AFP (Alpha Feto Protein)	 Serum	5	CCH SMMC	Daily		7 days
Alcohol (Ethanol)	 Serum	5	CCH SMMC	Upon request	Do not clean puncture site with alcohol-based disinfectants	2 weeks
APTT	 Citrate Plasma	4	CCH MB/ SMMC	Daily	Sample is stable for 4h at RT (23°C) or 2 weeks at -20°C.	4 hours
ASAT (SGOT)	 Serum	5	CCH MB/ SMMC	Daily		7 days
ALAT (SGPT)	 Serum	5	CCH MB/ SMMC	Daily		7 days
Amylase (serum)	 Serum	5	CCH MB/SMM C	Daily		1 month
Amylase in urine	Urine portion	5	CCH MB/SMM C	Daily		10 days

Directory of Services SLS NV

Test	Tube Type	Vol. (mL)	Location	Frequency	Remarks	Sample Stability (2-8 °C)
ANCA/GBM antibody	 Serum	5	Special Chem	1x/ week	MPO, PR3 and anti-GBM antibodies using line blot methodology	2 weeks
Albumin	 Serum	5	CCH MB/ SMMC	Daily		5 months
Anti-CCP	 Serum	5	Special Chem	1x/week		2 weeks
Anti-HAV IgM	 Serum	5	CCH MB	1x/ week		7 days
Anti-HAV Total	 Serum	5	CCH MB	1x/ week		7 days
Anti-HBs	 Serum	5	CCH MB	Daily		6 days
Anti-Hep B core total	 Serum	5	CCH MB	Daily		5 days
Anti-HCV	 Serum	5	CCH MB	Daily		5 days
ALP (Alkaline Phosphatase)	 Serum	5	CCH MB/ SMMC	Daily		7 days

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Test	Tube Type	Vol. (mL)	Location	Frequency	Remarks	Sample Stability (2-8 °C)
Ammonia	EDTA 	4	CCH SMMC	Upon request	EDTA sample on ice. Bring immediately to the lab, separate from hematocrit. An arterial sample is a more representative sample	<30 mins, ON ICE - ASAP
ANA screening	 Serum	5	Special Chem	2-4 X/month	Frequency depends on requests	2 weeks
ANA/ENA typing	 Serum	5	Special Chem	2-4 X/month	Automatic reflexed with positive ANA screen	2 weeks
β-HCG) (β-Human Chorionic Gonadotropin)	 Serum	5	CCH SMMC	Daily	Can be requested as a CITO test!	3 days
Bicarbonate (in serum)	 Serum	5	CCH MB/ SMMC	Daily	Sample has limited stability once the tube is exposed to air	7 days
Bilirubin (total or direct)	 Serum	5	CCH MB/ SMMC	Daily		7 days (prevent exposure to light)
Bloodgroup/ Rhesus	EDTA 	4	CCH SMMC	Daily	Store at 2-8°C up to 3 days.	72 hours

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Directory of Services SLS NV

Test	Tube Type	Vol. (mL)	Location	Frequency	Remarks	Sample Stability (2-8 °C)
Blood gas	Syringe or capillary or green top 		CCH SMMC	Daily	Sample must be analyzed within 15 minutes	15 minutes
CA 15-3 (Cancer Antigen 15-3)	 Serum	5	CCH SMMC	Daily		5 days
CA 125 (Cancer Antigen 125)	 Serum	5	CCH SMMC	Daily		5 days
CA 19.9 (Cancer Antigen 19.9)	 Serum	5	CCH SMMC	Daily		30 days
Calcium (in serum)	 Serum	5	CCH MB/ SMMC	Daily		3 weeks
Calcium (in urine)	Portion of U-24		CCH MB/ SMMC	Daily		4 days
Carbamazepine	 Serum	4	CCH SMMC	As needed		7 days
CEA (Carcino-embryonic Antigen)	 Serum	5	CCH SMMC	Daily		7 days
Cell panel (11 cells)	EDTA 	4	CCH SMMC	As needed	Ab typing result valid for 72 hr	48 hours
CD4% and CD4 Lymphocytes	EDTA 	4	CCH MB/ SMMC	Daily/ Upon request	Fresh blood sample	24 hours
Coombs test, direct (DAT test)	EDTA 	4	CCH SMMC	Daily		48 hours

Directory of Services SLS NV

Test	Tube Type	Vol. (mL)	Location	Frequency	Remarks	Sample Stability (2-8 °C)
Coombs test, Indirect	EDTA 	4	CCH SMMC	Daily		48 hours
CBC; complete blood count	EDTA 	4	CCH MB/ SMMC	Daily	Sample should be < 8 hours old to perform a manual differential	48 hours
Chikungunya IgG/IgM	 Serum	5	External	Daily	Day of onset symptoms is critical to interpret results	2 weeks
Chloride (serum)	 Serum	5	CCH MB/ SMMC	Daily		7 days
Chloride (in urine)	Up or U-24		CCH MB/ SMMC	Daily		7 days
Chloride (in CSF)	CSF		CCH SMMC	Daily	Fresh sample!	1 day
Cholesterol	 Serum	5	CCH MB	Daily		7 days
CMV IgG and IgM	 Serum	5	CCH MB	1x/week		4 weeks
Cortisol	 Serum	5	CCH MB	Daily	Sample collection time must be noted!	4 days
CPK (Creatine phosphokinase)	 Serum	5	CCH MB/ SMMC	Daily		7 days

Directory of Services SLS NV

Test	Tube Type	Vol. (mL)	Location	Frequency	Remarks	Sample Stability (2-8 °C)
CPK-MB (Creatine phosphokinase-myocardial band)	 Serum	5	CCH SMMC	Daily	Enzymatic method	8 days
Creatinine (in serum)	 Serum	5	CCH MB/ SMMC	Daily		7 days
Creatinine (in urine portion)	Urine		CCH MB/ SMMC	Daily	RT	6 days
Creatinine (24 hr collection)	Urine-24 hr		CCH MB/ SMMC	Daily	RT	6 days
Crossmatch	EDTA 	4	CCH SMMC	Daily	Recipient blood group must be performed on two independent occasions	48 hours
CRP (C-Reactive Proteïn)	 Serum	5	CCH MB/ SMMC	Daily		7 days
CSF pneumococcal antigen	CSF		MMB	Daily		7 days
CMV PCR qualitative detection	Urine		External			7 days
CMV PCR quantitaive	EDTA 		External			7 days
CSF analysis (Biochemical & cell count)	CSF		CCH SMMC	Upon request	Fresh sample that is not a traumatic puncture	1 day

Directory of Services SLS NV

Test	Tube Type	Vol. (mL)	Location	Frequency	Remarks	Sample Stability (2-8 °C)
Valproic acid (Depakine)	 Serum	5	CCH SMMC	Upon request		7 days
Dengue serology (IgG/IgM/NS1)	 Serum	5	Special Chem	1x/week	Day of onset symptoms is critical to interpret results	14 days
D-Dimer	 Citrate Whole blood	4	CCH SMMC	Daily		3 hours
Digoxin	 Serum	5	CCH SMMC	Upon request	Has a narrow therapeutic range	24 hours
Drugs of Abuse Screening	Urine	3	CCH SMMC	As needed	Positive screening test will be confirmed externally!	4 hours
Estradiol	 Serum	5	CCH MB	Daily	Values depend on menstrual cycle	14 days

Directory of Services SLS NV

Test	Tube Type	Vol. (mL)	Location	Frequency	Remarks	Sample Stability (2-8 °C)
eGFR (MDRD)	 Serum	5	CCH MB/ SMMC	Daily	Estimated GFR is reported together with the Creatinine test. Only applicable for ages 18 and up.	
ESR	Whole blood EDTA 	5	CCH MB/ SMMC	Daily		24 hrs
EBV IgG + IgM	 Serum	5	Special Chem	2-3/month		14 days
Ferritin	 Serum	5	CCH MB	Daily		7 days
Folic Acid	 Serum	5	CCH MB	Daily		2 days
fPSA (free PSA)	 Serum	5	CCH SMMC	Daily	Reflex test when PSA is between 4 and 10 ng/ml.	5 days
FSH (Follicle Stimulating Hormone)	 Serum	5	CCH MB	Daily		14 days
Gentamicin concentration	 Serum	5	CCH SMMC	Upon request	May be requested as CITO	7 days

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Test	Tube Type	Vol. (mL)	Location	Frequency	Remarks	Sample Stability (2-8 °C)
GGT (Gamma-Glutamyl Transferase)	 Serum	5	CCH MB/ SMMC	Daily		7 days
Glucose (in serum/plasma)	 Sodium Fluoride  plasma/ Serum	4	CCH MB/ SMMC	Daily		Plasma: 8 hours Serum: 3 days
HbA1C (Glyc-Hb)	EDTA 	4	CCH MB	Daily	Performed by cation-exchange HPLC.	96 hours
HBsAg	 Serum	5	CCH MB	Daily		5 days
Haptoglobin	 Serum	5	CCH SMMC	As needed	Part of the CITO list	3 months
Hb-electrophoresis (Hb profile)	EDTA 	4	CCH MB	1x/week	If abnormal peak is found, sample will be sent for confirmation externally. Performed by cation-exchange HPLC	96 hours
HDL-Cholesterol	 Serum	5	CCH MB	Daily		7 days

Directory of Services SLS NV

Test	Tube Type	Vol. (mL)	Location	Frequency	Remarks	Sample Stability (2-8 °C)
HSV 1/2 IgG	 Serum	5	Spec. Chem	1 or 2X /week	High prevalence of HSV 1 and 2 IgG in the general population	14 days
H. Pylori IgG (Helicobacter Pylori)	 Serum	5	Special Chem	2x/ week	Freeze	14 days
HIV 1/2 screening	 Serum ONLY FROM A PRIMARY TUBE!!	5	CCH MB/ SMMC	Daily	4th gen HIV Ag/Ab test or lateral flow rapid test. Reactive samples will be confirmed same day.	14 days
HIV Confirmation	 Serum	5	Special Chem	As required	ONLY FROM A PRIMARY TUBE!!	14 days
IgA and IgG	 Serum	5	CCH MB	2x/ week		8 months
IgM	 Serum	5	CCH MB	2x /week		4 months
INR test	 Citrate Plasma	4	CCH MB/ SMMC	Daily	Sample is 24 h stable at RT	24 hours
Iron (Fe)	 Serum	5	CCH MB/ SMMC	Daily		3 weeks

Directory of Services SLS NV

Test	Tube Type	Vol. (mL)	Location	Frequency	Remarks	Sample Stability (2-8 °C)
IgE total	 Serum	5	CCH MB	Daily		7 days
LDH	 Serum	5	CCH MB/ SMMC	Daily		4 days
LDL Direct	 Serum	5	CCH MB	Daily		7 days
Lactate	 Heparin Plasma/  Sodium Flouride Plasma	4	CCH SMMC	Daily	Analyse within 15 minutes	8 hours (Seperated plasma)
Lithium	 Serum	5	CCH SMMC	As needed		7 days
Lipase	 Serum	5	CCH SMMC/MB	Daily		7 days
LH	 Serum	5	CCH MB	Daily		1 month
Microalbumin (in urine)	Up or U-24		CCH MB/ SMMC	Daily	Only if the urine screening dipstick for protein is negative	1 month

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Test	Tube Type	Vol. (mL)	Location	Frequency	Remarks	Sample Stability (2-8 °C)
Legionella and Pneumococcal antigen in urine	Urine		MMB	Daily	Severe pneumonia admissions	7 days
Malaria Antigen and Microscopy	EDTA 	4	CCH SMMC	Upon request		
Magnesium	 Serum	5	CCH MB/ SMMC	Daily	Result is dependent on albumin concentration	7 days
NT-proBNP (B-type Natriuretic Peptide)	 Serum	4	CCH SMMC	Daily		5 days
Microscopic diff (Manual Cell Count)	EDTA 	4	CCH MB/ SMMC	Daily	Manual Cell Count is performed according to laboratory criteria.	<8hr
Occult blood in feces	Stool		MMB	Daily		
Osmol (in serum)	 Serum	4	CCH MB/ SMMC	Daily		7 days
Osmol (in Urine)	Urine	4	CCH MB/ SMMC	Daily		48 hrs
Parvo B19 IgG + IgM	 Serum	5	CCH SMMC			14 days
Phenobarbital	 Serum	5	CCH SMMC	Upon request		2 days
Phenytoïn (Dilantin)	 Serum	5	CCH SMMC	Upon request		4 days
Phosphate (P) Serum	 Serum	5	CCH MB/ SMMC	Daily		4 days

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Test	Tube Type	Vol. (mL)	Location	Frequency	Remarks	Sample Stability (2-8 °C)
Phosphate in urine	Up or U-24		CCH MB/ SMMC	Daily		
Potassium (K^+)	 Serum	5	CCH MB/ SMMC	Daily	K^+ in plasma is ~0.3 mmol/l lower than in serum	14 days
Potassium in Urine	Up or U-24		CCH MB/ SMMC	Daily		14 days
Pregnancy test (Urine)	Urine portion		CCH MB/ SMMC	Daily		48 hrs
Progesterone	 Serum	5	CCH MB	Daily		5 days
Prolactin	 Serum	5	CCH MB	Daily		14 days
Prothrombin (PT-INR)	 Citrate Plasma	4	CCH MB/ SMMC	Daily	24h Stable at 23°C.	24 hours
PSA (total)	 Serum	5	CCH SMMC	Daily		5 days
PTH	 Serum	5	CCH SMMC	Daily		2 days
Reuma Factor (RF)	 Serum	5	CCH MB	2x/ week		8 days
RPR-titer	 Serum	5	Special Chem	Daily	Automatic test for Trep positive results	14 days

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Test	Tube Type	Vol. (mL)	Location	Frequency	Remarks	Sample Stability (2-8 °C)
Rubella IgG	 Serum	5	CCH MB	1x/week		3 weeks
SARS-Cov2 Serology (IgA/IgG)	 Serum	5	Special Chem	1x/week		14 days
SARS-Cov-2 Antigen	Swab		CCH MB/ SMMC	Daily	Nasal/nasoph. swabs	1 day
Sodium in plasma	 Serum	5	CCH MB/ SMMC	Daily		14 days
Sodium in Urine	Urine portion or 24 h Urine		CCH MB	Daily		14 days
Syphilis Screening (Trep)	 Serum	5	CCH MB	Daily		14 days
Syphilis confirmation (Trep WB)	 Serum	5	Special Chem	1x/ week		14 days
Serum Protein Electrophoresis (SPE) (M-prot)	 Serum	5	Special Chem	1x/week	Suspected samples will be sent to reference laboratory for M-spike confirmation	14 days
Semen Analysis	Semen	1	CCH SMMC	2x/week	Appointment only	1 hr
Sickle Cell screening	EDTA 	4	CCH MB/ SMMC	Upon request	Not applicable for ages < 6 months. Positive screen will be confirmed with HPLC.	14 days

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Test	Tube Type	Vol. (mL)	Location	Frequency	Remarks	Sample Stability (2-8 °C)
Testosterone	 Serum	5	CCH MB	Daily		7 days
Tobramycin	 Serum	5	CCH SMMC	Upon request		3 days
Total Protein in Serum (TP)	 Serum	5	CCH MB/ SMMC	Daily		1 month
Total Protein in Urine (TPU)	Urine portion		CCH MB/ SMMC	Daily		7 days
Total Iron Binding Capacity (TIBC)	 Serum	5	CCH MB	Daily	Calculated through transferrin test result	
Tox Screen -TDM Urine	Urine portion		CCH SMMC	Daily	Positive samples sent for confirmation	48 hrs
Toxoplasma IgM/IgG	 Serum	5	CCH MB	1x/week		3 weeks
Transferrin	 Serum	5	CCH MB	Daily		8 days
Triglyceride	 Serum	5	CCH MB	Daily	Fasting sample	7 days
Troponin Hs-T	 Serum	5	CCH SMMC	Daily	Represents 99th percentile of normal	24 hours
T4 free (FT4)	 Serum	5	CCH MB/ SMMC	Daily		14 days

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Test	Tube Type	Vol. (mL)	Location	Frequency	Remarks	Sample Stability (2-8 °C)
TSH	 Serum	5	CCH MB/ SMMC	Daily		7 days
Urea	 Serum	5	CCH MB/ SMMC	Daily		7 days
Urea	Urine portion or 24h Urine	5	CCH MB/ SMMC	Daily		7 days
Uric acid	 Serum	5	CCH MB/ SMMC	Daily		5 days
Uric acid	Urine portion or 24 h Urine		CCH MB/ SMMC	Daily		4 days
Urine Screening and Sediment	Urine portion		CCH MB/ SMMC	Daily	Fresh samples: Refrigeration causes loss of RBC and WBC.	4 hours
Vancomycin concentration	 Serum	5	CCH SMMC	As needed	Time of draw and time and milligrams of vancomycin dose is important	48 hours
Vitamin D total (25-OH)	 Serum	5	CCH MB	Daily	Vitamin D storage, not the active metabolite	4 days
Vitamin B12	 Serum	5	CCH MB	Daily		2 days

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Test	Tube Type	Vol. (mL)	Location	Frequency	Remarks	Sample Stability (2-8 °C)
Zika IgG and IgM	 Serum	5	Special Chem	1x/week		14 days

Medical Microbiology Department Test list

Test	Tube Type	Vol. (mL)	Location	Frequency	Remarks	Sample Stability (2-8°C)
H. Pylori Antigen in feces	Feces	5 ml/gr	Microbiology	Every 3 days		<24 hr
Trichomonas Antigen	Dry swab from kit		Microbiology	daily		<24hr
Clostridium toxin A/B (gastroenteritis PCR panel)	Feces or rectal PCR swab	5 ml/gr	Microbiology	daily		<24 hr
Blood Culture	Pediatric, aerobic, or anaerobic bottle	See instruction	Microbiology	Daily	Note time of draw	<24hr
Cerebrospinal fluid (CSF), gram, culture, PCRs	CSF in CSF tube		Microbiology	Daily		<24hr
Catheter culture	Catheter tip	5 cm	Microbiology	Daily		<48hr
Urine culture	Urine	10-20 ml	Microbiology	Daily	Mid-stream urine	<24hr
Urine catheter culture	Urine	10-20 ml	Microbiology	Daily		<24 hr
Wound culture/pus	Swab amies	swab	Microbiology	Daily		<48 hr
Vaginal/Cervical culture	Swab amies		Microbiology	Daily		<48 hr

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Test	Tube Type	Vol. (mL)	Location	Frequency	Remarks	Sample Stability (2-8 °C)
ENT culture	Swab amies		Microbiology	Daily		<48 hr
Sputum, gram, ZN, culture, TB PCR	Sputum	1-5 ml	Microbiology	Daily		<24 hr
Fecal culture SSYCE	Feces	5 ml/gr	Microbiology	Daily		<72 hr
MRSA and HRMO detection	Swab amies		Microbiology	Daily	Conform NVMM	<48
Fecal parasites	Feces, fresh and in SAF	2x 5 ml/gr	Microbiology	Every 3 days		<72 hr
Blood parasites	Whole blood	1-5 ml	Microbiology	Daily		<24 hr
HIV viral load	plasma	5-10 ml	Microbiology	Daily		<24 hr
HIV genotypic susceptibility	plasma	10-15 ml	Microbiology	Weekly	Only if HIV VL > 1000 c/ml	<24 hr
T. vaginalis PCR	First catch urine or PCR swab	1-5 ml	Microbiology	Daily	First catch urine	<24 hr RTM
CT/NG PCR	First catch urine or PCR swab	1-5 ml	Microbiology	Daily	First catch urine	<24 hr RTM
HPV cervix screening	PCR swab/ Liquid PAP		Microbiology	Daily		24-48 hr
Meningitis PCR panel	CSF	1-10 ml	Microbiology	Daily		<24 hr
Respiratory PCR panel	Sputum, PCR swab		Microbiology	Daily		<24 hr
Gastroenteritis PCR panel	Feces, PCR swab	5 ml/gr	Microbiology	Daily		<24 hr

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Test	Tube Type	Vol. (mL)	Location	Frequency	Remarks	Sample Stability (2-8 °C)
Enteric PCR panel	Feces, PCR swab	5 ml/gr	Microbiology	Daily		<24 hr
SARS-CoV-2	PCR swab	1 – 5 ml	Microbiology	Daily		<72 hr

Environmental Department Test List

ENV- Analytical Chemistry Test List

Test	Sample Type	Volume (mL)	Frequency	Sterilized	Remarks
Alkalinity	Water/Ice	500	Request	No	Fresh, before 12:00
Aluminum	Water/Ice	500	Request	No	Fresh, before 12:00
Chloride	Water/Ice	500	Request	No	Fresh, before 12:00
Chlorine	Water/Ice	500	Request	No	Fresh, before 12:00
COD	Water/Ice	500	Monthly	No	Fresh, before 12:00
Nitrite	Water/Ice	500	Request	No	Fresh, before 12:00
TKN	Water/Ice	500	Request	No	Fresh, before 12:00
Nitrogen	Water/Ice	500	Request	No	Fresh, before 12:00
Phosphorus	Water/Ice	500	Request	No	Fresh, before 12:00
Iron	Water/Ice	500	Request	No	Fresh, before 12:00
Zinc	Water/Ice	500	Request	No	Fresh, before 12:00
Hardness	Water/Ice	500	Request	No	Fresh, before 12:00
Lead	Water/Ice	500	Request	No	Fresh, before 12:00
Oxygen	Water/Ice	500	Request	No	Fresh, before 12:00
pH	Water/Ice	500	Daily	No	Fresh, before 12:00
Conductivity	Water/Ice	500	Daily	No	Fresh, before 12:00
Turbidity	Water/Ice	500	Daily	No	Fresh, before 12:00
BOD	Water/Ice	500	Monthly	No	Fresh, before 12:00

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ENV- Microbiology Test List

Test	Sample Type	Volume (mL)	Frequency	Sterilized	Remarks
Cadmium	Water/Ice	500	Request	No	Fresh, before 12:00
Endotoxin	Water/Ice	500	Weekly	No	Fresh, before 12:00
Plate count	Water/Ice	500	Daily	Yes	Fresh, before 12:00
Enterococci	Water/Ice	500	Daily	Yes	Fresh, before 12:00
Coliform	Water/Ice	500	Monthly	Yes	Fresh, before 12:00
Legionella	Water/Ice	500	Monthly	Yes	Fresh, before 12:00
Clostridium	Water/Ice	500	Monthly	Yes	Fresh, before 12:00

Appendix 2: Reference Values

Test	Reference Values	Remarks
CLINICAL CHEMISTRY AND IMMUNOLOGY & SEROLOGY		
Acetaminophen	10-20 mg/L *[2]	Therapeutic range
ALAT	**Female**: 10-35 U/L **Male**: 10-50 U/L *[2]	IFCC with Ppi content
ASAT	**Female**: 10-35 U/L **Male**: 10-50 U/L *[2]	IFCC with Ppi content
Albumin	35-52 g/L *[2]	
Alcohol (ethanol)	<2 mmol/L *[2]	10.9 -21.7 slowing of reflexes >21.7 mmol/L depression of CNS >86.8 mmol/L fatalities reported
Alpha-fetoprotein (AFP)	≤ 7.0 ng/ml *[2]	Non-pregnant patients
Alkaline Phosphatase	**Female**: 35-105 U/L **Male**: 40-130 U/L *[2] **Children**: < 300 U/L *[15]	

Ammonia	**Female**: 11-51 µmol/L **Male**: 16-60 µmol/L *2	2 ml EDTA-blood on ice
Amylase	28-100 U/L *2	
Beta-HCG	≤ 5 U/L (neg. pregnancy) *2 ≥ 25 U/L (pos. pregnancy) *2	
Test	**Reference Values**	**Remarks**
Bilirubin	**Direct**: ≤ 0.2 mg/dl **Total**: 0.2-1.2 mg/dl *2	
Bicarbonate	22-29 mmol/L *2	
Calcium	2.15 - 2.55 mmol/l *2	M/F; Calcium result depends on Albumin concentration
CA 125	<35 U/ml *2	
CA 15-3	<25 U/ml *2	
CA 19.9	< 35 U/ml *2	
CEA	< 5.2 ng/ml *2	99ste percentile
Carbamazepine (Tegretol)	4.0-12.0 ug/ml *2	
Chloride	96 - 109 mmol/l *1	Indirect ISE
Cholesterol	120 - 200 mg/dl *3	
HDL-cholesterol	>38 mg/dl *3	
LDL-cholesterol direct	<100 mg/dl *2	
Chol/HDL ratio	< 4.5 *3	
CMV IgG	< 0.5 U/ml *2	AU= arbitrary units
CMV IgM	<0.7 Index *2	
Cortisol	6am-10am: 166 – 507 nmol/L 4pm-8pm: 73.8 – 291 nmol/L	Sample collection time must be noted!
CPK	**Female**: 26 – 192 U/L **Male**: 39 – 308 U/L*2	

CK-MB	<25 U/L *2	
CRP	<0.8 mg/dl *2	
Creatinine	**Female**: 0.5 – 1.0 mg/dl **Male**: 0.7 – 1.2 mg/dl *2	
Creatinine clearance	80 – 140 ml/min *7	Serum and 24hr urine paired samples
Depakine (Valproric acid)	50-100 µg/ml *2	Trough values
Dilantin (Phenytoin)	8-20 µg/ml *2	
Digoxin	0.8-2.0 ng/ml	

Test	Reference Values	Remarks
Estimated eGFR	> 60	Calculated using MDRD-4 formula
Estradiol	**Female:** Fol. Phase: 12.5-166 pg/ml Ovu. Phase: 85.8-498 pg/ml Lut. Phase: 43.8-211 pg/ml **Male:** 7.63-42.6 pg/ml *2	
Ferritin	**Female**: 13-150 ng/ml *2 **Male**: 30-400 ug/ml	
Folic Acid	7.3-26.1 ng/ml *2	
Gamma-GT (GGT)	**Female**: 5-36 U/L **Male**: 8-61 U/L *2	
Gentamicin	0.5-2 ug/ml *2	Therapeutic range
Glucose fasting	70-105 mg/dL *2 110-125 mg/dL *4 > 126 mg/dL *4	serum/plasma/cap blood

		irregulated glucose diabetes
Glucose 2-h AB	< 140 mg/dL *4 140-200 mg/dL *4 > 200 mg/dL *4	2 h after meal irregulated glucose tol. diabetes
HbA1c	4.0 - 6.5 % *4 > 7.0 % unregulated DM *4	HPLC cation-exchange
Haptoglobin	30 - 200 mg/dL *2	
HBsAg	Negative	<0.9 Index
HBs (Anti Hbs)	Negative *5	
Hepatitis A (Tot Ab.)	Negative	<20.0 IU/L
Hepatitis A IgM Ab.	Negative	<1.0 Index
Hepatitis C Ab Total	Negative	<0.9 Index
Hepatitis B core Ab	Negative	>1.0 Index
Hepatitis B panel	Negative	HBs-Ag, , anti-Hbcore Total and anti-HBs

Test	Reference Values	Remarks
HIV Ag and Ab rapid ICT	Negative	
HIV Ag and Ab screen	Negative	<0.9 Index
HIV Confirmation	Negative	Biorad GENius method (HIV1/2)
Helicobacter pylori (IgG)	Negative	<1.1 ratio *2
IgA	0.7-4.0 g/l *2	
IgG	7.0-16.0 g/l *2	
IgM	0.4-2.3 g/l *2	
IgE	100 IU/ml *2	
Iron (Fe)	33-193 ug/dL *2	Concentration is affected by time of collection
Lactate	Venous: 0.5-2.2 mmol/L *2	Heparin syringe (or capillary)

		without any air bubbles
LDH	< 250 U/l *2	
Lipase	Adults: 13 – 16 U/L	
LH (IU/L)	**Female:** Fol. Phase: 2.4-12.6 Ovul. Phase: 14.0-95.6 Lut. Phase: 1.0-11.4 Post. men. Phase: 7.7-58.5 **Male:** 1.7- 8.6 *2	Gender, menstrual cycle dependent values
FSH (IU/L)	**Female:** Fol. Phase: 3.5-12.5 Ovulation: 4.7-21.5 Lut. Phase: 1.7-7.7 Post men. Phase: 25.8-134.8 **Male:** 1.5-12.4 *2	Gender, menstrual cycle dependent values
Liquor (CSF) white cell count (WBC) and chemistry	**WBC** Adults: < 10/ mm^3 *12 Children: < 20/ mm^3 **Chemistry** Adult Tot. Protein: 15-45 g/dl*2 Child CSF protein: 4-28 g/dl *2 Glucose: 40-80 mg/dL *12	CSF is drawn by the doctor. A traumatic sample will have increased WBC and RBC

Test	Reference Values	Remarks
Lithium	0.6-1.2 mmol/l *2	Therapeutic
Magnesium	0.66- 1.07 mmol/l *2	Depends on Albumin concentration and Age
Sodium (Na)	135-145 mmol/l *1	Indirect ISE
NT-proBNP	Ages 0-75 yrs; < 125 pg/ml *2 Ages > 75 yrs; < 450 pg/ml *2	Age-dependent cut-off
Osmolality (serum)	271 – 286 mOsm/kg *6	Freeze method
Phenobarbital	15-40 ug/ml *2	
Phosphate (inorganic)	0.72-1.56 mmol/l *1	Age dependant!
Potassium	3.5-5.0 mmol/l	

PTH	15-65 pg/ml *2	
Progesterone	**Female:** Fol. Phase: 20-150 ng/dL Ovu. phase: 80-300 ng/dL Lut. phase: 170-2700 ng/dL Post men. phase: 10-80 ng/dl *2 **Male:** 20 – 140 ng/dL *2	
Prolactin	**Female:** 4.79 – 23.3 ng/ml *2 **Male:** 4.04- 15.2 ng/ml *2	
PSA fPSA ratio	<4 ng/ml *2 >25%	Basal PSA values increase with age
Rheumafactor (RF)	< 14 IU/mL *2	Combine with anti-CCP for increased specificity
Rubella IgG	Negative *5	<10 IU/ml (2)
Syphilis screen (Treponema)	Negative *5	<1.0 Index
TIBC	250 - 450 µgdL *2	Calculated from transferrin concentration
Total Protein	64-83 g/L *2	
Toxoplasma IgG	Negative *5	<1.0 IU/ml
Toxoplasma IgM	Negative *5	<0.80 Index
T4 free (FT4)	0.93-1.70 ng/dL *2	Method not validated for newborn samples
TSH	euthyr. 0.27 - 4.2 µIU/ml 2	Higher in newborns
Test	**Reference Values**	**Remarks**
Testosterone (ng/dL)	**Female** 20-49yrs: 8.40-48.1 **Female** >50yrs: 2.9-40.8 **Male** 20-49y: 249-836 **Male** >50yrs: 193-740	
Transferrin	200 – 360 mg/dL *2	

Tobramycin	0.0-1.0 ug/ml *2	
Triglycerides	<180 m/dL *2	Should be a fasting sample for adequate interpretation
Troponine T (high-sensitive)	< 14 pg/ml *2	99% percentile
Urea	16-40 mg/dL *2	
Uric Acid	**Female**: 2.4 - 5.7 mg/dL *2 **Male**: 3.4-7.0 mg/dL *2	
Vancomycin	15-20 ug/mL	Range is for trough sample
Vitamin D, 25-OH	> 30 ng/ml	Values below 30 ng/ml are considered insufficient
Vitamin B12	191 - 663 pg/ml *2	
SPECIAL CHEMISTRY		
Allergy Inhalation/Foodmix	Negative *5	Line blot
ANA screen	Negative *5	IIFT
ANA/ENA typing	Negative *5	Line blot
ANCA/GBM, MPO, PR3	Negative *2	Line blot assay
Anti-CCP	<=5 U/ml	Use in combination with RF test
CD4 Lymphocytes CD4%	500*-1200/ul N/A	
Chikungunya IgG/IgM	Negative *5	ELISA
Dengue IgG/IgM	Negative *5	ELISA
Dengue NS1 antigen	Negative *5	Offered as a panel together with dengue Ab
HSV 1/2 IgG	Negative *5	Line blot
SARS-Cov2 IgA/ IgG	Negative *5	<0.8 (IgG)

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Test	Reference Values	Remarks
SPECIAL CHEMISTRY		
Serum Protein Electrophoresis -- ALB 1 Fraction --Alpha 1 Fraction --Alpha 2 Fraction --Beta Fraction --Gamma Fraction	 33-57 g/L 1.0-4.0 g/L 3.0-9.0 g/L 7.0-15.0 g/L 5.0-14.0 g/L	
RPR-titer	Negative *5	In case of congenital syphilis suspicion, collect sample from both mother and child
Trep confirmation (WB)	Negative	Line blot
Zika IgG/ IgM	Negative	
HEMATOLOGY		
Bloodgroup and Rhesus	Not applicable	
Coombs test: Direct Indirect	 Negative *5 Negative *5	If Coombs indirect is positive, an antibody identification panel (11-cell) is requested If Coombs direct is positive, Coombs indirect is requested. (>4yrs)
Cross Match	i.o. (in order) *5	
Erythrocytes	4.2-6.1 M/ul	Age- dependant
ESR	<20 mm/hr *2	Age-dependant
Hematocrit	37.0-52.0 %	
Hemoglobin	**Female:** 12-15 g/dL	Age-dependant

	Male: 13.6-16.3 g/dL	
Hemoglobin Profile	HbAA is Normal Adult Hb profile	Cation-exchange HPLC
Irregular antibody screening (IRAS)	Absent for irregular antibody *5	IRAS result is only valid for a maximum of 72h
Malaria	Negative *5	
MCH	27.0-31.0 pg	
MCHC	33.0-37.0 g/dL	
Test	**Reference Values**	**Remarks**
MCV	80-99.0 fL	
Reticulocytes	0.5-2.5 %	Consider absolute reticulocyte number.
Sickle cell screening	Negative *5	Only applicable for samples from babies > 6 months
Thrombocytes (PLT)	150- 450 (10^3/ul)	Adjust calculation if PLT count is done in citrate-anticoagulated blood.
HEMATOLOGY		
White blood Cells (WBC)	4.8-10.8 (K/ul)	Age – and race dependant
Newborn	10-20” *15	Wil be corrected for normoblasts
Infant	9- 15” *15	
WBC differentiation	**Adults** *1 % Neutrophils: 37-80 % Lymphocytes: 10-50 % Monocytes: 0-10 % Eosinophils: 0-6 % Basophils: 0-2	Age dependent. Manual differentiation will be performed when analyzer flags or extremes in the

		different parameters are found.
COAGULATION		
APTT	25-31.3 sec *2	Range depends on the reagent/analyzer combination
D-Dimer	≤ 0.5 mg/l *2	Use primarily to EXCLUDE DVT/PE
INR test Intensity group 1 Intensity group 2	0.9-1.2 Ratio 2,5 – 3,5 *11 3,0 – 4,0 *11	Therapeutic ranges for OAC therapy
Protrombin time (PT)	0.8-1.1 sec *2	
URINE		
Amylase	**Female**: 21 - 447 U/L *2 **Male**: 16 – 491 U/L *2	Urine portion
Calcium (24 hr)	2.5-7.0 mmol/ 24 hour *2	
Chloride (24hr)	110- 250 mmol *2	
Creatinine	**Female**: 29-226 mg/dl **Male**: 40-278 mg/dl	Urine portion
Creatinine (24hr)	**Female**:720-1510 mg/24h **Male**: 980-2200 mg/24hr	24-hr output
Test	**Reference Values**	**Remarks**
Creatinine Clearance	66-143 mL/min	
Drugs of Abuse Screen	Negative	Reactive/positive results require quantitative confirmation
Magnesium (24hr)	3.0- 5.0 mmol/24hr *2	
Pregnancy test (screen)	Negative	Do not use gross hemolytic sample
Phosphate	13-44 mmol/L	
Phosphate (24hr)	13-42 mmol/24hr	
Potasium (24hr)	25-125 mmol/24hr	
Micro-albumin	<20 mg/l *2	1st morning void

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Micro-albumin (24hr)	<30 mg/24hr	
TPU portionTPU (24hr)	<150 mg/L *2 <140 mg/24hr *2	
URINE	**Reference Values**	**Remarks**
Osmolality (Urine)	275 -900 mOsm/kg *6	Depends largely on fluid intake
mAlb/Creatinine ratio	<30 mg/mmol creatinine *2	Random sample. Gender dependent
Sodium (Na) - (24 hr)	40-220 mmol/24hr *2	
Urea (24 hr)	25.7 - 42.9 g/24 hr *2	
Uric Acid (24 hr)	250 - 750 mg/24hr *2	
TPU/Creatinine ratio	0.2	
URINALYSIS	**Reference values**	**Remarks**
Specific Gravity	1.005 - 1.035	
pH	4.5 -8.0	
Protein	Negative	Trace can also be considered as a normal result
Glucose	Negative	
Ketones	Negative	
Blood	Negative	
Urobilinogen	<2.0	
Bilirubin	Negative	
Leukocytes	Negative	
Nitrites	Negative	

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BLOODGAS

Arterial/ Capillary *[9]

pH	7.35 – 7.45
pCO2	35–45 mmHg
Actual Bicarbonate (plasma)	22-26 mmol/l
BE (Base Excess)	-2 - +3
Adult PO2	80-105 mmHg
Neonatal PO2	54-95 mmHg
O2 Saturation	95-98%

Venous *[9]

pH	7.31-7.41
pCO2	41-45 mmHg
Actual Bicarbonate (plasma)	23-28 mmol/l
BE (Base Excess)	-2 - +3
Adult PO2	25-40 mmHg
O2 Saturation	40-70%

SEMEN ANALYSIS *[16]

Semen Characteristics	WHO 2010
Volume (ml)	≥1.5
Sperm count (10^6/mL)	≥15
Total sperm count (10^6)	≥39
Total motility (%)	≥40
Progressive motility (%)	≥32
Morphology (%)	≥4
Leukocyte count (10^6/ml)	<1.0

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Test	Reference Values	Remarks
FECES		
Occult blood	Negative *5	
MEDICAL MICROBIOLOGY		
All cultures	Negative *5	
All PCR	Not detected *5	
All serology	Negative *5	
Pneumococcus Ag	Negative *5	
Legionella Ag	Negative *5	
Trichomonas Ag	Negative *5	
Fecal parasites	Negative *5	
H. Pylori Ag in Feces	Negative *5	
Urine PCR for CT/NG /TV	Negative *5	
Biofire PCRs	Negative *5	
MRSA PCR	Negative *5	
HIV-1 qPCR	Negative *5	

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Test	Reference Values	Remarks
WATER (Drinking/Ice/Waste)	For all, see reference *10	
Alkalinity	Taste should be acceptable to consumers	No absolute value, subjective to individual variation
Aluminum	< 200 ug/L	
Chloride	< 150 mg/L	
Chlorine (free)	> 0.3 and < 2 mg/l	
COD	< 150 mg/L	“surface water”
Nitrite	< 0.1 mg/L	
Nitrogen	< 5 mg N/l	TKN method
Phosphorus	< 1 mg N/l	TKN method
Iron	< 200 ug/L	
Zinc	3.0 mg/L	
Hardness	> 1 and < 2.5 mmol/l	This is the combined concentrations of Calcium and Magnesium
Lead	< 10 ug/L	
Oxygen	>4 mg/L	“dissolved oxygen/DO”
pH	>7.8 en < 8.5	
Conductivity	< 100 mS/m	Measured at 37°C
Turbidity	4 FTE	FTE: formazine turbidity unit
BOD	< 30 mg/l	“surface water”
Cadmium	< 3.0 ug/L	
Endotoxin	absent	“for dialysis water”
Plate count	< 20 kve/ml	
Enterococci	0 kve/250 ml	For both tap or bottled water
coliform	0 kve/250 ml	
Legionella	Absent	
Clostridium	Absent	

Appendix 3. Tests which require SZV's approval before sending to external lab

Test Name
All Genotyping
BCRA 1& 2
BCRA, PALB2
Cytogenetic testing (FISH or chromosoom
HLA B5701
Hemochromatose mutations (DNA) in blood
Klinefelter Syndrome
Micro-Array, Autism
Marfan Syndrome
Prader Willy Syndrome
Postnatal Genotyping MLPA
Postnatal Genotyping NGS (Next Generation Sequencing)
Postnatal genotyping SVTTN, c.75571G>A, SV TTNc.90242A>C
Membrane deficiencies (Sferocytose, Stomato/Xerocytose, Ellipto/poikilocytose)
Mycobact. identificatio PCR + res.line blot method
Darmparasieten PCR, 3 species
Entamoeba histolytica PCR
Genetic panels

***Reference list:**

1. Internal research/method comparison/reference range verification

2. Derived from the Instructions for use

3. NECP (National Educational Cholesterol Program, USA)

4. American Diabetes Association (ADA) guideline

5. Norm/by convention

6. Tietz textbook of Clinical Chemistry, 3rd Edition, Burtis Eds.

7. KDOQI guidelines

8. (proteïnurie gedurende zwangerschap)

9. Clinical application of blood gases, 5th Edition. Shapiro BA, Eds.

10. St. Maarten Water Ordinance Law

11. www.fnt.nl (federatie Nederlandse trombosediensten)

12. Clinical utility of biochemical analysis of CSF. Clin Chem.41/3, 343-360, 1995.

13. Essential Haematology, Hoffbrand and Pettit, 3e editie, 1997

14. Vitamin D Deficiency. MF Holick. NEJM 2007;357: 266-281.

15. Pediatric Reference Ranges. Soldin et al Eds. 3rd Edition, 1999

16. WHO 2010 reference ranges

17. BD Vacutainer® Tube Guide

8 SLS Locations

Patients visiting an outpatient center must bring a valid proof of ID, the laboratory request form signed by a physician and a valid insurance card.

All insurances are accepted, and patients can pay with cash or swipe.

The Laboratory request form

SLS has a microbiology laboratory test form to order diagnostic testing. The laboratory will only process laboratory request forms that are correctly filled in with the required information, signed/initialed by an authorized applicant (physician or midwife). In addition, the laboratory request form **must** provide all relevant (correct) information including:

- Signature and/or stamp of applicant
- Patient information (name, surname, date of birth, gender, patient number, etc.)
- Ward (if applicable)

For **Microbiology** tests is required;

1. Date and time of sample collection
2. Specimen type (swab, fluid, feces, biopsy, etc.) must be indicated
3. Anatomical location where the specimen is taken
4. Requested test(s)
5. If applicable; clinical indication

8.1 Medical Microbiology Department

The Medical microbiology and molecular diagnostic departments are located in the Main Building of SLS NV. An accredited medical microbiologist specialist supervises the diagnostic processes. Incorrectly requested or sampled tests as well as irrational request may be adjusted or rejected by the medical microbiologist. Tests that are not performed by the SLS Microbiology or Molecular Diagnostic Departments are sent externally to an ISO 15189 accredited laboratory.

9 Directory of test Microbiology SLS NV

Test	Sample Type	Volume (mL)	Turn around time	Sample Specifications/Stability	Remarks
Blood Culture 	**Aerobic** (green) and **anaerobic (**orange) bottle	8-10 ml per bottle	3-7 days PM: extra long incubations are obsolete for current systems	Deliver sample immediately to the lab. <24 hours at Room Temperature, do not refrigerate.	Any infection: please draw 2 sets (4 bottles). Endocarditis: please draw 3 sets (6 bottles). Central catheter: 1 set peripheral vein 1 set from each lumen PM: note time of draw

Microbiology and Molecular Diagnostic Sample Collection Guide

Test	Sample Type	Volume (mL)	Turn around time	Sample Specifications/Stability	Remarks
Blood Culture 	Pediatric/neonatal: yellow bottle	Up to 4 ml	3-7 days	Deliver sample immediately to the lab. <24 hours at Room Temperature, do not refrigerate.	Intended for use under 2 years of age.
Cerebrospinal fluid (CSF) 	Bacterial culture, PCR, antigen and antibody testing.	No minimum amount required. In **sterile** container/ sterile 10ml tube	3-7 days for culture 1-2 days for Biofire PCR	Deliver sample **CITO** to the lab.	After hours call the **ON-CALL** microbiology lab technician.
Culture swab (blue cap) 	Culture for bacteria, yeast and fungi. MRSA culture HRMO culture	Swab in amies agar medium	2-7 days for culture	Keep at room temperature. Deliver to the lab same or next day.	Can be combined with sterile container or PCR swab to allow for more stains and PCRs

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Test	Sample Type	Volume (mL)	Turn around time	Sample Specifications/Stability	Remarks
Pleural fluid, ascites, pus, biopsies 	Fluid or biopsy in sterile container. Small volume or small biopsies may require 0.5 ml saline against dehydration.	Preferably >1 ml	2-7 days for culture 1-2 days for TBC PCR	Keep refrigerated 2–8 °C. Deliver to the lab same or next day (<24 hours).	
Urine culture  	Midstream urine, catheter urine, bladder puncture	Minimum 1 ml	2-5 days for culture	<24 hours stored in the refrigerator at 2–8 °C.	Can be requested for MRSA and HRMO
Urine PCR for CT/NG 	First catch urine	Maximum 5 ml of first voided urine	Daily	Keep refrigerated. Deliver to the lab same or next day.	Samples for CT/NG PCR remain stable for 7 days at 4 °C.

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Test	Sample Type	Volume (mL)	Turn around time	Sample Specifications/Stability	Remarks
Respiratory Biofire PCR  	Nasopharyngeal swab. Nasopharyngeal lavage, bronchial lavage, bronchial aspirate.	Minimum 200 µl if stored in sterile container	1-2 days for Biofire PCR	<24 hours at room temperature or kept 1x overnight stored in the refrigerator	Samples for RP panel can remain stable at 2–8 °C for up to 7 days.
Sputum gram stain + culture 	Sputum in sterile container		2-7 days for culture 1-2 days for TBC PCR or Biofire PCR	The presence of epithelial cells in the gram stain may lead to rejection of the sample.	Suitable for TBC PCR or culture
Catheter tips 	Catheter tip Add 0.5 ml sterile saline against dehydration.	Tip in **sterile** container	2-7 days for culture	Keep refrigerated 2–8 °C. Deliver to the lab same or next day (<24 hours).	Please send only tip or tunnel-segment from central venous catheters.

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Test	Sample Type	Volume (mL)	Turn around time	Sample Specifications/Stability	Remarks
Feces  	Fecal culture Helicobacter antigen		2-7 days for culture 1-3 days for H. pylori antigen	Keep refrigerated 2–8 °C. Deliver to the lab same or next day (<24 hours).	Salmonella, Shigella, Campylobacter, Yersinia and E. coli O157
Gastrointestinal (GI) panel   Biofire PCR	PCR swab Add feces for culture and susceptibility testing of bacteria if present.	Swab in liquid PCR medium or Fresh feces	1-2 days for Biofire PCR	Keep refrigerated 2–8 °C. Deliver to the lab same or next day (<24 hours).	Samples for GI panel can remain stable at 2–8 °C for up to 7 days.
Fecal parasites 	Feces from 2 consecutive days in fecal parasite containers.	Day 1: with fixative (SAF) Day 2: without fixative	1-4 days	Keep refrigerated. Deliver to the lab same or next day after collection of 2nd container.	

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Test	Sample Type	Volume (mL)	Turn around time	Sample Specifications/Stability	Remarks
MRSA PCR 	TSB Salt Broth	2 ml TSB	1 day for PCR	15–25 °C for up to 24 hours	Samples for mrsa pcr can remain stable at 2–8 °C for up to 7 days.
HIV Viral Load 	PPT: plasma preparation tube	5 ml whole blood	Daily	Room Temperature < 24 hours	Sample can remain stable at 2–8 °C for up to 72 hours

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Test	Sample Type	Volume (mL)	Turn around time	Sample Specifications/Stability	Remarks
Trichomonas vaginalis PCR  	PCR swab or first catch urine		Daily	Deliver PCR swab same day at Room Temperature or refrigerated next day. Keep **urine** refrigerated 2–8 °C. Deliver to the lab same or next day (<24 hours).	Sample can remain stable at 2–8 °C for up to 96 hours
Trichomonas vaginalis antigen 	Dry swab from kit		Daily	Deliver dry swab same day at Room Temperature or refrigerated next day.	Sample can remain stable at 2–8 °C for up to 96 hours
Malaria Blood Parasites					

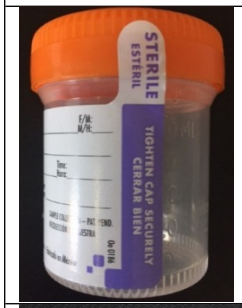
10 Sample collection containers

Microbiology and Molecular Diagnostic Sample Collection Guide

BacTec blood culture bottles.

Pediatric version optimized for smaller volumes

Weight of patient		Patient's total blood volume (ml)	Recommended volume of blood for culture (ml)		Total volume for culture (ml)	% of patient's total blood volume
kg	lb		Culture no.1	Culture no.2		
≤1	≤2.2	50-99	2		2	4
1.1-2	2.2-4.4	100-200	2	2	4	4
2.1-12.7	4.5-27	>200	4	2	6	3
12.8-36.3	28-80	>800	10	10	20	2.5



Sterile container for the collection of urine, sputum, fluid pus and other body fluids for culture.

Swab with amies agar. Suitable for aerobic and anaerobic culture of pathogens: bacteria, yeasts and fungi.

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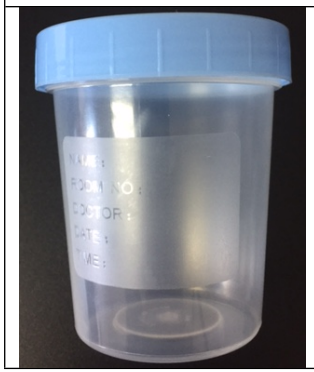
	Swab + Universal Viral Transport Medium (3.0 ml) for PCR. The thin flexible model swab is suitable for nasopharyngeal sampling, vaginal sampling (also as self-sampling) and urethral sampling.
  	ThinPrep container. Cervical samples for HPV PCR and liquid PAP smears. The preservative fluid can be used with any kind of brush or spatula. The samples remain stable for weeks.
	Sterile container for feces: Salmonella, Shigella, Yersinia and Campylobacter culture, Clostridium difficile toxin A/B, Helicobacter antigen test.

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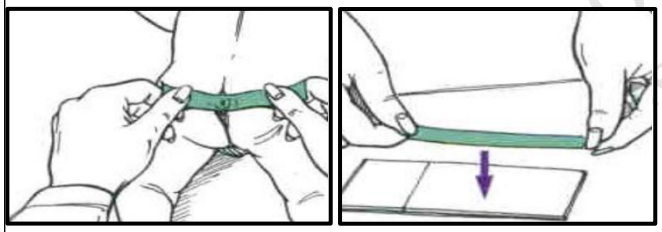
	**Parasitic F**eces **T**est: Feces sample day 1 in SAF fixative day 2 without fixative
	Tape test. Requires **transparent tape** and microscopic slide. Press short piece of tape to perianal tissue. Worms or eggs stick to tape. Fix the piece of tape onto one side of the glass slide. A piece of tape on a slide can be sent to the laboratory. PM: one piece of tape per slide PM: work cleanly, slides that pose a contamination hazard will be rejected
	Cerebrospinal fluid sample containers. Multiple tubes from CSF collection kits. Multiple sterile tubes allow for testing at microbiology and other laboratory departments. Suitable for various microbiological and molecular tests including: culture, antigen detection and PCR testing including Biofire PCR, serology. PM: these kits are not available via SLS. Neurologist or clinic must use kits suitable for the procedure.

Microbiology and Molecular Diagnostic Sample Collection Guide

	PPT: Plasma preparation tube: Viral load PCR and genotypic susceptibility for HIV-1. Other PCRs for pathogens detectable in blood: HBV DNA, Dengue PCR, culture -negative endocarditis etc.
	SST: Serum separator tube. Allows testing of serology: various IgG, IgM and IgA tests, as well as antigen testing.

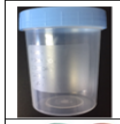
Notes

- For specific tests or materials, please contact the medical microbiologist.
- For CITO/STAT and urgent testing see the Microbiology and Molecular departments in the SLS Directory of Services for available tests and how to order.
- Turnaround times (TAT) are listed as they are expected. The TAT is the time of arrival of the sample at the laboratory until a (final) report is produced. Estimated TATs may be exceeded for various reasons and are no guarantee. Negative cultures are usually processed faster than positive ones.

- Specimens are kept for 7 days unless otherwise requested. Some (but not all) additional tests can be requested for a specimen during that time.
- For Saba and Sint Eustatius: please **refrigerate all containers and swabs** in anticipation of longer duration of the storage and transport times.

Microbiology and Molecular Diagnostic Sample Collection Guide

Abbreviated instruction for SMMC for Poster or Pocket Formats

Abbreviated Preanalytical Storage Guideline for Microbiology Department Samples in the SMMC	
	**Amies agar gel swab; aerobic and anaerobic culture.** After use: transport back to lab at room temperature. **Do not refrigerate.**
	**Dry PCR swab, viral transport medium PCR swab; various PCRs** After use: **refrigerate**
	**CSF collection tube; culture, PCR** After use: transport back to lab at room temperature. **Do not refrigerate.**
	**Sterile container; urine culture, PCR for Chlamydia, Gonorrhea** **Clean catch**: Fill no more than half of container. **Refrigerate** urine. **First catch**: first 2-5 ml (no more) of voided urine. Transport to lab at **room temperature**.
	**Sterile container; culture of pus, aspirates, punctates, biopsies** After use: **refrigerate;** if necessary, add 0.5 ml sterile saline to avoid dehydration of small biopsies
	**BactAlert bottles; bloodculture, peritoneal fluid punctate** After use: **do not refrigerate**. Transport to laboratory at room temperature.
 	**Fecal samples; Sterile container with or without fixative; fecal culture, fecal PCR; parasitology** After use: **refrigerate**
 	**Serum and plasma tubes: serology, malaria and PCR.** After use: **refrigerate** PM: plasma for malaria: **do not centrifuge**

11 Editing History:

Changes made: (which paragraph or page)	Date of change:
M. Busby and W. Vrutaal removed as verifiers; They no longer work here; front page	12-11-2018
CITO and TDM added to definitions	12-11-2018
3; waterlab removed and instead Environmental department	12-11-2018
3.1.1. table 1; adjusted opening hours and location names	12-11-2018
3.1.3 add SLS provides …..	21-02-2019
3.2 change sentence to **If a patient's blood type has not been performed previously (unknown)**, two (2) independent EDTA tubes from different draw moment are sent to the lab for blood typing.	21-02-2019
3.2.1 added New born baby…. and to the last sentence of birth (current date or an estimation of the age of the patient are used as date of birth)	21-02-2019
3.2.4. CERBA removed and RDGG website updated	13-11-2018
3.3.1 the last 10 -12 replaced with the minimum of 8	21-02-2019
3.3.3.: for bloodgrouping, …the laboratory will request a second sample….added to text	13-11-2018
3.3.4.substitute: "guard house for medical ward", medicine blood level for TDM and applicant for requesting person"	13-11-2018
3.3.4.1: added /Intensive care unit to the head of the paragraph	13-11-2018
3.4 CITO/STAT Table.; added: Alcohol in serum, HIV screen (in case of needle accident), and drugs of abuse screen	13-11-2018
3.5.1 ;;added to the text " see also MB sample requirements "….	13-11-2018
3.6 Water testing header changed to "Environmental testing".	13-11-2018
3.6 the Betty Estate Phlebotomy Center replaced for Simpsonbay	21-02-2019
5.3 move 3rd sentence as 2nd sentence	25-02-2019
5.4 Reflex testing: added to the following sentence: "The clinical chemist…. interpretation of results"	13-11-2018
5.6 removed non-conformities from the paragraph	21-02-2019
Added chapter 5.7. completely new.	13-11-2018
Chapter 5.8: changed Cole Bay to Simpson Bay yacht club"	13-11-2018
Chapter 5.8: changed all phone ext numbers	21-02-2019
Chapter 6; added MB Sample handling guidelines	13-11-2018

Chapter 7 (ref 8): Removed "proteinuria in zwangeren" and placed www.acog.org.	13-11-2018
Appendix 1: added the following tests: • Alcohol in serum • ANA screening • ANA/ENA typing • Anti-HCV • Drugs of Abuse screening (urine) • HSV ½ antibodies • Serum protein electrophoresis • (25)-OH vitamin D • H. Pylori antigen in feces • HIV viral load • CT/NG PCR • Gastro-intestinal or Respiratory panel (PCR) • MRSA PCR • TB PCR • Pathogen panel detection Removed from same list: • Cortisol (urine and serum) • Chlamydia Ag in urine Textual: added special remark for micro-albumin test	
Appendix 2 reference values: • Added or removed all references values to changes listed in Appendix 1 Changed ref value for troponin I to TroponinT hs STAT	25-04-2019
3.4 Microbiology Department, Page 4 • update CITO testing removed media preparation from microbiology dpt.	25-04-2019
Microbiology Test list page 25 • Trich Ag: removed urine • updated sample volumes • updated TATs updated PCR test portfolio	25-04-2019
3.1.1. Adjusted opening hours phlebotomy centers and added Maho center, page 9	09-07-2021
Appendix 2: Adjusted Reference range for direct Bili and Free PSA, Appendix 2- page. 34 & 38	09-07-2021
Added periodic review scheme of referral labs, Appendix 2-page 12	09-07-2021

Appendix 1: Added Test Stability Column page 19-31	09-07-2021
Table 2: Change Acetaminophen tube top from red to yellow top, page 11	15-07-2021
Table 2: Change to EDTA-ESR (purple top tube), removed: Sample should be analyzed within 4 hrs page 11	15-07-2021
Table 2: replaced RDGG to ADC for Thin prep, page 11	15-07-2021
3.2.4 referral tests, made changes to the paragraph Added tests not covered by SZV, page 12	15-07-2021
Adjusted the cito list. Added Covid PCR and CSF diagnostics, removed Cortisol, page 14	15-07-2021
5.3 phone in tests – via email was added, page 17-18	15-07-2021
5.8. Important Telephone numbers updated, page 17-18	15-07-2021
Appendix 1: Remove rows Allergy screening: Inhalation screening and Allergy screening: Foodmix screening, made it one, Changed 3x/month to 1x/week page 19	15-07-2021
Appendix 1: Added B-HCG to Appendix 1 page 20 Remove test Cryoglobulin (qualitative) page 22	15-07-2021
Appendix 1: Change Blood group 48 hour to 72 hours page 21	16-07-2021
Cito list: removed Digoxin and gentamyzine, page	16-07-2021
Appendix 1: Add Creatinine in Serum page 23 - Change Dengue serology 2x/week to 1x/week page 23 - Changed Estrodiol stability from 2 days to 14 days page 24 - Changed H. Pylori 2-3/month to 1x/week page 27 - Removed Inhalation/ADT page 26 - Added tests- IgG, IgA, IgM page 26 - Added test- Phenobarbital page 28 - Added test- Prolectin page 28 - Removed test- Reductie/Aceton page 28 - Removed LDL-calculated - Removed RPR-screening page 29 - Added remark to RPR-Titre page 29 - Removed Rubella IgM page 29	17-07-2021

- Added test Syphilis Screening page 29 - Added test Syphilis Confirmation page 29 - Added test Tobramycin page 29 - Added Semen Analysis test page 29 - Change RF daily to 2x/ week page 28 - Added test SARS-Cov2 IgG/IgM page 29 - Added SARS-Cov-2 Antigen test page 29 - Change Vit D 2x/week to daily page 31 - Added test Zika IgG/IgM page 31 Added Microbiology Test Stability Column page 31-32	
Appendix 1: Removed Respiratory Panel multi-PCR test page 28	19-07-2021
Appendix 1: Added Pregnancy test page 28 Add Tox screen page 30	23-07-2021
Added Appendix 3: Test which require SZV approval page 44	06-08-2021
Appendix 2: Adjusted Reference Ranges and units page 34-44	06-08-2021
Added WHO 2010 to Ref List page 45	06-08-2021
Added number of inversion in Table 2	19-08-2021
Adjusted values in Appendix 1	09-11-2021
Adjusted procedure in par 3.2	09-11-2021
Merged MB sample collection guidelines with this file	09-11-2021
Notice minor changes in Unique ID – Directory of Services is SLS.GEN.PRO.011.1 and starting on page 51, MB collection guideline is SLS.GEN.PRO.011.2	09-11-2021
Added Cortisol and Lipase to Appendix 1 and Appendix 2	18-11-2021
Table 1 Phlebotomy centers updated	15-12-2023
Accompanying document numbers updated to new MediaLab document number	15-12-2023
Table 2 overview of blood collection order of tube type per department or test updated – color of tubes were also updated	15-12-2023
Table 3 STAT testing list updated	15-12-2023
Par 5.6 Medical Microbiology Directory of Services updated	15-12-2023
Table 4 Important Telephone numbers updated	15-12-2023
Par 6 accompanying form/document updated	15-12-2023
Appendix 1 Directory of test SLS updated	15-12-2023
Chapter 9 Directory of test Microbiology updated	15-12-2023

ST. MAARTEN LABORATORY SERVICES	**Directory of Services SLS NV**

Update Table with ref ranges for quantitative urinalysis on page 53	09-07-2025