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## Project Proposal: Universal Electronic Dental Records

### Vision

We envision a product to make the lives of dental professionals easier by consolidating all patient information into a tool with electronic patient records. This tool will be used by dentists, their staff, and patients. The dentist and staff will be able to update the patient records while the patients will be able to view their personal records but not make changes to the data.

A long time pain point of the healthcare industry is the notion of paper records. A pipe leak, fire, or other incident can lead to the loss of an entire clinic's records of their patients. Those patients won't be able to use the old information for any future visits. While many dentists are moving to using electronic dental records, there is no standard for the industry.

The notion of a central database of electronic records also serves to reduce redundancy between clinics. Patients may change their primary dental clinic multiple times during their lifetime, thus needing to transfer their information over and over. This serves as an easy way for patients to give their new dentists their dental record history. Our product will reduce the amount of busy work for dentist professionals and patients as well as serving as a safeguard against any incidents that may destroy paper records.

### Software Architecture

We believe that this product could provide great benefit to dental professionals and patients. We are also confident that this is a task that can be accomplished within the allotted eight week period, as we have narrowed the scope by focusing only on dental records. Our high-level view of the architecture of this proposal is that of a Model-View-Controller architecture. These components would be represented by a database, a website, and a server, respectively.

We will be using a database, such as PostgreSQL, which will serve as the storage facility of the patients' data. We will encrypt the contents of the database by using strategies such as one provided by the Guardian Project or by mandating a stringent authentication process.

Our view component would be implemented as a website; we're considering using technologies such as Ruby-on-Rails or HTML5. It would also require some sort of authentication in order to access any patient data. The view would communicate with the server to manipulate and display data within the model.

The server, which may be implemented using Heroku services, will communicate information from the database to be displayed on the website. Furthermore, the server will be responsible for marshaling data across the front-end to the database whenever authenticated changes are made.

The most interesting and important technical aspect of this project is the undeniable need for security. In vein of this, we need to be very careful and compliant with current patient information rules and regulations in implementing this project.

### Challenges and Risks

Our most serious challenge is figuring out how to gain and maintain the trust of our customers; in this case, the trust of both dentists and patients. As with all personal and sensitive data, the privacy of our patients is always paramount. We will have to decide how to allow dentists and patients control the privacy of their information.

The Health Insurance Portability and Accountability Act, or HIPAA, provides an outline of what the industry standard is when it comes to confidentiality and privacy. In following with one of the most important aspects of the requirements of this Congressional act, our design must also require that personal health information be handled in a strictly confidential manner and be well-protected.

To build up and maintain trust, we will have to talk to several people about their concerns. We will talk to current dentists and their office staff on how they manage the privacy of their patients. We will also talk to current dental patients about what is important to them in terms of privacy and keeping these records secure.

Data integrity is also another important issue under trust. We need to make sure dentists who review patient records trust the information that is there. We will only allow verified dentists to edit health records while allowing patients to comment on those records. For example, a dentist can update a test for periodontal disease for a specific patient. That patient cannot change the numbers on the test chart, but can comment on it with questions. Thus, that same dentist or another dentist that reviews the patient's chart can confidently assume that the dental records have not been altered in an authorized way.

Finally, we will also need to implement some form of a secure login system. This could include salting login information, using 2 factor authentication, or multiple security questions. We can minimize the amount of time someone can stay signed into the website to view information; for example, we would not use cookies or have a browsing expiration time of an hour. This will prevent unauthorized persons from accessing patient information.