EMERSE: an easy-to-use, self-service search engine and chart review tool for EHR notes

Presentation for UM Quality

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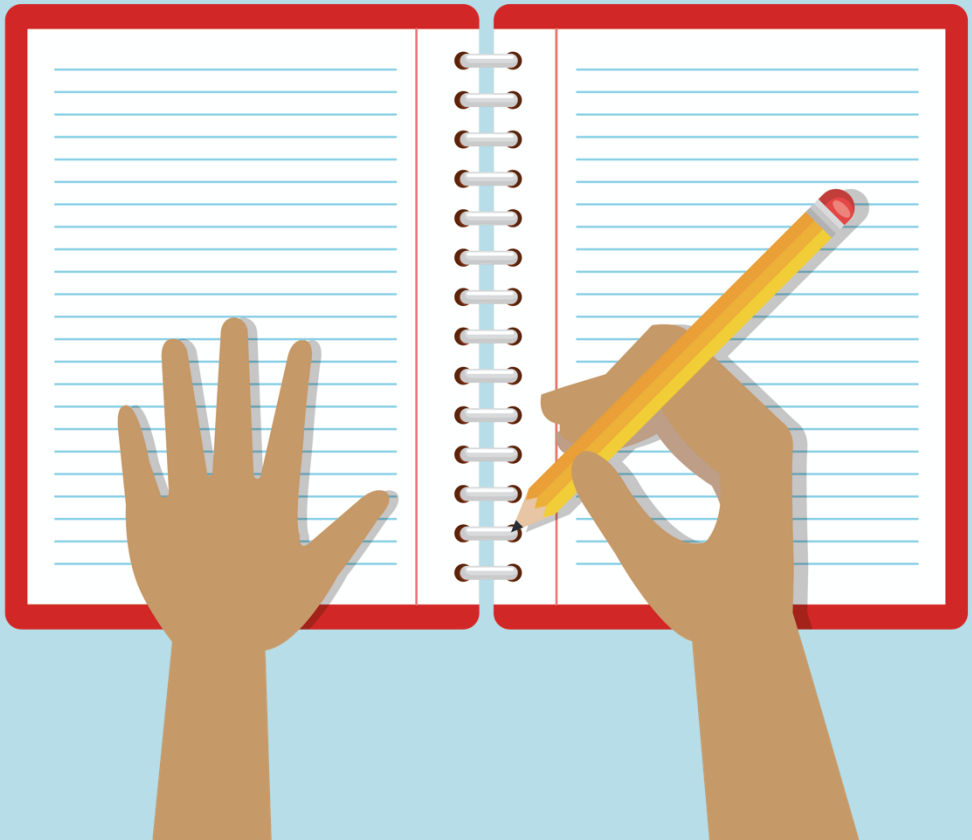
Twitter/X: @projectEMERSE
Web: project-emerse.org
Email: hanauer@umich.edu
emerse-team@umich.edu

David Hanauer, MD, MS
Dept of Learning Health Sciences
University of Michigan

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

If you want to take notes or visit links



these slides can be found at:

this link will be
on most slides

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I am here to tell you about EMERSE
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2021 study out of UC Irvine: *Design, Implementation, and Usability of the Electronic Medical Record Search Engine (EMERSE) Tool*
https://escholarship.org/uc/item/44p23878

"Users unanimously responded that they would recommend the system to others, and…for a tool they found so useful, they believed that **far too few people both within and outside of their network knew about the tool's existence**."

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Unstructured vs Structured Data

EMERSE is for this…	…not 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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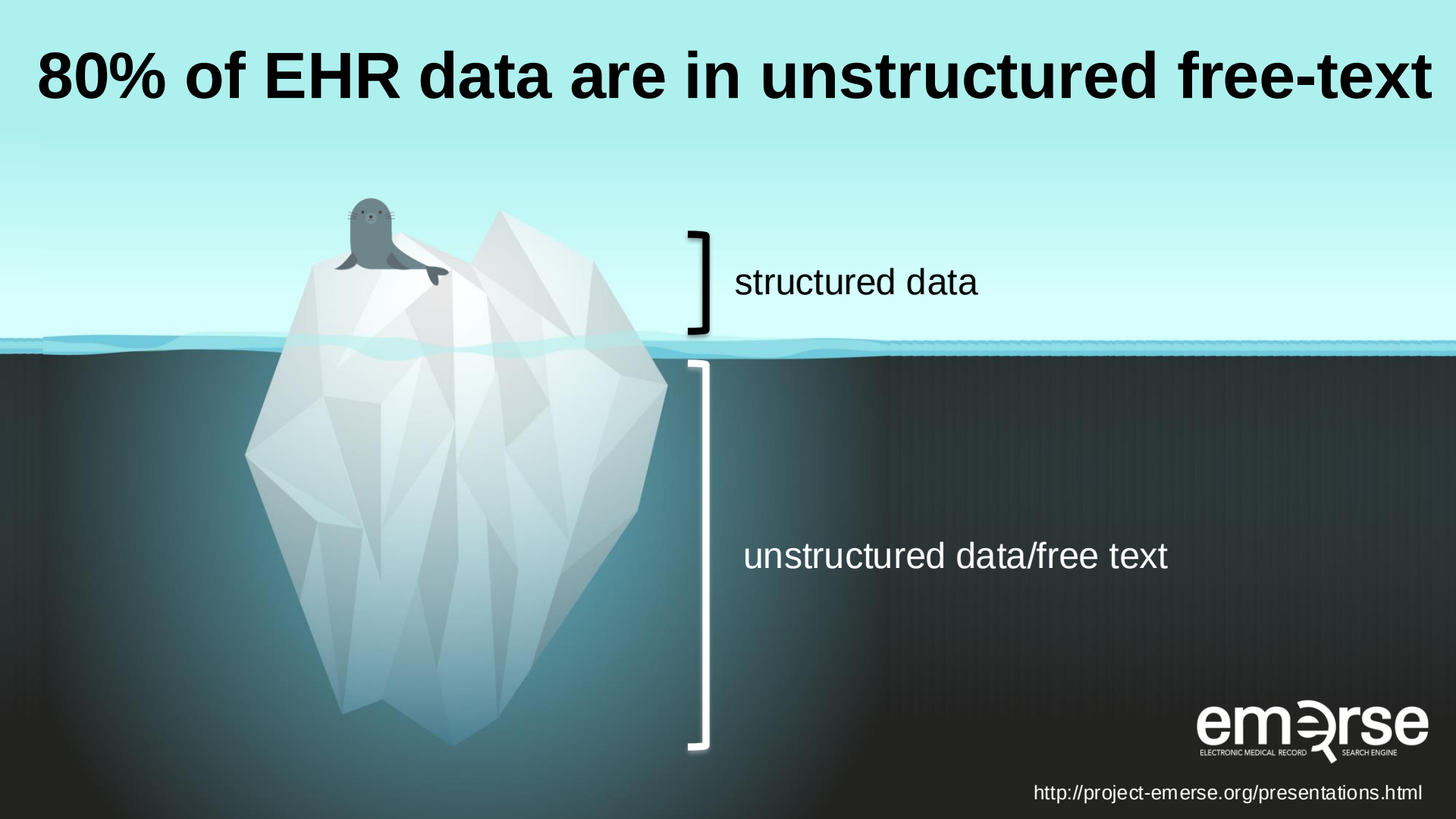
80% of EHR data are in unstructured free-text



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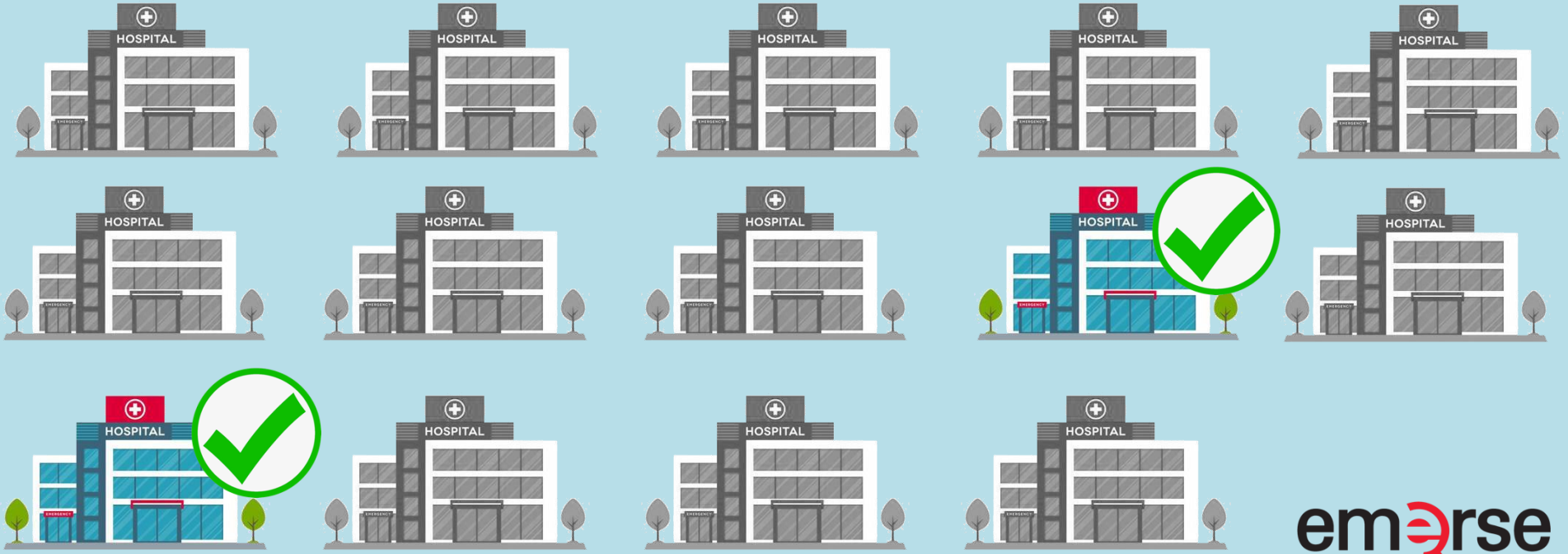
Most medical centers lack tools for free-text



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The EMERSE solution

- A system “for the people”
- Users search the notes on their own
  - No need to wait in a queue for an analyst or a data scientist
- Easy-to-use for non-technical users
- Unlike with some EHRs, EMERSE can search across all notes and all patients at once
- Continuous refinements for almost 19 years

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EMERSE is a useful tool

- It will be one of many you need to build/support your project

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We think EMERSE is really good

- We’re proud of what we created
- We think it’s better than other software tools that cost $$$

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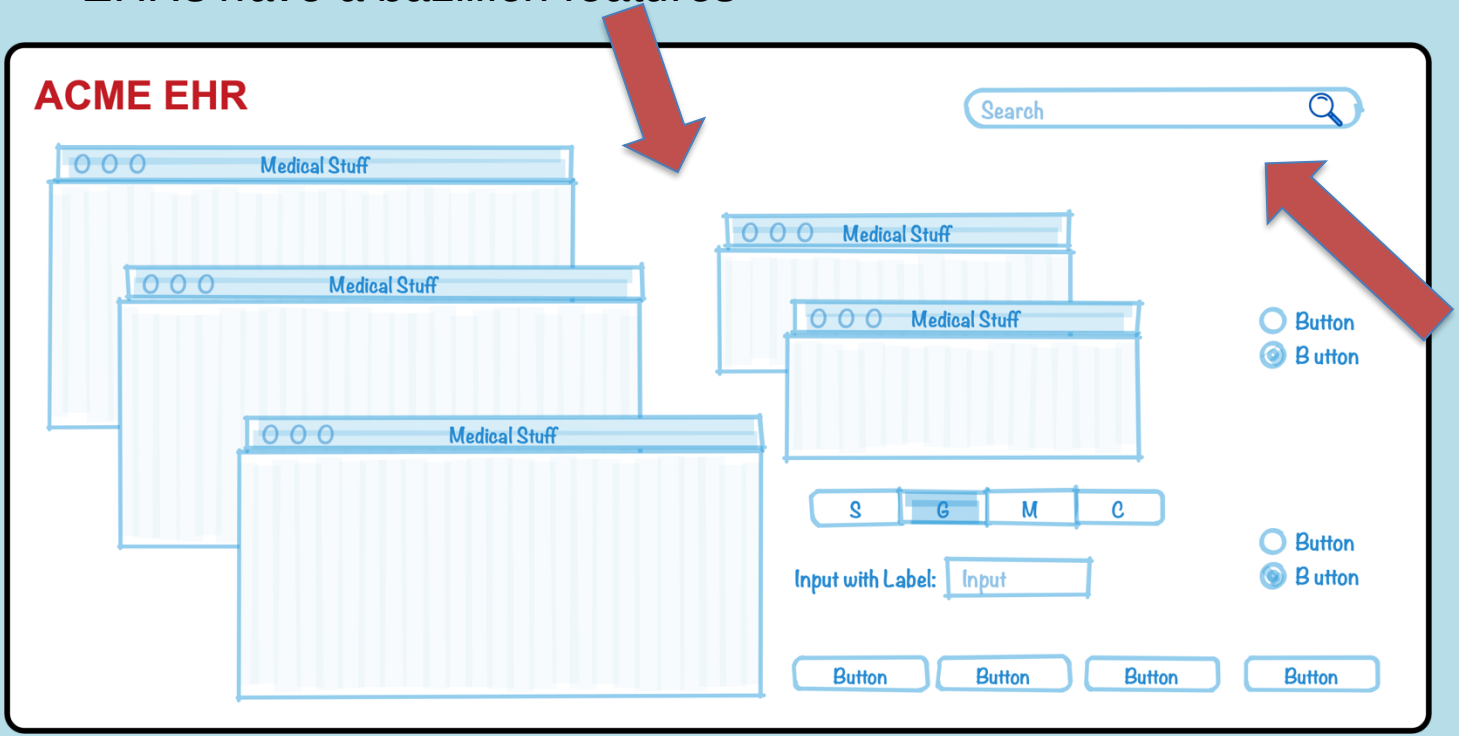
How do we know it's better?
We've been laser-focused on it

EHRs have a bazillion features



The EMERSE team has invested $millions and 18 years on just this one feature (search) because it's so important

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How do we know it's better?
We've studied it

- "new users of the EMERSE system are able to complete basic but critical workflow tasks in the system with a high rate of success…are **highly satisfied with the interface**, and have highly positive perceptions of its expected utility in their work."

- "survey results indicate **very high ratings of usability and satisfaction** with the EMERSE system by new users after only one session of use."

https://project-emerse.org/documents/reyes_masters_thesis_2021.pdf

How do we know it's better?
Our users tell us

Thank you for…this important tool which is **proving extremely valuable** in enhancing patient safety and quality of care delivered at Michigan Medicine.

..continued gratitude for the availability of this powerful research tool. As always, **thank you for this innovation**!

EMERSE is **working out great for casefinding**...have found quite a bit of cases that we would have missed otherwise. **Thank you and everyone on your team!**

To say "**it is the most useful tool I use in my job**" would be an understatement, so **thank you** for creating and sharing it with others!!

EMERSE is **an absolute gem** @umichmedicine. The functionality is very friendly and it saved hours of time during the data collection process. **Thank you to the team** that created this powerful research tool!

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How do we know it's better?
Top-tier medical centers trust it

Installed	Installing
U of Michigan	Weill Cornell Medical Center
Harvard U – Dana Farber Cancer Center	U of Virginia
Columbia U Cancer Center	Moffitt Cancer Center, Tampa, FL
U of North Carolina – Chapel Hill	U of California – Irvine
U of California – San Francisco	Children's Health Orange County, Calif.
U of Kentucky	
U of Cincinnati	
Case Western Reserve U	
U of Minnesota – Minneapolis	
Utrecht University, Netherlands	
U of Iowa	

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What can EMERSE do?

Lots of things!

Cardiac Surgery Research

"It allows us to basically target exactly what we need to know."

--Linda Farhat, Clinical Research Coordinator

Quality Analytics

"I can't imagine having to do what I do without having EMERSE."

--Andrew Heiler, Quality Analytics Coordinator

Infection Prevention

"The value of EMERSE is immeasurable."

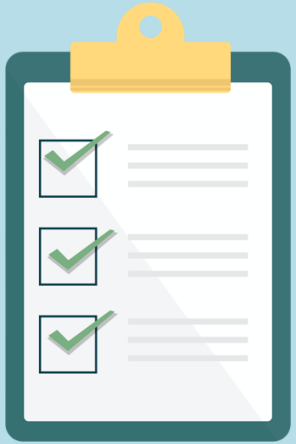
--Jayna Berger Heiler, Infection Prevention Coach

Watch our videos: https://project-emerse.org/use_cases.html

Find cohorts

EMERSE allows you to find cohorts based on things mentioned in the notes

- diseases
- drugs
- symptoms
- anything*



*if it is mentioned

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Find cohorts

It’s perfect for finding rare things…

…like rare cancers such as cutaneous leiomyosarcoma

See this talk for more details:
https://vimeo.com/677482835
“Using EMERSE to Improve Research Involving Rare Cancers”

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Highlight documents for chart review

Thoracocentesis confirmed the recurrence of mantle cell lymphoma. Disease restaging work-up revealed multicompartment lymphadenopathy in the neck, mediastinal, retrocrural, retroperitoneal and pelvic regions. Bone marrow was also involved. The patient was treated with a total of six cycles of rituximab, cyclophosphamide, vincristine, doxorubicin and dexamethasone (R-HyperCVAD) completed in January 2007. That treatment led to complete remission that lasted until October 2008, when the disease was found to have recurred in the left pleural space and retroperitoneum without bone marrow involvement.

https://jmedicalcasereports.biomedcentral.com/articles/10.1186/1752-1947-4-329

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EMERSE is *fast*

Query to identify all patients with the following	Reporting DB time (s)	EMERSE time (s)	EMERSE advantage
cavernous hemangioma	14,652	2	7,320x
gray platelet syndrome	14,940	2	7,470x
inferior lingular segment of the left upper lobe	17,784	9	1,980x

…enabling real-time querying

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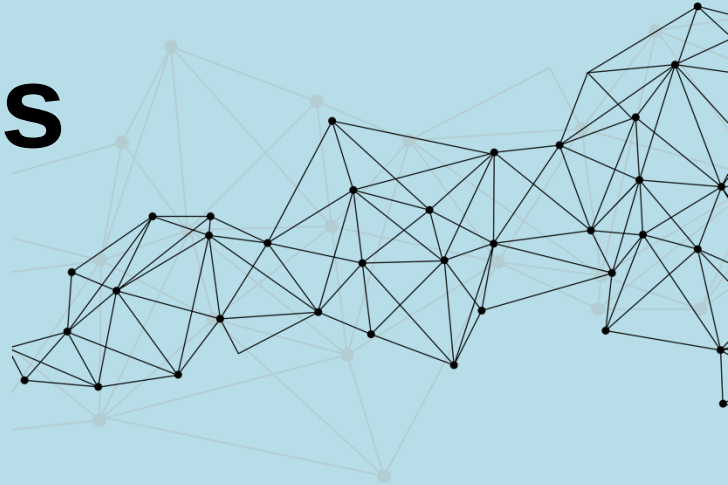
Synonyms



- Used for query expansions
- User-controlled
- Multiple datasets can be included
- EMERSE Synonyms
  - acronyms, abbreviations, professional/consumer terms, misspellings, trade/generic drug names, species, chemo regimens, phrase variations, malapropisms, idioms, neologisms, organizations, companies, & more
  - 2.6 million unique entries

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Synonyms for "smoker"

Click individual terms to highlight or de-highlight.

Synonyms (126) SORT A TO Z HIGHLIGHT ALL HIGHLIGHT NONE

abuse nicotine | abuses nicotine | addicted to nicotine | addicted to tobacco | addiction to nicotine | addiction to tobacco | ash tray | ash trays | ashtray | ashtrays | chain smoker | chain smokers | chain smoking | chainsmoker | chainsmokers | chainsmoking | cigar | cigar day | cigar per day | cigarette day | cigarette pack day | cigarette packs each day | cigarette packs every day | cigarette packs per day | cigarette per day | cigarette smoke | cigarette smoker | cigarette smokers | cigarette smoking | cigarettes | cigarettes day | cigarettes per day | cigars | cigars days | cigars per day | continue to smoke | continued to smoke | continues to smoke | continuing to smoke | current every day smoker | current everyday smoker | current smoker | currently smokes | dependence on cigarettes | dependence on nicotine | dependence on tobacco | dependent on cigarettes | dependent on nicotine | dependent on tobacco | nicotine | nicotine abuse | nicotine abuser | nicotine abusers | nicotine addiction | nicotine addictions | nicotine dependence | nicotine dependent | pack a day | pack day | pack each day | pack history | pack per day | pack year | pack year smoker | pack years | pack yr | pack yrs | packs | packs a day | packs day | packs each day | packs of cigarette day | packs of cigarette each day | packs of cigarette per day | packs of cigarettes day | packs of cigarettes each day | packs of cigarettes every day | packs of cigarettes per day | packs per day | packs per year | packyear | packyears | packyr | packyrs | pipe | pipes | pk year | pk years | pk yr | pk yrs

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Synonyms for "social determinant of health"

Click individual terms to highlight or de-highlight.

Synonyms (364) SORT A TO Z HIGHLIGHT ALL HIGHLIGHT NONE

abused | academic problem | adoptive parent | afford | affordable medication | affordable prescription
alcoholism | amphetamine abuse | antisocial | appears depressed | appears sad | appears to be depressed
appears to be sad | assisted living facilit | assisted living facility | assistive device | bankruptcy | banned
bath bench | bath not on first floor | bed and bath are not on the first floor | boarding house | burglary
care giver support | cared for by a friend | cared for by a relative | charity care | cheaper | childhood abuse
chipped paint | cigarettes | cluttered | co pay | cocaine abuse | common law partnership | community support
computer illiterate | condominium | copay | correctional facility | court date | court mandated | court ordered
crime victim | death of family member | death of friend | death of partner | dementia | detox
difficult working conditions | difficulty maintaining employment | disability income | disabled partner
disabled partners | disabled relative | disorderly | divorced | drug seeking | drunk | dysthymia | dysthymic
economic problems | education level | education problem | education problems | elderly parents
employment difficulties | employment income insecurity | employment insecurity | estranged | evict | evicted
experiencing discrimination | exposed to violence | extended care facility | extended tub bench | feeling down
feels down | felony | filthy living | finances | financial concerns | financial constraints | financial difficulties
financial issues | financial strain | financial stress | financial stressors | financially | fixed income | flooded
food bank | food insecure | food insecurity | food pantries | food stamps | foreclosed | forgery | forging
foster care | foster family | fruit and vegetable intake | gender identity | general financial insecurity
grab bars present | group home | gunpoint | hand held shower | health insurance | healthcare problem

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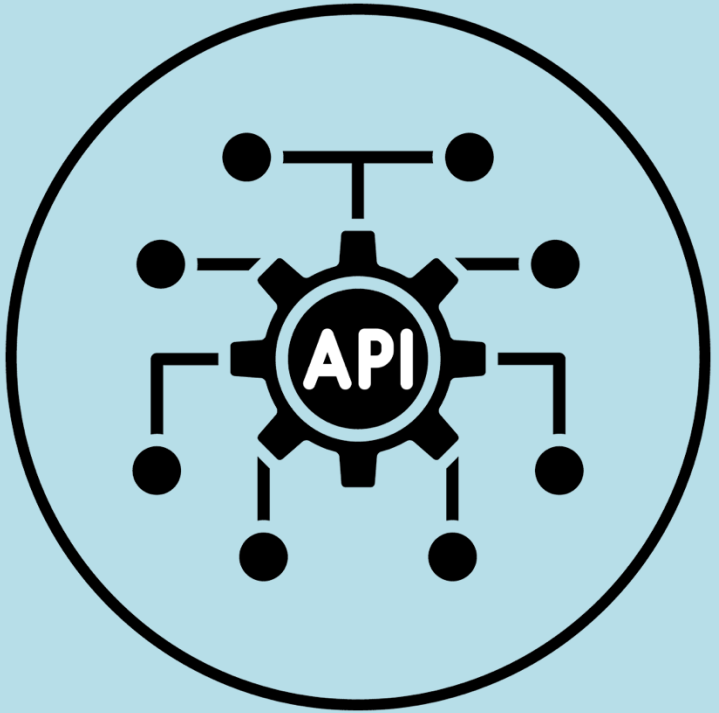
Application Programming Interface (API)

For technical teams

Can pull notes based on keywords, CSNs, etc

Contact us for details



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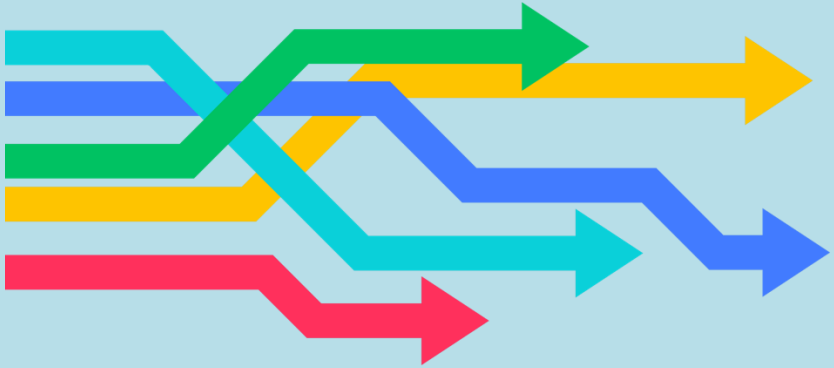
Future Work



Data extraction from templated notes

Integration with ChatGPT or similar tools

& more…

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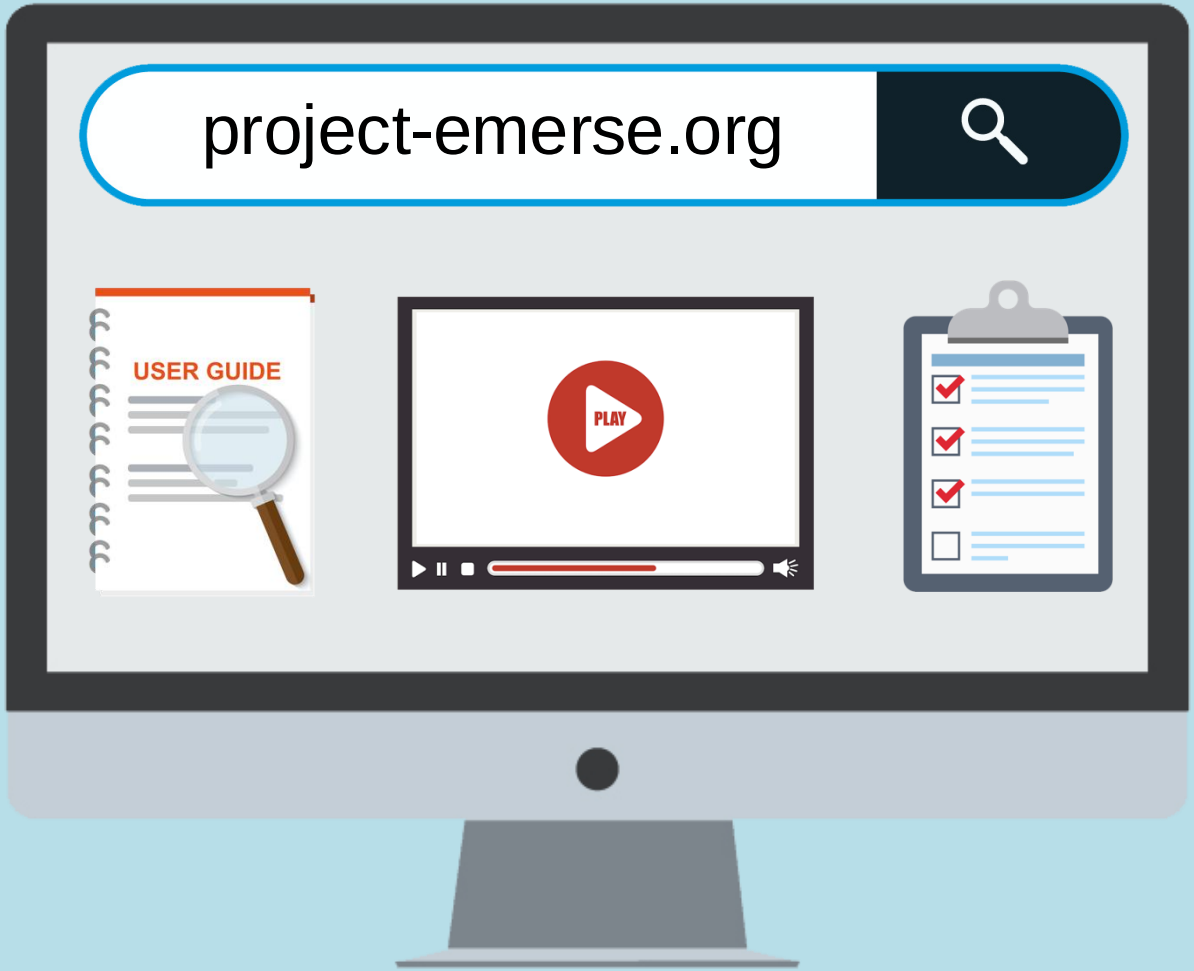

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Interested in EMERSE?

Contact us to schedule a time with your team for:

- Discussions about usage strategies
- Training
- Live demonstrations (abstractors, IT teams, etc)

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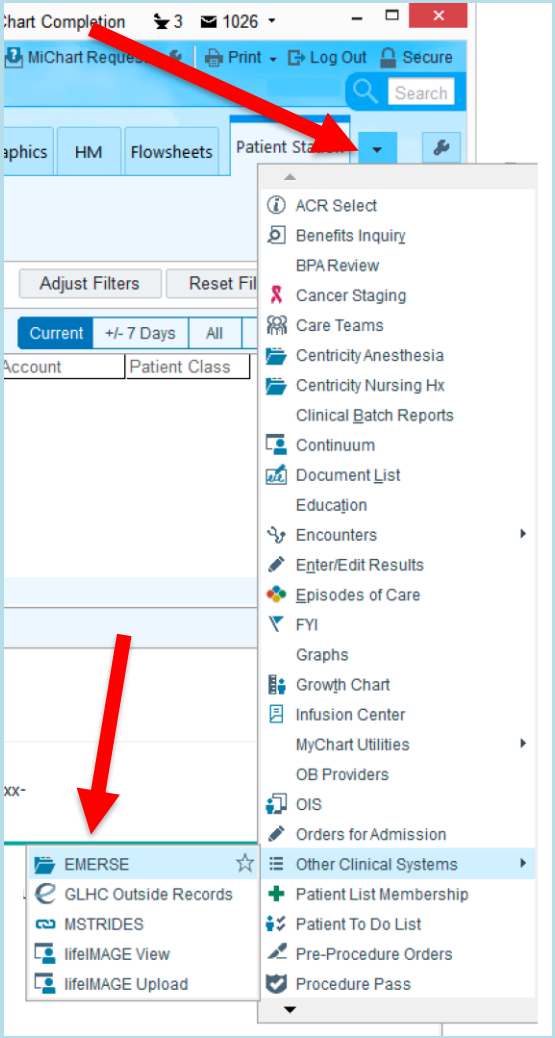

Getting an account

If you already have access to MiChart, you have access to EMERSE

Contact us if you have questions/problems

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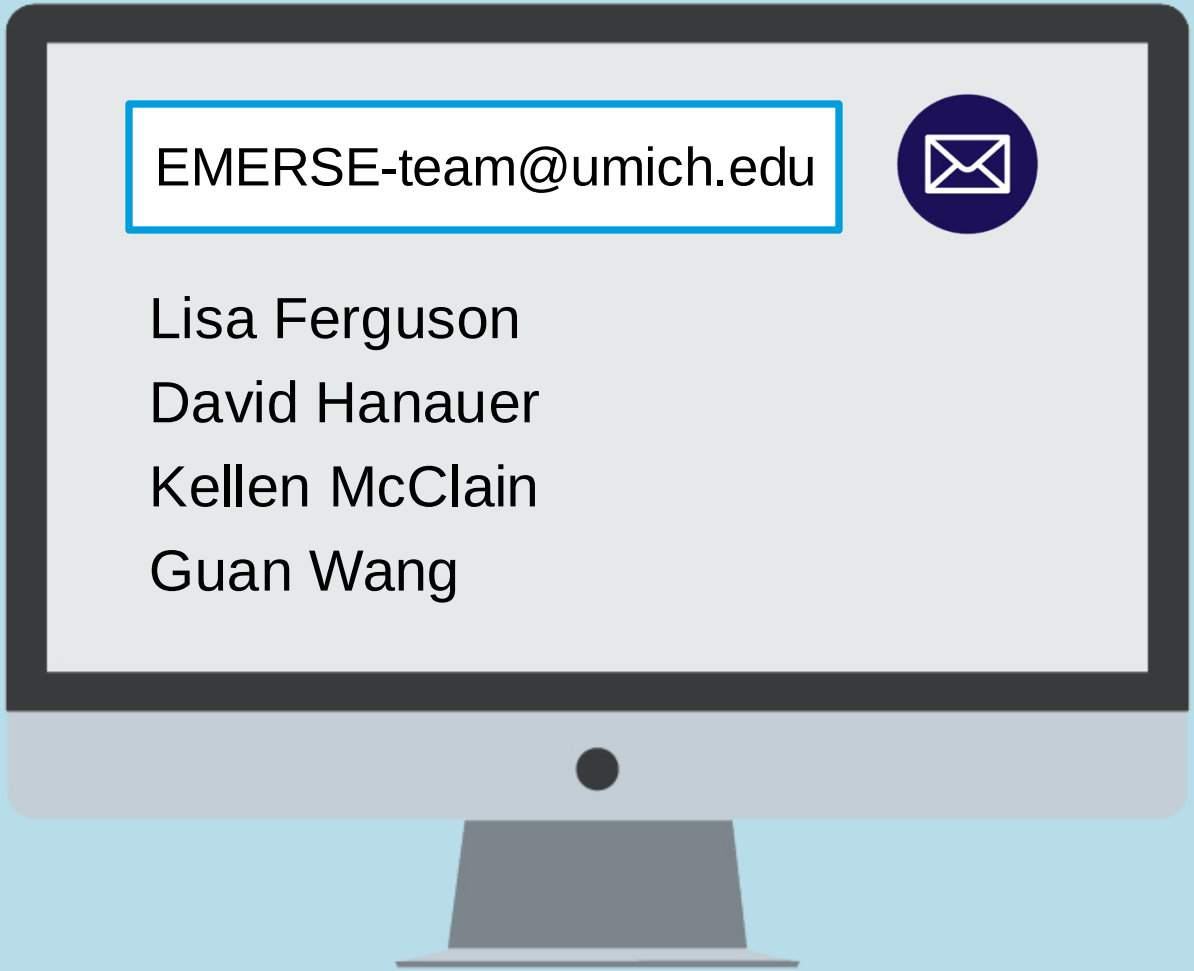

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Live Demo (if we have time)

- No real names
- No PHI
- Publicly available
- Abstracts & case reports

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