



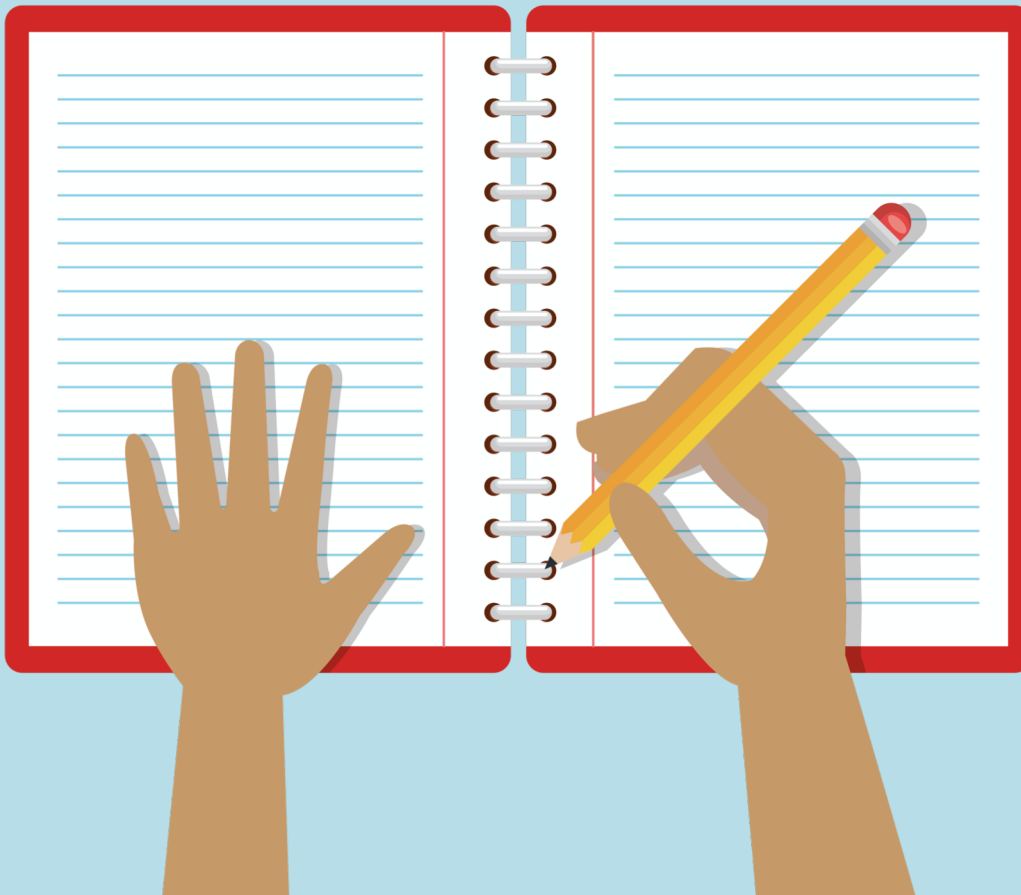
Introduction to EMERSE

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University of Michigan
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February 18, 2020

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

If you're thinking of taking notes



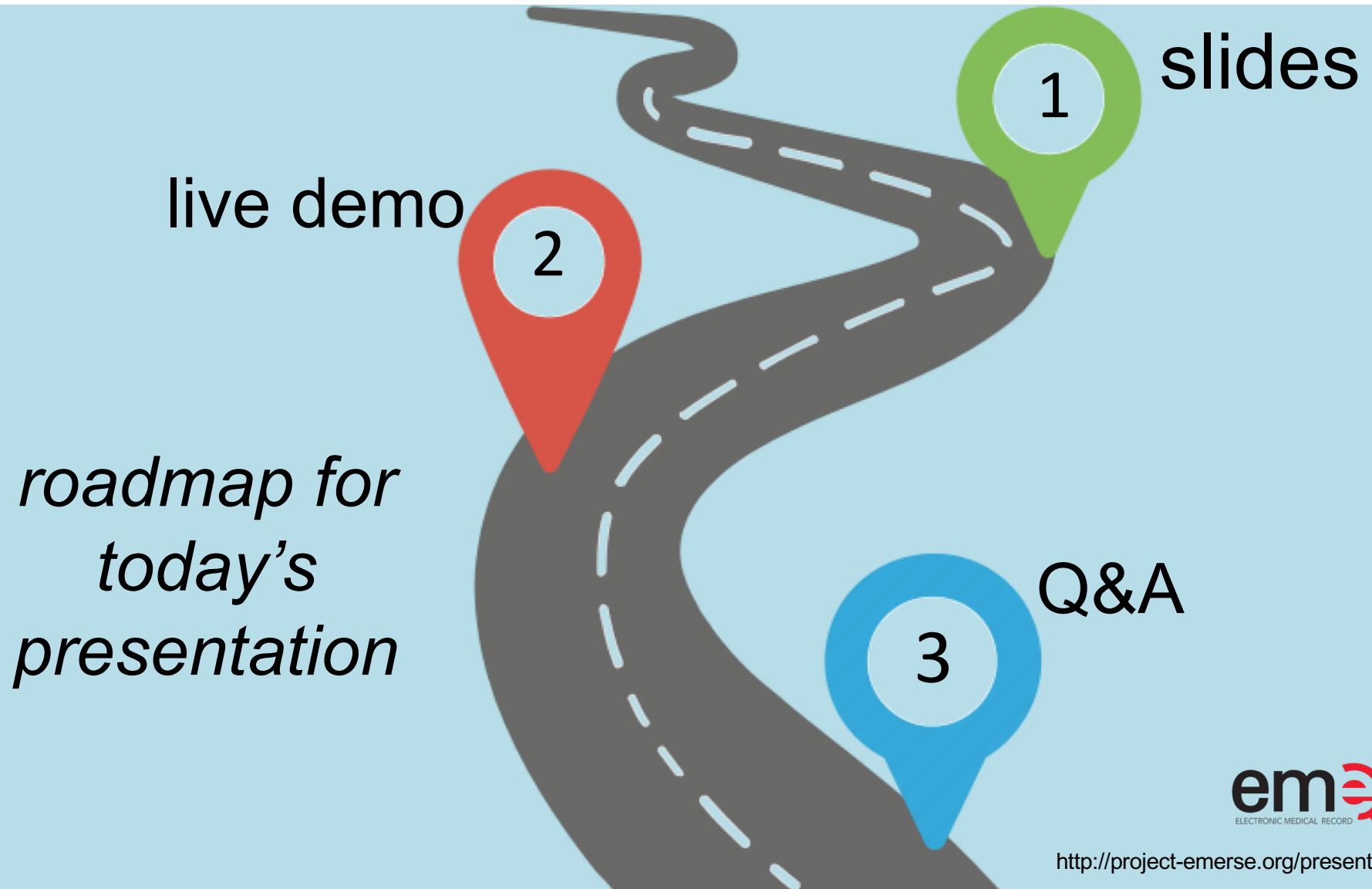
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link will be on
most slides



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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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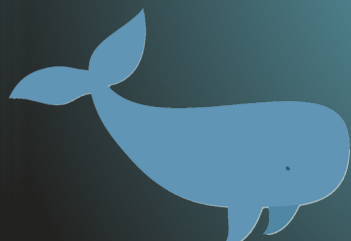
80% of EHR data are in unstructured free text

"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)



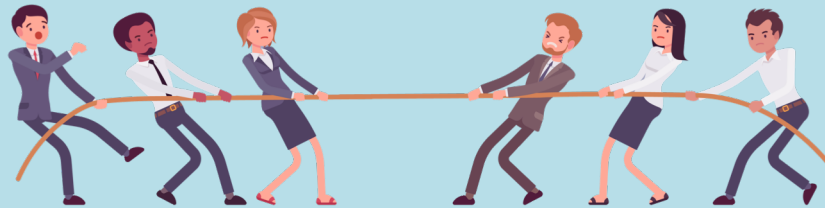
What isn't EMERSE?

It is not: natural language processing (NLP)

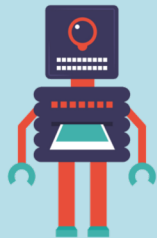
- but full NLP may not always be needed
- and NLP can be hard to use or customize



EMERSE vs NLP



EMERSE: *augmented* intelligence

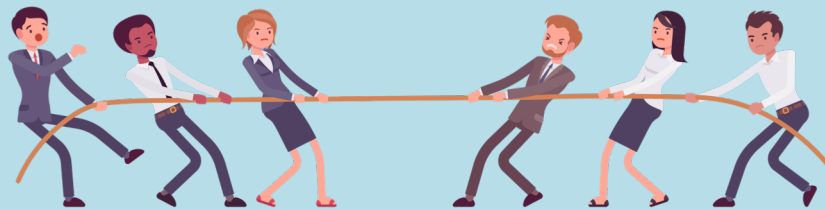


NLP: *artificial* intelligence



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EMERSE vs NLP



EMERSE

NLP

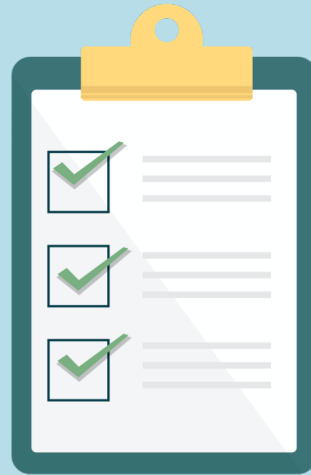
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Find cohorts

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

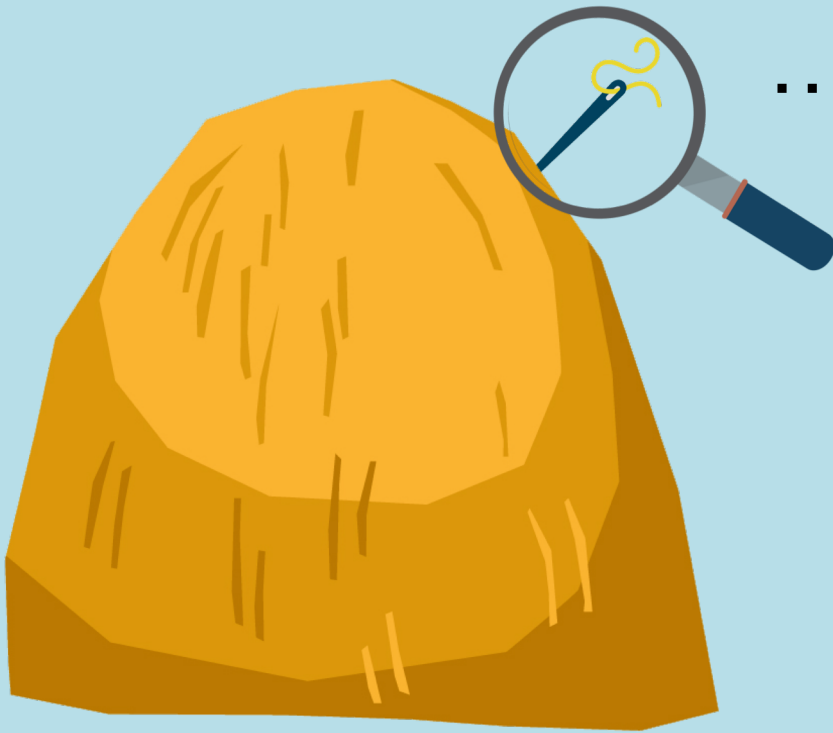
- diseases
- drugs
- symptoms
- anything!



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

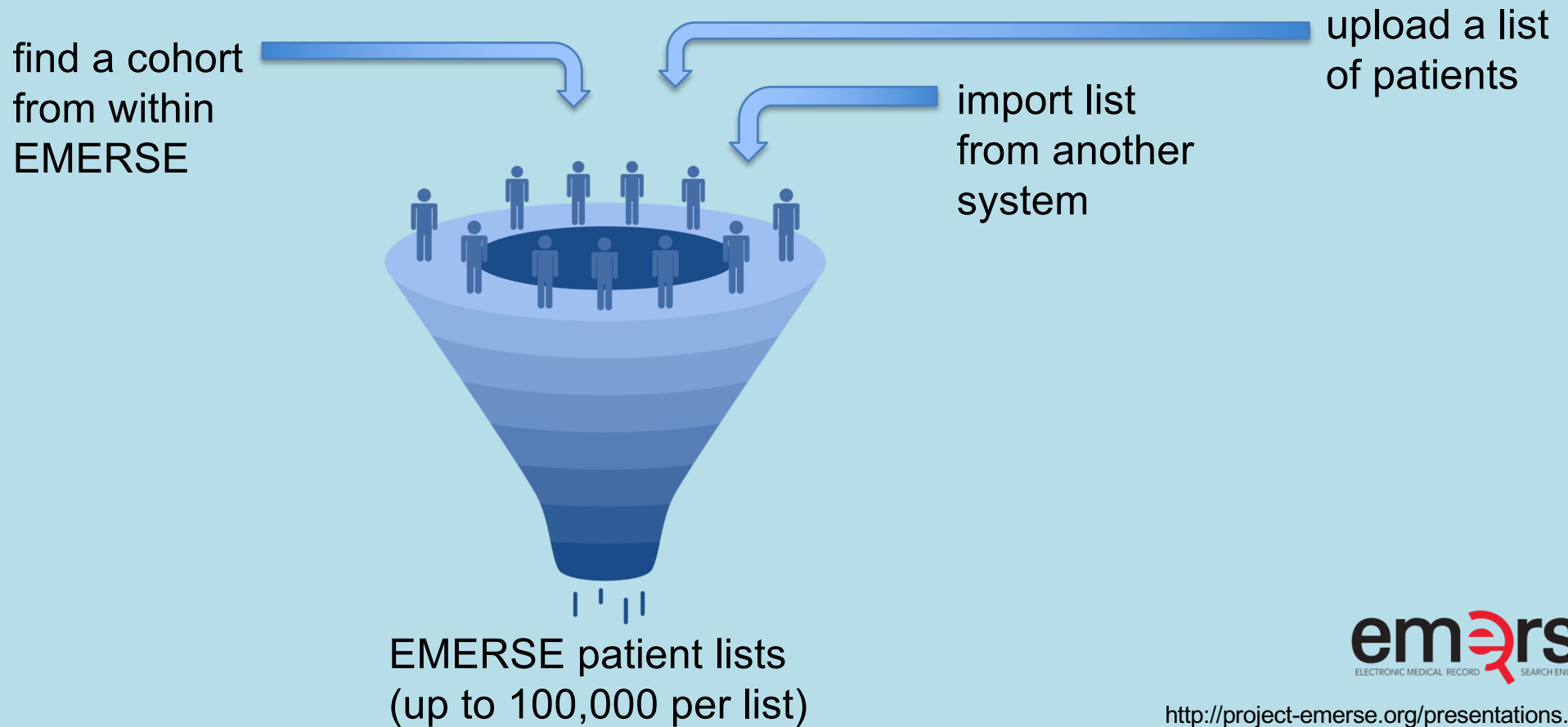
↳ Malignant neoplasm of conn and soft tissue of trunk, unsp; Angiosarcoma, trunk; Cancer of the soft tissue, trunk; **Leiomyosarcoma**, trunk; Liposarcoma, trunk; Malignant fibrous histiocytoma, trunk; Primary angiosarcoma of trunk; Primary **leiomyosarcoma** of trunk; Primary liposarcoma of trunk; Primary 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

Once a cohort is identified, highlight all mentions of terms anywhere in the notes:

- e.g., mentions of terms related to radiation therapy

radiation	cGy	fractions	IMRT
rad onc	radiosensitive	dosimetry	tomotherapy

What's in EMERSE?

Free text notes

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



What's not in EMERSE?

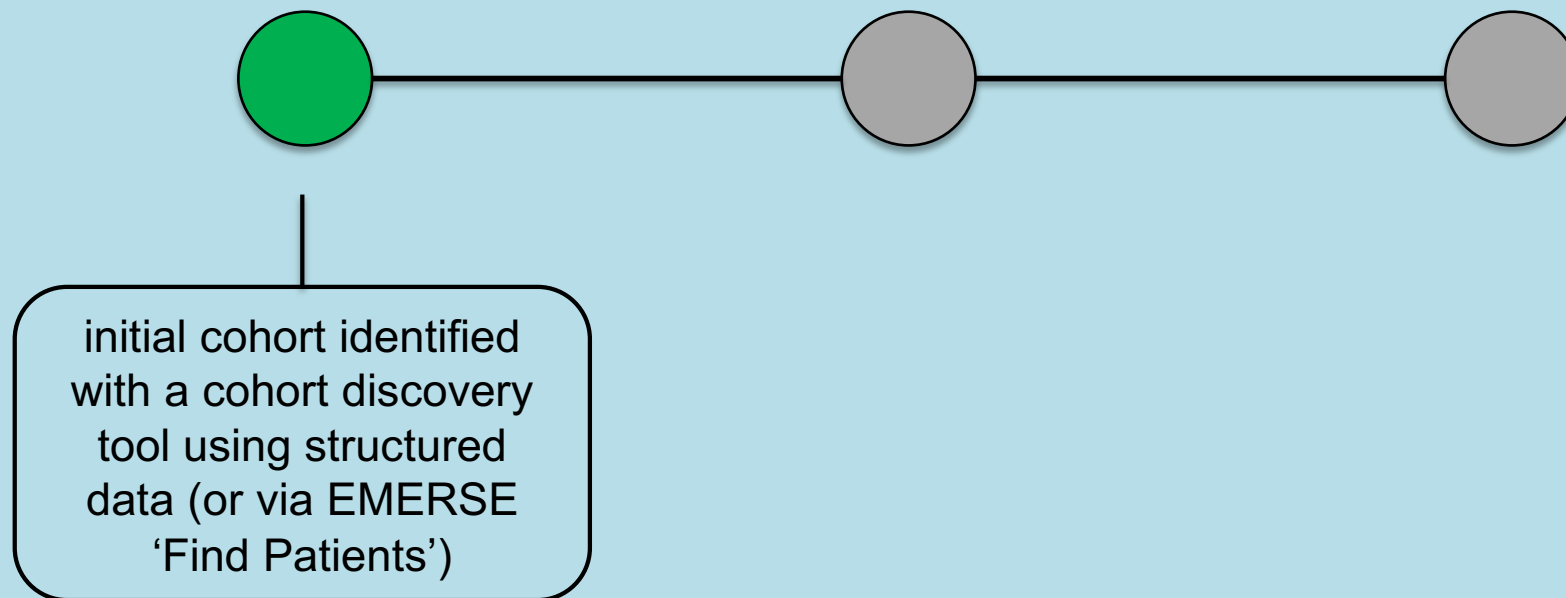
Structured data

- discrete lab values
- vital signs
- billing codes

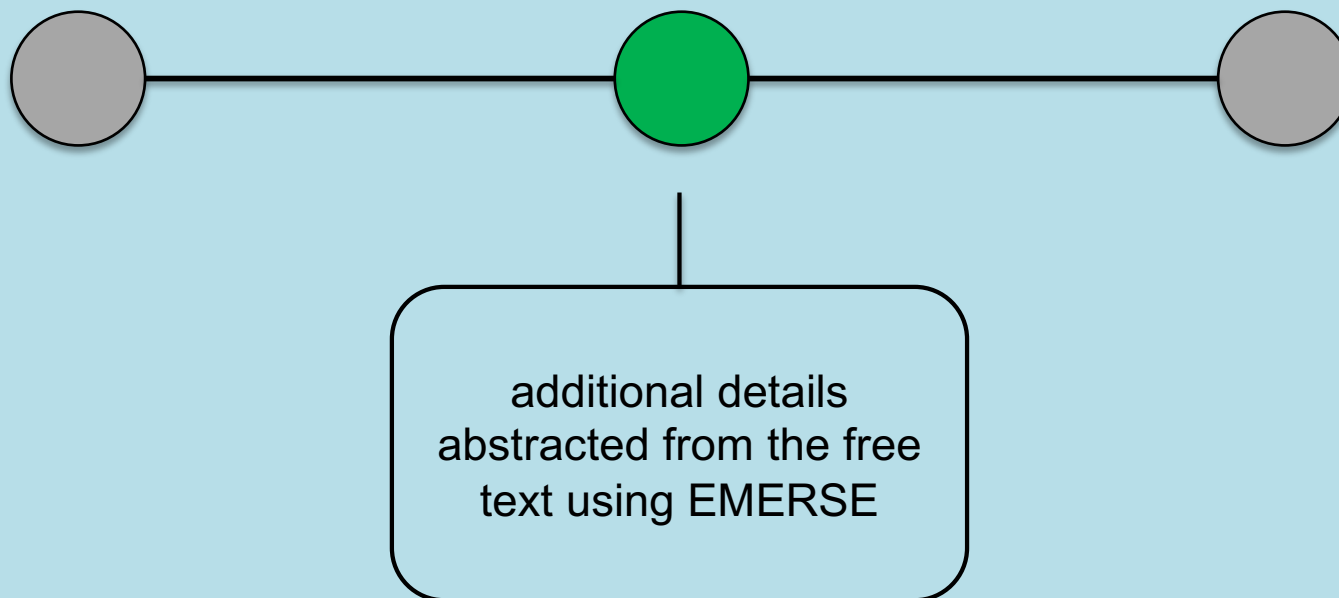
Other tools exist for structured data



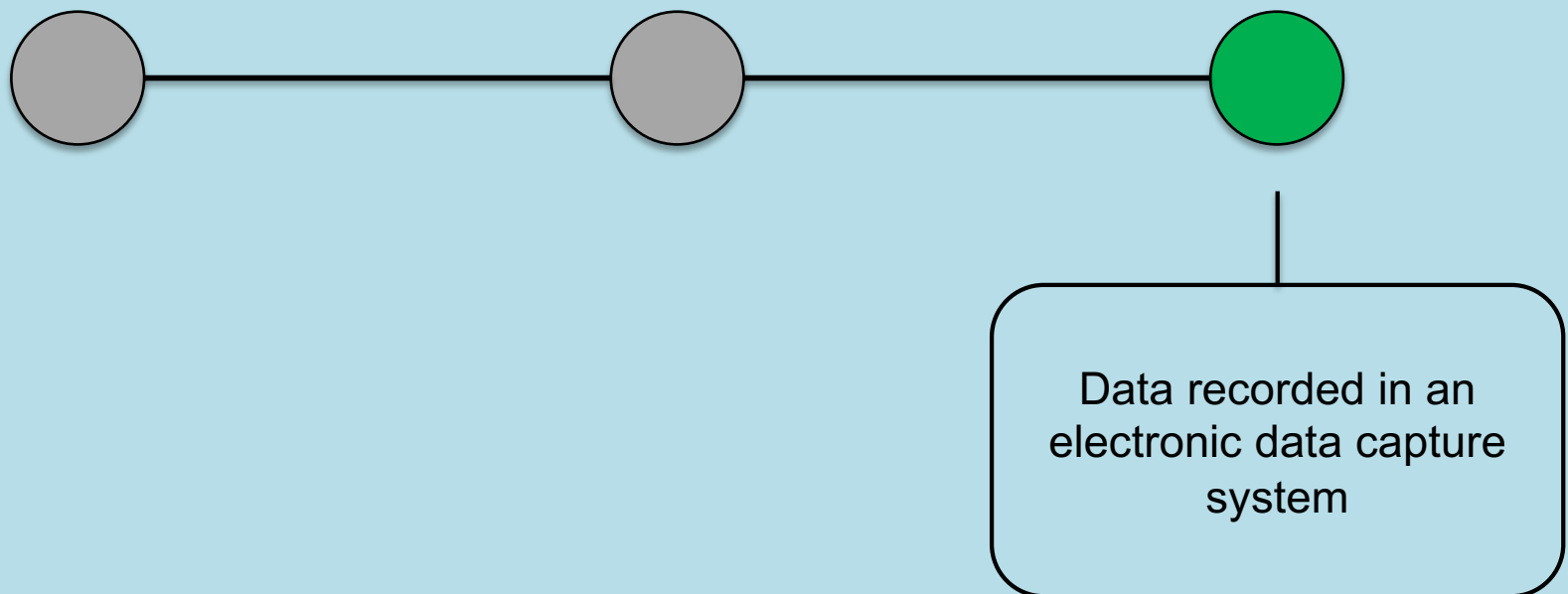
Typical workflow



Typical workflow



Typical workflow



Publications using EMERSE

Reid MD, Bhattarai S, Graham RP, Pehlivanoglu B, Sigel CS, Shi J, Saqi A, Shirazi M, Xue Y, Basturk O, Adsay V. **Pancreatoblastoma: Cytologic and histologic analysis of 12 adult cases reveals helpful criteria in their diagnosis and distinction from common mimics.** Cancer Cytopathol. 2019 Oct 3. doi: 10.1002/cncy.22187. PMID: 31581358

Manton T, Tillman B, McHugh J, Bellile E, McLean S, McKean E. **Sinonasal Melanoma: A Single Institutional Analysis and Future Directions.** Journal of Neurological Surgery Part B. 2019. DOI: 10.1055/s-0038-1676355. PMID: 31534890

Zhang Y, Staley SA, Tucker K, Clark LH. **Malignant Brenner tumor of the ovary: Case series and review of treatment strategies.** Gynecol Oncol Rep. 2019 Feb 12;28:29-32. doi: 10.1016/j.gore.2019.02.003. eCollection 2019 May. PMID: 30815527

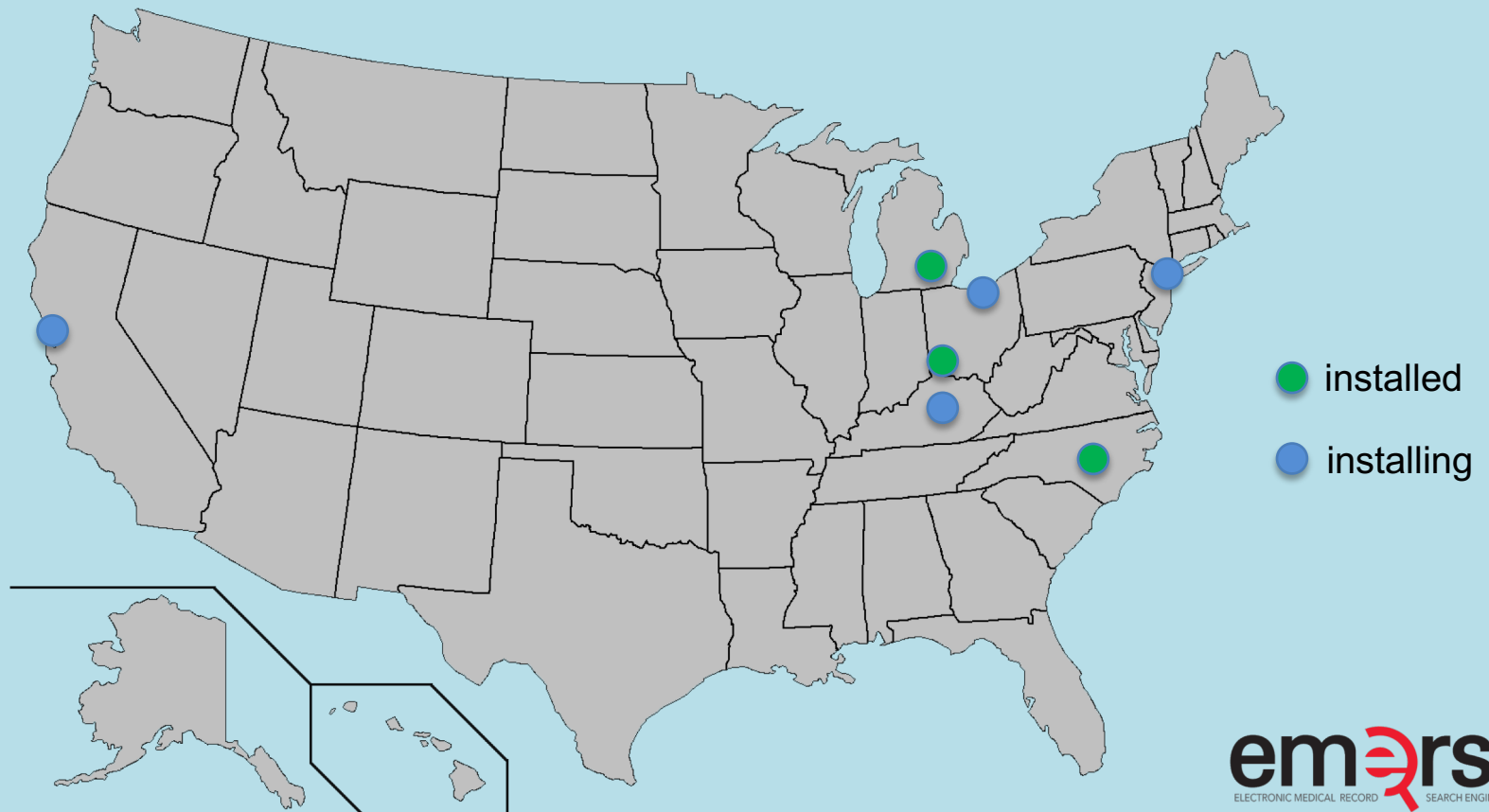
More at: <http://project-emerse.org/publications.html>



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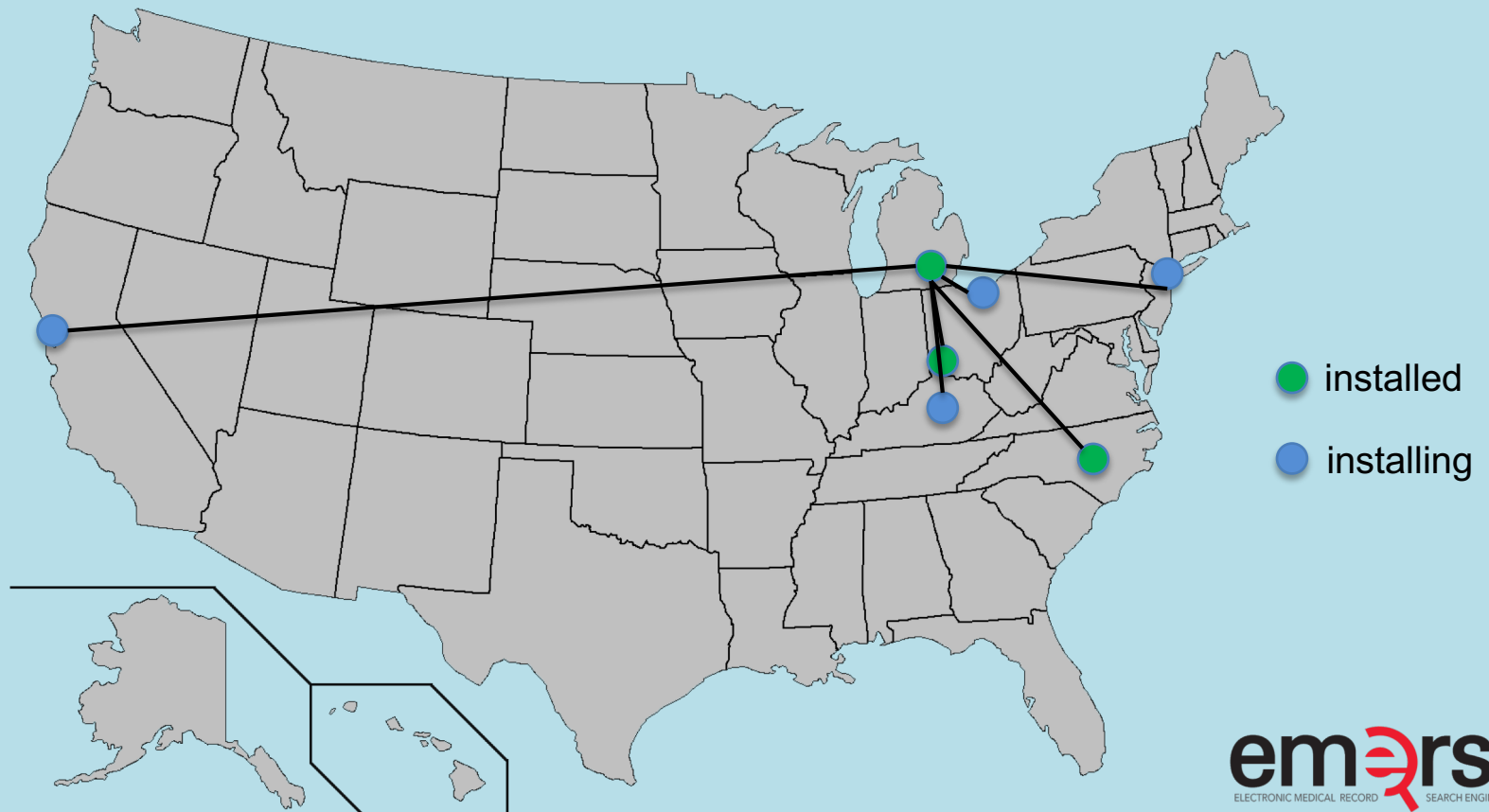
Where is EMERSE?



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The future...



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Getting 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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EMERSE 101

live online training

open to anyone

March 11, 2020, 10-11 AM EST

register here:

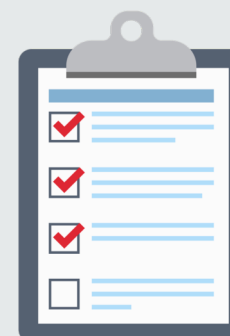
<https://research.medicine.umich.edu/workshops/emerse-101-live-online-training-1>



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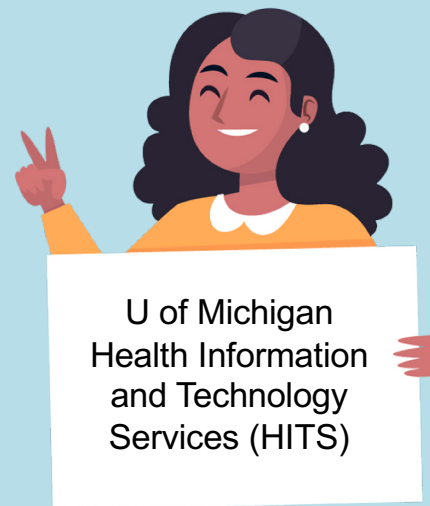
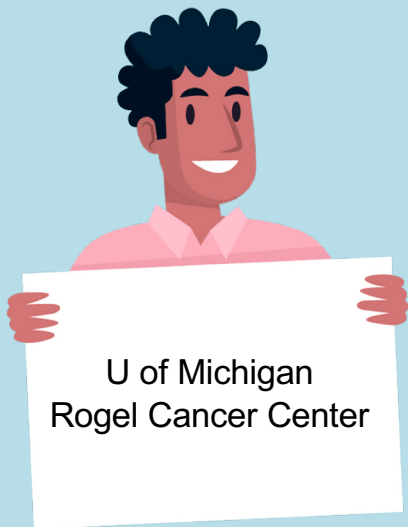
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Acknowledgements



Final slide (then on to the demo)

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Please provide feedback about this presentation:

<http://bit.ly/emerse-feb-2020>



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