

Hygieia

The Health Management System User Guide and Test Plan



Hygieia

Presented by: Yuji Shimojo, Cara Howie, and Thomas Vera

For: Dr. Clarence Huff CMSC 495

Created On: January 26, 2017



Hygieia

Table of Contents

Contents

Contents	2
Introduction:	3
Hygieia:.....	3
Modules Description	5
Patient Registration:.....	5
Medical Files:.....	6
Employee Records	9
Navigating Hygieia.....	11
Login/Logout Page:.....	11
Home Page:	12
New Patient:.....	12
Medical Files:.....	13
Employee Records:.....	13
Search:.....	14
Minimum System Requirements for Hygieia	15
Test Plan	16



Hygieia

Introduction:

Our team of developers has dedicated their time and efforts in hopes to provide enterprise solutions at cost effective prices to local hospitals. This new system will allow all patient records to be stored in a centralized database that will improve the overall efficiency of your hospital and allow for future growth. This allows for additional modules to be added as they come out and/or as your hospital needs see fit.

Hygieia:

Hygieia comes with the base components to allow hospitals to added new patients, create new medical files for patients, and employee records. All these components are stored in the centralized database that has multiple layers of security.

Patient Registration	Medical Files	Employee Records
<ul style="list-style-type: none">• Patient Name• Patient Social Security Number• Admitted Date• Doctor's Name• Patient Type• Patient Address• Patient Insurance	<ul style="list-style-type: none">• Date of Visit• Doctor's Name• Start Bed Date• End Bed Date• Bed Name• Room Number• Disease name• Treatment• Medicine Given• Medicine Name• Medical Notes• Ambulance Service	<ul style="list-style-type: none">• Staff/Doctor Name• Staff Type• Staff Address• Staff Social Security Number• Qualifications• Certifications Expirations• Cell Number• Email• Payroll• Shifts



Hygieia

	• Billing Amount	• Personnel Notes
--	------------------	-------------------

Overall System Features:

- **Modular design:** Each module is designed to satisfy a singular functionality of a hospital. This allows the system to update only certain modular and not affect existing one creating a more stable environment.
- **Relational database:** MySQL is used to store and collect all of the systems data. This provides the benefits of high performance as well as high availability, which in a fast pace environment is critical to success. It also provides one of the lowest total cost of ownership meaning that the setup and long term maintenances of running the server cost effective in the long run. Additionally, it proved the ability to growth with the hospital as new capabilities are integrated into the hospital.
- **Web Interface:** The systems modules are designed to work on any web browsers allowing any computer or mobile device to have access to the system with in the hospital.
- **Security:** The system comes with a secure log in feature and allows the administrator to assign roles to different users. These different roles ensure that only certain people can modify the data that is relative to them.



Hygieia

Modules Description

Patient Registration:

Overview: Once the information below is sent to the backend database employees can search data up by any of the fields listed below. If any discrepancy are found then an authorized user will have to go in and modify the appropriate field.

1. Patient Name:

There are three different fields that are labeled *First Name*, *Middle Name*, and *Last Name*. Using them, a general staff member will be able to add in the patient's full name which then gets associated with the database on the back end.

2. Patient Social Security Number:

This field will allow general staff members to add the patient's social security number. As the administrator types in the social security number it will be marked with a black circle to hide the information from anyone who is shoulder surfing.

3. Admitted Date:

This field is automatically generated based on when the form is filled out based on the date and time of the server running the frontend, but may be changed manually. The format will be *day of the week, month, day, year*. Example (Sun Jan 22 2019).



Hygieia

4. Doctor's Name:

This field is a drop down menu that the general staff can select which doctor at the time of administration was seeing the patient. This gives a quick way to see who initially diagnosed the symptoms.

5. Patient Type:

This field is a radio button that allows the general staff to select if this person is an inpatient or an outpatient. This field will also influence the type of billing will be charged and what information will need to be filled out for the medical file forms.

6. Patient Address:

This field will allow general staff members to add the patient's physical address which can be used for sending reminder cards, or for billing purposes.

7. Patient Insurance:

This field will allow general staff members to add the patient's health insurance which will help determine the finalized bill. Additionally, it will help see how much your hospital can charge to keep it in the black.

Medical Files:

Overview: Once the information below is sent to the backend database medical staff can search data up by any of the fields listed below. If any discrepancies are found then an authorized user will have to go in and modify the appropriate field. This module is to be used by only medical staff for the patient's health information.



Hygieia

1. Date of Visit:

This field is automatically generated based on when the form is filled out based on the date and time of the server running the frontend, but may be changed manually. The format will be *day of the week, month, day, year*. Example (Sun Jan 22 2019).

2. Doctor's Name:

This field is a drop down menu that the medical staff can select which doctor at the time of this visit was seeing the patient. This gives a quick way to see who initially diagnosed the symptoms, and allow for medical review of patients files. Additionally, it allows doctors to keep a record of which patients they have worked with in the past.

3. Start Bed Date:

This field is automatically generated based on when the form is filled out based on the date and time of the server running the frontend, but may be changed manually. The format will be *day of the week, month, day, year*. Example (Sun Jan 22 2019).

4. End Bed Date:

This field will need to be typed in as outpatients and inpatients will stay in hospitals for different lengths of time. The format must be *day of the week, month, day, year*. Example (Sun Jan 22 2019).

5. Bed Name:

This field is a drop down that allows the medical professional to select what bed the patient is currently using. This information is linked up with the backend database that can allow the medical staff to see what floor it is associated with.



Hygieia

6. Room Number:

This field allows the general staff to type what room number the patient is being seen in on the admitted date.

7. Disease Name:

This field allows for the medical staff member to type in what disease the medical team thinks is impacting the patient at this time.

8. Treatment:

This field allows for the medical staff members to type in what treatment the doctor recommends. This essentially allows the doctor to go back and see what treatment was tried before.

9. Medicine Given:

This field is two radio buttons that is labeled *Yes* or *No*. The yes radio button will automatically be selected to ensure that this field is not skipped.

10. Medicine Name:

If the previous field is check *Yes* this field becomes writable and must be filled in to send the information to the back end database. If the previous field is check *No* then this field is not editable and will display *N/A*.

11. Medical Notes:

This field allows the medical team to write a brief summary of notes such as stats on the patient, and descriptions of symptoms.



Hygieia

12. Ambulance Service:

This field is two radio buttons that say *Yes* or *No*. This field will play into effect of the total cost of the bill once the patient is fully recovered. It is important to note that this field only needs to be added once per visit if multiple forms are filled out for the same visit.

13. Billing Amount:

This field is used to tally the total cost of the bill of the service provided on this medical form.

This field must be filled out using dollar signs and decimal points. Example (\$53.68).

Employee Records

Overview: Once the information below is sent to the backend database administration staff can search data up by any of the fields listed below. If any discrepancies are found then an authorized user will have to go in and modify the appropriate field. This module is to be used by only administration staff for hospital employee information.

1. Staff/Doctor Name:

There are three different fields that are labeled *First Name*, *Middle Name*, and *Last Name*.

Using them, an administration staff member will be able to add in the employee's full name which then gets associated with the database on the back end. In this case of doctors their name will get added to a database that is used throughout the other modules.

2. Staff Type:

This field is two radio buttons labeled *Staff* and *Doctor*. The *Staff* button is automatically selected. If the *Doctor* button is selected it will tell the program to add the doctor's name to the database mentioned above.



Hygieia

3. Staff Address:

This field will allow admin staff members to add the employees' physical address which can be used for sending paychecks, notifications, or in cases of emergencies.

4. Staff Social Security Number:

This field will allow general admin members to add the employees' social security number. As the administrator types in the social security number it will be marked with a black circle to hide the information from anyone who is shoulder surfing.

5. Qualifications:

This field is used for describing employees' qualifications like certifications, higher educations, years of experiences, and medical awards won. This information can be useful to human resources when they need to replace staff members, or for annual reviews of qualifications.

6. Certification Expirations:

These fields includes a textbox where the certification name can be typed in, and a second text box that is used to type in the expiration date of the certification stated above. The expiration date needs to be inputted in the following format *month, day, year*. Example (Jan 22 2019).

7. Cell Number:

This field is used to save the cell number of the employees in the following format *xxx-xxx-xxxx*. This information can be used for recalls and emergency situations.

8. Email Address:

This field is a textbox where admin staff members can add a staff member's email address. The field must end with *@xxxxx.xxx*. Example (doctored@ha.net). This will be useful when



Hygieia

getting in contact with staff members in not time sensitive, for example letting them know their certification is about to expire.

9. Payroll:

This field is a textbox where admin staff members can add the base pay of the staff member. This field is then used for pay checks, and review of profits vs lose in the quarterly hospital budget meetings.

10. Shifts:

These fields are a set of drop boxes that have three options of *Morning*, *Evening*, and *Overnight* shifts next to seven labels with the days of the week in each one. This allows the staff members to know when they will be working and can allow for easy modification between the different shifts.

11. Personnel Notes:

This field allow admin staff members to write down any need notes like disabilities, garnish wages, disciplinary actions, or bonuses.

Navigating Hygieia

Overview: This section discuss how any user will navigate through the system to get to the need information. Using the information here will help train and get any employee caught up to speed on this new system.

Login/Logout Page:

When a user first comes to the web interface they are presented a prompt for *Login Name:* and *Password:*. The user will need to type in there user name and then type in their password. The



Hygieia

user name is not case sensitive, but the password is case sensitive and will not allow the user to log in if it is incorrect. Once these two fields are filled out the user will need to click the *login* button which verifies the given information with the database records. If they match then the system lets the user in. If they do not match the system redisplay the login screen with both fields cleared out. Additionally, at the login screen there is a *reset* button that can be clicked to clear both fields.

Home Page:

The system then brings the user to the home page which can be used to see any important announcements the hospital deems necessary for their users to see. On this page there is a *logout* button on the bottom left side of the screen which allows the user to securely exit the system. This method should always be used to logout as it is the most secure way.

New Patient:

Once in the system the list of different modules on the top listed as *Home, New Patient, Medical Files, Employee Records, and Search* which can allow the user to access different pieces of information based on their access level. To reach the *New Patient* page the user only need to click the *New Patient* tab up top. Once there the page displays all the information listed above in the **Module Description** sections. Once all the information is put in the user will need to click the *Submit* button at the bottom left of the screen to save the file to the database; however, before this data is sent back the system will perform a series of checks. The checks will make sure the information is inputted correctly. If any field is inputted incorrectly the system will display a message to the user and clear the field that is wrong. Once the field has been correct



Hygieia

the user will need to click the *Submit* button once again. Additionally, there is a *Logout* button on the bottom left side of the screen as well.

Medical Files:

Once in the system the list of different modules on the top listed as *Home*, *New Patient*, *Medical Files*, *Employee Records*, and *Search* which can allow the user to access different pieces of information based on their access level. To reach the *Medical Files* page the user only need to click the *Medical Files* tab up top. When this screen first pops up it will appear with two buttons labeled *Create a New File* and *Modify Existing File*. If the *Create a New File* button is clicked then the page will display all the information listed above in the **Module Description** section. Once all the information is put in the user will need to click the *Submit* button at the bottom left of the screen to save the file to the database; however, before this data is sent back the system will perform a series of checks. The checks will make sure the information is inputted correctly. If any field is inputted incorrectly the system will display a message to the user and clear the field that is wrong. Once the field has been correct the user will need to click the *Submit* button once again. Additionally, there is a *Logout* button on the bottom left side of the screen as well.

If the user clicks the *Modify Existing File* then the web page will redirect to the *Search* page. All of the *Search* page functionality will be discussed below.

Employee Records:

Once in the system the list of different modules on the top listed as *Home*, *New Patient*, *Medical Files*, *Employee Records*, and *Search* which can allow the user to access different pieces of



Hygieia

information based on their access level. To reach the *Employee Records* page the user only need to click the *Employee Records* tab up top. When this screen first pops up it will appear with two buttons labeled *Create a New Record* and *Modify Existing File*. If the *Create a New Record* button is clicked then the page will display all the information listed above in the **Module Description** section. Once all the information is put in the user will need to click the *Submit* button at the bottom left of the screen to save the file to the database; however, before this data is sent back the system will perform a series of checks. The checks will make sure the information is inputted correctly. If any field is inputted incorrectly the system will display a message to the user and clear the field that is wrong. Once the field has been correct the user will need to click the *Submit* button once again. Additionally, there is a *Logout* button on the bottom left side of the screen as well.

If the user clicks the *Modify Existing File* then the web page will redirect to the *Search* page. All of the *Search* page functionality will be discussed below.

Search:

Once in the system the list of different modules on the top listed as *Home*, *New Patient*, *Medical Files*, *Employee Records*, and *Search* which can allow the user to access different pieces of information based on their access level. To reach the *Search* page the user only need to click the *Search* tab up top. Once at this page the user is able to select a drop down of different fields based on the **Module Description** section. Next to this drop down box will be a textbox that the user will type in the phrase they are looking for. This will not be case sensitive to allow for maximum search results and ensure no medical documents are missed for a patient. Then the



Hygieia

user will need to click the *Search* button at the bottom of the left hand screen that will bring up the list of documents a user is looking for. The user will select the file they wish to see and based on permissions will be able to modify the file or record. It should be noted that only one file or record can be view/modified at a time. Once changes have been made or reviewed the user will click the *Done* button which will save any modify data. Additionally, there is a *Logout* button on the bottom left side of the screen as well.

Minimum System Requirements for Hygieia

Hardware:

- 2.5 GHz processor
- 1 GB of RAM
- Internet Connectivity

Software:

- JDK version 8.0
- Tomcat version 8.0
- MySQL version 5.7
- Servlet as backend
- JSP/HTML/CSS/JavaScript as a frontend



Hygieia

Test Plan

The first part of the test plan is to verify that all web pages pull up properly within the system. Then the next part of the test plan is to try different inputs into each of the forms. The attached document shows a list of inputs for each form that will be tested. These inputs will help to ensure that our Hygieia can accept and handle proper and improper data. The first set of data is proper data and the goal of this test set is to see if data is transfer back to database properly. The next set of data is set to test improper values. Some of the values are letters and symbols where numbers should be and vice versa. The other data is common SQL injections attacks, which we chose to use since we are running a MySQL for the backend database. When this improper data is submitted to the system error messages should display to the user, telling them what field is wrong and clear out that field.

Additionally, we will attempt to get to each web page without logging in, and we expect that each attempt will redirect us back to the log in screen. Then test plan will then consist of trying to search for patients, employees, and medical files using the search page, which we expect to pull only proper documents related to the search field. Finally, test will include an attempted denial of service by trying to open multiple connections simultaneously.