C4G BLIS Documentation

None

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1. C4G BLIS

C4G Basic Laboratory Information System is a collaboration between Computing-for-Good (C4G) at Georgia Tech, the Center for Disease Control (CDC), and participating PEPFAR countries.

- BLIS Home Page
- BLIS User Guide
- BLIS Developer Guide
- BLIS GitHub Repo

You may download a copy of this documentation at this link: C4G BLIS Documentation

2024-05-03

2. Contributing

2.1 About the documentation

The documentation is generated by mkdocs and mkdocs-material using GitHub Actions. They use markdown for composition.

2.2 Making Local Changes

If you are using the devcontainer-based setup, you have everything you need. If you are running locally, and you have Python installed, you should run:

```
$ pip install -r requirements.txt
```

Then you can run:

```
$ mkdocs serve
```

To see your documentation changes locally.

2.3 Deployment

Deployment is handled by our GitHub Action, so once you make a pull request to the repository and it is merged, the documentation will be updated.

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3. Frequently Asked Questions

3.0.1 Q: I'm using BLIS for Windows and everytime I try to run the executable, it crashes! What's going on?

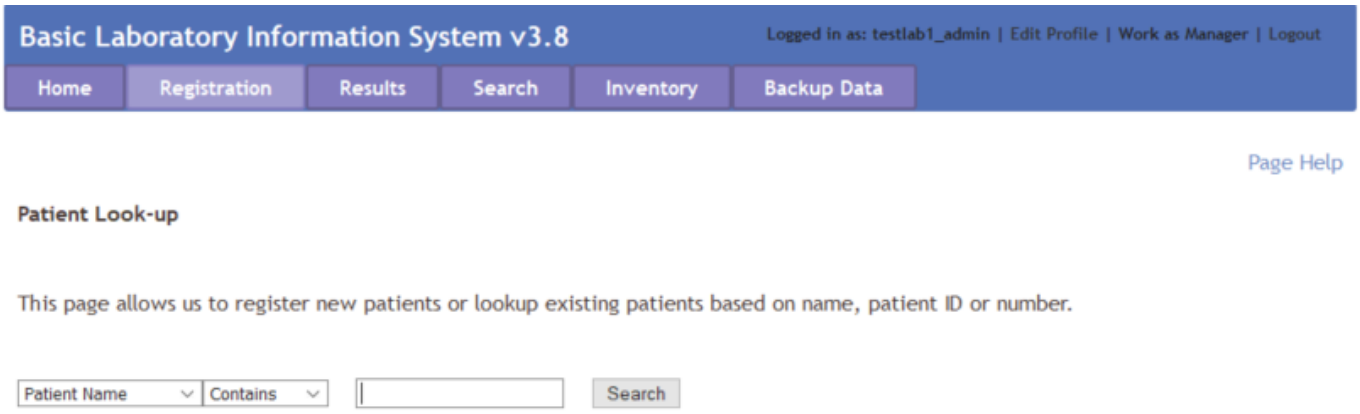
A: Ensure that the zipped files from the Runtime.zip are extracted directly into the BLIS directory. They should not remain in a Runtime folder.

3.0.2 Q: I am trying out BLIS. How do I login?

A: Please login using the credentials: testlab1_admin/admin123 (as admin) or testlab1_tech1, testlab1_tech2/tech123 (as lab technician).

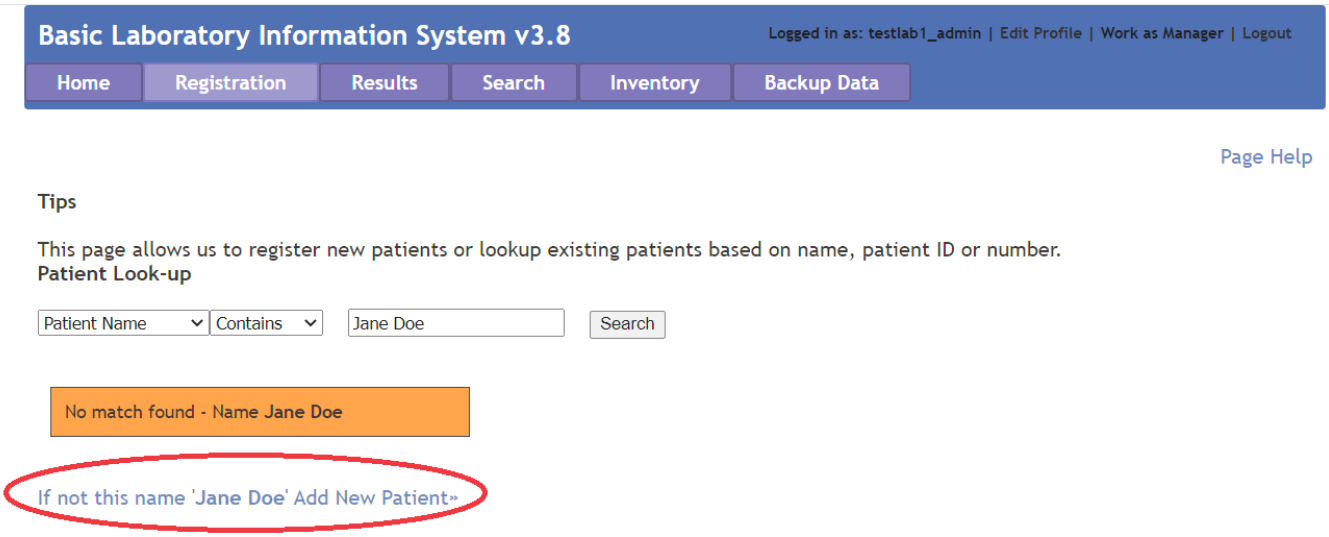
3.0.3 Q: How do I look up a patient in our system?

A: Navigate to the Registration tab and search for the patient by name, number, or ID.



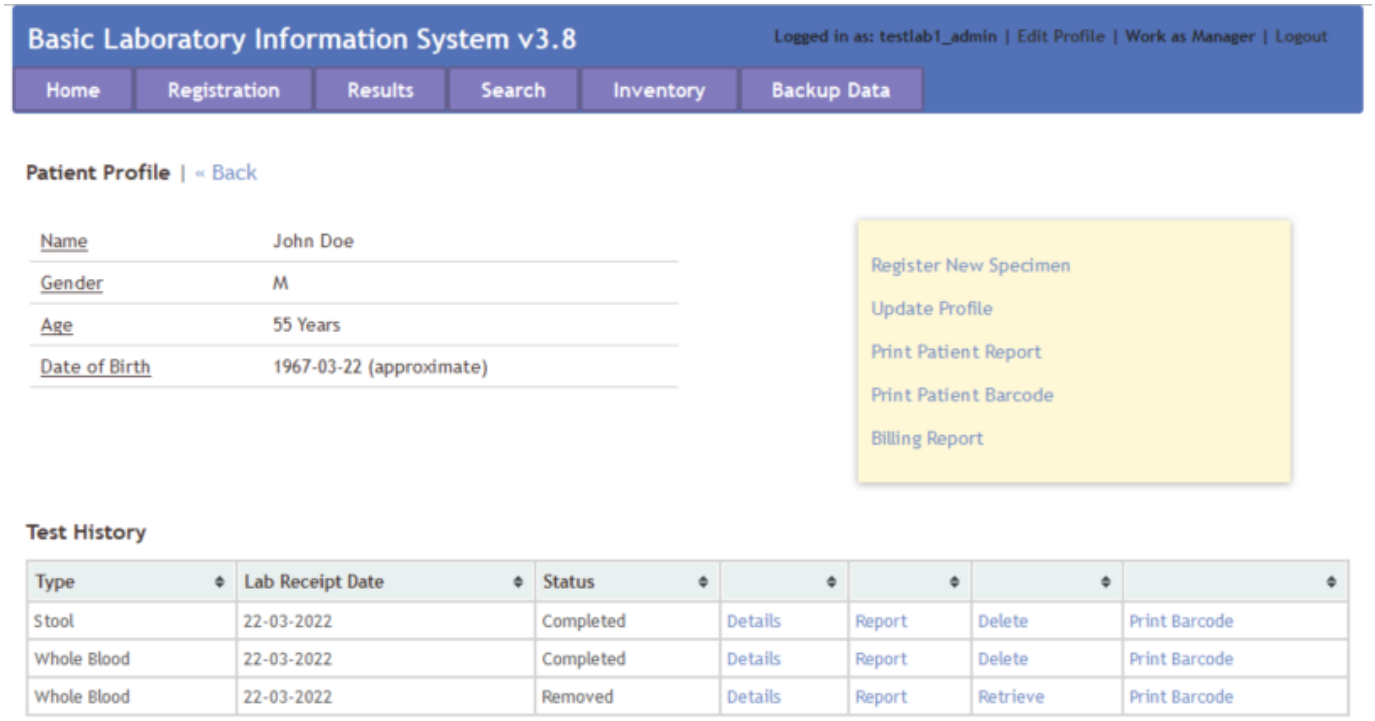
3.0.4 Q: How do I add a new patient?

A: To add a new patient, navigate to the Registration tab. Do not enter anything into the search bar and click 'Search'. You will see an option to add new patient appear. Click the link to proceed.



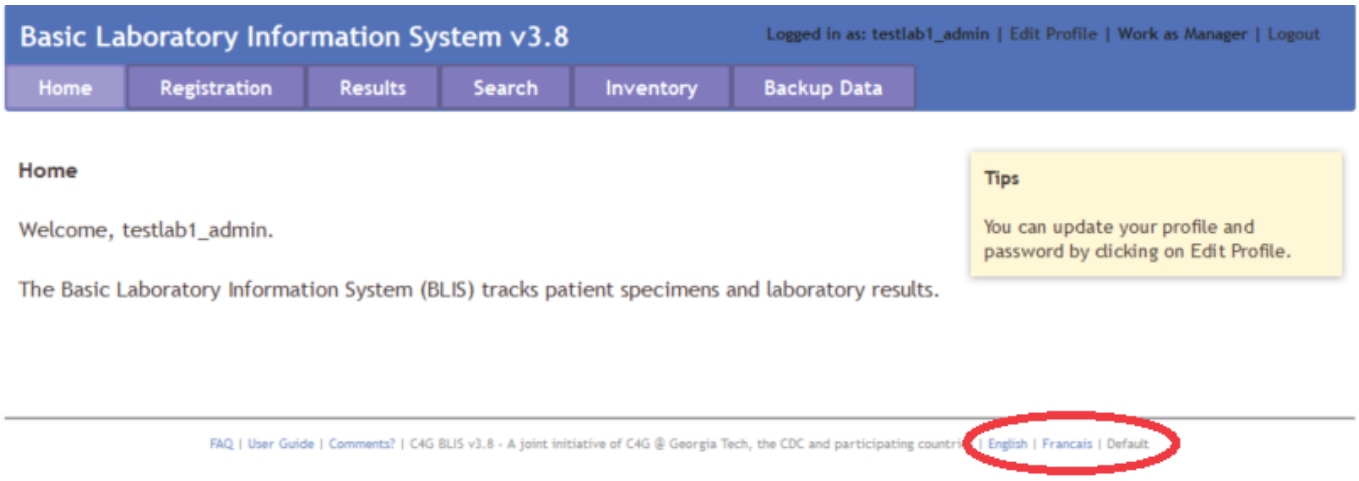
3.0.5 Q: How do I add a new Specimen to a patient?

A: After pulling open the patient's profile, click the 'Register New Specimen' hyperlink on the righthand side.



3.0.6 Q: How do I change the language of BLIS?

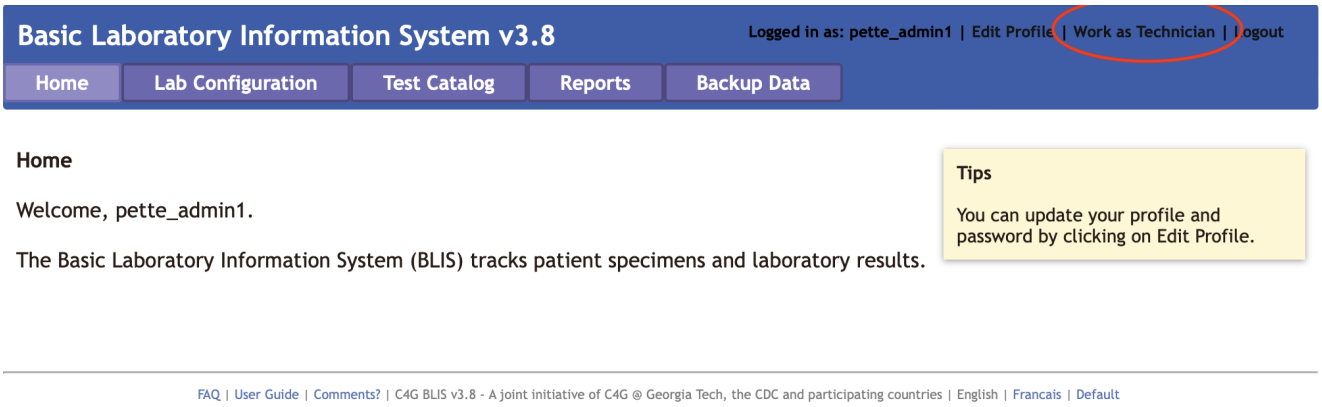
A: You can change the language to either the English or French version by clicking on the preferred language in the footer menu.



BLIS has several language options to cater to a diverse community, and we're still working to implement our changes in all of them! Thank you for your patience.

3.0.7 Q: I'm logged in as an admin user but I want to work as a lab technician. How do I switch to the technician interface?

A: The *Work as Technician* option can be selected from the top right side of the header next to the logout button.

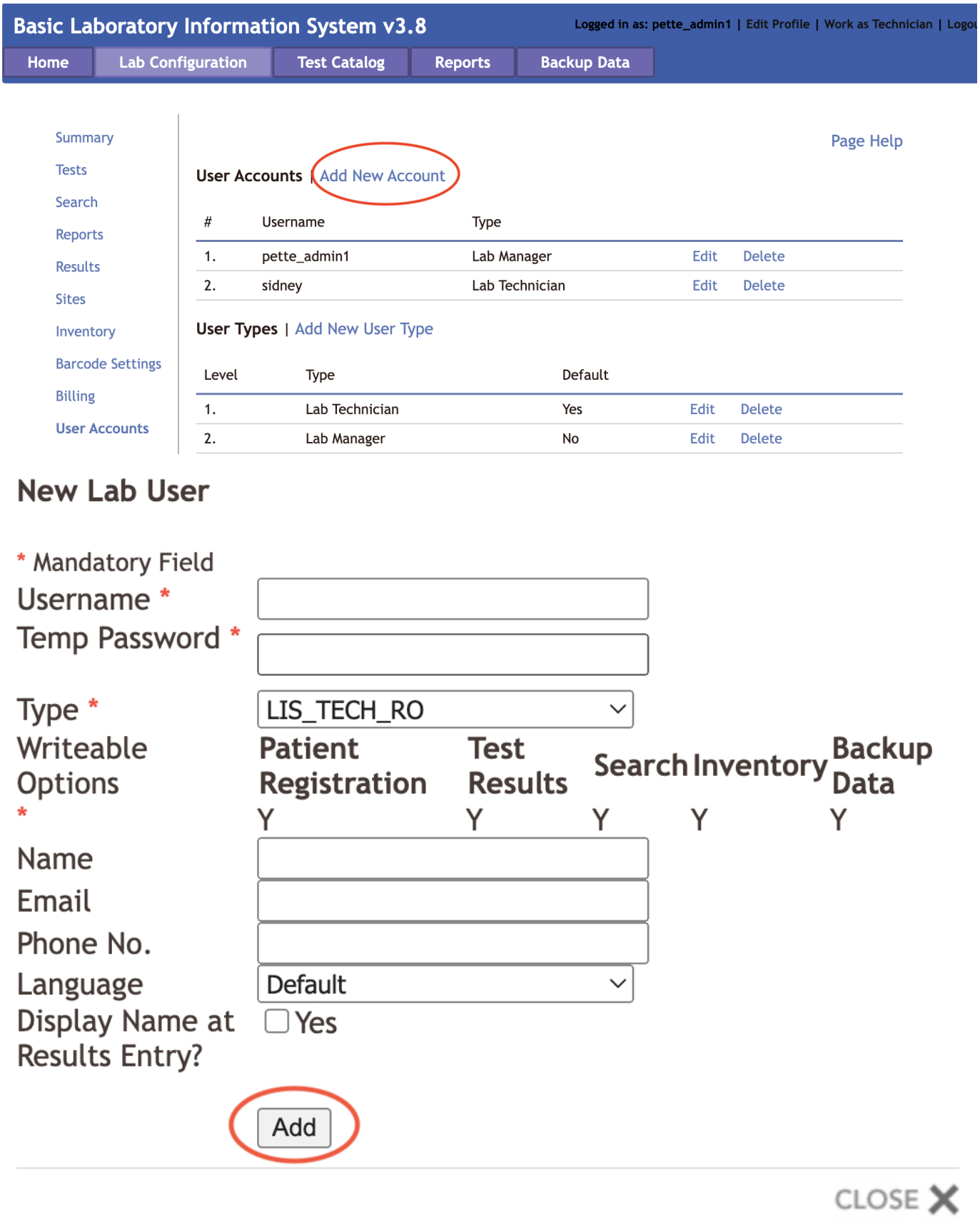


3.0.8 Q: What are the different lab tests that BLIS can be used for?

A: The lab tests that BLIS can be used for are configured by your administrator, so they vary from lab to lab. Check with you local adminstrator for more information.

3.0.9 Q: How do I add new BLIS users to the system?

A: An administrator can add new users. The types of users can also be configured. To add a new user, you must be logged in as an adminstrator. Go the the *Lab Configuration* tab and select the User Accounts option (from this page you can also add new user types, e.g. technicians or administrators. Click on *Add New Account* and fill out the form that pops up to add a new user. Be sure to click the Add button, not Close at the bottom of the form. permissions.


Basic Laboratory Information System v3.8
Logged in as: pette_admin1 | Edit Profile | Work as Technician | Logou
Home
Lab Configuration
Test Catalog
Reports
Backup Data
Summary
Tests
Search
Reports
Results
Sites
Inventory
Barcode Settings
Billing
User Accounts
Page Help
User Accounts | Add New Account
Username Type
1. pette_admin1 Lab Manager Edit Delete
2. sidney Lab Technician Edit Delete
User Types | Add New User Type
Level Type Default
1. Lab Technician Yes Edit Delete
2. Lab Manager No Edit Delete
New Lab User
* Mandatory Field
Username *
Temp Password *
Type *
LIS_TECH_RO
Writeable Options *
Patient Registration
Test Results
Search
Inventory
Backup Data
Y Y Y Y Y
Name
Email
Phone No.
Language
Default
Display Name at Results Entry?
Yes
Add
CLOSE

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4. Developer documentation

4.1 C4G BLIS Developer Guide

C4G Basic Laboratory Information System is a collaboration between Computing-for-Good (C4G) at Georgia Tech, the CDC, and participating PEPFAR countries. This doc will works as a supplement to `BLIS_User_Guide.pdf`, mainly to help developers quick ramp up on this repo and list out tips when contribute to this project.

4.1.1 Welcome

So welcome to this project! In this guide, we are going to go through the recommended tools, workflows and debug tips.

4.1.2 Set up the dev envs

Tools

1. git Depending on your computer OS, there will be different step to setup git. You can refer to the official manual for git installation.

> **Tips on install git**
>
> On Windows, installing command-line tools can be done with a Windows package manager such as Scoop. On MacOS or Linux systems, installing tools can be done with package manager brew.

1. VScode For IDE, we recommended using VSCode, which is a lightweight, opensource IDE. VSCode-Extension recommended to install:

- Remote-Containers
- Remote-WSL
- Docker
- Docker-compose

2. Docker We will need Docker as the major tool in the development cycle.

   With the Docker application running, after installing the `Remote-Containers` and related extensions, we will be able to start the devcontainer which has been setup under `/root/.devcontainer` directory.

> **What's devcontainer and why do we use it here?**
>
> Devcontainers are a feature of Visual Studio Code that allow you to specify your development environment as a Docker container develop inside of it as if you were running the tools on your computer directly.
>
> The `c4g-blis-spr22/BLIS` repository has a `.devcontainer` configuration already specified, so you can develop BLIS on any computer that can run Docker and Visual Studio Code.

Test the envs

A quick way to test the dependencies installed correctly is: 1. Clone the BLIS repository to your computer:

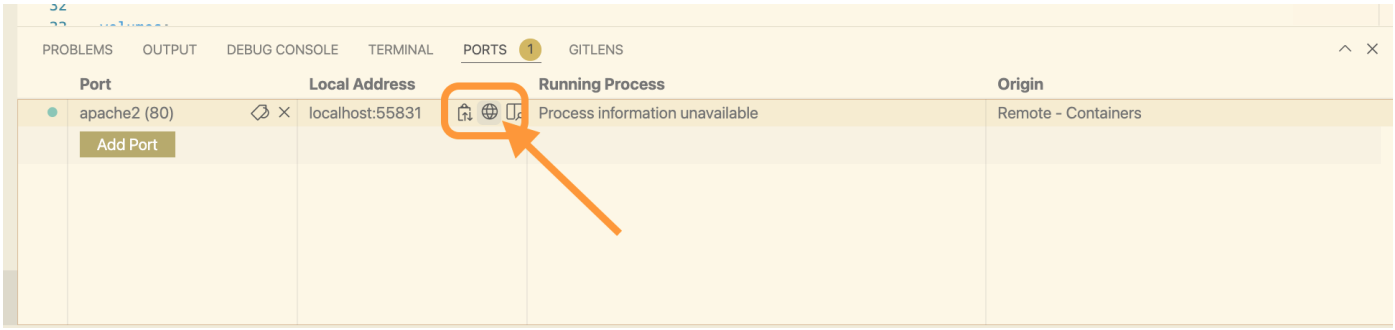
```
$ git clone https://github.com/C4G/BLIS.git
```

1. Open the folder in Visual Studio Code
2. A pop-up that says something like "This folder contains a devcontainer configuration" will appear. Click the button to open the folder in a container.
3. If that does not appear, open the command palette (Ctrl-Shift-P or Cmd-Shift-P) and find "Open folder in container" and select the BLIS folder.

4. Once the container is started, the ports should forward automatically. You can see apache2 running if you click the "Ports" tab on the bottom (if the bottom panel is not open, use Ctrl-` (backtick) to open it)

   In this plot, you can see the terminal output, where the apache servers starts.

   In this plot, you can see the port, click the little earth button and then it will take you to the local hosted BLIS instance.



5. You can then browse BLIS in your normal browser by visiting http://localhost:80 (substituting 80 for another port, depending on what port VS Code has mapped to apache2.)
6. Log into the BLIS and start your exploration.

Read the data structures site for (username, password) pairs, as well as data structures stored in database before diving in

Smoke tests

If you want to run smoke tests on BLIS you can find them in the smoke_tests folder on the C4G BLIS Github. Below are the tests that are implemented and instructions for running the smoke tests.

Tests 1. Login

1. Specimen test
2. Registering a patient
3. Registering a specimen

Running Instructions 1. You will need python 3 installed, the latest is preferred

1. You will need to pip install selenium, if pip is not on your command line you can do python -m pip install selenium
2. Create a folder called test or something of that variety to extract your smoke test zip file to
3. Extract the zip to that folder
4. Ensure you have Firefox installed on the local machine, you will need to also get the gecko driver
5. Get the gecko driver from here for your platform you are running the tests on https://github.com/mozilla/geckodriver/releases
6. Put the gecko driver into the folder where your tests are running
7. Either run BLIS locally or have it installed on digital ocean
8. Get the address for your BLIS installation, this is what you put in the address bar in your browser to access BLIS
9. Edit the BLIS_URL in test.py with your address from step 9, so if your address was http://172.24.80.1:4001 that line should now be blis_url = "http://172.24.80.1:4001"
10. Open up command prompt or terminal
11. Navigate to the directory with cd
12. Run python main.py in your terminal or command prompt
13. The testing platform will run and will report back if any tests failed and with any errors or if all the tests ran successfully

4.1.3 Running environment

Running on `devcontainer`

You can see more details on the Test the envs section.

Running on Windows

Aside by running BLIS on `devcontainer`, you can also try with running BLIS on Windows, where the BLIS was originally designed and developed on). This process will only require `git` to pull the code from github.

BLIS was originally developed to run on Windows using a discontinued project called Server2Go. This packages Apache2, MySQL, PHP, and Firefox together into a package that can be run all at once on a desktop computer.

See Also

- Design and Implementation of a Basic Laboratory Information System for Resource-Limited Settings
- Server2Go - Portable Web Server

This is the primary way that end-users are still using BLIS. You can still run BLIS this way to develop it.

> **Warning**
>
> These instructions are subject to change.

1. Clone the BLIS repository to your computer:

```
$ git clone https://github.com/C4G/BLIS.git
```

2. Download the latest version of BLISRuntime.zip archive
3. Unzip BLISRuntime.zip into the BLIS repository directory
4. Run `BLIS.exe`

The bundled Firefox will start and you can use BLIS normally, or make changes to files in the `htdocs/` directory.

4.1.4 Code directory and organization

As you can see in the directory, there is the first level file tree directory. And in the following sections, we will cover the some of important file/directory for your faster & better understanding about the BLIS code organization.

```
├── .devcontainer
├── .github
├── .editorconfig
├── .gitignore
├── API_documentation.txt
├── Dockerfile
├── README.md
├── Update_Instructions.txt
├── bin
├── composer.json
├── composer.lock
├── docker
├── files
├── htdocs
├── local
├── log
├── splash.png
├── tools
├── update_C4GBLIS_v3.3.bat
└── vendor
```

> **s about file structure**
>
> The above tree structure can be generated via the `tree` command. For more details, read this doc.

Developer tools directories

DOCKER RELATED

```
├── Dockerfile
├── docker
├── .devcontainer
```

The above files are mostly for development usage. As mentioned above, we use docker to containize the application and make it easily deployable in Linux platforms. `.devcontainer` contain the setup for docker setup locally when running in devcontainer; `Dockerfile` contains the details for pushing image to `ghcr.io` in the CI/CD stage (Also mentioned in the below **Github related** section). And `docker/` directory contains the `docker-compose` file, bash files for deployment at Linux machine. More details can be seen in the Deployment section below.

GITHUB RELATED

```
├── README.md
├── files
├── log
```

```
├── .github
├── splash.png
```

You will find mostly directory empty (As of April, 2022). And in the `.github/` directory, there is a CI/CD step: releasing latest changes to the `ghcr.io`, thus we can easily deploy the latest changes when needed. You can see more details in `release-docker.yml`.

COMPOSER RELATED

```
├── composer.json
├── composer.lock
├── tools
├── vendor
```

Start from Version [TODO], we introduced `Composer` as the php package manager for BLIS. You will need to set it up before using it, see more details here. But this is not necessary till you want to make changes to the BLIS dependencies.

As for the `composer.json` and `composer.lock` file, you can refer to this documentation to understand how they work. `composer.lock` records the exact versions that are installed. So that you are in the same versions with your co-workers. And `composer.json` records the packages you specify and want to use in the project.

And the `vendor` directory is where the specified packages installed.

Source code directories

After going through the developer tools directories, you will find one few files/directories left.

```
├── API_documentation.txt
├── Update_Instructions.txt
├── bin
├── htdocs
├── local
├── update_C4GBLIS_v3.3.bat
```

And among those, the most important two directories are `htdocs` and `local`. The `htdocs` contains almost all the modules in BLIS. And `local` directory contains the localization versions' settings of phrases, tips, UI appearance. Due to the complexity of this section, few features will be focused for illustration, feel free to add your findings when working on some features. 😄

BACKUP DATA AND CLOUD BACKUP

Cloud backup means you can specify the IP Address and then send backup to the BLIS instance hosted on that IP Address. (More details of UI can be found in User Guide -> Backup Data section).

This functionality mainly lives in `./htdocs/export`. The latest changes mainly live in `backupData.php` and `backupDataUI.php`. We can refer to specific git commits for better understanding.

UI CHANGES

UI and tips have been refactored in the version [TODO], and we found out that the UI settings is reflected in both `./htdocs/Language` and `local/lab_id` directory. Changes in `./htdocs` don't necessary propogate to the local labs. So if you want to your changes to be reflected in both new labs and old existed labs, you will need to change the files in `./local/lab_id` accordlingly.

There may be some confusion on `default`, `en`, `fr` versions across the repo. TLDR is `default` is the version will be setup by your country directory when setting up the lab, and can be `en` or `fr`. To better understand this scenario, let's imagine we are going to change the tips for english version, then potentially, we will make 4 changes (2 for `default` and `en`, 2 for `local_lib` and `htdocs`)

4.1.5 Deployment

After you are satisfied with your new changes and want to deploy a newer version BLIS on cloud. In this doc, we will use DigitalOcean for the deployment platform as example. You will go through two main steps:

1. Push & merge your changes to github repo. Based on `./github/workflows/release-docker.yml`, the newest change will reflect in the `ghcr.io/C4G/blis:latest` docker repo.
2. Use the docker image to deploy BLIS service as well as database service. An step-by-step detailed instruction can be seen in this site

Deployment Video

Video showing how to deploy the BLIS cloud version, upgrade script and collected survey from the BLIS online team in Spring of 2023

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4.2 Adding Localized Strings

If you are adding a new BLIS feature, or modifying the text that is on an existing feature, you probably want to add or change strings.

4.2.1 Files & Directories

BLIS uses XML and PHP files to store strings. These are located in a few places.

```
[root]
  - htdocs/
    - Language/
      - default.xml
      - en.xml
      - fr.xml
      - default.php
      - en.php
      - fr.php
      - ...
  - local/
    - langdata_[lab ID]/
      - default.xml
      - en.xml
      - fr.xml
      - default.php
      - en.php
      - fr.php
      - ...
```

`htdocs/Language` Folder

The `Language` folder is the base template from which all labs are created. When a new lab is created, or a lab is updated, files from this folder are copied to the `local/langdata_` folder.

`local/langdata_[lab ID]` Folder

The files in this folder are what is actually used to render the text on the pages that you visit in BLIS. These files are required conditionally depending on what your session's language is set to..

4.2.2 How to Use Localized Strings

Because the logic for requiring the correct language file is handled in `db_lib.php`, you must require it in your file if it is not already required (it probably already is.)

```
require_once("../includes/db_lib.php");
```

Once that is done, you can use the `LangUtil` class like so:

```
<?php
  echo LangUtil::$generalTerms['NAME'];
?>
```

There are several "pages" of localized strings. These sections are organized in the XML file. You can set the current page ID and then use the `pageTerms` array.

```
<?php
  LangUtil::setPageId("stocks");
  echo LangUtil::$pageTerms["Reagents"];
?>
```

4.2.3 How to Add or Change a String

It is important to keep the strings in BLIS consistent so we can make it easy to maintain these strings for future generations of contributors.

Here is the process for adding or changing a string:

1. In `htdocs/Language/`, for **each** `en.xml`, `fr.xml`, `default.xml`, add or change the string.

a. Identify the correct page to place the string under (adding it to "general" is acceptable)

b. Decide on a name for the string (like `CMD_EXIT`, `UPDATE_PATIENT`, etc.) and ensure it is not already taken

c. Add a value for the string

d. If you don't speak or understand French, judicious use of Google Translate or other services is reasonable. BLIS administrators will be able to change this value.

2. Run the `update-lang.php` utility. This will copy your changes to the corresponding PHP file.

- **If you are using the BLIS devcontainer:** You can run:

```
vscode@14ba082a42d1:/workspace$ php bin/update-lang.php htdocs/Language/en.xml
Generating PHP file: /workspace/htdocs/Language/en.php
From XML file:       /workspace/htdocs/Language/en.xml
Calling: lang_xml2php("en", "/workspace/htdocs/Language/")
Calling: require_once("/workspace/htdocs/Language/en.php") to ensure valid PHP syntax...
```

- **If you are on Windows:** You can run:

```
C:\Users\c4g\BLIS>server\php\php.exe bin\update-lang.php htdocs\Language\en.xml
Generating PHP file: /workspace/htdocs/Language/en.php
From XML file:       /workspace/htdocs/Language/en.xml
Calling: lang_xml2php("en", "/workspace/htdocs/Language/")
Calling: require_once("/workspace/htdocs/Language/en.php") to ensure valid PHP syntax...
```

- Copy all your changes from the `htdocs/Language` folder to the `local/langdata_` folders.

```
$ cp htdocs/Language/en.* local/langdata_127/
$ cp htdocs/Language/fr.* local/langdata_127/
$ cp htdocs/Language/default.* local/langdata_127/

# Repeat for local/langdata_12/, local/langdata_revamp/
# These folders are distributed with BLIS as test labs.
```

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4.3 Database & Backup Structure

Notes as I look into the database and structure of the databases, and the backups generated by the "export" function.

4.3.1 BLIS Default Users/passwords

Username	Password	Description
cameroon_dir	dir123	Director's view
testlab1_admin	admin123	Lab admin account
testlab1_tech1	tech123	Lab tech account
testlab1_tech2	tech123	Lab tech account

4.3.2 Database Dumps

In the BLIS download from the website, the MySQL tables are prepopulated with a structure. It's not clear if this can be recreated exactly from the various SQL files available in the data/ directory. So I dumped the databases using DBeaver and here they are:

- blis_12
- blis_127
- blis_revamp

I can use this to seed a container image of BLIS on Linux.

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4.4 Work in progress

4.4.1 Reference & Satellite Labs

Last updated by @mrysav

4.4.2 Use Case: 1 reference lab, 2 satellite labs

- The reference lab admin can create accounts for satellite lab users.
- The reference lab technician can enter results into the reference lab and tag those results as belonging to satellite labs.
- The satellite labs can log in to the reference lab cloud BLIS and view results only for their labs.

```
sequenceDiagram
    participant A as Reference Lab BLIS Cloud
    participant B as Reference Lab Admin
    participant C as Reference Lab Technician
    participant D as Satellite Lab A
    participant E as Satellite Lab B

    B->>A: Creates Account for Satellite Lab A
    B->>A: Creates Account for Satellite Lab B

    D->>C: Send Specimen A for test
    E->>C: Send Specimen B for test

    C->>A: Log in as Reference Lab Technician and Enter Test Result for Specimen A
    C->>A: Log in as Reference Lab Technician and Enter Test Result for Specimen B

    D->>A: Log in as Satellite Account A
    A->>D: Can ONLY view result for Specimen A

    E->>A: Log in as Satellite Account B
    A->>E: Can ONLY view result for Specimen B
```

4.4.3 Data Model (in progress)

```
classDiagram
    BLISCloud <-- Lab
    BLISCloud <-- UserAccountType
    BLISCloud <-- UserAccount
    UserAccountType <-- UserAccount

    class BLISCloud {

    }

    class Lab {
        - Contains specimens and test results specific to a particular lab
    }

    class UserAccountType {
        - List of permissions
    }

    class UserAccount {
        - Has access to specific lab or labs
    }
```

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5. User guide

5.1 Introduction

The Basic Laboratory Information System (BLIS) is a freeware Web-based system that can be installed in a local, district, or national laboratory. It is a tool that can help to standardize data, which improves the ability to run useful reports and can both give a realistic picture of laboratory services and assist with staff and budget planning. With enough data, BLIS can be used to track disease prevalence over time.

Features of BLIS

- One-time entry of each unique patient
- Standardization of data collected (allowable entries for specimen type, test type, patient data, reagents are set at MOH level and then entered consistently throughout a country)
- Customization to a country's needs
- Ability to track lab supplies such as test kits, reagents
- Ability to run reports as specified by a country
- Automatic alerting of data values that may be out of range(reference ranges and panic values are set at the regional or national level)
- Daily logs to be reviewed for data verification
- Simple data backup to a zipped file
- [NEW] BLIS running on a cloud provider
- [NEW] Manual data backup to a version of BLIS running on a remote server
- [NEW] Ability to view statistics for tests reported quantitatively. e.g., how many test results for calcium are in the range of 0.5 to 1
- [NEW] Ability to print results in bulk

As with any properly implemented electronic record system, BLIS may be found over time to improve data accuracy and reduce costs in laboratories.

Benefits seen in labs using BLIS

- Reduced burden for technicians, as results are available soon after testing
- Improved consistency of data entry
- Ability to view patient history and track samples
- Ability to aggregate data and analyze data patterns and trends at a regional or national level
- Printed patient records in place of handwritten records
- Printed daily logs that make the reports look like the paper forms used in the laboratory

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5.2 Getting Started

There are three versions of BLIS that currently exist.

Firstly, **BLIS on Windows** was the original version developed for end-users. Stand-alone versions, updates, and packaged content are still publicly available on the C4G BLIS home page, accessible here.

Secondly, **BLIS on the Cloud** is a newly deployed version of BLIS that is capable of running on a Cloud Provider, and was originally intended to be used as an online backup database for aggregating country-wide data for analysis.

> **Installation Instructions for BLIS on the Cloud**
>
> For instructions on installing **BLIS on the Cloud**, please see the article on Running BLIS on a Cloud Provider.

Thirdly, **BLIS in a Devcontainer** is an instantiation of BLIS that allows for developers to specify the development environment, and is intended to be used by developers only.

> **Installation Instructions for BLIS in a Devcontainer**
>
> For instructions on installing **BLIS in a Devcontainer**, please see the Developer Documentation.

BLIS For Windows

BLIS was originally developed to run on Windows using a discontinued project called Server2Go. This packages Apache2, MySQL, PHP, and Firefox together into a package that can be run all at once on a desktop computer. BLIS on Windows is the primary way that end-users are using BLIS, but can and should be used by developers to test updates.

> **Original BLIS Windows Setup Instructions**
>
> These instructions are carried over from a previous version of the user guide. If you are setting up BLIS for the first time, you should ignore these.
>
> If using a server and router, plug in the router first.
>
> - Set up and turn on the server PC and its monitor.
> - Navigate to the BLIS home page and select Download
> - Save the files to a hard drive.
> - Open the BLIS folder on the desktop and double click on BLIS.exe. Wait for a dialog box to appear on the screen. Choose Yes from the two options. The application will be installed automatically and the full login screen will appear.
> - This completes installation for a single computer. For networked computers, we recommend setting a static IP address for the network.
> - Ensure that the computer is on the network.
> - Copy the file *BlisSetup.html* to the computer
> - Double click *BlisSetup.html* to install BLIS on the networked computer.
> - Wait for the login screen. If the full screen with username, password, and login does not appear, check the URL on the server and make sure they are the same.

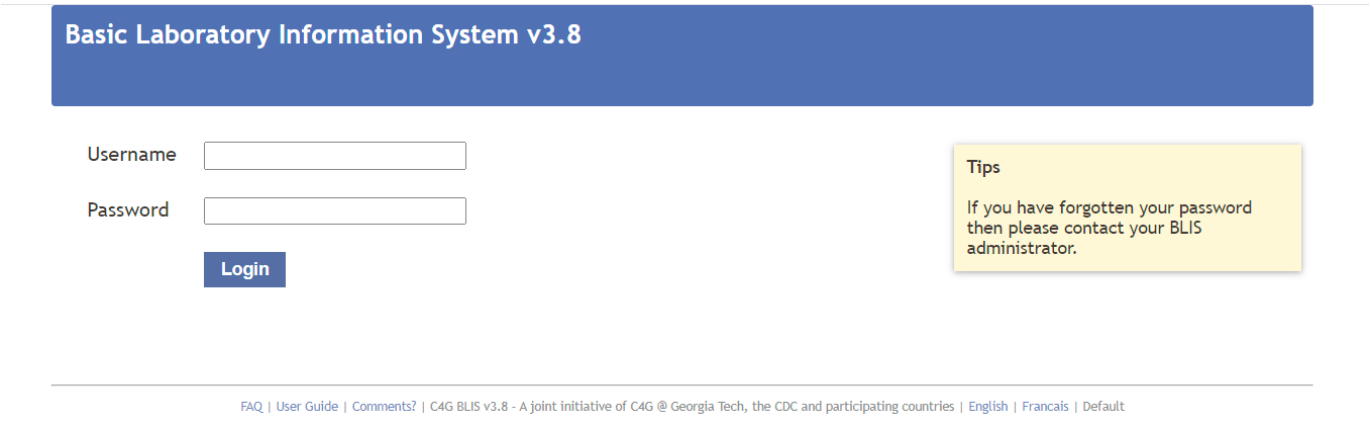
INSTRUCTIONS FOR INSTALLATION

1. Navigate to the C4G BLIS home page.
2. Click on the **Download** tab in the top menu bar, then click **Download BLIS v3.8 Complete**.

3. Follow all instructions on the Download page.

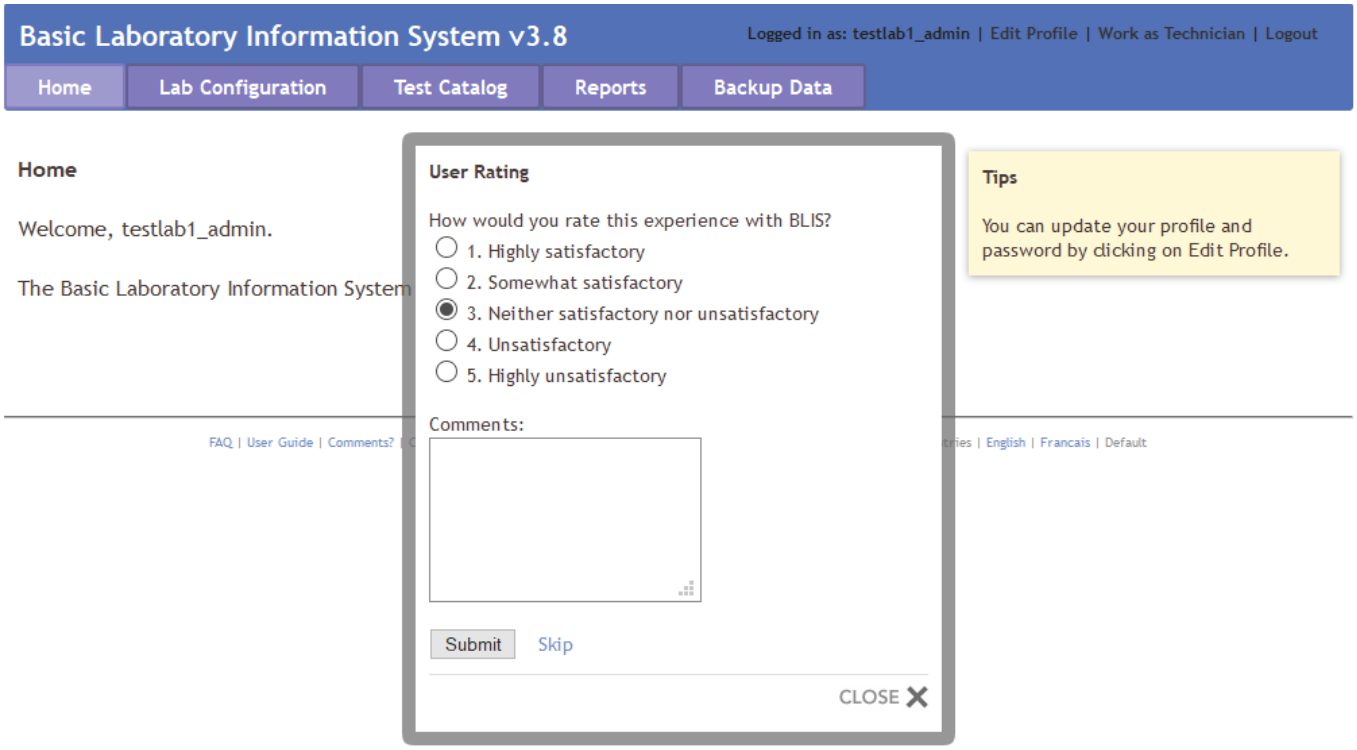
Starting BLIS

1. Double-click on the BLIS.exe file.
2. A page requesting login information will appear. Enter in the user's login credentials.



Stopping BLIS

1. After the session is complete, click the **Logout** button in the top right pane of the screen.
2. A popup window will appear where the user can rate their experience with C4G BLIS and write any comments they may have. After entering any feedback, press the **Submit** button to fully logout. Alternatively, press **Skip** to logout immediately without providing any feedback. Press **CLOSE** to cease logging out.



5.2.1 Overview of Roles in BLIS

There are three roles in BLIS.

Firstly, **Directors** (also referenced to as country directors) are a role held by a single individual at the management level of each country. The roles of Directors are to oversee many laboratories using BLIS, summarize data trends from uploaded patient data from across the country, and work with C4G developers to provide user feedback for future versions of BLIS.

Secondly, **Managers** (also referenced as admin users) are the managerial supervisors of laboratories. The roles of Managers are to maintain the user permissions to individual labs and alter individual lab configurations as needed.

Thirdly, **Technicians** are the majority of BLIS users. The role of Technicians is to enter in and verify patient data.

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5.3 Running BLIS on a Cloud Provider

Running BLIS in the cloud is still a new process and there may be issues.

5.3.1 Quick Version

> **Warning**
>
> You must already have an account with a cloud provider to continue, and you must create a virtual machine running a relatively modern Linux distribution.
>
> **The minimum amount of RAM required to run the BLIS container is 1 GB.** As of writing, this is $6 USD per month, not including backups.

You can run our official bootstrap script to start BLIS on a new, Ubuntu-based Digital Ocean image:

```
curl https://raw.githubusercontent.com/C4G/BLIS/master/docker/bootstrap.sh | bash
```

You may now proceed to Running BLIS.

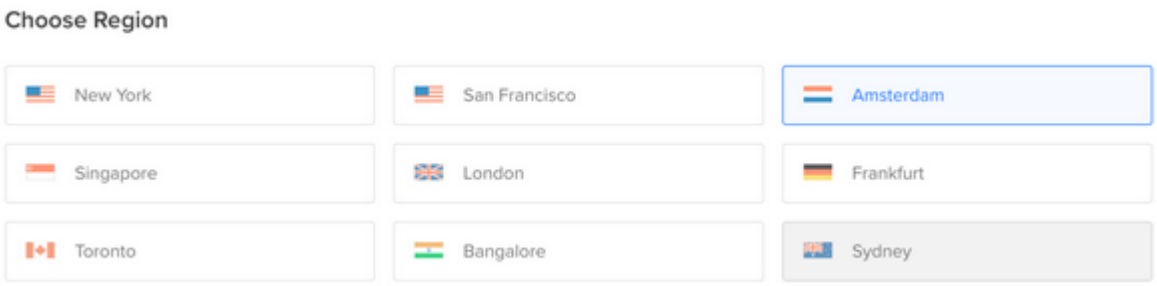
If you are not using Ubuntu, or you want to install BLIS manually, follow the instructions below.

5.3.2 Manual Instructions

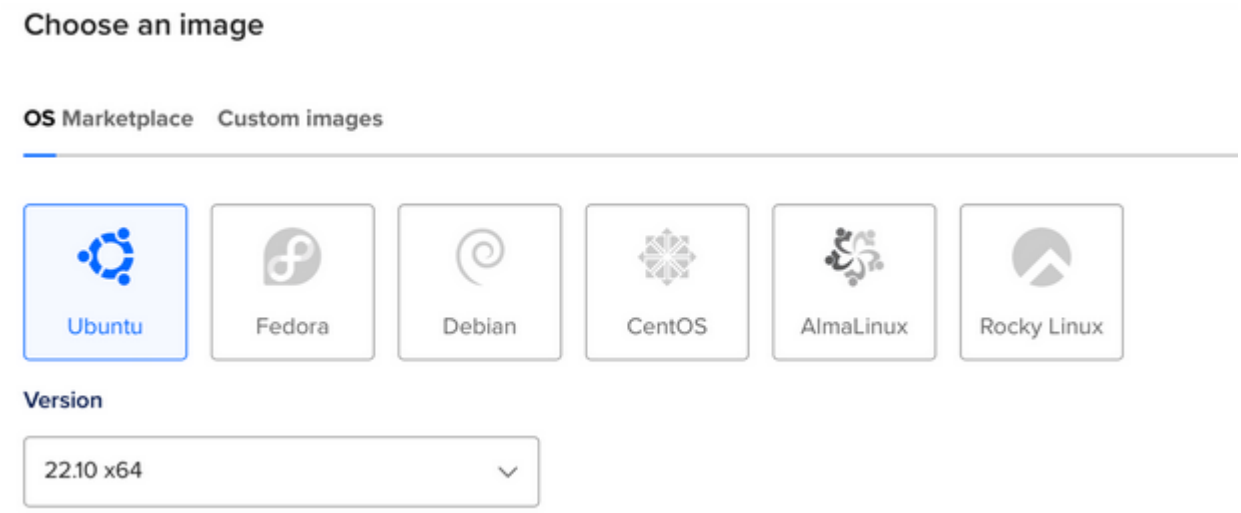
Creating a Droplet

If you need additional help or feel like something is missing you may want to look at the Digital Ocean droplet documentation but below are instructions to get you running.

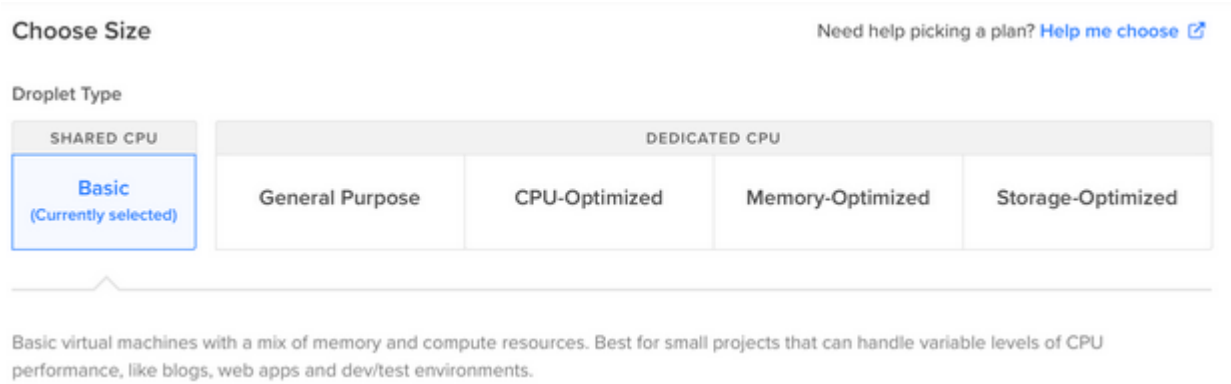
1. Signup for Digital Ocean and start creating a droplet
2. Choose a region (preferably closest to the country location)



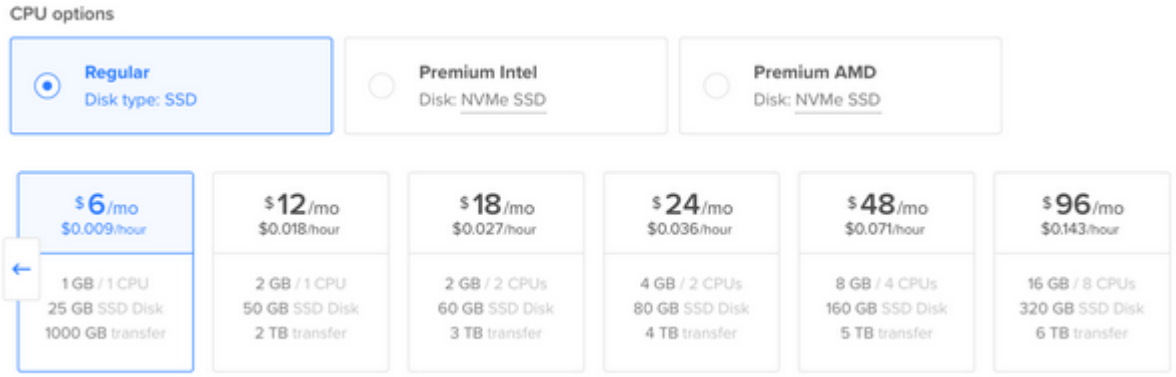
1. Select the latest **LTS version** of Ubuntu (20.04 LTS, 22.04 LTS, etc)



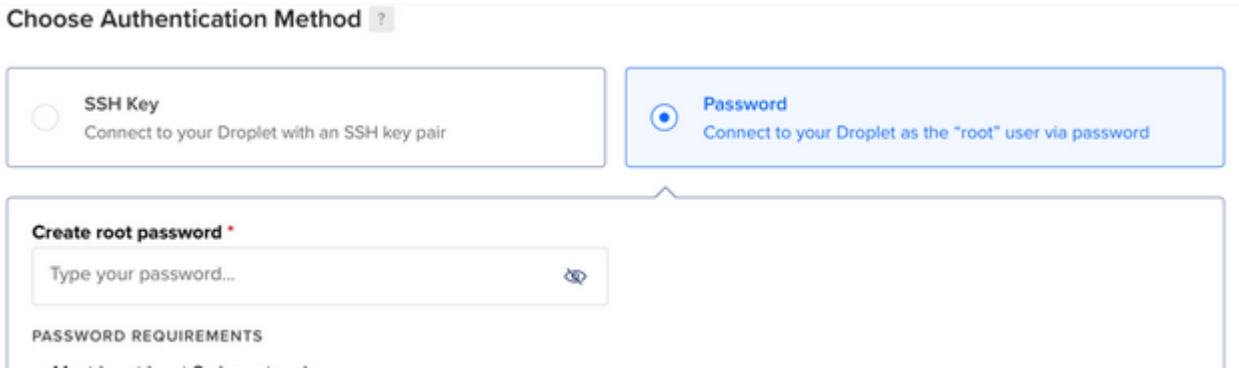
1. Select the basic droplet type



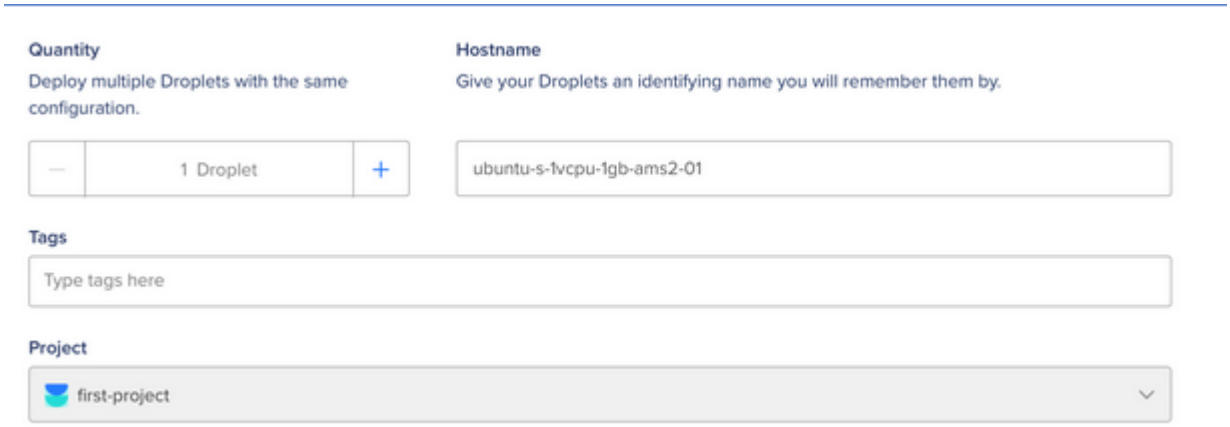
1. Choose the regular $6 a month or equivalent in your local currency CPU type



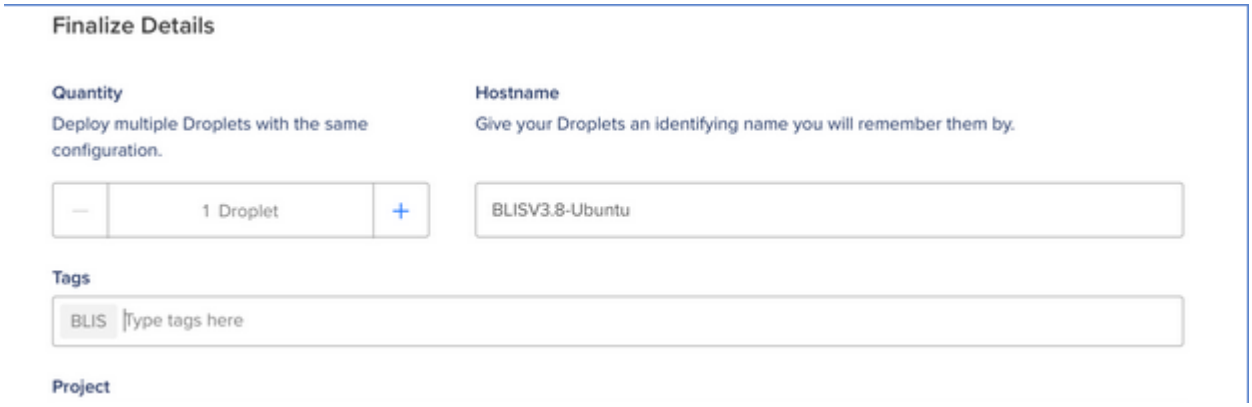
1. Choose password for you authentication method, make sure to store this password somewhere.



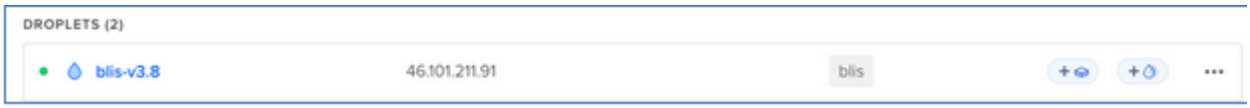
1. Finalize the details



1. Add BLIS to the Tags section

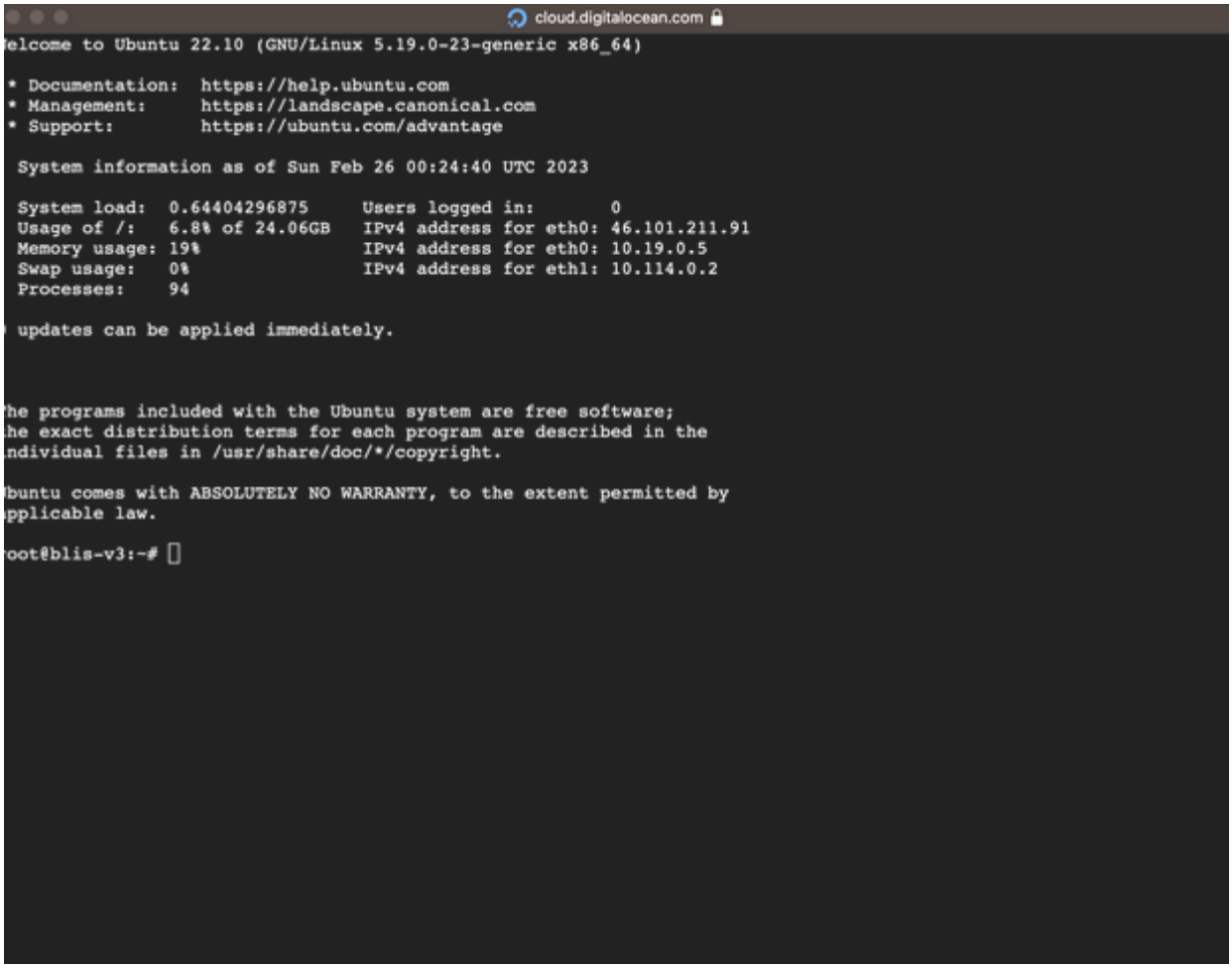


1. Create droplet by pressing the blue "Create Droplet" button, this may take a few minutes. Once it is complete it will be shown on the home page under droplets.



Installing Docker

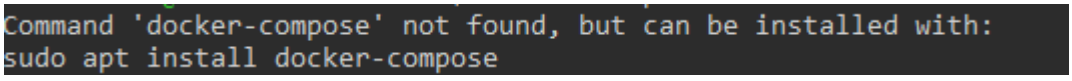
1. To login to your droplet click on the three dots at the end of the droplet on the home page and choose "Access console" or use SSH to login. The login will be root and the password you created for your droplet earlier. The console will look something like this.



1. Run this to install docker

```
curl https://raw.githubusercontent.com/C4G/BLIS/master/docker/bootstrap.sh |bash
```

1. Check if `docker-compose` is installed. You can check this by running `docker-compose` if it is **not installed** you should see something like this



If you see something like the above run this command

```
sudo curl -L "https://github.com/docker/compose/releases/download/1.29.2/docker-compose-$(uname -s)-$(uname -m)" -o /usr/local/bin/docker-compose
```

1. Run this command to allow docker compose to run

```
chmod +x /usr/local/bin/docker-compose
```

Now you're ready to run BLIS!

Running BLIS

1. Install `python3-pip`:

```
$ sudo apt-get install -y python3-pip
```

2. Install the BLIS Cloud CLI

```
$ pip3 install git+https://github.com/C4G/blis-cloud-cli.git
```

3. Ensure Docker is installed correctly:

```
blis docker status
```

You should get something like this:

```
root@ubuntu-s-1vcpu-1gb-nyc0-00:~# blis docker status
Docker is accessible? Yes
Docker Compose is installed? v2
```

4. Install BLIS:

```
blis install
```

These commands will set up two containers:

1. The `app` container: This contains all of the BLIS source code, as well as the Apache2 web server and PHP 5.6 runtime.
2. The `db` container: This contains the MySQL 5.7 database.

5.3.3 Accessing BLIS

Now, BLIS should be running. You can access it by visiting a URL that looks like:

```
http://[your droplet IP address]/
```

Substitute your droplet IP address above, you should have this from your console.

5.3.4 Upgrading BLIS

When you want to upgrade BLIS, you can follow these commands to pull the latest version of the Docker image and restart the containers:

```
blis update
```

And that's it!

5.3.5 Adding an HTTPS certificate to BLIS

By default, BLIS will only communicate over HTTP on port 80 (see `docker/docker-compose.yml` for the full port configuration.)

BLIS includes support for automatically retrieving and configuring a certificate from Let's Encrypt for communicating over HTTPS. However, you must already have a domain configured and pointing at the host you are running BLIS on. **This process is not included in this guide.** If you are using DigitalOcean, there is a guide you can use as a jumping-off point here.

After your domain is pointing to your BLIS host IP address

You will need to add the `BLIS_SERVER_NAME` to the `docker-compose.yml` configuration:

```
services:
  app:
    # This image is automatically built and pushed from the GitHub action in .github/workflows/ folder
    image: "ghcr.io/C4G/blis:latest"
    environment:
      DB_HOST: 'db'
      DB_PORT: '3306'
      DB_USER: '[blis database user here]'
      DB_PASS: '[blis database password here]'
      # Add or uncomment this line, and change the domain value to your own
      BLIS_SERVER_NAME: 'blis.mydomain.com'
```

Then, (re)start BLIS:

```
# if BLIS is running
$ docker-compose down

# bring the database container up first and daemonize it
$ docker-compose up -d db

# bring the app container up alone, syncronously, so we can see the output
$ docker-compose up app
```

Make sure there are no errors in the output. The container will attempt to read the value of `BLIS_SERVER_NAME` and set the appropriate `ServerName` directive in the Apache2 web server configuration and a message will say that it is successful.

Assuming it is successful, you can quit with Ctrl-C and restart as a background process (`docker-compose up -d app`).

In a separate terminal window, while BLIS is running, run the script:

```
$ docker-compose exec app get-https-cert.sh
```

This will verify the environment configuration seems correct and execute the certificate tool for you! Answer the questions about the domain to the best of your knowledge.

Once the domain is verified and the certificate installed, you can visit your BLIS instance with an `https://` URL and hopefully it just works!

5.3.6 Troubleshooting

1. There maybe a error when you call `docker-compose` API, the error will show similar to:

```
root@blis-test:~/BLIS/docker#docker-compose
-bash: /usr/local/bin/docker-compose: Permission denied
```

Using a `chmod +x /usr/local/bin/docker-compose` will help the work.

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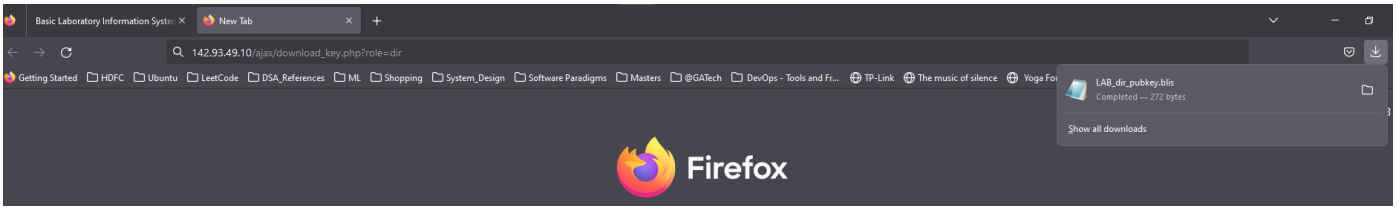
5.4 Migrating labs to Cloud

1. Upgrade your labs to version 3.8 from C4G BLIS web page.
2. Open your Firefox browser.
3. Set up BLIS on cloud if not already done. You can follow the Running BLIS on a Cloud Provider guide for instructions.
4. Go to the Digital Ocean hosted BLIS webpage. Example: http://142.93.49.10/login.php
5. Now either create encrypted or unencrytped backups using the steps below.

5.4.1 Encrypted lab backup

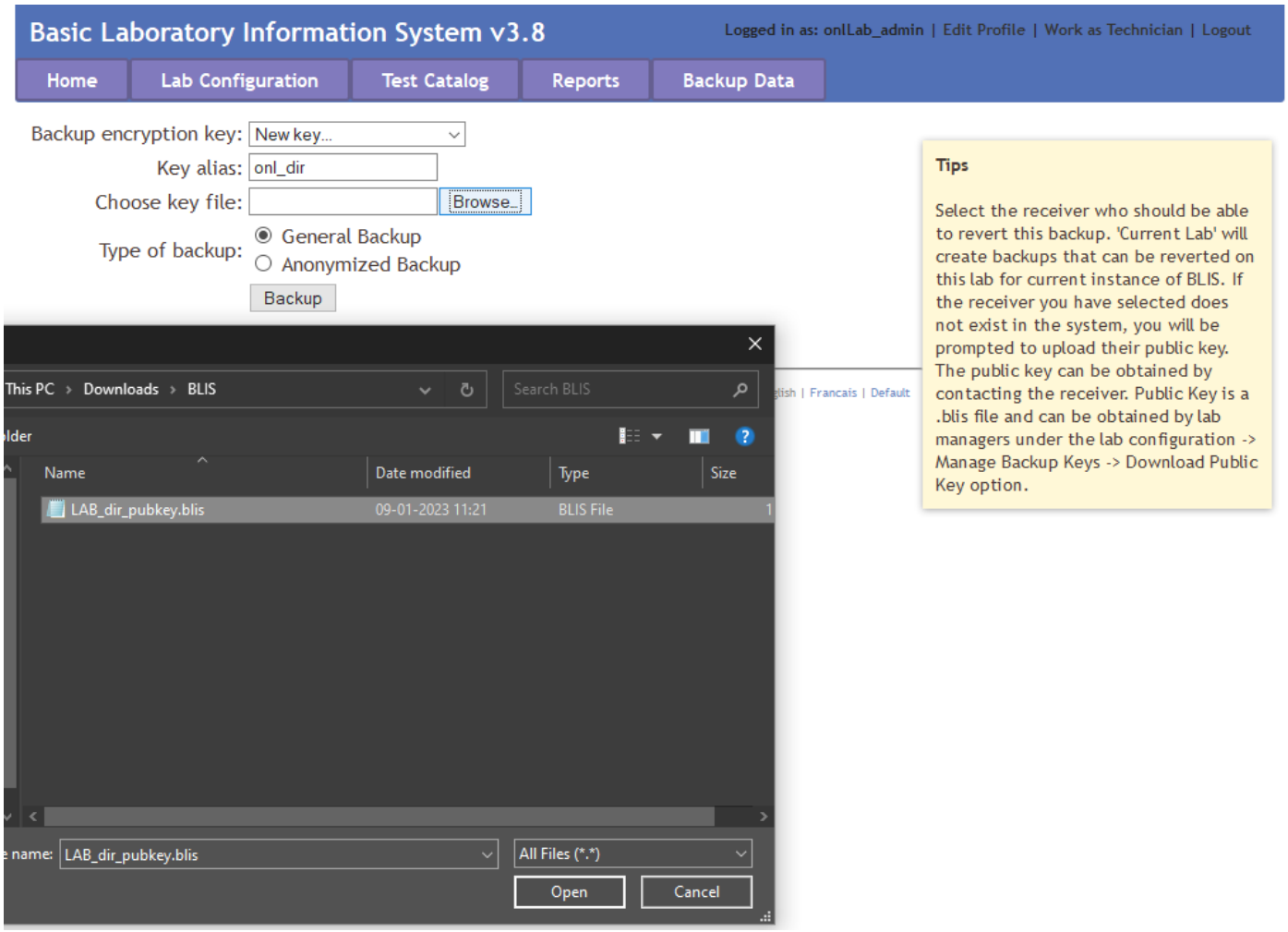
1. Go to the url http://digital-ocean-blis-host/ajax/download_key.php?role=dir to download the public key needed to encrypt the back-up. Example: http://142.93.49.10/ajax/download_key.php?role=dir



2. Next, inorder to create an encrypted backup of the local lab:

a. Navigate to the **Backup Data** tab.

b. Upload the public key dowloaded in the previous step.



c. Click on **Backup** and save the .zip encrypted backup.

5.4.2 Unencrpyted lab backup

1. Navigate to the **Lab Configurations** tab.
2. In the left side panel, click **Manage Backup Keys**.
3. Click **Disable Encrypted Backups**.
4. Now, navigate to the **Backup Data** tab.
5. Click on **Backup** and save the .zip encrypted backup.

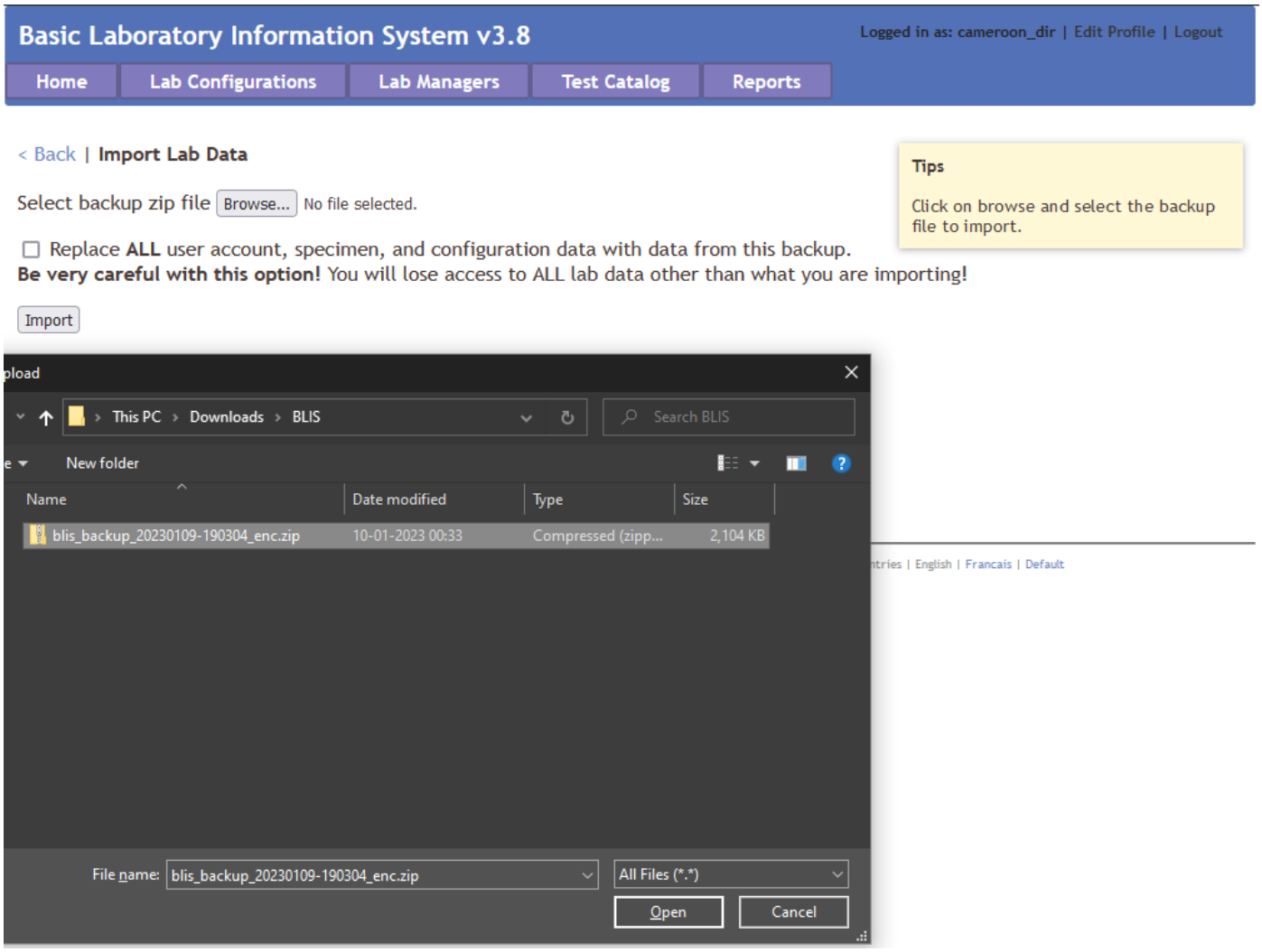
5.4.3 Importing the backup onto cloud

1. Now the country Director can upload this lab's encrypted backup onto cloud:

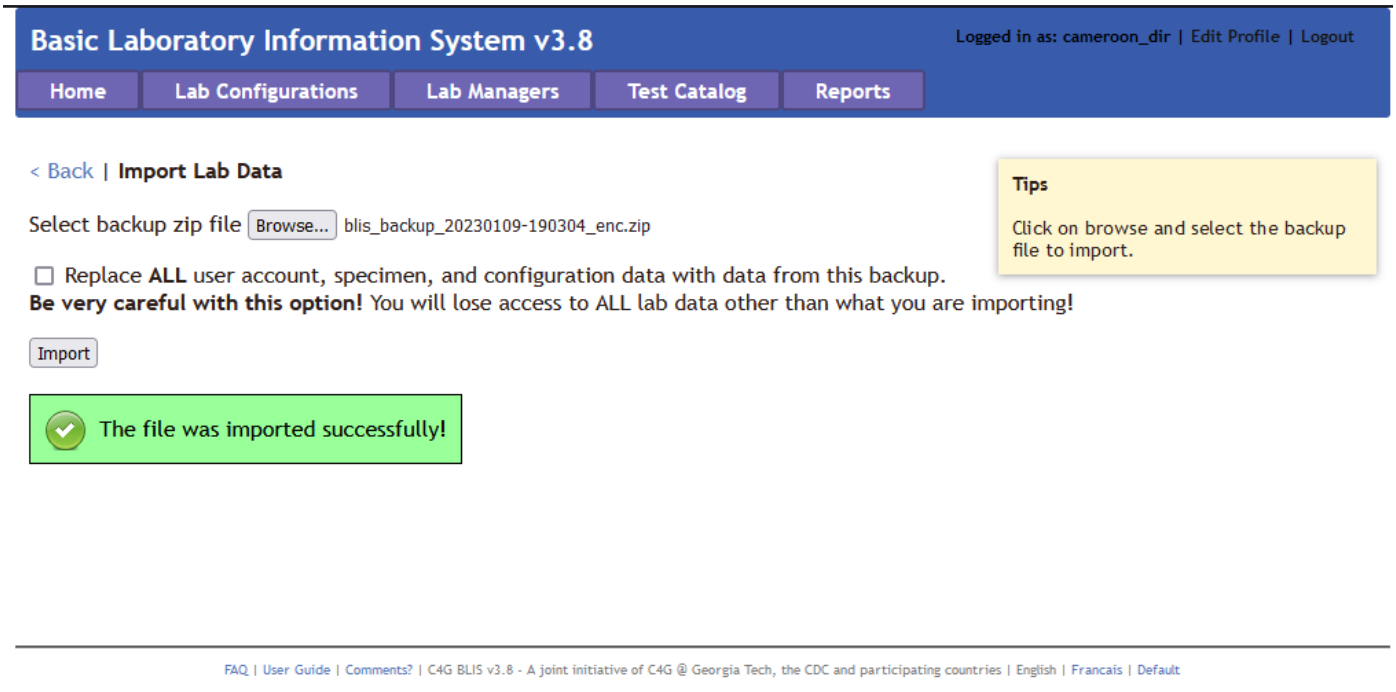
a. Login onto http://digital-ocean-blis-host/login.php as a Director.

b. Navigate to **Lab Configurations**.

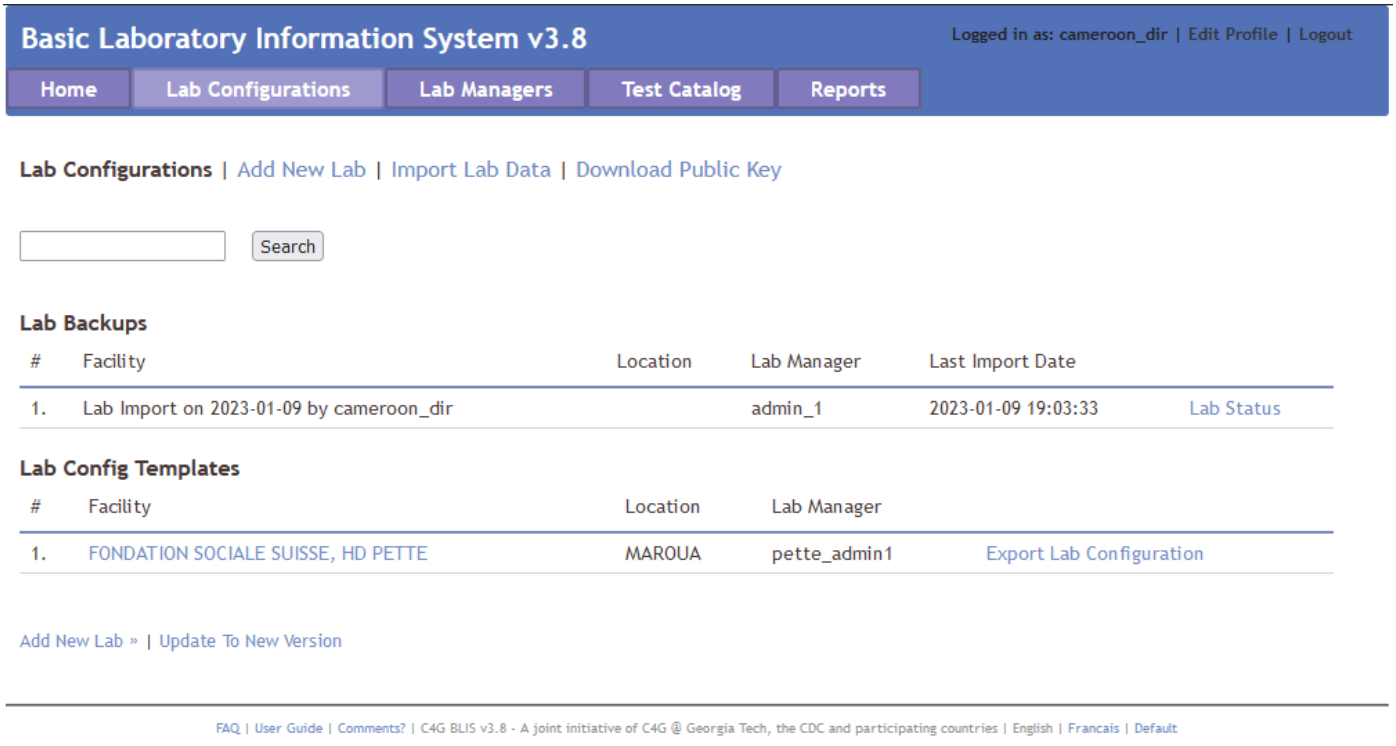
c. Click on **Import Lab Data** and upload the encrypted lab backup.



d. Upon successfully importing the lab you will see something like this:



e. And in the **Lab Configuration** tab you would see:



2. The new admin created for the newly imported lab can login using the default credentials using C4G BLIS in the cloud.

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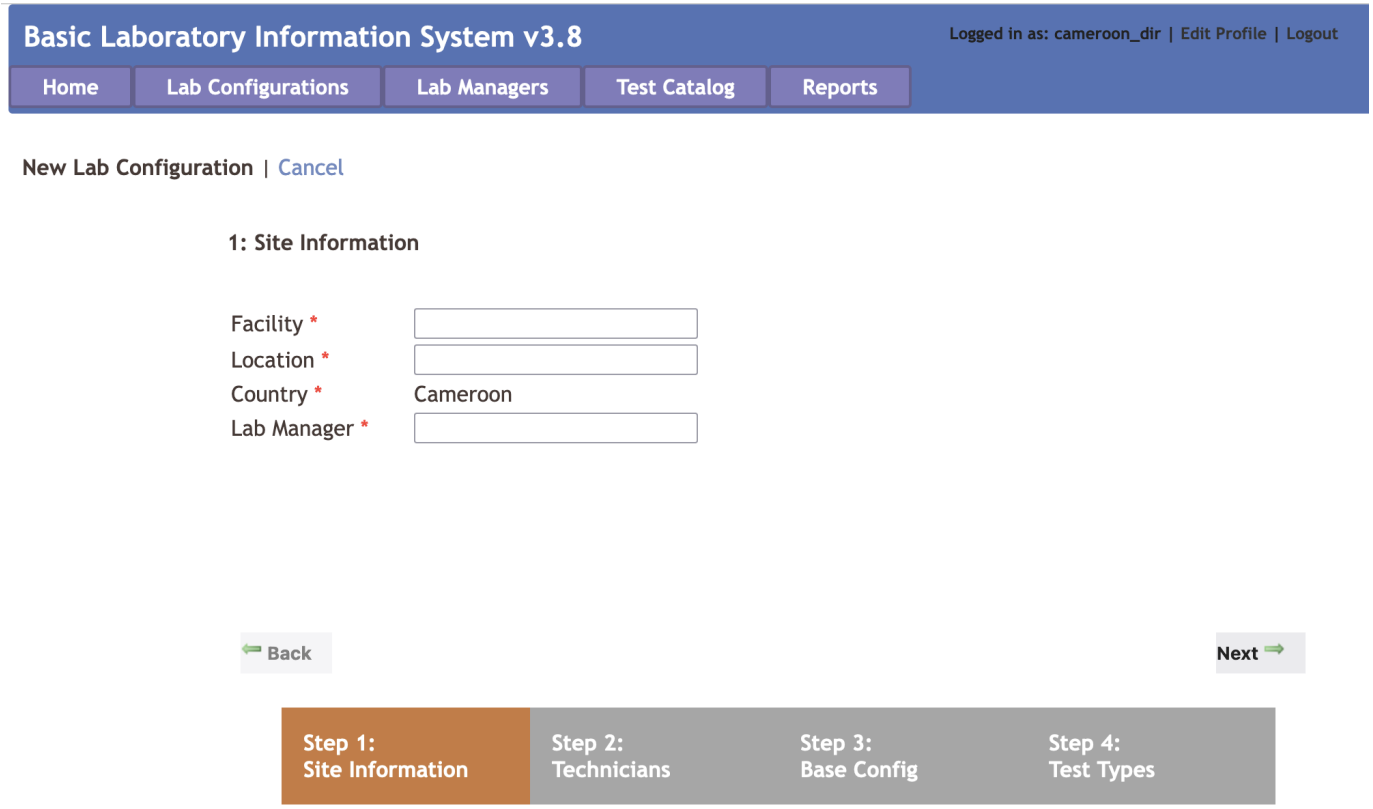
5.5 Director Overview

The Director role allows a user to control some components at a country level. This is organized into tabs, as with the other interfaces.

Lab Configurations

In the **Lab Configurations** tab, the Director can view lab backups that have been imported. A list of the different lab configurations is also displayed, along with links to export each of these lab configurations. This allows a Director to setup a lab configuration in advance and then export it for a new lab to import to streamline the process.

To setup a new lab configuration, click the button to add a new lab. This walks the user through four steps to setup site information, technicians, base configuation, and test types.



It is possible to add Technicians during this setup process, but note that additional Technicians can be added later. During setup of the base configuration, an existing lab configuration can be selected from the dropdown menu to use as a base. During the next step, test can be imported from an existing facility by selecting it from the dropdown menu. As with the other steps, the configuation can be further customized later from the **Lab Configuration** tab when logged in and work as a Manager.

Clicking on the name of a facility takes the user to the **Lab Configuration** view, with all the same options available in the Manager view, plus three additional menu options: **General Settings**, **Change Manager**, **Delete Configuration**, and **Import Configuration**. For information on the other menu options and how they work, please go to the Manager Lab Configuration section. Each of the additional options are covered here.

The **General Settings** option allows the Director to change the name or location of a facility. Additionally, the user can populate the database with random data or clear randomly populated data. The **Change Manager** option is self-explanatory. This option allows the Director to select a user from the dropdown menu as the new Lab Manager. The **Delete Configuration** menu option should be used with caution. This allows the Director to delete an entire lab configuation. Please use this with caution!

Warning

After a Lab Configuration is deleted, it cannot be recovered. Please take caution when proceeding with deleting a lab configuration.

Another functionality available on the **Lab Configuration** tab is importing lab backups. Lab Managers can perform backups and send the backups to the Director. To import a lab backup from the **Lab Configuration** tab, select **Import Lab Data**. Browse to find the zipped backup provided by the lab, and click the import button. A confirmation message will display indicating that the backup was successful or an error message if there is something wrong with the backup.

If the backup is encrypted, it can only be unencrypted with the correct key. If an encrypted backup is desired, first download the public key and share it with the lab. To do this, click the button to download a public key. It will get saved in the local computer's downloads folder by default. Send this file to the lab that is going to perform the backup. The Lab Manager can use the public key to export an encrypted backup from the Backup Data tab, and then share the zipped backup folder with the user, which can be imported as described above.

Who else can edit Lab Configurations?

Lab Configurations can also be set by Lab Managers. Click here for more details.

Lab Managers

Under the **Lab Managers** tab, the Director can add, edit, or delete Lab Managers. Click **Edit** on an existing manager to change the name, email address, phone number, or language of a manager, or to reset the managers password.

Note

Directors cannot edit/reset passwords for Technicians. Navigate to the **User Accounts** menu option in the **Lab Configurations** tab from the Manager view to edit/reset passwords for Technician accounts.

Test Catalog

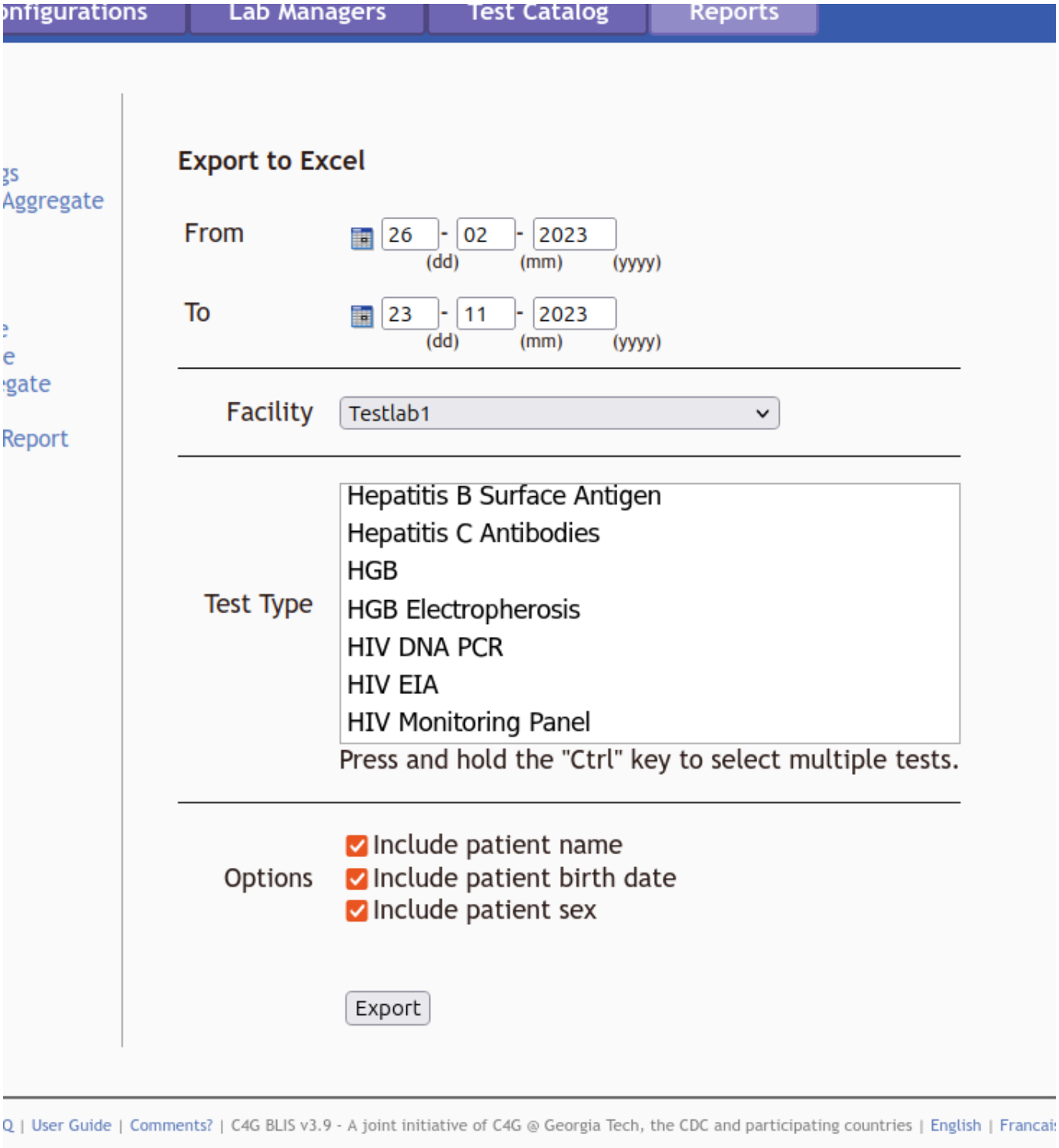
The **Test Catalog** tab allows the Director to add country-wide specimens and tests.

Reports

The **Reports** tab allows the Director to build reports for some or all of the labs that are under the country's management. The aggregate reports work much as the aggegrate reports do within the Manager view, with two additional options to select a specific test and select which facilities should be included in the report. There is also a menu option to configure some of the aggregation settings (e.g. age ranges) for the reports.

EXPORT TO EXCEL

The process for exporting to and Excel spreadsheet is identical for the director as it is for a lab manager, however, the director can select which lab among those they have access to thatthey want to generate the report for.


onfigurations
Lab Managers
Test Catalog
Reports
gs
Aggregate
e
gate
Report
Export to Excel
From
26 - 02 - 2023
(dd) (mm) (yyyy)
To
23 - 11 - 2023
(dd) (mm) (yyyy)
Facility
Testlab1
Test Type
Hepatitis B Surface Antigen
Hepatitis C Antibodies
HGB
HGB Electropherosis
HIV DNA PCR
HIV EIA
HIV Monitoring Panel
Press and hold the "Ctrl" key to select multiple tests.
Options
Include patient name
Include patient birth date
Include patient sex
Export
Q | User Guide | Comments? | C4G BLIS v3.9 - A joint initiative of C4G @ Georgia Tech, the CDC and participating countries | English | Francais

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5.6 Manager Overview

The manager interface allows the Manager to do the following:

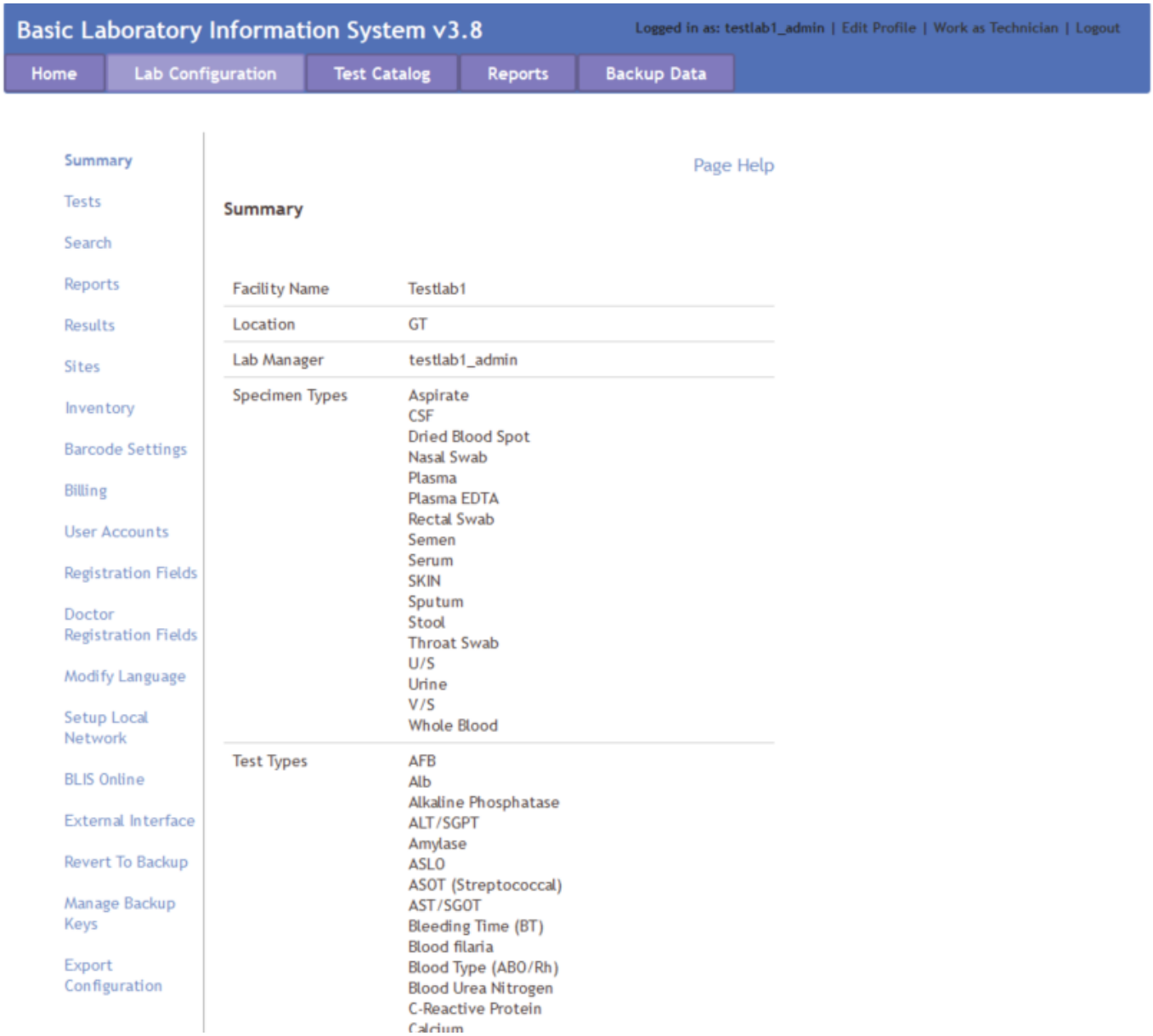
1. Add, edit, and delete users
2. Change the laboratory configuration settings in the **Lab Configuration** tab in the top menu bar
3. Generate and print reports in the **Reports** tab in the top menu bar

Manager Lab Configuration

The laboratory configuration can be changed by Managers or admin users of BLIS. Here, Lab Managers can change how reports are generated, what patient data is collected, as well as various other settings. In general, laboratory settings are usually initialized by the Country Director, but can be modified to suit individual labs' needs.

SUMMARY

The **Summary** page displays information about the laboratory. Specific information includes the Facility Name, Location, Lab Manager, available Specimen Types, available Test Types, and Technician Accounts allocated to the specific laboratory.

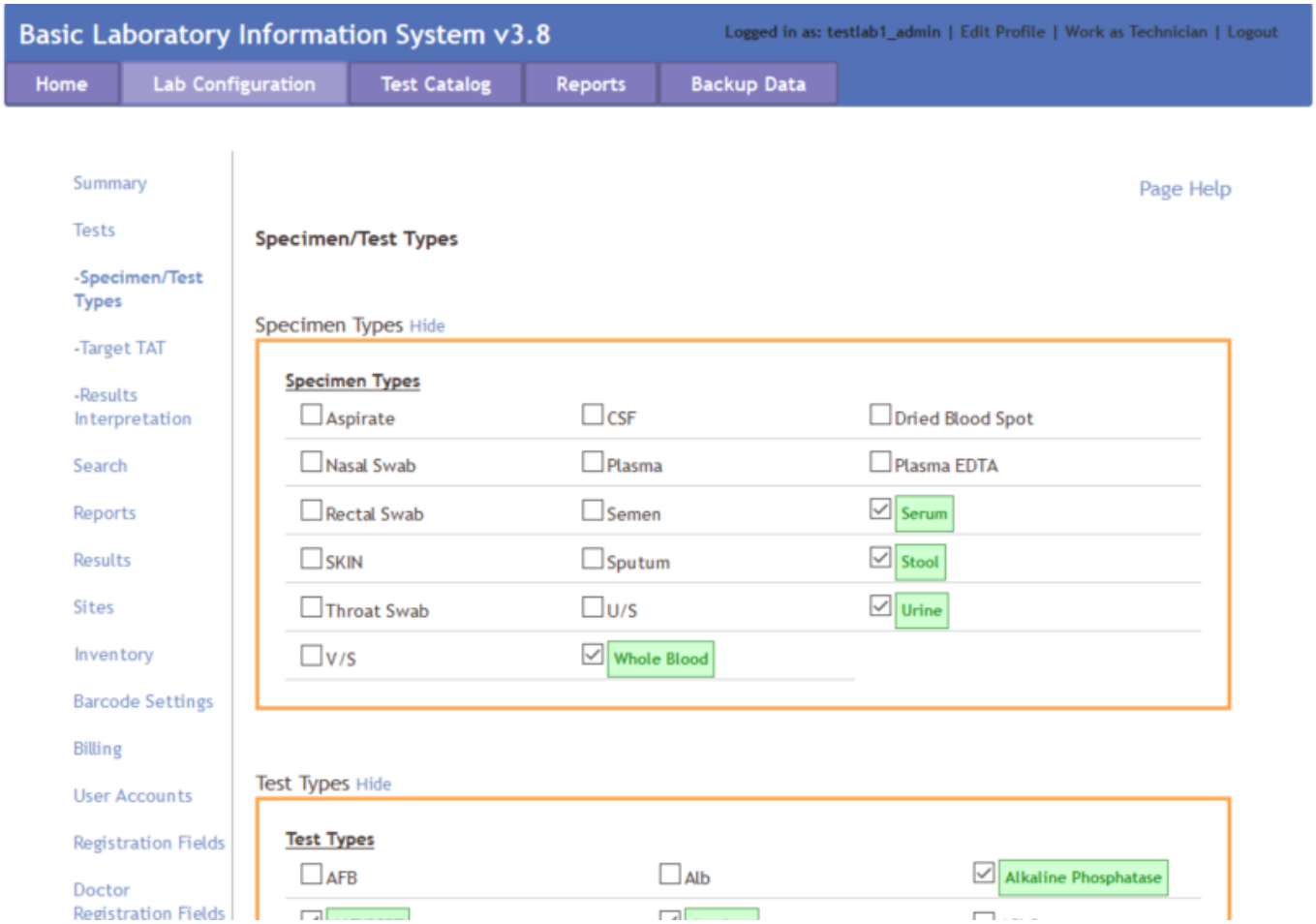


TESTS

The **Tests** page has a drop down menu that opens up to reveal three different options: **Specimen/Test Types**, **Target TAT**, and **Results Interpretation**.

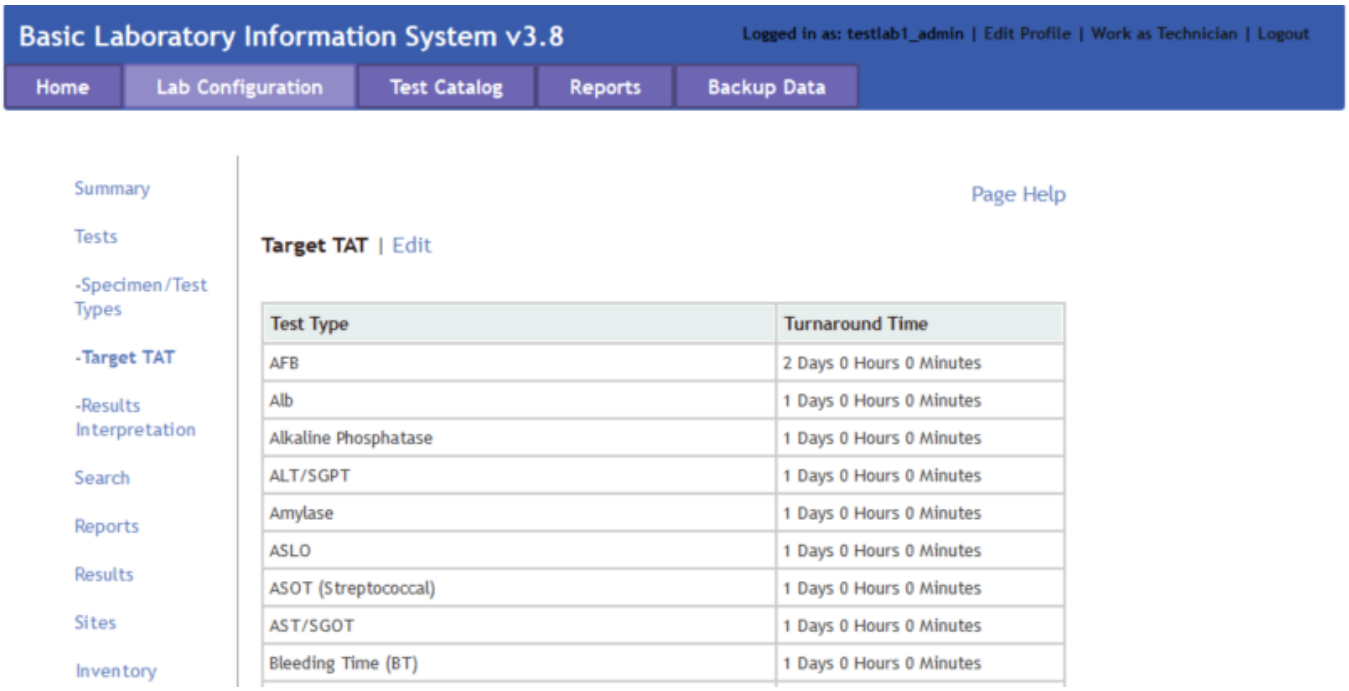
Specimen/Test Types

The **Specimen/Test Types** page allows the Lab Manager to set the specimen and test types as appropriate for their country. Click **Show** to reveal hidden panes and **Hide** to close the panes. Check the box for each specimen type collected or test done at this facility, and click **Submit** to save.



Target TAT

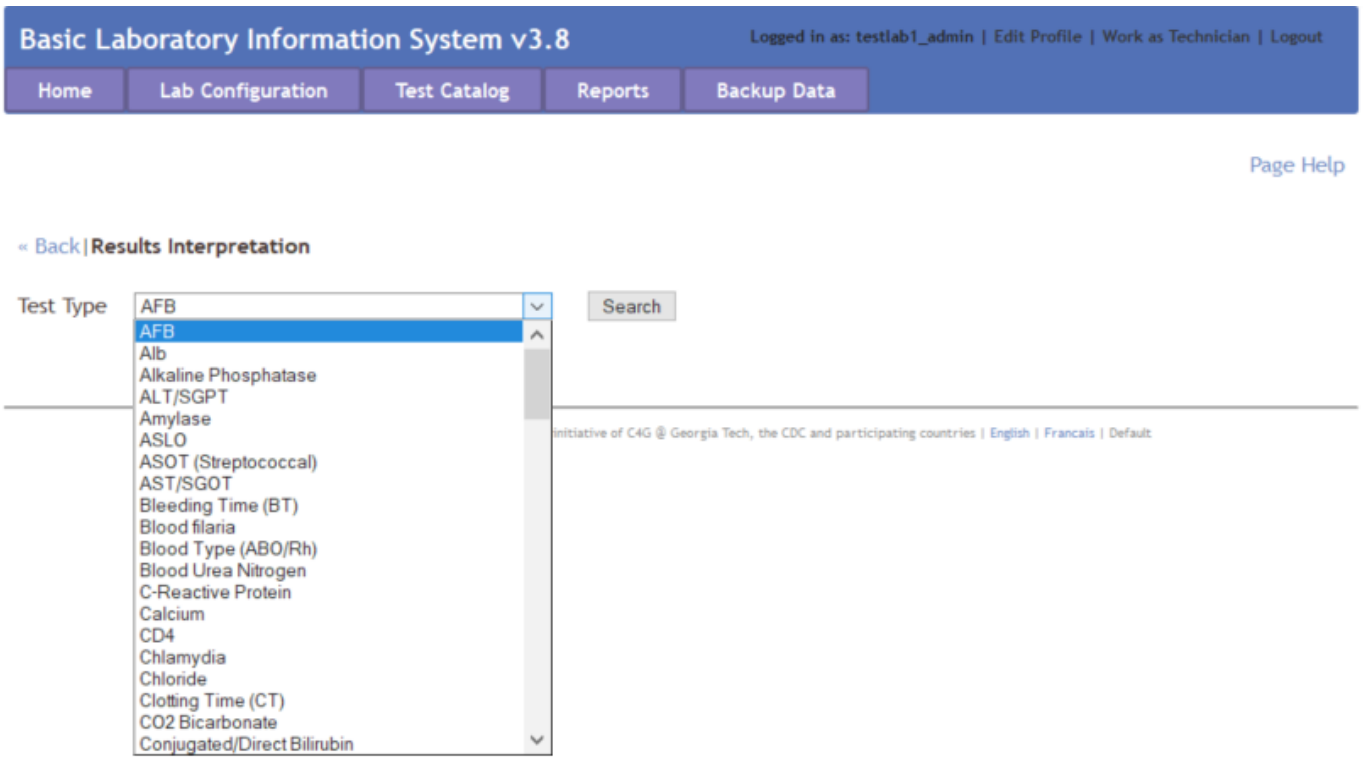
The **Target TAT** page displays turnaround times for tests. To enter or change turnaround time, click **Edit**. The number and unit (such as “24 hours”) change to a text field and a drop-down list. Enter the desired number and choose **Hours** or **Days**. When finished, click the **Submit** button to save changes, or **Cancel** to discard changes. These options are below the list.



Results Interpretation

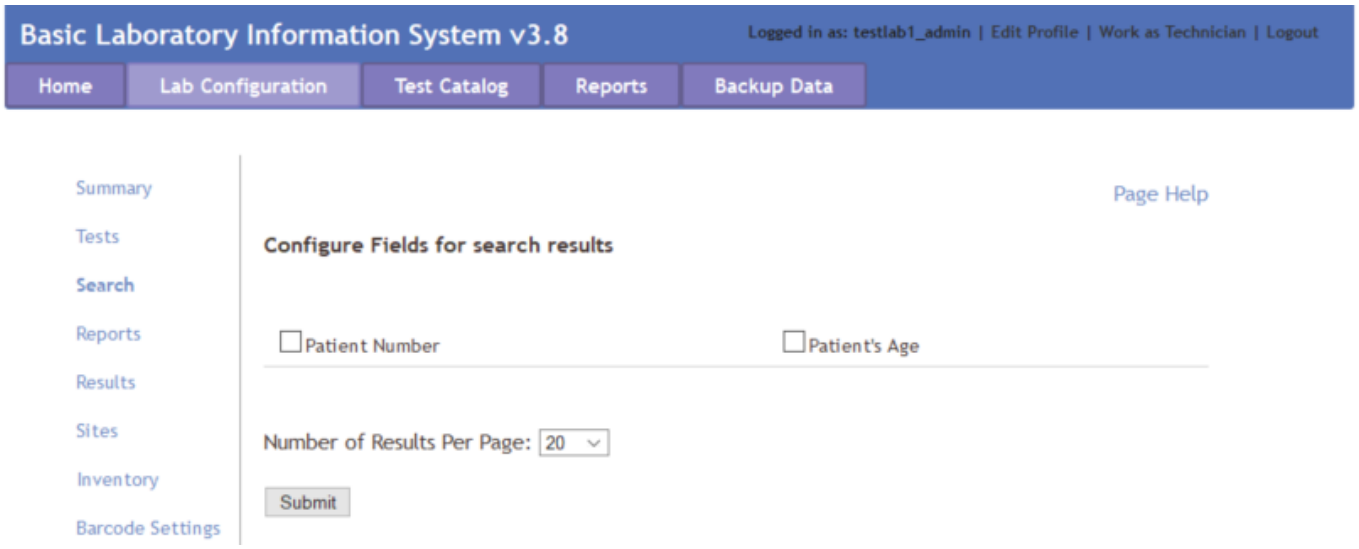
The **Results Interpretation** page allows the Lab Manager to specify the interpretation for multiple ranges of values for each test type. To view or edit an existing test's result, choose the test type from the drop-down list and click the **Search** button. The current interpretation appears. Edit using the text boxes.

To add a new range to the list, click the **Add Another** link and enter data in the text boxes. Click the **Submit** button to save changes, or **Cancel** to discard them.



SEARCH

The **Search** page allows the Lab Manager to configure what results are displayed for each patient when a search is executed. It also permits changing how many results are displayed on each page.



REPORTS

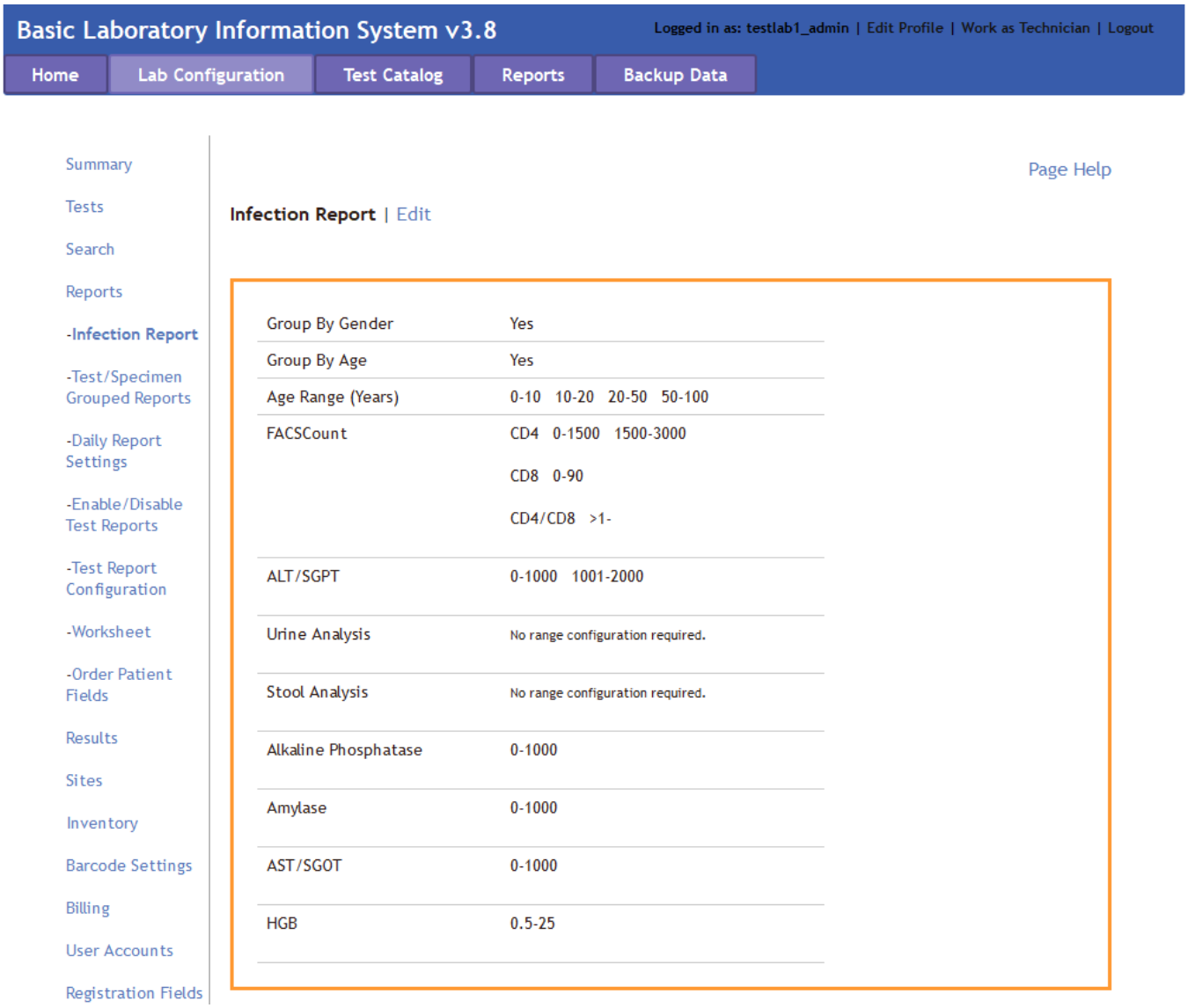
The **Reports** page has a drop down menu that opens up to reveal seven different options: **Infection Report**, **Test/Specimen Grouped Reports**, **Daily Report Settings**, **Enable/Disable Test Reports**, **Test Report Configuration**, **Worksheet**, and **Order Patient Fields**.

Which users can create reports?

Previous functionality of BLIS permitted Technicians to create reports. Currently, creating reports is a functionality only available to Managers and Directors.

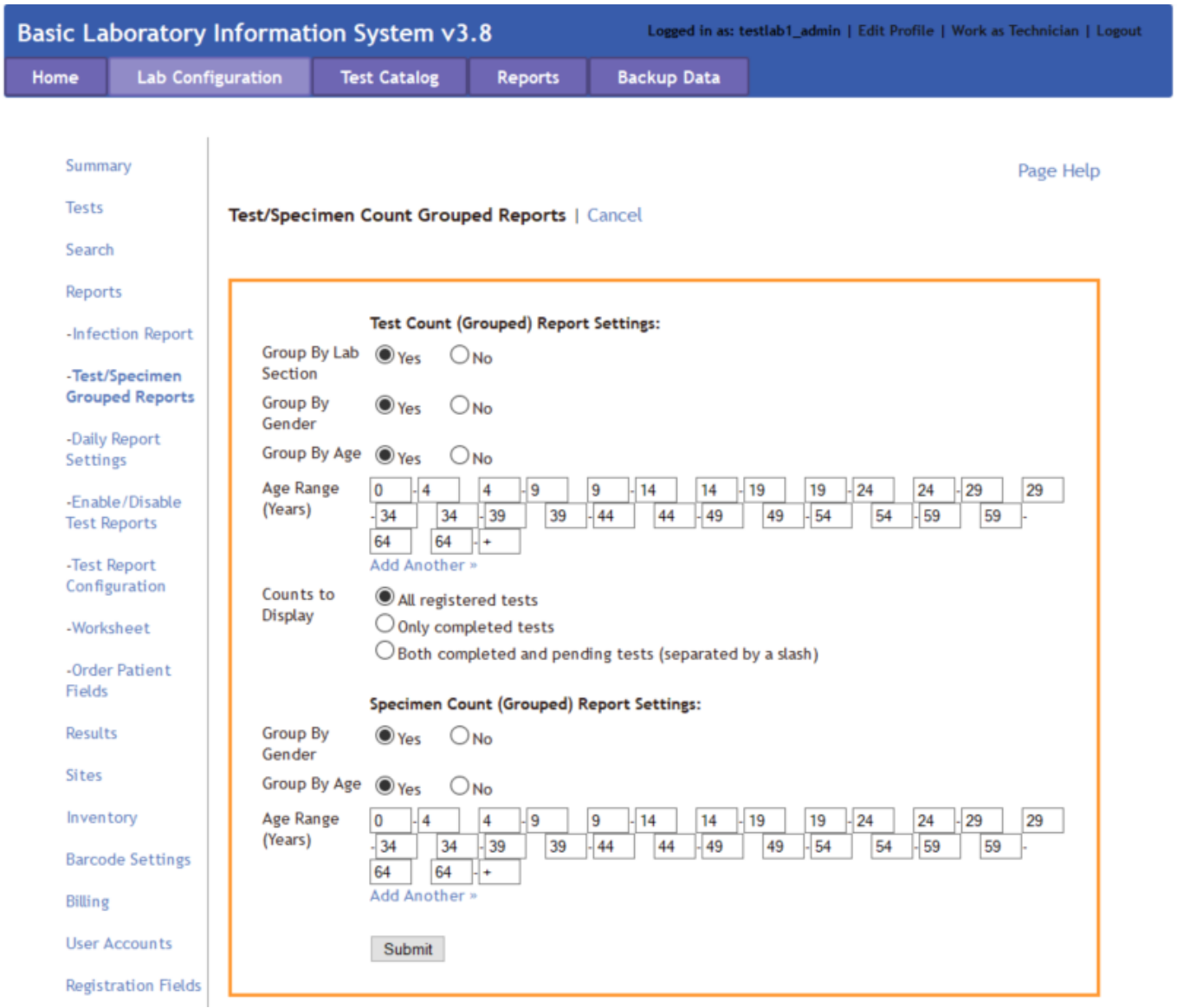
Infection Report

The **Infection Report** page generates an aggregate report of laboratory test results for a particular period for one or all lab sections. The tests listed in the report are the ones checked to include on the **Specimen/Test Types** page. Click **Edit** to make changes to the details reported. When finished, click **Submit** button to save changes, **Preview** to view the report, or **Cancel** to discard changes.



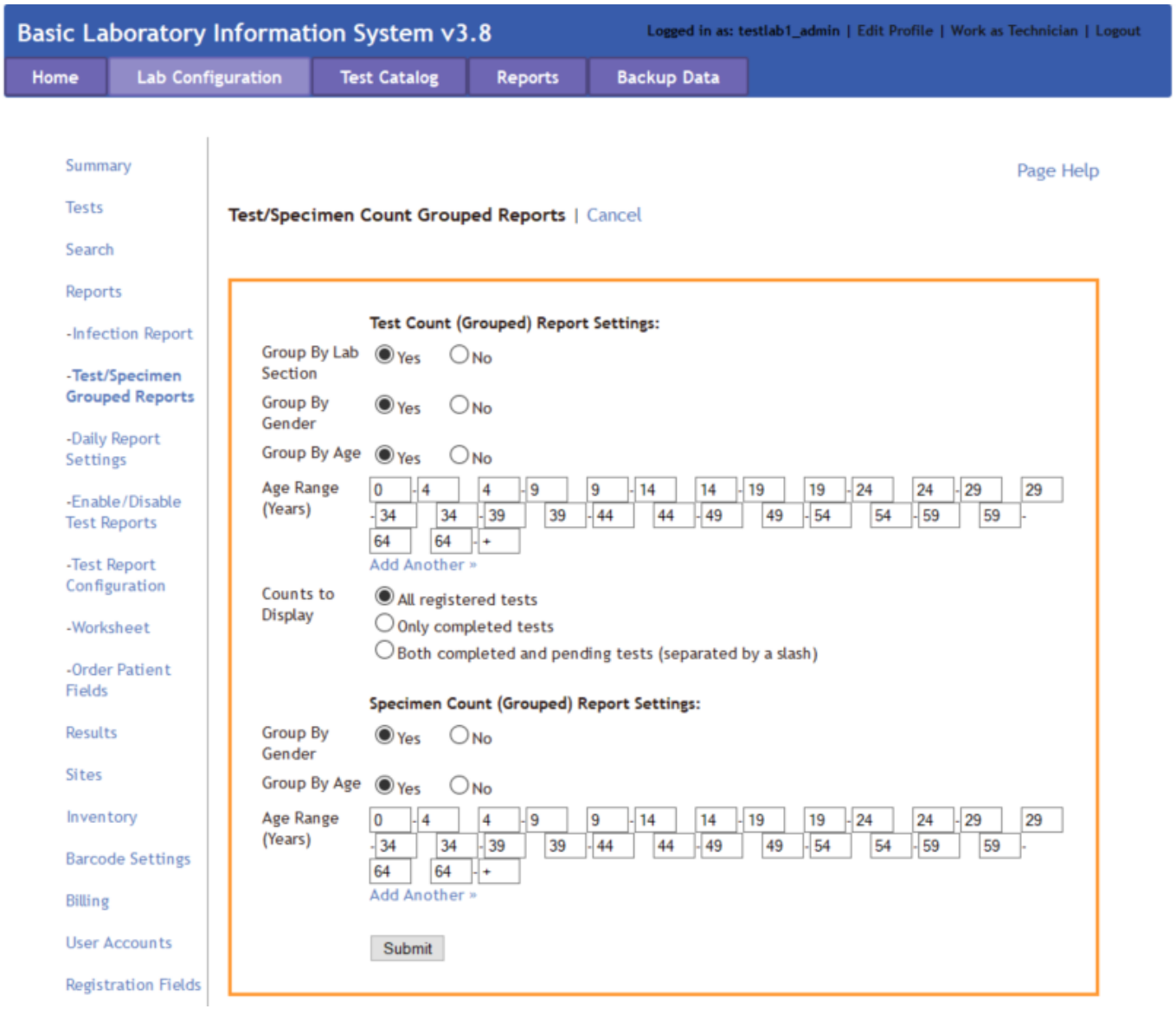
Test/Specimen Grouped Reports

The **Test/Specimen Grouped Reports** page allows the Lab Manager to set the **Test Count (Grouped) Report** settings and the **Specimen Count (Grouped) Report** settings. Click **Edit** to change settings. When finished, click the **Submit** button to save changes, or **Cancel** to discard changes.



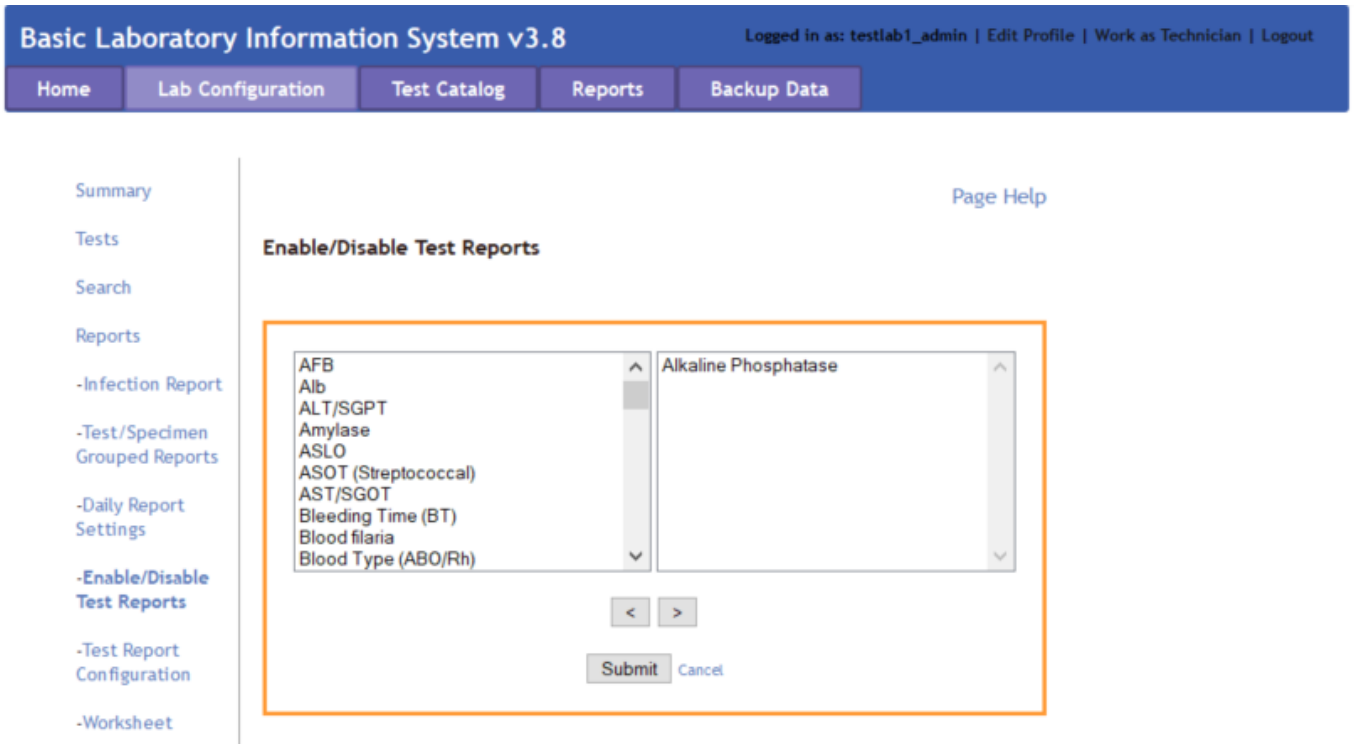
Daily Report Settings

The **Daily Report Settings** page sets the layout of the **Patient Report**, **Daily Log - Specimens**, and **Daily Log - Patients**. Use the drop-down to select the report type, then click **Search**. Check or un-check boxes to show or hide patient, specimen, and test information. If desired, the Lab Manager can upload a .jpg logo file to appear on the report. When finished, click the **Submit** button to save changes, or **Cancel** to discard changes. These options are below the list.



Enable/Disable Test Results

The **Enable/Disable Test Results** page allows the Lab Manager to enable or disable specific tests. Items on the left side are disabled; move the test items to the right side to enable them. When finished, click the **Submit** button to save changes, or **Cancel** to discard changes.



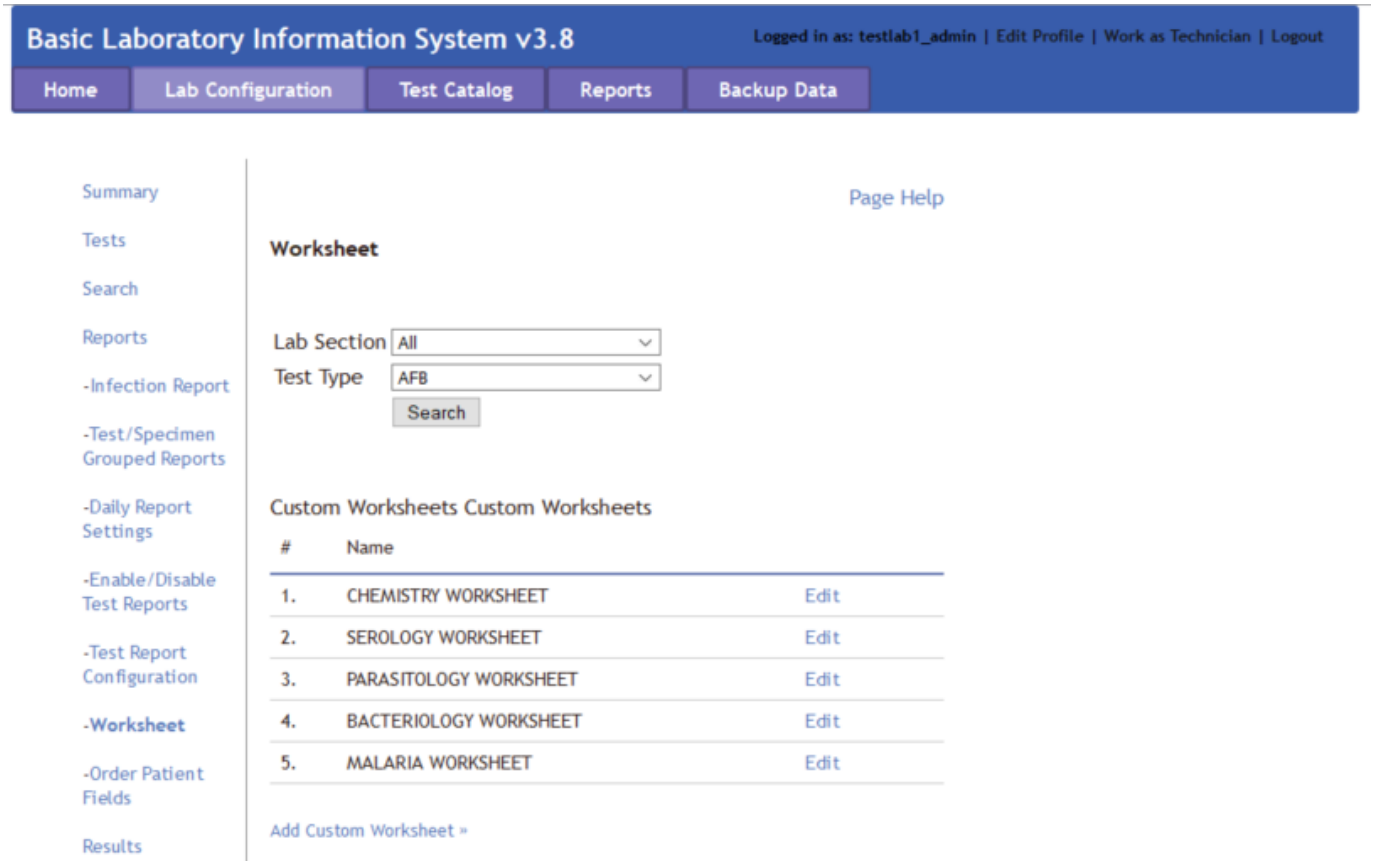
Test Report Configuration

The **Test Report Configuration** page allows the Lab Manager to visualize the enabled test configurations. Use the drop-down to select the test type from the enabled test list, then click **Search**. Click **Edit** to edit the configuration of the reported test data. Check or un-check boxes to show or hide patient, specimen, and test information. When finished, click the **Submit** button to save changes, or **Cancel** to discard changes.

Worksheet

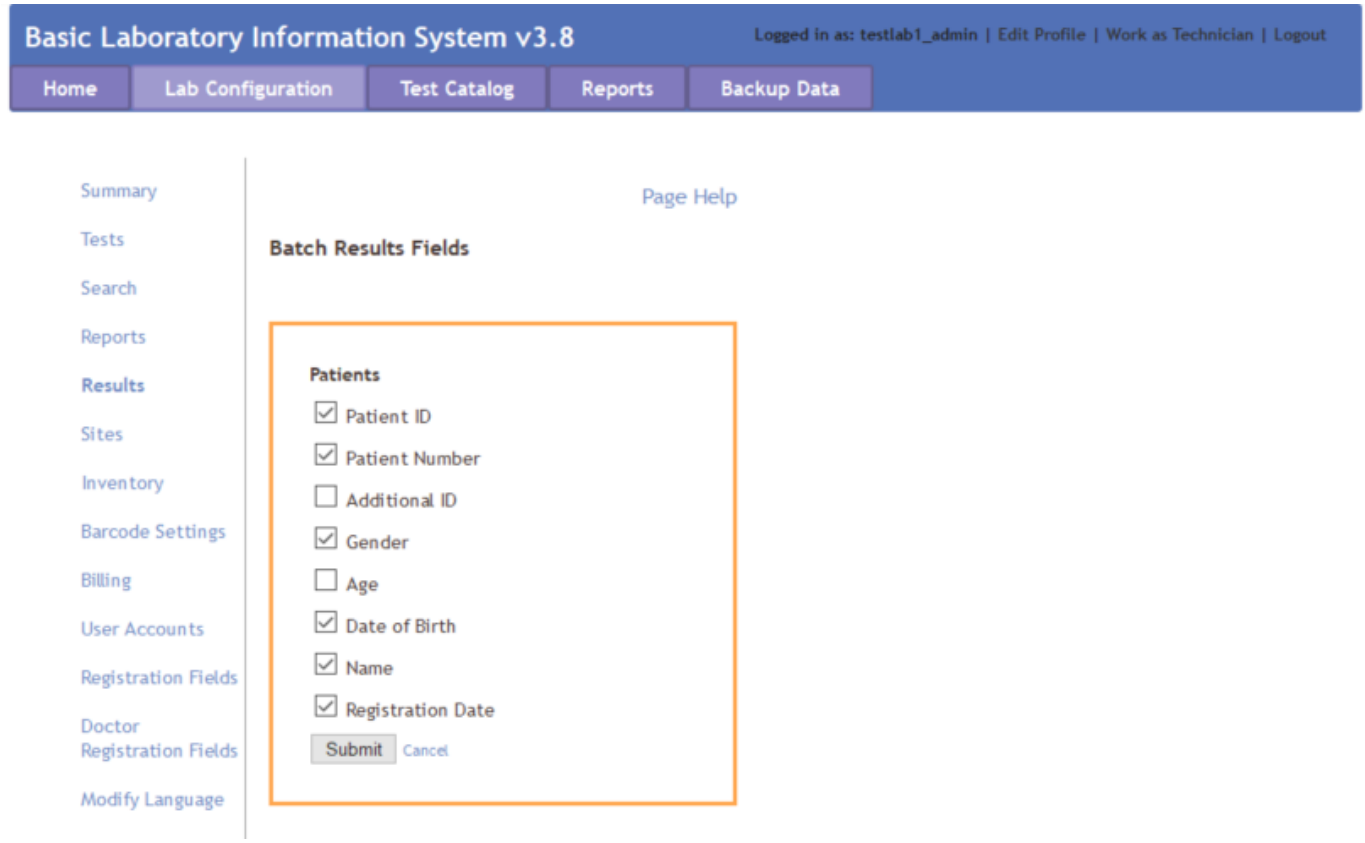
The **Worksheet** page allows the Lab Manager to create templates for gather patient data in the lab. In lab settings where data are not entered at the point of service, the data entry staff can enter the laboratory's patient information and ordered tests, then print the worksheet so that lab technicians can write test results and other data to be entered into BLIS.

Select the **Lab Section** and **Test Type** and click **Search** to edit the report format. To edit a custom report, click **Edit** to the right of the report. To create a new custom worksheet, click the **Add Custom Worksheet** link at the bottom of the list.



RESULTS

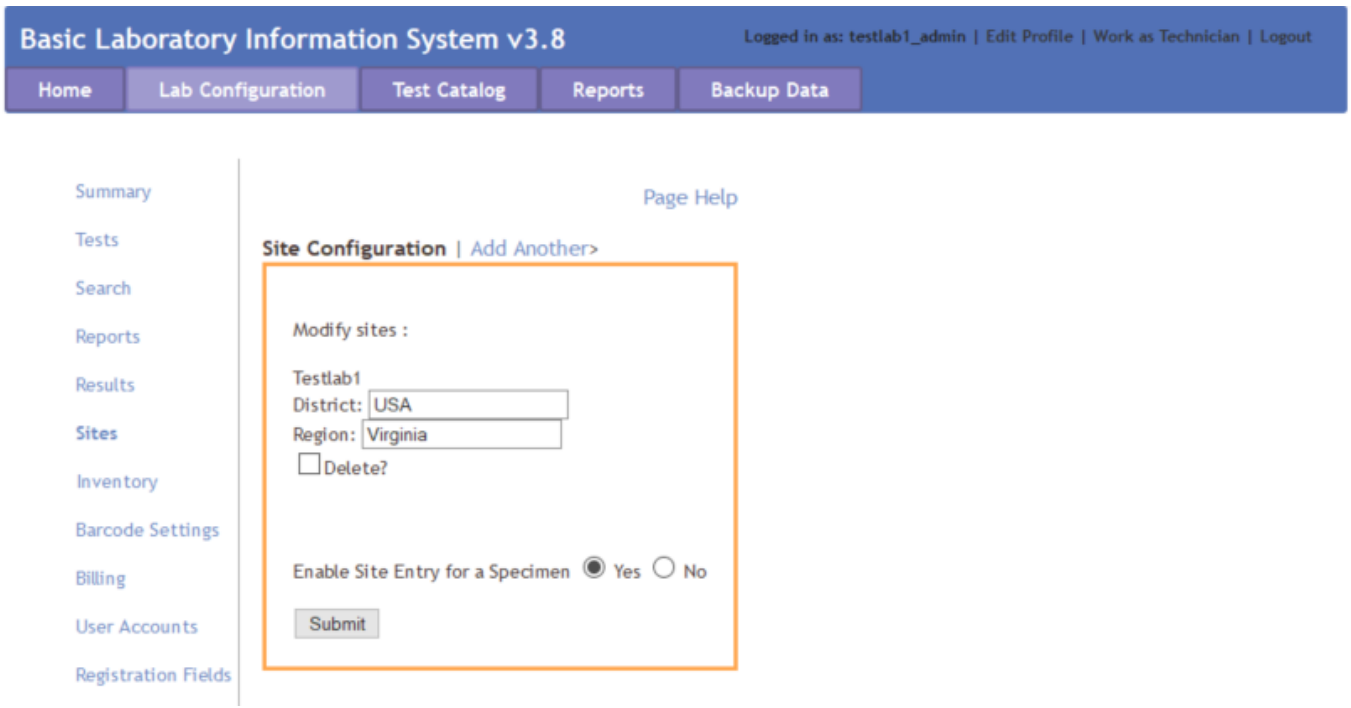
The **Results** page allows the Lab Manager to edit the parameters displayed in the batch results page. Currently, the editable data is limited to Patient information.



SITES

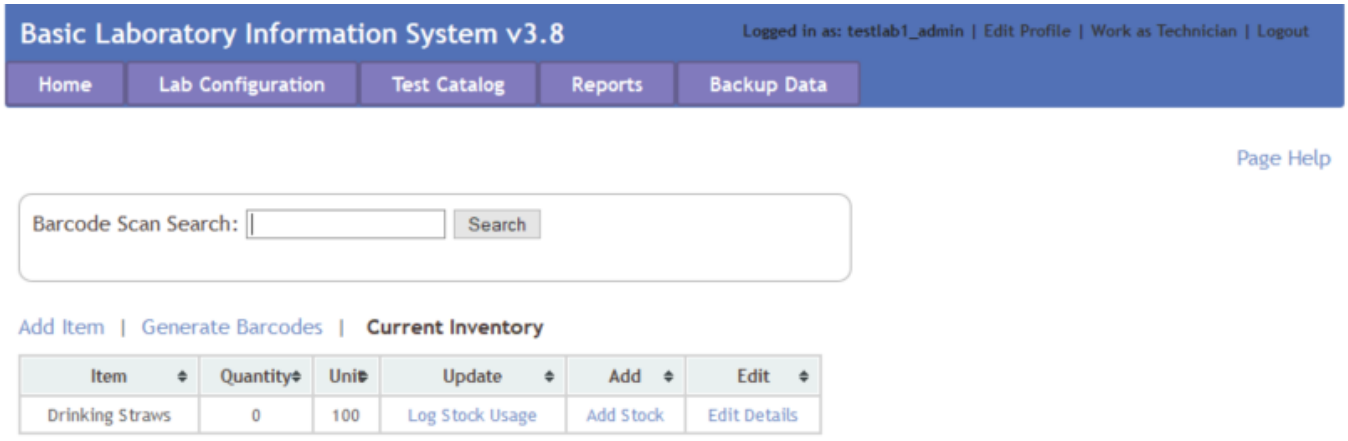
The **Sites** page allows the Lab Manager to add, modify, or remove specimen collection sites to the laboratory records. When first spawning a laboratory, only one site - the default site - will exist.

Additional information about the site can be provided in the textboxes - currently, BLIS supports adding in District and Region information. To add another site, click on the **Add Another** hyperlink at the top and fill in textbox with the new site name, then click **Submit**. To go back, click **Cancel**.



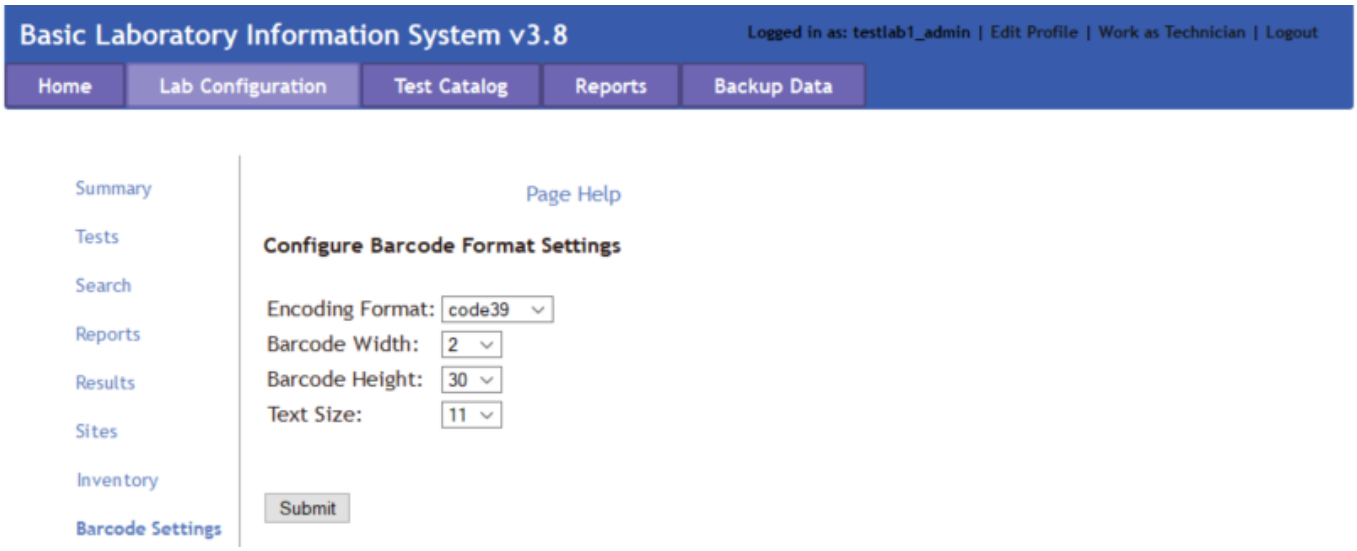
INVENTORY

The **Inventory** page is a list of any existing reagents being tracked in BLIS. To add another, click the **Add Item** link above the list and input the name, unit of measurement associated with the reagent, and any miscellaneous remarks about the reagent. After pressing **Submit**, don't forget to add the item's stock. On the **Current Inventory** page, other features include **Log Stock Usage**, **Add Stock**, or **Edit Details**.



BARCODE SETTINGS

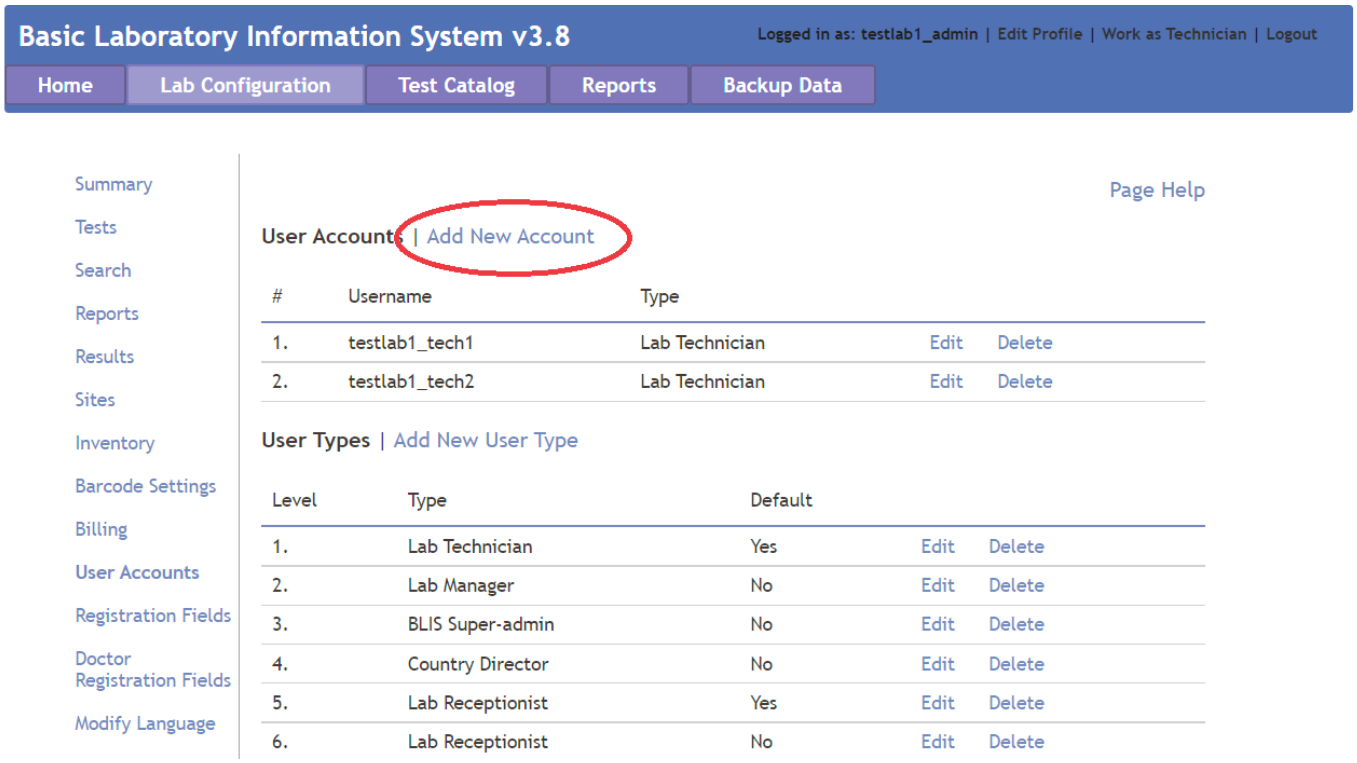
The **Barcode Settings** page configures the settings for barcode formats. Click on the **Page Help** for more details. After changing the settings, click **Submit** to save any edits.



USER ACCOUNTS

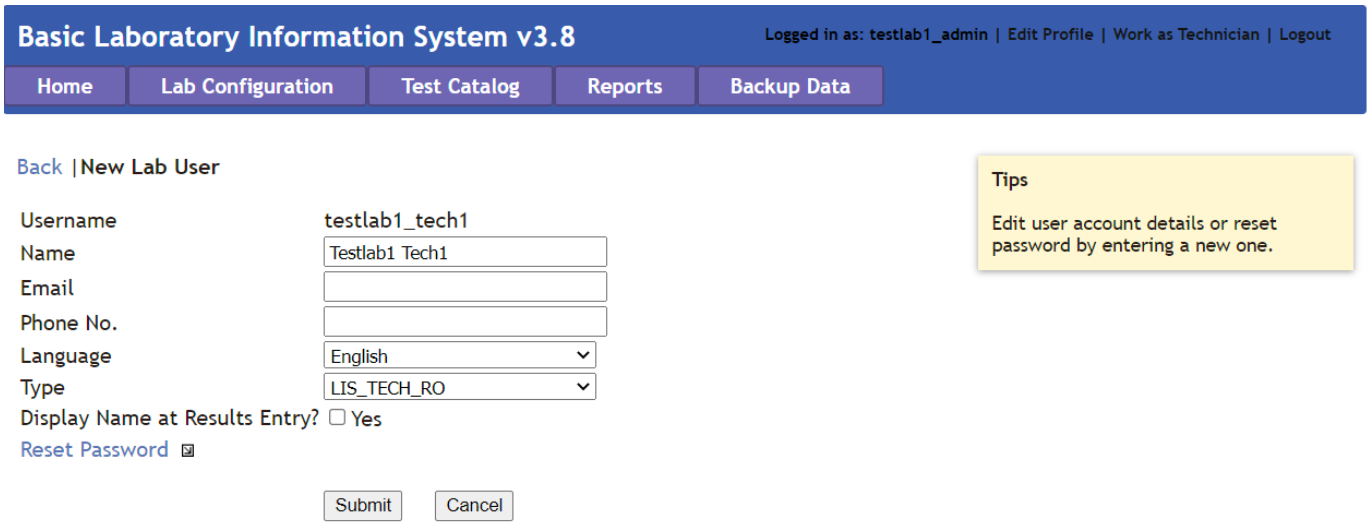
The **User Accounts** page shows all the users with access to the system. Here, a Lab Manager can create new user accounts, edit account settings, delete accounts, and monitor account activity.

Click **Add New Account** to enter a new user.



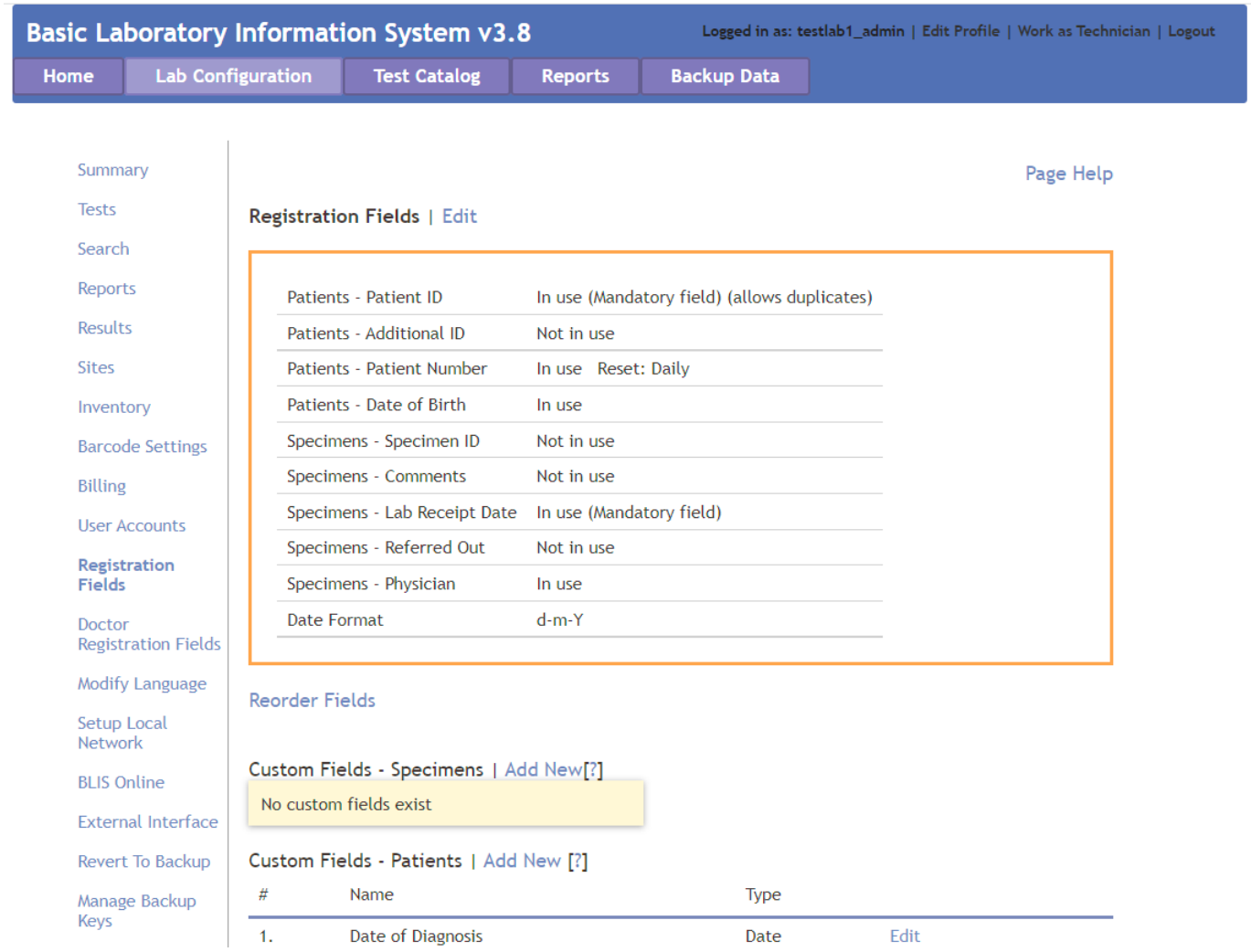
Click **Edit** on a user to edit the user account details or to reset password. User Type dictates the access the user has in the system. **Reset Password** allows the Lab Manager or admin user to enter a new password for this user. Click the **Submit** button to save changes, or **Cancel** to discard.

To remove a user account, click the **Delete** link for that user. A confirmation box appears. Click **OK** to complete the deletion, or **Cancel** to keep that user's information.



REGISTRATION FIELDS

The **Registration Fields** page shows the configuration of the patient registration page. It allows the Lab Manager to create mandatory fields and hide the fields that are not used, per the country's protocols. It also allows for creation of certain custom fields for patient registration and new Specimen addition which may be needed by certain labs only.



To customize fields, click **Edit** to make changes: check the box to display a field, uncheck to hide. Set fields as required. After editing, click **Update** button below the fields to save changes, Cancel to discard.

To create new fields, choose the **Add New** link for which to add, and enter field name and type. Click **Submit** button to save changes, **Cancel** to discard.

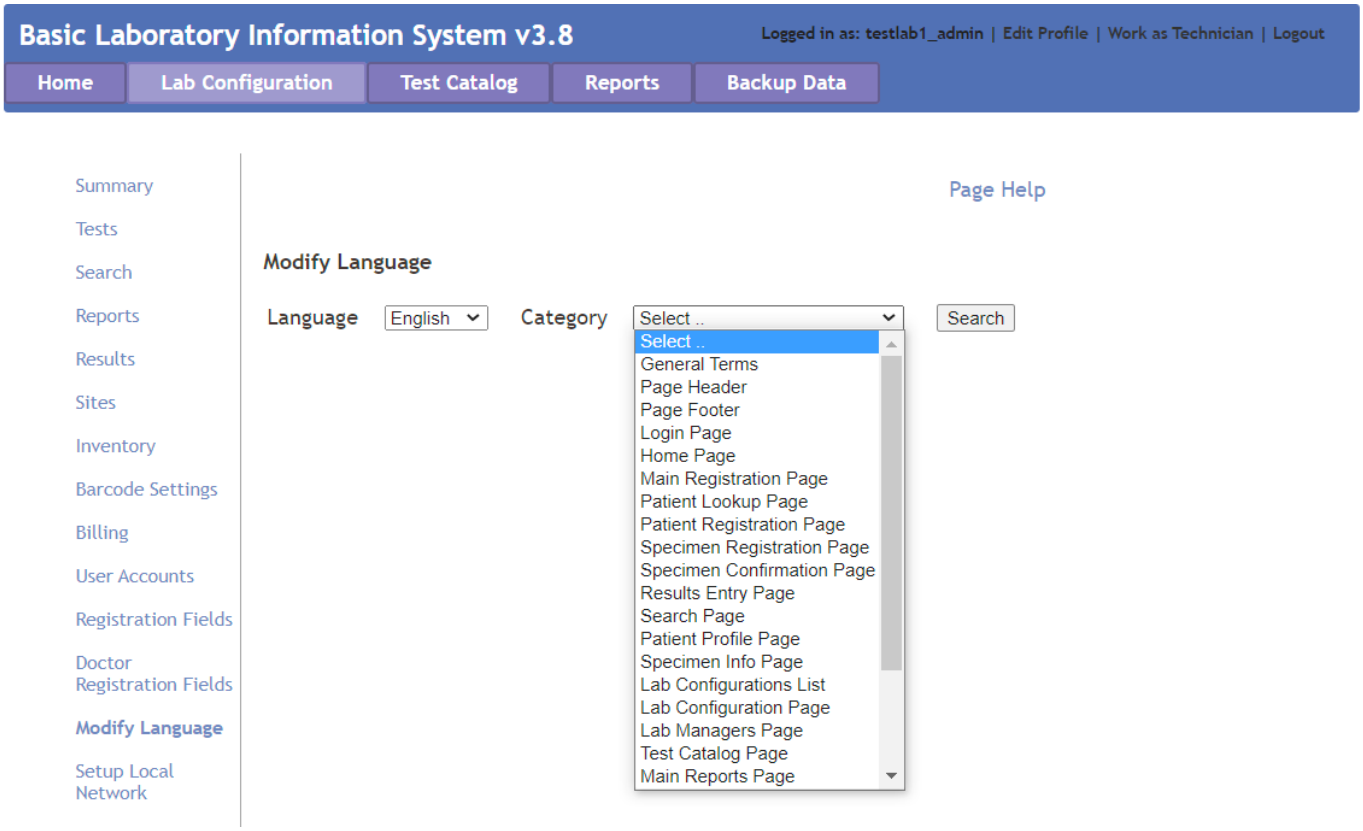
Also, the Lab Manager can customize the order of the registration fields for Patient and Specimen Registration forms.

DOCTOR REGISTRATION FIELDS

The **Registration Fields** page shows the configuration of the patient registration page. There is currently an issue opened to address the duplicity of the previous **Registration Fields** page.

MODIFY LANGUAGE

One of the features of BLIS is the ability to toggle between languages. The **Modify Language** page allows the Lab Manager to change the language for a few pages using this option. The pages are listed as a drop-down menu.



Select the language and category (type of page or section). Select **Search** button to view or edit the text. When finished, click **Submit** button to save changes, or **Cancel** to discard.

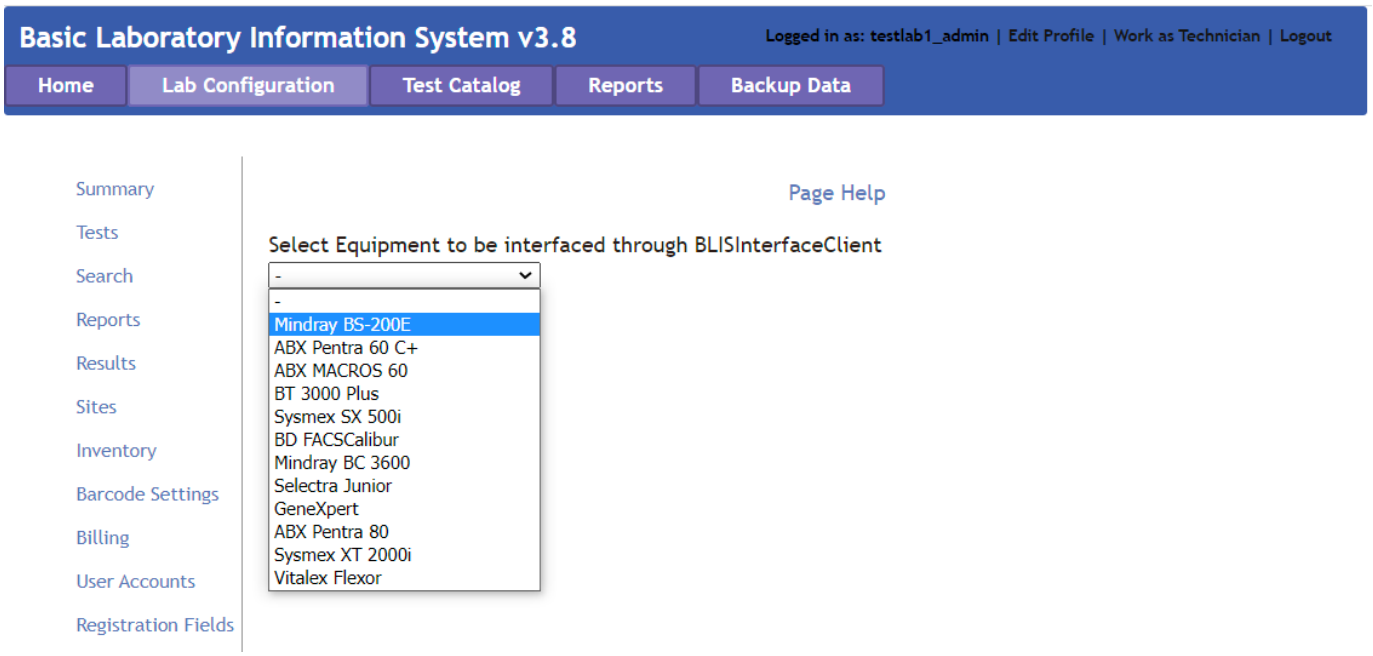
SETUP LOCAL NETWORK

The **Setup Local Page** is an instructional page on how to set up a local network for a hospital or laboratory. Please access it from BlisSetup.html in the main folder, then enter login credentials (username and password).

EXTERNAL INTERFACE

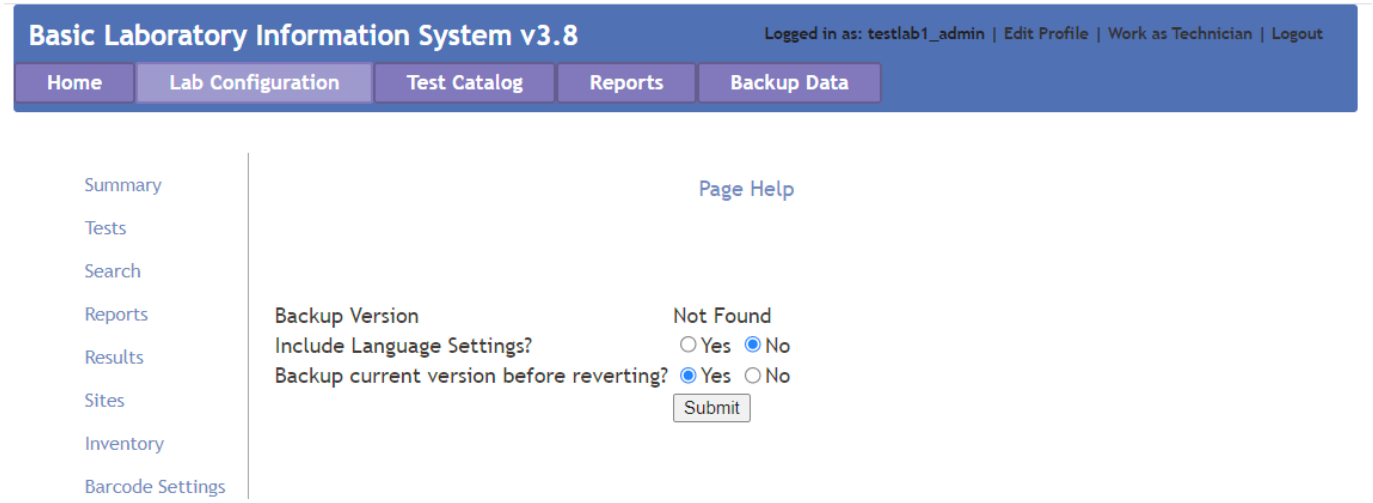
The **External Interface** Laboratory settings allows the Lab Manager to set up an interface with external devices or websites. The currently featured interface for alternative patient registration system is DHIMS 2. Others may be added upon request.

The **Interfaced Equipment** page allows the Lab Manager to select the equipment to be interfaced through BLISIntterfaceClient. Configurations may be set in the *BLISInterfaceClient.ini* file.



REVERT TO BACKUP

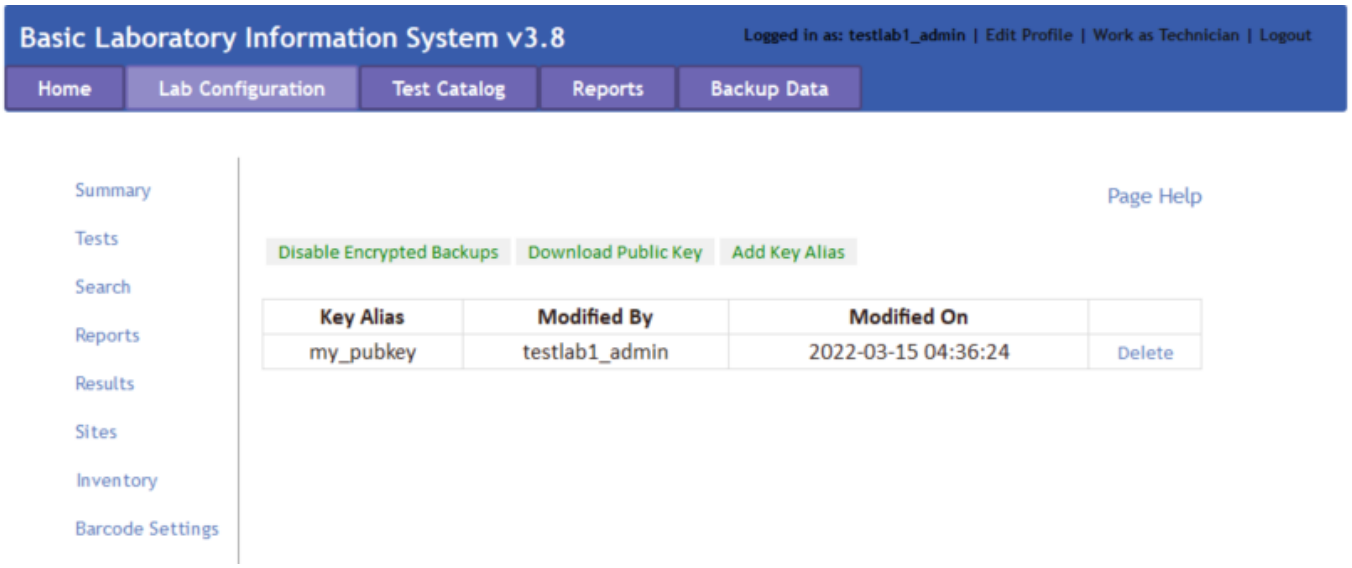
In case of system failure, the **Revert to Backup** page allows the Lab manager to revert to a previously backed-up copy of the data. Clicking the link presents the dates of the previous backups, click one to select which data set to load.



MANAGE BACKUP KEYS

The **Manage Backup Keys** page creates, manages, or deletes key pairs in order to encrypt laboratory backup data. Encrypting laboratory backup data with a unique key-pair ensures that only the personnel with the correct private key will be able to successfully decrypt the encrypted data with the correlated public key.

The home screen of the **Manage Backup Keys** page displays the list of currently active public keys. In the example image below, only one public key is available for use, with a key alias of "my_pubkey".

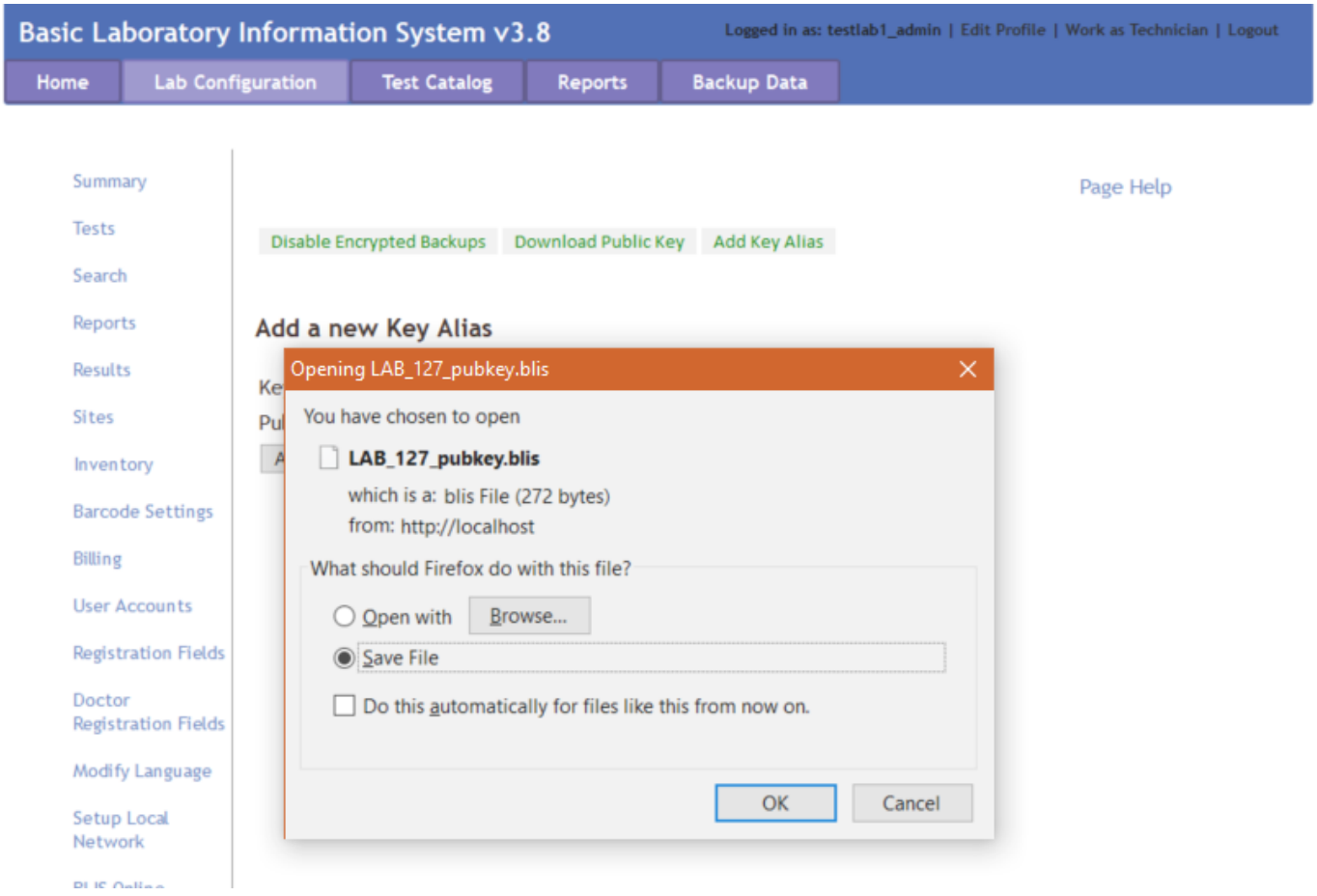


Disable Encrypted Backups

Toggle this button to disable or enable encrypted backups. It is recommended to enable encrypted backups to protect private patient information.

Download Public Key

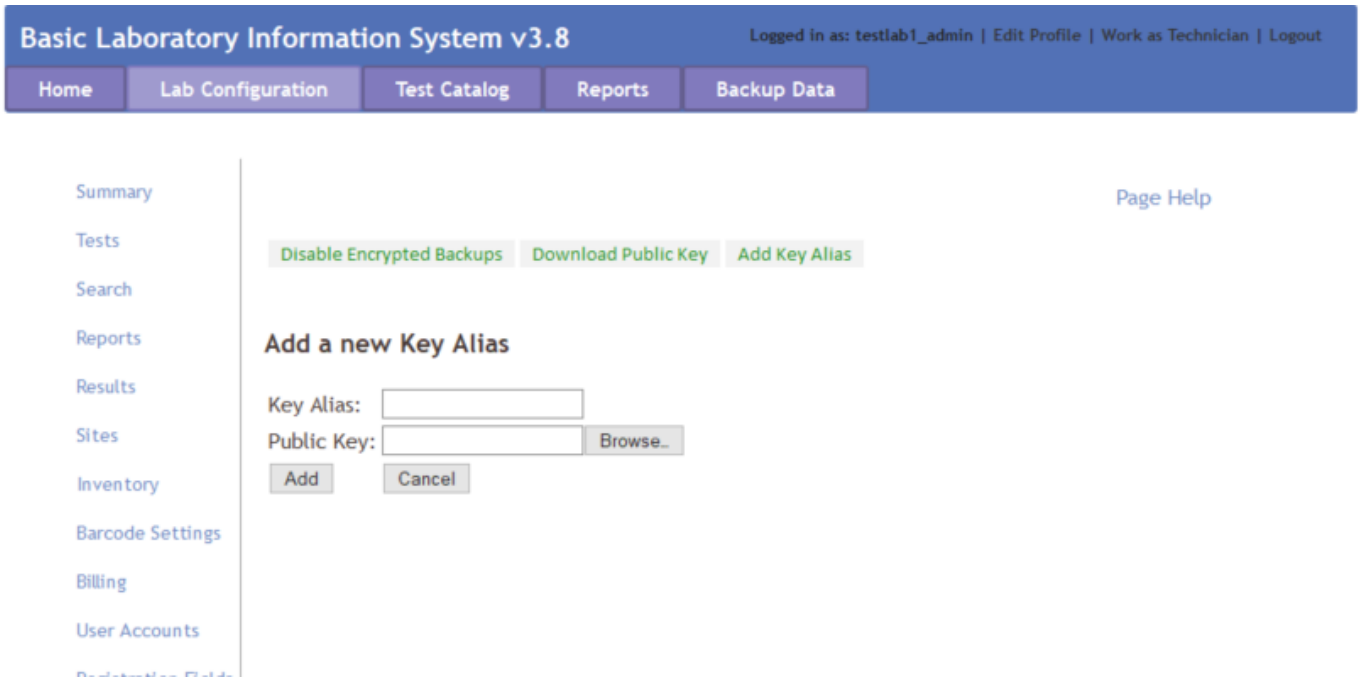
This button opens a popup window prompting the user to download a public key. This key should be saved onto the computer.



Add Key Alias

To add a new public key, click **Add Key Alias**. Fill free to enter in any key alias names here. We recommend entering in some identifying information that describes the origin of the public key. For example, if the public key was provided by the country director, the key alias name could be "country_director_pubkey".

To upload the public key, click **Browse** and use the File Upload navigational controls to select the desired public key (ending in a .blis file extension). After selecting the correct public key, click **Add** to add the public key to the list of currently active public keys, or **Cancel** to discard changes.

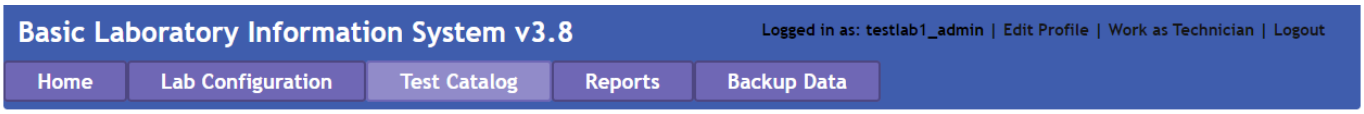


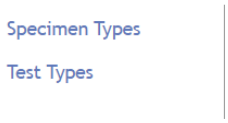
EXPORT CONFIGURATION

The **Export Configuration** page exports all configuration settings to Microsoft Word. Clicking this link opens a new browser tab with a preview showing all preset and custom fields as well as report settings. The preview has three buttons at the top: Print, Export as Word document, and Close. Click the **Print** button to open the print dialog box; **Export as Word document** to create a file named **blisreport_[date of report].doc**, which may be opened or saved, or **Close** to close this browser tab.

Test Catalog

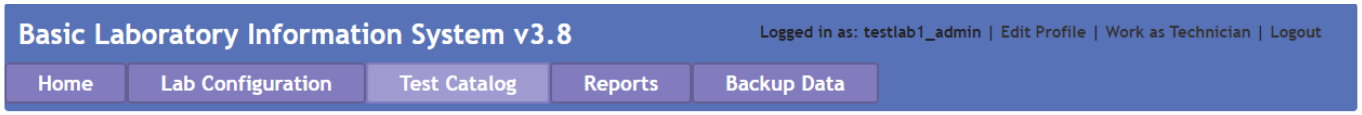
The **Test Catalog** page allows the Manager to add or edit specimen or test types used in their laboratory.

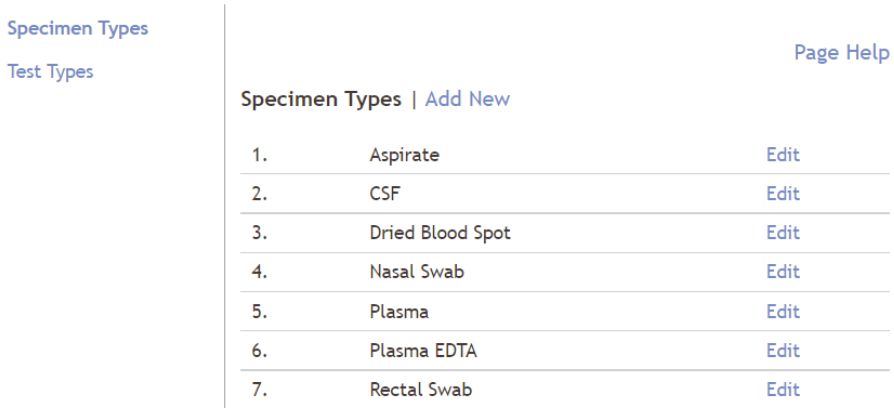




SPECIMEN TYPE

The **Specimen Type** page allows for adding or editing specimen types used in the laboratory.

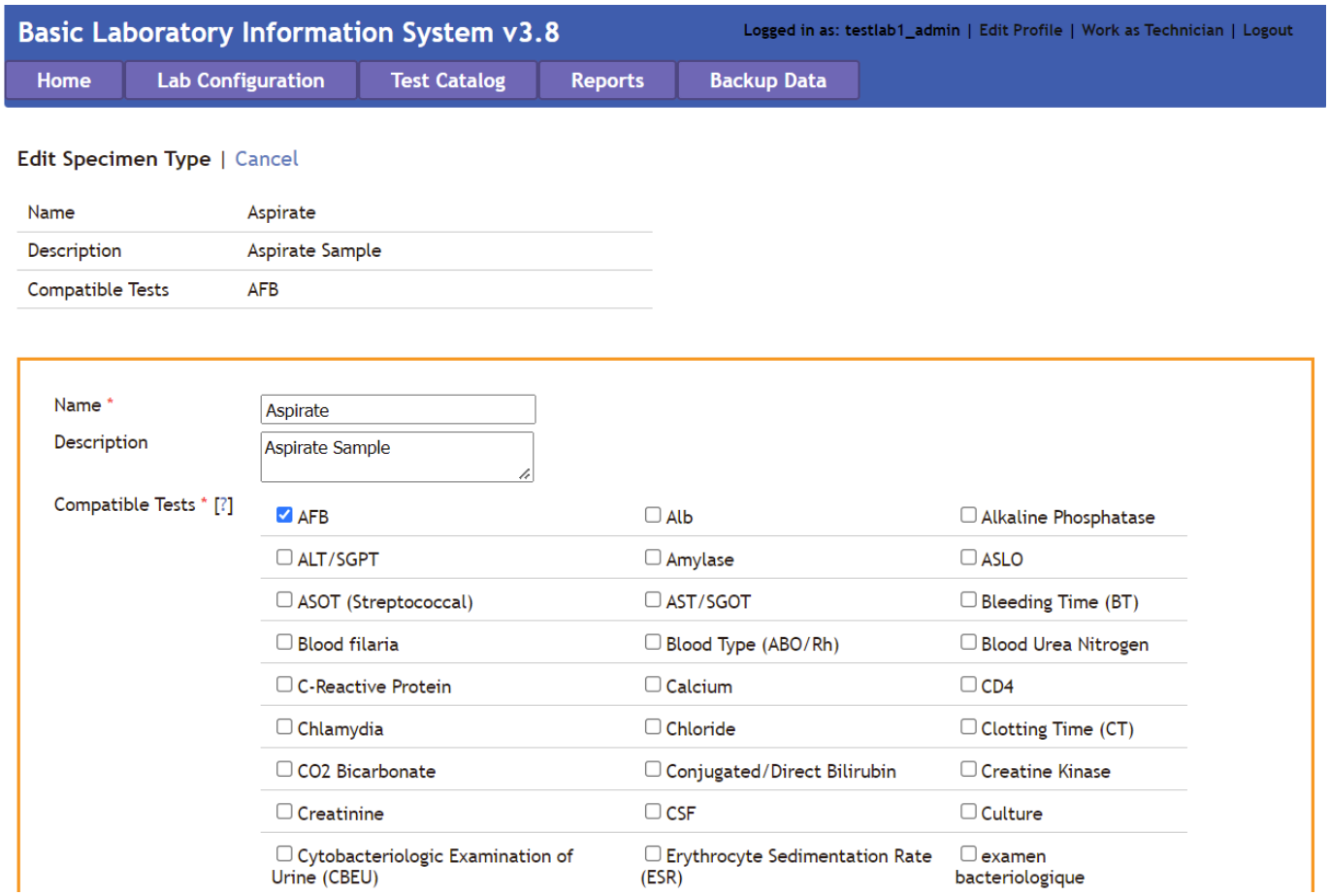




Click **Add New** to enter a new specimen type. Required fields are **Name**, which is a text box for entering the name of the specimen, and **Compatible Tests**, which allows the user to check the tests that can be performed using that specimen. **Ctrl-F** opens the Find function to search for a test. Another feature is a **Description** of the specimen type, which is optional.

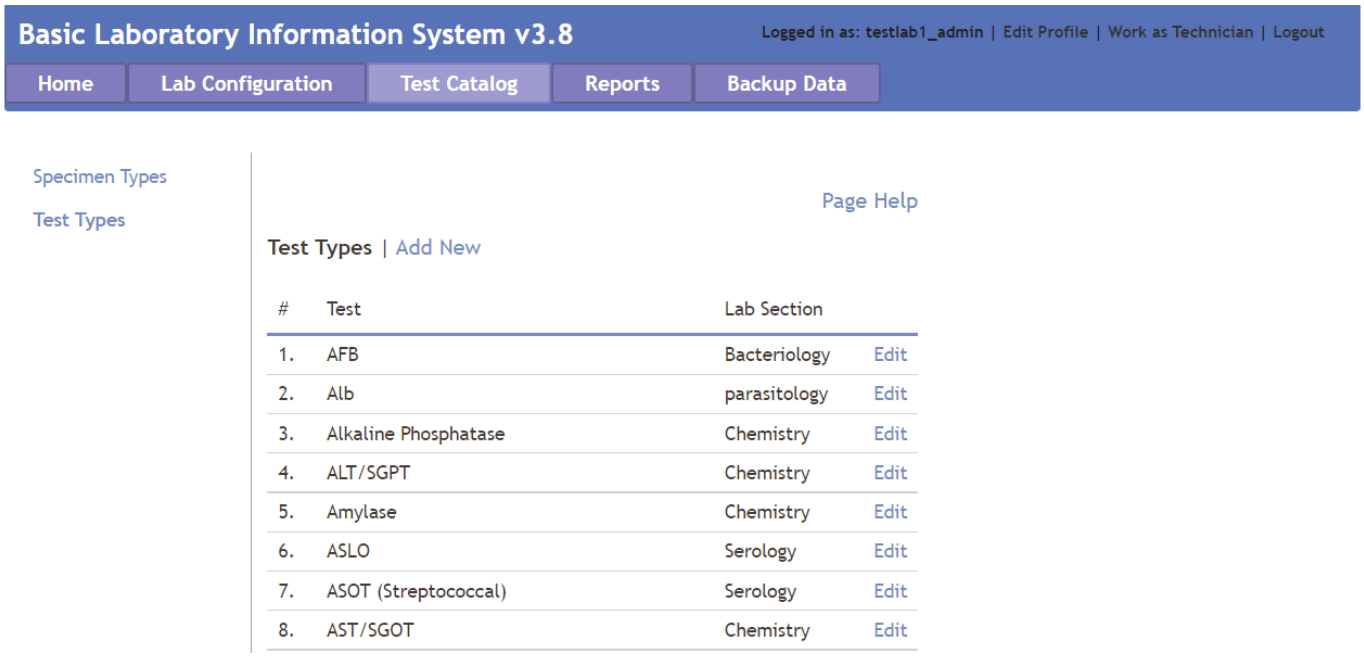
To edit the information about a specimen type, find the editable specimen type and then click the **Edit** link in the far-right column.

Click **Submit** button to save changes, **Cancel** to discard.



TEST TYPE

The **Test Type** page allows for adding or editing test types used in the laboratory. It is controlled the same way as Specimen Types.

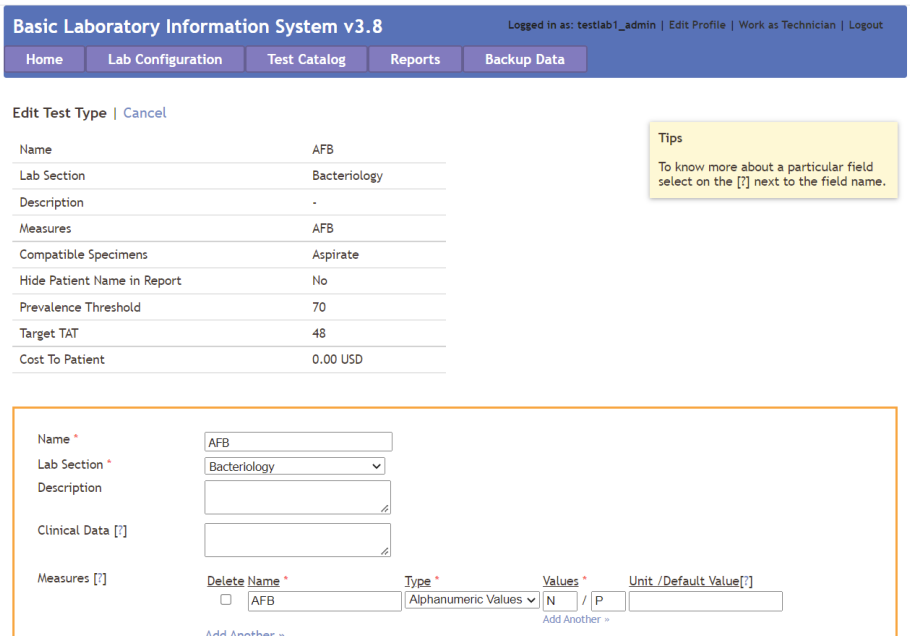


Click **Add New** to enter a new test type. Required fields are **Name**, which is a text box; **Lab Section**, a drop-down list that includes an option to add a new section; **Measures**, which are editable; and **Compatible Specimens**, which allows the user to check one or more specimens that can be used for this test.

Optional fields include **Description** (text box), **Clinical Data**, **Panel Test** (a check-box, checked for Yes), **Hide Patient's Name** (drop-down Yes/No), **Prevalence Threshold** (text box), and **Target TAT** (text box).

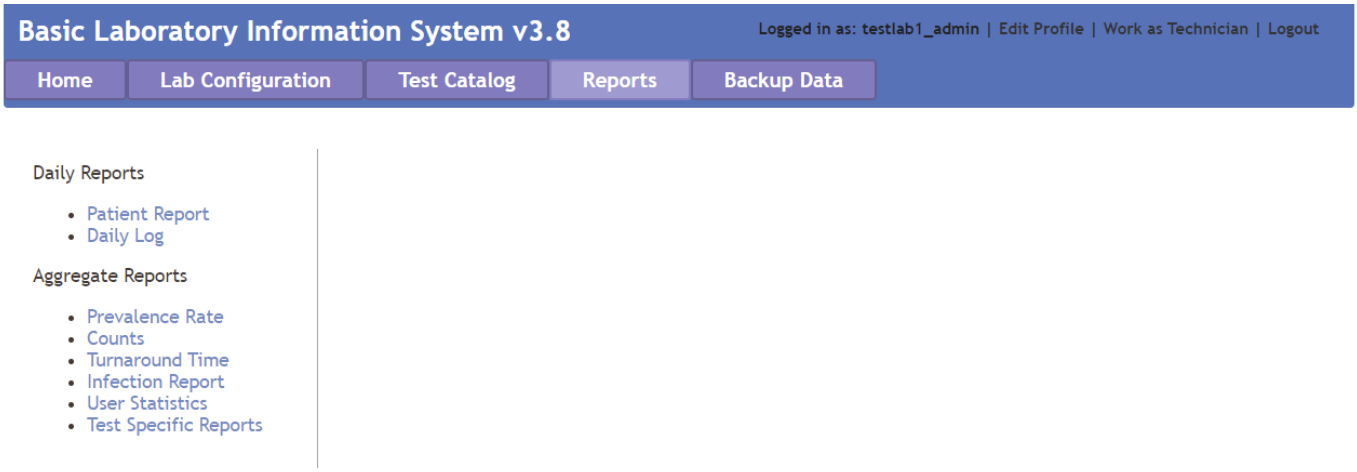
To edit the information about a test type, select the editable test type and then click the **Edit** link in the far-right column.

Click **Submit** button to save changes, or **Cancel** to discard.



Reports

The **Reports** page is used to generate reports ranging from **Daily Reports** to **Aggregate Reports**.



DAILY REPORTS

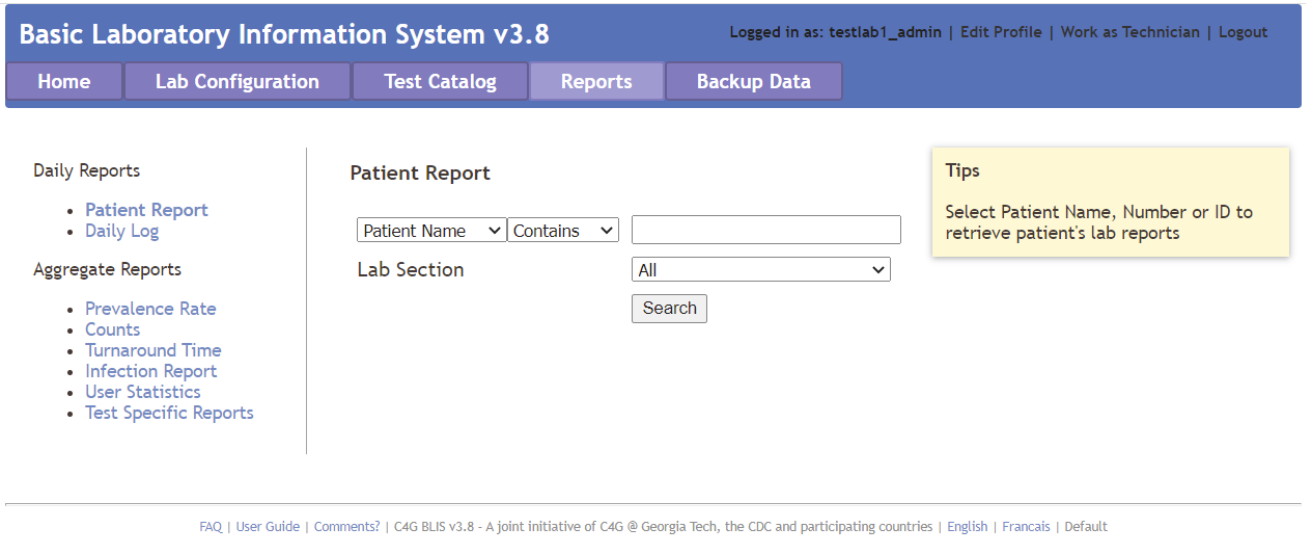
The **Daily Reports** should be generated each day for both the Patient Report and also Daily Log.

Patient Report

The **Patient Reports** page generates reports for each searchable patient.

Search for the patient by Patient Name, Patient Number, or Patient ID and Lab Section to which the patients' specimen are registered against. Click the **Search** button to start search. Select the desired patient from the list if more than one patient matches the search criteria. Click **View Report** to see all data for that patient, or **Select Tests** to see tests ordered and the results for that patient.

Additionally, the user can edit the report to show activity within a date range, include pending tests for which results are not available, set printing information, set tests to print 1 per page, or export to Word using the controls at the top of the page.

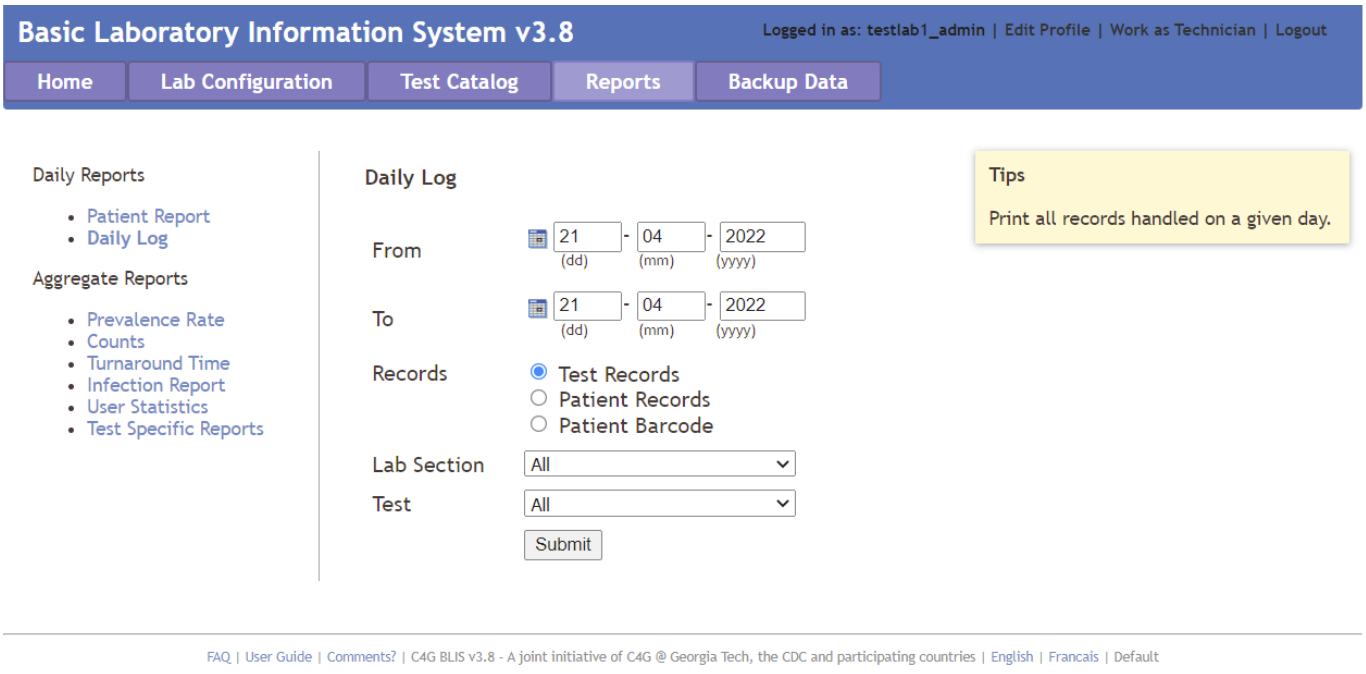


Daily Log

The **Daily Log** creates a report of the day's activity.

Set the date range to reflect the log to print. The Lab Manager can run a report of the day's activity by patients seen (by clicking **Patient Records**), or by tests run (by clicking **Test Records**). If **Test Records** is selected, logs can be generated for one lab section or for one type of test. The default settings are test records, all sections, and all tests. The report opens in a new browser tab and has **Print** and **Export** controls at the top of the page.

Also patient barcodes for each patient with the number of specimens they have handed over can also be printed over a given a range of time by selecting the **Patient Barcode** option.



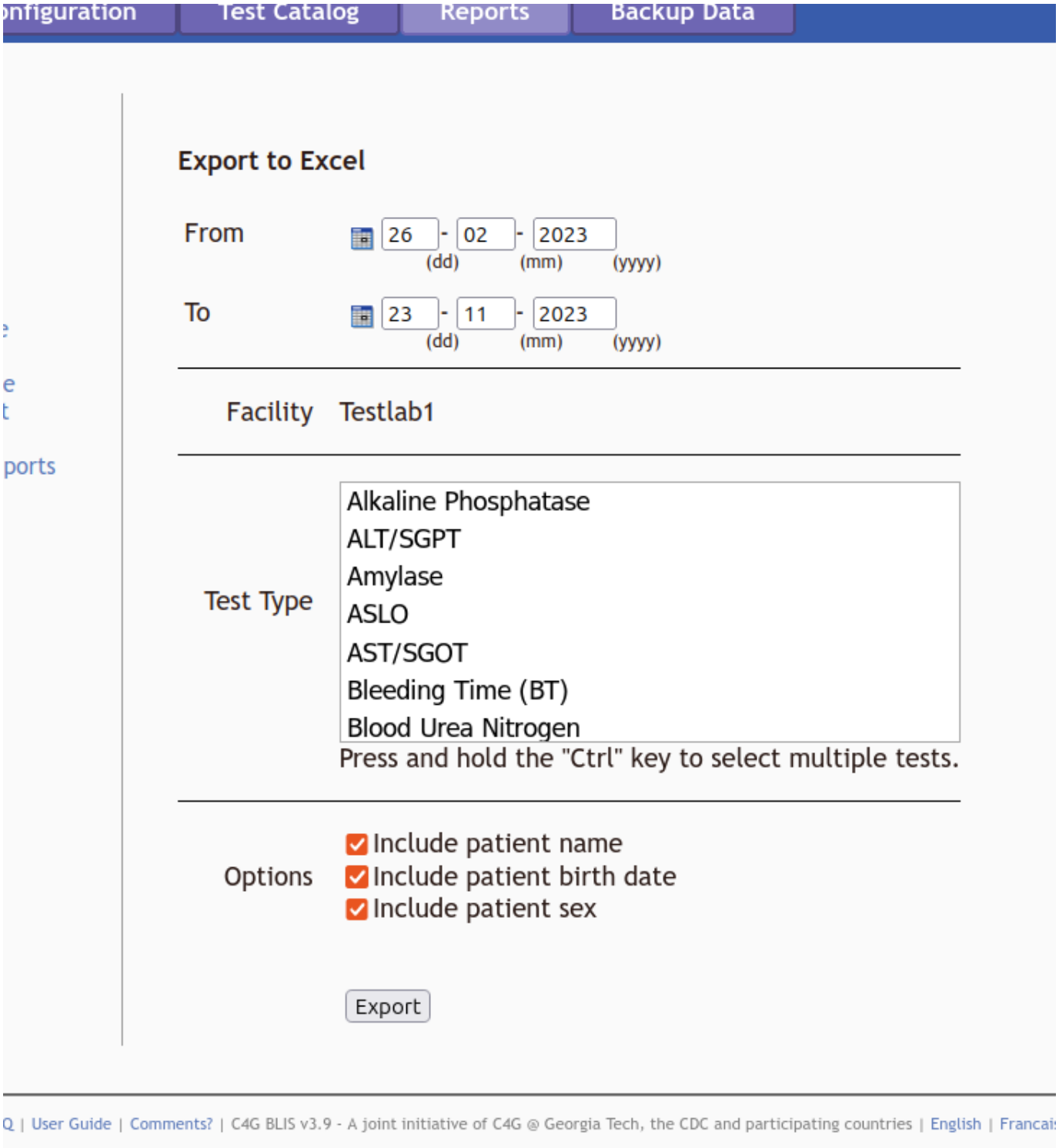
AGGREGATE REPORTS

Aggregate Reports generates reports for specific data selected by the user. There are currently six types of reports to generate:

1. **Prevalence Rate** which opens an infection graph and prevalence rates. It gives the prevalence of a particular laboratory test result based on the number of testsdone and the results.
2. **Counts** which can open a specified kind of ungrouped or grouped, test/specimen/doctor statistics. It generates a report for a particular time period of the number of tests, specimens, or doctor statistics.
3. **Turnaround Time** which opens the average test-wise turnaround times for the lab test reports, either for all or specific tests.
4. **Infection Report** which opens an Infection Report for a specified laboratory. It generates reports of infections by patient age and gender.
5. **User Statistics** which displays user specific statistics and user activity logs.
6. **Test Specific Reports** which provides information on specific tests, and can be specified to an individual site.

EXPORT TO EXCEL

The Export to Excel feature allows the lab manager to export the results of tests across the whole lab for a given date range. The user can select to exclude patient data from the final report.

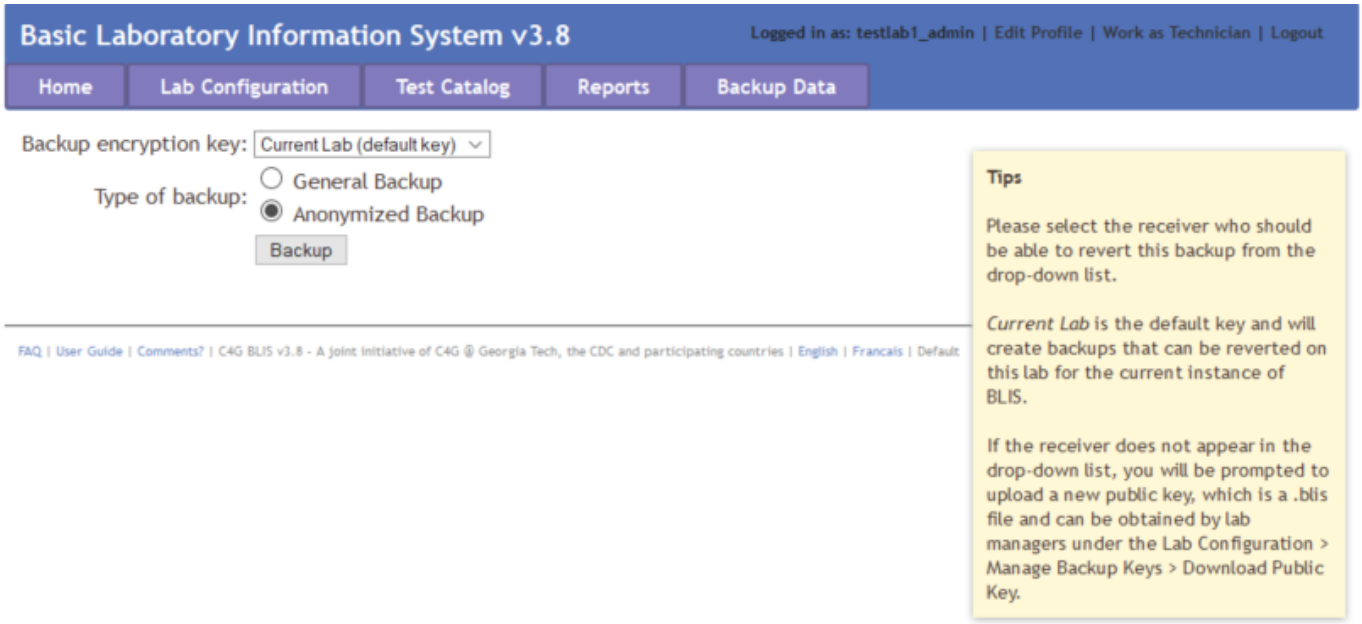


Backup Data

The **Backup Data** feature was created for two reasons - to revert to a previously backed-up copy in cases of system failure, but also to create a backup file of the current laboratory patient data for uploading to a **BLIS on Cloud** version.

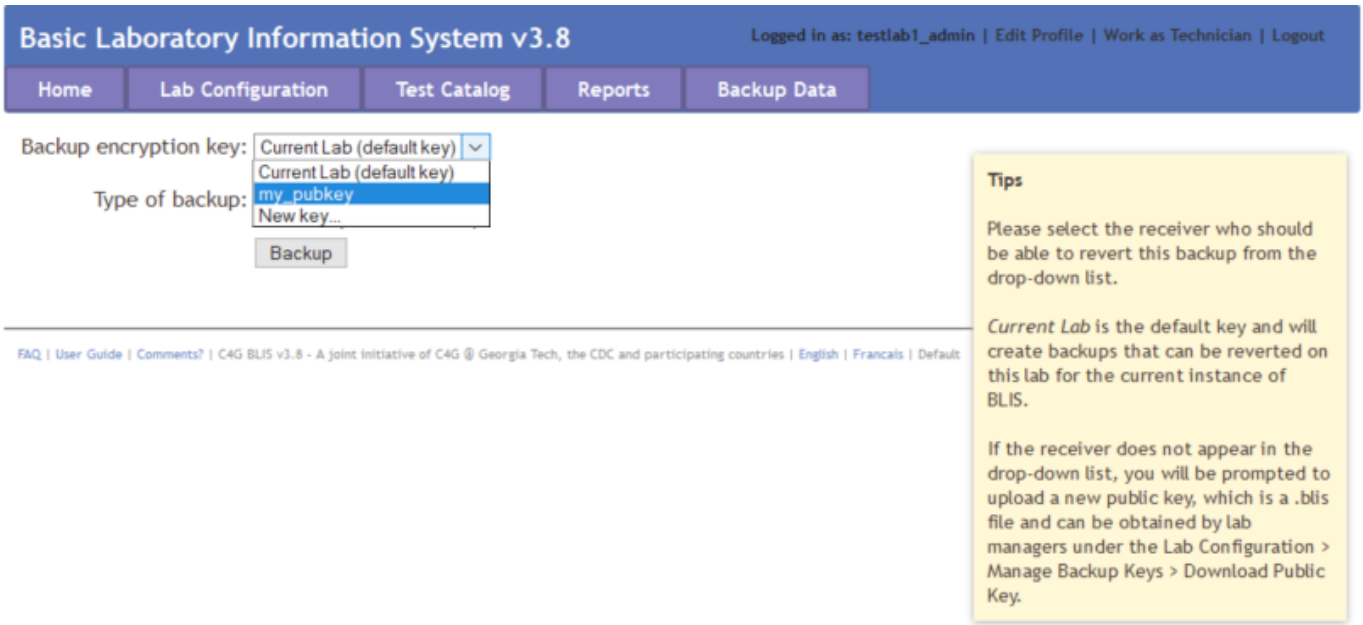
For example, one intended use of the second scenario would be to upload the current laboratory data to the director's instantiation of BLIS. A conglomeration of multiple labs' data would permit the director to visualize larger trends in the healthcare data across several laboratories. This would aid the director in understanding the needs of individual labs, and permit them to mobilize aid catered to the specific needs of each laboratories.

The below image is the default view of the **Backup Data** page.



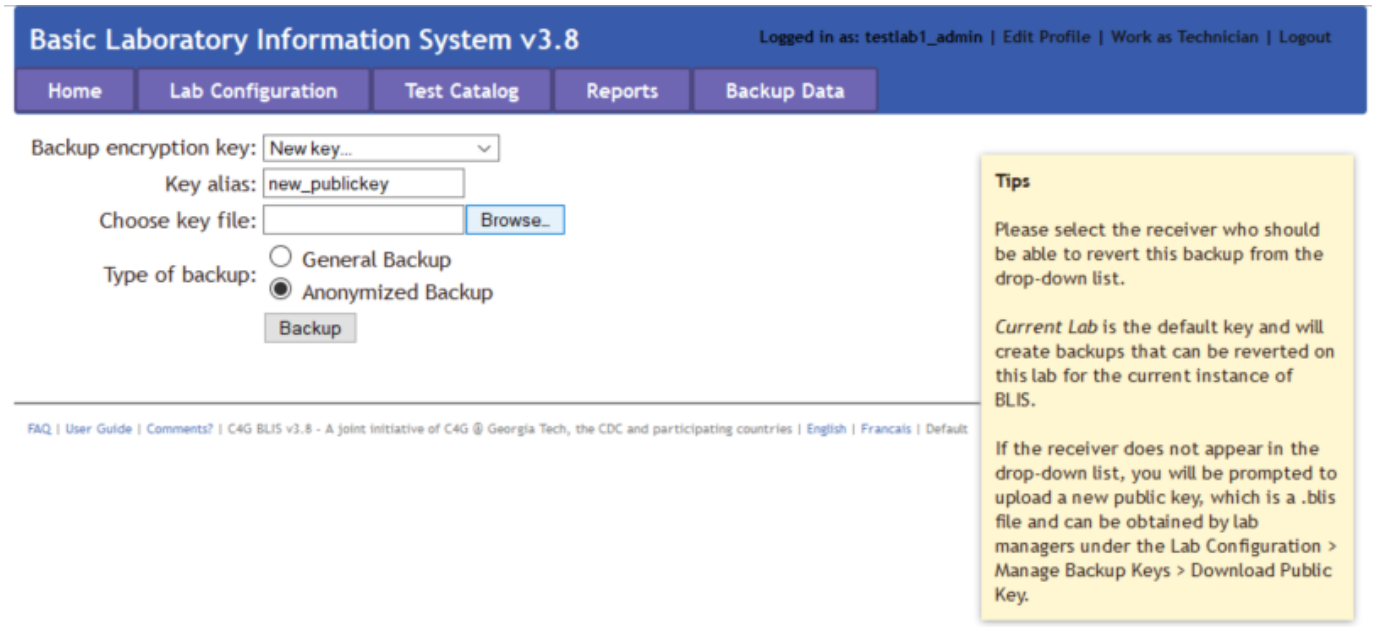
BACKUP DATA WITH PRE-EXISTING KEY

If a public key has already been registered to the personnel account through the **Lab Configuration > Manage Backup Keys** functionality, then the key should appear in the drop-down menu. In the image below, *my_pubkey* is a pre-existing public key that had been previously registered. Please select the key from the drop-down menu.

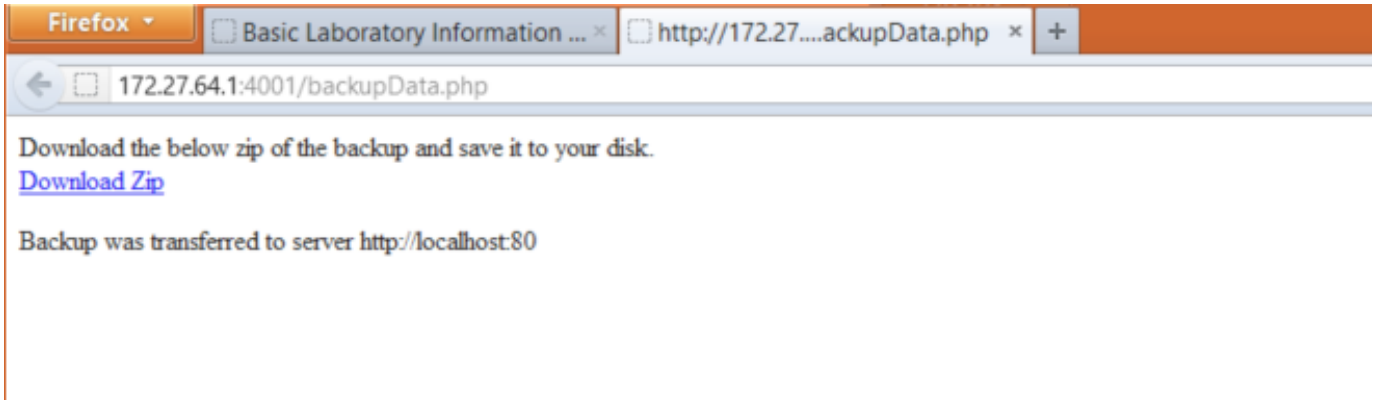


BACKUP DATA WITHOUT PRE-EXISTING KEY

If the desired public key has not already been registered to the account, then please select *New Key...* from the drop-down menu. Two new boxes should appear. Give the key a name (recommend either the lab name or lab ID), and click on the **Browse** button. Find the public key that was previously downloaded onto the user's computer and select it to upload.



After selecting the public key of choice, please choose the desired backup (General or Anonymized) and then click **Backup** to trigger the data backup. A new page should pop up, confirming that the backup was successful. Please click the **Download Zip** hyperlink to download the zipped file to the user's Desktop.



2024-05-03

5.7 Technician Overview

The technician interface allows the Technician to do the following:

1. Register new patients and look up existing patients.
2. Add results for a patient based on the specimens provided.
3. Manage existing reagents currently being tracked in BLIS.

Users with Admin rights can click the **Work as Manager** link in the top right corner to switch to the Lab Manager view.

Users with only Technician rights can access their profile page by clicking **Edit Profile**. Users can edit their profile to add or change email, phone, and language. Click on the **Change Password** link to change the user's password.

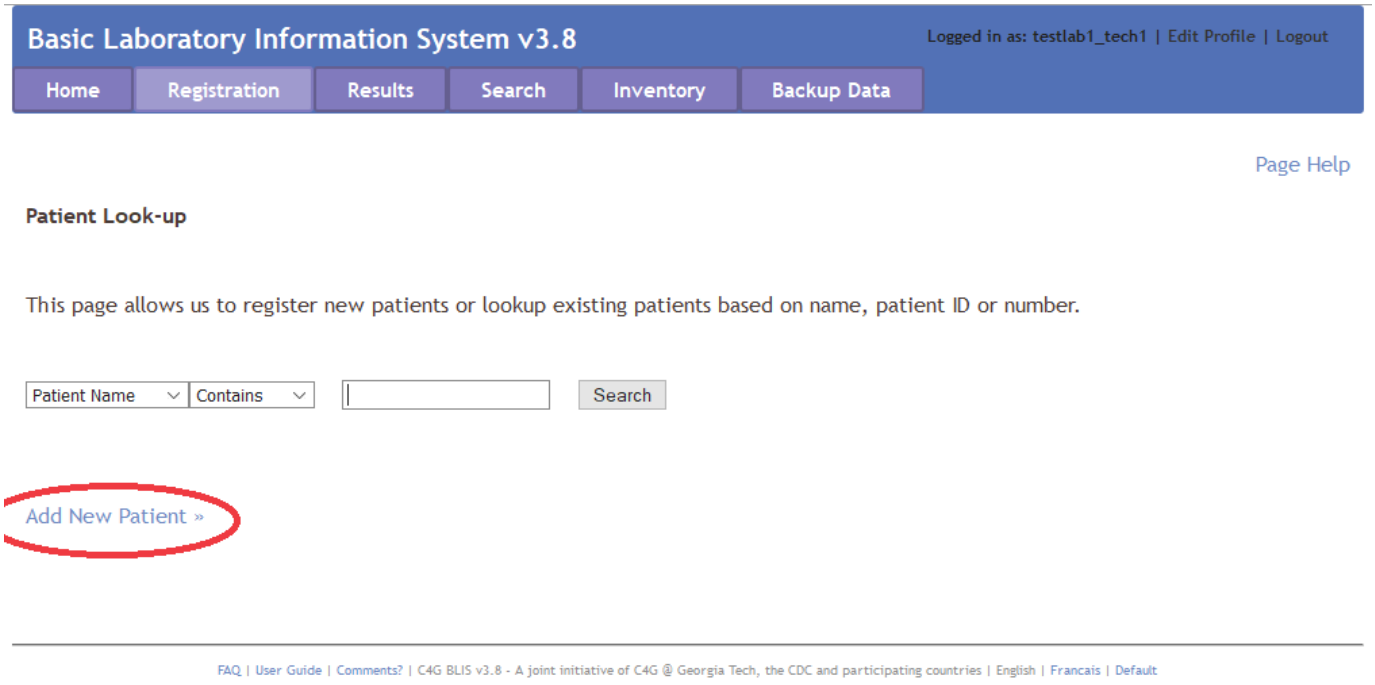
> **Note**
>
> The Username cannot be changed after creation.

Registration

The **Registration** page allows the Technician to register new patients or lookup existing patients based on name, patient ID or number.

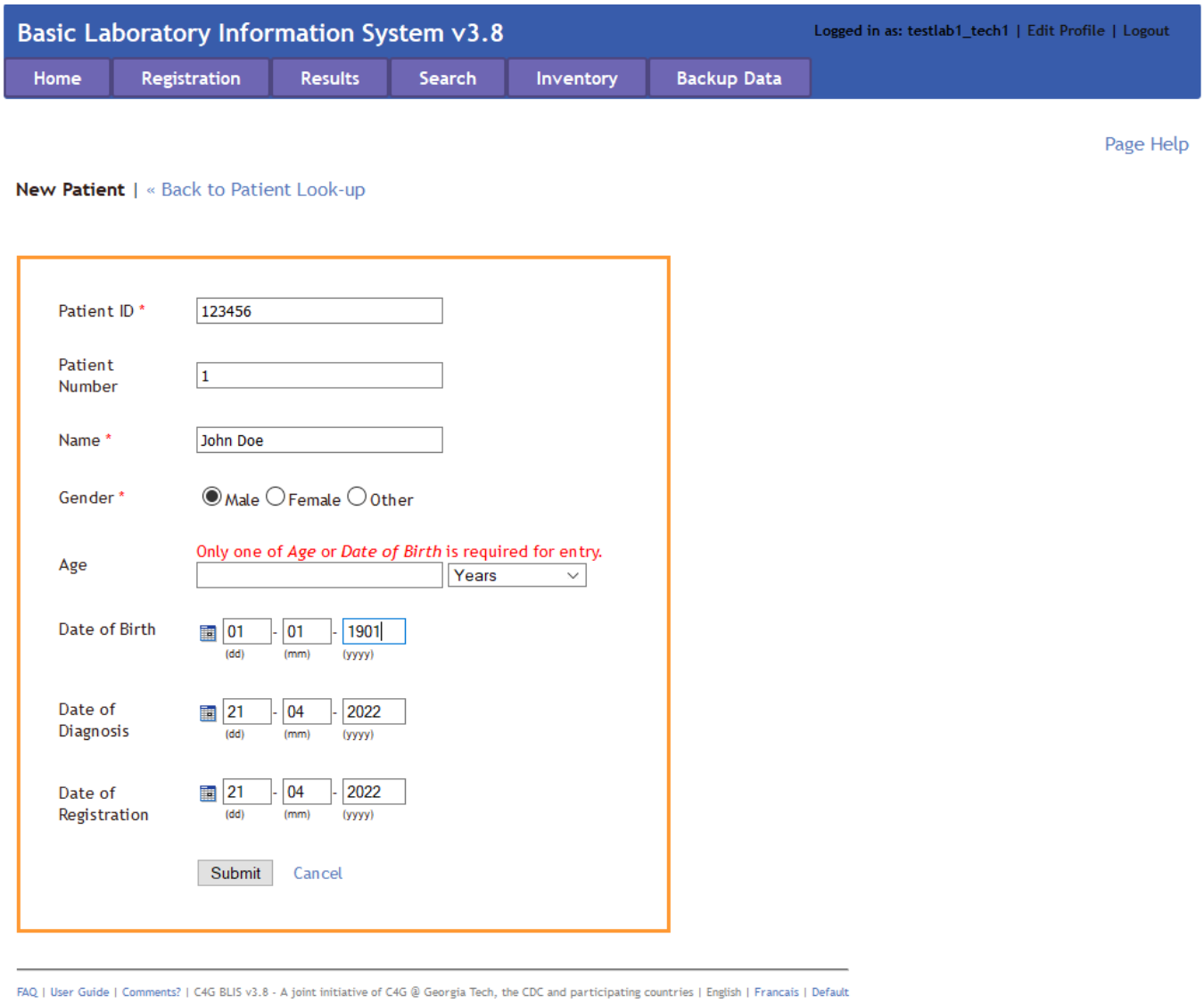
ADD NEW PATIENT

To add a new patient: Click the **Search** button without entering any search criteria. The **Add New Patient** link appears, illustrated in the red circle in the image below.



Also, if no results are found for the desired patient, an option to create a new patient will be presented and the searched name will automatically be filled into the new patient form. Click the link and wait for a dialog box to appear on the screen. Fill in the blank fields and check the appropriate elements. Elements with asterisks * are mandatory.

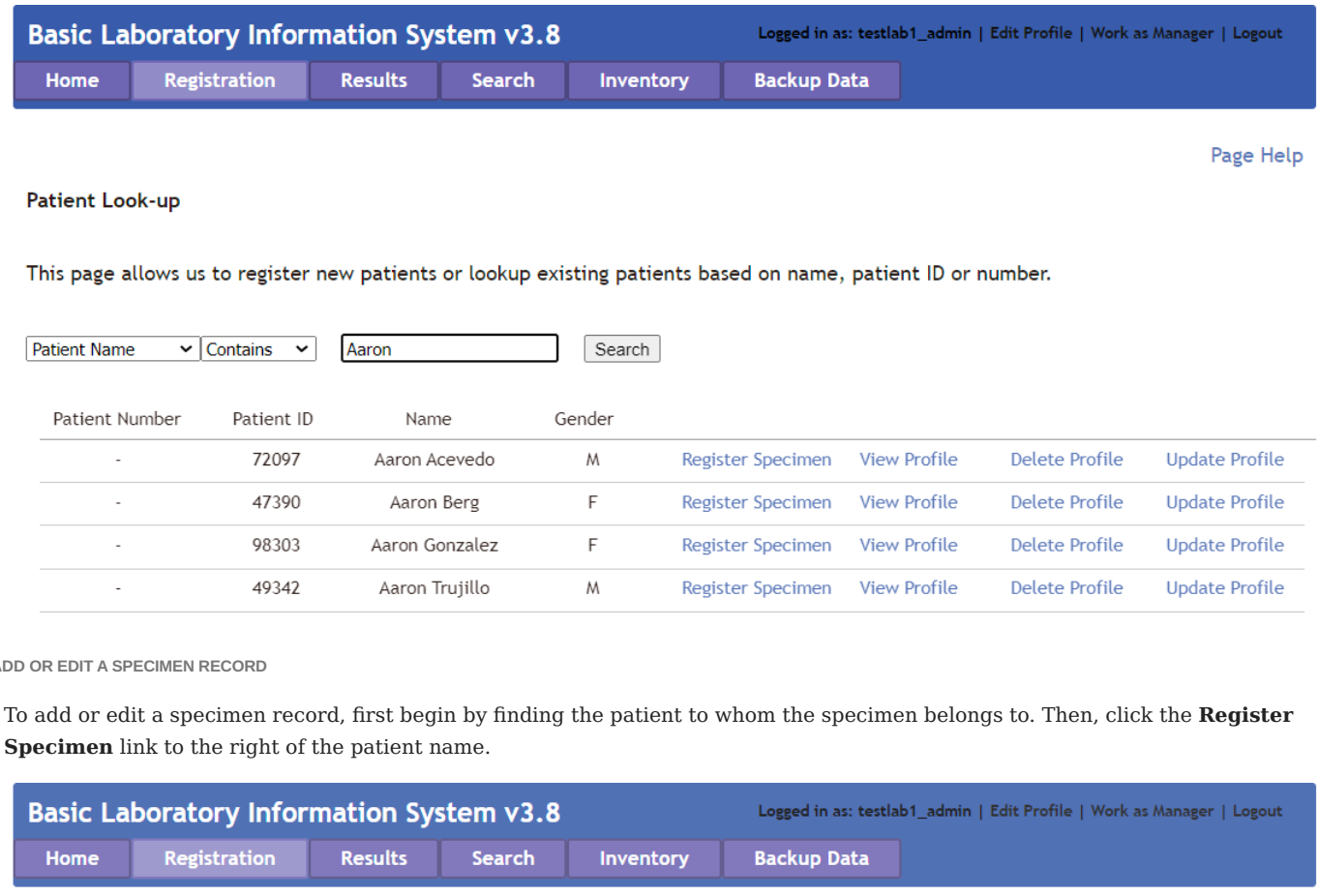
Click on **Submit** to save, or **Cancel** to discard changes and return to patient look-up page.



PATIENT LOOK-UP

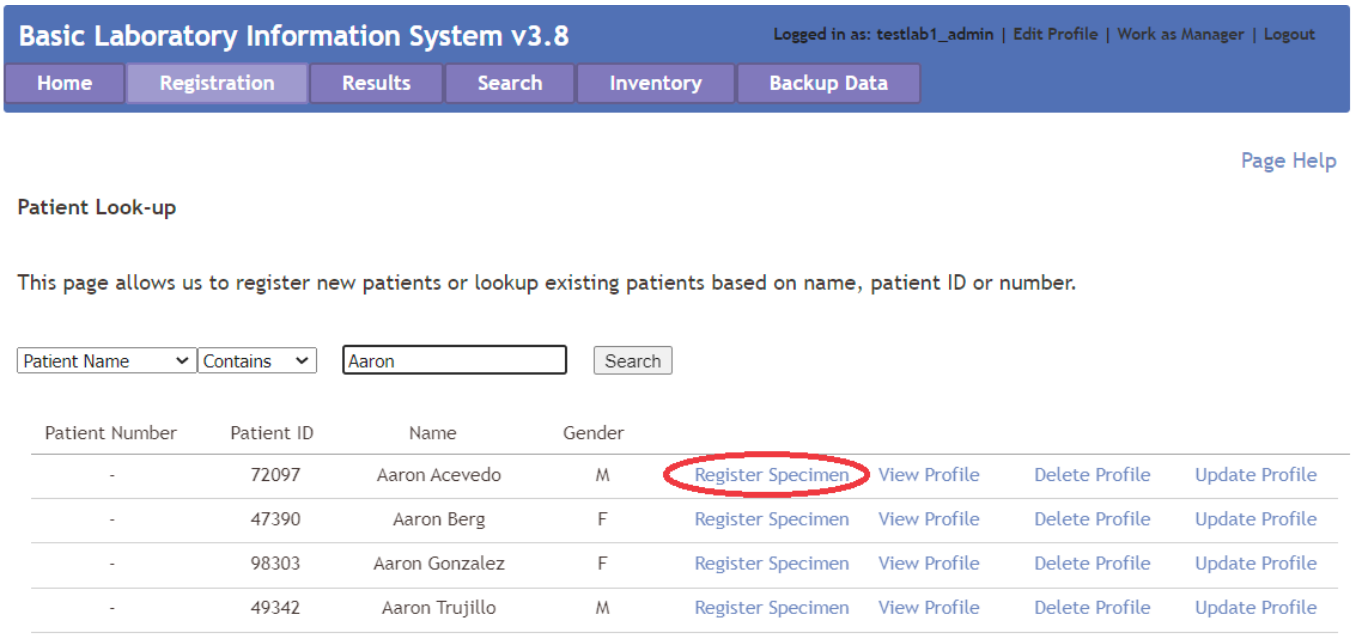
Once a patient has been registered, the Technician can use the **Registration** page to view or edit patient profiles. Additionally, a specimen the patient has provided for a particular test can also be registered.

Click on the drop-down list and select patient name, ID, or number. Type in the blank space the patient name, ID, or number. Enter all available patient information for the best search results.

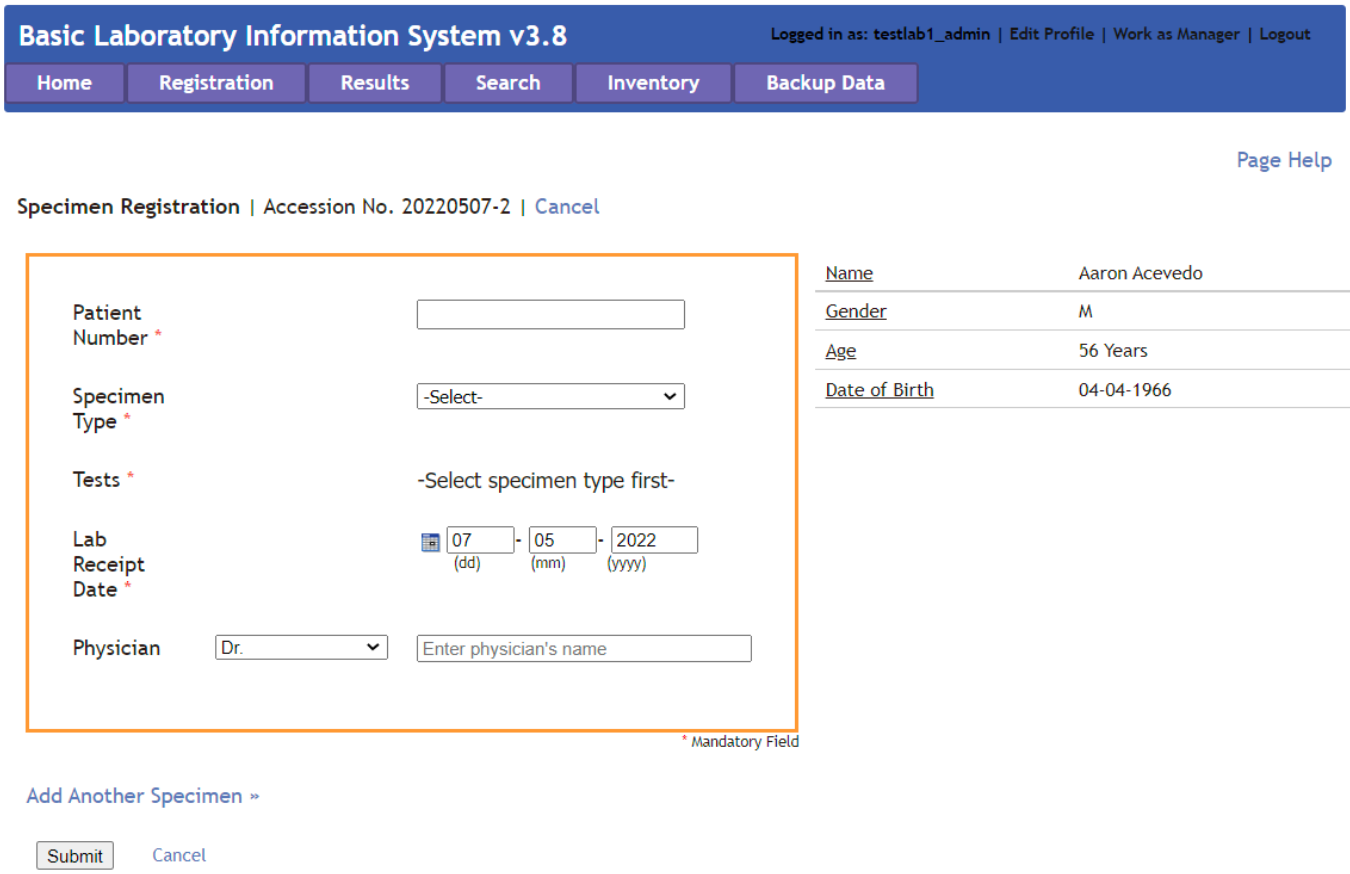


ADD OR EDIT A SPECIMEN RECORD

To add or edit a specimen record, first begin by finding the patient to whom the specimen belongs to. Then, click the **Register Specimen** link to the right of the patient name.



Fill in the blank fields and check the appropriate elements. Elements with asterisks * are mandatory.



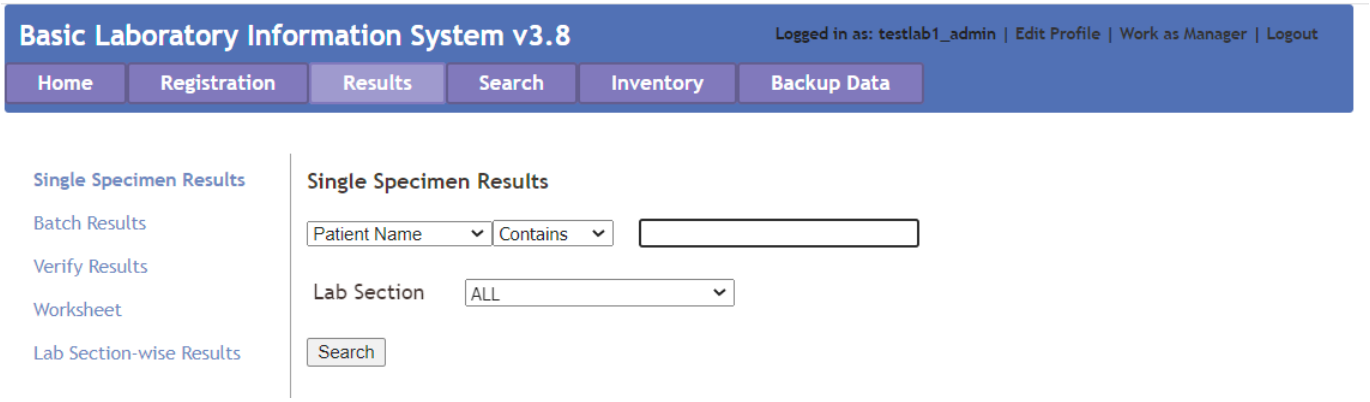
Click on **Submit** to save, or **Cancel** to discard changes and return to patient look-up page. Click **Add Another Specimen** to add another specimen for this patient.

Results

The **Results** page allows the Technician to see, evaluate, and verify results for collected specimens.

SINGLE SPECIMEN RESULTS

This option allows the Technician to add results for a patient based on the specimens provided and Lab sections to which the specimen tests are registered. Click on the drop-down list and select patient name, ID, or number. Type in the field at least 2 characters to search.



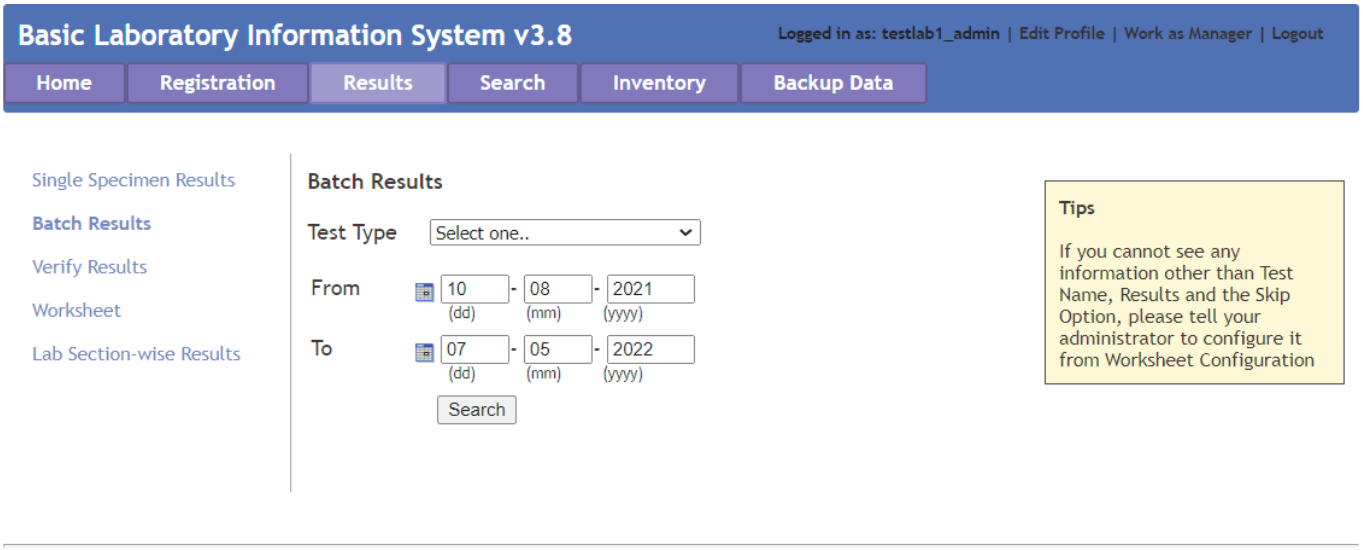
To add or edit a specimen record: Find the patient as above and then click the **Enter Results** link to the right of the patient name. Fill in the blank fields and check the appropriate elements.

Click on **Submit** to save, or **Cancel** to discard changes.

BATCH RESULTS

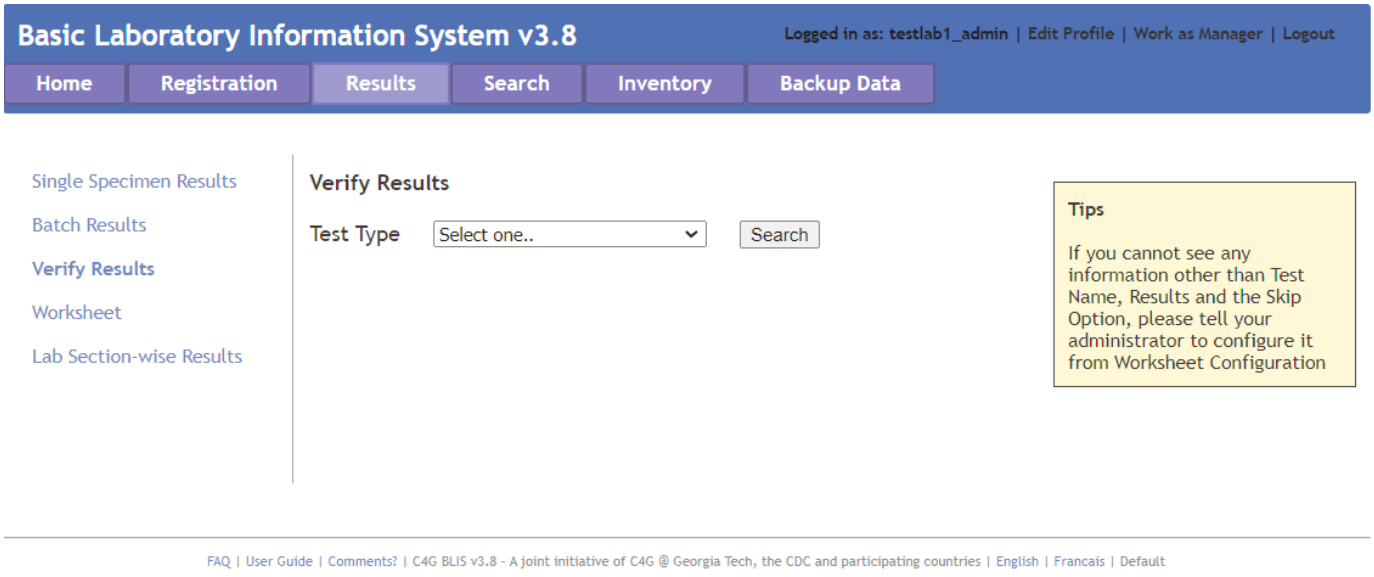
This option allows the Technician to add results for a particular Test Type.

Select a test for which to find results. Set a date range, then click Search. The results appear without patient names. Click on **Submit** to save, or **Cancel** to discard changes.



VERIFY RESULTS

This option allows the Technician to verify the result based on the test type. It shows the list of results for all patients whose results have not been verified. Here, results can be modified and entered prior to verifying.



Select a **Test Type** and click **Search**. All test results for that test appear. Look over the test results for accuracy. Edit the results as appropriate. When finished, click on **Verify**, or **Cancel** to discard changes. Choosing **Verify** opens a confirmation dialog box.

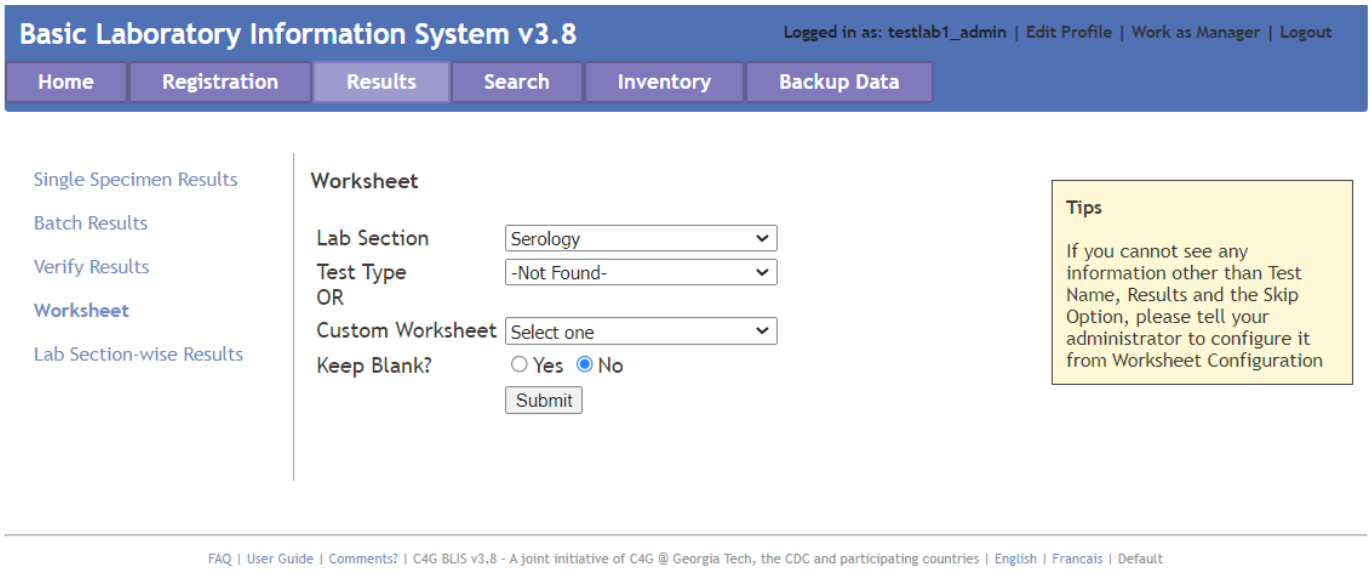
Click **OK** to mark results as verified, **Cancel** to discard changes.

WORKSHEET

This option generates a worksheet based on the Lab Section and Test Type. In lab settings where data are not entered at the point of service, the data entry staff enter patient information and the tests ordered, then print the worksheet so that lab

technicians can write test results and other data to be entered into BLIS. Custom worksheet which can be created by Admins using Lab Configuration > Tests > Reports > Worksheet.

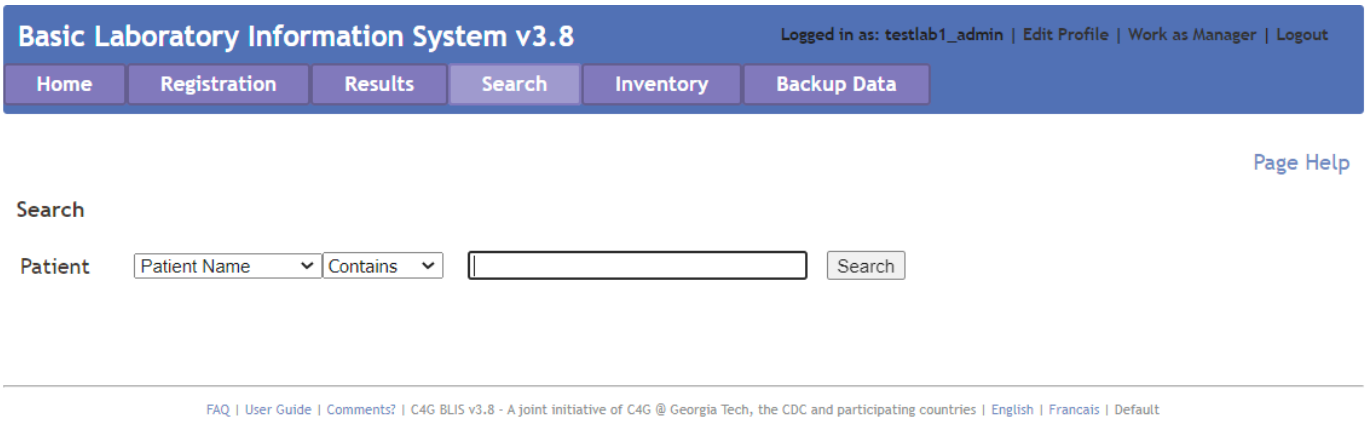
Create a blank worksheet by choosing the **Keep Blank** option and specifying the number of rows needed. Click **Submit** to create the worksheet.



After generating the worksheet, click on a column heading to sort the table by that field. Other features include **Print** in portrait (default) or landscape view, **Export as a Word Document**, or **Close** the page. If **Export** is selected, the default option is to open the Word document. The document can be printed or saved from Word.

Search

This page allows the Technician to search for a patient by name, number, or ID. Enter a partial name or ID (at least 2 characters) to generates a list of matches.



Click **View Profile** to view the patient's profile and test history.

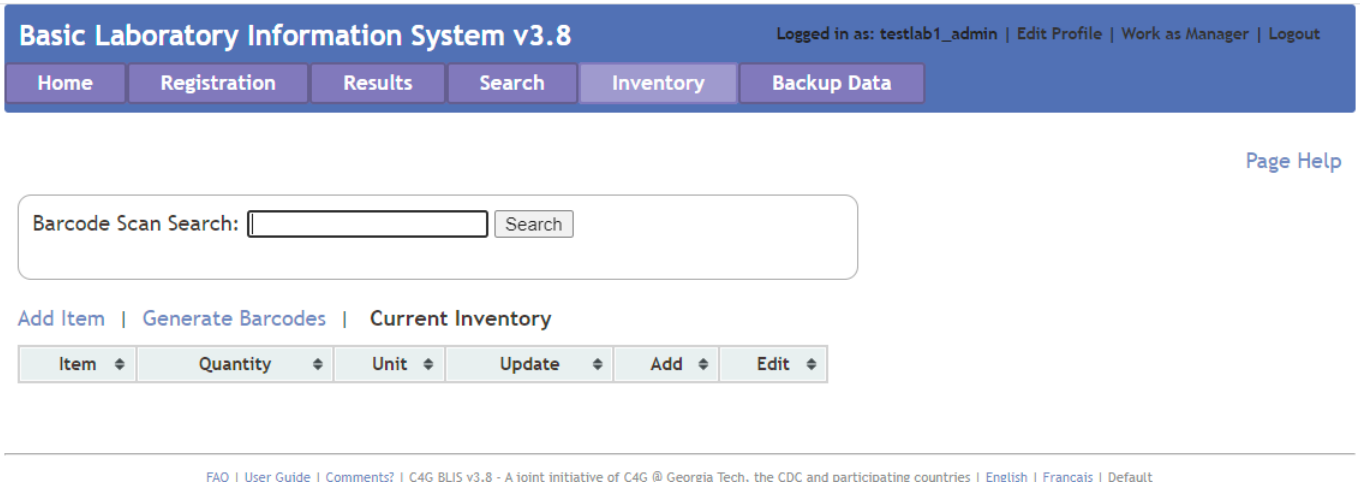
From the test history section, click **Details** for specimen information. Then, choose **Get Report** for a specimen report; **Track Actions** to view a log of actions on that specimen, or **Enter Results** to enter the specimen analysis results. A report can be generated from the test history section on the profile page by clicking the **Report** link.

From the profile page, other features include can also **Register New Specimen**, **Update Profile**, or **Print Patient Report**.

Inventory

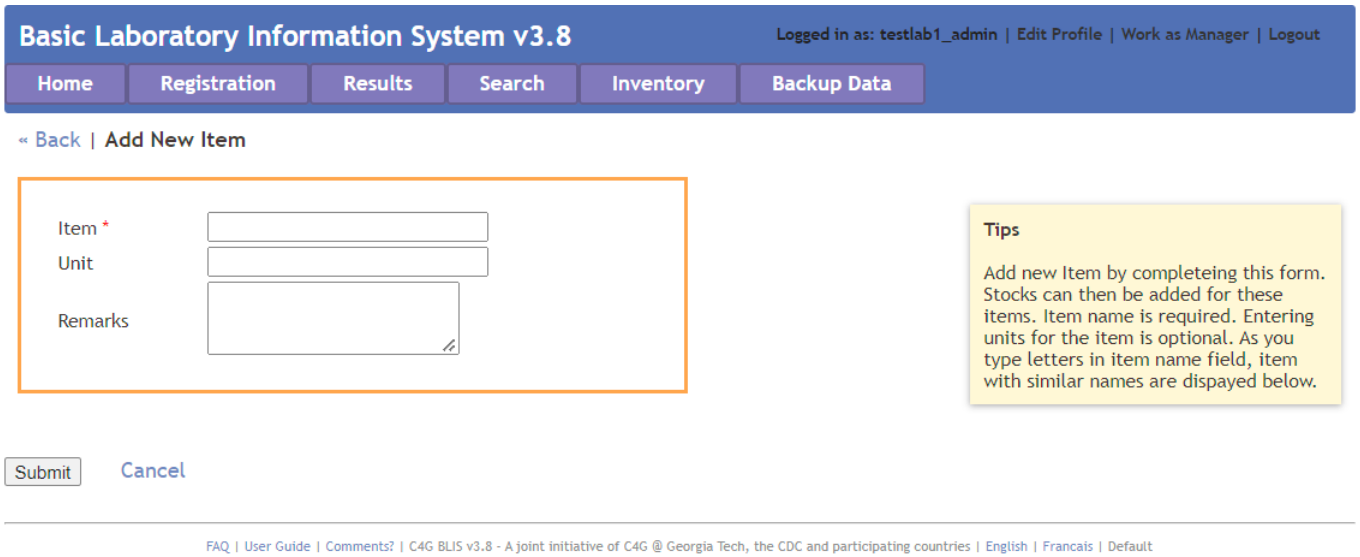
CURRENT INVENTORY

This link displays the reagent quantities currently in stock. It is not editable. To edit the list, click **Add Reagent**.



ADD ITEM

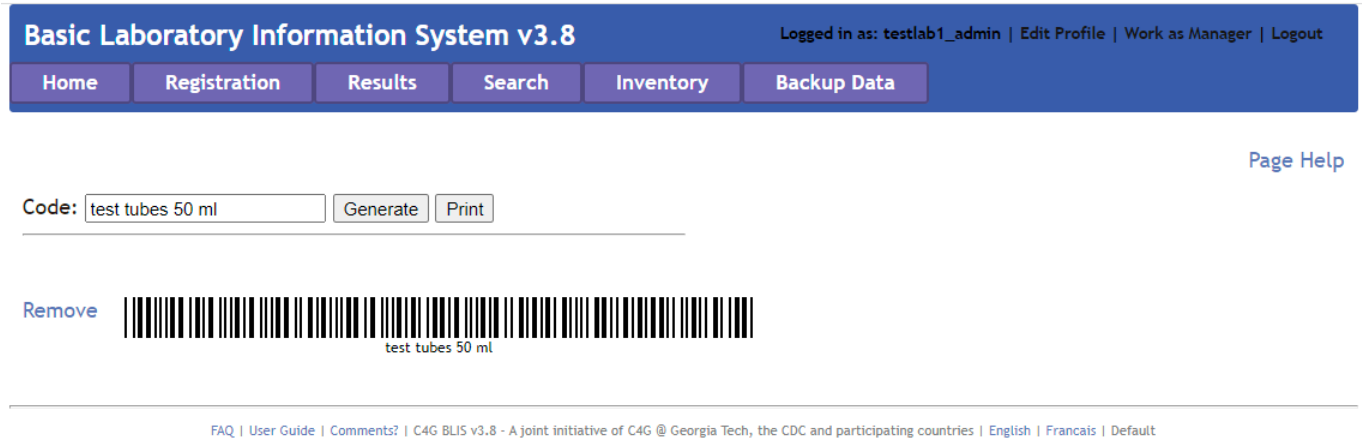
Click **Add Item** to add a new item to the list. Update the stock as more reagents are acquired by adding the reagent name, quantity received, receiver name, and remarks.



Click **Submit** to save changes.

GENERATE BARCODES

Clicking **Generate Barcodes** allows the Technician to generate a unique barcode. To do so, enter text into the field on the page, and press **Generate**. After generating the barcode, print them by pressing the **Print** button.



Backup Data

The Backup Page is similarly designed to the Backup Data feature available for Lab Managers.

See Also

The Backup Data functionality can be found in the Lab Manager section on Backup Data.

2024-05-03

5.8 Glossary

Admin - Designation for a user that has control over lab configuration settings. Also known as a Lab Manager.

Aggregate - Type of report that collects data over a period of time and presents it to the user.

Barcodes - Used in inventory management to create printable 'barcode' labels for reagents.

Director - Designation for a user that oversees many laboratories, typically at the country level. Manages lab configuration standardization.

Grouped Reports - Reports that cover multiple types of information.

Inventory - Interface for managing reagents and supplies.

Lab Configuration - Collection of customizable settings relating to the collection and storage of data.

Manager - Another name for an Admin user. Also known as a Lab Manager.

Patient - Entry for a ptient whose specimen tests are performed on.

Prevalence Rate - The percentage of rate occurrence of a particular result of tests.

Reagent - Term used in inventory control in BLIS. Denotes any physical supply that requires tracking in the inventory system.

Registration - The act of entering a patient into the BLIS program. Creates a unique patient entry that can be associated with specimens and tests.

Reports - Pages that collect metrics for various types of data. The scope of these reports varies from individual patients to entire groups of laboratories.

Results - The recorded outcome of tests performed on specimens.

Specimen - An entry representing a physical specimen or reading taken from a patient.

Specimen Type - Classification for different types of specimens.

Technician - A designation for a user who is tasked with entering data into BLIS.

Test - An entry representing a test or reading taken from a specimen.

Test Type - Classification for different types of tests.

Turnaround Time - A measurement of the time it takes to receive a result, once a specimen is collected.

User - Any person or entity that logs into the BLIS program.

Verify - An action performed on test entries that validates the results for further use.

Worksheet - Customizable, printable sheets for improving the speed at which information is recorded in a physical sense (i.e. not entered *directly* into the BLIS program.)

2024-05-03

5.9 Experimental: BLIS Cloud Command-Line Interface

The BLIS Cloud CLI is an experimental way to install and manage BLIS on cloud-based virtual machines.

> ⚠ **This tool is in preview!**
>
> Unless you are comfortable debugging issues, you should instead use the article on Running BLIS on a Cloud Provider.

5.9.1 Installation

The tool is intended to be used on **Ubuntu** installations only. In order to install the tool, you must first install the prerequisites:

```
sudo apt-get update
sudo apt-get install -y python3-pip
echo "export PATH=\"\$HOME/.local/bin:\$PATH\"" | tee -a ~/.bashrc
source ~/.bashrc
```

Then you can install the tool with:

```
pip3 install -U git+https://github.com/C4G/blis-cloud-cli.git
```

5.9.2 Usage

Installing Docker

You can check the status of Docker with:

```
blis docker status
```

The tool will check to see if Docker is installed and configured correctly. If Docker is not installed, then you should run:

```
blis docker install
```

Checking the status of BLIS

```
blis status
```

This command will check the status of BLIS: whether or not it is running, and if the system is supported.

BLIS Installation

```
blis install
```

This command will install the BLIS configuration file to `~/.blis/` and provision the database as a Docker container.

Starting BLIS

```
blis start
```

This command will start BLIS.

BLIS Update

```
blis update
```

This command will update the container used by BLIS. If BLIS is running, it will stop and start BLIS as needed.

Stopping BLIS

```
blis stop
```

This command will stop BLIS.

Accessing log files

```
blis logs application
blis logs database
```

These two log files are generated by the BLIS application. The `application` log is most useful for debugging issues.

```
blis logs apache2/error
blis logs apache2/access
```

These two log files are generated by the Apache2 webserver. The `apache2/error` log contains PHP errors useful for debugging issues.

2024-05-03