Clinical Data

What is Biomedical & Health Informatics?
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What are clinical data?

- A datum is a single observation
- Clinical data are the collection of observations about a patient
- Each datum about a patient has a minimum of four elements:
  - the patient (Bill Hersh)
  - the attribute (heart rate)
  - the value of the attribute (50 beats per minute)
  - the time of the observation (1:00 pm on 7/1/1990 – many ways to record dates!)
Where do clinical data come from?

- Dis-ease – pain, altered body function, etc.
- Maintenance – follow-up of ongoing problems
- Preventive measures (primary, secondary) – screening
- Pre-work/school examination

Types of clinical data

- Narrative – recording by clinician
- Numerical measurements – blood pressure, temperature, lab values
- Coded data – selection from a controlled terminology system
- Textual data – other results reported as text
- Recorded signals – EKG, EEG
- Pictures – radiographs, photographs, and other images
Uses of clinical data

- Form basis of historical record
- Support communication among providers
- Anticipate future health problems
- Record standard preventive measures
- Coding and billing
- Provide a legal record
- Support clinical research

Types of clinical data documents

- History and physical – initial assessment by a clinician
- Progress notes – update of progress by primary, consulting, and ancillary providers
- Reports – by specialists, ancillary providers
- Typical paper chart maintains all patient notes in chronological order, sometimes separated into different components
Assessment of a stable patient

- Chief complaint
- History of the present illness
- Past medical history
- Social history
- Family history
- Review of systems
- Physical examination
- Testing – lab, x-ray, other
- Assessment and plan

Some complications of data

- Circumstances of observation – e.g., how was heart rate taken? pulse? EKG?
- Uncertainty – how accurate is patient reporting, measurement, device?
- Time – what level of specificity do we need?
- Imprecision vs. inaccuracy
Coding of clinical data

- Historically performed by a Clinical Coding Specialist (CCS)
- Major purpose has historically been for reimbursement (Scott, 2013)
- A core issue in biomedical informatics has been how to generate and use coded data for other purposes
- Trade-offs
  - Standardization of language vs. freedom of expression
  - Time to narrate vs. code
- Other difficulties
  - Creating and maintaining coding systems
  - Structuring coding systems to capture meaning

Many sources, users, and uses of clinical data (NCVHS, 2009)
And many other data sources, including beyond EHR (Weber, 2014)

Another important part of data: social determinants of health (SDOH) (Artiga, KFF, 2018)
We also need effective “stewardship” of data

- Ensuring the “knowledgeable and appropriate” use of data from individuals’ personal health information (NCVHS, 2009)
- Maintaining the patient’s story in the record (Vigilante, 2018) – even if EHRs can make that difficult (Kommer, 2018)