

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

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David Hanauer, MD, MS
Dept of Learning Health Sciences
University of Michigan
hanauer@umich.edu

Twitter: @informaticsGeek
@projectEMERSE
Web: project-emerse.org

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

If you're thinking of taking notes or want to visit links



these slides can be found at:

this link will be
on most slides



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Disclosures

Funding: NIH (NCI, NCATS); PCORI

Licenses/Royalties: EMERSE “Synonyms”
(used for query expansion) which is
licensed by the U of Michigan



A hand holding a megaphone, with several orange and white lines radiating outwards, suggesting sound or a call to attention. The background is black with a red triangular shape on the left.

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.”

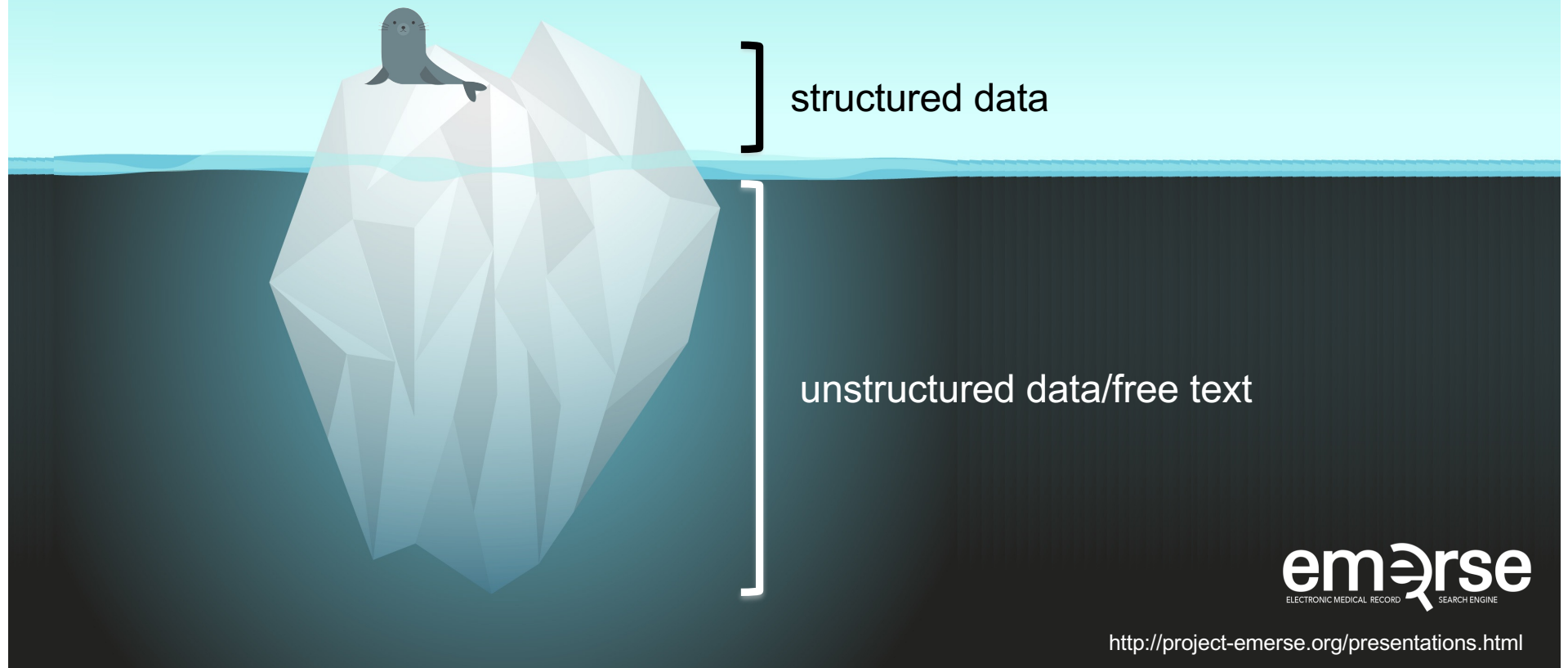


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Unstructured vs Structured Data

EMERSE is for this...	...not this
<i>Unstructured Data (free text)</i>	<i>Structured Data</i>
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

80% of EHR data are in unstructured free text



The EMERSE solution



- A system “for the people”
- Users search the EHR on their own
 - No need to wait in a queue for an analyst or a data scientist
- Data are kept secure within a centralized, audited system
 - No need to download/store the data elsewhere
- Easy-to-use for non-technical researchers

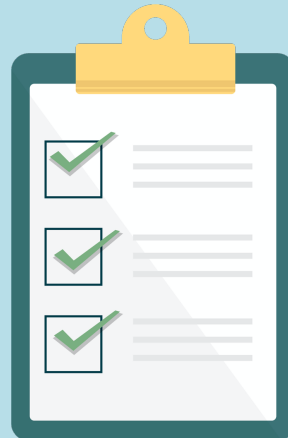
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Find cohorts

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

- diseases
- drugs
- symptoms
- anything*

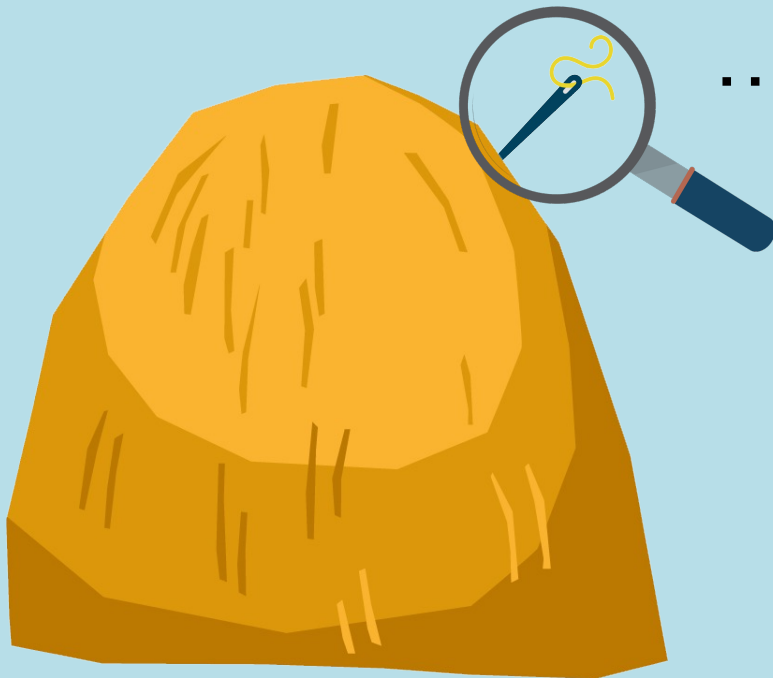


*if it is mentioned

Find cohorts

It's perfect for finding rare things...

...like rare cancers



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

Thoracentesis 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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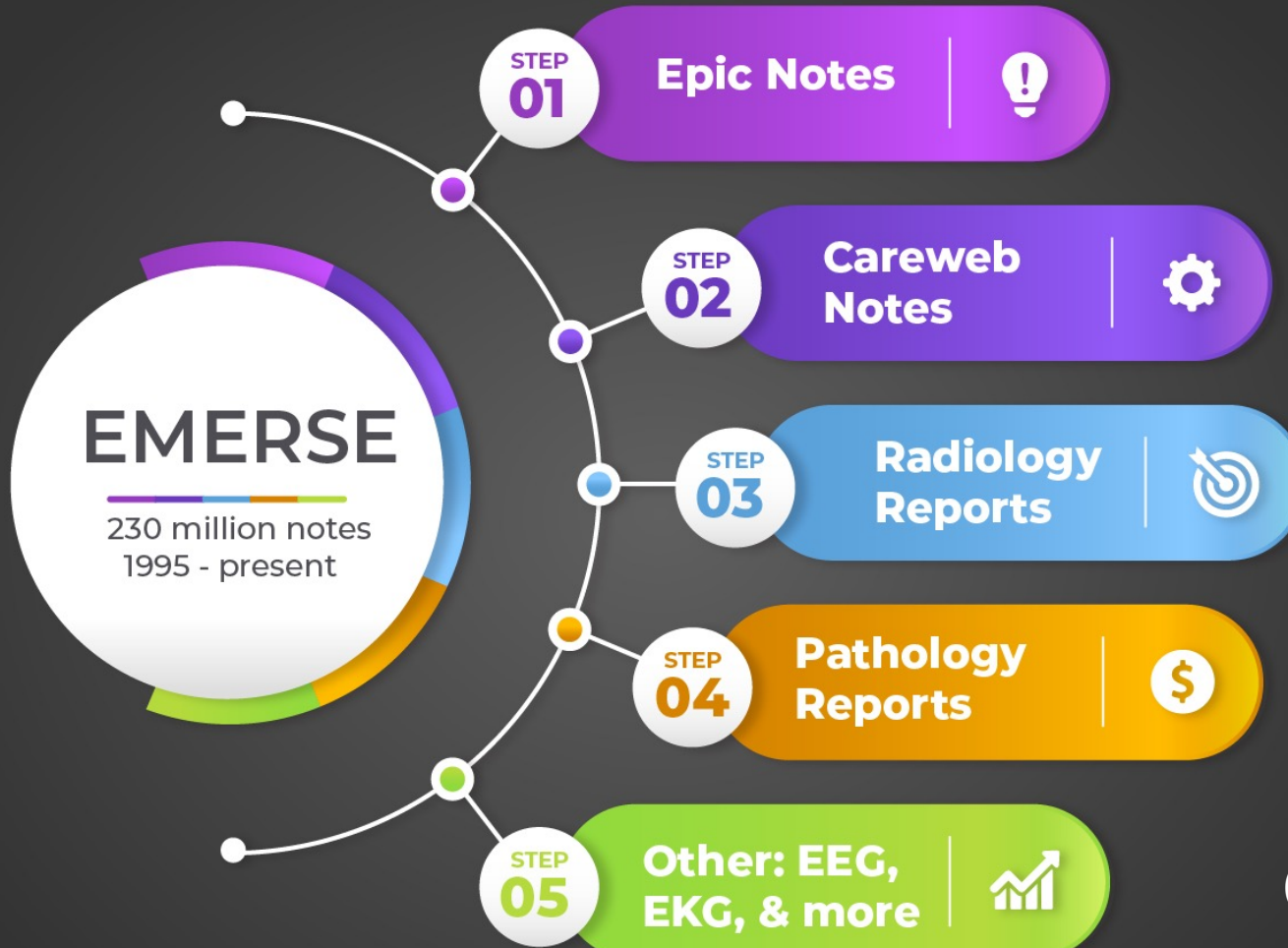
EMERSE is *≡fast*

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

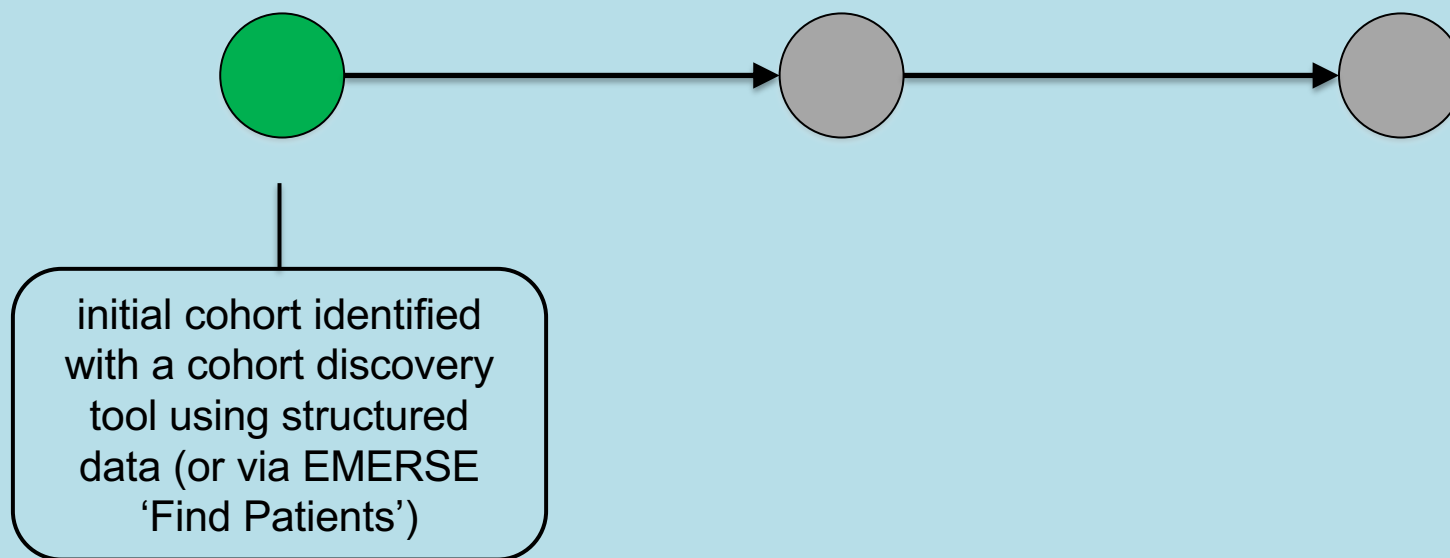
...enabling real-time querying



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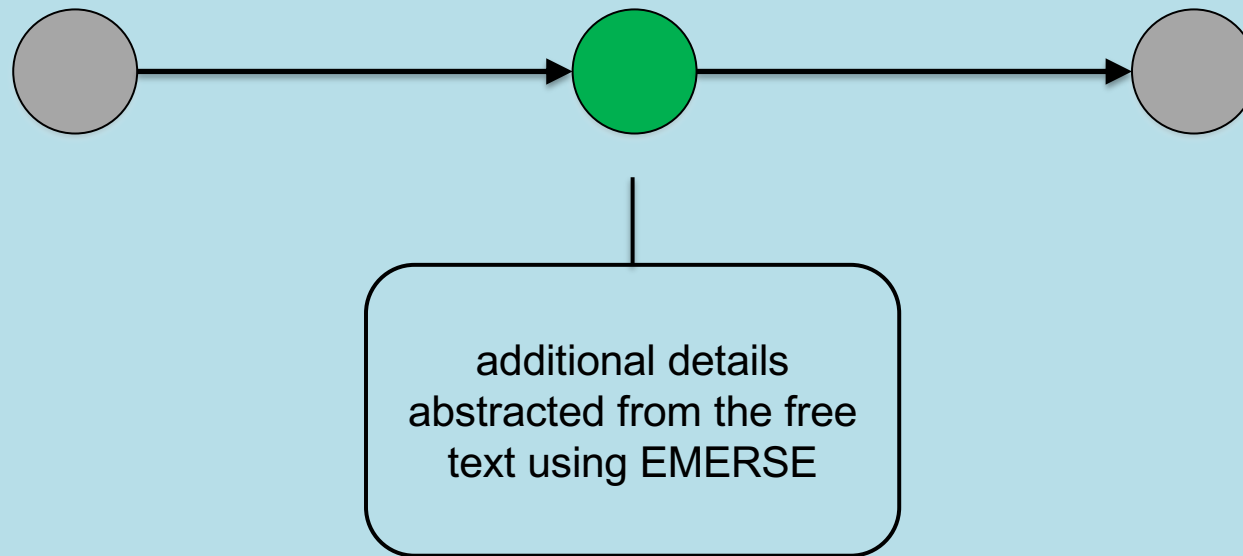


Typical workflow

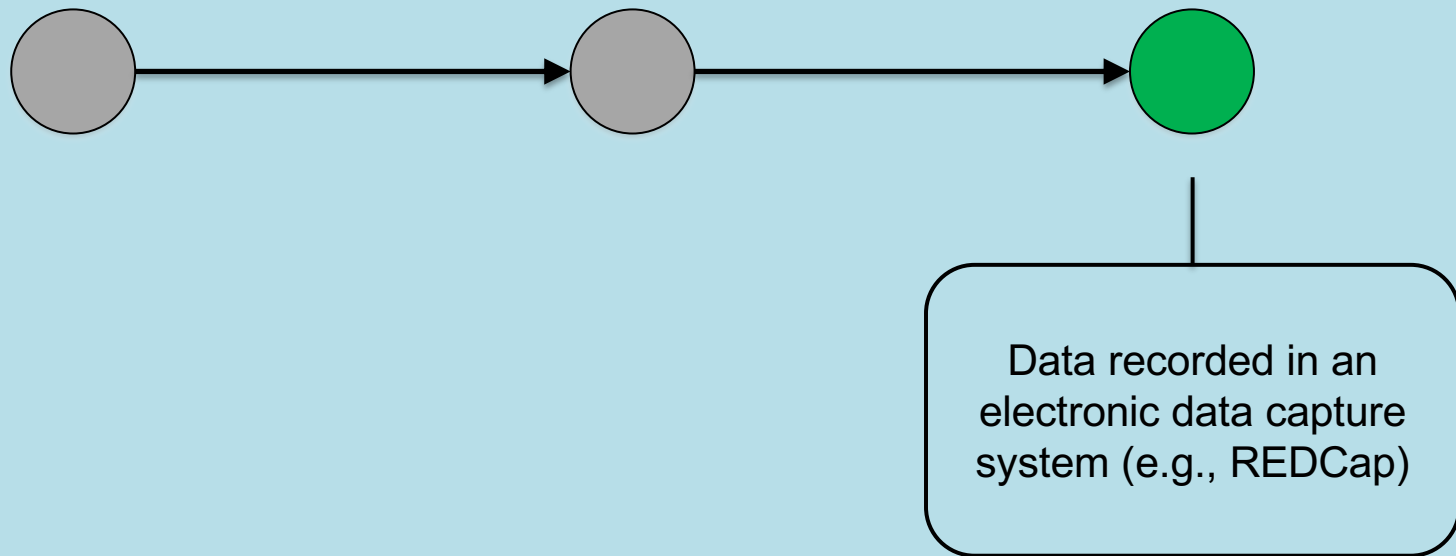


Cohort discovery tools:
DataDirect @ Michigan

Typical workflow



Typical workflow



Statistics at Michigan



Sept 2018 – Sept 2021

- 31,800 research logins
- 926 studies
- 525 PIs

Publications using EMERSE

553

papers and abstracts



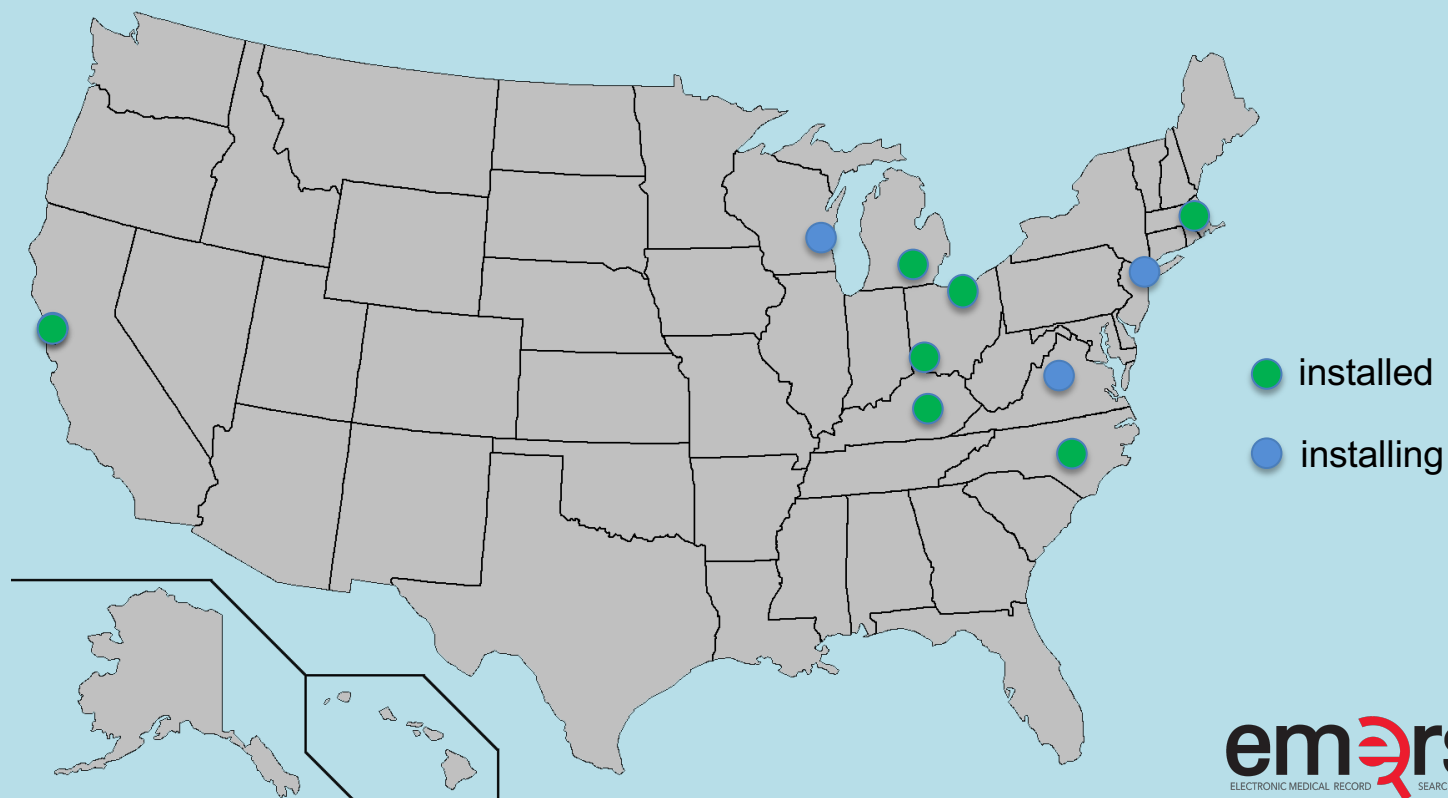
Full list at:

<http://project-emerse.org/publications.html>

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Where is EMERSE?



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The future...

EMERSE Research Informatics Network

real-time, secure
cross-site queries

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EMERSE Research Informatics Network



David Hanauer ^

Patients University of Kentucky (66385), University of Michigan (2812337)

Filters

Terms

"renal cell carcinoma"

Results

HIGHLIGHT DOCUMENTS

FIND PATIENTS

SEARCH NETWORK

Site	Patient Count
University of Kentucky	
University of Michigan	

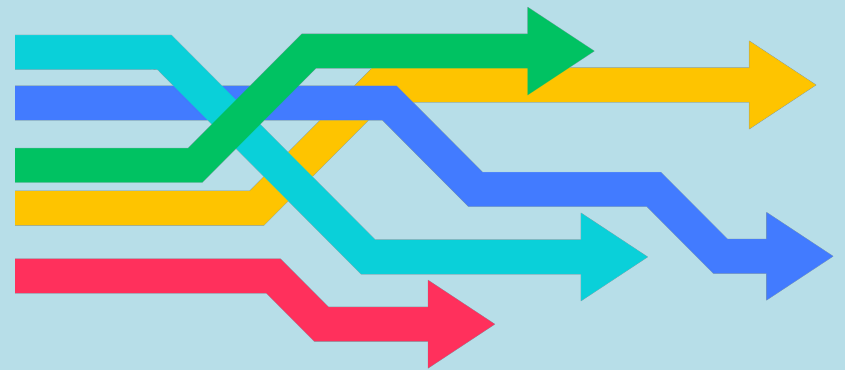


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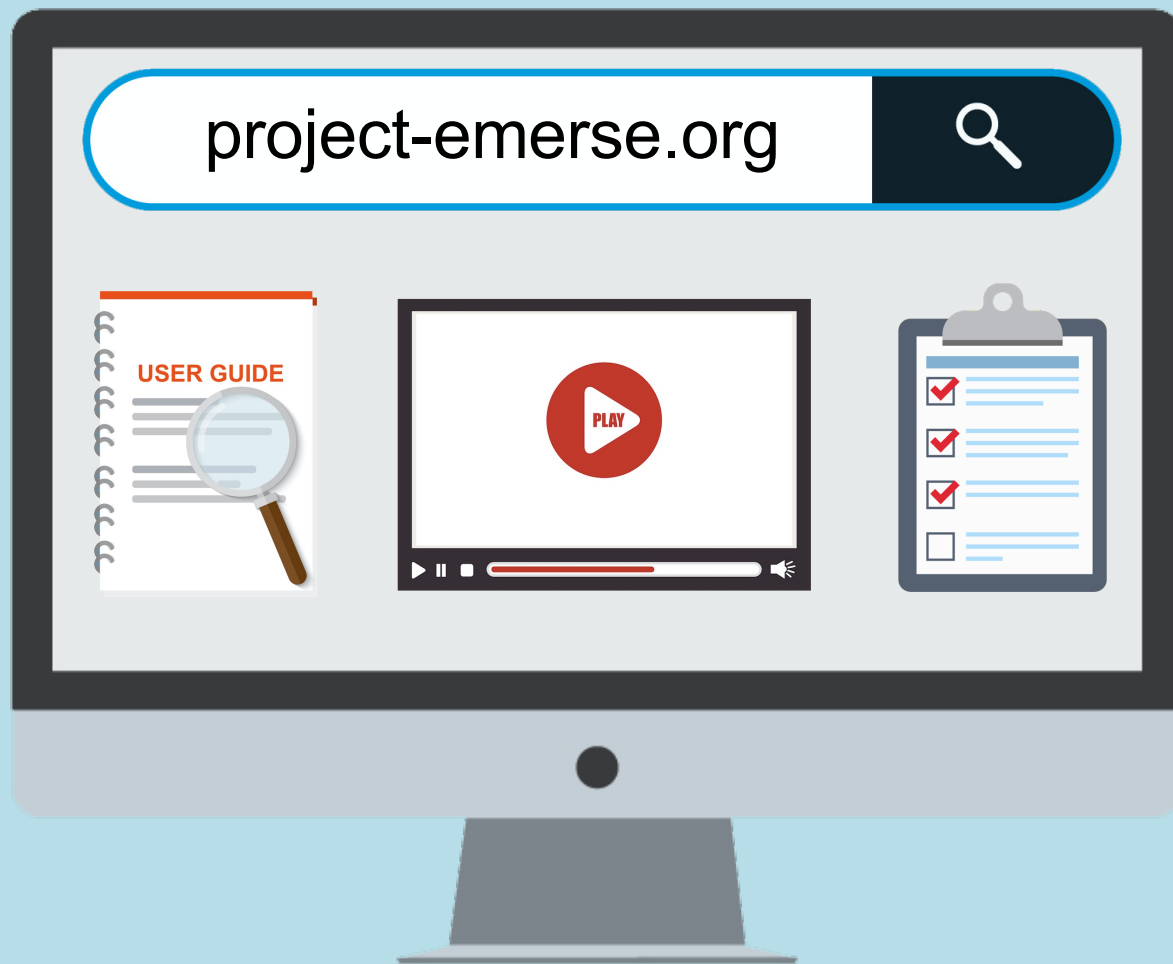
The future...

Incorporation of NLP features

- negation
- uncertainty
- subject (patient vs other)
- named entity recognition/mapping to ontologies



Data extraction from templated notes



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EMERSE-team@umich.edu



Lisa Ferguson
David Hanauer
Kellen McClain
Guan Wang

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