**Monthly Report Generator SOP**

*(Updated: 02/2022)*

**SOP OUTLINE**

1. **Prerequisites**
2. **Usage: Script**
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**APPENDICES**

1. **Linux Setup**
2. **Installing Program**
3. **Creating Input Files**
4. **List of Program Commands**
5. **Script Setup**
6. **Basic Linux Commands**
7. **Prerequisites**
8. Linux system available (*e.g.*, Ubuntu on WSL). See Appendix A for first-time setup.
9. Program compiled in Linux environment. See Appendix B for first-time setup.
10. Filesystem set up per specifications. See Appendix A for first-time setup.
11. Input files formatted properly as .csv (comma-delimited). See Appendix C.
12. SCRIPT: Values are changed to reflect the locations of files and directories. See Appendix E.
13. **Usage: Script**
14. Use the command: cd ~/BTIL/processingsheets
15. Place input files in respective directories
    1. Blood processing sheet .csv files in ~/BTIL/processingsheets/blood/, etc.
    2. Can use File Explorer; make sure no files are marked as Read Only
16. Go to the install directory (this can vary; if standard setting, see below)
    1. Command: cd ~/BTIL/monthlyreports
17. Run the script from within the install directory
    1. Command: ./generator.sh
18. Input month as a number when prompted and press Enter (*e.g.*, 3 or 03 for March)
19. Input year as a 4-digit number when prompted and press Enter (*e.g.*, 2021)
20. You will see the terminal output information on each file, which you can ignore
21. Output files will be automatically be generated in respective directories
    1. Base directory is ~/BTIL/reports/ with subdirectories for blood, stool, tissue
    2. Files will have same name as corresponding input files

Note: If there is an issue running the script, it will enter manual mode; see section 3.

1. **Usage: Full Program**

2.1 Menu Operation

To make menu selections in the program, enter the one-digit number corresponding to your selection and then press Enter. For a full list of menu options, see Appendix D.

2.2 Workflow

1. Go to the install directory (this can vary; if standard setting, see below)
   1. Command: cd ~/BTIL/monthlyreports
2. Run the program from within the install directory
   1. Command: ./reportgenerator
3. Input month as a number when prompted and press Enter (*e.g.*, 3 or 03 for March)
4. Input year as a 4-digit number when prompted and press Enter (*e.g.*, 2021)
5. Import file in Main Menu following prompts from program
   1. File type should be selected based on the type of sheet you are importing
   2. File name should be the path to the file in the Linux system (See Appendix F)
6. Optional: Sort the report as desired using the menu
7. Optional: Display report to screen
   1. Displaying report will show you the sorted list of samples – does NOT save
8. Optional: Write report to .csv file
   1. Writing the report to file will save the list to a .csv file
   2. Optional: When prompted, you can specify the file location and name (See Appendix F)
9. **Future Changes and Updates**

If future updates to the program are necessary, the program can be updated following these steps:

1. Go to the directory where the program is installed in Linux
   1. Standard: cd ~/BTIL/monthlyreports/
2. Use the command: sudo apt update
   1. Input password if prompted
3. Use the command: sudo apt upgrade -y
4. Use the command: git pull
5. Use the command: make

**APPENDIX A**

**Linux Setup**

This process only applies to Windows computers. Macs are not supported.

1. Installing Windows Subsystem for Linux (WSL)

Skip this step if running on a Linux system already. Otherwise, continue on Windows 10/11.

1. Run Powershell as an administrator
2. Use the command: wsl --install
3. Follow prompts
   1. This process installs Ubuntu by default and uses WSL 2.0
4. Run Ubuntu; first-time setup might take a while
5. Create a user and password as prompted – remember this information
6. Installing Necessary Packages
7. Open Ubuntu
8. Use the command: sudo apt update
   1. Input password if prompted
9. Use the command: sudo apt upgrade -y
10. Use the command: sudo apt install g++
11. Use the command: sudo apt install make
12. Use the command: sudo apt install git
13. Directory/Filesystem Structure
14. Use the following commands:

cd ~

mkdir BTIL

cd BTIL

mkdir processingsheets

mkdir reports

cd processingsheets

mkdir blood

mkdir stool

mkdir tissue

cd ../reports

mkdir blood

mkdir stool

mkdir tissue

**APPENDIX B**

**Installing Program**

Before installing the program, please ensure that the steps required for installing Linux and the necessary packages have been completed, as well as setting up the filesystem (see Appendix A).

* + 1. GitHub Setup
       1. Create an account at github.com
       2. Create an SSH key in Linux and add it to your GitHub account
  1. Use the command: ssh-keygen -t rsa -b 4096
     1. Press enter to follow default settings
     2. Please choose a password (do not leave blank) and remember it
  2. Use the command: cd ~/.ssh
  3. Use the command: vim id\_rsa.pub
  4. Select the entire file beginning at ssh-rsa and ending at <user>@<device>

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* 1. Copy the selection, then type :q and press enter to exit Vim
  2. On github.com, go to Settings 🡺 SSH and GPG Keys 🡺 New SSH Key
  3. Paste your key under the Key field and press “Add SSH Key”
     + 1. Make sure your account is added to the GuerrieroLab group on GitHub
     1. Download Files from GitHub

1. Go to the monthlyreports repository
2. Click the green “Code” button and select SSH (not HTTPS or GitHub CLI)
   1. Copy the address that begins with git@github.com:
3. In Linux, use the following commands:

cd ~/BTIL

mkdir monthlyreports

cd monthlyreports

git init

git remote add origin <paste the SSH address you copied in 2.ii.a>

git pull origin main

* + 1. Compile Program
       1. Go to the directory with the files you pulled from GitHub
          1. Use the command: cd ~/BTIL/monthlyreports
       2. Use the command: make
       3. Confirm that no errors printed in the terminal
       4. Confirm the program file is present
          1. Use the command: ls
          2. There should be a file called reportgenerator

**APPENDIX C**

**Creating Input Files**

1. General File Format

All input files must be CSV (Comma delimited) format. Note that this format is unique from CSV UTF-8 and other .csv formats that are available in Excel. See figure below, where the correct option is highlighted blue.

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Files should contain only fields PN through Date. Do not include any fields past Date (*e.g.*, Person Processing). Do not include header of file (*i.e.*, only include sample information). See figure below for example of area of required data.

Table

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1. Creating Input Sheets

On the BTIL server, go to \\rc-stor14.dfci.harvard.edu\breastiolab\Clinical Trials and Sample Collection\Clinical Trial Excel Sheets\Monthly Report Sheets. The sheets Monthly Reports Blood/Stool/Tissue are linked to the Blood/Stool/Tissue Processing Sheets on the server, including only the relevant data for the program.

To update the sheets:

1. Open the Monthly Report Sheets
2. Enable editing
3. Enable content (a warning might pop up, this is OK)
4. Save

If you notice that the cells are not updating past a certain point, simply link additional cells to the sheet in Excel by copying and pasting as link.

Once the sheets are updated, save each individual sheet/tab as a CSV (comma delimited) file. Save them in their respective folders for blood, stool, and tissue which are located in the same path on the server. See step 1 of this appendix for the file type to save as in Excel. You can name these sheets however you want, but it is easiest to do <trial>-blood.csv, <trial>-stool.csv, and <trial>-tissue.csv.

Copy these files to the processingsheets/blood, stool, and tissue folders in your Linux system.

**APPENDIX D**

**List of Program Commands**

The program’s Main Menu has the below options, numbered from 1 to 6.

To operate menus, type the corresponding number ONLY and press Enter. For example, to choose the option “Import File”, the user should type 1 and then press Enter. If prompted for other types of input, such as file names, enter the information and then press Enter.

1. Import File

Imports data from a .csv file into the program.

1. Select the type of sheet to be imported (1 for blood, 2 for tissue, 3 for stool)
2. Enter the name of the file you want to import including the .csv at the end
   1. Include the entire path of the file if it is not in the same directory as the program (*e.g.*, /home/<user>/BTIL/processingsheets/blood/<filename>.csv)
3. Sort File

Sorts the imported samples in user-selected manner. List of options is below.

Note: This option should only be used after importing a file. It can be used multiple times on a single file, however.

1. PN : sorts alphabetically by patient initials/PN field
2. OncID : sorts numerically from lowest to highest by OnCore ID
3. Subject ID : sorts numerically from lowest to highest by Subject/Study ID
4. Stool ID : sorts from lowest to highest by Stool ID (for VICTORY blood, use iii.)
5. Timepoint : groups samples by timepoint and counts the number of samples
6. Date : sorts by descending date (*i.e.*, earliest date first)
7. Back to Main Menu (returns user to Main Menu)
8. Display Results

Shows the imported samples in the terminal. If sorted, this option will display the sorted list. If not sorted, the list will be shown in order of the original file. Note that this option does not save the sorted list.

1. Write Results to File

Saves the list of samples to a file. If the list was sorted before saving, the file will reflect the sorted list. Also saves the total number of samples per timepoint through the selected month/year as well as the number of samples per timepoint in the selected month/year.

1. Select if you would like to use the default location when prompted
   1. If you use the default location, the file will be placed in the same directory as the program and named monthly\_report.csv
   2. Note that using the default file name multiple times will overwrite the previous file, so it is advisable to change the default name/location
2. Optional: Change the file location
   1. Input the filename ending in .csv, including the path if you do not want the file to be placed in the program directory
   2. For example, /home/<user>/BTIL/reports/blood/<filename>.csv
3. Set Month/Year

Changes the month/year by which the imported file is sorted. For example, if the user initially imported a file and filtered by 01-2022, using this option would allow the user to change to 12-2021 within the same imported file. This option can also be used in conjunction with 1. Import File.

1. Enter the month in format mm and press Enter (*e.g.*, 3 or 03 for March)
2. Enter the year in format yyyy and press Enter (*e.g.*, 2021)
3. Quit

Closes the program. All data will be cleared unless you saved to a file using option 4. Write Results to File.

**APPENDIX E**

**Script Setup**

1. Open Script
2. Navigate to the program install directory
   1. Use the command: cd ~/BTIL/monthlyreports
3. Open the script in Vim
   1. Use the command: vim generator.sh
4. The terminal should now look like the below figure, potentially with different colors

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1. Change Script Values
2. Note: To move the cursor in Vim, use the arrow keys on the keyboard
3. Enable editing in Vim
   1. Press “i” on the keyboard one time (i stands for insert, but don’t press the insert key on the keyboard!)
   2. -- INSERT -- will appear in the lower left-hand corner of the terminal, as shown in the below figure

Text

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1. Change the areas denoted by (CHANGE) to appropriate values
   1. Places to change (9 total, shown in below figure):
      1. 3x SOURCEDIR
      2. 3x DESTDIR
      3. 3x in the script in places denoted as program location

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* 1. If using default filesystem from Appendix A, simply change “aus87” to the username in your Linux system
  2. If not using default filesystem, change the directories to respective setup

1. Save Updated Script
2. Exit edit mode
   1. Press Esc on the keyboard
   2. -- INSERT -- should no longer show in the lower left-hand corner of the terminal
3. Save and exit Vim (shown in below figure)
   1. Type: :wq

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* 1. Press Enter

**APPENDIX F**

**Basic Linux Commands**

1. Linux Command Format

Linux is used primarily through a command-line/terminal interface. While different than a graphical interface like Windows or macOS, the same things can be accomplished using commands from the user. Complete lists of commands can be found online.

Some basic commands and options are listed in the table below. Options are used to change the effect/output of commands. Options are selected by typing: -<option> following the command (*e.g.*, ls -al). More than one option can be used at a time, depending on the command.

Commands and options are then followed by arguments. Arguments are typically what the command is acting upon. For example, the argument of cd would be the directory the user wants to change to, or the argument of rm would be the file the user wants to delete.

|  |  |  |  |
| --- | --- | --- | --- |
| **COMMAND** | **SHORT FOR** | **OPTIONS** | **DESCRIPTION** |
| cd | Change Directory | N/A | Changes user’s location in the system |
| cp | Copy | -r | Copies from <source> to <destination>  Use -r to copy a directory |
| ll | Long List | N/A | See ls, but includes additional information |
| ls | List | -al | Lists the files in the current directory |
| mkdir | Make Directory | N/A | Makes a new directory in current location |
| rm | Remove | -r | Deletes a file  Use -r to delete a directory |
| ssh-keygen | N/A | -b #bits  -t keytype | Generates an SSH key of set type and length (ssh-keygen -t rsa -b 4096) |
| vim | Vim Text Editor | N/A | Opens a file in the Vim editor |

Note: The commands and options in this table are not exhaustive, simply the most relevant ones for this program.

1. Usage Notes and Tips
2. cd – Directory Navigation

Syntax: cd <directory>

* The directory “above” the current directory can be accessed as cd ../
* The home directory can quickly be accessed with the shortcut ~ (*e.g.*, cd ~)

1. cp – Copying Files

Syntax: cp <source> <destination>

* To copy a directory, use the -r option with syntax: cp -r <sourcedir> <destdir>
* Instead of typing the entire path, the user can shortcuts such as ../ and ~

1. ls – Viewing Files in Directory

Syntax: ls

* The -al option shows a vertical list with additional information, similar to ll

1. rm – Deleting Files

Syntax: rm <file>

* To remove a directory, use the -r option with syntax: rm -r <dir>
* Instead of typing the entire path, the user can shortcuts such as ../ and ~

1. vim – Editing Files

Syntax: vim <file>

* Enter edit mode (aka Insert) by pressing “i”
* Exit edit mode by pressing Esc
* Navigate using arrow keys only (no mouse/trackpad)
* Saving File
  + Press Esc if in edit mode
  + Type :w and press Enter
* Exiting Vim
  + Press Esc if in edit mode
  + Type :q and press Enter
* You can combine commands (*e.g.*, :wq will both save and exit)
* Other commands can be found online

1. File Paths

* The location of a file in the system
* Can be written as a whole/complete path or with shortcuts
* Shortcuts:
  + ~ is equivalent to /home/<user>/
  + ../ is equivalent to going “up” one level (*i.e.*, exiting a directory)
* Whole path example:
  + /home/aus87/BTIL/processingsheets/blood/bprep-blood.csv
* Shortcut examples:
  + ~/BTIL/processingsheets/blood/bprep-blood.csv is equivalent to the whole path example above
  + Starting in ~/BTIL/processingsheets/blood, can go to ../tissue/, which is equivalent to ~/BTIL/processingsheets/tissue