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# Medical Record Management Recommendations

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### Research Question

Our task was to find how to select a reliable and efficient way to store and access sensitive details in medical records, including health card number. This requires investigation because keeping data online is always considered insecure. Transferring data from one server to another can be intercepted if the necessary security steps are not taken. The client is looking for a system which allows the facility to store student records online, and also allows parents to access and update their child’s records remotely.

### Medical Records

Medical records are considered to be private data that should not be available for any third party or external audience members without the permission of an individual. In this case, the health card number is considered to be very sensitive in addition to other personal information. However, since the South End Community Day Care is not keeping this information for the purpose of medical treatment, they are not obliged to meet the same standards of security as medical facilities. Instead, the South End Community Day Care is required to provide only a “reasonable” level of security. Our team has interpreted a “reasonable” level of security to mean that precautions have been taken to ensure that the private data of individuals remains inaccessible to unauthenticated users.

### Options for the Online Management of Student Medical Records

The following are potential methods of implementing the online management of medical records. The methods below are of varying levels of security, and will be evaluated based on security, usability, and ease of implementation.

#### Option 1: Using a third-party tool:

The first option we are presenting is the use of a third-party tool. There are many pros and cons to this option:

Pros:

* Easy to use. Given that a wide variety of third party tools for data management are available, it would be up to the team to choose one that is most easily usable by the client. Since the use of a third party tool requires little to no development by the team, more time could be devoted to finding a tool that is easy for the client to use.
* Easy to maintain. Third party tools are maintained by the third party and thus require little maintenance from the client.
* Updates to security are provided by the third party. A well maintained third party tool will make regular updates available to its users. By installing these updates when they become available, the client can ensure that their application remains secure.

Cons:

* Dependent on a third-party service (dependent on third-party tool working and being updated). If a system is dependent on a third party tool, the system will quickly become outdated if the third party ceases to update and continue work to provide that tool. In that case, the medical record management system would need to be redesigned to work with another third party tool.
* May be interrupted and unusable when feature is under maintenance.
* Questionable security. A third party tool from an unknown vendor can only provide an unknown level of security. There is no way of knowing what the capacity of the third party is to provide or guarantee the security of data.

An example of a third party application is *JotForm.*

#### Option 2: Using plugins or features from well known contributor:

The second option we are suggesting is to use different plugins or features from a well-known and reliable contributor. There are many pros and cons associated with this option:

Pros:

* Easy to use. Using a plugin or pre-built features does imply ease of use. Again, the wide variety of premade functionality available does give the development team the ability to select a tool that is usable by the client.
* More secure. Using a plugin created by a well known contributor such as Google or Microsoft can give the client some confidence that the plugin has been well made with all the resources of a reputable and knowledgeable contributor.
* Easy to maintain. A pre-built feature is maintained by a third party and will therefore be maintained by the third party. This takes the onus off of the client to maintain the system.

Cons:

* Will be interrupted and unusable when feature is under maintenance. Because the system will be dependent on the third party function or service, maintenance and service schedule will be out of client control.
* May not be free and may have monthly subscription. Using the product of a well known contributor often comes with an associated cost. While there are reputable open source softwares available that may meet client needs, it is likely that a feature built by a larger company will have a cost.

Some examples of plugins that fit these criteria are *Google*, or a WordPress Form which has a combination of form, database and security plugins. Three examples of the WordPress Form plugins are *Ninja Forms*, *BulletProof Security*, and *Sucuri Security*.

#### Option 3: Creating a custom database:

The third and final option we are suggesting is to create a custom database. There are many pros and cons associated with this option:

Pros:

* Can be designed to fit user needs. A third party tool may meet most user needs, but a custom tool would be designed with the client in mind and thus be able to meet all client needs.
* Most secure and reliable for sensitive data. The creation of a custom database would allow the team to provide custom security. This would give the client a way of controlling the level of security being implemented in the medical record management system.
* Could use encryption algorithms to ensure the safety of the data.

Cons:

* Must be updated by the user. A system that is not maintained by a third party means that the client is responsible for maintaining the level of security of the system as well as updating the software. This implies prolonged support on behalf of the development team, which may not be realistic for a development team composed of Community Outreach students.
* Can be difficult to implement. A custom system will take a development team significant time to research and plan the best possible solution. It will then take additional time to implement and test that solution before it is ready to be released to the client. It may be not be possible for such a system to be implemented by a Community Outreach team in a single term.

Methods of implementing a custom database are many and varied. There are a very large number of database tools available such as:

* Creating a database through MySQL
* Using phpMyAdmin to maintain the database
* Creating a web server (which is used by mainly large organizations)

**Recommendation**

When dealing with sensitive data such as medical records and other personal records, we recommend creating a database using an advanced encryption algorithm. These databases can be managed by using MySQL to create the database, and phpMyAdmin to update and maintain it. Furthermore, MySQL is supported and used in WordPress so it would be possible to attach the database to the current South End Community Day Care website.

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