# Expanding Molecular Testing of COVID-19 in St. Maarten Laboratory Service

MEETING DEMAND FOR MOLECULAR DIAGNOSTIC TESTING OF COVID-19 AT SLS

ST. MAARTEN LABORATORY SERVICES | 12-08-2020

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# Laboratory Capacity for COVID-19 Testing

## Introduction

The Sint Maarten Laboratory Services (SLS) performs PCR testing for the Sint Maarten Medical Center (SMMC), the general practitioners, the Collective Prevention Service (CPS) of the public health department and other parties like the penitentiary institution and the morgue. Current services include the islands of Saba, Sint Eustatius and Anguilla. Other parties like airport, harbor, marina, hotels and groups of travelers have requested testing as well.

Current capacity resides with two microbiology/molecular laboratory technicians and an 8-slot GeneXpert machine. The GeneXpert machine is required to run not only the COVID-19 assay but is also used for routine diagnostics.

Sint Maarten is currently experiencing a second wave of the COVID-19 pandemic. Positive results are generated daily in increasing numbers. Current demand for testing from the SMMC and CPS is managed by working 7 days/week and many extra hours. Current maximum capacity approaches 80 tests per day. Non-healthcare parties are denied services.

The amount of kits for the COVID-19 PCR is limited per month and is currently matched by extra orders that take up any surplus of kits in the Benelux territory. Rise in demand in the Netherlands is threatening the supply of surplus kits and may result in a situation where SLS will not have enough test kits to meet current demand.

In order to meet current and future demand for testing, SLS plans to expand test capacity for COVID-19 to 150+ tests per day. The foreign hire of a micro/molecular laboratory technician has been initiated and the acquisition of additional hardware is planned. The detailed plans are outlined in this proposal. SLS is requesting full or partial material support for the expansion of the COVID-19 testing capacity.

# Laboratory Space in SLS

## Spatial Planning

SLS main building is the place of the microbiology and parasitology laboratories. By sacrificing part of the conference room and repurposing of the parasitology lab and the multipurpose room, the required space for the molecular laboratory rooms can be allocated. PCR 1 and 2 are projected in a newly created areas separated off the SLS conference room. Sample preparation and handling of amplicon rich standards is projected in the current parasitology lab and PCR 3 is projected in the repurposed multipurpose room. Contamination risks are reduced by the use of the sample preparation room and a closed extractor + PCR setup robot with biosafety features in PCR 2.

### *PCR 1*

PCR 1 requires a clean air PCR cabinet. A fridge and freezer to store reagents. All reagents are vortexed and spun down before pipetting. PCR 1 requires dedication and entry discipline to avoid contamination. Reagents are handled in cool blocks or kept on ice when being processed.

### *Sample preparation*

Sample preparation takes place in the repurposed parasitology lab. The biosafety cabinet and pipetting equipment allow a safe start of processing and entry of samples in extraction format. Inactivation and mucolysis can be handled in a biosafe setting.

### *PCR 2*

The PCR 2 room is extraction. Extraction robot MGI-100 is used to combine extraction and PCR setup. The closed MGI-100 can extract without biosafety risks and uses UV-C light for self-decontamination. The closed format of the MGI-100 allows its proximity to either PCR-1 or PCR-3 without raising the risk of contamination of the test routine.

### *PCR 3*

The PCR 3 is where the prepared plates are analyzed with the rt-PCR reaction in the rt-thermocycler. At minimum, the room is fitted with an operating computer and a cycler. A plate centrifuge or spinner is a useful addition. Working in PCR 3 traditionally means no entry in other PCR rooms until the next day (after shower and change of clothes).

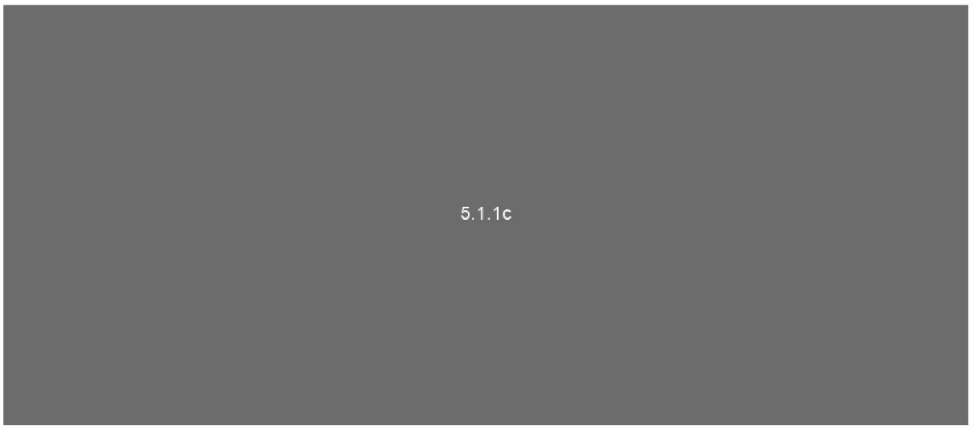
# Staffing

## Molecular Diagnostic Laboratory Technicians

Molecular testing on Cepheid and Biofire platforms is primarily done by the two microbiology labtechnicians. Increasing capacity for molecular testing in SLS would mean to support their functions and add newly hired staff allow more hours allocated to molecular testing. The part-time allocation of the general lab technician from media preparation into molecular and microbiology lab makes a first move to increase support in Micro/Molecular work. The foreign hire of a microbiological molecular laboratory technician is a second move for structural increased staff. The foreign hire comes with a significant lead time due to administrative processes for immigration and work permit. Assistance on a temporary basis would be welcomed.

# Molecular Diagnostic Equipment

Molecular testing was quoted in detail by Siemens, BioAnalytical Instruments and Caribbean Diagnostics. A summary is given in the table below. More detail is added in the conclusion.




## RNA extraction and PCR setup hardware

Extractors like kPCR and Kingfisher Flex extract 96 samples and require special precautions for biosafety reasons. The kingfisher is not capable of PCR setup. The MGI-100 is capable of 32 extraction per run and combines extraction and PCR-setup. The MGI-100 is closed, can decontaminate with UV light and does not require precautions to reduce the biosafety risk.

## Amplification hardware

Thermocyclers quoted were Quantstudio, qTower and LabDex. qTower 3 presenting the most economical and capable option of all.

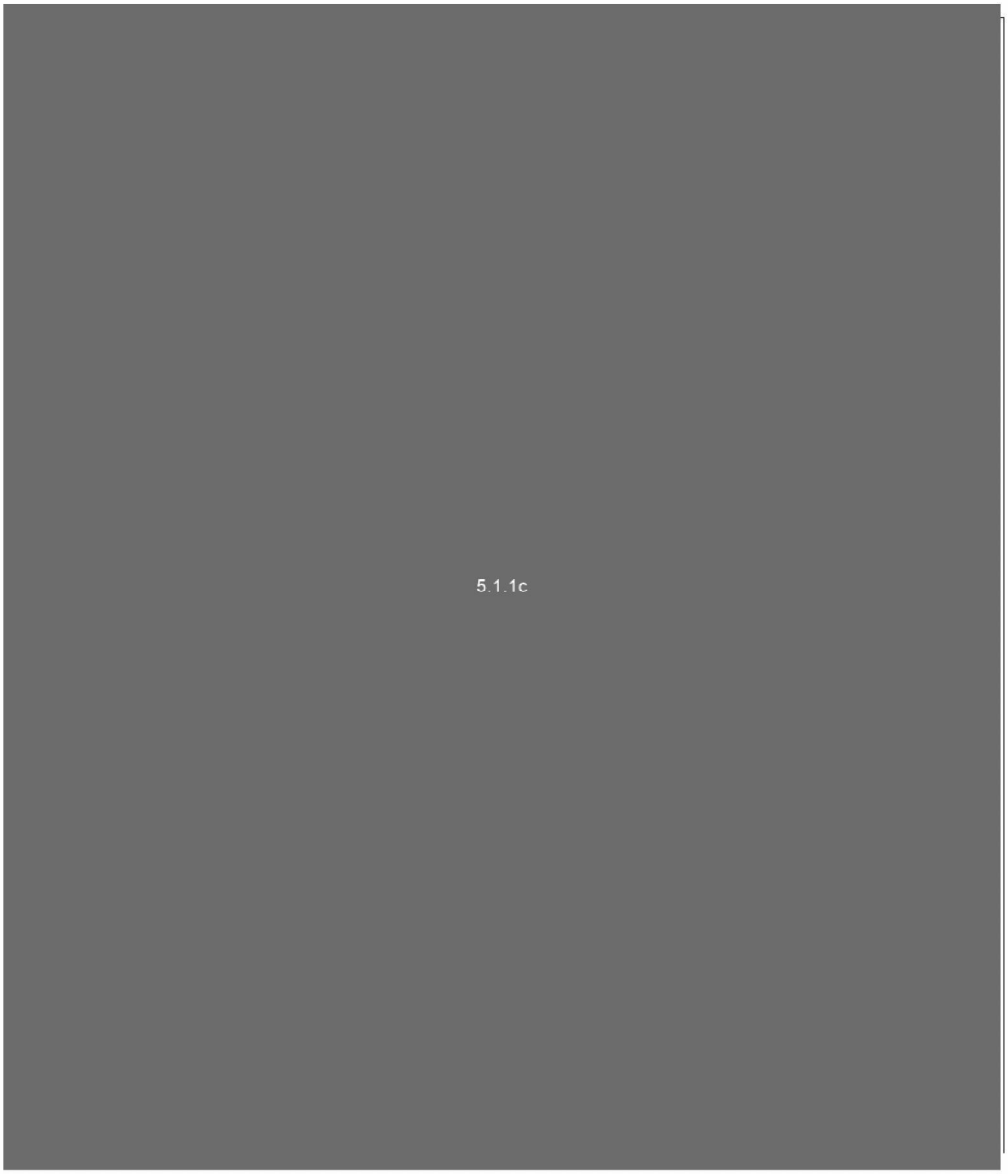
## Extraction and Amplification consumables

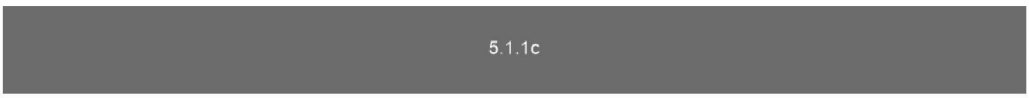
Kingfisher and MGI-100 extractors can work with any brand extraction kit allowing maximum flexibility for price and availability.

## Conclusion and Financial Summary

SLS is seeking to expand COVID-19 testing capacity to meet current and future demand. Based on the cheapest option, the total one-time investment is 180.000 USD for hardware and consumables for an initial 2000 tests. **In order to facilitate the above, SLS is also interested in acquiring two extra microbiology/molecular technicians to support the team.**

Table 1 list of items:

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