Bug Explanations and Attempts to Fix

1. Secure Logout Feature

Bug: There were times when the session key could be accessed by outside users for hijacking.

Fix: A logout script was implemented “logout.php” which when activated by the user, destroys the session and redirects the user back to the login page. Secure session cookies were put into place and regenerative session ID keys were used to secure the session management.

2. Session Expiry and Redirection

Bug: Unauthorised users were able to access pages without logging in.

Fix: Added session checks at the beginning of each file that redirects unauthorised users back to the login page.

3. Login Form and Session Handling

Bug: Users were able to view the database with unauthorised access due to session handling issues.
Fix: This was fixed by applying a session handling script at the beginning of each file such as “add_patient.php”, which ensured sessions were always status checked before allowing the user to access the sensitive data.

4. SQL Injection Prevention

Bug: initially basic SQL queries were being used which could have allowed for SQL injection vulnerabilities.

Fix: To fix this, raw SQL queries were converted to prepared statements by using “bind_param” to bind user inputs securely as seen in “add_patient.php”.

5. Dynamic Navigation Links

Bug: Initially it was hard to handle navigation links with multiple patients, as the initial code would try to make a new PHP file for each clinician and patient. These new files were corrupt hence a new strategy needed to be introduced.

Fix: PHP variables were used to dynamically generate the URLs in navigation links, hence allowing pages to have the correct patient and clinician ID values passed.

6. Generating PDFs with TCPDF

Bug: Struggled to run basic code that would generate PDFs. The code used was basic and did not use any plugins, addons, software to help generate the PDFs.

Fix: After Researching different programs and software to make the process simpler, TCPDF was found to be very useful and simple to understand. As seen in “generate_all_patients_pdf.php” the pdf creation was relatively simple after implementation of this open-source software.

7. Missing Field Handing in Forms

Bug: Optional Fields were not handled correctly, hence when a clinician would not have enough data, the patient could not be added.
Fix: Updated the form handling code to make sure only some fields that were essential were

“required”. NULL coalescing was also used for optional fields, ensuring the database could handle the fields correctly.

8. Edit and Adding Multiple Entries

Bug: When using only PHP to edit and add multiple phenotypes, mutations and diagnostics for patients, the data would not save into the proper SQL table. The code was also very messy.

Fix: By incorporating JavaScript to add fields while PHP saved the entries, the data would be saved correctly with less lines of code.