



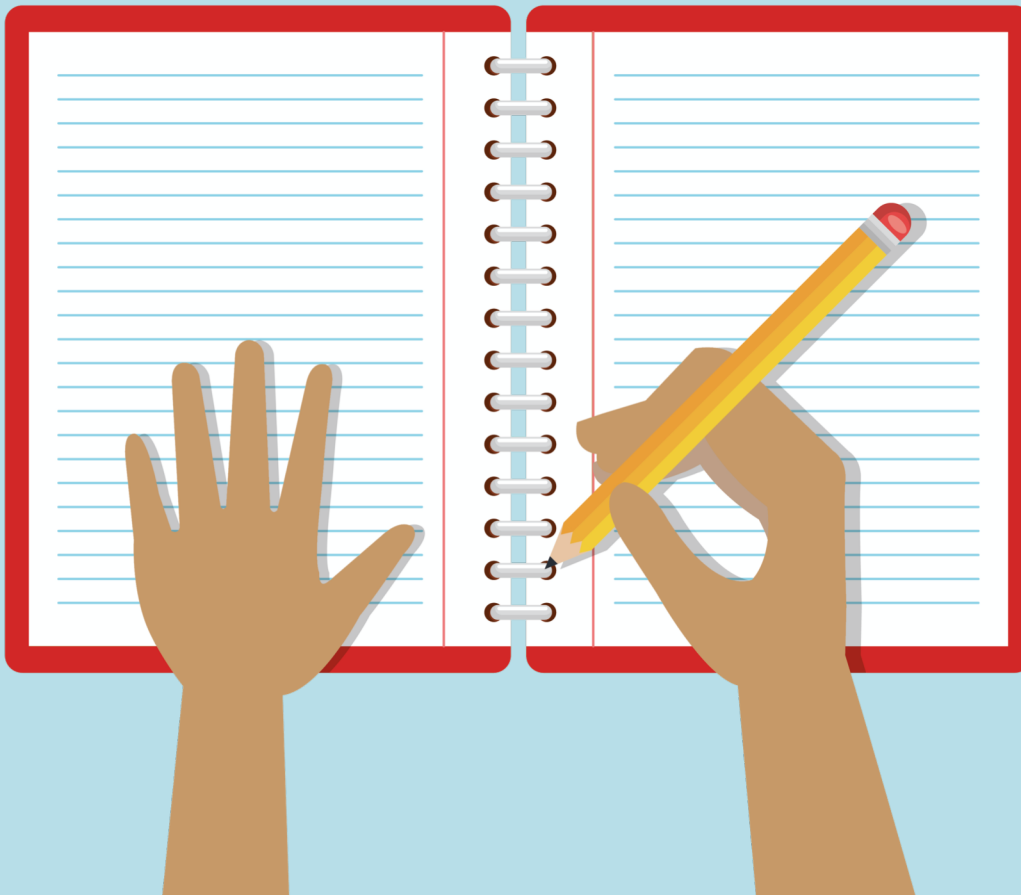
101

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June 25, 2020

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

If you're thinking of taking notes



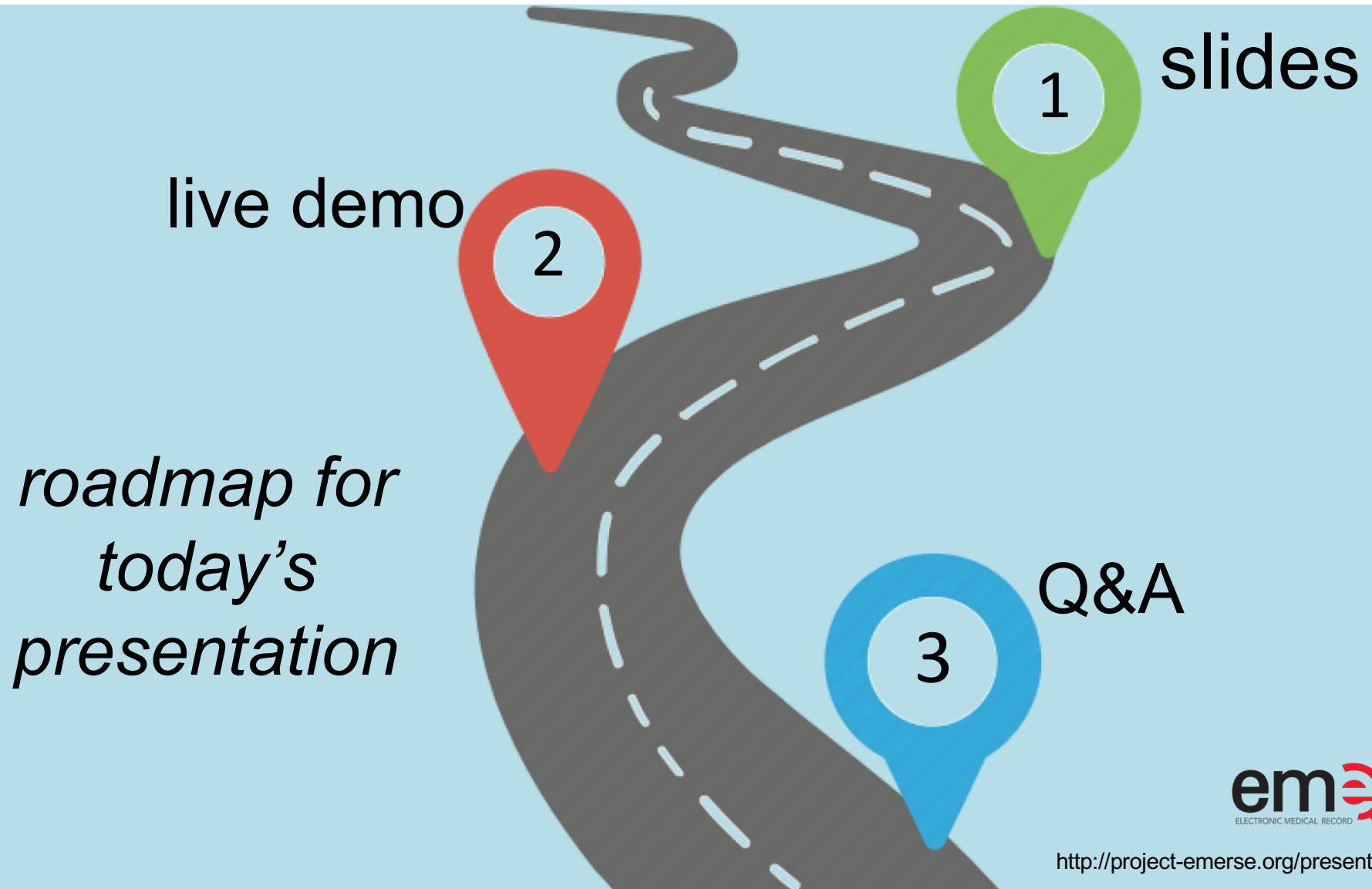
these slides can be found at:

link will be on
most slides



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Goals

- Describes tools for research
- Discuss free text vs structured data
- Describe use cases for EMERSE
- Introduce capabilities of EMERSE
- Explain how access is obtained
- Show a live demo of EMERSE

What is EMERSE?

A search engine, kind of like Google, for free text medical record documents
(technically, it's an *information retrieval* system)



Simple to use

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What is EMERSE?

A research tool, available at no cost

- requires local implementation
- picking the right tool for your research is important; multiple tools are often needed



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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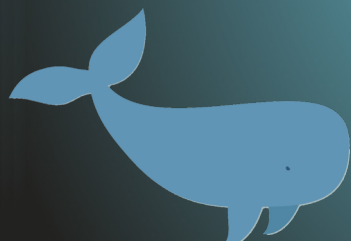
80% of EHR data are in unstructured free text

"potential cases may be missed or wrongly dated when coded data alone are used.." (PMID: 23964710)

"structured data is best used for first pass filtering of EHR data...prior to a more nuanced second pass using unstructured data" (PCMCID: PMC4333685)

"...urinary incontinence, an important patient-centered outcome following prostate cancer treatment, was reported almost exclusively in the free text of EHRs and was rarely coded as an ICD 9 diagnosis code." (PMCID: PMC4899050)

"Claims and structured EHR data give an incomplete picture of burden related to geriatric syndromes. Geriatric syndromes are likely to be missed if unstructured data are not analyzed." (PMID: 29972595)



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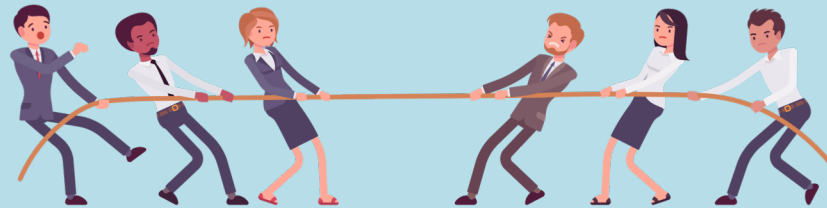
What isn't EMERSE?

It is not: natural language processing (NLP)

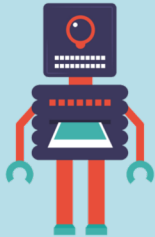
- but full NLP may not always be needed
- and NLP can be hard to use or customize



EMERSE vs NLP



EMERSE: *augmented* intelligence

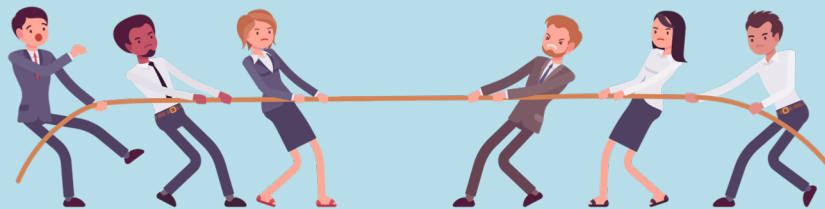


NLP: *artificial* intelligence



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EMERSE vs NLP



EMERSE

NLP

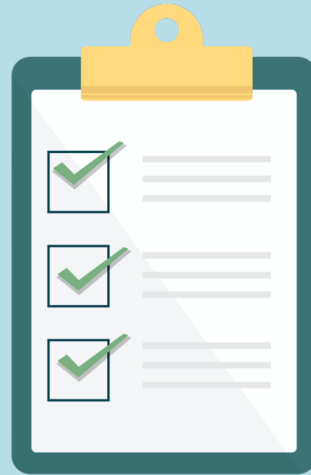
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Find cohorts

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

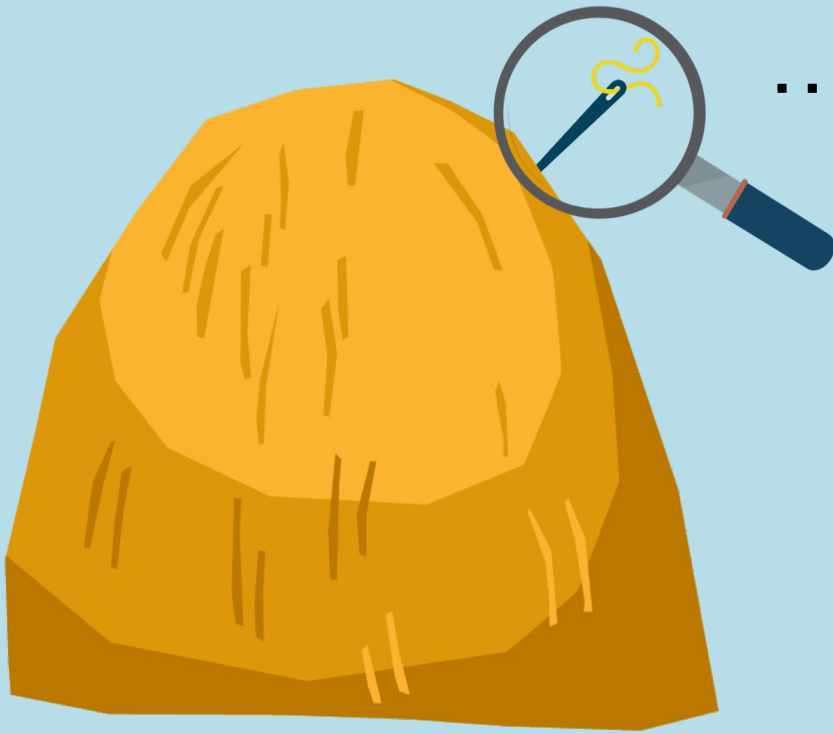
- diseases
- drugs
- symptoms
- anything!



Find cohorts

It's perfect for finding rare things...

...like rare cancers



Find cohorts

It's perfect for finding diagnoses that don't have a specific ICD-10 code... like leiomyosarcoma

► **ICD-10-CM Diagnosis Code C49.6** 📄 [\[convert to ICD-9-CM\]](#)

Malignant neoplasm of connective and soft tissue of trunk, unspecified

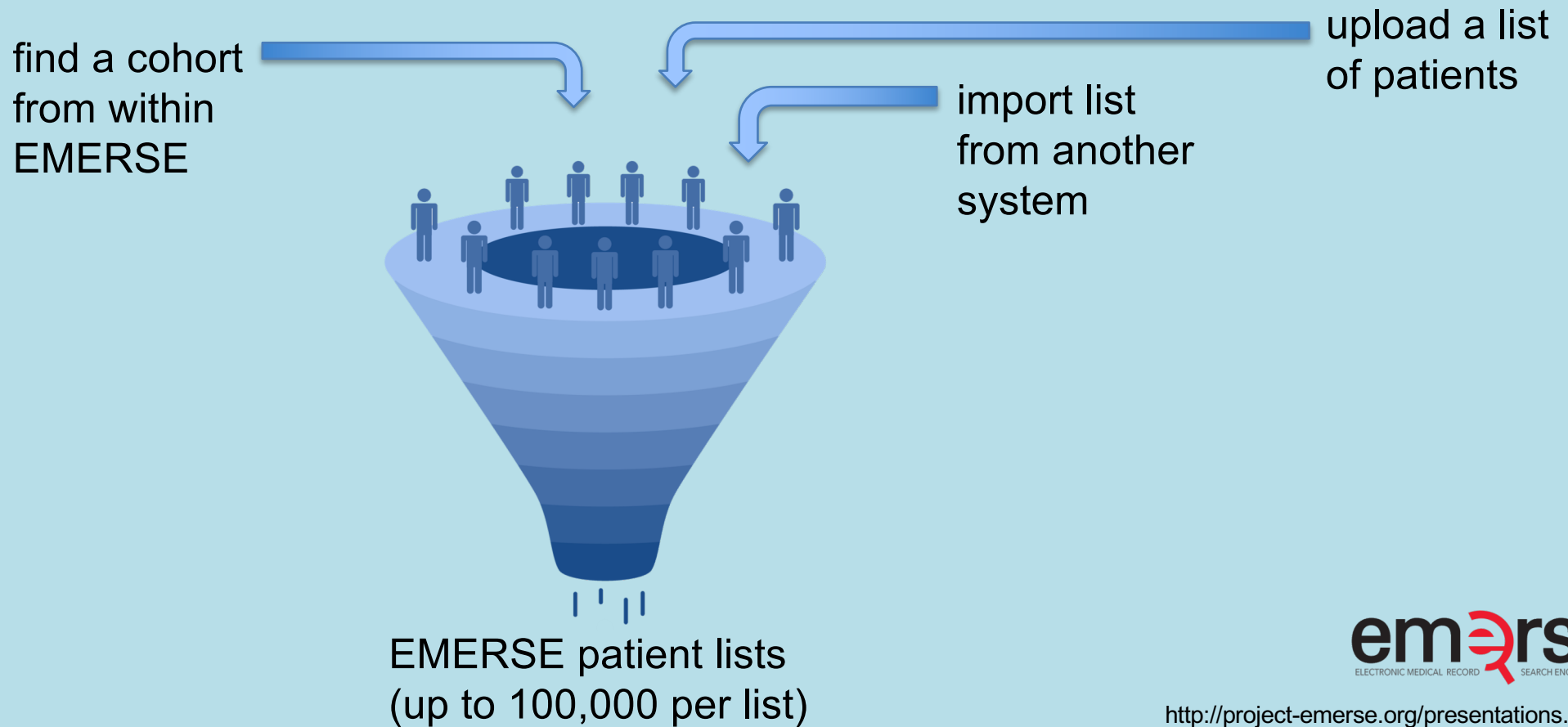
↳ Malignant neoplasm of conn and soft tissue of trunk, unsp; Angiosarcoma, trunk; Cancer of the soft tissue, trunk; **Leiomyosarcoma**, trunk; Liposarcoma, trunk; Malignant fibrous histiocytoma, trunk; Primary angiosarcoma of trunk; Primary **leiomyosarcoma** of trunk; Primary liposarcoma of trunk; Primary malignant fibrous histiocytoma of trunk; Primary malignant neoplasm of soft tissues of trunk; Primary rhabdomyosarcoma of trunk; Primary sarcoma of trunk; Rhabdomyosarcoma, trunk; Sarcoma, trunk; Malignant neoplasm of back NOS

<https://www.icd10data.com/search?s=leiomyosarcoma>



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Working with cohorts



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>

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What's in EMERSE?

Free text notes

- admission notes
- history and physical
- progress notes
- pathology reports
- radiology reports
- more!

@ Michigan: 2.5+ million patients
 170+ million notes
 1995-present



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What's not in EMERSE?

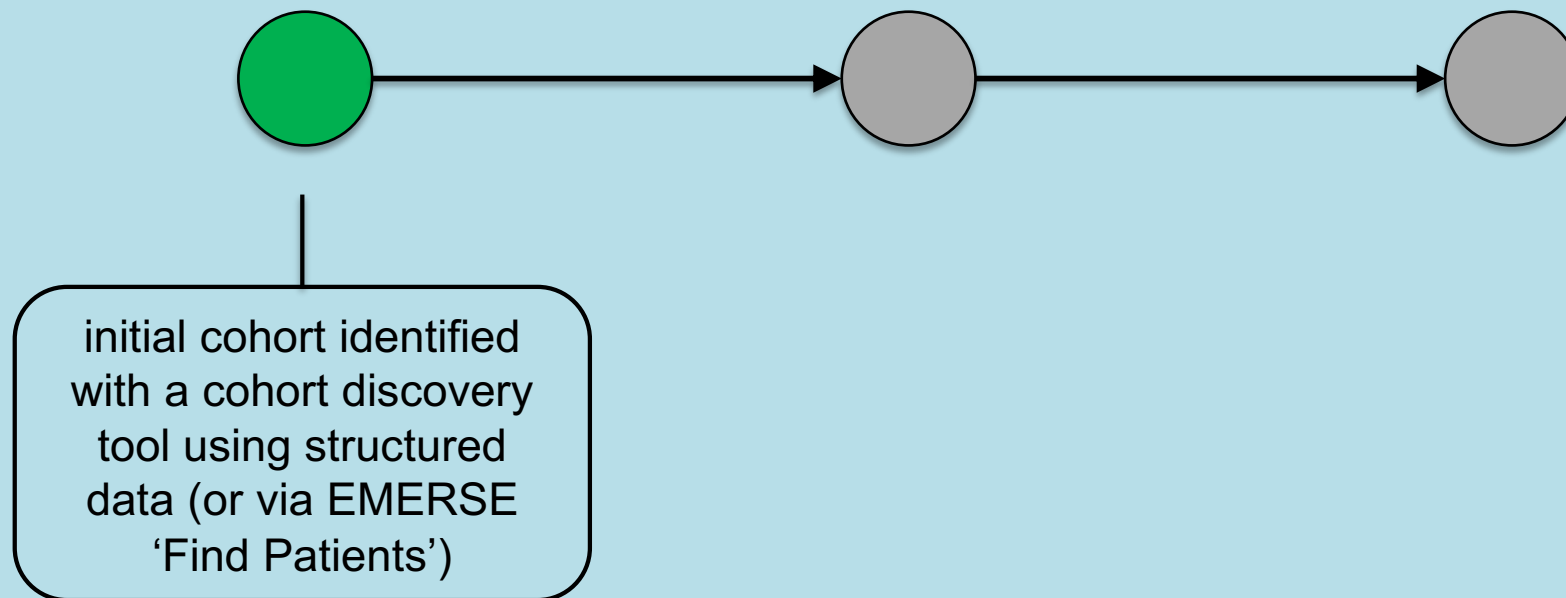
Structured data

- discrete lab values
- vital signs
- billing codes

Other tools exist for structured data (DataDirect, i2b2, etc.)

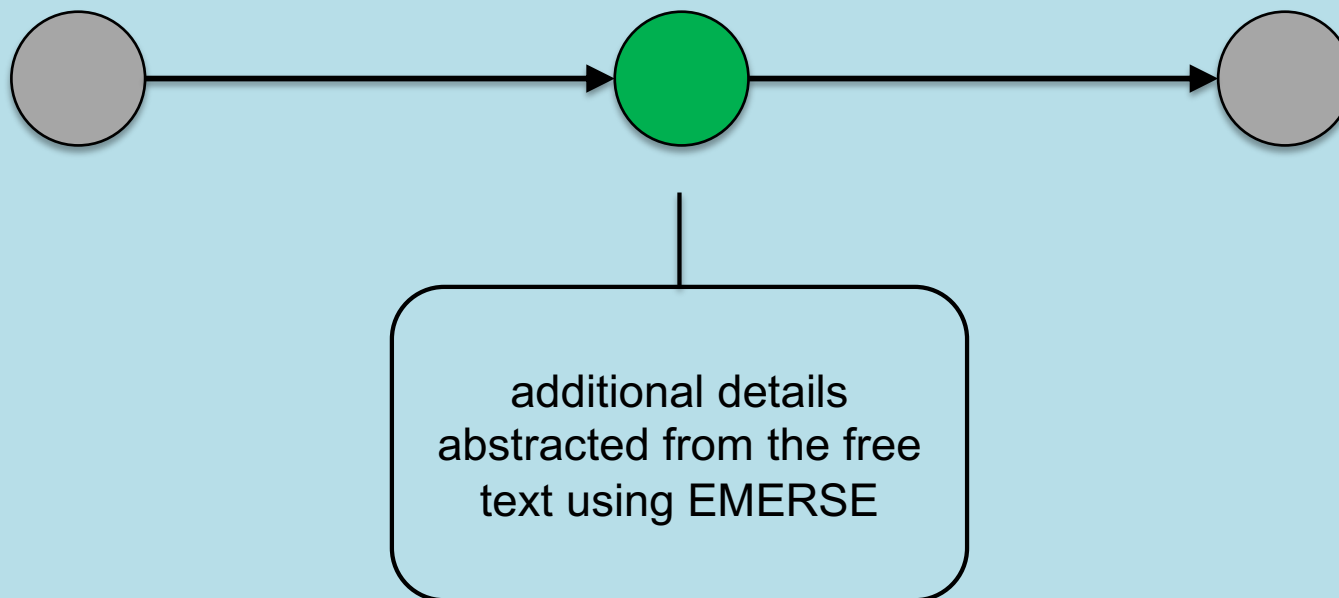


Typical workflow

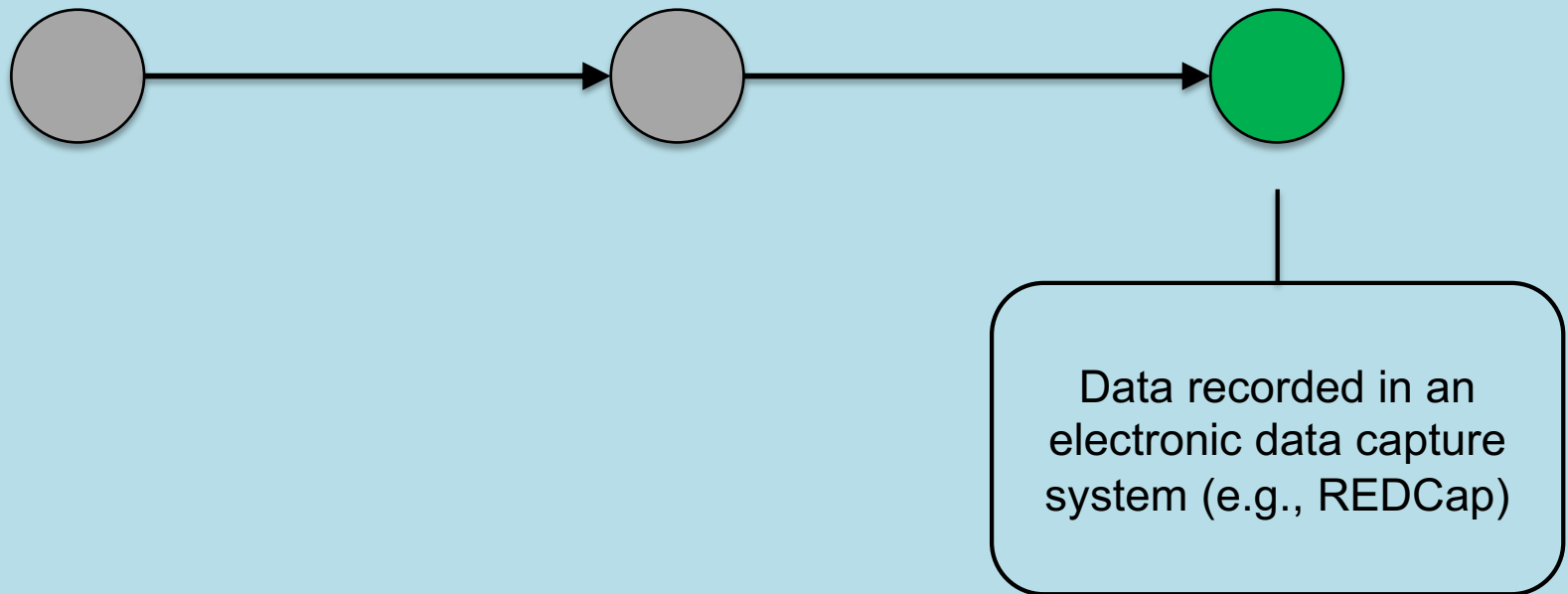


Cohort discovery tools:
DataDirect @ Michigan
i2b2, LEAF, others elsewhere

Typical workflow



Typical workflow



Publications using EMERSE

354 papers

54 abstracts



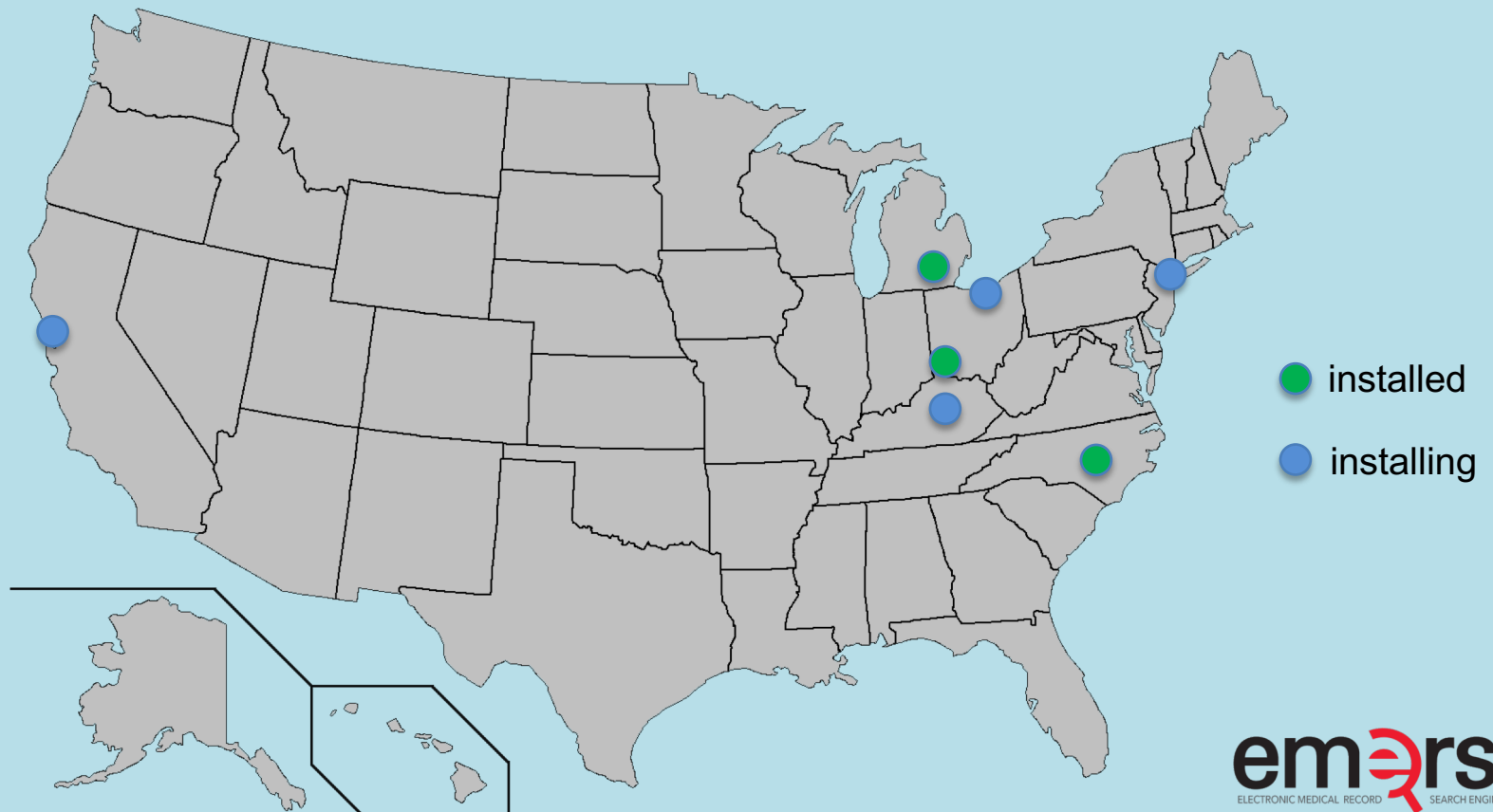
Full list at:

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

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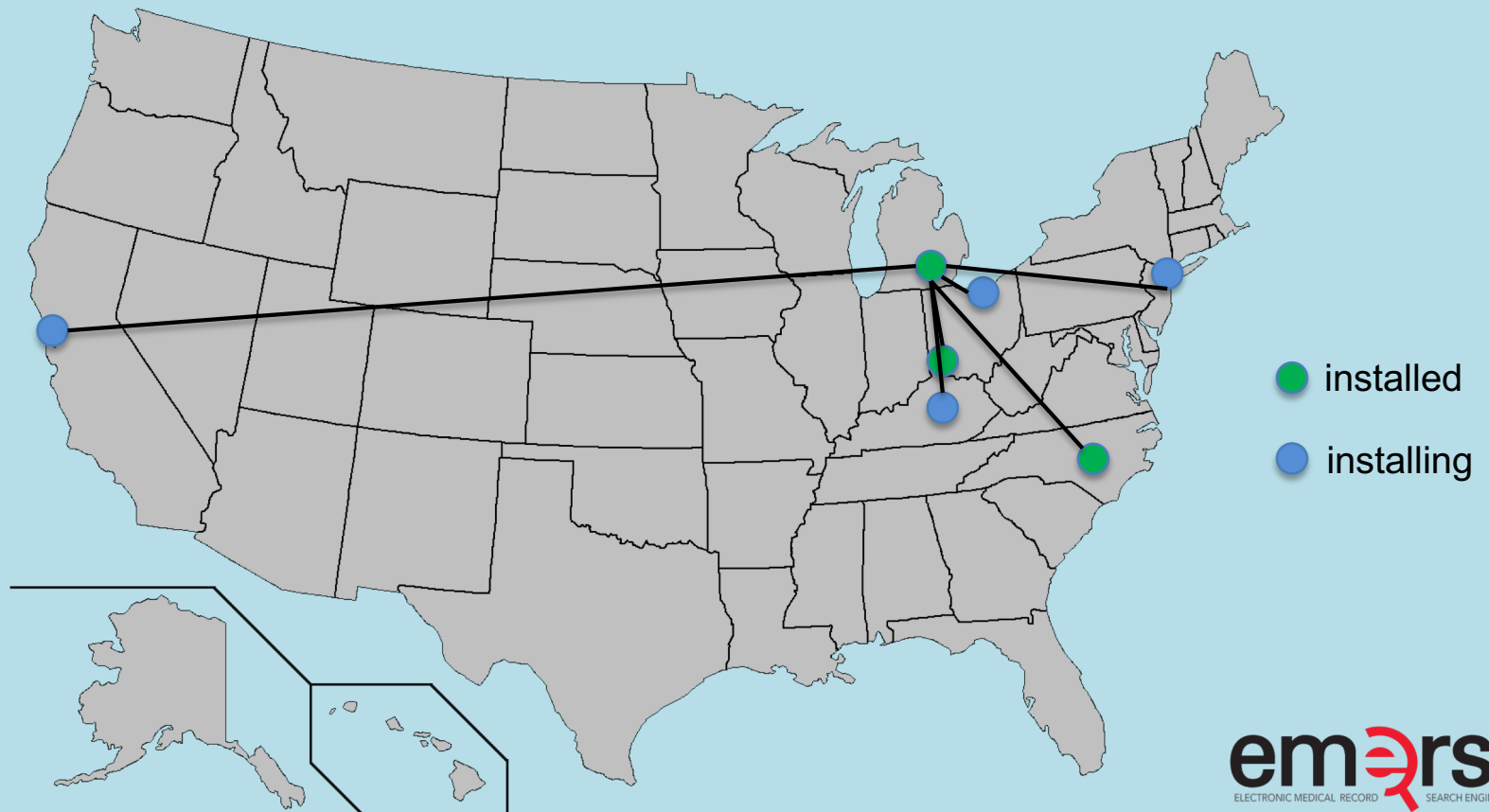
Where is EMERSE?



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The future...



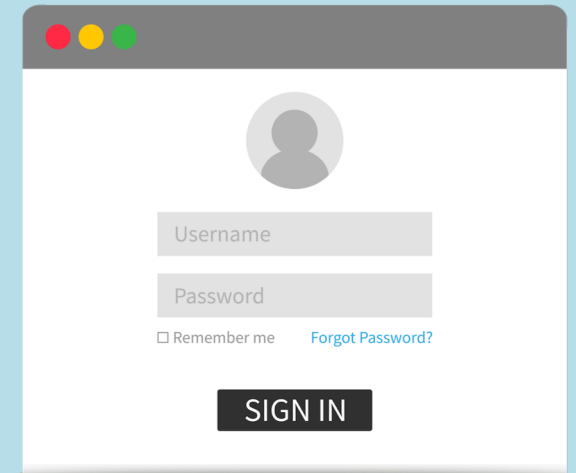
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Getting access to EMERSE

@ Michigan

- Research: Data Office
- Non-research: Through Michart
(contact David Hanauer for details)

A screenshot of a web browser window showing the EMERSE login page. The page has a white background with a gray header bar. Below the header is a gray circular placeholder for a profile picture. Underneath the profile picture are two input fields: 'Username' and 'Password'. Below the 'Password' field are two links: 'Remember me' (with an unchecked checkbox) and 'Forgot Password?'. At the bottom of the form is a black button with the text 'SIGN IN' in white capital letters.

Who can obtain access?

@ Michigan

Anyone with EHR access, BUT:

- you need a valid reason such as research, operations, quality
- “curiosity” is not a valid reason
- all usage is tracked



Getting EMERSE

local installation required

need support of IT team



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Test driving EMERSE

online demo

videos on website

virtual machine

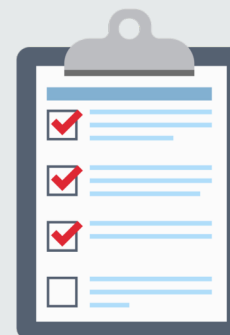
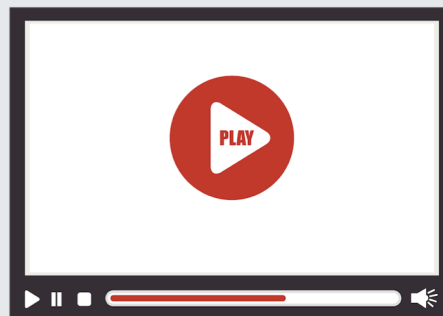
- could be used for
individual projects



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Acknowledgements

