The Office of the National Coordinator for Health Information Technology

Data Provenance

Environmental Scan

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Data Provenance

- What is "Provenance"?
  - Origin of clinical information when first created
    - Information about the source of the data
    - Information about processing/transitions the data has undergone
- Why is it important?
  - Enables segmentation of information based on source
  - Enhances provider trust in information being exchanged between providers
  - Enhances provider trust in information received from a patient (e.g., data from PHR)

About the Environmental Scan

- Explore how EHRs, PHRs and health information exchanges (HIEs) track data provenance
- Focus on marking and retaining provenance as systems aggregate data from multiple sources and records are exchanged
- Focus on provenance within CDA documents
- Includes landscape analysis, gap analysis

Key Provenance Considerations

- Who/What to list as source?
  - Organization
  - Provider
  - Data entry staff
  - Device details
- At what level?
  - Entire document (full record has one source listed)
  - Section (ex. medication section lists its own source)
  - Individual data element (ex. each individual medication lists its own source)
- How to update or modify source when importing/exporting?
  - List receiving organization as source
  - List original creator as source

Current Provenance Practices

- How are systems documenting provenance today?
  - Considerable **variability** in how provenance marked and retained in EHRs, PHRs, and HIEs
    - Different levels of granularity (document level vs section level vs data element level)
    - Different practices regarding source (organization vs provider vs individual entering the data)
    - Different practices when importing/exporting data (list original source vs modify source to list importing org)

Flow Down of Provenance Data

- Common response to variability is to utilize "flow down" of provenance data
  - Mark provenance at **document level only**
  - Provenance data inherited at data element levels
    - Example: the source for an individual medication will be the same source listed at document level
  - Results in insufficient granularity of detail; creates integrity issues; undermines trust

Implications for Patient-generated Data

- Generally, provenance at data element level is lacking as records are shared with providers
  - EHRs often export with sending organization listed as source on **document level only** (not section or element)
  - PHRs may import with provenance at document, section and/or data element level, but often export with PHR as source on **document level only**
  - HIEs can export with documentation at data element level, but sufficient information often **not available**
- Resulting flow down of document level provenance data may not meet provider need for granular detail

Challenges and Opportunities

- Currently no dominant provenance model within the HIT community
  - No uniform way of handling data provenance when sharing data
- No harmonized standard currently in place
  - Upcoming work includes HL7 data provenance and privacy support in C-CDA initiative
- Current flow down practice does not meet provider need for granularity regarding origin of data


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