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Interaction Design
1 October 2021

Milestone 1:

The origins of Electronic Health Records (EHRs) can be traced back to the development of Problem-Oriented Medical Records (POMRs) by Dr. Lawrence Weed in 1968, but despite several decades of use and innovation, many 21st century healthcare professionals have criticized modern EHRs for their inefficiency and unintuitiveness[1].

Our list of potential users encompasses clinics or hospitals of all sizes. While any clinic might take interest in our system, our target users are smaller clinics, specifically clinics that cannot afford to use existing software due to these programs being too expensive. Within any clinic the users would be the nurses and doctors who are dealing with patients. We are placing an emphasis on making our system inward-facing. Therefore, our target users will not consist of patients. Our platform is to be accessed solely by the administration of a clinic or hospital.

Our users are seeking a platform that allows them to easily and efficiently access and track patient data. Therefore, when using our platform, users should be able to query, modify, and add to patient information. This information will include name and contact info, medication, notes, and appointments. We are keeping these ideas in mind as we design our system and will ensure to include the functionality of tracking and updating patient information. Our system will have a well designed backend as well as an intuitive and efficient frontend. We will emphasize efficiency and ease of use, especially when it comes to looking up a user. Our platform will come

[1] https://www.icanotes.com/2019/04/16/a-history-of-ehr-through-the-years/

equipped with a space for practitioners to add notes about their patients and will allow users to adjust font size.

What is this a solution to? Why is it needed?

- Small clinics and hospitals often serve underrepresented areas
- Being smaller and often less well-funded, they don't always have the money and resources to purchase a larger scale EMR
    - Also, systems like Epic are made for giant hospitals and so they don't work as well w/ family-run, more poorly funded hospitals and clinics
- Our project would be filling a gap for an underrepresented community

Task analysis

Our system will be a web application so users are likely to use a desktop or laptop. Our web application is not intended for mobile use. Our system will also be used in a private area because we will be dealing with sensitive and private information in regards to patient data. Therefore, we will be adding security measures so that patient data is protected from the public eye. Currently, our web application is intended for communities in the United States due to the language barrier. Our ideal communities are low income areas where clinics do not have the income to purchase expensive software to manage records and perhaps even currently manage their records by hand. Using our software will ideally enable them to manage the records of a greater number of people and allow them to help more people living in these low-income areas. Our stretch goal is to have our software be equip to handle multiple languages.

Hierarchical Task Analysis:

1. Log In
    a. Enter Username
    b. Enter Password
    c. Click to Log In

2. Look up Patient
    a. Type in patient name
    b. Select on correct patient
3. View Information
    a. Find desired type of information (symptoms, diagnosis, medications, appointments etc.)
4. Enter Information
    a. Select desired field
    b. Enter/Update information
    c. Save changes

Current similar systems exist however there aren't really any that track the totality of a patient's data. The design of the current systems as well is really bad according to several studies (see bottom of page).

"Electronic medical record software (EMR) – used to store data like medication types and dosage, past and planned procedures, and data on the patient's recovery course"

I think this project actually fits in perfectly with the diversity theme b/c the patient-base that a type of hospital like the ones using Epic (see New Yorker article) will use are incredibly diverse in terms of age, race, gender, and socioeconomic status.

Questions about scope:

- Is this system for doctors *and* admin or just one or the other?
- Is this for giant hospitals or small clinics?
- What different information will the interface display?
- What different information will the backend hold?
- How will users login?
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Things to incorporate

- autogenerated receipt detailing visit sent to patient email on file (so people don't forget to ask for a doctor's note)

https://www.newyorker.com/magazine/2018/11/12/why-doctors-hate-their-computers

"More than ninety percent of American hospitals have been computerized during the past decade, and more than half of Americans have their health information in the Epic system."

"I did fine with the initial exercises, like looking up patients' names and emergency contacts. When it came to viewing test results, though, things got complicated. There was a column of thirteen tabs on the left side of my screen, crowded with nearly identical terms: "chart review," "results review," "review flowsheet." We hadn't even started learning how to enter information, and the fields revealed by each tab came with their own tools and nuances."

"A 2016 study found that physicians spent about two hours doing computer work for every hour spent face to face with a patient—whatever the brand of medical software. In the examination room, physicians devoted half of their patient time facing the screen to do electronic tasks. And these tasks were spilling over after hours. The University of Wisconsin found that the average workday for its family physicians had grown to eleven and a half hours. The result has been epidemic levels of burnout among clinicians. Forty per cent screen positive for depression, and seven per cent report suicidal thinking—almost double the rate of the general working population."

https://www.nuffieldtrust.org.uk/files/2017-01/delivering-the-benefits-of-digital-technology-web-final.pdf

https://bmcanesthesiol.biomedcentral.com/articles/10.1186/s12871-019-0757-z

Forty-three (43%) interviewees provided problems regarding the presentation of information. The participants complained that they consider the display of information in current monitoring confusing, e.g., the information is number-coded, and interpretation requires skills. The participants reported that they often feel overloaded with information. In addition, participants complained about a lack of standardization in the design and presentation of monitoring information between different manufacturers and hospitals. Eighteen participants (14%) mentioned software interface design aspects, e.g., a lack of intuitiveness in interface designs and the importance of customizability.