Insert Facility/Institute Logo Here

STANDARD OPERATING PROCEDURE (SOP) *TEMPLATE*

Facility:	
SOP Title:	
Document Number:	Version Number: *00* Effective Date: *MM-DD-YYY*
Other documents cross-referenced in this SOP (i.e., manuals, SOPs, forms, records):	

Revision Number	Sections Changed	Description of Change	Date	Approved By

SOP Title:	
Document Number:	Version Number: *00* Effective Date: *MM-DD-YYY*

1. Acronyms

AMR	Antimicrobial resistance
CamLIS	Cambodia Laboratory Information System
ID	Identity
MoH	Ministry of Health
PMRS	Patient Management Registry System
SOP	Standard Operating Procedure
TAT	Turnaround time

2. Purpose

CamLIS is a web based database that allows timely and standardized data entry and analysis by laboratory staff. Data from each laboratory is sent to a central database via internet connection, allowing key personnel in the Ministry of Health to analyze and monitor data. CamLIS is linked to Patient Registry Management System (PMRS). This SOP will ensure all laboratory staff is using CamLIS in a standardized manner.

3. Scope

CamLIS is to be used by laboratory staff for patient data input, by clinicians for data visualization, by MoH for data visualization and analysis, and by WHO for overall view (visualization, analysis, updates to the system) and support.

4. Responsibilities

The laboratory technician enters the data, which is validated by the laboratory manager and/or head of laboratory before submission.

5. Materials
- Desktop computer
- Keyboard
- Printer
- Barcode reader
- Internet connection
- Browser software (Firefox or Google Chrome)

SOP Title:	
Document Number:	Version Number: *00*
	Effective Date: *MM-DD-YYY*

6. Procedure

Using the system: log in/change password/log off

- Enter the web address **www.camlis.net** to open the CamLIS web based database, use Firefox or Google Chrome browser.
- Staff entering data into CamLIS will be provided with a login name and password. Each laboratory will nominate an administrator, who will be responsible for providing the staff who will work with CamLIS with the login name and password.
- User account can be manually changed by user (old password required) or administrator (no requirement for old password).
- Changes by user: click on the username at the top-right corner of the screen; a new screen appears, allowing editing of personal information and password (the old password has to be entered). Follow prompts on screen (old password, new password, etc).
- Changes by administrator: click on the menu "Manage Laboratory" then select "User Account" on the left. A new screen will display all existing users in the laboratory. Click on edit to change the password. Enter information as prompted (new password, etc).
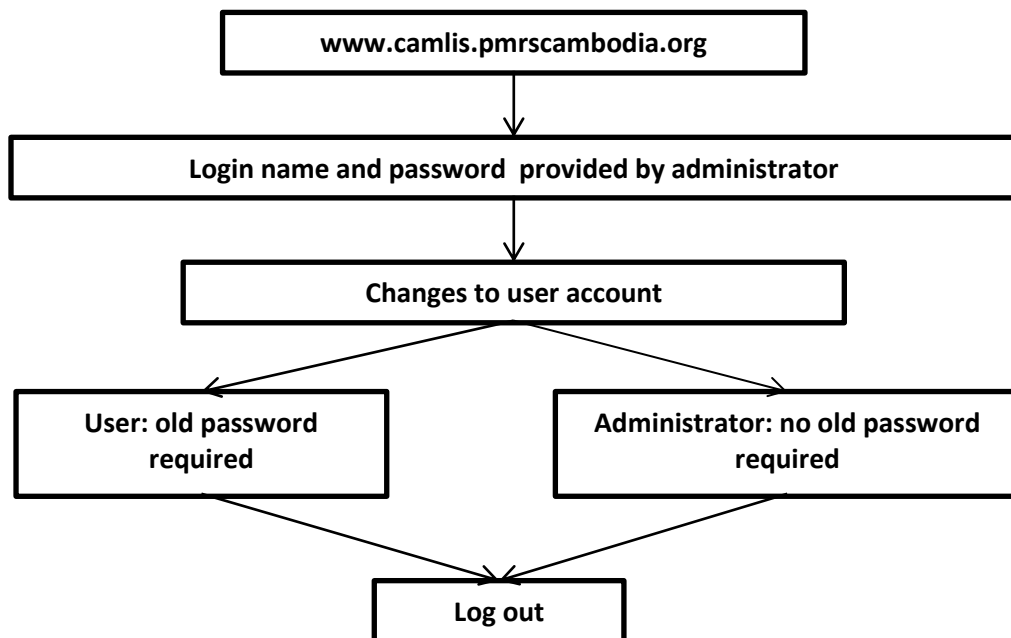- Click 'logout' to exit CamLIS.

```
              ┌─────────────────────────────────────┐
              │   www.camlis.pmrscambodia.org        │
              └─────────────────────────────────────┘
                               │
                               ▼
  ┌───────────────────────────────────────────────────────────┐
  │   Login name and password  provided by administrator       │
  └───────────────────────────────────────────────────────────┘
                               │
                               ▼
          ┌───────────────────────────────────────┐
          │        Changes to user account        │
          └───────────────────────────────────────┘
             │                               │
             ▼                               ▼
  ┌──────────────────────┐      ┌──────────────────────────┐
  │  User: old password  │      │ Administrator: no old     │
  │     required         │      │ password required         │
  └──────────────────────┘      └──────────────────────────┘
             │                               │
             └───────────────┬───────────────┘
                             ▼
                  ┌──────────────────────┐
                  │       Log out        │
                  └──────────────────────┘
```

Figure 1. Steps to log in/log out and change user account

SOP Title:	
Document Number:	Version Number: *00* Effective Date: *MM-DD-YYY*

Entering patient/sample data

- Once logged into the system, there are 6 tabs: home, patients, sample, analysis, manage laboratory and manage CamLIS.
- To enter patient data, click on tab "Sample", then "Add new sample".
  a) For CamLIS linked with PMRS:
     o This can be performed automatically with the barcode readers. Enter patient ID in to patient ID box and click search. If patient ID is not found, the system will display "No result found"
     o Patient data will be displayed (retrieved from PMRS), and sample data entry can be initiated
  b) For CamLIS not linked to PMRS:
     o Click on "add new patient" to access the webpage for patient data entry. Fill in information (patient name, sex, date of birth, age, etc), and follow prompts to save data or cancel to exit
- To find patient data, click on "Patient" tab, enter patient ID or patient name and click "search".
- The patient data will be displayed, or if not found, the message "no matching records found" will be displayed.
- To delete patient data, select the data to delete and click remove, and confirm.
- To add sample data, follow same steps as for patient data, described above: click "sample" tab, followed by "new sample". A new screen will appear, where user introduces the patient ID and click search. A new screen appears where sample information can be entered (sample number, sample source, requester, collection date/time, etc).

Quality check 1: If all required data is not entered, then the system will not proceed to next phase in data entering

- A list of usable buttons is shown on the right of the screen, describing the actions to be taken with the sample (assign test, save, reject, add result, remove, etc).
- To assign a test: click on "Assign test", and select tests on the table divided by units (hematology, biochemistry, serology and microbiology. Once all tests have been selected, select again "assign test" and if results are ready to be entered, click on "Assign test and add result", after which the table for result input appears. To print the result, click "print", or "cancel" to exit without saving results.
- To search and update sample: click on "sample" and "view sample", after which a screen will appear with a list of patients, divided into two, urgent and routine patients.

- Users can open individual pages to find specific patients. Once the patient is found, click on "edit", which opens patient information which may then be edited, and saved at the end. If more samples for each patient are required, click "new sample" and fill in required fields.
- To delete or reject a sample, follow the steps described above to search for a patient by adding patient ID. The menu in the new window will show the actions to be taken (assign test, save, reject, add result, remove, etc). To delete, click "remove", and confirm. To reject, click on "reject sample" to reject samples and all tests associated, or click on specific tests to reject. Enter reasons for rejection "Comment" box or click on "Choose comment" to choose predefined reasons.

Entering results

- Follow the steps described above to search for a patient by adding patient ID, click "Add result"
- A new screen will appear where test results can be entered, based on type of test selected for that patient (there is a test scroll menu for patients with many tests.
- The test results can be numerical or in text format:
    - If the numeric test result entered is beyond the reference range (below or above limits), this will be highlighted in orange, indicating anomalous values.

Quality check 2: a message will automatically appear to alert user to check- is the value entered due to a true patient anomaly or is it an input error

    - A choice of "single" or "multiple" results can be selected, and after result input in either case, click on "Assign" to confirm.
    - For result boxes with no units, text format can be entered (test date, performed by, diagnosis), click on "save" to record data entered.
- For microbiology result input, a "multiple" result selection may be needed. Selecting the pathogen identified will automatically show the AST tests available, for which the results can then be inputed (sensitive, intermediate, resistant). The test zone may also be entered, and invisible may be selected if no AST is to be reported to the physician. Click "Assign" once all tests have been entered.
- The results may be printed, by entering the patient ID to find the sample with results ready to print. Click on "preview result" to preview results, verify and validate and click "print".

Quality check 3: Validation by another user and admin needs to occur before results are released

Visualizing/analysing data

To visualize reports, click on "Analysis" tab, followed by "report generation". A new screen will be displayed for selection of the type of report to be generated (individual, bacteriology, aggregated, ward, TAT and AMR):
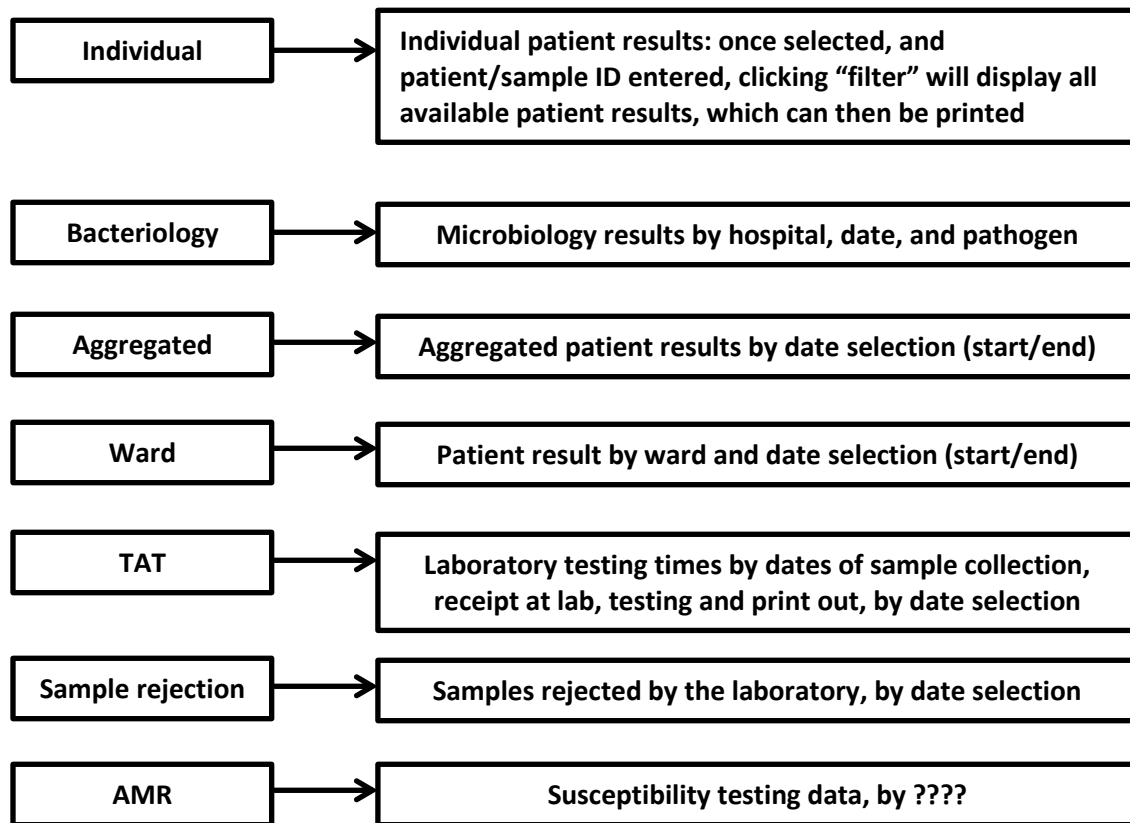
Individual →	**Individual patient results: once selected, and patient/sample ID entered, clicking "filter" will display all available patient results, which can then be printed**
Bacteriology →	**Microbiology results by hospital, date, and pathogen**
Aggregated →	**Aggregated patient results by date selection (start/end)**
Ward →	**Patient result by ward and date selection (start/end)**
TAT →	**Laboratory testing times by dates of sample collection, receipt at lab, testing and print out, by date selection**
Sample rejection →	**Samples rejected by the laboratory, by date selection**
AMR →	**Susceptibility testing data, by ????**

Figure 2. Types of CamLIS reports

Some of these reports can be exported to excel for further analysis, without compromising the original data. Printouts of these reports is also available.

7) References

CamLIS manual, English and Khmer versions, 2017

8) Attachments