

Vuka Research Clinic

Standard Operating Procedure for

Testing Facility Operation, Physical Facilities and Equipment

VUKA

TOWARDS WELLNESS

SOP:

3.08

Version:

6.0

Dated:

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Prepared by:

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Designation

Approved by:

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Signature

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Approval Date

Revision History:	Version	Effective Date	Description
	4.0	Effective date is the same as approval date	Current version replaces all previous versions.
	5.0	Effective date is the same as approval date	Transfer SOP to latest SOP template (05Apr23) Add: Temperature monitoring of fridges, freezers, lab & storeroom. Add: Corrective action taken with temperature deviations. Add: individual timer identifiers.
	6.0	Effective date is the same as approval date	Merged SOP 3.08, 3.09 and 3.23 Added: Access control procedure for non-laboratory personnel Frequency of service and calibrations Frequency of alarm testing

Testing Facility Operation, Physical Facilities and Equipment

A. Purpose

The purpose of this SOP is to describe The Vuka Research Clinic Laboratory (VRC Lab):

1. Facility operation and physical attributes,
2. Access requirements,
3. The procedures to ensure comprehensive maintenance of equipment and compliance with requirements as per GCLP.

B. Scope

This SOP applies to all VRC Lab Managers, Technologists and Technical Assistants.

C. Allowable Exception

This SOP is meant to be followed without deviation. However, it is an allowable exception to follow procedures specified in a protocol or Study Specific Procedure Manual (SSP) that may deviate from this SOP.

D. Facility Operation

The VRC Lab Manager/ designee is responsible for ensuring:

1. Written SOPs are in place to ensure the consistency, quality, and integrity of the data generated by laboratory,
2. SOPs are written in a manner and language that is appropriate to the laboratory personnel conducting the corresponding procedures,
3. SOPs are written in accordance with the structure and control plan as set out in *SOP 1.01 Standard Operating Procedures*,
4. SOPs are organized according to *SOP 1.01 Standard Operating Procedures* and filed and retained according to *SOP 1.15 Regulatory Procedures*,
5. Relevant SOPs are distributed to the relevant VRC Lab personnel,
6. Relevant staff are trained, and proof of training is organized according to *SOP 1.01 Standard Operating Procedures*,
7. Only approved versions of paper-based or electronic documents are available for use by VRC Lab personnel in all locations where they are needed.

E. Laboratory Physical Facility

The VRC Lab Manager/ designee is responsible for ensuring a suitable and safe physical laboratory environment that does not compromise test quality or the safety of staff, visitors, and participants. The VRC Lab complies with the following physical facility standards:

1. Laboratory Layout and Workspaces

The VRC Lab physical facility (Appendix 1) includes a **Lab Proper** with dedicated office, an additional **Controlled Ambient Storage**, and space within a compliant **Document Storage** located within the VRC.

Testing Facility Operation, Physical Facilities and Equipment

A safe and efficient working environment is achieved through:

- Strategic laboratory design, spacious workbenches and surfaces that enable unobstructed movement and minimize workflow disruptions,
- Ergonomically optimized workstations that mitigate the risk of fatigue and boost productivity, and adhere to established best practices,
- Adequate storage, lighting and ventilation,
- All molecular assays are performed in closed systems, maintaining a strictly aseptic and sterile environment, minimizing contamination risk and ensuring the integrity of test results.

2. Access Control and Security

Routine access to the VRC Lab is restricted to authorized personnel only. Authorized personnel include:

- VRC Laboratory Manager,
- VRC Technologists,
- VRC Technical Assistants,
- VRC Management/ designee.

Access control and security measures include:

- Temporary access for non-authorized personnel requires signing the *Vuka Research Clinic Laboratory Visitors Log* (Appendix 2),
- Clear signage indicating "No Entry" and "Authorized Personnel Only" at VRC Lab entrance,
- Secure double-lock system to ensure restricted access when unattended.

The VRC Lab Manager is responsible for reviewing and updating access as needed. For more broader access control and security measures at VRC refer to *SOP 1.03 Clinic Operations*.

3. Cleanliness of Facilities

A clean and well-organized environment is achieved through:

- Routine cleaning of the VRC Lab, including floors, walls, ceilings, benchtops, cupboards, drawers, and sinks and the removal of general waste by a dedicated VRC cleaner.
- Specialized cleaning & maintenance of equipment on a daily, weekly, monthly, quarterly and 6-monthly basis by VRC Lab personnel as described in the equipment section of this SOP.
- The removal of biohazardous waste as described in *SOP 3.02 Personnel & Laboratory Safety*

4. Temperature Monitoring & Control

The VRC Lab Proper and Controlled Ambient Storage have temperature-controlled ambient environments for optimal equipment performance and assay accuracy. This is achieved through air-conditioning.

The VRC Lab has refrigerators, freezers and ultra-low temperature (ULT) freezers within the ambient controlled environments for the storage of kits, supplies and specimens that need to be maintained at temperatures outside of the ambient range.

Testing Facility Operation, Physical Facilities and Equipment

The **temperature-controlled environments** are expected to be maintained in the following ranges, with the corresponding tolerance limits:

Environment	Expected Range °C	Tolerance Limits °C
Refrigerator(s) Internal	2 to 8	± 3
Freezer(s) Internal	-15 to -25	± 5
ULT Freezer(s)	-75 to -85	±10
Controlled Ambient	15 to 25	± 2

°C = degrees Celsius

The temperature-controlled environments are **monitored by a dual system** that includes both:

- **Manual Temperature Monitoring System (MTMS):**
 - **Temperature monitoring** devices with probes in the VRC Lab Proper and Controlled Ambient Storage's and all refrigerators and freezers are read by VRC Lab personnel **daily**. The temperature at time of reading and the minimum and maximum temperatures since the previous reading are recorded. A download for each monitored environment is done at the end of each month.
- **Continuous Temperature Monitoring System (CTMS):**
 - Temperature monitoring devices with probes in the VRC Lab Proper, Controlled Ambient Storage's and all refrigerators and freezers are set to record a reading and refresh at 1-minute intervals. A download for each monitored environment is done at the end of each month.
 - The CTMS is set to alert when temperatures get close to either higher than the maximum or lower than the minimum of the expected ranges in each environment, thus alerting the VRC personnel before the tolerance limits are breached. Alerts are communicated to registered VRC Lab personnel via an automated Short Message System (SMS) and an email. This communication is sent within 5-minutes of the alert temperature being recorded and conveys the recorded temperature. The alert communication is repeated every 10-minutes until temperature readings are within the stipulated alert levels. All VRC Lab personnel are added to the communication list (maintained by the service provider) within 30-days of appointment. The VRC Lab Manager/ designee is responsible for ensuring the communication list is kept up to date with the relevant staff members.
 - Alert testing is conducted monthly through sending a test message via the service providers system. Test records are filed both electronically on the Vuka OneDrive and paper copies are kept at the VRC Lab in the Vuka Research Clinic Laboratory Core Regulatory Files.

The VRC Lab Manager/ designee is responsible for ensuring the manual and downloaded **records of temperature monitoring** are filed on the Vuka OneDrive and paper copies are kept at the VRC Lab in the Vuka Research Clinic Laboratory Core Regulatory Files. VRC Lab Manager/ designee review of temperature monitoring record is done monthly and documented.

Testing Facility Operation, Physical Facilities and Equipment

A **temperature deviation** refers to an occurrence of a temperature reading rounded to the nearest whole number that is **out of the specified tolerance limits**.

The Lab Manager/ designee is responsible for **acting in response to a temperature alert (including all temperature deviations)**. In the event of a temperature deviation a root-cause analysis is done, and a corrective and preventative action (CAPA) are formulated and implemented. This is documented in *The VRC Laboratory Deviation and CAPA Tracker* (see SOP 3.01).

The corrective action taken is determined by the time of day the alert has triggered.

Temperature deviations that occur **during routine operations** at VRC (during clinic operational hours or when there are already ongoing operations outside of operational hours e.g. a Saturday Clinic) are attended to within 10-minutes of receiving the alert. Immediate corrective actions include the following for each environment under the stipulated conditions:

Environment	Condition	Immediate Corrective Action	If continued action likely required beyond 24-hours
Controlled Ambient	Air-conditioner cannot be repaired, or temperature corrected within 60 minutes	Remove stored items to the other VRC Lab temperature-controlled ambient environment.	Inform each of the affected studies Study Coordinator and PI via urgent email requesting determination of feasibility for ongoing study conduct, give an account of all affected samples and consumables and the taken and planned actions.
Refrigerator(s) Internal	Refrigerator cannot be repaired, or temperature corrected within 60 minutes	Remove stored items to a temperature-monitored cold box with wet ice until refrigerator temperatures are within tolerance limits.	AND
Freezer(s) including ULT	Freezer cannot be repaired, or temperature corrected within 30 minutes	Remove stored items to a temperature-monitored cold box with dry ice until freezer temperatures are within tolerance limits.	In the case of a study with downstream processing and/or long-term storage at a secondary location transfer samples to that laboratory as soon as possible, by arranging with the facility's Lab Manager and/ or escalating the shipping schedule to at minimum daily.

The response to temperature alerts that occur **outside of routine operations** at VRC are determined by VRC Management on a case-by-case basis. The following are considered:

- If the alert temperature has breached, or is close to breaching tolerance limits,
- The consequence of losing temperature control of the specific environment, i.e. Are there samples or stock currently in storage where there is a (high risk of) temperature deviation that may damage the integrity of the trial data or safety of a participant?
- The safety risk to staff to access the VRC Lab outside of routine operations.

Testing Facility Operation, Physical Facilities and Equipment

In the event of an alert received outside of routine operations where there is a temperature deviation, or an inevitable temperature deviation, the VRC Lab Manager/designee is responsible for communicating with VRC Management to determine the best course of action. The VRC Lab Manager/ designee is responsible for communicating the required actions (or inaction) to each of the affected studies Study Coordinator and PI, and to the VRC relevant staff as required.

All communications pertaining to temperature deviations are filed electronically on the Vuka OneDrive and paper copies are kept at the VRC Lab in the Vuka Research Clinic Laboratory Core Regulatory Files.

4. Humidity Monitoring & Control

The VRC Lab is in Khayelitsha, Cape Town, Western Cape, South Africa. The yearly average relative humidity is 64% (Ref: <https://weatherandclimate.com/south-africa/western-cape/khayelitsha>, accessed 26 July 2024). Most equipment and assays can operate between 20 and 80% relative humidity. Therefore, the **VRC Lab does not routinely use methods to specifically control humidity**, although the air-conditioning used for temperature control is likely to impact relative humidity in the temperature-controlled environments.

The VRC Lab Proper and Controlled Ambient Storage's **relative humidity is monitored** to ensure optimal equipment performance and assay accuracy. The relative humidity is expected to be in the following ranges, with the corresponding tolerance limit:

Environment	Expected Range %	Tolerance Limits %
Ambient	30 to 70	± 10

Humidity monitoring devices in the VRC Lab Proper and Controlled Ambient Storage are read by VRC Lab personnel **once daily**. The relative humidity at time of reading is recorded.

Should the relative humidity read outside of the tolerance limits for a period of 5 consecutive days a de-humidifier or humidifier will be used to bring it within the limit.

The VRC Lab Manager/ designee is responsible for ensuring records of concerning humidity are filed electronically on the Vuka OneDrive and paper copies are kept at the VRC Lab in the Vuka Research Clinic Laboratory Core Regulatory Files.

5. Back-up & Emergency Power

The VRC and VRC Lab **back-up and emergency power is described in *SOP 1.03 Clinic Operations***.

In the **event the back-up power fails** it is expected that VRC Management is responsible for informing the VRC Lab Manager/ designee. If VRC Lab personnel are the first to become aware of failed power back-up at the VRC, the VRC Lab Manager/ designee is responsible for informing VRC Management promptly by telephone call. The VRC Lab Manager/ designee is then

Testing Facility Operation, Physical Facilities and Equipment

responsible for informing the Study Coordinator and PI of each study that is currently using the VRC Lab for testing, processing or storage via an urgent email. The email must also request a determination of feasibility for ongoing study conduct and give an account of all affected samples and consumables and the taken and planned actions.

Each PI/ designee is responsible for determining the best course of action for ongoing laboratory operations for that study. VRC Lab Manager/designee is responsible for determining the best course of action for non-study specific laboratory operations and for managing temperature control per the relevant section of this SOP. The VRC Lab Manager/ designee is responsible for implementing the decided action and communicating regularly with the PIs/ VRC management/ designees on changes to power stability and the resumption of back-up power and normal operations.

The VRC Lab Manager/ designee is responsible for ensuring these communications (or failed attempts) are filed electronically on the Vuka OneDrive and paper copies are kept at the VRC Lab in the Vuka Research Clinic Laboratory Core Regulatory Files.

6. Archiving and Storage Spaces

Data and documents pertaining to VRC Lab are managed according to *SOP 1.15 Regulatory Procedure* which outlines the organization, storage, retention and archival procedures.

The VRC Lab has adequate space within the Lab Proper and access to a compliant filing room (Document Storage) for the storage of documents and data.

The VRC Lab has adequate space within the Lab Proper and Controlled Ambient Storage to ensure the preservation of **laboratory materials, kits and reagents**.

F. Equipment Management

The term equipment is used and includes all instruments within VRC Lab. The VRC Lab Manager/ designee is responsible for:

- Planning the necessary equipment for the VRC Lab and ensuring the VRC Lab can provide the needed services to support research studies at VRC.
- The verification of performance of all equipment to ensure that they run according to expectations at the following times:
 - prior to initial use,
 - after major maintenance or service, and
 - after relocation.

Testing Facility Operation, Physical Facilities and Equipment

1. Documentation for Equipment

The VRC Lab Manager/ designee is responsible for maintaining an up-to-date **master list of all equipment**, and for ensuring VRC Lab personnel have access to the required equipment for operation within the laboratory's scope. The master list contains at minimum:

- Equipment name,
- Make & model,
- Location within VRC,
- Date placed into service,
- Serial number,
- The chosen service and/or calibration interval(s),
 - The chosen interval is the more stringent interval if there are differences between the manufacturer's recommendation, GCLP, any other sponsor or regulatory requirement.
- Next service(s) / calibration(s) due,
- Service & calibration Contact.

If a **new piece of equipment** is procured for VRC Lab, it is added to the master list within 30-days of delivery at VRC Lab.

If a piece of equipment is **permanently retired** from use this is indicated on the master list with date of retirement clearly visible. Permanently retired pieces of equipment are removed from the VRC Lab.

If a piece of equipment is **not in use**, it is clearly marked as such. An entry of NIU may be recorded in maintenance documentation for the applicable time periods.

To ensure optimal quality of data and that each piece is adequately inspected, cleaned, tested, and that operations of each are standardized, all equipment listed on the master list have:

- An **Equipment Specific Operational Procedure (EOP)**. Each EOP includes at minimum:
 - The intended use for the piece of equipment within VRC Lab,
 - The maintenance schedule as recommended by the manufacturer,
 - The service and/or calibration (as applicable) interval(s) as recommended by the manufacturer,
 - Any other maintenance requirement as stipulated by GCLP, a sponsor or a regulator,
 - The procedures followed by VRC Lab personnel.
- A **record of supporting documentation** for each piece of equipment including at minimum:
 - Evidence of preventative maintenance recorded in real-time,
 - Evidence of services, calibrations (as applicable) in the form of service and calibration certificates,
 - Evidence of corrective and preventative actions including follow-up actions in the event of a failed calibration/check/damage/ other non-routine event,
 - Each record of supporting documentation includes at minimum the following:
 - Equipment serial number/ other unique identifier if no serial number available,

Testing Facility Operation, Physical Facilities and Equipment

- Date the action (e.g. maintenance/ calibration) was performed,
- Specific activities performed (e.g. weekly maintenance, repair),
- Results of maintenance and calibration (if applicable),
- Acceptability status of maintenance and calibration (pass/fail, if applicable),
- Identity of personnel performing the activity,
- Review by VRC Lab Manager/designee at least monthly.

It is the responsibility of The VRC Lab Manager/ designee to file the master-list and all maintenance documents electronically on the Vuka OneDrive and paper copies in the VRC Lab in the Vuka Research Clinic Laboratory Core Regulatory Files.

2. Equipment Operation

All manufacturer equipment operation manuals as provided by the supplier are stored electronically on the Vuka OneDrive any hard paper copies received in the VRC Lab in the Vuka Research Clinic Laboratory Core Regulatory Files. EOPs are available for each piece of equipment as described above.

Authorization and Training

All VRC Lab personnel undergo training and demonstrate competence for each piece of equipment that falls within their scope before being authorized to use it unsupervised. Training and authorization (demonstrated through a satisfactory competency), and the documentation thereof are described in *SOP 3.07 Laboratory Organization and Personnel*.

3. Equipment Maintenance

Routine in-house (done by VRC Lab staff) maintenance, and calibrations, services and repairs by a service provider are required to ensure continued accuracy, precision, and extended usable life of the equipment. By default, this follows the manufacturer specifications, unless there is a more stringent specification in GCLP, a protocol, or sponsor policy. Where equipment does not have maintenance requirements stipulated by the manufacturer, the VRC Lab Manager/ designee checks applicable guidance and creates a maintenance, service and calibration (as applicable) schedule to be adhered to in an EOP. The most stringent requirement always applies and is summarised for each piece of equipment in the EOP, and referred to as *VRC Laboratory's Chosen Maintenance Schedule, Intervals and Specifications*.

The VRC Lab Technologists are responsible actioning and documenting in-house maintenance for all equipment in VRC Lab per EOPs and formulating and actioning a corrective action as applicable.

The VRC Lab Manager/ designee is responsible for planning and booking service-provider maintenance, calibrations, services and repairs for each piece of equipment at stipulated frequencies, and for reviewing the documentation, and corrective action of routine in-house maintenance at least monthly.

4. Back-up Equipment and Correlation Testing

The VRC Lab may have more than one piece of equipment to perform the same test e.g. CliniTek and GeneXpert Machines. One of each type of piece of equipment may be designated as a primary piece of equipment and the other a back-up. External Quality Assurance (EQA) is maintained for each primary piece of equipment. If both pieces of equipment maintain EQA

Testing Facility Operation, Physical Facilities and Equipment

independently then each may be considered a primary machine and used interchangeably. If one of a particular piece of equipment does not get utilised in EQA activities it is assigned as a back-up to the primary.

VRC conducts qualitative testing and verification of back-up equipment is done through the testing EQA samples from the primary piece of equipment using the back-up equipment. Results correlation of EQA samples between primary and back-up of >95% is considered acceptable.

G. Training

1. Each staff member receives or has direct access to applicable Standard Operating Procedures (SOPs).
2. SOP review and revision are done as needed, or at minimum annually.
3. All SOP training is documented and tracked on the CRS SOP training log and is kept in the regulatory file on site.
4. New staff is trained on applicable SOPs within 30 days of employment.
5. Staff members whose duties fall within this SOP scope are retrained within 30 days of the approval of each SOP revision.

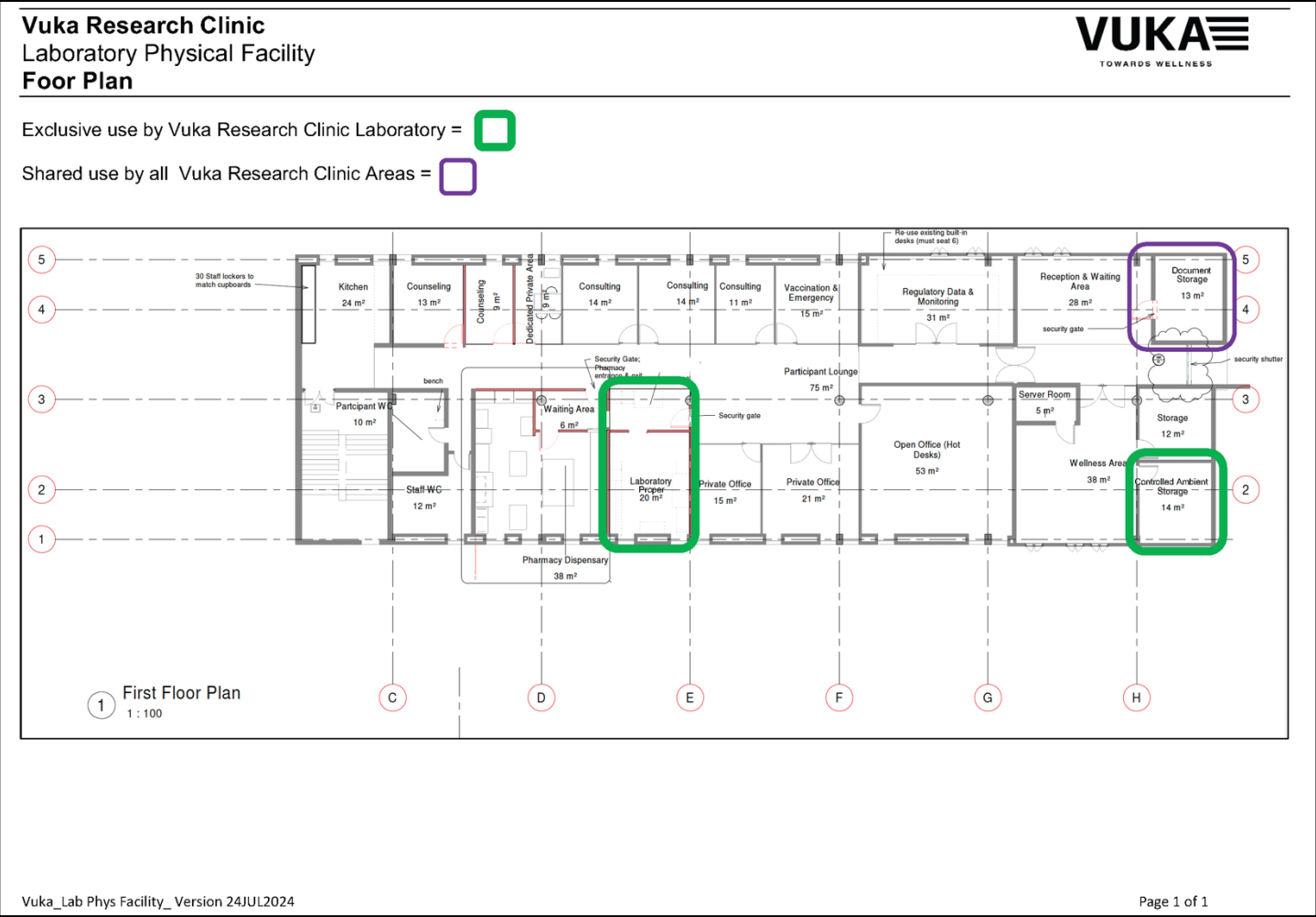
H. References

1. DAIDS Good Clinical Laboratory Practice Guidelines. 16 Aug 2021.
<https://www.niaid.nih.gov/sites/default/files/gclpstandards.pdf>
2. NIST Traceable Website. <http://www.time.gov/>.
3. Digital Laboratory Count Up-Down Timer information sheet.
4. Laboratory equipment manuals (as per manufacturer).

Vuka Research Clinic
Standard Operating Procedure for
Testing Facility Operation, Physical Facilities and Equipment



Appendix 1



Vuka Research Clinic
Standard Operating Procedure for
Testing Facility Operation, Physical Facilities and Equipment



Appendix 2



Vuka Research Clinic
Laboratory Visitors Log

Date	Visitor's Name	Company Name	Reason for Visit	Phone Number	Time In	Time Out	Signature