Introduction to EMERSE

October 16, 2019

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slides: http://bit.ly/emerse-october-2019

If you're thinking of taking notes…

these slides can be found at:
(link will be on most slides)

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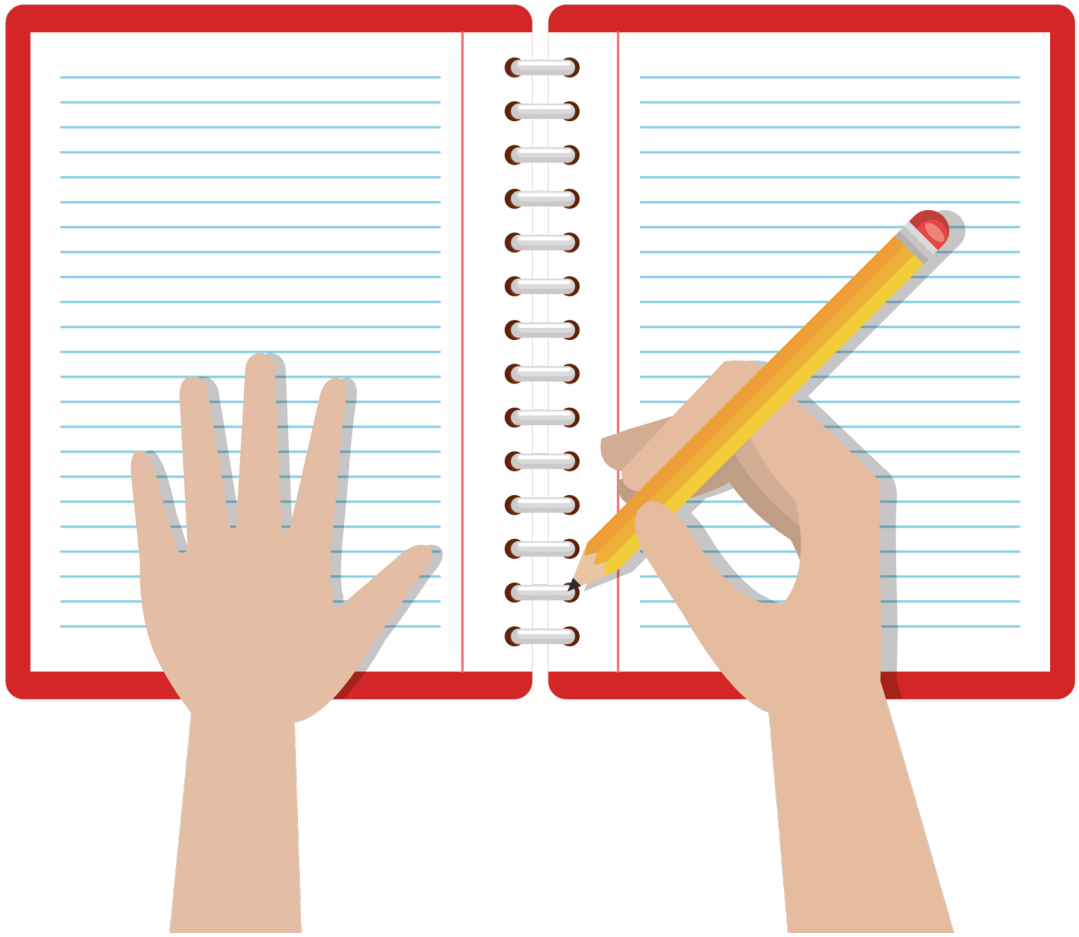

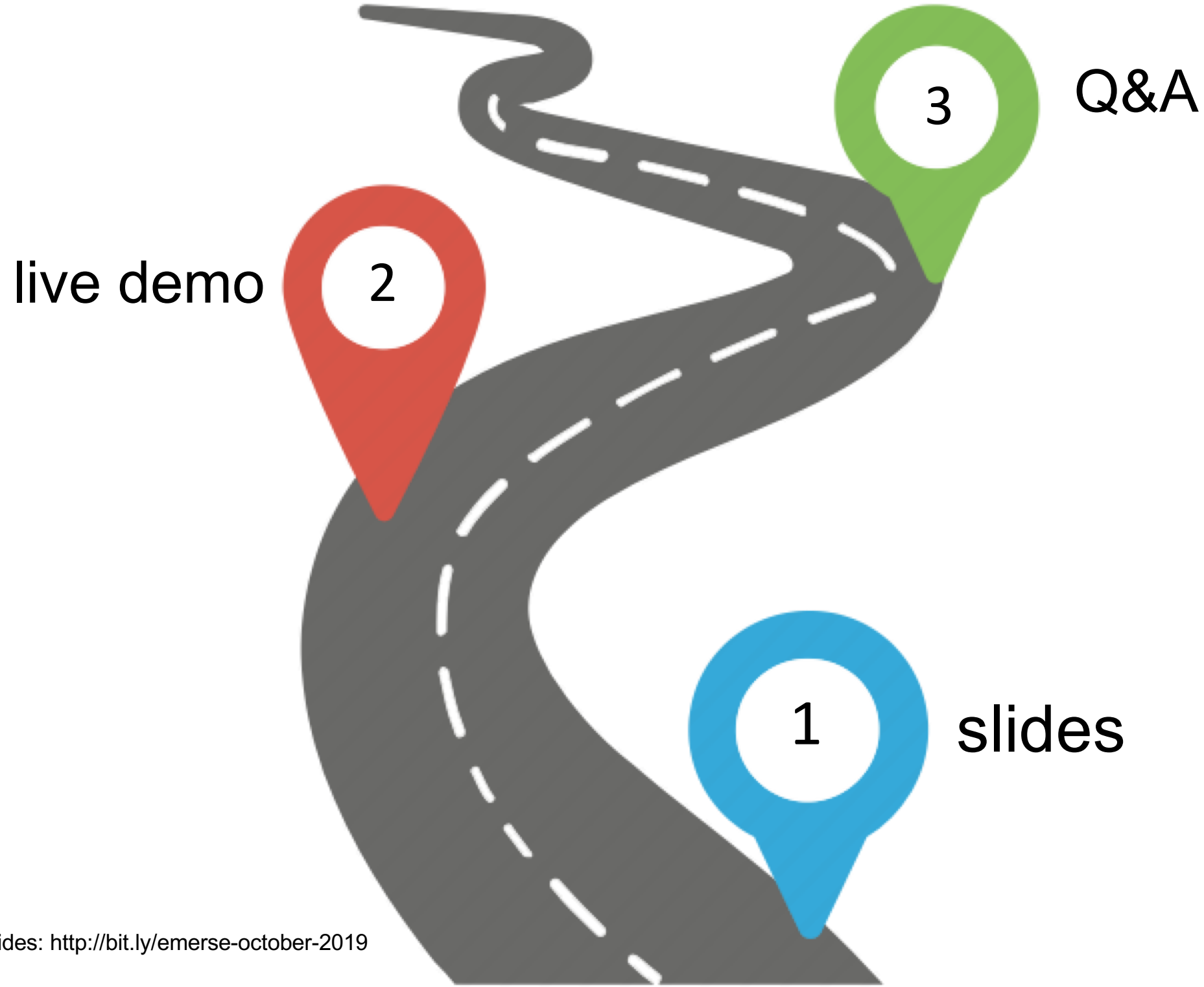

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- What is EMERSE?
  - A search engine, kind of like Google
  - Pretty easy to use (but does take some learning…health data are complex)

- What isn't it?
  - It's not natural language processing (NLP), but your task may not actually need full NLP

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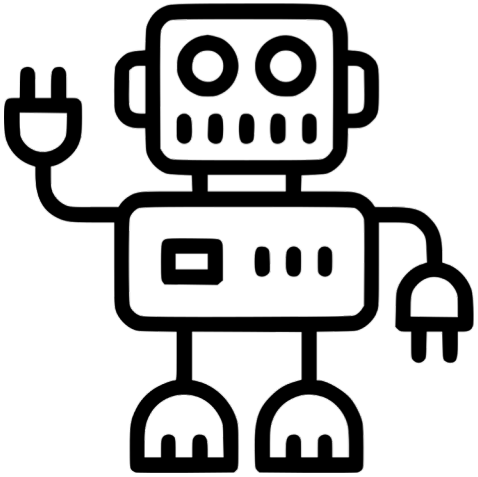
EMERSE is “augmented intelligence”

natural language processing is “artificial intelligence”



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- What does EMERSE do?
  - Helps find a cohort when you don't know who the patients are, or no specific ICD code exists:

    "***I want to find all patients in the system who have Elhers-Danlos syndrome type 4***"

  - Helps find details in patients notes if you have a cohort already identified:

    "***I want to highlight all mentions of beta-blockers in the notes and instances of chest pain***"

- What doesn't it do?
  - There is no "download the notes" feature (you are meant to view them within EMERSE).

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- What's in EMERSE?
  - Free text notes (170 million) from all of our Michigan Medicine patients (2.5 million)
    - History & Physicals, Progress notes, discharge note, outpatient notes, radiology report, pathology reports, etc.
    - CareWeb and Michart data (about 1995 – present)

- What's not in it?
  - Structured data
    - discrete lab values
    - vital signs
    - billing codes
  - For structured, DataDirect: **datadirect.med.umich.edu**

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EMERSE is for this	DataDirect is for this
unstructured data (free text)	**structured data**
Mrs. Jones is a 56 year old female with a history of HTN, hypercholesterolemia, and T2DM who comes to the clinic today with a 3 day h/o dizziness and severe headache on the left side.	WBC: 5.6 Total cholesterol: 182 Weight: 67.4 AST: 30 ALT: 52

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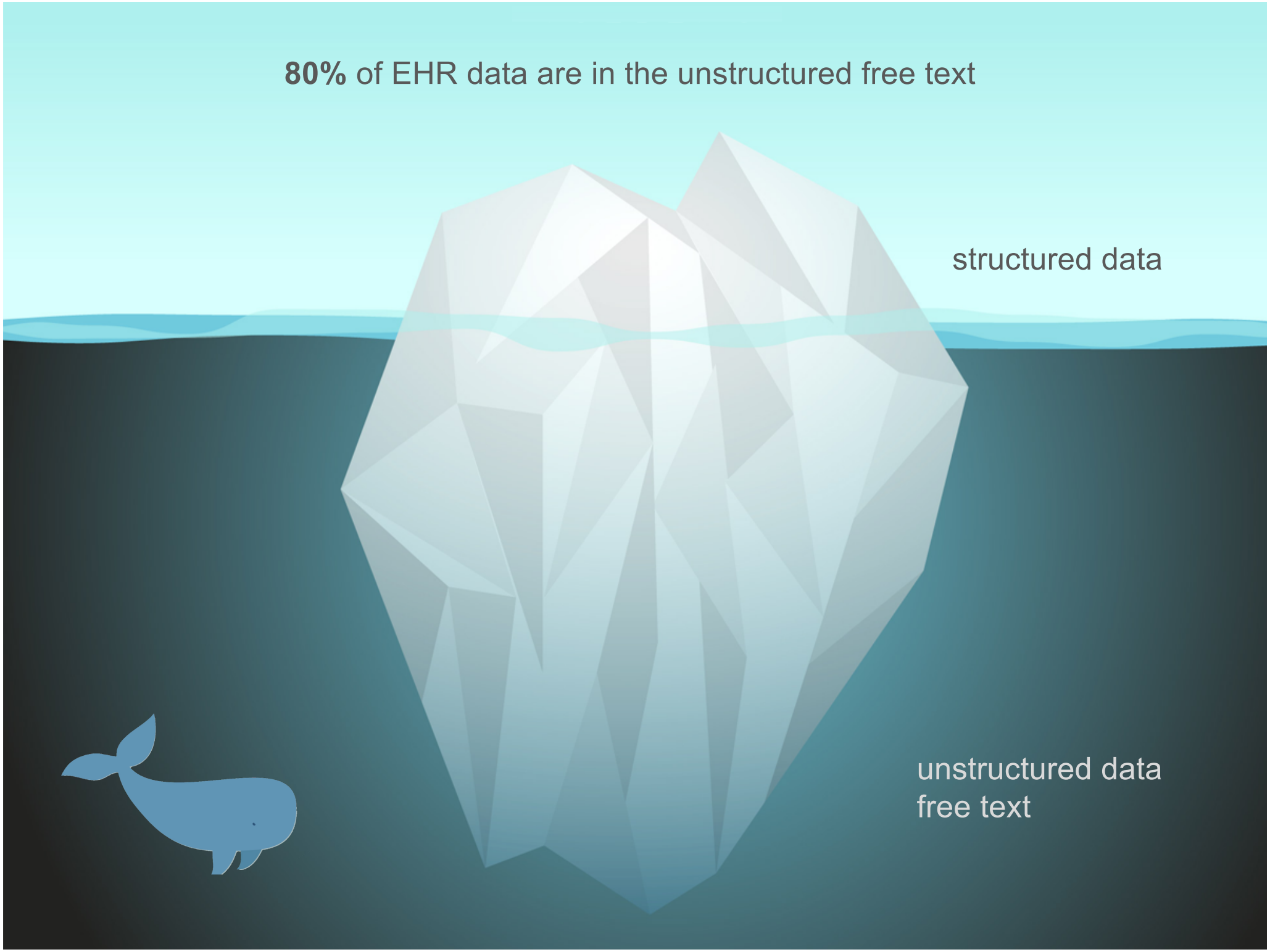
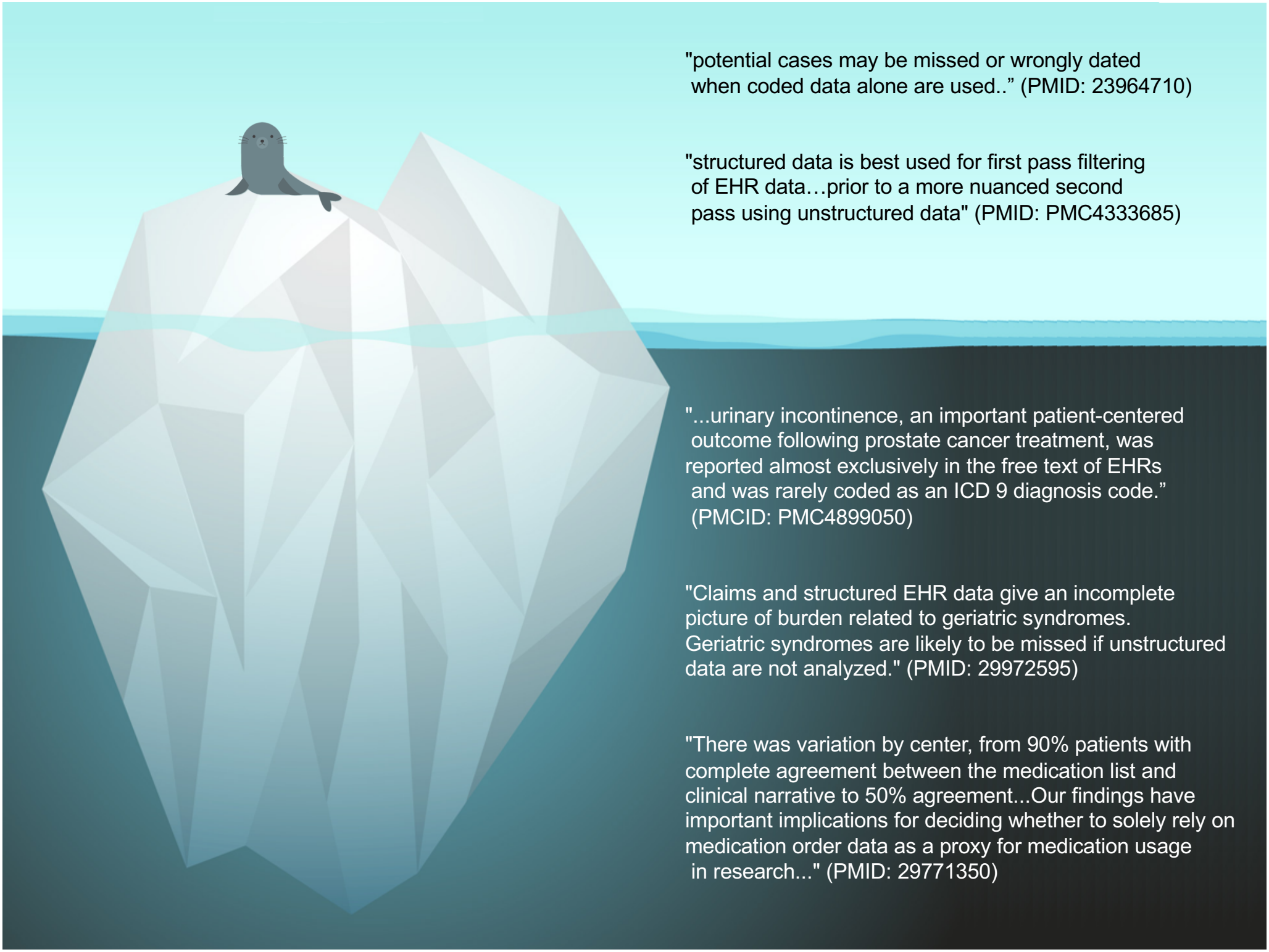

80% of EHR data are in the unstructured free text
structured data
unstructured data
free text


"potential cases may be missed or wrongly dated when coded data alone are used..” (PMID: 23964710)
"structured data is best used for first pass filtering of EHR data…prior to a more nuanced second pass using unstructured data" (PMID: PMC4333685)
"...urinary incontinence, an important patient-centered outcome following prostate cancer treatment, was reported almost exclusively in the free text of EHRs and was rarely coded as an ICD 9 diagnosis code.” (PMCID: PMC4899050)
"Claims and structured EHR data give an incomplete picture of burden related to geriatric syndromes. Geriatric syndromes are likely to be missed if unstructured data are not analyzed." (PMID: 29972595)
"There was variation by center, from 90% patients with complete agreement between the medication list and clinical narrative to 50% agreement...Our findings have important implications for deciding whether to solely rely on medication order data as a proxy for medication usage in research..." (PMID: 29771350)

Quick Diversion

If you are interested in **structured data** you might be interested in the **PaTH Network**:

Michigan
+ Pittsburgh
+ Ohio State
+ Penn State
+ Geisinger
+ Temple
+ Johns Hopkins

= 13 million patients

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more info

https://www.pathnetwork.org/

http://pathnetwork.org/Researchers/patient_demographics.html

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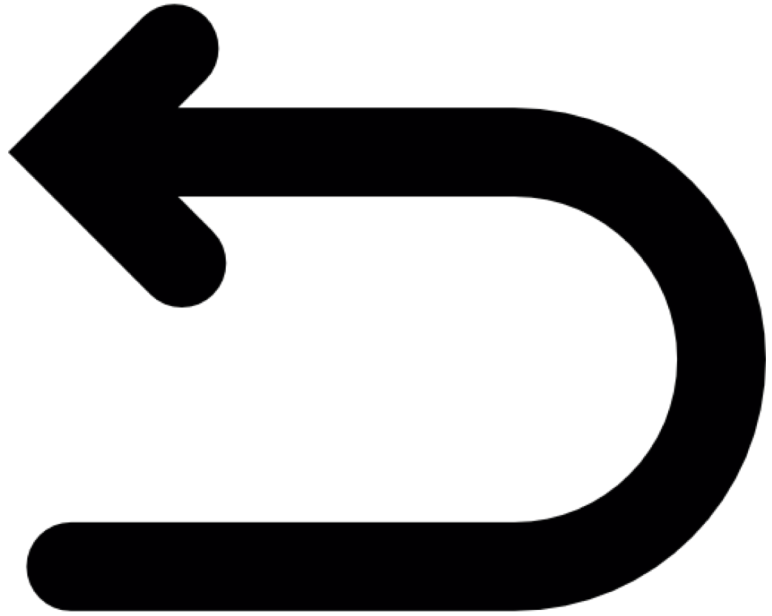
emerse

ELECTRONIC MEDICAL RECORD SEARCH ENGINE



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- Basic EMERSE functions:
  - Find a cohort across all of the patients
    - Then save the list to look through in more detail
  - Highlight terms across a list of patients
    - From an uploaded list (or pasted in) of MRNs
    - From a list from DataDirect
    - This is basically like a computer-aided chart review

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- Who can use EMERSE?
  - Anyone with MiChart access
  - BUT, you have to have a valid reason to use it:
    - Research
    - Operations
    - Quality Improvement
    - Education
    - “Curiosity” is not a valid reason, unless that curiosity is related to a review preparatory to research

All usage is tracked and audited

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- How to get access:
  - Option 1: Create account through MiChart
    - Open up a patient
    - Click on More in bottom left corner
    - Navigate to Other Clinical Systems → EMERSE
    - You will be logged in and the patient in MiChart will be moved over automatically
    - After this, you can either login through MiChart or simply visit https://emerse.med.umich.edu

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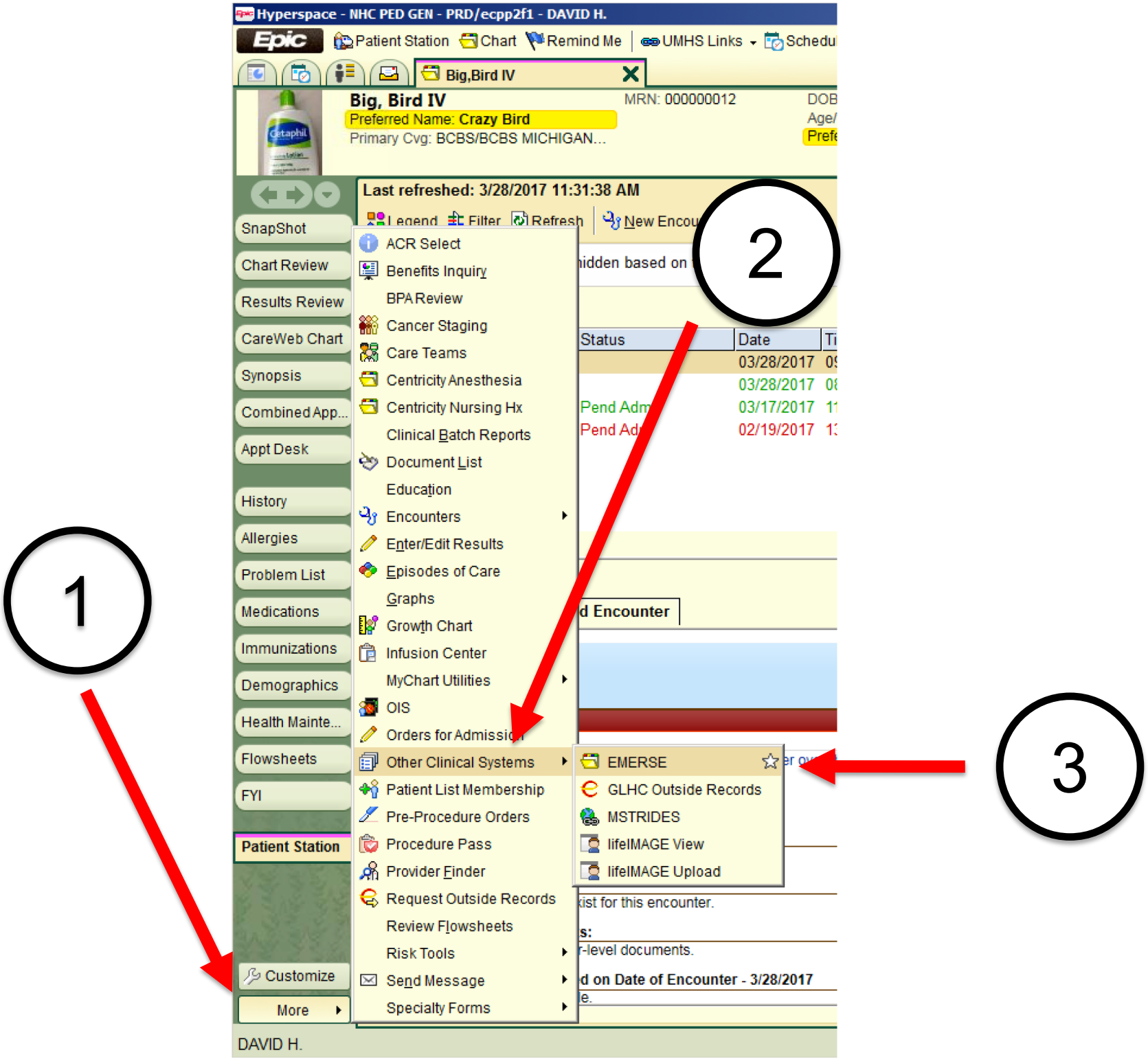
Hyperspace - NHC PED GEN - PRD/ecpp2f1 - DAVID H.
Epic
Patient Station
Chart
Remind Me
UMHS Links
Big,Bird IV
Big, Bird IV
MRN: 000000012
Preferred Name: Crazy Bird
Primary Cvg: BCBS/BCBS MICHIGAN...
Last refreshed: 3/28/2017 11:31:38 AM
Legend
Filter
Refresh
SnapShot
Chart Review
Results Review
CareWeb Chart
Synopsis
Combined App...
Appt Desk
History
Allergies
Problem List
Medications
Immunizations
Demographics
Health Mainte...
Flowsheets
FYI
Patient Station
Customize
More
ACR Select
Benefits Inquiry
BPA Review
Cancer Staging
Care Teams
Centricity Anesthesia
Centricity Nursing Hx
Clinical Batch Reports
Document List
Education
Encounters
Enter/Edit Results
Episodes of Care
Graphs
Growth Chart
Infusion Center
MyChart Utilities
OIS
Orders for Admissio
Other Clinical Systems
Patient List Membership
Pre-Procedure Orders
Procedure Pass
Provider Finder
Request Outside Records
Review Flowsheets
Risk Tools
Send Message
Specialty Forms
EMERSE
GLHC Outside Records
MSTRIDES
lifeIMAGE View
lifeIMAGE Upload
Status
Date
03/28/2017
03/28/2017
03/17/2017
02/19/2017
Encounter
DAVID H.
1
2
3

- How to get access:
  - Option 2: Data Office can create account, preferred option for research. Prerequsites:
    - Level-2 password
    - PEERRS training
    - IRB approval
    - Complete access request form (https://www.umms.med.umich.edu/data-office-requests/accessrequests)
    - Data Office MLearning training (training link is sent after request form is submitted)

Contact Information

- All things general EMERSE usage related:
  - David Hanauer, hanauer@umich.edu
- All things EMERSE research access related:
  - Arika Owens, arikao@med.umich.edu

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EMERSE website

emerse.med.umich.edu

This is behind the UM firewall, so if you're not at the medical center or a clinic you will need the VPN to access it

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Where to find more information

project-emerse.org

User guide:

http://project-emerse.org/documentation/user_guide.html

Video tutorials: http://project-emerse.org/videos.html

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What's in store for the future:

- Better filtering
  - Document type
  - Source
  - Exam type
  - Demographics
- Revised/simplified user interface

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What may someday be there

- Optical character recognition (OCR) of imaged documents
  - Essentially be able to search the imaged documents
  - If you think this would be important for your work, please let me know with a brief description: hanauer@umich.edu

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Where else is EMERSE used?

- Currently
  - University of North Carolina at Chapel Hill
  - University of Cincinnati

- Coming “soon”
  - Columbia University Cancer Center
  - University of Kentucky
  - Case Western Reserve University
  - University of California-San Francisco

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If you use EMERSE…

PLEASE, PLEASE CITE OUR PAPER!

http://project-emerse.org/citation.html

Hanauer DA, Mei Q, Law J, Khanna R, Zheng K. Supporting information retrieval from electronic health records: A report of University of Michigan's nine-year experience in developing and using the Electronic Medical Record Search Engine (EMERSE). J Biomed Inform. 2015 Jun;55:290-300. PMID: 25979153.

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If you use EMERSE…

PLEASE, PLEASE TELL YOUR PRINCIPLE INVESTIGATOR TO CITE OUR PAPER

Let’s avoid this:

"EMERSE was not used in either study."

"Those are all industry studies and none involved EMERSE to my knowledge"

"I don't know if EMERSE was used. "

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Final Slide (then on to the demo)

- These slides can be found at:

http://bit.ly/emerse-october-2019

- Please provide feedback about this presentation:

http://bit.ly/emerse-feedback-october-2019

Q&A

Q: “Is there a way to show just the path results in the results?”

A: Yes, for now, you can use an **Advanced Search** and append the following to your query to limit the search to only pathology reports:

AND SOURCE:PATHOLOGY

We hope to be able to include better filtering at some point to make this easier for uses.

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Q&A

Q: “is there a way to export into excel without copying and pasting?”

A: Currently you can export a patient list to Excel, along with any comments or tags you add. But you cannot export the notes themselves. This is primarily due to security constraints.

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Q&A

Q: “What is the common barrier users face?”

A: The biggest problem people face is often not understanding how complex the notes can be and how the same concept can be worded very differently. This needs to be considered when thinking about what to search for.

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Q&A

Q: “Who do we call if we need help in the moment?”

A: For problems getting on the system, contact HITS. For questions about effectively using the system, contact David Hanauer.

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Q&A

Q: “Is there a way to exclude results where the term is only found in headers or standard documentation of notes?

For example, one recent search we did was trying to find adolescents who had pelvic inflammatory disease but were not sexually active – some of the terms in our bundle were “pelvic inflammatory disease,” “PID,” and “**not having sex**” and it brought back a bunch of results with people who had these things in the notes but only in the standard documentation for adolescents being seen in gynecology:

“Well Care - Tips for Teens: Care Instructions” (one of the items is “The decision to have sex is a serious one that only you can make**. Not having sex** is the best way to prevent HIV, STIs (sexually transmitted infections), and pregnancy.”

A: The best approach is to use the “Exclude terms” feature. Simply add a phrase you want to exclude and it won’t include that in the search results. In the case above, you could exclude the phrase **“Not having sex is the best way to prevent”** EMERSE would then still find “not having sex”, but not in the context of that longer sentence.

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