

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

May 6, 2022

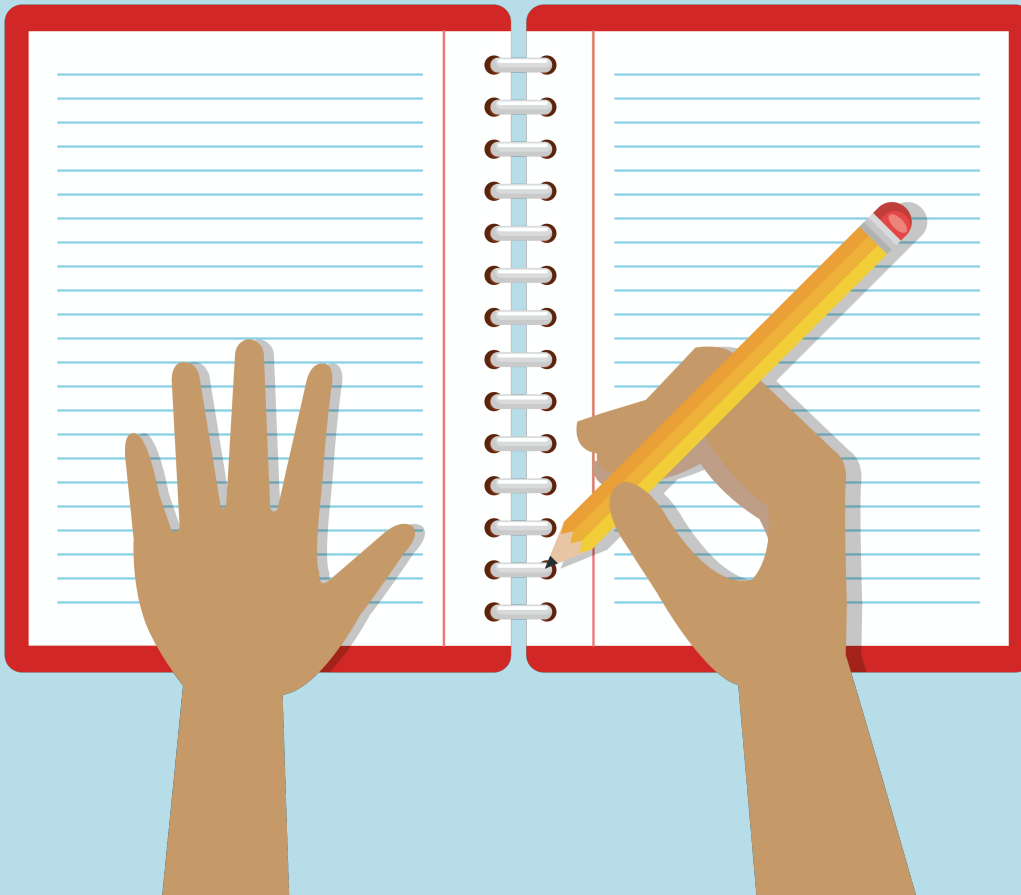


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<http://project-emerse.org/presentations.html>

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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ELECTRONIC MEDICAL RECORD SEARCH ENGINE

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

Disclosures



Funding: NIH (NCI, NCATS); PCORI

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



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



structured data

unstructured data/free text

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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

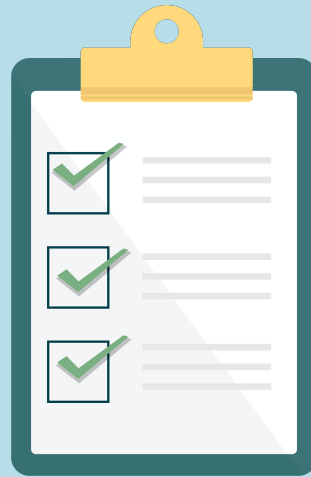
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Find cohorts

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

Thoracocentesis confirmed the recurrence of mantle cell lymphoma. Disease restaging work-up revealed multicompartiment 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>



EMERSE is *≡fast*

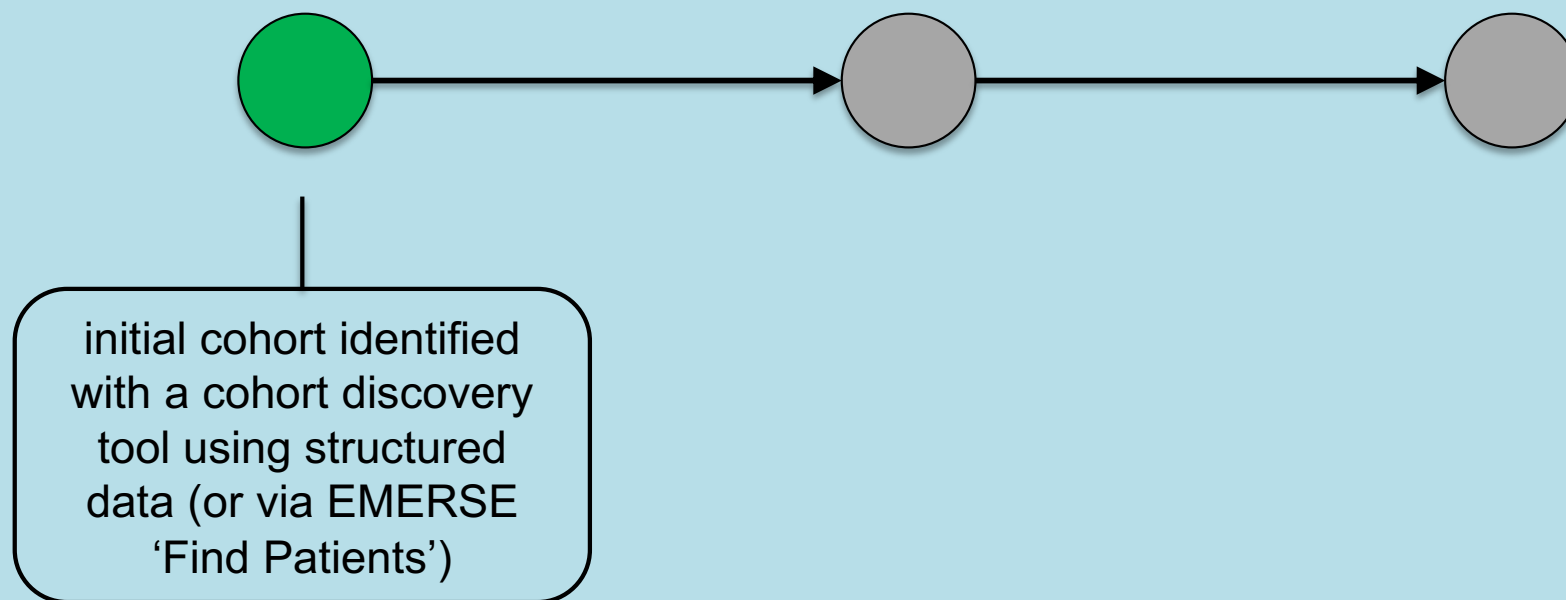
Query to identify all patients with the following	Reporting DB time (s)	EMERSE time (s)	EMERSE advantage
cavernous hemangioma	14,652	2	7,320x
gray platelet syndrome	14,940	2	7,470x
inferior lingular segment of the left upper lobe	17,784	9	1,980x

...enabling real-time querying



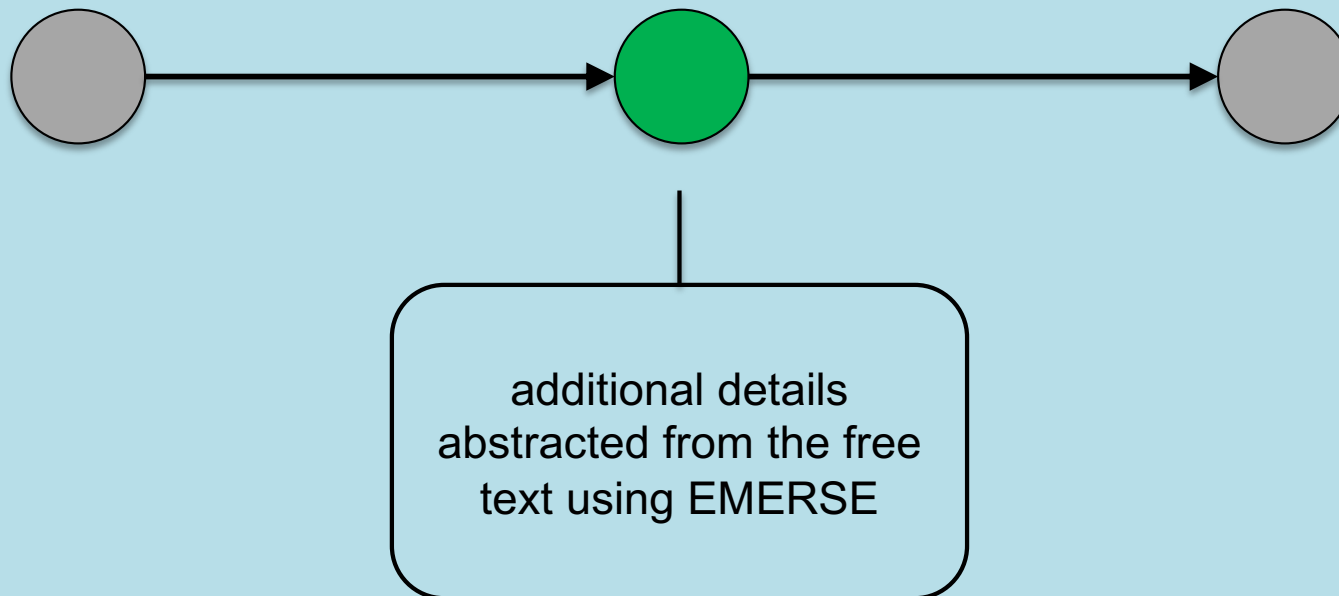
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Typical workflow

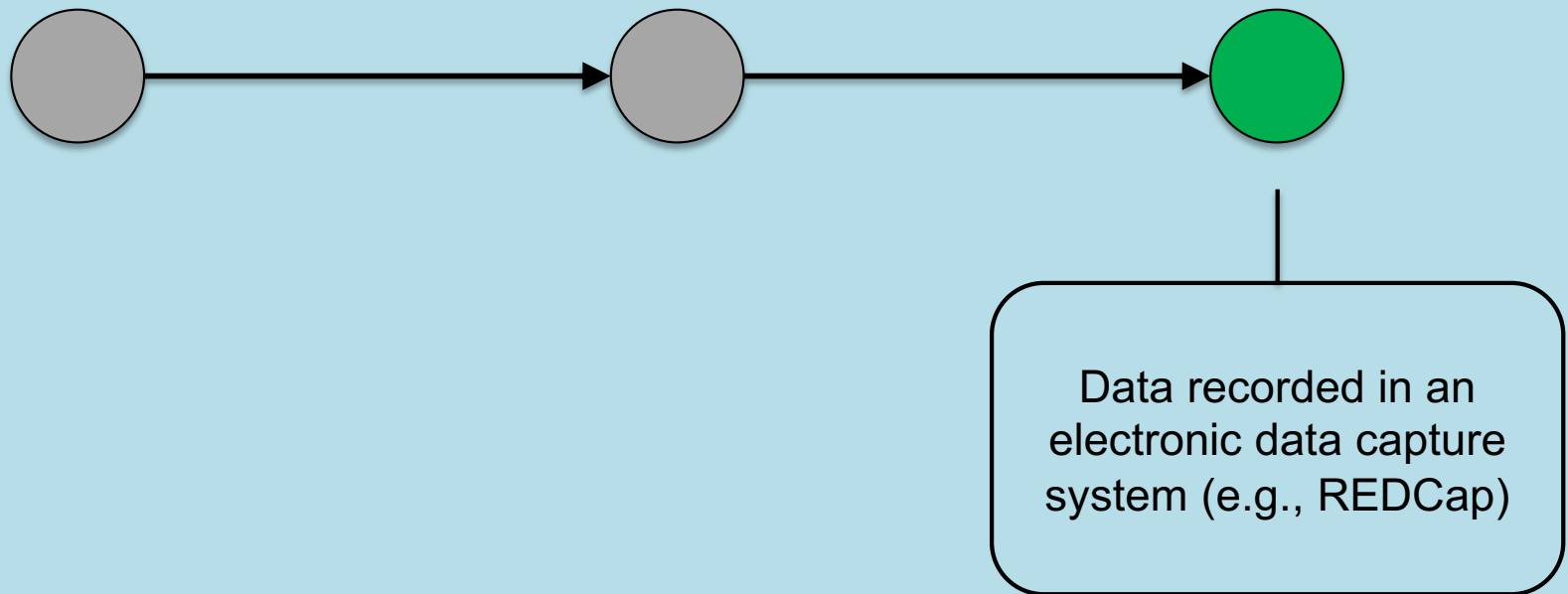


Cohort discovery tools:
i2b2, LEAF, etc.

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



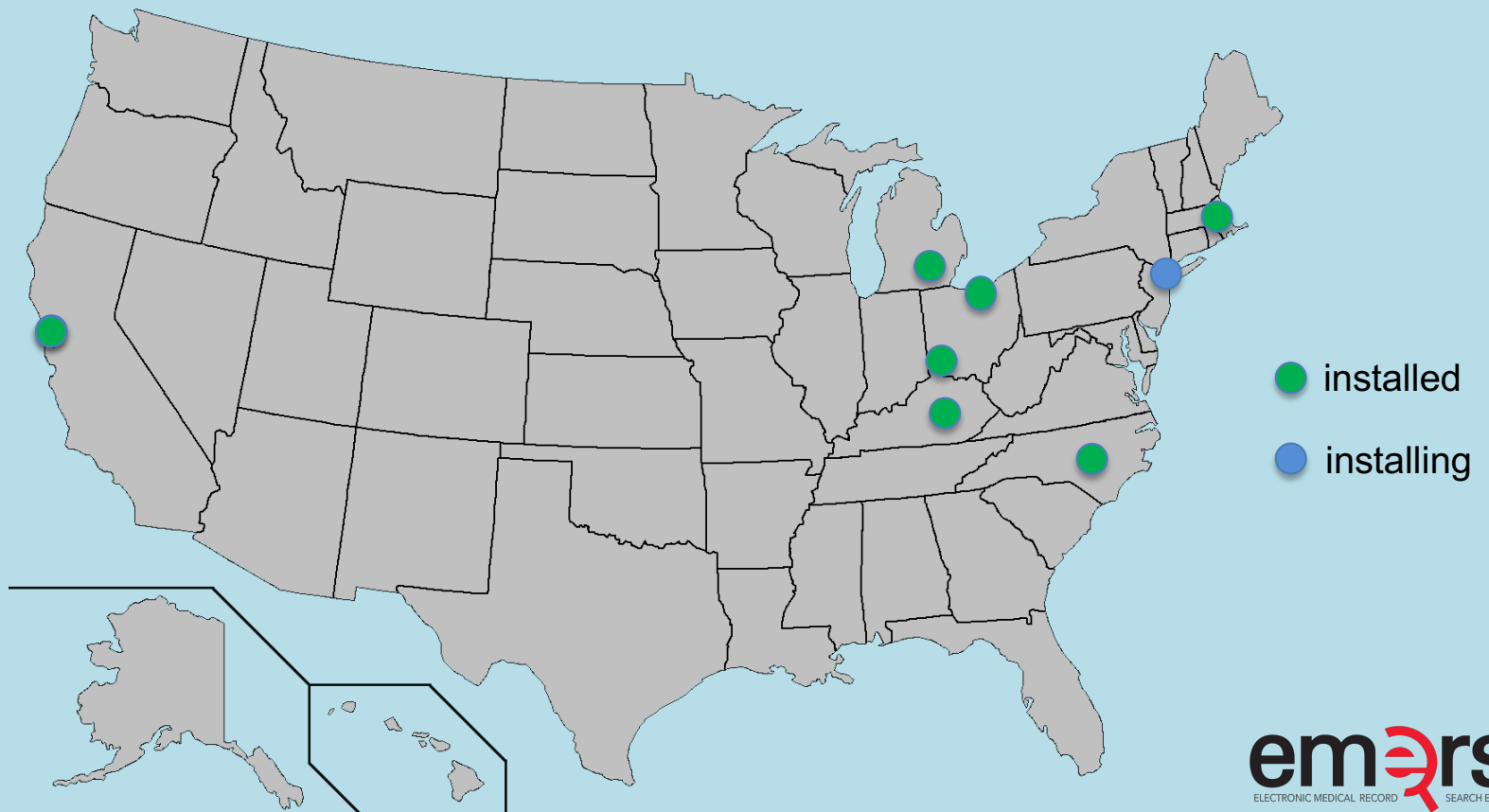
Full list at:

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

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Where is EMERSE?



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Now available...

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	

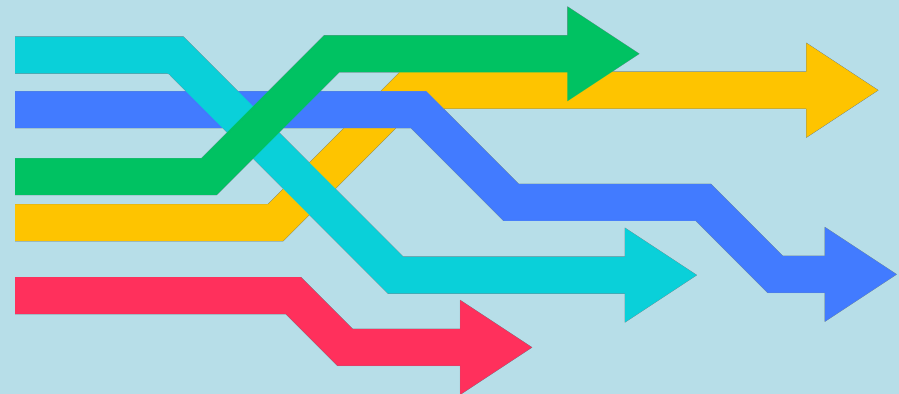


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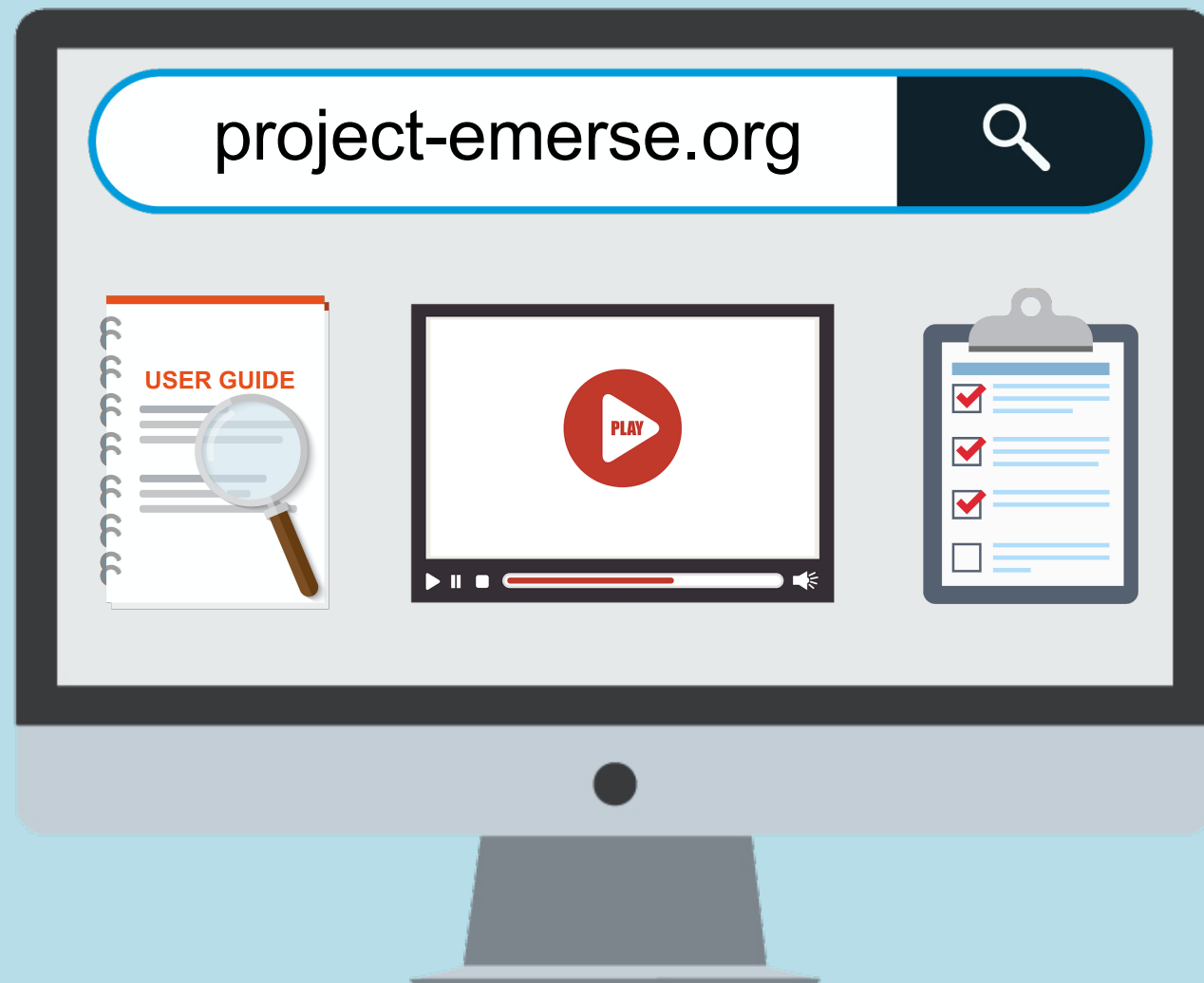
The future...

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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