

# Patient Database and Manager

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## Abstract:

Create a web-based database driven Patient Manager and Database application that will assist medical professionals with following their patients and collecting meaningful clinically relevant information in an electronic format that is searchable / queryable. The application's goal is to revolutionize patient care and accelerate research and discovery.

## Detailed Description:

Current electronic medical records systems provide functionality that facilitates the provision of medical care and administrative and billing functions; however, they fail to address key clinician needs. Clinicians have a need to follow their patients over time, not only when they are in the hospital or visiting for an outpatient appointment. Clinicians also have a need to collect and store specific disease related data on their patients in a format which can be accessed and searched at a later date to follow outcomes or identify patients that may be candidates for particular therapies or interventions. Current electronic medical records systems are 'one-way' systems that provide a means to report laboratory data or dictated or typed clinical notes from patient visits and procedures, but not much beyond this. They solve the problem of inaccessible paper patient records by creating a means for accessing medical records from any location with a computer that can access the medical records system; but they fail to offer any functionality beyond this. Electronic medical records systems do not provide a means for physicians to search and identify patients they have cared for with particular diagnoses, patients that had a particular pathology finding, surgery or procedure, or patients taking a particular medication. They also fail to offer physicians a means to store information that they have determined is clinically relevant in a format that is readily searchable. The only way for a clinician to enter data into electronic medical records solution is through a clinical note (either a dictated report or a type written note). This does allow for rich clinical data to be stored but it is stored in loosely organized and inconsistent language that is not robust so the information cannot be queried efficiently at a later time. Data storage in such formats does permit free text key words searches; however, this is a query technique which is laborious and very inefficient. Though this would be a starting point, most electronic medical records systems do not even provide this functionality. Free text word searches will identify any instance where a given word is mentioned. For example a pathologist may state that a surgical specimen is positive or negative for a given immunohistochemical stain; however, in addition or in lieu of using the words positive or negative, the pathologist may use other language to denote the results such as, the specimen stained strongly for xyz immunohistochemical stain. So if a physician wanted to identify all patients that were positive for xyz immunohistochemical stain, they would have to do a free text search for the stain and then sort through all the records to identify only those patients that stained positive and this would require them to read each report. Again, this is very labor intensive, inefficient and provides room for human error. However, if the data were stored in a more robust format (i.e. the pathologist

was able to enter a binary answer for positive or negative staining), it would be very easy to search this data and identify a particular group of patients very quickly and efficiently.

There are infinite numbers of examples across just about any medical institution or practice where clinicians have created their own patient databases to address this un-met need. However there is no universal tool to help them do this and doing this requires specific know how with a database program of some sort, a skill possessed by only a minority of medical providers. Their solutions are by and large not networked and are created by manual data entry (as opposed to data feeds) and chart abstraction (for clinical data that has to be abstracted from a dictated clinical note, i.e. the presence or absence of a particular finding on physical exam at the time of admission to the hospital). Data collection in this manner is, to say the least, inefficient, error prone, and creates lots of duplicate work. There are problems with version control and data security. Moreover, the need to use and have familiarity with software packages that can be used to keep a database of patients (i.e. Excel, File Maker Pro, Access, MySQL, etc.) and the difficulty and high degree of effort required to keep a database like this is in many instances a deterrent to doing so and as a result some aspects of patient care suffers and easily answered research questions go uninvestigated.

The Patient Manager and Database application will assist clinicians with following their patients and collecting clinician determined clinically relevant information in an electronic format that is searchable / queryable. The application's goal is to revolutionize patient care and accelerate research and discovery. The creation of this tool will result in a paradigm shift in the practice of medicine and will provide functionality heretofore widely unavailable and unutilized. The impact this could have on medicine could be as powerful as the introduction of the assembly line in automobile manufacturing during the industrial revolution. The Patient Manager and Database solution will bring medicine into the information technology age, a change long overdue.

## Examples

Imagine a new preventative medical therapy has been developed for asthma and clinicians want to identify all of their patients that have the disease; currently the electronic medical records systems do not permit searches by diagnosis, so the clinician will only be able to share information about the new medication if and when they happen to see their patients with asthma in the ER, the office, or the hospital undermining the entire concept of preventative medicine.

Or say several patients within a clinician's practice with asthma have been started on a new therapy and the clinician wants to see i) how they have done compared to similar patients with asthma that were not started on the therapy; and ii) whether there is any difference in how asthma patients that are smokers respond to the therapy as compared to those that are non-smokers. The clinician knows the specific pieces of data or endpoints that would be helpful to keep track of to determine if the patients are truly benefiting from the new medication (i.e. ER visits, the number of hospitalizations, any exacerbations requiring intubation, etc.), but the current medical records system does not allow him to identify these patients nor create a custom form / data collection instrument. To do the study, the clinician would have to go through a painstaking process of combing through every clinical note of all their patients in order to determine which patients have asthma and are or are not taking the medication, which of the

patients are smokers, and how each patient has done since starting the medicine. If this is too hard and time consuming, the clinician is likely not going to look into the question, even if the answer may provide useful information that would improve patient care and advance the field. However, imagine if the clinician could create a custom form that would allow documentation of the relevant data needed to answer the question in a searchable format that would be a part of his or her personal patient database. For example, data the clinician might collect could include whether the patient is taking the new medication or not, whether the patient is a smoker or not, the dates of ER visits, the dates of hospital admissions, and the dates of any asthma exacerbation requiring intubation. Once the clinician has created the form, he or she can then search his or her database of patients (because the database has this functionality as compared to the current medical records systems) for patients with asthma and add the form created to their record in the database (essentially add the new fields associated with the form to the patients database record). The clinician and their staff can then retrospectively review the medical records of their patients with asthma and fill in the answers to these questions. In addition, the clinician can begin to collect this data prospectively when he or she sees patients with asthma in the office, the ER, or the hospital by adding the fields to each patients record and populating them with data. Over time, the clinician will have created a searchable database with robust well organized data that can be easily queried. All of a sudden the clinician can answer a question in a matter of minutes that previously would have taken months to answer. The patient database and manager would allow clinicians to easily i) identify patients by various criteria (diagnoses, medications, smoking history, etc.) permitting the optimization of patient care and the practice of truly preventative medicine (i.e. offering patients new treatments that may come available right away rather than waiting to do so when the patient presents to the emergency room or happens to have an office appointment); and ii) answer important research questions accelerating the advancement of medicine.