CS 5555 Lab 1: Hands on with EHR (Practice Fusion)
Fall 2015

Pre-Work

- Work with Anas to make sure you have access to our instance of the Practice Fusion EHR

Objectives

- To expose students to a "real" Electronic Health Record (EHR) and some of the associated common workflows.
- To stimulate students to think about limitations of current systems, and new ways to improve the functionality of EHRs, and to interface with EHRs

Approach

- Students will conduct several exercises within a commercial EHR, write up notes on the experience, and sketch out an idea for how the EHR could be improved or enhanced.

Details

- You will conduct the exercises outlined below in detail using a free instance of a commercial EHR called Practice Fusion. You will get an invite from the system once Anas has your email registered with the system. We have no financial disclosures regarding this company - only using it for convenience and cost (free).
- While going through the exercises, think about the functionality you are experiencing and the user interface design. Take notes about what you like and don't like about the user experience, and any ideas about how things could be improved.
- Finally think about how systems outside of the EHR could provide value - either upstream (getting data into the EHR that can then be seen/used by clinicians when interacting with patients) and downstream (leveraging data that could be extracted from the EHR).
- If you get stuck on anything below, refer to the Practice Fusion knowledge base or tutorials. If that doesn't help, feel free to reach out to Dr. Stein.

Deliverables

- The name and record number of the patient you created (details below). We will review your patient's chart to see that you completed the exercises.
- Write up some observations/questions that arise from the exercises - feel free to discuss any (you don't need to answer all of them) of the questions written into the exercise instructions (in ***bold italics***) or any others you came up with yourself. (No more than 2 pages)
- A 1-page description and mock up of a new tool/solution that could interact with the EHR either upstream or downstream of the clinical workflow, or even a "plugin" that could work inside of the EHR - you can use words, graphics/drawings, or both.

Mentor: Dan Stein

Exercises

1. **Chart Walkthrough**
    a. Navigate to the Charts section, and choose the test patient, “John” (record # DP278077).
    b. Summary view: Note and explore the different sections in the summary view of this patient’s chart:
        i. Flowsheets - these are templates for documentation of structured data. The example in John’s chart is “Vitals” - follow the link to see what we mean by vitals.
        ii. Diagnoses - This is where we record what is often called a patient’s “problem list.” ***What do you think is represented by the numbers in parentheses before the diagnoses?*** Search for a few of them on the Web, and then read a bit about this coding system and the one that is soon to replace it.
        iii. Social history - note the patient’s smoking status is here. Things like alcohol and drug use, and sexual activity are also often documented in this section. See this interesting letter to the editor in Academic Medicine (blue highlight) on how social history is documented by physicians.
        iv. Past medical history - this is where pertinent past diagnoses, major medically related events etc. are recorded. Sometimes (not in this case) clinical documentation will separate past surgical history from past medical history to document previous procedures. Click the pencil icon to see some of the suggested topics to be covered in the past medical history section.
        v. Advanced directives - these are legal documents that instruct a care provider on a patient’s preferences for end-of-life care, for example if he or she would want to be resuscitated in the event of cardiac arrest or intubated if unable to breathe. ***Quite often this goes undocumented in the official chart - can you think of some reasons why?***
        vi. Allergies & Medications - more on these later
        vii. Encounters - Each encounter a patient has with a healthcare provider/organization must be documented in the medical record. Note this patient has three previous encounters, for three different “Chief Complaints” (CC).
2. **Create a Patient**
    a. Click back to the main “Charts” section, and click the orange “Add patient” button on the top right of the screen.
    b. Create a new, fake patient that you will use for some test documentation.
        i. Note the mandatory fields in the “Patient Information” section. ***Do you think this is enough to prevent issues with people with the same name*** (hint - it’s not at a big medical center - why not?).
        ii. You can skip the “payment information” section - though this is a key part of registering a new patient in any real practice or medical center since it’s what pays the bills.

iii. Demographics - **why do you think these distinctions of race/ethnicity are important in healthcare? What are some limitations and issues associated with recording this?**
iv. Care team/registry information/ clinical data exchange - More and more we are building tools into EHRs that enable communication with other care providers, and between care providers and patients.

3. **Create an encounter** with your new patient: When a patient comes for an office visit, the encounter must be documented - typically with the following elements. Go through the process of documenting an imagined visit with your new patient. Pretend you are a primary care physician (an internist) and that the patient is coming to you with a sore throat.
    a. Open the patient's chart through the "Charts" activity
    b. On the top right, click the orange, "New Encounter (SOAP)" button
    c. Note the highlighted yellow bullets. These are alerts, and this functionality is often referred to as Clinical Decision Support (CDS).
        i. Certain elements must be documented for all patients for the purpose of patient safety and quality of care.
    d. Encounter Details
        i. Click the drop down menu for "Encounter Type" and note the different types of clinical encounters you can document - for the purposes of this exercise we will conduct an "office visit"
        ii. Under, "Note Type" we will select "SOAP Note" - this is a classic way to document a clinical encounter:
            1. S = Subjective (what the patient has to say about what is going on, why they are seeking care)
            2. O = Objective (what the clinician observes clinically, purportedly more "objective" than what the patient describes)
            3. A = Assessment (what the clinician believes is the underlying medical problem)
            4. P = Plan (what will be done for the patient, such as any new medications, procedures, etc.)
    e. Chief Complaint
        i. The chief complaint is typically documented in "the patient's own words" and represents the main reason why the patient has shown up for the visit. Record a chief complaint related to a sore throat for your patient. **Why do you think we differentiate between the chief complaint (the patient's words) and the "actual" diagnosis?**
    f. Flowsheets
        i. Vitals: record some vitals for your patient. In a given encounter we typically measure and record basics such as temperature, blood pressure, heart rate, height and weight. Other items may be measured depending on the clinical context. Put some values in for your patient. Make up a height and weight and note the calculated BMI.

g. Diagnoses
    i. Hit “record” under Diagnoses and add the following diagnoses to the patient’s problem list:
        1. Add diagnoses of diabetes and high blood pressure to your patient’s problem list. Note and play around with the terminology mapping. For example, if you type “high blood pressure,” you won’t actually see that in the returned list. Why not? Are the things that you do see relevant anyways? What must be going on in the background to achieve this? There are several company that are very busy providing the infrastructure for user-friendly diagnosis lookup in EHRs (see IMO), especially in the context of switching from ICD-9 to ICD-10).
        2. Add the presenting problem of sore throat to the patients diagnoses, and be sure to check of the “acute” checkbox under “Acuity.” Again, note the terminology mapping when you type “sore throat” into the search box - there are lots of different types, each with their own corresponding diagnostic code. **Do you think that there is enough or too much granularity regarding the terms for describing what is going on with your patient?**
h. Allergies
    i. When documenting allergies, there are several details that are critical to evaluate. Just noting a “peanut allergy” or an allergy to penicillin is not enough to make some tough clinical decisions regarding a medication that is needed despite known allergies.
    ii. Add an allergy to penicillins to your patient. Make it a “severe” severity, and document a serious reaction such as anaphylaxis or respiratory distress.
    iii. Medications
        1. Add some medications to the patient’s med list, as instructed below. You can either select a medication and just hit “done” or you can walk through the “Order” process, which will ask you for more details. As we won’t actually be sending the scripts to a pharmacy, if you go through the “Order” process, you can finish the medication entry by hitting the drop-down menu that says “Print Rx” and selecting “Record.” These prescriptions will not be valid, so don’t bother hitting “Print Rx” :) In real life, you would likely be sending these prescriptions electronically to a pharmacy.
        2. Let’s assume that we diagnose the patient’s sore throat as strep throat. We will prescribe the patient Amoxicillin, 500mg tablets. Type “Amoxicillin 500” into the search bar and choose the oral capsule or tablet. If you properly entered the allergy to penicillins as instructed above, you should get an alert. This is an ideal Clinical Decision Support intervention - the clinician gets an alert

in the moment that a mistake might be happening. One of the more famous cases of a medical mistake, the case of Libby Zion, resulted in a national reduction in medical resident work hours. This was a case of prescribing a medication that can result in fatality if used in combination with another medication that this patient was taking. Review the article linked to above. **Do you think that a mistake like this could have been avoided by decision support implemented in a manner similar to what you're observing here when trying to prescribe your patient Amoxicillin?**

3. Add a couple of other medications to the patient's record. Note how the system helps you write the "sig" (short for "Signatura" from Latin "signa") - this section contains the instructions to the patient on how to take the medication. Also note and click on the drug-specific resources provided, such as the MedlinePlus article and patient education materials.

i. Social/Past Medical History
    i. Record some fictional history items for your patient. Refer to discussion in the Chart Walkthrough above (1.B.iii and 1.B.iv) for insight into these sections.

j. SOAP Note
    i. The sections of the SOAP note are not structured beyond the "S," "O," "A," and "P" sections. The soap note is where the thoughts of the clinician are recorded, and it therefore arguably contains the most relevant information regarding the health of the patient. Physicians are trained to think about patients in terms of a "story" or "narrative," and therefore it is most natural for them to document their thoughts in an unstructured narrative documentation format. **What implications does this have for data mining EHRs?** More to come in our Natural Language Processing lecture later on in the course...

k. Screenings/Interventions/Assessments
    i. This is where you can document various procedures or record the result of a variety of screening assessments.
        1. Type "referral" in the search box to see some examples of how you might document the results of a referral to some other type of provider
        2. Type "chest" to see some of the procedure-related results you might document that are related to a particular part of the anatomy.
        3. Type "depression" to see how you might document the results of some standardized screening tools.

4. Note that in “real life” you would actually have to create and transmit orders for any procedures, or create and transmit a real “referral” to get outside input, but since we have nowhere to transmit such an order, we’ll skip that for this exercise. In this EHR done through the “Actions” button on the top right of your screen, click on it and have a look for fun.

l. Observations & Quality of Care
    i. These two sections provide a way to provide structured (computable) ways to prove that you have assessed certain items or completed certain tasks for your patient that are considered mandatory, either clinically or per regulations or incentive programs. ***How does this relate to the question asked above in 3.J.i above?***

m. Care Plan
    i. This is an interesting concept that provides a space for you to document a plan that will be viewable by the patient. This has become more common as patients gain access to “patient portals” which give them direct access to their medical record. Hit “Record” and write something in the box. Note the disclaimer above the entry box that states, “Shared with your patient via the PHR.” ***Why do you think it might be important to make this obvious to the documenting clinician? Should all elements of the patient’s chart be accessible to the patient? Why or why not?*** See the Open Notes initiative for an interesting take on this.

n. Referral
    i. This is where you would add a real referral to another clinician or clinical service. You can skip this for this exercise.

o. Superbill
    i. Billing for clinical encounters is a complex process and beyond the scope of this exercise. Feel free to play around with the “superbill” which is an itemized list of what was performed for the patient that is submitted to the patient’s insurance company. If you’re curious, assume that we did a throat culture for the patient’s presumed strep throat - you can use CPT code 87880 in the procedure search. You would need to associate the procedure with an appropriate diagnosis that explains the need for the procedure. In this case you would probably enter acute pharyngitis (ICD-9 462).

p. Wrap-up
    i. That concludes our walkthrough of documenting an office visit for your patient. It was certainly simplified, but it gives you an overview of the types of things that you would need to document in the EHR, and what the user experience is like for at least one commercial EHR.
    ii. By the way, did you notice the banner ads at the bottom of the page when using Practice Fusion? What types of products were they marketing?

What do you think about this? This free EHR model is a bit atypical in the marketplace but has its own set of interesting challenges.

iii. Before you finish, scroll back up to the top of the screen, and hit the "Refresh" link at the top of the yellow section with the clinical alerts. Note that there are several diabetes and hypertension related alerts that now show up, given that you added these diagnoses to the patient's problem list.

iv. When you are done, click the orange "Sign" button at the top right of the encounter to finish your documentation. ***Why do you think it's important that once a patient's note is signed it can't be changed?*** In the old days the analog was that we had to document our paper notes with pens and not pencils…