



Unlocking Real World Data Buried in the EHR: The EMERSE Experience at Case Western Reserve University and University Hospitals of Cleveland

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EMERSE – What is it?



- A human-augmented search engine for anything contained in medical notes – not NLP, but another tool in the informatics toolbox – however NLP is coming in the next version (stay tuned!)
- Created in 2005 by David Hanauer, MD, MS, FACMI, FAMIA and maintained/enhanced at the University of Michigan and tested/deployed by partners/collaborators
- Used to perform rapid searches against the 80% of clinical data stored in notes – for an entire patient population, defined lists of patients, and at the individual patient level
- All source notes are indexed and stored in a document repository – EHR never touched directly
- Powered by a collection of over 2 million clinically curated terms and phrases
- Searches can be done on 100's (1000's) of terms simultaneously
- Live at 6 academic medical centers covering ~10 million patients and > 442 million documents



The Open-Source EMERSE (Electronic Medical Record Search Engine) Tool

- Easy to understand user-interface with a ~30-minute learning curve – A “system for the people”
- Software is free from the University of Michigan, however, there is an initial cost to implement
- Relatively low maintenance requirements – (0.15 FTE) – no ongoing vendor fees
- Other tools require customizations for each medical specialty and require ongoing license fees
- Rapid querying compared to EMR – e.g., gray platelet syndrome: 14,940 seconds vs. 2 seconds
- EMERSE excels at finding diagnoses that do not have a specific ICD-10 code – e.g., leiomyosarcoma

Michigan Case Study - Cutaneous Leiomyosarcoma (cLMS) – Incidence of 0.2 per 100,000 per year – Cancer Registry found 101 patients, EMERSE found 311 potential that was narrowed down to 128 positive after manual chart review= 21% additional patients; 183 false positives due to standardized language in genetics consultation notes stating risk for “cutaneous leiomyosarcoma”*



The Open-Source EMERSE (Electronic Medical Record Search Engine) Tool

- Used for research and clinical operations (billing/coding, quality, infection control)
- University of Michigan is tracking research where EMERSE has been referenced (project-emerse.org/publications.html)

EMERSE has supported a wide variety of clinical and translational research studies, listed below:

Papers (489)

Abstracts (86)

More (16)

This lists below contain publications and other works that have used EMERSE to support clinical and translational research. The lists do not include informatics-themed papers that reference EMERSE in the context of being an information retrieval system for clinical data.

* Papers and abstracts marked with an asterisk are part of multi-site collaborative studies, where EMERSE was used at a single site; data for the overall study came from multiple sites.

Papers

1. Hale BW, Lu JC, Romano JC, Lowery R, Yu S, Norris MD. Kommerell Diverticulum: Distinctions Between Arch Side and Evaluation of Morphology, Size, And Risk. *Ann Thorac Surg*. 2022 Sep;114(3):848-856. doi: 10.1016/j.athoracsur.2021.06.035. Epub 2021 Jul 18. PMID: [34283954](#)
2. Carlozzi NE, Graves C, Troost J, Kallen MA, Tulskey DS, Hanks RA, Ianni PA, Miner JA, Sander AM. Initial evidence for reliable and valid use of scores on the 8-item Econ-QOL short form to measure economic quality of life in caregivers of persons with traumatic brain injury. *Arch Phys Med Rehabil*. 2022 Aug 6:S0003-9993(22)00573-1. doi: 10.1016/j.apmr.2022.07.015. Epub ahead of print. PMID: [35944601](#)
3. Blazy C, Ellingrod V, Ward K. Variability Between Clinical Pharmacogenetics Implementation Consortium (CPIC®) Guidelines and a Commercial Pharmacogenetics Laboratory in Genotype to Phenotype Interpretations For Patients Utilizing Psychotropics. *Front Pharmacol*. 2022 Jun 24;13:939313. doi: 10.3389/fphar.2022.939313. PMCID: PMC9263441. PMID: [35814245](#)
4. Halawa A, Kim J, Liao E, Trobe JD. MRI Diagnosis of Clival Cancer and Sixth Nerve Palsy. *J Neuroophthalmol*. 2022 Jul 13. doi: 10.1097/WNO.0000000000001655. Epub ahead of print. PMID: [35830685](#)
5. Watson MA, Anderson C, Karlic KJ, Hogan CK, Seelye S, Taylor SP, Prescott HC. Receipt of Recovery-Oriented Care Practices During Hospitalization for Sepsis. *Crit Care Explor*. 2022 Sep 13;4(9):e0766. doi: 10.1097/CCE.0000000000000766. PMCID: PMC9473794. PMID: [36119396](#)



Cleveland Institute for Computational Biology

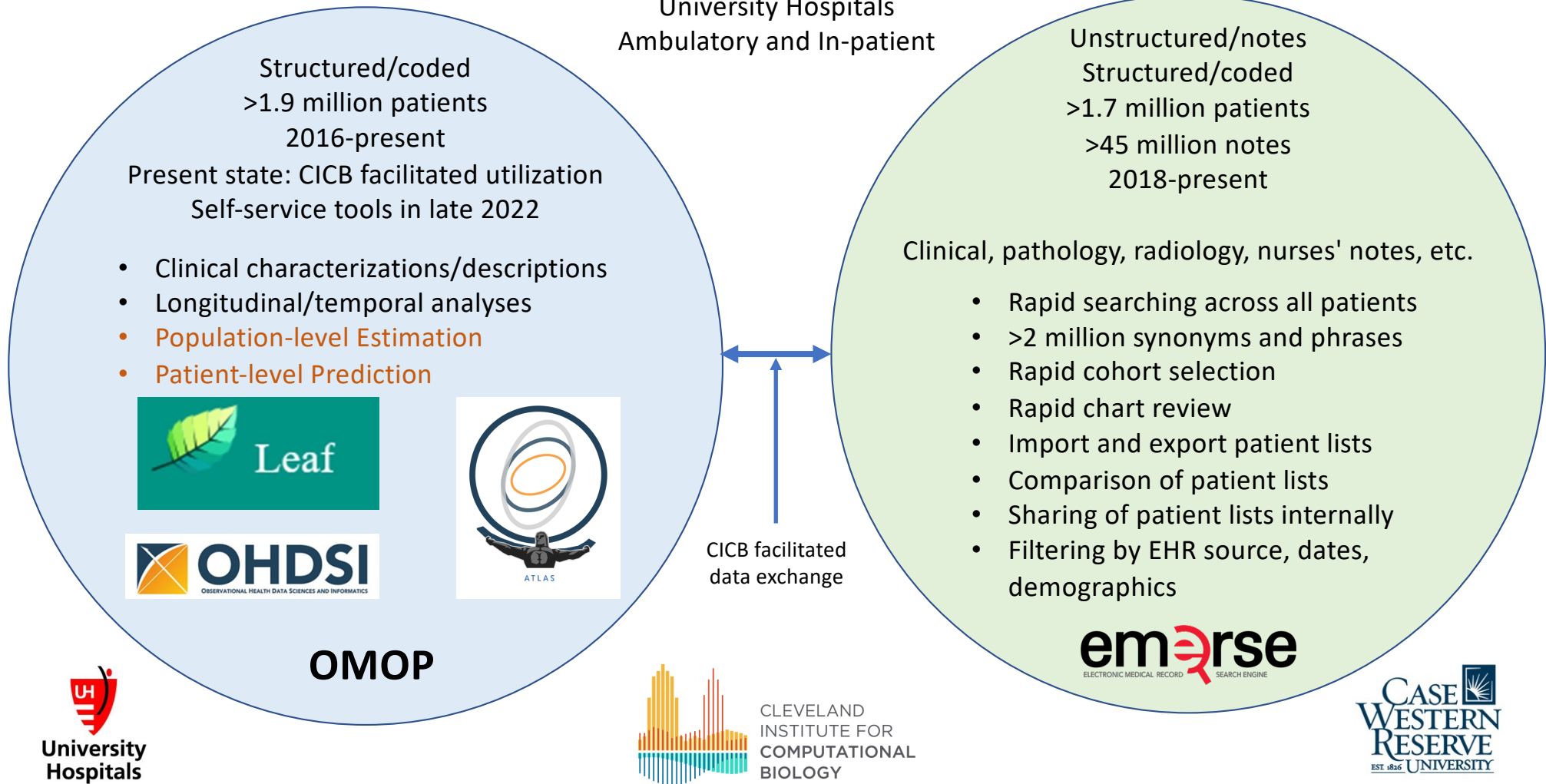
- University Hospitals Health System of Cleveland, Ohio, ~ 2 million patients
- Case Western Reserve University, Cleveland, Ohio, Jonathan L. Haines, PhD, Faculty Director

Translating big data to better understand disease mechanism, improve clinical care, and inform population health



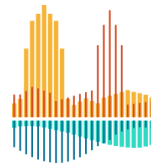
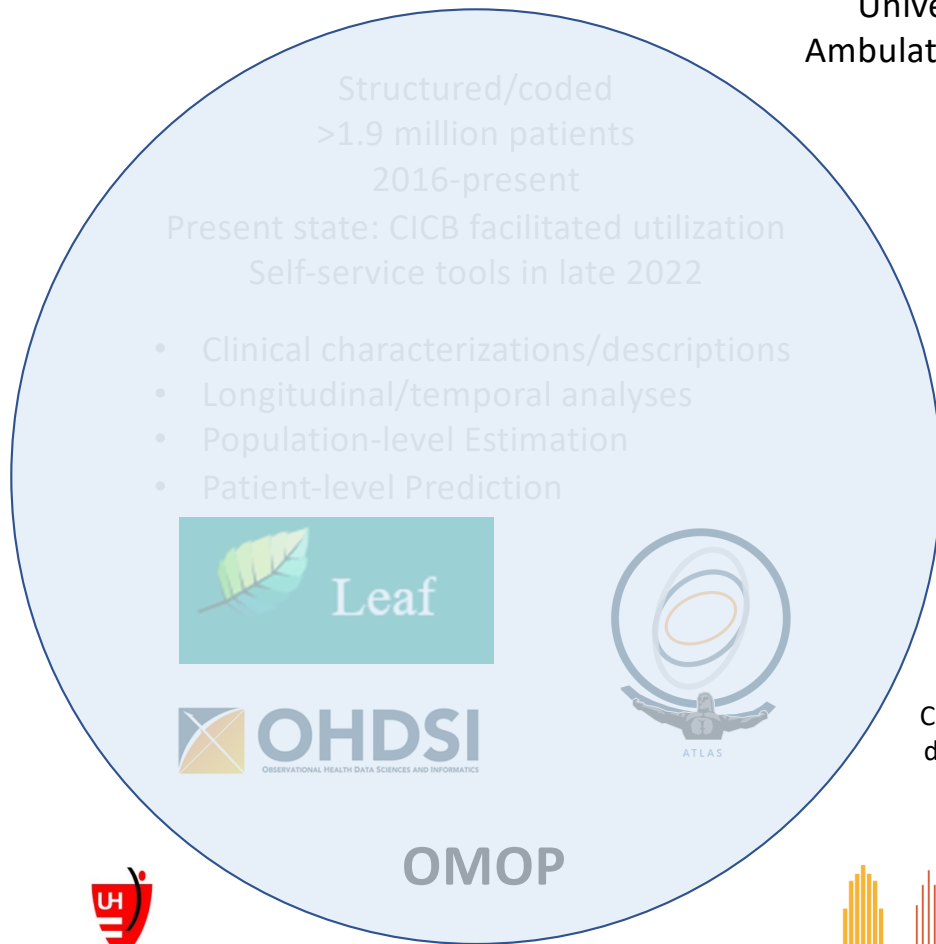
CICB Infrastructure Overview

University Hospitals
Ambulatory and In-patient



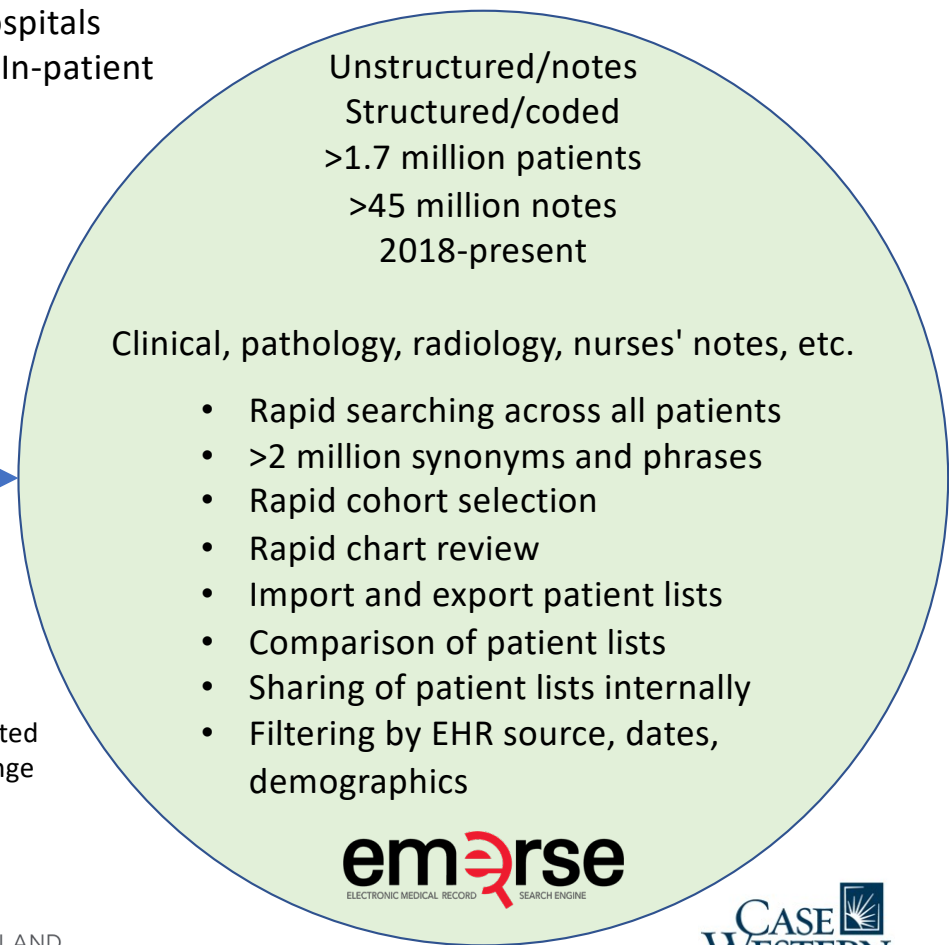
CICB Infrastructure Overview and Example

University Hospitals
Ambulatory and In-patient



CLEVELAND
INSTITUTE FOR
COMPUTATIONAL
BIOLOGY

CICB facilitated
data exchange

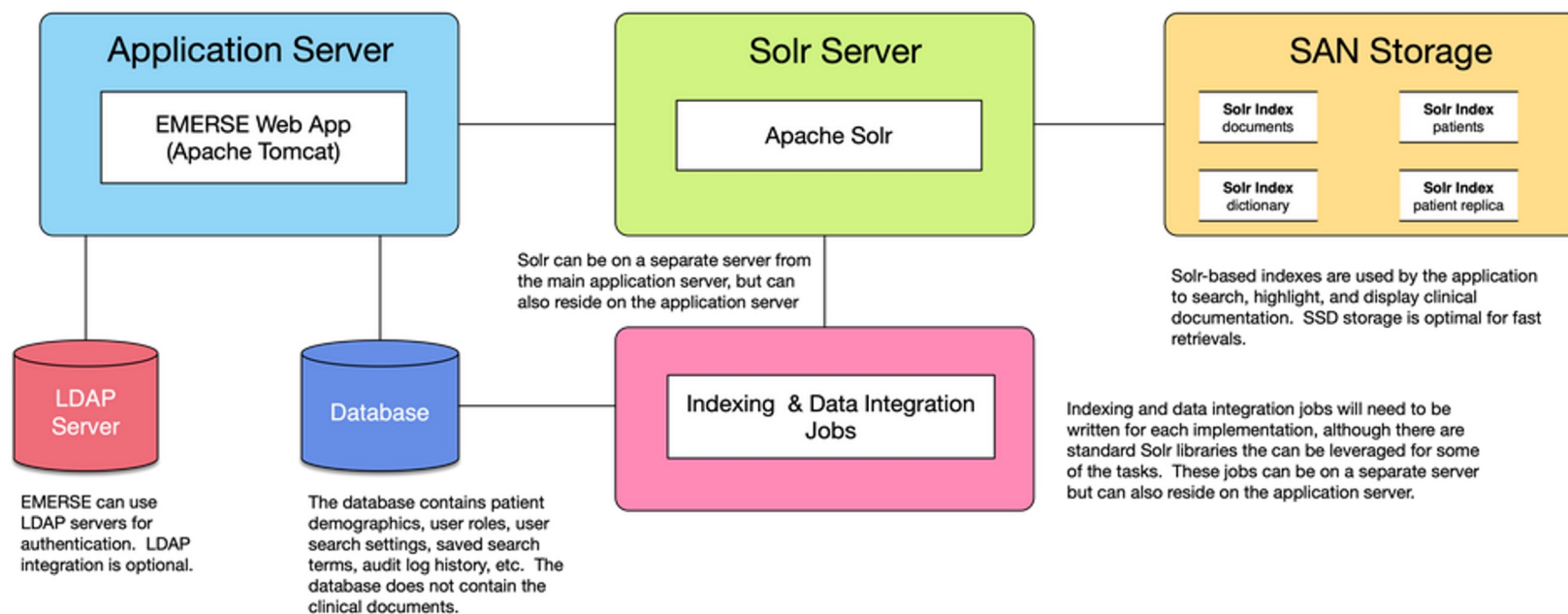


CICB EMERSE Implementation Timeline and Experience To Date

- NIH/NCI 5-year grant starts (Jill Barnholtz-Sloan, PhD, years 1-4, and Satya Sahoo, PhD, year 5; local PIs)
- 18 months spent obtaining institutional buy-in
 - ❖ Meetings with researchers – many
 - ❖ Meetings with C-suite hospital representatives
 - ❖ At least 2 visits from David Hanauer to drum up support
 - ❖ Meetings with CQOs and system CMIO, leading to capital funding from University Hospitals Cleveland Medical Center, Daniel Simon, MD (President, Academic & External Affairs and Chief Scientific Officer)
- Implementation started at the beginning of COVID – all remote work (2/2020-11/30/2020)
- Pilot phase in late 2020 through October 2021 – Validation of EMERSE via source systems
- Official launch in November 2021
- Currently over 200 EMERSE user accounts (research and ops), > 70 IRB protocols
- Picking up new users every week



EMERSE Architecture – Deployment View



Apache Solr – the open-source software under the hood

- Open-source enterprise search platform built on Apache Lucene
- Highly reliable, scalable, fault tolerant
- Distributed indexing, replication, and load-balanced querying

Solr powers some of the most heavily-trafficked websites and applications in the world. Here are some examples (alphabetical order):

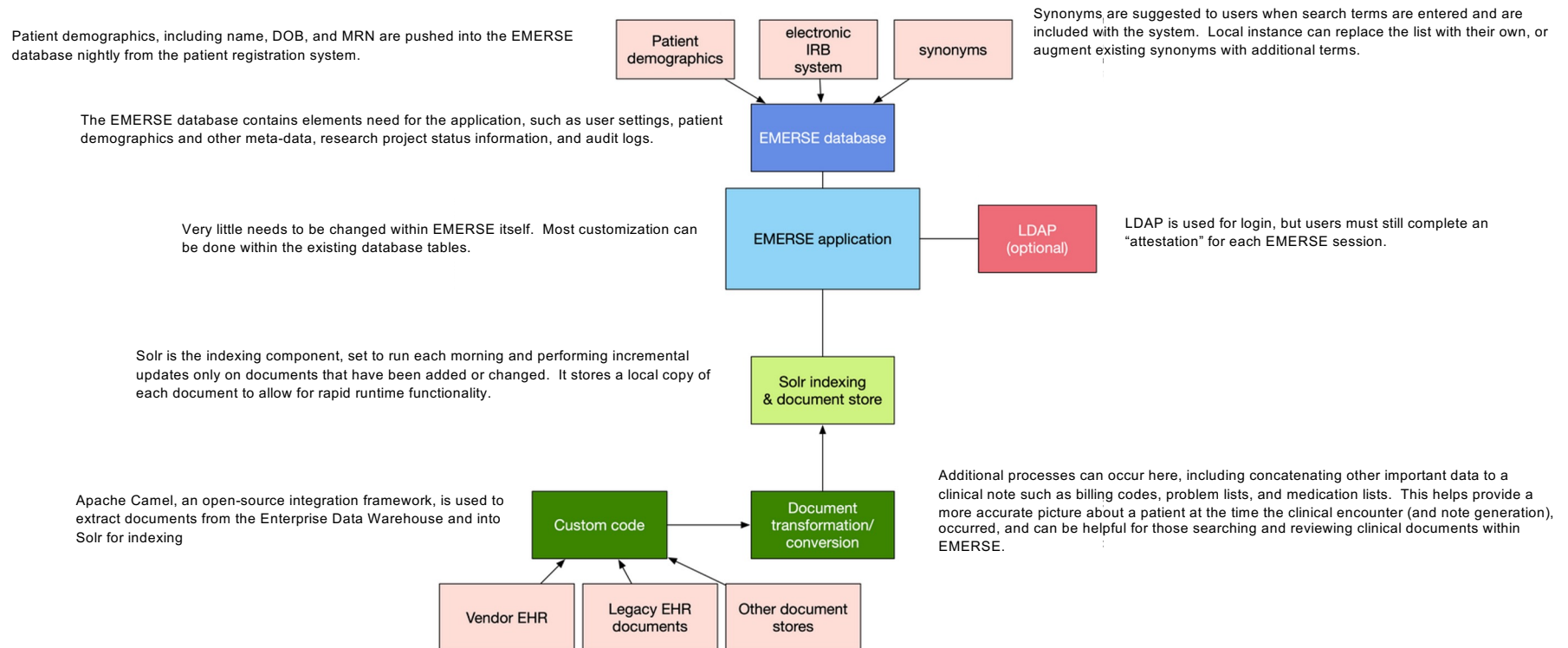
Adobe
Bestbuy
Chegg
DuckDuckGo
Instagram
MTV Networks
SAP Hybris
Travelocity

AOL
Bloomberg
Comcast
eBay
Internet Archive
Netflix
StubHub
Zappos

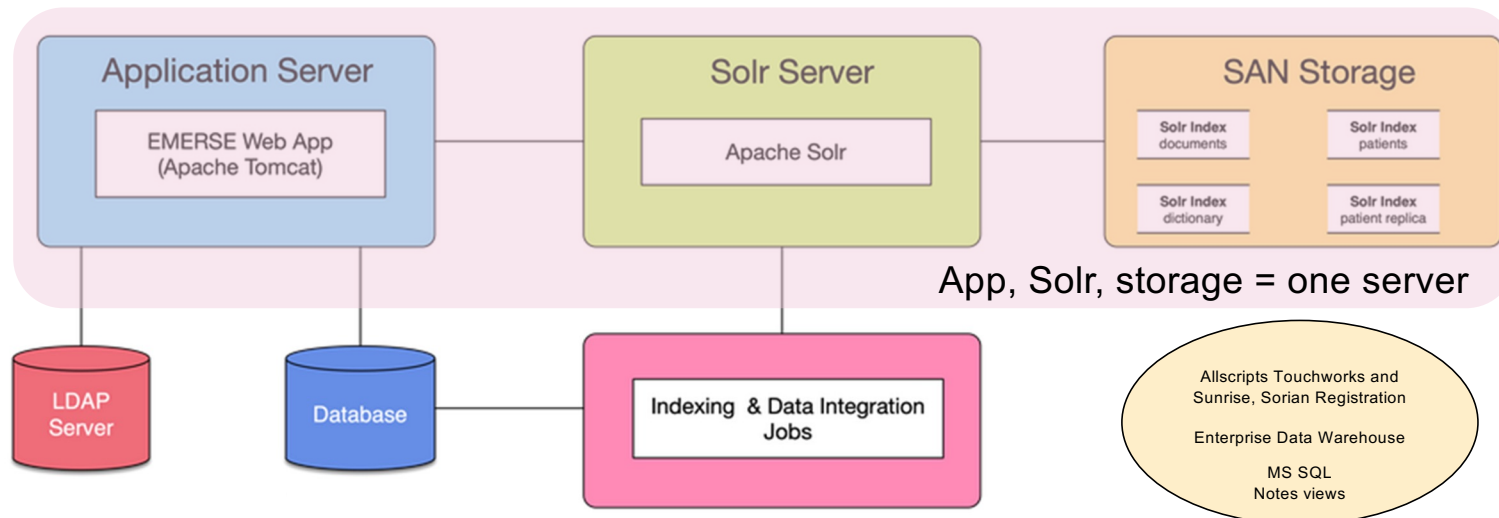
AT&T
Buy.com
Disney
eharmony
Magento
Salesforce
Ticketmaster



EMERSE Architecture – Process View



University Hospitals EMERSE Implementation



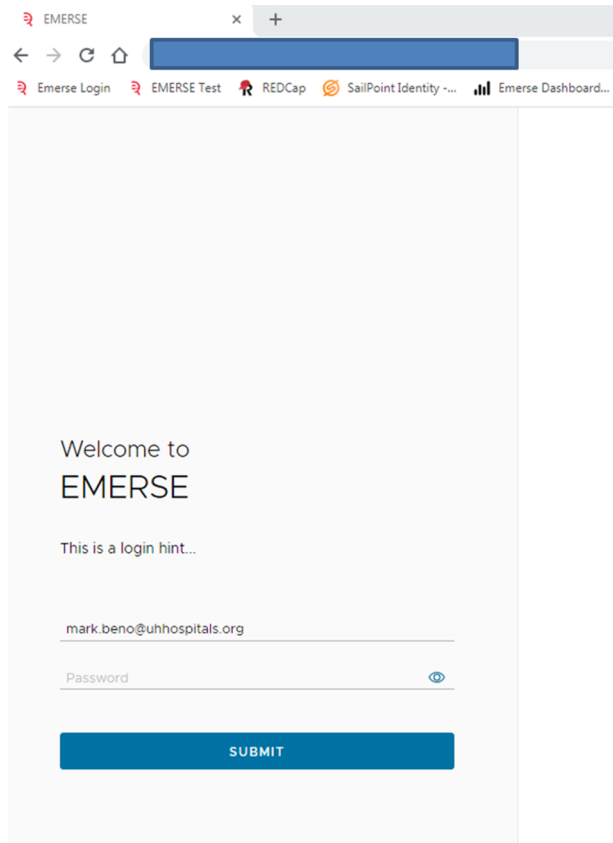
- New notes added from prior day at 6 a.m. for near real-time updates
- Emergent MRN errors corrected from the prior day via Health Identity Management



EMERSE Demonstration Simulation – Why?

- “Live Demos” = **Extra stress** of a technical issue arising
- Demo system is limited to 10,000 synthetic patients; live = ~ 2 million
- Live system contains full PHI and we need to redact
- Allows us to look at real world scenarios
- Allows us to look at performance across >1.7 million patients and >45 million documents
- However, return counts will also be obfuscated

Accessed via Chrome Browser



The screenshot shows a Chrome browser window with a single tab titled "EMERSE". The address bar is empty. The page content is a login form with the following elements:

- Text: "Welcome to EMERSE"
- Text: "This is a login hint..."
- Text input field containing: "mark.beno@uhhospitals.org"
- Text input field labeled "Password" with a toggle icon (an eye) to its right.
- A blue "SUBMIT" button.

EMERSE – Attestation Screen

Attestation

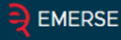
Please select the reason you are using EMERSE from the list below

	Reason	Type
<input type="radio"/>	Other Reason _____	Free Text (new)
<input type="radio"/>	Testing by CICB	Free Text (prior)
<input type="radio"/>	Education/Training	Common Use Case
<input type="radio"/>	STUDY20210332 UWL (Rao, Goutham)	Free Text (prior)
<input type="radio"/>	PREP TO RESEARCH (FernandezBacaVaca)	Free Text (prior)
<input type="radio"/>	PREP TO RESEARCH (Rajagopalan)	Free Text (prior)
<input type="radio"/>	Quality Improvement	Common Use Case
<input type="radio"/>	Patient Safety	Common Use Case
<input type="radio"/>	Infection Control	Common Use Case
<input type="radio"/>	Clinical Care	Common Use Case
<input type="radio"/>	Cancer Registry	Common Use Case
<input type="radio"/>	Billing & Coding	Common Use Case

SUBMIT

- Records why are you using EMERSE for each session
- Some categories are for operations (e.g, Quality Improvement, Patient Safety, Billing and Coding)
- Research identified as either PREP or by the IRB number
- All activity is logged for the session

EMERSE – Main Interface

 EMERSE

Patients

All Local Patients

Filters

Terms

Results

HIGHLIGHT DOCUMENTS

FIND PATIENTS

Temporary Terms

Saved Terms

Advanced Terms

Synonym Preferences

Temporary Terms

Name/Description

Manage Terms

View Terms

Sharing

Clear/Delete

Export

Terms to include

Please add terms or multi-word phrases, one at a time using the field below.

! You need at least one term in your query

Add term

ADD

Included terms

None

Phrases to exclude

Please add phrases to exclude or

Add Phrase

ADD

Excluded phrases

None

EMERSE – Main Interface

The screenshot displays the EMERSE web application interface. At the top, a dark blue header contains the EMERSE logo. Below the header, a navigation bar includes links for 'Patients', 'All Local Patients', and a red circle highlighting the 'Filters' link. The 'Filters' link is also highlighted in the left sidebar. The main content area is divided into two sections: 'Temporary Terms' and 'Terms to include'. The 'Terms to include' section features a text input field with a red error message: 'You need at least one term in your query'. Below the input field is a yellow 'Add term' button. To the right, the 'Phrases to exclude' section has a text input field and a blue 'ADD' button. The bottom of the page shows a list of 'Included terms' which is currently empty.

EMERSE

Patients All Local Patients [REDACTED]

Filters

Terms

Results HIGHLIGHT DOCUMENTS FIND PATIENTS

Temporary Terms Saved Terms Advanced Terms Synonym Preferences

Temporary Terms

Name/Description

Manage Terms

View Terms

Sharing

Clear/Delete

Export

Terms to include

Please add terms or multi-word phrases, one at a time using the field below.

! You need at least one term in your query

Add term

ADD

Included terms

None

Phrases to exclude

Please add phrases to exclude or

Add Phrase

ADD

Excluded phrases

None

EMERSE – Filters

FILTERS	
Encounter Dates	Only documents dated between the following dates will be found in search and when reviewing patients' charts.
Age (current)	The date range for selection is from 07/15/2014 to 01/06/2022
Sex	
Race	
Ethnicity	
Vital Status	
Document Source	

FILTERS	
Encounter Dates	Only documents with the following criteria will be found in search and when reviewing patients' charts.
Age (current)	(Checking all options is equivalent to unchecking all options. No filter will be applied)
Sex	
Race	<input checked="" type="checkbox"/> American Indian and Alaska Native
Ethnicity	<input type="checkbox"/> Black or African American
Vital Status	<input type="checkbox"/> Patient Refused
Document Source	<input type="checkbox"/> Middle Eastern
	<input type="checkbox"/> Other
	<input type="checkbox"/> Hispanic
	<input type="checkbox"/> BI/Multi Racial
	<input type="checkbox"/> Asian
	<input type="checkbox"/> Native Hawaiian and Other Pacific Islander
	<input type="checkbox"/> Unknown
	<input type="checkbox"/> White or Caucasian

EMERSE – Main Interface

The screenshot displays the EMERSE web application interface. At the top, a dark blue header contains the EMERSE logo. Below the header, a navigation bar includes links for Patients, Filters, and Results. The 'Terms' link is highlighted with a red circle. The main content area is divided into two columns. The left column contains a sidebar with options: Temporary Terms, Name/Description, Manage Terms (highlighted), View Terms, Sharing, Clear/Delete, and Export. The right column features a 'Terms to include' section with a text input field and an 'ADD' button. A red warning message states: 'You need at least one term in your query'. Below this is a yellow 'Add term' section with a text input field and an 'ADD' button. To the right of these sections is a 'Phrases to exclude' section with a text input field and an 'ADD' button. At the bottom of the right column, there is a section for 'Excluded phrases' showing 'None'.

EMERSE

Patients All Local Patients [REDACTED]

Filters

Terms

Results HIGHLIGHT DOCUMENTS FIND PATIENTS

Temporary Terms Saved Terms Advanced Terms Synonym Preferences

Temporary Terms

Name/Description

Manage Terms

View Terms

Sharing

Clear/Delete

Export

Terms to include

Please add terms or multi-word phrases, one at a time using the field below.

! You need at least one term in your query

Add term

ADD

Included terms

None

Phrases to exclude

Please add phrases to exclude or

Add Phrase

ADD

Excluded phrases

None

EMERSE – Simple search

Terms to include

Please add terms or multi-word phrases, one at a time using the field below.

! You need at least one term in your query

Add term

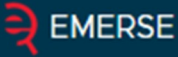


ADD

Included terms

None

EMERSE – Simple Search

 EMERSE

Patients

Filters

Terms

enbrel

Results

HIGHLIGHT DOCUMENTS

FIND PATIENTS

Results returned in less than 1 second

Summaries

Demographics

Trends

X

patients matched the search criteria

To review these patients in more detail, move to a Temporary Patient List and then click the Highlight Documents button.

Top 100 Matching Documents

(Touchworks)

09/07/2021

EMERSE – Simple Search

(Touchworks)

07/06/2020

...instructions on how to inject Enbrel. please call her at [REDACTED]
...instructions on how to inject Enbrel SureClick (did not receive medication...
...7bf4e9f373e1FormStart GroupHeading8Start Specialty Pharmacy: Medication: Enbrel Dose: 50mg SQ once weekly...
...Clinical Intervention: Medication education/counseling: Enbrel New start education. Patient Education...
...Monitoring Note: TNF Inhibitors Medication: Enbrel (Etanercept) 50mg every week Indication...
...storage, administration, and disposal of Enbrel. Patient educated to pull Enbrel from refrigerator approximately 30 minutes...
...again. Patient not to leave Enbrel at room temperature for more...
...hours. Patient instructed to inject Enbrel subcutaneously, and ensure the full...
...manufacture web site to view enbrel SureClick injection video before injecting...

EMERSE – Adding synonyms

Terms to include


Please add terms or multi-word phrases, one at a time using the field below.

Add term



ADD

Included terms

 enbrel

SYNONYMS



Adding synonyms – previous version of EMERSE

Synonyms for "enbrel" ×

Click individual terms to highlight or de-highlight.

Synonyms (11) HIGHLIGHT ALL HIGHLIGHT NONE

enbrel sureclick

enbrel sureclick auto injector

enbrel sureclick autoinjector

etanercept

etanercept enbrel

etn

sureclick

sureclick auto injector

sureclick autoinjector

tnfr fc

tumor necrosis factor receptor igg chimera

Spelling Alternatives (48) HIGHLIGHT ALL HIGHLIGHT NONE

ambriel

eanbrel

ebbrel

ebrel

eenbrel

embrel

embril

enabrel

enbbrel

enbel

enberel

enberl

enbiel

enbre

enbreal

enbree

enbrek

enbrel4

enbrel8

enbrela

enbrele

enbrell

enbrels

enbreo

enbrex

enbril

enbrle

enbrol

enbryl

encrel

endbrel

endrel

engrel

enlbrel

enmbrel

enprel

enrbel

enrel

enrrel

entrel

envrel

erbel

eubrel

ewnbrel

ienbrel

inbrel

nbrel

renbrel

ADD HIGHLIGHTED TERMS (59)

CANCEL

These are all of the synonyms built-in to EMERSE for Enbrel

Adding synonyms – upgraded version of EMERSE

Synonyms for "enbrel" ×

Click individual terms to highlight or de-highlight.

Synonyms (8) SORT A TO Z HIGHLIGHT ALL HIGHLIGHT NONE

enbrel sureclick (10029)

enbrel sureclick autoinjector (2)

etanercept (3938)

etanercept enbrel (241)

etn (509)

sureclick (32556)

sureclick auto injector (8)

sureclick autoinjector (729)

Spelling Alternatives (26) SORT A TO Z HIGHLIGHT ALL HIGHLIGHT NONE

ambril (1)

ebrel (16)

embrel (1251)

embril (78)

enabrel (1)

enbbrel (1)

enbel (33)

enberel (1)

enberl (2)

enbre (3)

enbreal (1)

enbrela (2)

enbrell (7)

enbrels (1)

enbrex (1)

enbril (54)

enbrol (1)

enbryl (2)

endrel (1)

engrel (5)

enmbrel (1)

enrbel (4)

enrel (8)

entrel (1)

inbrel (1)

nbrel (1)

ADD HIGHLIGHTED TERMS (34)

CANCEL

The counts are an indication of how many notes contain these variations of Enbrel

EMERSE – Adding synonyms

EMERSE

Patients

Filters

Terms

enbrel"enbrel sureclick""enbrel sureclick auto injector""enbrel sureclick autoinjector"etanercept"etanercept enbrel"etn"surecl

Results

HIGHLIGHT DOCUMENTS

FIND PATIENTS

Temporary TermsSaved TermsAdvanced Terms

Temporary Terms

Name/Description

Manage Terms

View Terms

Sharing

Clear/Delete

Please add terms or multi-word phrases, one at a time using the field below.

Add term

ADD

Included terms

enbrel

"enbrel sureclick"

"enbrel sureclick auto injector"

"enbrel sureclick autoinjector"

etanercept

"etanercept enbrel"

etn

sureclick

"sureclick auto injector"

"sureclick autoinjector"

"tnfr fc"

"tumor necrosis factor receptor igg chimera"

EMERSE – Adding synonyms to search

The screenshot shows the EMERSE search interface. At the top, the EMERSE logo is on the left. Below it, there are tabs for 'Patients', 'Filters', 'Terms', 'Results', 'Summaries', 'Demographics', and 'Trends'. The 'Results' tab is selected. In the 'Terms' section, several search terms are entered in yellow boxes: 'enbrel', '"enbrel sureclick"', '"enbrel sureclick auto injector"', '"enbrel sureclick autoinjector"', 'etanercept', and '"etane...'. Below the 'Terms' section, there are two buttons: 'HIGHLIGHT DOCUMENTS' and 'FIND PATIENTS'. The 'FIND PATIENTS' button is highlighted with a black border. A purple oval callout points to the search results area, stating 'Results returned in less than 4 seconds'. Below the 'Results' tab, a blue box highlights the text '1.62X', followed by the text 'patients matched the search criteria'. Below this, there is a link to 'To review these patients in more detail, move to a Temporary Patient List and then click the Highlight Documents button.' and a section titled 'Top 100 Matching Documents'.

EMERSE

Patients

Filters

Terms

enbrel "enbrel sureclick" "enbrel sureclick auto injector" "enbrel sureclick autoinjector" etanercept "etane

Results

HIGHLIGHT DOCUMENTS FIND PATIENTS

Summaries Demographics Trends

1.62X patients matched the search criteria

To review these patients in more detail, move to a Temporary Patient List and then click the Highlight Documents button.

Top 100 Matching Documents

EMERSE – Synonyms discussion

Synonyms and phrases collection


- >2 million built into EMERSE and are updated through U. of Michigan
- Allows rapid searching across 100s of terms simultaneously
- Drugs and brand names, diagnoses and procedures, non-clinical words, etc.
- Common phrases in written notes
- Users can supplement with additional search terms

Think about the variety of styles used in writing medical notes – all of this can be searched as well as combined in a single search

Category*	Examples
Acronyms	<ul style="list-style-type: none">• ALL, acute lymphoblastic leukemia• ESRD, end stage renal disease• CXR, chest x-ray
Abbreviations	<ul style="list-style-type: none">• chemotherapy, chemo• ventilator, vent• shoulder pain, shld pain
Professional and consumer terms	<ul style="list-style-type: none">• myocardial infarction, heart attack• alopecia, hair loss• emesis, puking
Misspellings	<ul style="list-style-type: none">• ventilator, ventilater ventalator• pneumoina, pneumonia, pneumonia• diarriaea, diahhrea, diarrhea
American English & British English spelling	<ul style="list-style-type: none">• anesthesia, anaesthesia• anemic, anaemic• virilization, virilisation
Trade and generic drug names	<ul style="list-style-type: none">• Tylenol, acetaminophen• Prilosec, omeprazole• Zoloft, sertraline

EMERSE – Synonyms for common phrases

Included terms

 "feels tired" SYNONYMS

Synonyms for "feels tired"



Click individual terms to highlight or de-highlight.

Synonyms (14)

[SORT A TO Z](#)

[HIGHLIGHT ALL](#)

[HIGHLIGHT NONE](#)

bushed (28) completely exhausted (476) completely tired (23) feel exhausted (838) feel tired (28154)
feeling exhausted (3833) feeling tired (1733107) feels exhausted (4741) felt exhausted (1002) felt tired (8081)
really exhausted (322) really tired (7847) tired after (10542) tired out (855)

ADD HIGHLIGHTED TERMS (14)

CANCEL

Synonyms that allow rapid discovery of Social Determinants of Health in Notes

Terms to include

Please add terms or multi-word phrases, one at a time using the field below.

Add term

ADD

Included terms

hungry

SYNONYMS

Synonyms for "hungry"

Click individual terms to highlight or de-highlight.

Synonyms (24)

SORT A TO Z

HIGHLIGHT ALL

HIGHLIGHT NONE

appetite (3079827)

appetites (1574)

appetitive (452)

extremely hungry (259)

famished (108)

hangry (200)

hunger (110545)

hunger pang (9)

hunger pangs (154)

hungers (12)

hungrier (5966)

hungriest (65)

hungrily (32)

hungriness (10)

lack food (1)

lack of food (831)

lacked food (4)

lacking food (13)

lacks food (6)

munchie (30)

munchies (146)

ravenous (567)

starving (2994)

very hungry (6394)

Spelling Alternatives (7)

SORT A TO Z

HIGHLIGHT ALL

HIGHLIGHT NONE

apetite (5048)

appetit (115)

appetitie (6432)

appettite (118)

appettie (455)

appettite (275)

appitate (5)

ADD HIGHLIGHTED TERMS (31)

CANCEL

Synonyms that reflect injuries that are discussed in notes

Terms to include

Please add terms or multi-word phrases, one at a time using the field below.

Add term

ADD

Included terms

trampoline

SYNONYMS

Synonyms for "trampoline" ×

Click individual terms to highlight or de-highlight.

Synonyms (7)

SORT A TO Z

HIGHLIGHT ALL

HIGHLIGHT NONE

home trampoline (32)

tramp (2281)

trampoline fracture (17)

trampoline park (1481)

trampolines (544)

trampolining (68)

ADD HIGHLIGHTED TERMS (7)

CANCEL

Searching with synonyms contained with the same note









Terms to include

Please add terms or multi-word phrases, one at a time using the field below.

Add term

ADD

Included terms

 arthritis	SYNONYMS
 "rheumatoid arthritis"	SYNONYMS
 "rheumatoid arthritides"	SYNONYMS
 enbrel	
 "enbrel sureclick"	
 "enbrel sureclick auto injector"	
 "enbrel sureclick autoinjector"	
 etanercept	SYNONYMS

EMERSE – Searching for any blue AND any yellow within the same note

The screenshot shows the EMERSE search interface. At the top, the EMERSE logo is on the left. Below it, there are sections for Patients, Filters, and Terms. The Terms section contains several search terms: 'arthritis', '"rheumatoid arthritis"', '"rheumatoid arthritides"', 'enbrel', '"enbrel sureclick"', and '"enbrel sureclick a'. The Results section is active, showing a 'HIGHLIGHT DOCUMENTS' button and a 'FIND PATIENTS' button. Below the Results section, there are tabs for 'Summaries', 'Demographics', and 'Trends'. The 'Summaries' tab is selected, showing a summary of the search results: 'Y patients matched the search criteria'. Below this, there is a note: 'To review these patients in more detail, move to a Temporary Patient List and then click the Highlight Documents button.' and a section for 'Top 100 Matching Documents'.

EMERSE

Patients

Filters

Terms

Results

Summaries Demographics Trends

Y patients matched the search criteria

To review these patients in more detail, move to a Temporary Patient List and then click the Highlight Documents button.

Top 100 Matching Documents

Results returned in less than 3 seconds

EMERSE – Moving discovered cohort to a temporary list

[illegible]

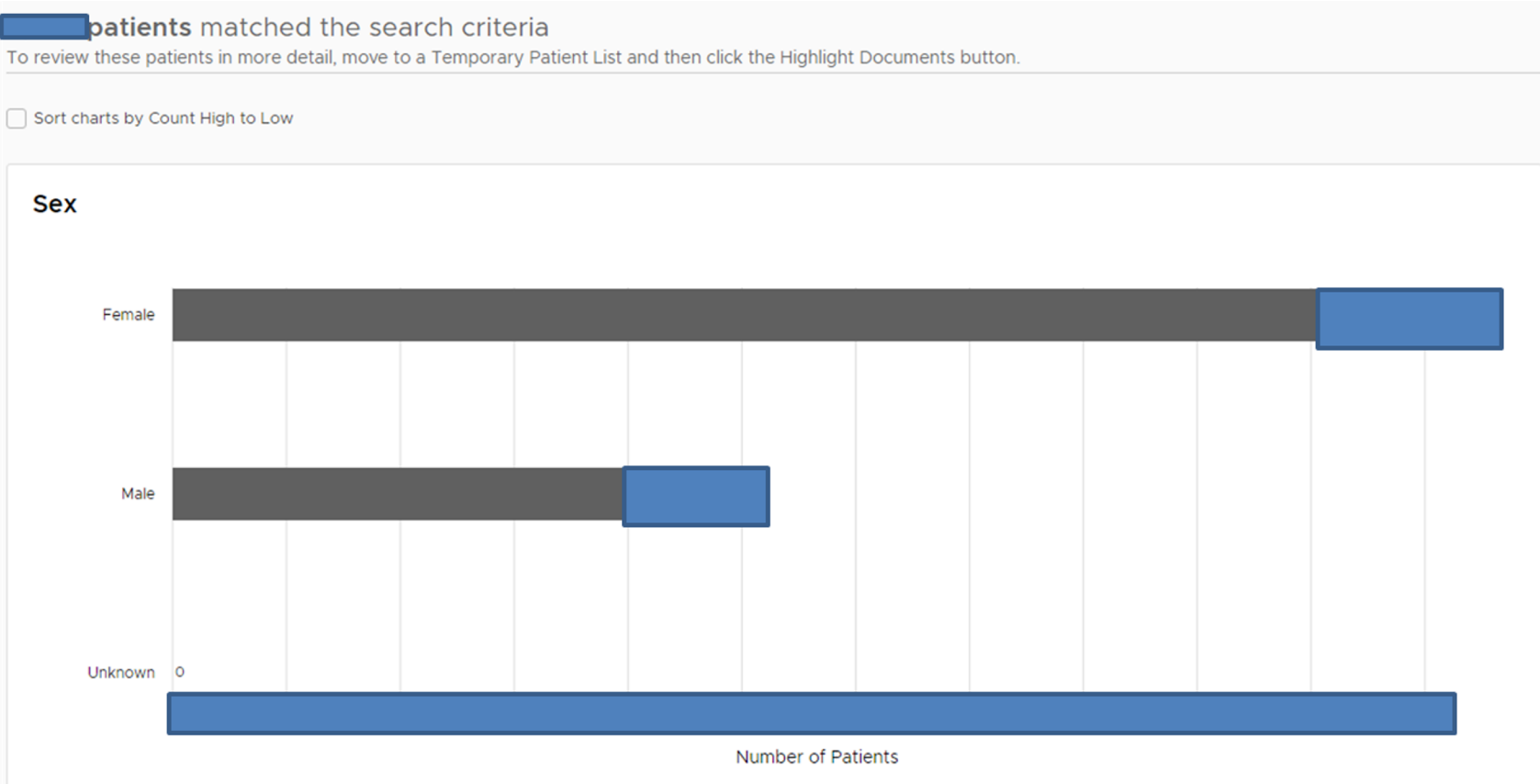
EMERSE – Selecting highlight documents numeric view

MRN	Name	Touchworks	Sunrise
		1 of 46	343 of 4289
		100 of 141	109 of 386
		63 of 89	140 of 256

EMERSE – Switching to mosaic view for highlighting

MRN	Name	Touchworks	Sunrise	Comment
		<div><div></div><div></div></div>	<div><div></div><div></div></div>	<div></div> <div>0 / 255</div>
		<div><div></div><div></div></div>	<div><div></div><div></div></div>	<div></div> <div>0 / 255</div>
		<div><div></div><div></div></div>	<div><div></div><div></div></div>	<div></div> <div>0 / 255</div>

EMERSE – Temporary list demographics



EMERSE – Saving patients to a permanent list

Patient lists

- Created using EMERSE searches
- Entered manually
- Imported from an Excel file
- Shared with other EMERSE users
- Can be compared to other patient lists

Create Patient List



Name Enbrel and arthritis

Description

Example

CREATE

CANCEL

EMERSE – Saving patients to a permanent list

Patient lists

- Created using EMERSE searches
- Entered manually
- Imported from an Excel file
- Shared with other EMERSE users
- Can be compared to other patient lists

You can add patients to your patient list by typing or pasting their medical record numbers (MRNs) in the field below or uploading a text file.

Your patient list must not exceed 100,000 patients.

- Number of patients on the list: 12345
- Number of patients that can be added to the list: 87654

Add Patients

Medical Record Numbers

Enter Medical Record Numbers

[ADD PATIENTS](#)

Add by Bulk Upload

Uploading will append patients to the list

[Choose File](#) No file chosen

[UPLOAD FILE](#)

EMERSE – Tagging, annotating, and exporting patient lists

Temporary Patient List **Saved Patient Lists** All Local Patients Network

Name/Description
Add/Upload Patients
View Patients
Patient Demographics
Sharing
Clear/Delete
Export

Add a password to protect the Excel file

Enter password

A strong password is required

Re-enter password

Temporary Patient List **Saved Patient Lists** All Local Patients Network

colorectal AND carcino...
Name/Description
Add/Upload Patients
View Patients
Patient Demographics
Sharing

MRN	Patient Name	Age	DOB	Comment	Tag	Action
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	need to review	<input checked="" type="checkbox"/>	Remove

14 / 255

Patients per page 50 69 Patients |< < 1 / 2 > >|

EMERSE – Term collections

Term collections

- The building blocks of effective searching with EMERSE
- User-created and shared with other users locally (and with other institutions using EMERSE if the feature is turn on)
- Allows for reusable tools to use with EMERSE
- Potential to create catalogs of terms based on discipline or specialty
- Potential to create catalogs based on providers in a department by creating a term list of provider names

EMERSE		
Patients		
Filters		
Terms		
Results	HIGHLIGHT DOCUMENTS	FIND PATIENTS
Temporary Terms	Saved Terms	Advanced Terms
breast cancer		demo
UWL terms to exclude version 2		UWL exclude
Location based		UHCMC
Type 1 diabetes E10 1-9		Type 1 diabetes E10, 1-9
Type 1 Diabetes uncoded		Type 1 Diabetes uncoded
CICB_myelopathy		Training session

EMERSE – Term collections

Term collections upload feature

- Allows common term collections to be shared with other research teams at other institutions who also have EMERSE installed
- Potential for many multi-institutional collaborative studies with the EMERSE consortium

Upload Terms

×

Terms

|

Paste search terms one per line

UPLOAD TERMS

EMERSE – Sharing Terms Across Sites

PediaTrac™ a multi-disciplinary project dedicated to creating a comprehensive, user-friendly tool for tracking infant development across key domains



IMHF: GASTRO - parenteral nutrition	rec "home parenteral nutrition" hpn kabiven parenteral "partial parenteral nutrition" "peripheral parenteral nutrition" pn ppn "total parenteral nutrition" tpn ntp pareneteral parental parenternal tpm trn ttpn "parenteral nutrition"
-------------------------------------	--



EMERSE – Finding patients w/o coded T1D diagnosis

Step 1: Search for all with coded T1D in notes or other structured data source

T1D extensive coded

Name/Description

Manage Terms


View Terms

Sharing

Clear/Delete



Please add terms or multi-word phrases, one at a time using the field below.



Add term







ADD



Included terms



 "e10 9" 



 "e10 8" 



 "e10 69" 



 "e10 65" 



 "e10 649" 

 "e10 641" 

 "e10 64" 

 "e10 638" 

 "e10 63" 

 "e10 628" 

EMERSE – Finding patients w/o coded T1D diagnosis

The screenshot displays the EMERSE search interface. At the top, the 'Patients' section has a blue search bar. Below it, the 'Filters' section includes a text input for 'Encounter Dates'. The 'Terms' section contains a row of yellow buttons with the following text: '"e10 9"', '"e10 8"', '"e10 69"', '"e10 65"', '"e10 649"', '"e10 641"', '"e10 64"', '"e10 638"', '"e10 63"', '"e10 628"', and '"e10 629"'. The 'Results' section features a 'HIGHLIGHT DOCUMENTS' button and a 'FIND PATIENTS' button. Below the search bar, there are tabs for 'Summaries', 'Demographics', and 'Trends'. A purple oval callout on the right side of the interface states 'Results returned in less than 9 seconds'. At the bottom, a box with a large 'X' icon is followed by the text 'patients matched the search criteria'. Below this, a smaller line of text reads: 'To review these patients in more detail, move to a Temporary Patient List and then click the Highlight Documents button.'

Patients

Filters

Encounter Dates

Terms

"e10 9" "e10 8" "e10 69" "e10 65" "e10 649" "e10 641" "e10 64" "e10 638" "e10 63" "e10 628" "e10 629"

Results

HIGHLIGHT DOCUMENTS FIND PATIENTS

Summaries Demographics Trends

X patients matched the search criteria

To review these patients in more detail, move to a Temporary Patient List and then click the Highlight Documents button.

Results returned in less than 9 seconds

Step 2: Move these patients to a permanent list called T1D coded

EMERSE – Finding patients w/o coded T1D diagnosis

Step 3: Search for patients where T1D is mentioned in the notes, with synonyms

Unstructured search for T1D - Assumptions

- Patients in this list should be in the coded list in the prior example
- We have not entered any exclusion criteria such as “do not suspect T1D”
- Resulting list would have patients who have T1D but have not been coded for it

Step 4: Save list of found patients as permanent list called T1D uncoded

The screenshot displays the EMERSE search interface. At the top, the 'Terms' section contains three search criteria: "type 1 diabetes mellitus", "childhood onset diabetes", and "childhood onset diabetes". Below this, the 'Results' section has two buttons: 'HIGHLIGHT DOCUMENTS' and 'FIND PATIENTS'. The 'Summaries' tab is selected, showing '8.57X patients matched the search criteria'. A purple oval highlights the text 'Results returned in less than 9 seconds'. Below the patient count, there is a section for 'Top 100 Matching Documents' with a sub-header '(Sunrise)'. The document snippets show medical notes with T1D-related terms highlighted in yellow, such as 'Diabetes mellitus type 1', 'Type 1 diabetes mellitus', and 'Type 1 diabetes'.

Terms: "type 1 diabetes mellitus" "childhood onset diabetes" "childhood onset diabetes"

Results: HIGHLIGHT DOCUMENTS FIND PATIENTS

Summaries Demographics Trends

8.57X patients matched the search criteria

To review these patients in more detail, move to a Temporary List Highlight

Top 100 Matching Documents

(Sunrise)

...type 1: Additional Dx: Encephalopathy: Diabetes mellitus type 1: Type 1 diabetes mellitus with ket...

...w medication regimen: Hyperglycemia: Hypomagnesemia: Diabetes mellitus type 1: Non compliar...

...term current use of insulin: Type 1 diabetes mellitus without complication: Nonadherence to...

EMERSE – Finding patients w/o coded T1D diagnosis

Step 5: Compare coded T1D with uncoded T1D search

Temporary Patient List **Saved Patient Lists** All Local Patients Network

[NEW PATIENT LIST](#) [COMPARE PATIENT LISTS](#)

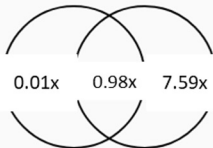
Name	Description	Owner	Created ↓	Modified	Last Used	Patient Count
T1D coded demo 11	T1D coded	Mark Beno	10/28/2021	10/28/2021		x
T1D_uncoded_demo_11	T1D uncoded	Mark Beno	10/04/2021	10/28/2021	10/28/2021	8.57x

(New patient list can not have more than 100,000 patients)

[CREATE NEW PATIENT LIST FROM SELECTION](#)

T1D coded demo 11
T1D coded

[REMOVE](#)

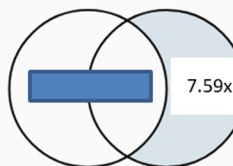


0.01x 0.98x 7.59x

T1D_uncoded_demo_11
T1D uncoded

[REMOVE](#)

Only patients in the right list not in the left



The patient list on the right mentions type 1 diabetes but none of those patients have any of the T1D ICD-10 codes in their charts

Use this cohort to refine actual T1D Dx

EMERSE – Searching within a patient list

These patients have a coded type 2 diabetes

Patients

Filters

Encounter Dates

Terms

e11"e11 0""e11 00""e11 01""e11 1""e11 10""e11 11""e11 2""e11 21""e11 22""e11 29""e11

Results

HIGHLIGHT DOCUMENTS

FIND PATIENTS

Summaries

Demographics

Trends

patients matched the search criteria

To review these patients in more detail, move to a Temporary Patient List and then click the Highlight Documents button.

Top 100 Matching Documents

EMERSE – Searching within a patient list

Who is taking specific drugs to control T2D?

- We want to visually see who in this list of T2D patients has a mention of 3 different drugs, all beta-blockers, somewhere in their notes
- **When searching in a saved patient list, the search is done using logical OR**

beta blockers

Name/Description

Manage Terms

View Terms

Sharing

Clear/Delete

Terms to include

nebivolol

bystolic

byvalson

nadolol

"bendroflumethiazide nadolol"

corgard

corzide

"nadolol bendroflumethiazide"

atenolol

"apo atenolol"

apohenolol

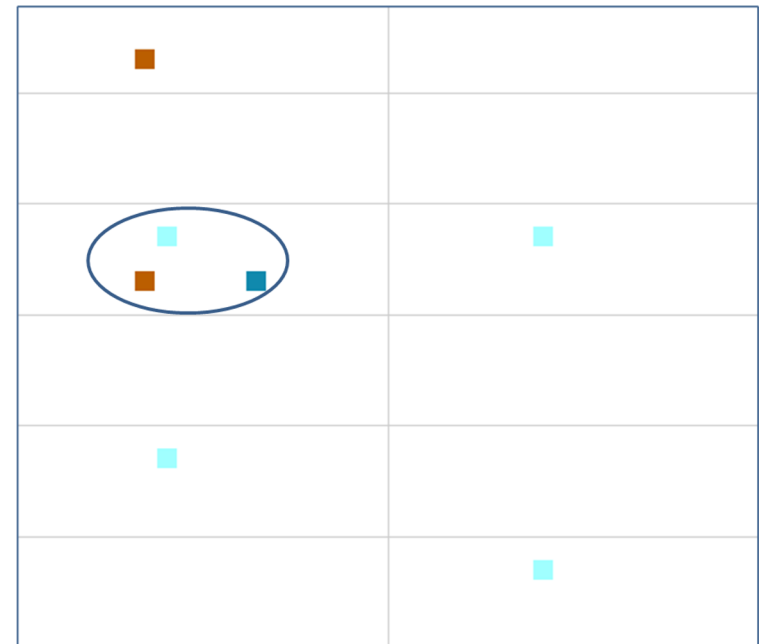
"aspirin simvastatin atenolol ramipril thiazide"

polycap

EMERSE – Searching within a patient list

Highlighting documents with mosaic view

- Allows view of T2D patients who have these drugs mentioned in their notes
- Can quickly narrow down someone who might has more than one drug brand mentioned in their notes



EMERSE – Searching all patients for Dx and Rx classes

Who is taking different classes of drugs to control T2D?

- We want to visually see who in this list of T2D patients has a mention of 3 different drug classes mentioned in their same note

Results returned
in less than 3 seconds
345 terms searched
simultaneously

[illegible]

Summary	Source	MR
<p>...type 2, uncontrolled (250.02) (E11.65) Very poor control with...</p> <p>...of insulin (250.50,362.06) (E11.3493) Diabetic peripheral neuropathy associated...</p> <p>...diabetes mellitus (250.60,357.2) (E11.42) Gabapentin 400 mg daily...</p> <p>...mellitus (250.50,362.07,362.04) (E11.3211) - Mild vitamin D deficiency...</p> <p>...diabetic retinopathy) (250.50,362.03) (E11.3299) - Obesity (278.00) (E66...</p> <p>...type 2, uncontrolled (250.02) (E11.65) - History of Diabetes mellitus...</p> <p>...type 2, uncontrolled (250.02) (E11.65) - History of Diabetes mellitus...</p> <p>...type 2, uncontrolled (250.02) (E11.65) - Resolved Date: 18 Feb...</p> <p>...Another referral placed to endocrinology Trulicity increased to 1.5 mg...</p> <p>...controlled His initial doses of Trulicity was given today Alogliptin reordered Compliance stressed Instructed to...</p> <p>...the pros and cons of Trulicity and patient agrees to give...</p> <p>...We will start him on Trulicity Metformin added to her regimen Advised...</p> <p>...Diabetic neuropathy (250.60,357.2) (E11.40) - History of Diabetic neuropathy (250.60,357.2) (E11.40) - History of Diabetic polyneuropathy (250.60,357.2) (E11.42) - History of Diabetic polyneuropathy (250.60,357.2) (E11.42) - History of Diabetic polyneuropathy (250.60,357.2) (E11.42) - Resolved Date: 20 Nov...</p> <p>...Diabetic polyneuropathy (250.60,357.2) (E11.42) - Resolved Date: 18 Feb...</p> <p>...nonproliferative, mild (250.50,362.04) (E11.3299) - History of GERD (gastroesophageal... 2 diabetes mellitus (250.00) (E11.9) - History of Type 2... 2 diabetes mellitus (250.00) (E11.9) PastMedicalHistory_10_twCiteListControlEnd PastMedicalHistorySectionEnd</p> <p>...TAKE 1 TABLET BY DAILY Trulicity 1.5 MG/0.5ML...</p>	Touchworks	02
<p>...type 2, uncontrolled (250.02) (E11.65) Very poor control with...</p> <p>...of insulin (250.50,362.06) (E11.3493) Diabetic peripheral neuropathy associated...</p> <p>...diabetes mellitus (250.60,357.2) (E11.42) Gabapentin 400 mg daily...</p> <p>...mellitus (250.50,362.07,362.04) (E11.3211) - Mild vitamin D deficiency...</p>	Touchworks	02

EMERSE – Searching within a patient list

Breast Cancer

- This example shows visually how many patients had a mention of breast cancer and the various stages in their notes
- The search quickly shows which patients match all 5 of the search criteria in our existing list the initial search was simply “breast cancer”

The screenshot displays the EMERSE search interface. At the top, there's a 'Patients' section with a search bar. Below it, the 'Filters' section includes 'Encounter Dates'. The 'Terms' section shows a list of search criteria: "stage 4", "stage iv", "stage 3", "stage iii", "stage ii", "stage 2", "stage i", "stage 1", and "breast cancer". The 'Results' section has buttons for 'HIGHLIGHT DOCUMENTS' and 'FIND PATIENTS'. Below the search bar, there are tabs for 'Temporary Terms', 'Saved Terms', and 'Advanced Terms'. The 'Temporary Terms' tab is active, showing a list of terms to include. The 'Terms to include' section has a text input field and an 'ADD' button. Below this, the 'Included terms' section lists the search criteria with a 'SYNONYMS' button next to each term.


















Temporary Terms	Terms to include
Name/Description	Please add terms or multi-word phrases, one at a time using the field below.
Manage Terms	<input type="text"/>
View Terms	<input type="button" value="ADD"/>
Sharing	
Clear/Delete	

Included terms
<input type="checkbox"/> "stage 4" <input type="button" value="SYNONYMS"/>
<input type="checkbox"/> "stage iv" <input type="button" value="SYNONYMS"/>
<input type="checkbox"/> "stage 3" <input type="button" value="SYNONYMS"/>
<input type="checkbox"/> "stage iii" <input type="button" value="SYNONYMS"/>
<input type="checkbox"/> "stage ii" <input type="button" value="SYNONYMS"/>
<input type="checkbox"/> "stage 2" <input type="button" value="SYNONYMS"/>
<input type="checkbox"/> "stage i" <input type="button" value="SYNONYMS"/>
<input type="checkbox"/> "stage 1" <input type="button" value="SYNONYMS"/>
<input type="checkbox"/> "breast cancer" <input type="button" value="SYNONYMS"/>

EMERSE – Searching within a patient list

Breast Cancer

- We implicitly know that this patient has a mention of stages 1 through 4 mentioned in his/her notes
- Now we can look to see if it was related to cancer or some other disease
- Can add terms to exclude and do another search within this list
- We can tag matches and save as a new list

Touchworks	Sunrise
	
	 
	  
 	  
	  

Synonyms for "breast cancer"



Click individual terms to highlight or de-highlight.

- infiltrating mammary carcinoma
- infiltrative breast c
- infiltrative breast cancer
- infiltrative lobular
- infiltrative lobular breast cancer
- infiltrative lobular carcinoma
- inflammatory breast cancer
- intracystic papillary carcinoma
- intracystic papillary carcinoma of breast
- intracystic papillary carcinoma of the breast
- intraductal papillary ca
- intraductal papillary cancer
- intraductal papillary carcinoma
- intraductal papillary carcinoma of the breast
- invasive breast ca
- invasive breast cancer ()
- invasive breast cancers
- invasive breast carcinoma
- invasive breast carcinom
- invasive cancer breast
- invasive cancer of the breast
- invasive carcinoma breast
- invasive carcinoma of breast
- invasive carcinoma of the breast
- invasive duct
- invasive duct carcinoma
- invasive ductal
- invasive ductal carcinoma
- invasive ductal carcinomas
- invasive lobular
- invasive lobular breast c
- invasive lobular breast cancer
- invasive lobular breast cancer
- invasive lobular breast carcinoma
- invasive lobular cancer of the breast
- invasive lobular carcinoma
- invasive lobular carcinoma breast
- invasive lobular carcinoma of breast
- invasive lobular carcinoma of the breast
- invasive lobular carcinomas
- invasive mammary breast cancer
- invasive mammary breast carcinom
- ipc
- juvenile breast
- juvenile breast cancer
- lcis
- left breast ca
- left breast cancer
- left breast carcinoma
- left sided breast ca
- left sided breast cancer
- left sided breast carcinoma
- lobular breast ca
- lobular breast cancer
- lobular breast cancers
- lobular breast carcinoma
- lobular carcinoma
- lobular carcinoma in situ

ADD HIGHLIGHTED TERMS (192)

CANCEL

EMERSE

https://dev-emerse.med.umich.edu/emerse/results/overview?qk=952&pl=3002&mode=mosaic

EMERSE

David Hanauer ^

Patients

Demo List (16)

Filters

Terms

treatment

lymphocytes

hepatitis

cancer

"bowel obstruction"

lasix

seizures

"mitral valve prolapse"

reflux

shingles

Results

HIGHLIGHT DOCUMENTS

FIND PATIENTS

SEARCH NETWORK

Overview

Sorted by: Insert Order

Numbers Grayscale Mosaic

123

MRN	Name	Main EHR	Radiology	Pathology	Other	Scanned/PDFs	Comment	Tag
<div></div>		<div><div></div><div></div></div>	<div><div></div><div></div></div>	<div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div></div>	<div><div></div></div>	<div><div></div><div>0 / 255</div></div>	<div><div></div></div>
		<div><div></div><div></div></div>	<div><div></div><div></div></div>	<div><div></div><div></div></div>	<div><div></div><div></div></div>	<div><div></div><div></div></div>	<div><div></div><div>0 / 255</div></div>	<div><div></div></div>
		<div><div></div><div></div></div>	<div><div></div><div></div></div>	<div><div></div><div></div></div>	<div><div></div><div></div><div></div></div>	<div><div></div><div></div></div>	<div><div></div><div>0 / 255</div></div>	<div><div></div></div>
		<div><div></div><div></div></div>	<div><div></div><div></div></div>	<div><div></div><div></div></div>	<div><div></div><div></div></div>	<div><div></div></div>	<div><div></div><div>0 / 255</div></div>	<div><div></div></div>
		<div><div></div><div></div></div>	<div><div></div><div></div></div>	<div><div></div><div></div></div>	<div><div></div><div></div></div>	<div><div></div></div>	<div><div></div><div>0 / 255</div></div>	<div><div></div></div>


Patients per page: 50

1 - 16 of 16 patients

EMERSE – Searching with wild cards

 hyperten*

- Using the * character allows for the expansion of the word-stem
- In this example, hyperten is expanded


 Page 1 of 1

EMERSE – Temporal searching

Notes – Temporal searching

- Updated every morning at 6 a.m.
- Allows for near real-time searches
- Potential use for differential Dx follow-up for ED patients post-discharge
- In-patient tracking (e.g., DVT, sepsis)

Only documents dated between the following dates will be found in search and when reviewing patients' charts.

The date range for selection is from 07/15/2014 to 10/27/2021

Start Date: 10/26/2021 


End Date: 10/26/2021 

Please add terms or multi-word phrases, one at a time using the field below.

Add term

ADD

Included terms

 sepsis	SYNONYMS	
 "david thomas"		
 "chrisopher thomas"		
 summers	SYNONYMS	
 stecyk		
 roheny		
 "bobby paul"		
 linz		
 luong		
 kuo		
 debs	SYNONYMS	
 chagin		

EMERSE – Temporal searching

Clinician Names

- The names of all signing clinicians are searchable and can become part of search strategies
- Search for both last name first name and first name last name to catch all instances of common names

The screenshot displays the EMERSE search interface. At the top, the 'Patients' section has a dropdown menu set to 'All'. Below this, the 'Filters' section includes a text input field containing 'Encounter Dates'. The 'Terms' section features a series of search tags: 'sepsis' (in a blue box), '"david thomas"' (in a yellow box), '"christopher thomas"' (in a yellow box), 'summers' (in a yellow box), 'stecyk' (in a yellow box), 'roheny' (in a yellow box), '"bobby paul"' (in a yellow box), 'linz' (in a yellow box), and 'luoni' (in a yellow box). Below the search terms, the 'Results' section contains two buttons: 'HIGHLIGHT DOCUMENTS' and 'FIND PATIENTS' (which is highlighted with a black border). Underneath the search bar, there are three tabs: 'Summaries' (which is selected and underlined), 'Demographics', and 'Trends'. Below the tabs, a blue square icon is followed by the text 'patients matched the search criteria'. Below this, a line of text reads: 'To review these patients in more detail, move to a Temporary Patient List and then click the Highlight Documents button.' At the bottom, the text 'Top Matching Documents' is visible, followed by another blue square icon.

Patients All

Filters Encounter Dates

Terms sepsis "david thomas" "christopher thomas" summers stecyk roheny "bobby paul" linz luoni

Results HIGHLIGHT DOCUMENTS FIND PATIENTS

Summaries Demographics Trends

patients matched the search criteria

To review these patients in more detail, move to a Temporary Patient List and then click the Highlight Documents button.

Top Matching Documents

EMERSE – Enhancing notes content

Meta-data added to note headers is fully searchable

EMR Note Types

- Over 2000 found during implementation
- Can search for many of these by name as part of a search strategy (e.g. Triage ED Peds and some condition of interest)
- Adding additional meta-data may be useful for research and ops (e.g., GIS data)

The screenshot displays the EMERSE search interface. At the top, there's a search bar with a blue button. Below it, the 'Filters' section shows 'Encounter Dates'. The 'Terms' section contains the search query '"trriage ed peds"'. The 'Results' section has two buttons: 'HIGHLIGHT DOCUMENTS' and 'FIND PATIENTS'. Below the search bar, there are tabs for 'Summaries', 'Demographics', and 'Trends'. The 'Summaries' tab is selected, showing a message: 'patients matched the search criteria'. Below this, it says 'To review these patients in more detail, move to a Temporary Patient List'. The 'Top 100 Matching Documents' section is visible, showing a document titled '(Sunrise)'. The document content includes a snippet: '...Triage - ED Peds Triage: Chart Review: CHIEF COMPLAINT...'. Below this, there are references: '...References: 1. Data Referenced From ""Triage - ED Peds"" 03-Oct-...' and '...53 1. Data Referenced From ""Triage - ED Peds"" 10/3/2021 11:53...'.

EMERSE – Advanced Searches

Temporary Terms Saved Terms Advanced Terms

The current settings will enable you to search using Advanced Terms.

The **Advanced Terms** feature offers precise control of searches. The search criteria are sent directly to the underlying Lucene search engine query parser. Lucene has a rich query syntax that allows for many types of searches including nested Boolean operators, proximity searches, fuzzy searches, and more. The full set of options are available on the [Lucene Web Site](#). All searches are restricted to individual documents.

Note that with **Advanced Terms**, all terms will be highlighted in yellow. For more control over the colors assigned to each term, use a **Term Bundle**.

"hyperten*" AND ("diabetes" OR "asthma") NOT "cancer"

SET TERMS

EMERSE – Proximity Search

Patients

Filters

Terms

cancer AND "ct mass"~15

Results

HIGHLIGHT DOCUMENTS

FIND PATIENTS

Summaries

Demographics

Trends

patients matched the search criteria

To review these patients in more detail, move to a Temporary Patient List and then click the Highlight Documents button

Top 100 Matching Documents

(Touchworks)

07/10/

...-8132724bbaffFormFormStart FreeTextEntry1Start The patient returns to review CT for right postauricular mass. CT findings...

EMERSE – Excluding terms from a search

Terms to include

Please add terms or multi-word phrases, one at a time using the field below.

Add term

ADD

Included terms

- ✎ "Idl 116"
- ✎ "Idl 115"
- ✎ "Idl 114"
- ✎ "Idl 113"
- ✎ "Idl 112"
- ✎ "Idl 111"
- ✎ "Idl 110"
- ✎ "Idl 109"
- ✎ "Idl 108"

Phrases to exclude

Please add phrases to exclude one at a time using the field below.

Add Phrase

ADD

Excluded phrases

None

Terms: "Idl 116" "Idl 115" "Idl 114" "Idl 113" "Idl 112"

Results HIGHLIGHT DOCUMENTS FIND PATIENTS

Summaries Demographics Trends

...goal is to get the LDL Test Name Result Flag Reference...

...goal is to get the LDL Test Name Result Flag Reference...

(Touchworks)

...borderline : tootal 220 (optimal LDL 106 (optimal ...

...borderline : tootal 220 (optimal LDL 106 (optimal ...

...borderline : tootal 220 (optimal LDL 106 (optimal ...

...borderline : tootal 220 (optimal LDL 106 (optimal ...

...borderline : tootal 220 (optimal LDL 106 (optimal ...

...borderline : tootal 220 (optimal LDL 106 (optimal ...

(Touchworks)

...levels are good: HDL 67 LDL 116 (down from 121 in December.

...levels are good: HDL 67 LDL 116 (down from 121 in December.

...levels are good: HDL 67 LDL 116 (down from 121 in December.

...levels are good: HDL 67 LDL 116 (down from 121 in December.

...levels are good: HDL 67 LDL 116 (down from 121 in December.

EMERSE cannot do math, but if you search for lab values, such as LDL, and include a term for each possible value of LDL, then all patients with lab results in their notes that are in that lab value "range" will be found

However, we do not want to find anything related to an "optimal" value for LDL

EMERSE – Excluding terms from a search













Terms to include

Please add terms or multi-word phrases, one at a time using the field below.

Add term

ADD

Included terms

	"Idl 116"	
	"Idl 115"	
	"Idl 114"	
	"Idl 113"	
	"Idl 112"	
	"Idl 111"	



Phrases to exclude

Please add phrases to exclude one

Add Phrase

ADD

Excluded phrases

	"optimal Idl"	
---	---------------	---

Excluding "optimal LDL" from the search eliminates 20 patients from the search results of this time bound search

Synonym Sets that Can Be Added to EMERSE

Orphanet Rare Diseases - Findings and Diseases

Relationships between rare disease and associated findings in the Orphanet database.

Source: Orphodata.org, en_product4_HPO.xml, 2019-01-01 ([link](#))
Total data rows: 147,764
Unique data rows: 17,819
Last updated: 2019-02-15

Download

Orphanet Rare Diseases - Disease Names and Synonyms

A list of rare disease and the name variants/synonyms for those diseases.

Source: Orphodata.org, en_product1.xml, 2019-01-01 ([link](#))
Total data rows: 18,138
Unique data rows: 18,105
Last updated: 2019-02-18

Download

ICD-10 codes and text descriptions

ICD-10 codes and their text descriptions.

Source: CDC.gov, 2019-ICD-10-CM.zip, 2018-06-08 ([link](#))
Total data rows: 419,003
Unique data rows: 369,646
Last updated: 2019-03-05

Download

Roget's Thesaurus

Synonyms from the 1911 edition of the Roget's Thesaurus. Many of the terms now seem outdated, but it still may be useful in some cases.

Source: Project Gutenberg ([link](#))
Total data rows: 145,000
Unique data rows: 55,020
Last updated: 2018-05-01

Download

MeSH Terms

MeSH (Medical Subject Headings) terms are a controlled vocabulary used for organizing biomedical literature such as PubMed and other database.

Source: National Library of Medicine (NLM), MeSH 2018 dataset ([link](#))
Total data rows: 1,445,217
Unique data rows: 803,637
Last updated: 2018-05-01

Download

Occupations (Dataset 1)

A list of occupations, which may be useful if trying to find occupation data for patients. Searching for synonyms of 'occupation' will bring up the list within EMERSE.

Source: Careerplanner.com ([link](#))
Total data rows: 27,954
Unique data rows: 14,707
Last updated: 2018-07-12

Download

GSSO Ontology

Terms from the Gender, Sex, and Sexual Orientation Ontology.

Source: version 2.0.5, Biportal ([link](#))

Spanish-English Dictionary

A dictionary of Spanish and English words.

Source: GitHub ([link](#))
Total data rows: 104,537

Spanish-English Dictionary of Health Related Terms

This dictionary contains many popular expressions used in Mexico and Central America to describe names, signs and symptoms of illness.

Occupations (Dataset 2)

A list of occupations, which may be useful if trying to find occupation data for patients. Searching for synonyms of 'occupation' will bring up the list within EMERSE.

DrugBank (Canada)

Drug names and synonyms, including international names.

Source: DrugBank ([link](#))

Human Phenotype Ontology (HPO)

Terms and synonyms related to human phenotype abnormalities.

VA Formulary National Drug File

A list of drugs with trade and generic names, as well as drug classes

Source: US Department of Veterans Affairs, January 2016 NDF data file ([link](#))

Gene Names

A list of human genes, as well as known relationships between genes and diseases

Source: Ensembl Project, Human genes (GRCh38.p12) dataset ([link](#))
Total data rows: 224,450

Journal Titles and Abbreviations

A list of journal titles and their MedLine abbreviations. This can be useful for searching documents for mentions of literature citations.

Synonym Preferences

Temporary Terms Saved Terms Advanced Terms Synonym Preferences

The Preferences/Settings on this page allow you to control how the Synonyms are displayed. Synonyms are system-suggested Terms based on the Terms you type in. Your EMERSE system administrator can improve your search queries. On this page you can select which Datasets to include when Synonyms are suggested, as well as change how the suggested Terms are displayed.

Synonym Dataset	Description	Number of Synonyms	Updated	Enabled
DrugBank (Canada)	Drug names and synonyms, including international names	21,819	07/25/2018	<input type="checkbox"/>
Gene Names	A list of human genes, as well as known relationships between genes and diseases	224,450	07/02/2018	<input type="checkbox"/>
ICD-10 codes	ICD-10 codes and their text descriptions	418,956	03/05/2019	<input type="checkbox"/>
Orphanet Rare Diseases - Disease Names	A list of rare disease and the name variants/synonyms for those diseases	18,137	02/18/2019	<input type="checkbox"/>
Orphanet Rare Diseases - Findings and Diseases	Relationships between rare disease and associated findings in the Orphanet database	147,570	02/15/2019	<input type="checkbox"/>
EMERSE Synonyms	These are the standard EMERSE synonyms	2,003,310	09/08/2022	<input checked="" type="checkbox"/>
Occupation Synonyms (Careerplanner)	Occupation synonyms from careerplanner.com	27,954	07/12/2018	<input type="checkbox"/>
Gender, Sex, and Sexual Orientation Ontology	The Gender, Sex, and Sexual Orientation Ontology (GSSO) has terms related to biology, medicine, psychology, sociology, and gender studies with an emphasis on LGBTQIA+ terminology.	17,935	05/11/2021	<input type="checkbox"/>
Human Phenotype Ontology (HPO)	Terms and synonyms related to human phenotype abnormalities	46,958	07/30/2018	<input type="checkbox"/>
Occupations (dataset 2)	A list of occupations from the Bureau of Labor Statistics, which may be useful if trying to find occupation data for patients. Searching for synonyms of 'occupation' will bring up the list within EMERSE.	7,226	07/12/2018	<input type="checkbox"/>

Synonym Preferences – ICD10 Codes

Synonyms for "e10"

×

Click individual terms to highlight or de-highlight.

e10 3393 () e10 3399 () e10 3411 () e10 3412 () e10 3413 () e10 3419 () e10 3491 ()
e10 3492 () e10 3493 () e10 3499 () e10 3511 () e10 3512 () e10 3513 () e10 3519 ()
e10 ()
e10 ()
e10 ()
e10 ()
e10 ()
e10 ()
e10 ()
type 1 diabetes mellitus with diabetic amyotrophy ()
type 1 diabetes mellitus with diabetic autonomic poly neuropathy ()
type 1 diabetes mellitus with diabetic cataract ()
type 1 diabetes mellitus with diabetic chronic kidney disease ()
type 1 diabetes mellitus with diabetic dermatitis ()
type 1 diabetes mellitus with diabetic macular edema resolved following treatment left eye ()
type 1 diabetes mellitus with diabetic mononeuropath ()
type 1 diabetes mellitus with diabetic nephropathy ()
type 1 diabetes mellitus with diabetic neuropathic arthropathy ()
type 1 diabetes mellitus with diabetic neuropathy unspecified ()
type 1 diabetes mellitus with diabetic peripheral angiopathy with gangrene ()
type 1 diabetes mellitus with diabetic peripheral angiopathy without gangrene ()
type 1 diabetes mellitus with diabetic polyneuropathy () type 1 diabetes mellitus with foot ulcer ()

Synonym Preferences – Occupations

EMERSE Synonyms	These are the standard EMERSE synonyms	2,003,310	09/08/2022	<input checked="" type="checkbox"/>
Occupation Synonyms (Careerplanner)	Occupation synonyms from careerplanner.com	27,954	07/12/2018	<input checked="" type="checkbox"/>
Gender, Sex, and Sexual Orientation Ontology	The Gender, Sex, and Sexual Orientation Ontology (GSSO) has terms related to biology, medicine, psychology, sociology, and gender studies with an emphasis on LGBTQIA+ terminology.	17,935	05/11/2021	<input type="checkbox"/>
Human Phenotype Ontology (HPO)	Terms and synonyms related to human phenotype abnormalities	46,958	07/30/2018	<input type="checkbox"/>
Occupations (dataset 2)	A list of occupations from the Bureau of Labor Statistics, which may be useful if trying to find occupation data for patients. Searching for synonyms of 'occupation' will bring up the list within EMERSE.	7,226	07/12/2018	<input checked="" type="checkbox"/>

Synonyms for "occupation"

Click individual terms to highlight or de-highlight.

tool maker

tow truck operator

town clerk

travel agent

treasurer

tree cutter

tree pruner

tree surgeon

tree trimmer

truck driver heavy

truck driver light

truck loader

truck supervisor



Synonyms for "truck driver"

Click individual terms to highlight or de-highlight.

Synonyms (13)

[SORT A TO Z](#)

[HIGHLIGHT ALL](#)

[HIGHLIGHT NONE](#)

heavy truck driver

truck (84511)

truck driver heavy

truck driver light

truck drivers

truck driving

truckdriver

truckdriving

trucked

trucker

truckers

trucking

trucks

Spelling Alternatives (1)

[SORT A TO Z](#)

[HIGHLIGHT ALL](#)

[HIGHLIGHT NONE](#)

truckin

ADD HIGHLIGHTED TERMS (14)

CANCEL

Synonym Preferences – Human Phenotype Ontology (HPO)

EMERSE Synonyms	These are the standard EMERSE synonyms	2,003,310	09/08/2022	<input checked="" type="checkbox"/>
Occupation Synonyms (Careerplanner)	Occupation synonyms from careerplanner.com	27,954	07/12/2018	<input checked="" type="checkbox"/>
Gender, Sex, and Sexual Orientation Ontology	The Gender, Sex, and Sexual Orientation Ontology (GSSO) has terms related to biology, medicine, psychology, sociology, and gender studies with an emphasis on LGBTQIA+ terminology.	17,935	05/11/2021	<input type="checkbox"/>
Human Phenotype Ontology (HPO)	Terms and synonyms related to human phenotype abnormalities	46,958	07/30/2018	<input type="checkbox"/>
Occupations (dataset 2)	A list of occupations from the Bureau of Labor Statistics, which may be useful if trying to find occupation data for patients. Searching for synonyms of 'occupation' will bring up the list within EMERSE.	7,226	07/12/2018	<input checked="" type="checkbox"/>

Synonyms for "blue irides"



Click individual terms to highlight or de-highlight.

Synonyms (1)

[SORT A TO Z](#)

[HIGHLIGHT ALL](#)

[HIGHLIGHT NONE](#)

blue eyes

Related Terms (2)

[SORT A TO Z](#)

[HIGHLIGHT ALL](#)

[HIGHLIGHT NONE](#)

angelman syndrome

williams syndrome

ADD HIGHLIGHTED TERMS (3)

CANCEL

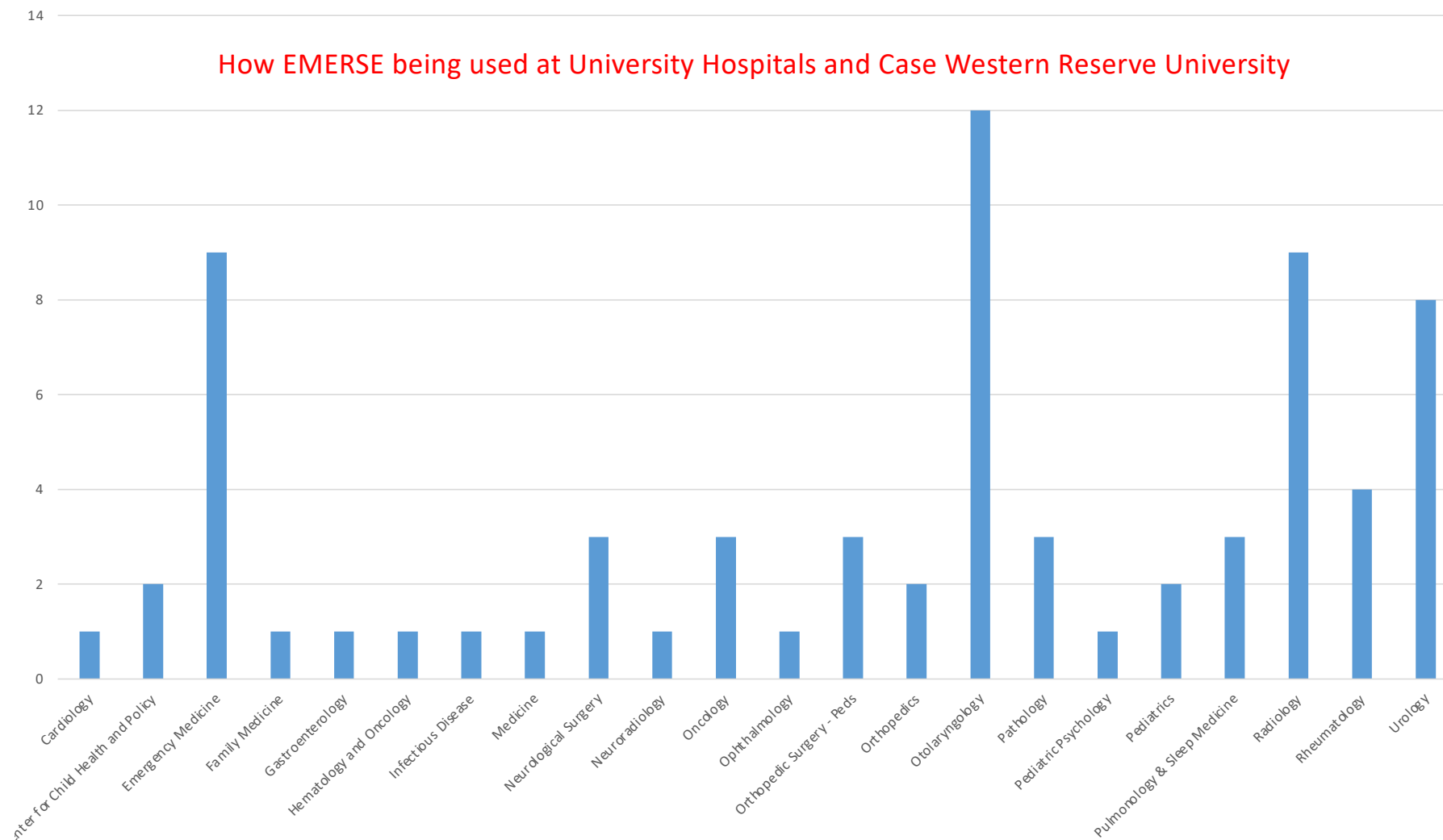
Examples of how EMERSE is being used

at University Hospitals and Case Western Reserve University



IRB Studies Utilizing or Intending to Utilize EMERSE by Department/Division (n = 74)

How EMERSE being used at University Hospitals and Case Western Reserve University



EMERSE – Sampling of Current Uses for Cancer Research

- Understanding racial and gender disparities in bladder cancer
- Exploring treatment delays in metastatic spinal cord disease
- Management of head and neck malignancies involving the lateral skull base
- Retrospective study of resistance and response to immunotherapy in patients with urothelial cancer
- Unintentional weight loss (UWL) identification, evaluation and management

EMERSE – Sampling of Current Uses for Research

Epidemiological studies on eosinophilic and CMV (cytomegalovirus) colitis

EMERSE

Patients []

Filters

Terms ["eosinophilic colitis" "eosinophilic gastrointestinal disorder" "cmv colitis" "cytomegalovirus colitis"]

Results [HIGHLIGHT DOCUMENTS] [FIND PATIENTS]

Temporary Terms Saved Terms Advanced Terms

Temporary Terms

- Name/Description
- Manage Terms
- View Terms
- Sharing
- Clear/Delete

Included terms

- "eosinophilic colitis" []
- "eosinophilic gastrointestinal disorder" [SYNONYMS]
- "cmv colitis" [SYNONYMS]
- "cytomegalovirus colitis" [SYNONYMS]

Excluded phrases

None

EMERSE

Patients []

Filters

Terms ["eosinophilic colitis" "eosinophilic gastrointestinal disorder" "cmv colitis" "cytomegalovirus colitis"]

Results [HIGHLIGHT DOCUMENTS] [FIND PATIENTS]

Summaries Demographics Trends

patients matched the search criteria

To review these patients in more detail, move to a Temporary Patient List and then click the Highlight Documents button.

Top 100 Matching Documents

Represents just 0.0266% of local population

Ability to rapidly review charts via EMERSE; not feasible with EHR

Digestive Health Institute

EMERSE – Sampling of Current Uses for Research

Studying the prevalence of ulcerative colitis and Crohn's disease in the LGBTQ population

Synonyms for "lgbtq"

Click individual terms to highlight or de-highlight.

Synonyms (21) HIGHLIGHT ALL HIGHLIGHT NONE

bisexual gay intersex lesbian lesbian gay bisexual and transgender lesbian gay bisexual transgender
lesbian gay bisexual transgender and queer lesbian gay bisexual transgender queer
lesbian gay bisexual transgender queer and questioning lesbian gay bisexual transgender queer questioning lgb
lgbt lgbtqa lgbtqi lgbtqs lgbtqz queer questioning sexual minorities sexual minority transgender

Spelling Alternatives (1)

lgbtq

HIGHLIGHT ALL HIGHLIGHT NONE

ADD HIGHLIGHTED TERMS (21)

CANCEL

Find LGBTQ
population via notes
and save the list

Synonyms for "crohn's disease"

Click individual terms to highlight or de-highlight.

Synonyms (28)

HIGHLIGHT ALL HIGHLIGHT NONE

autoimmune disease bradshaw cd cdai crohn crohn disease crohn syndrome crohn's
crohn's disease activity index crohn's disease of pouch crohn's disease of the pouch crohn's of pouch
crohn's of the pouch crohn's syndrome crohns crohns disease crohns syndrome de novo crohn's
de novo crohn's disease de novo crohn's disease of pouch de novo crohn's disease of the pouch
de novo crohn's of the pouch de novo crohn's of pouch granulomatous colitis harvey harvey bradshaw index
hbi regional enteritis

Spelling Alternatives (26)

HIGHLIGHT ALL HIGHLIGHT NONE

crohn crohn's chrohns chron chron disease chron's chron's disease chrone chrone's chrones
chrons chrons disease chron's corhn crhon crobn crobn's croh's crohnes crohnsshow crohn
crohn cronhn cronhs rohn's rohns

Search this
patient list

Synonyms for "ulcerative colitis"

Click individual terms to highlight or de-highlight.

Synonyms (35)

HIGHLIGHT ALL HIGHLIGHT NONE

active distal colitis autoimmune disease backwash ileitis backwashed ileitis bwl chronic colitis
chronic enterocolitis colitis colitis ulcerosa distal active colitis distal colitis distal disease distal uc
distal ulcerative colitis enterocolitis ileitis left colitis left side colitis left sided colitis limited colitis
pan ulcerative pan ulcerative colitis pancolitis panulcerative panulcerative colitis proctitis
proctosigmoid colitis proctosigmoid ulcerative colitis proctosigmoiditis uc ulcerative ulcerative enterocolitis
ulcerative pancolitis ulcerative proctitis ulcerous colitis

Spelling Alternatives (4)

HIGHLIGHT ALL HIGHLIGHT NONE

pncolitis ulcerative colitis ulcerative colitis ulcerative colitis

Resulting cohort that
can now be
rapidly reviewed

EMERSE

Patients: lgbtq syn

Filters

Terms: "ulcerative colitis" "active distal colitis" "backwash ileitis" "backwashed ileitis" bwl "chronic colitis" "chronic enterocolitis" colitis

Results HIGHLIGHT DOCUMENTS FIND PATIENTS

Summaries Demographics Trends

patients matched the search criteria within the patient list "lgbtq syn"

To review these patients in more detail, move to a Temporary Patient List and then click the Highlight Documents button.

Top 100 Matching Documents

(Touchwork) 10/16/2018

...8544-4719-9473-0036a218063f urn:formid:art:FreeTextEntry50an Crohn's blood in stool:FreeTextEntry50nd
ChiefComplaint:FreeTextEntry4214409L...
...presents for follow-up of Crohn's disease. Initially diagnosed in 1998...
...similar to enter examinations of Crohn's disease. He denies any further...

Digestive Health Institute



ROSES Reach Out, Stay Strong, Essentials for New Moms

Principal Investigators:



Implementation

Eric Reed, MD



Evaluation

Sarah D Ronis, MD MPH

Funders:

- The George Gund Foundation
- The Bruening Foundation

Goal: The primary goal of RED ROSE is to pilot ROSE, an evidence-based intervention shown to reduce the risk of developing perinatal depression in high-risk populations, within targeted patient populations at the UH Rainbow Center.

As a part of this project, we are conducting an EHR Chart Review to understand process (attendance at recommended prenatal, postpartum, and well child visits) and health (preterm birth, low birth weight, c-sections) outcomes to women who opt to obtain traditional care during pregnancy.

ROSE Project was used to validate EMERSE utility

Title: Validation of the Electronic Medical Record Search Engine (EMERSE) to Speed and Standardize Chart Review

Section: Building the Future of D&I Science: Training, Infrastructure, and Emerging Research Areas

Background: EMERSE (Electronic Medical Record Search Engine) is an open-source tool developed at the University of Michigan. It is engineered to be a fast and simple way to search through electronic medical records for keywords within free text data, and has the capability to compile patient lists, create project-specific term bundles, and filter patient charts by date range. We used manually reviewed data from our ongoing study, "Reach Out, Stay Strong, Essentials for New Moms," (ROSE) to identify the strengths and weaknesses of EMERSE for chart review, as compared to manual review and EHR navigation.

Methods: We defined a patient list and term bundle (Figure 1) to search for key words in the medical charts of ROSE participants and controls. The term bundle was color-coded to visually differentiate words related to the six key areas of our review: type of ambulatory visit, nutrition status, postpartum depression screening, infant growth metrics, referrals, and scanned health questionnaires. Infant well-child visit notes were identified and reviewed using highlighted terms in EMERSE.

Findings: EMERSE quickly compiled highlighted notes for all patients within our list (n=50) from both the **Touchworks** ambulatory EHR and **Sunrise** inpatient EHR in a single search. Reviewing highlighted terms with in-note context produced nearly identical results compared to manual review. Because inpatient data, social work, and telephone call documentation were also available within the same search, EMERSE was more accurate for identifying the date and number of referrals made for each patient and could be used to gain additional information regarding patient birth history. Discrete, tabulated data (vaccinations, vital signs) was more easily reviewed directly within the EHR. EMERSE was also unable to identify or search scanned documents.

Implications: We found EMERSE to be a highly sensitive search tool. The inability to search scanned PDF documents and the lack of specificity for keywords in context necessitated some interpretation on the part of the reviewer. Overall, however, we find EMERSE to be a faster, more replicable, and more uniform way to conduct chart reviews in free-text documentation within the EHR and anticipate its utility increasing with increased study enrollment.

Internal validation study submitted to D & I conference for 12/2021

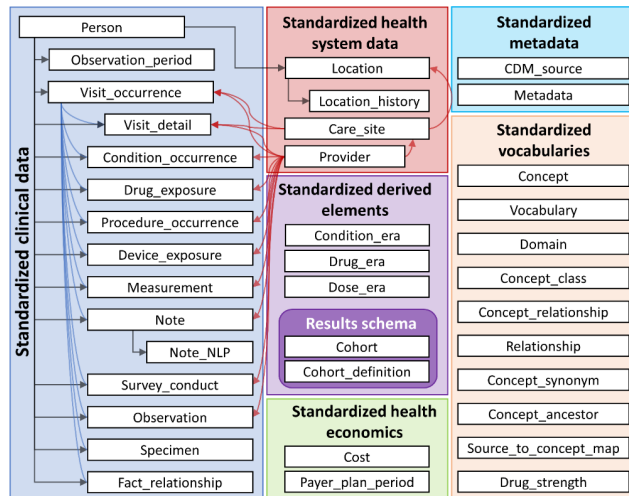
Nora Lee, MD, Suzanne Lo, MPH, Mark Beno, MSM, Sarah Ronis, MD, MPH

Identification of unintentional weight loss from electronic health records data

Society to Improve Diagnosis in Medicine Annual Conference, October 16-18, 2022

Mark Beno, Harry Menegay, Goutham Rao, Paola Saroufim, and Kelsey Ufholz

University Hospitals OMOP Data Mart



Extracted EHR data on >1.8 million UH patients



1. Data temporally queried from OMOP according to inclusion and exclusion criteria defined in UWL study protocol

2. Resulting cohort list exported to an encrypted Excel file and then imported into EMERSE for further analysis

4. Iterative cohort refinement via clinical- research-technical team dialogue and feedback



Notes on >1.7 million UH patients

3. EMERSE used to determine whether weight loss was unintentional and, if so, was it recognized clinically

Development of a phenotype for unintentional weight loss to improve missed diagnoses

Unintentional Weight Loss and Cancer

- Review found cancer was the underlying cause of 6 to 36% of cases of UWL
 - All but one study reported cancer as UWLs at least 15%
- UWL may often be the only symptom of underlying cancer
 - Among 328 patients with UWL and no other symptoms, cancer was found in 35%
- UWL may be the most common cancer symptom
 - 1/3 cancer patients have UWL at diagnosis
- Estimated that 1 out of 2 Americans will get cancer in their lifetime
- 1 in 4 will die from cancer



University Hospitals
Cleveland Medical Center

Center to Improve Clinical Diagnosis

Center to Improve Clinical Diagnosis

- AHRQ R18HS029358
- Goutham Rao, MD (PI); Marlene Miller, MD; Peter Pronovost, MD, PhD (MPIs)
- Mission: *“To identify best practices for diagnostic evaluation of common conditions prone to diagnostic error.”* Classic examples include dizziness in older patients, undifferentiated abdominal pain, sepsis in children, hypertension in children, and unintentional weight loss in the elderly.
- Will employ a four-step strategy developed by Dr. Rao and his team over the past ten years.
- Advisory committee and diagnosticians’ panel will include > 30 clinicians from many institutions.
- Focal point for improving diagnosis nationwide. Significant dissemination through weekly seminars and workshops to begin late this fall.
- Central component of health services research efforts at UH.
- Total budget: \$3,993,301.00 over four years.

Center to Improve Clinical Diagnosis

Center to Improve Clinical Diagnosis

Project Number
1R18HS029358-01

Contact PI/Project Leader
RAO, GOUTHAM Other PIs

Awardee Organization
UNIVERSITY HOSPITALS OF CLEVELAND

Description

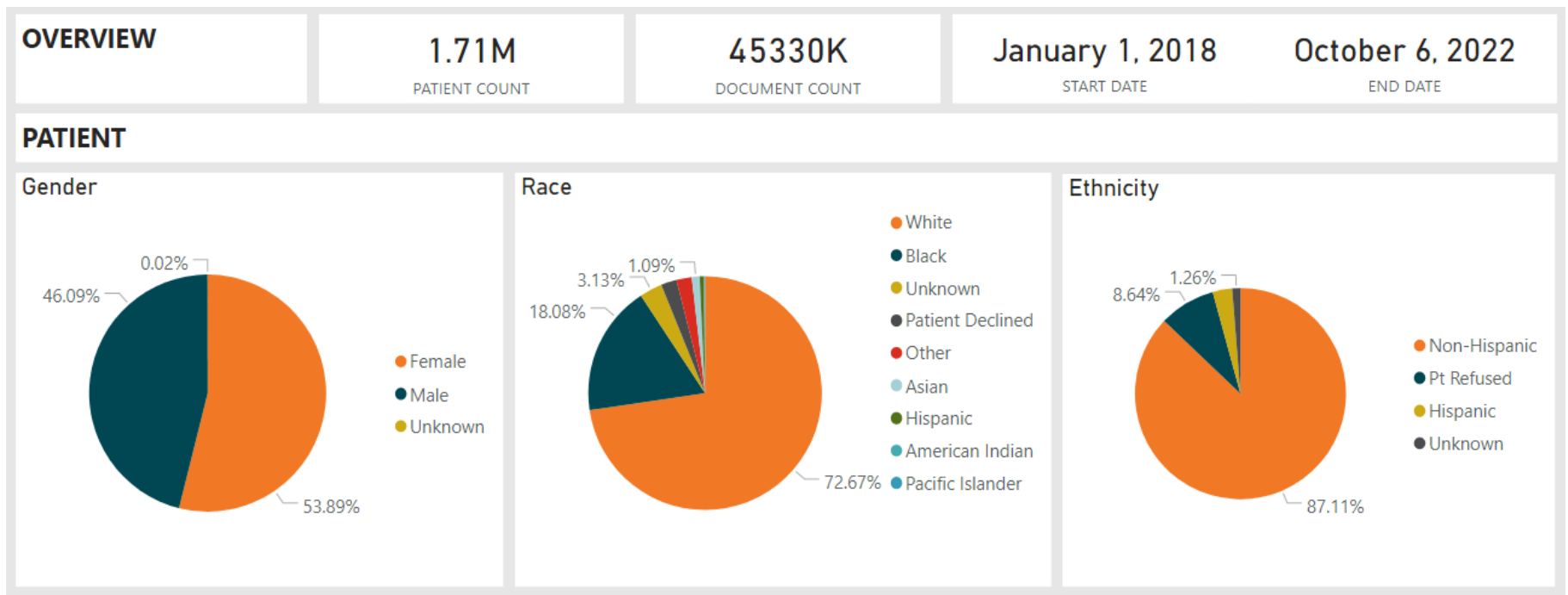
Abstract Text

Abstract: Diagnostic errors are common and frequently extremely serious. Unfortunately, strategies to identify diagnostic standards and best diagnostic practices for a variety of problems are scarce. The focus of the Center to Improve Clinical Diagnosis will be to tackle diagnostic problems using a data and consensus driven approach. The goals of the Center are to (a) assemble a diverse, multidisciplinary team to provide formal input about standards and best practices; (b) to implement a 4-step strategy to develop recommended diagnostic practices; and (c) to sustain the Center by creating a set of policies, methods, a future agenda, and partnerships within and outside our organization. Our Center will be fully integrated into a larger health services research center within University Hospitals Health System. Our general 4-step process to develop recommended practices includes (1) identifying problems which are common, associated with high rates of diagnostic error, and for which guidance is lacking and identify current diagnostic practice (or practices in response to diagnostic interventions) (2) identify outcomes of diagnostic practices; (3) in collaboration with a panel of diagnosticians, review data about practice and outcomes and formulate recommendations; (4) implement recommendations and monitor their impact. We have chosen three problems as demonstration projects based on how common and serious they are and the expertise and experience of our research team: (1) The best approach to identifying and evaluating unintentional weight loss in adults; (2) The best approach to screening for hypertension in African American adolescents using home-BP devices; (3) Improved diagnosis of sepsis in children in community emergency department (ED) settings, and adults in community (ED) and inpatient settings through implementation and most importantly, refinement of electronic sepsis trigger tools. We believe our systematic approach to developing standards and best practices for these and future problems will provide a system for badly needed diagnostic guidance that is useful for patients, clinicians, and health systems.

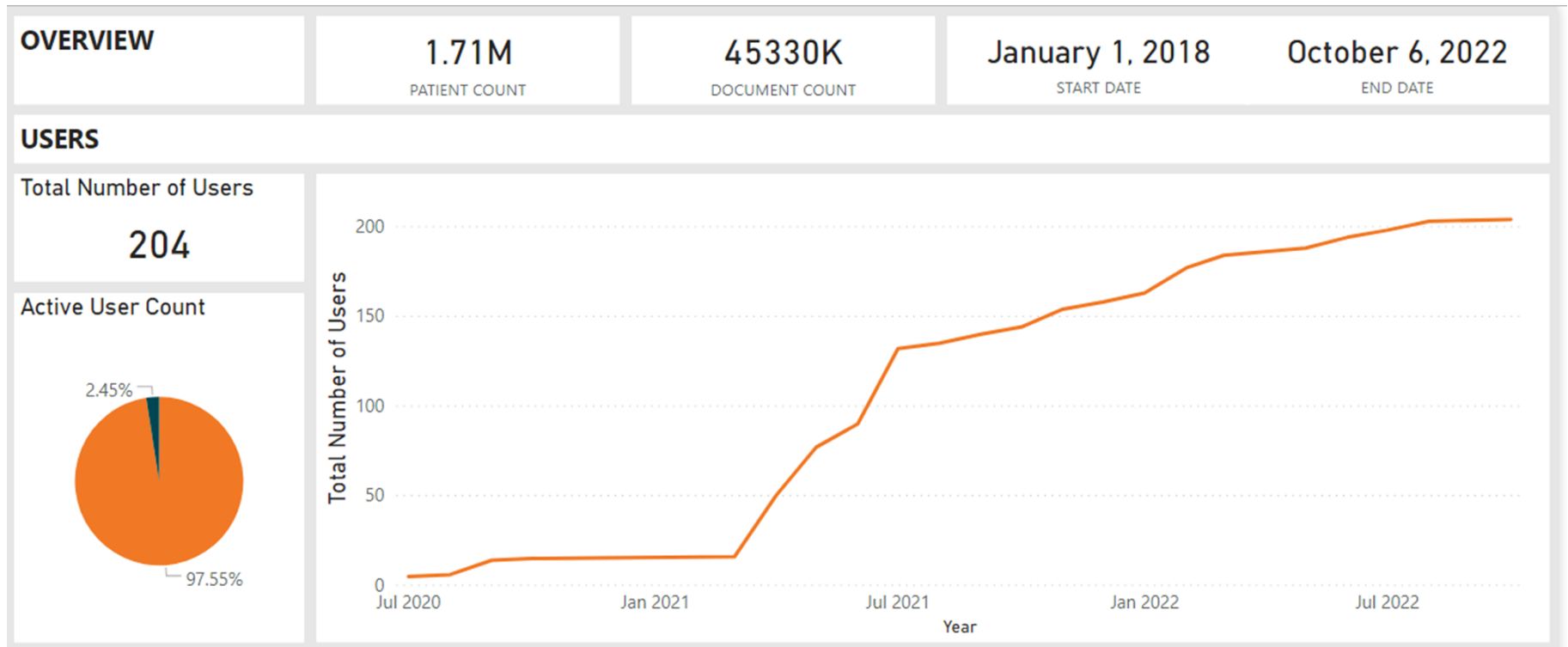
Tracking EMERSE Utilization for Stakeholders and Compliance



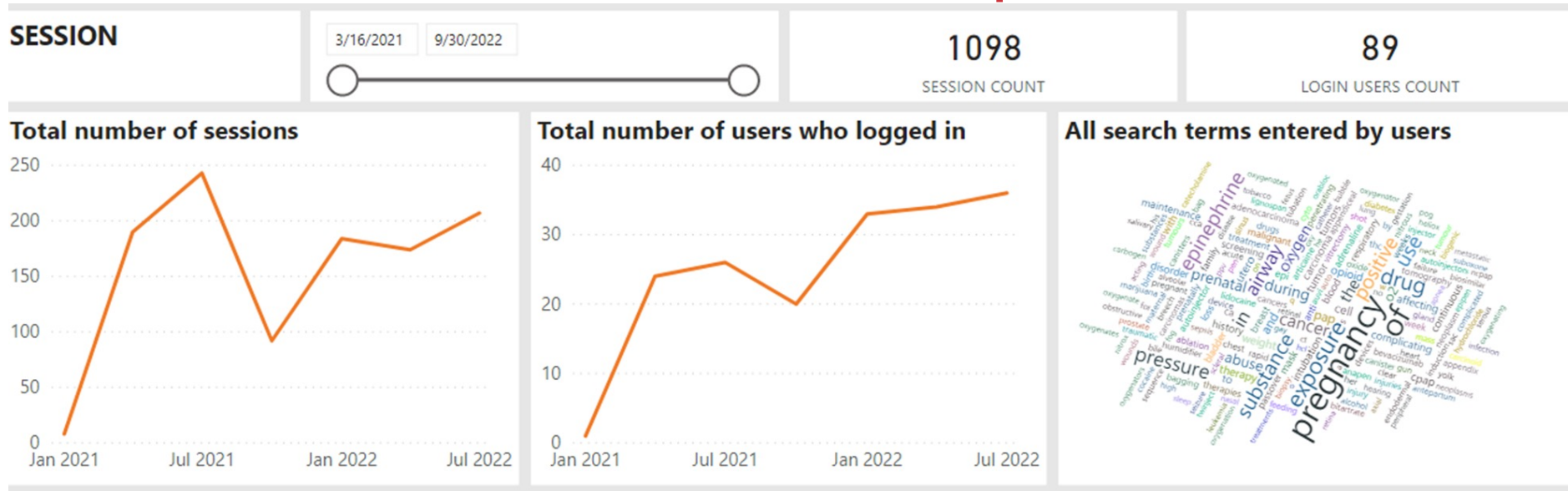
EMERSE – Power BI Dashboard – Patient Demographics



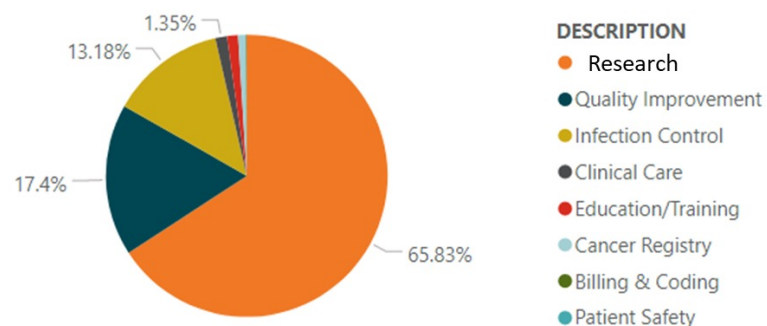
EMERSE – Power BI Dashboard – Accounts Provisioned to Date



EMERSE – Power BI Dashboard – Unique Sessions to Date



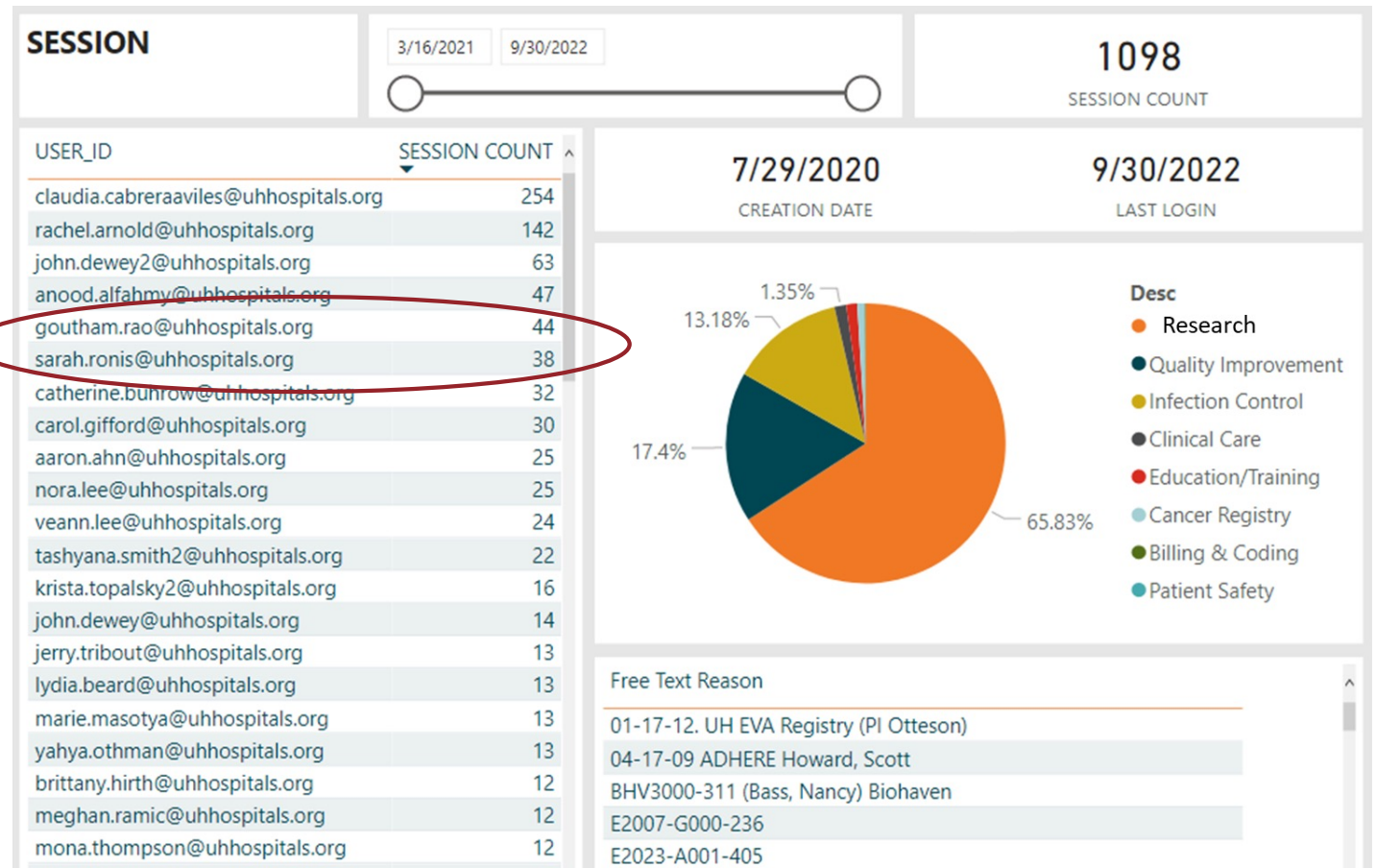
All Attestation



Many introductions to the system occurred just prior to when COVID was swamping hospitals again

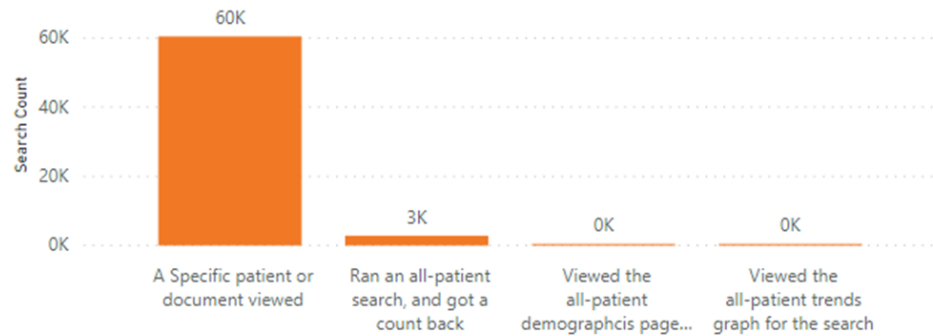
EMERSE – Power BI Dashboard – Sessions by User

But we clearly have
some power users

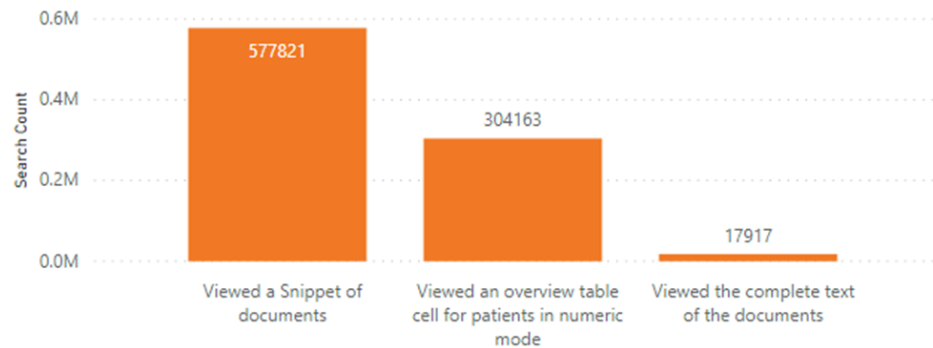


EMERSE – Power BI Dashboard – Sessions Details

Search Count by Search Action Done



Search Count by Data Viewed



SEARCH

6/25/2021

9/30/2022

USER

All

63.84K

SEARCH TERM COUNT

SEARCH_TERMS

z34,pregnancy,substance use,drug use,substance use disorders,substance use disorder,substance abuse disorder,substance abuse,sud,suds,substance abuse during pregnancy,substance abuse affecting pregnancy,currently pregnant,is pregnant,pregnant yes,mat,maintenance therapy,opioid use disorder,opioid use,opioid use disorders,opioids,oud,ouds

z34,pregnancy,substance use,drug use,substance use disorders,substance use disorder,substance abuse disorder,substance abuse,sud,suds,substance abuse during pregnancy,substance abuse affecting pregnancy,current pregnancy,currently pregnant,is pregnant,pregnant yes,mat,maintenance therapy,opioid use disorder,opioid use,opioid use disorders,opioids,oud,ouds

z34,pregnancy,substance use,drug use,substance use disorders,substance use disorder,substance abuse disorder,substance abuse,sud,suds,pregnancy complicated by subutex maintenance antepartum,substance abuse during pregnancy,substance abuse affecting pregnancy,current pregnancy,currently pregnant,is pregnant,pregnant yes,mat,maintenance therapy,opioid use disorder,opioid use,opioid use disorders,opioids,oud,ouds

z34,pregnancy,substance use,drug use,substance use disorders,substance use disorder,substance abuse disorder,substance abuse,sud,suds,opioid use disorder moderate in early remission,opioid use disorder in sustained remission,pregnancy complicated by subutex maintenance antepartum,substance abuse during pregnancy,substance abuse affecting pregnancy,current pregnancy,currently pregnant,is pregnant,pregnant yes,mat,maintenance therapy,opioid use disorder,opioid use,opioid use disorders,opioids,oud,ouds

young,central line,central line catheter,central catheter,central line

Lessons Learned During the EMERSE System-wide Rollout

- Cannot simply train and go away – generic examples do not translate to actual user engagement nor success, and **users initially want to believe that EMERSE can do everything**
- Listening to potential end user stories is key – what will make their lives easier?
- Every medical specialty has unique potential uses for EMERSE – we have needed to guide each group, and then **sometimes be added to the IRB as study members to facilitate the research**
- Searching effectively and getting to the information desired requires a degree of strategy as well as **practice and patience – this is difficult when bandwidth is limited**
- Clinicians are busy and will look to their research teams to use EMERSE
- EMERSE can serve as a powerful research resource for medical fellowships, MD students, MPH students, Nursing, Social Workers – pretty much anything that requires chart reviews
- New 12 consecutive weeks for research for University Program medical students in summer between 1st and 2nd years



Lessons Learned During the EMERSE System-wide Rollout

- Social Determinants of Health Research – tons of potential here – the notes provide a window to the clinician/patient relationship and the patient environment that is never captured through structured data
- Utilization of EMERSE beyond research is currently untapped potential – need clearer messaging on how EMERSE can create greater efficiencies and to set up meetings with operational leadership
- There is some confusion about what tool can and cannot do even after showing it to users in a live setting
- CICB coordination with department/division and central UH research coordinators will be key in moving forward
- Using EMERSE with OMOP structured data allows for integrative innovation

Synonyms that allow rapid discovery of Social Determinants of Health in notes

Synonyms for "social determinant of health"

×

Click individual terms to highlight or de-highlight.

Synonyms (353)

SORT A TO Z

HIGHLIGHT ALL

HIGHLIGHT NONE

abused (2658071)

academic problem (1713)

adoptive parent (551)

afford (217572)

affordable medication (131)

affordable prescription (19)

alcoholism (294799)

amphetamine abuse (2363)

antisocial (13277)

appears depressed (4733)

appears sad (1742)

appears to be depressed (413)

appears to be sad (110)

assisted living facilit (5)

assisted living facility (63765)

assistive device (2568510)

bankruptcy (2575)

banned (1060)

bath bench (12912)

bath not on first floor (14)

bed and bath are not on the first floor (13535)

boarding house (681)

burglary (1533)

care giver support (108)

cared for by a friend (30)

cared for by a relative (2422)

charity care (154)

cheaper (17533)

childhood abuse (3198)

chipped paint (42)

cigarettes (533259)

cluttered (1299)

co pay (70755)

cocaine abuse (43771)

community support (18868)

computer illiterate (11)

condominium (33308)

copay (95622)

correctional facility (31181)

court date (5739)

court mandated (679)

court ordered (60747)

crime victim (244)

death of family member (3288)

death of friend (229)

death of partner (255)

dementia (973874)

detox (27010)

difficult working conditions (1)

difficulty maintaining employment (123)

disability income (478)

disabled partner (8)

disabled relative (8)

disorderly (2072)

divorced (484687)

drug seeking (17033)

drunk (20169)

dysthymia (30804)

dysthymic (20330)

economic problems (10)

education level (20158)

education problem (721)

education problems (30)

elderly parents (2027)

employment difficulties (2518)

employment insecurity (1)

estranged (13189)

evict (550)

evicted (4885)

experiencing discrimination (1)

exposed to violence (61)

extended care facility (19635)

extended tub bench (525)

feeling down (1364829)

feels down (6047)

felony (22501)

filthy living (51)

finances (337913)

financial concerns (66624)

financial constraints (1716)

financial difficulties (6901)

financially unstable (10000)

financially unstable (10000)

financially unstable (10000)

financially unstable (10000)

ADD HIGHLIGHTED TERMS (354)

CANCEL

Synonyms that allow rapid discovery of Social Determinants of Health in notes

Synonyms for "chipped paint" ×

Click individual terms to highlight or de-highlight.

Synonyms (3)

paint chipped (10)

paint chipping (21)

paint is chipping (4)

SORT A TO Z

HIGHLIGHT ALL

HIGHLIGHT NONE

ADD HIGHLIGHTED TERMS (3)

CANCEL

EMERSE Next Steps

- Upgrade to latest version of EMERSE (6.3) – completed October 2022
- We will loop back with the power users and learn from them as well as loop back with those who have accounts but have not used the tool (or used it only a few times)
- Complete the implementation of EMERSE dashboard in Power BI to track utilization and provide functions for audit and compliance **(winter 2022)**
- Populate the studies tables to allow for the auto-population of end user attestation options **(winter 2022-2023)**
- Conduct a meta-analysis of the publications, abstracts and theses that have used EMERSE that can serve as a resource for researchers **(BHI M.S. student completed and will be transitioned to an R Shiny dashboard)**
- Conduct an EMERSE end-user experience survey at all active EMERSE sites **(winter 2022-2023)**

How is EMERSE being used? Are users sufficiently aware of how to use EMERSE? Can learning materials be developed to enhance EMERSE?

- Plan for the University Hospitals go-live with Epic in 2023



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Thank you and Questions!

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