NLP and clinical records: Are we focused on the right thing?

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The views expressed in this presentation are my own and do not reflect those of my institution, nor many of my colleagues 😊

-- heck, there is a distinct possibility I could be completely wrong ---

-- just give me a few minutes of your time, and you be the judge
A typical process for clinical research c2008
The coming of the EHR – Nirvana is near!

- 2013 – 78.4% office-based physicians with some EHR
  - A 430% increase since 2001

- 69% of physicians are either participating or planning to participate in the incentive program

- ssshhh ... Only 19% had EHR systems that can support at least 14 of the 17 stage 2 MU requirements
EHRs and Data Quality: Are we really better off?

- Powell et al (2006) – 55% of 97 encounters had active pain documented in free text but “no pain” in the data template

- Goulet et al (2007) – missing data in VA EHR records – LDL 24-38% missing, BP missing in 3%-31% of records

- Szpunar et al (2008) – vital sign documentation rate *increased* to 58.5% of visits (0.7% increase) when standardized data fields were used

- Baldwin (2008) – NLP able to retrieve 100% of gender/race but had 35% false negative rate for mammography and clinical breast exam
  - “these findings highlight the role of documentation practices in the accuracy of data obtained using free-text abstractions programs”

- Baker et al (2007) – CHF diagnosis was recorded in multiple different locations across the EHR
  - 95% - in diagnostic fields
  - 71% - problem list
  - 37% - in medical history
A ‘real world’ experience in using EHR for comparative effectiveness research

- 4 leading health systems using an EHR
  - Intermountain, Mayo, Providence Health, Baylor Health

- Experiment to see how EHR data could be used to support a study of HTN treatment
  - BP control and outcomes assessed over 3 year period across the 4 institutions
  - Data needed – indication of hypertension, prescribed medications, encounters

- Insights
  - Onset of disease is rarely documented in the EHR – very difficult to know “when something started or was diagnosed”
  - Patients sometimes saw “other” physicians who modified their medication (not in the EHR)
  - Significant variation in how BP data are collected and who collected the information

Bayley. 2013. Medical Care. Volume 51, Number 8 Suppl 3
So... a typical process for clinical research c2014

- Now we “abstract” from EHR records instead of paper.. woohoo!
- Data quality is still very poor
- We still “forage” for information – but now we do it across the EHR because data ‘location’ and recording is not standardized
A Workflow Study – Project INSPIRE

- Studied four UC medical centers with EHRs
  - Irvine, San Diego, Davis, San Francisco
  - 2 are HIMSS Stage 7
    - 40 interviews
    - 12 unique roles/perspectives

- Compilation of 348 pain points & observations
- Creation of high-level process map
Most common pain point = information finding
NLP to the rescue!
“Clinical” NLP is here!
But can NLP really help?

**Cut&Paste:**
“90% of EHR-using physicians admitted to copying, **80% planned to continue**”

Highest copying events were in the **physical examination section!** (Hammond study)

**Note Bloat:**
“Auto-inserted data is of no practical use and only causes note bloat”

Cut&Paste propagates incorrect or out-of-date information in the chart - “chart lore”

The irony of EHRs and physician productivity

Survey of 9 practices
“46 minutes of free time lost per clinic day per physician”

Survey of 410 Internists
“42 minutes of free time lost per clinic day per physician”

Information finding takes time because notes are bloated and “new” or “key” data is hard to find...

I don’t have time, so I will cut & paste...

(1) http://www.redwoodmednet.org/projects/events/20130725/rwmn_20130725_mcdonald_v2.pdf
Your EHR Data – Landfill or Landscape?
Should we be surprised? Some things are just pretty simple...
High data quality starts with good data capture
Maybe our goal should be to re-engineer how we capture data...

BTPS = ASCO’s Breast Cancer Adjuvant Treatment Plan and Summary (Breast TPS)
Capturing key data in checklists

Identify key data elements and provide a single place in EHR for this data

Providers fill out dynamic forms ("checklists") at key points of care

Data is now "more structured" and usable for decision support, comparable analytics, etc...
The Athena breast cancer “key” data elements

- Group of ~50 Athena participants developed list of key data elements
  - pathologists
  - breast surgeons
  - oncologists
  - radiologists
  - radiation oncologists
  - nurses
  - cancer registrar

- ~ 80 key data elements for care of breast cancer patients

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“Data elements that are used for quality measurement (or clinical research) should be identified and prioritized for empirical investigation”

“Standardization of data documentation and management procedures and terminologies should be evaluated for their effectiveness in decreasing variation in documentation rates and allowing for improved data comparability”

“Greater attention must be paid to how clinical workflow and EHR system design interact to affect data quality”
Is ‘clinical’ NLP still useful? YES!
Taking it to the extreme...

What is the meaning of life?
I don't know. The computers are down.
Questions?