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Learning from Patient Safety Events:

A Shift from Quantity to Quality

Session 103, March 7, 2018

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Conflict of Interest

Yang Gong, MD, PhD

Has no real or apparent conflicts of interest to report.

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Agenda

- What are patient safety events
- Challenges of reporting patient safety events
  - Quantity v.s. Quality of the reports
- The role of clinical informatics in improving patient safety
- Our approaches
- Initial results
- Discussion of future steps

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Learning Objectives

1. Describe the benefits of quality event reporting for patient safety/healthcare quality improvement
2. Identify the barriers of event reporting and applicable informatics approaches for turning reports into actionable knowledge
3. Discuss how data representation and knowledge management in incident reports can facilitate quality improvement towards a better and safer healthcare system

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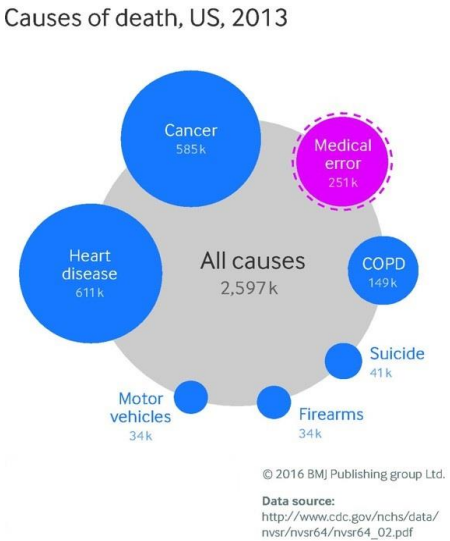
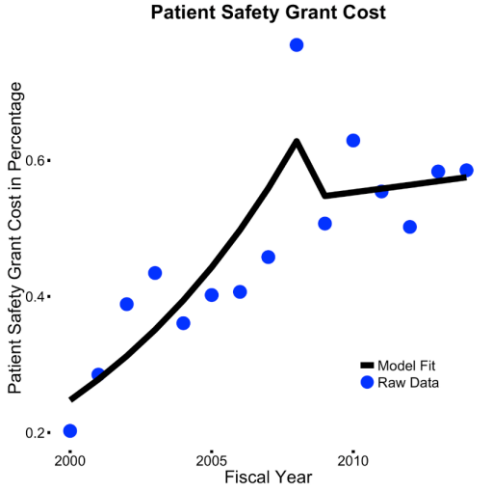
Patient Safety: Pressures and Incentives



Medical error. (Makary & Daniel, 2016)



A track of patient safety study from NIH.
(Liang, Miao & Gong, unpublished)

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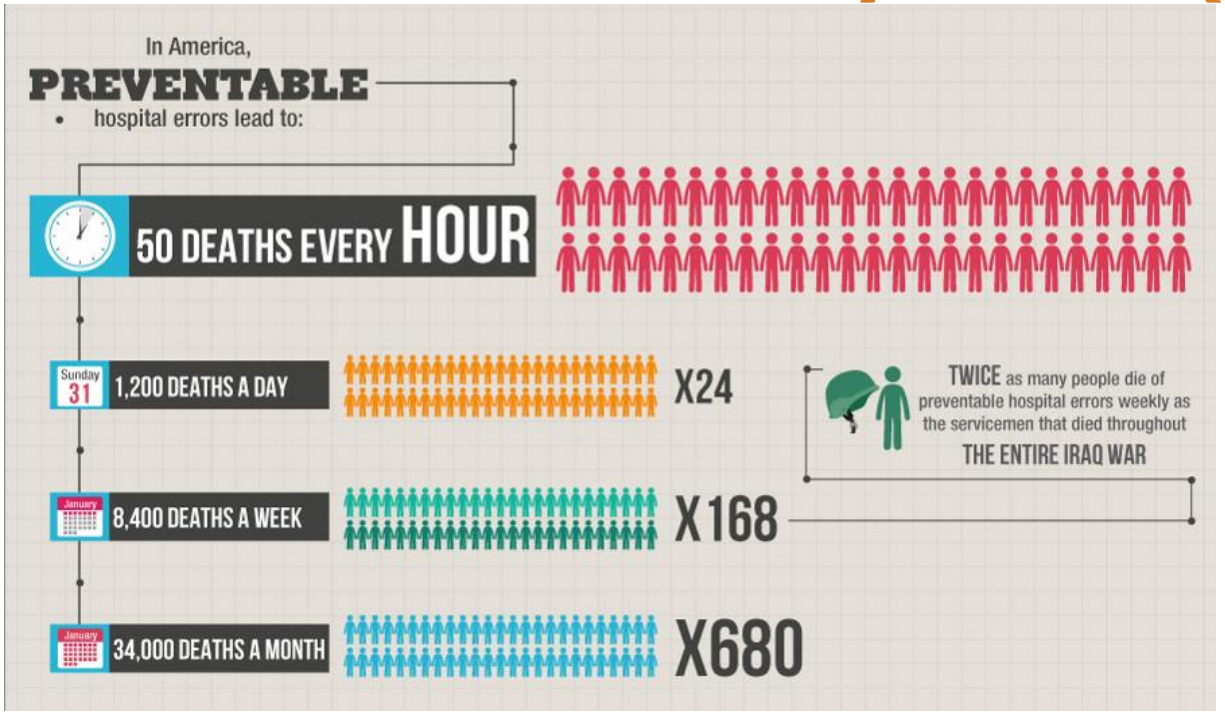
Deaths due to Patient Safety Event (PSE)



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Patient Safety Event Reporting

- Patient safety event (PSE) reporting
  - a mainstay of efforts to detect PSE and quality problems from the frontline practitioners
  - collected from a broad range of practitioners
  - generate a summary and feedback toward
    - actionable knowledge
    - shared learning

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Patient Safety Event Reporting

- 1999 Institute of Medicine (IOM) report
  - To Err is Human
- Patient Safety and Quality Improvement Act of 2005 (PSQIA)
  - Federal privilege and confidentiality protections for PSE
    - Agency for Healthcare Research and Quality (AHRQ)
    - Patient safety organizations (PSOs)
  - Analyze near misses and incidents
  - Identify underlying factors
  - Generate actionable knowledge

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Reporting Quantity and Quality

- Quantity
  - an increase in reports → an improved reporting culture
  - a reduction in reports → an indication of a safer environment
- Quality
  - underreporting
  - low quality and fragmented reports

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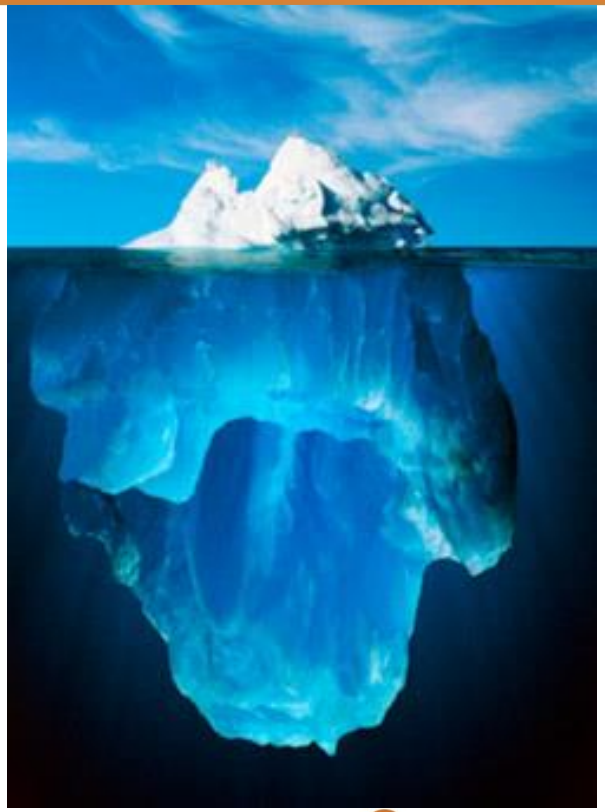
Self-Perceived Barriers

- Voluntary reporting
  - No feedback
  - Lengthy reporting forms
    - competing with other priorities
  - Observed event seemed “trivial”
    - A trivial tip --> a large ‘iceberg’ under water



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Goal

- Develop a user-centered, knowledge-based reporting and learning system
  - Help healthcare practitioners better report events
  - Connect with relevant reports
  - Learn how to address causes of errors
  - Improve the behavior at work

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Our Solution

- user-centered design (UCD) and knowledge-based (KB) design
- advancing from simply counting events into a new era of understanding, trending, integrating, and resolving the events
  - a synchronous and collaborative platform
- UCD & KB features
  - improving user acceptance and satisfaction
  - promoting user engagement for
    - shared learning
    - quality underreporting

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Data, User, and System

- Data consistency
  - >30% labelled under ‘other’ and “miscellaneous’
  - 66% reports created by nurses
  - 75% reports created <48 hours
  - Quality of reports is just as significant as the number of submissions

- Gong Y. Data consistency in a voluntary medical incident reporting system. J Med Syst. 2011 Aug;35(4):609-15. PubMed PMID: 20703528. Epub 2010/08/13. eng.
- Gong Y. Toward a human-centered voluntary medical incident reporting system. Stud Health Technol Inform. 2010;160(Pt 1):729-33. PubMed PMID: 20841782. Epub 2010/09/16. eng.

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Data, User, and System

- Various terminologies in use
  - AHRQ Common Formats
    - Common definitions and reporting formats
- Underreporting can occur
  - Unable to identify a proper classification or definition

AHRQ Agency for Healthcare Research and Quality
Advancing Excellence in Health Care

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Data, User, and System

- Survey and interview users
  - Language difficulties on describing events & selecting terms
  - Competing priorities
- Retrospective think-aloud
  - Recall difficulties reported by inexperienced reporters
  - Prolonged completion time on questions

• Gong Y, Song HY, Wu X, Hua L. Identifying barriers and benefits of patient safety event reporting toward user-centered design. Safety in Health. 2015, 1(1):7. doi:10.1186/2056-5917-1-7

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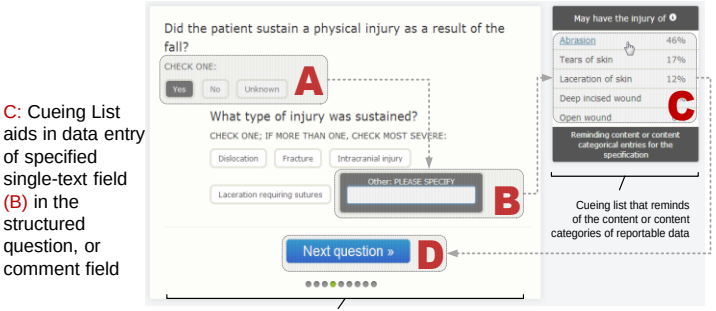
Predictive Text Entry

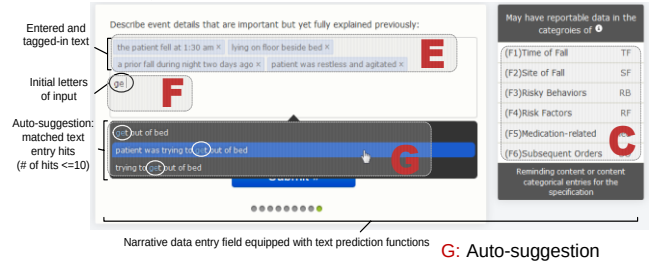
- To support reporting
  - Cueing list, auto-suggestion
- By two-group randomized test
  - Improved text generation
  - Improved data consistency and quality

Structured Data Entry – 13 MCQs and four of them have narrative fields as illustrated as the part B



C: Cueing List aids in data entry of specified single-text field (B) in the structured question, or comment field

Unstructured Data Entry – One narrative comment field



G: Auto-suggestion Suggesting the words, phrases and sentence in the context to describe the event details

- Gong Y, Hua L, Wang S. Leveraging user's performance in reporting patient safety events by utilizing text prediction in narrative data entry. Computer methods and programs in biomedicine. 2016 Jul;131:181-9. PubMed PMID: 27265058. Pubmed Central PMCID: PMC4899837. Epub 2016/06/07. eng.
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- Hua L, Wang S, Gong Y. Text prediction on structured data entry in healthcare: a two-group randomized usability study measuring the prediction impact on user performance. Appl Clin Inform. 2014;5(1):249-63. PubMed PMID: 24734137. Pubmed Central PMCID: PMC3974259. Epub 2014/04/16. eng.

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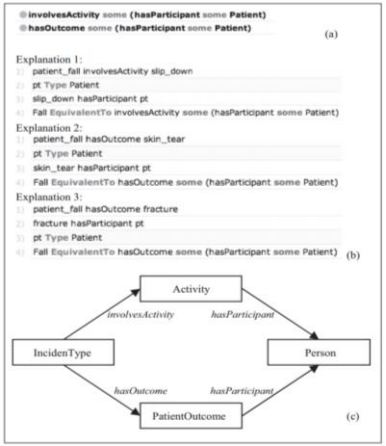
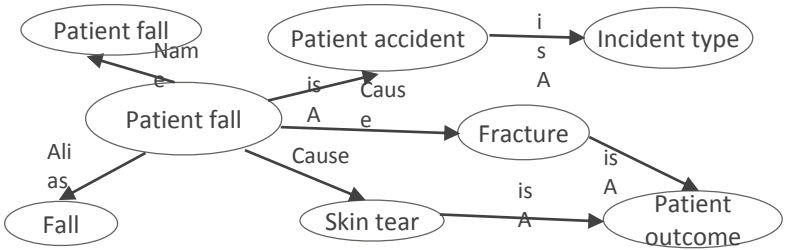
Managing PSE Knowledge

- Ontology
  - Interoperability among
    - home-grown systems
    - patient safety organization (PSO) systems
  - Data integration
    - organizing prevailing classifications
  - Decision making





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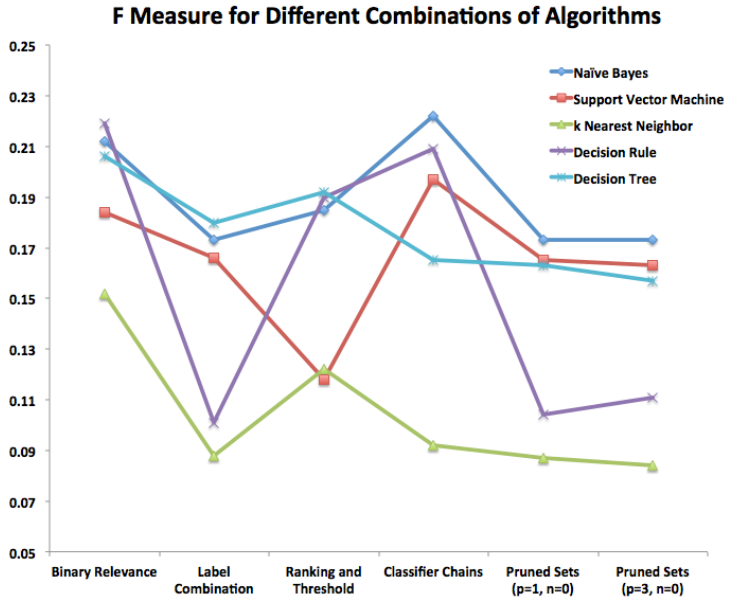
Classifying PSE Reports

- Identify multiple categories -- term frequency
  - Reveal details of complex cases
  - Reduce manual review workload
  - Detect systems failure



• Liang C, Gong Y. Predicting Harm Scores from Patient Safety Event Reports. Stud Health Technol Inform. 2017

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Knowledge Support

- Identify similar cases based on query
  - Web M&M (PSNet)
  - Patient Safety Organization (PSO) data
  - Data from home-grown system
- Provide solution and suggestion

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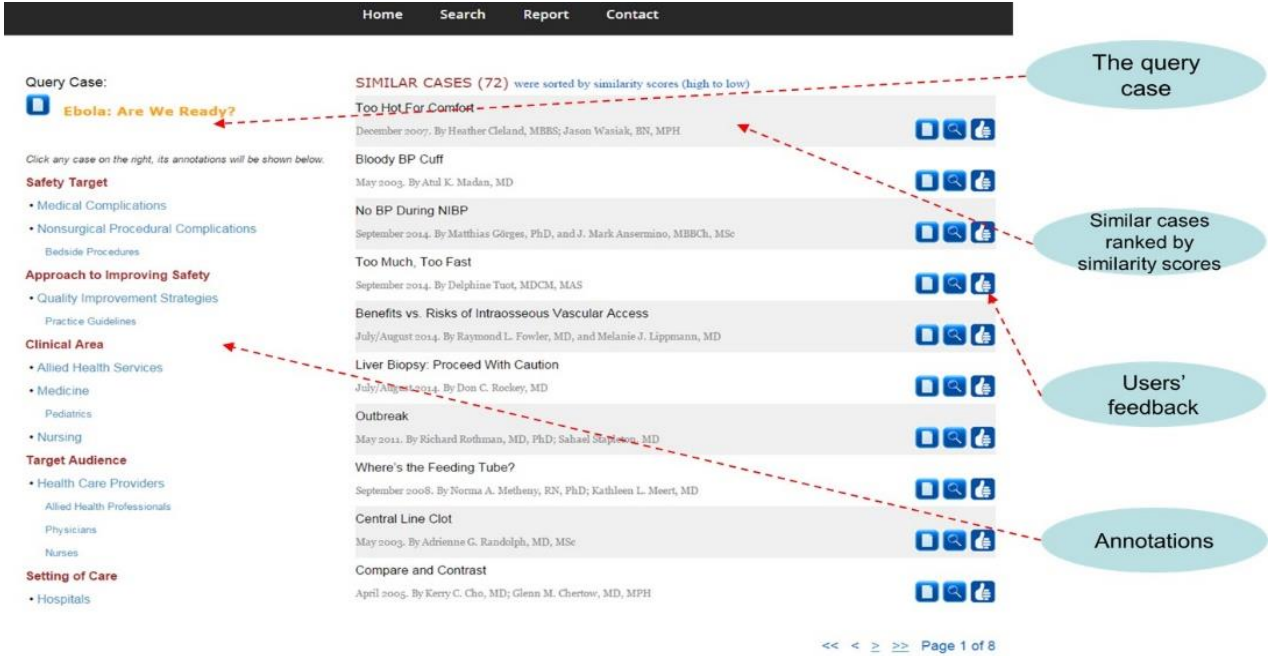
Prototype



• Kang H, Gong Y. Design of a User-Centered Voluntary Reporting System for Patient Safety Events. Stud Health Technol Inform. 2017

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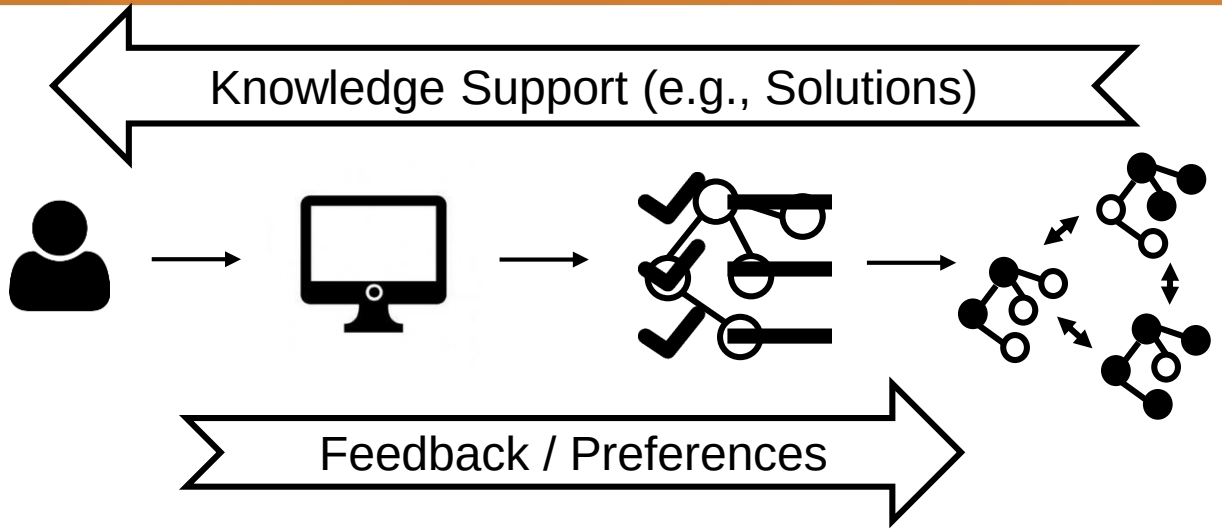
Innovative Design



Current Frames

- Reports are stored entry by entry
- Reporters learn nothing
- No feedback for systems

Proposed Frames

- Reports are annotated on the same feature tree
- Provide solutions for reporters
- The system can learn from user feedback and preferences

- Gong Y, Kang H, Wu X, Hua L. Enhancing Patient Safety Event Reporting. A Systematic Review of System Design Features. Appl Clin Inform. 2017 Aug 30;8(3):893-909. doi: 10.4338/ACI-2016-02-R-0023. PubMed PMID: 28853766.

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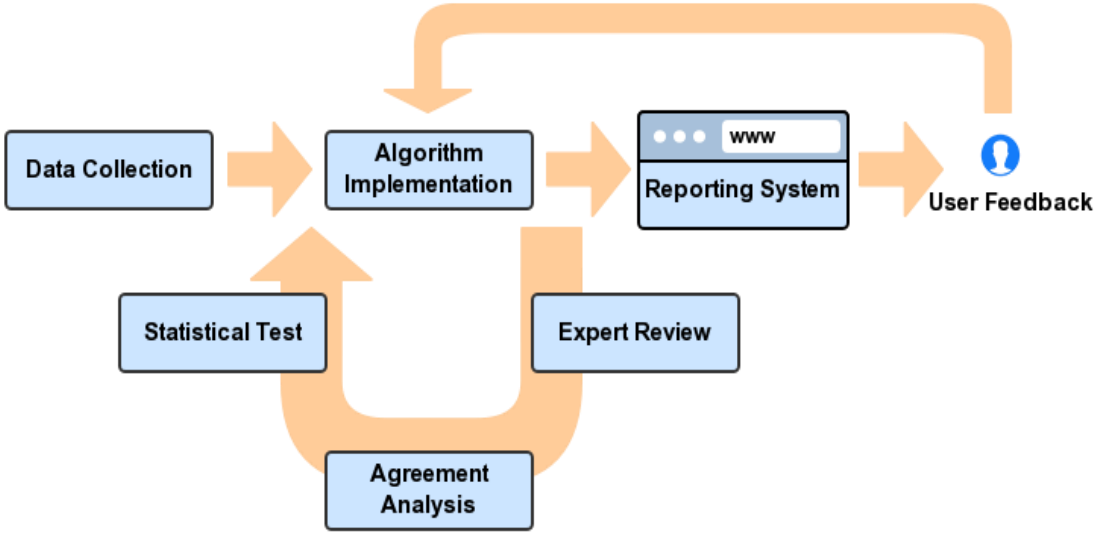
A New Workflow

- To improve data quality of PSE reporting system
  - Seven key modules:



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- Zhou S, Kang H, Gong Y. Toward Learning from Patient Fall Events Based on Kirkpatrick Model. Stud Health Technol Inform. 2017

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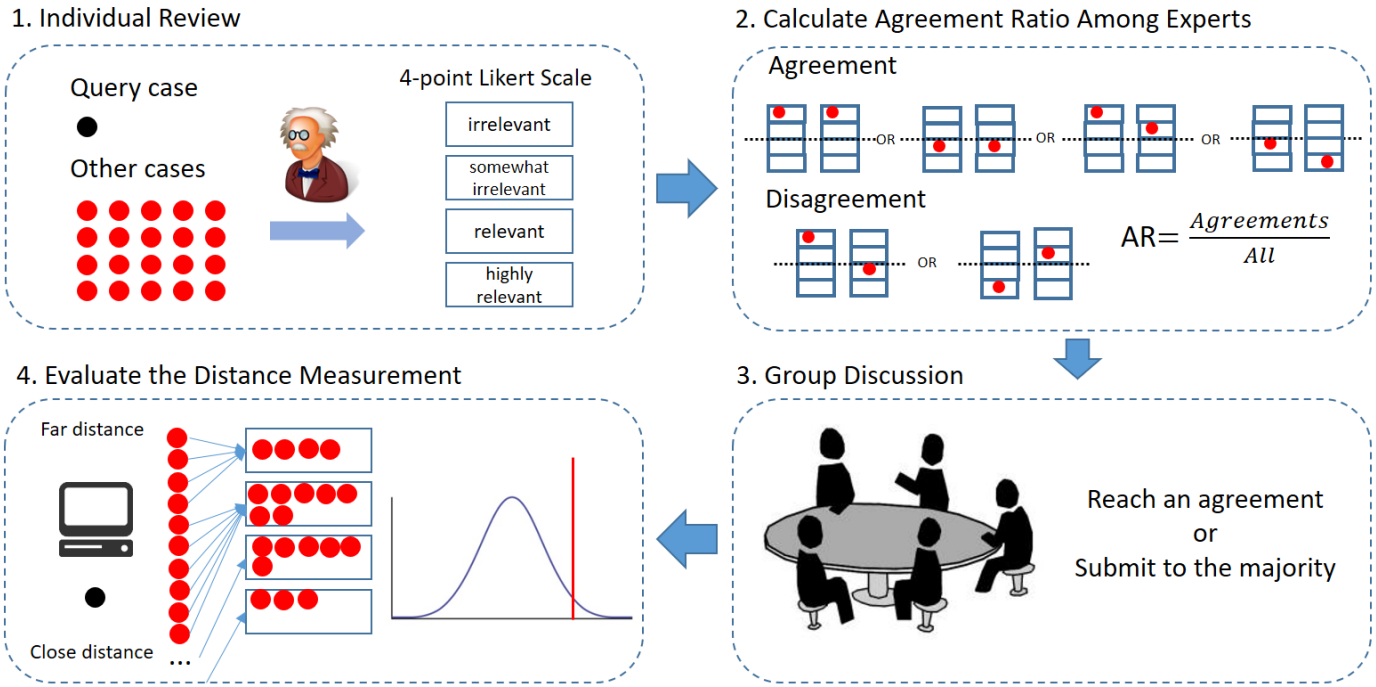
Identifying Relevant Cases



- Liang C, Gong Y. Automated Classification of Multi-labeled Patient Safety Reports: A Shift from Quantity to Quality Measure. Stud Health Technol Inform. 2017

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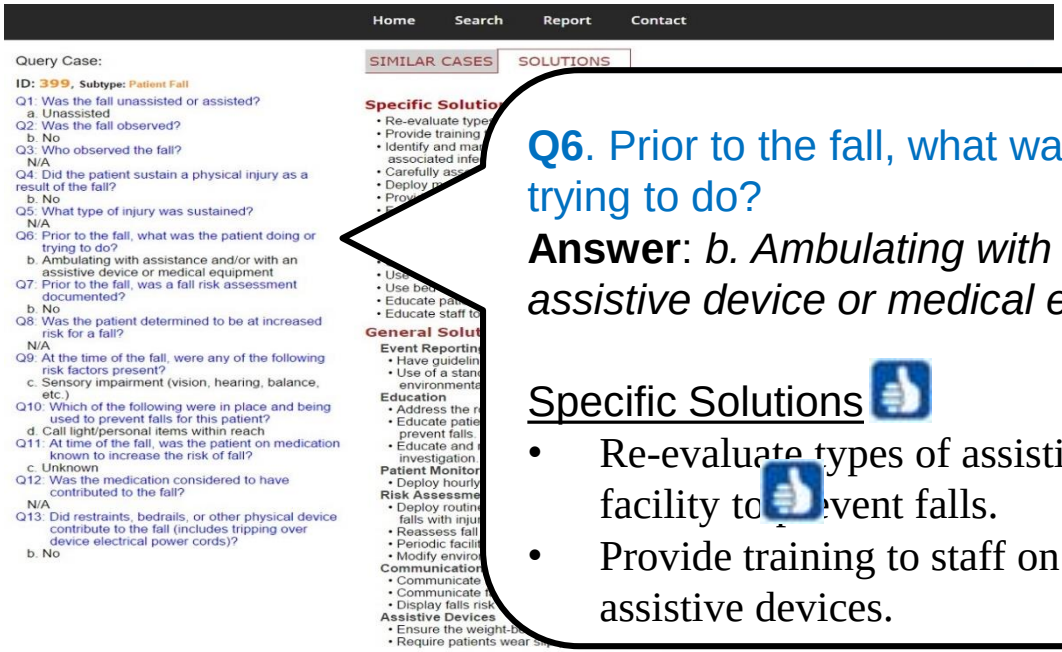
Providing Targeted Solutions



Q6. Prior to the fall, what was the patient doing or trying to do?

Answer: *b. Ambulating with assistance and/or with an assistive device or medical equipment.*

Specific Solutions

- Re-evaluate types of assistive devices used by the facility to prevent falls.
- Provide training to staff on the use and maintenance of assistive devices.

• Kang H, Gong Y. Design of a User-Centered Voluntary Reporting System for Patient Safety Events. Stud Health Technol Inform. 2017

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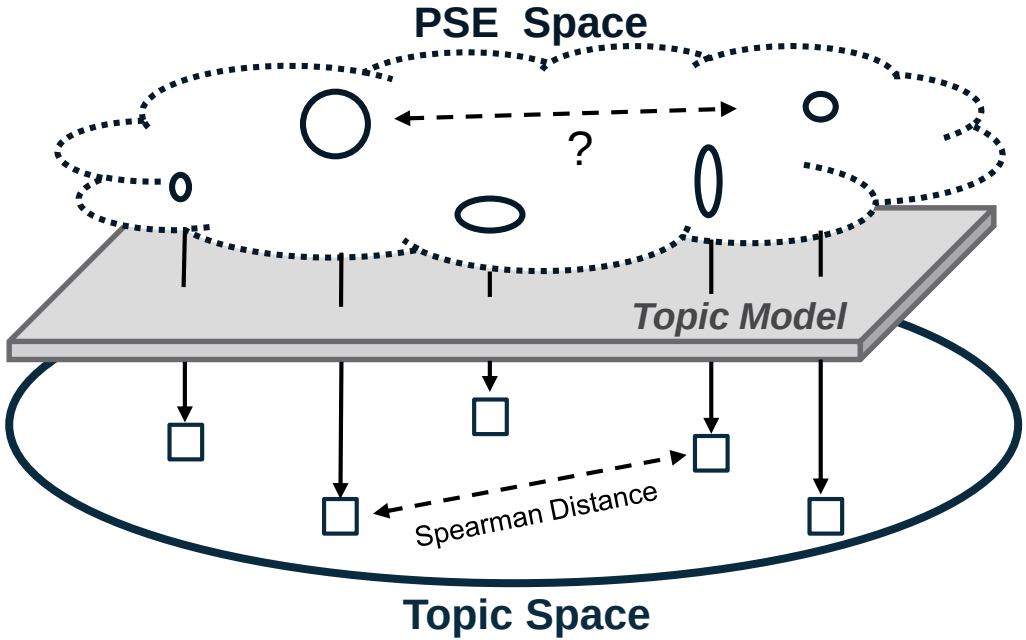
Exploring Event Connections



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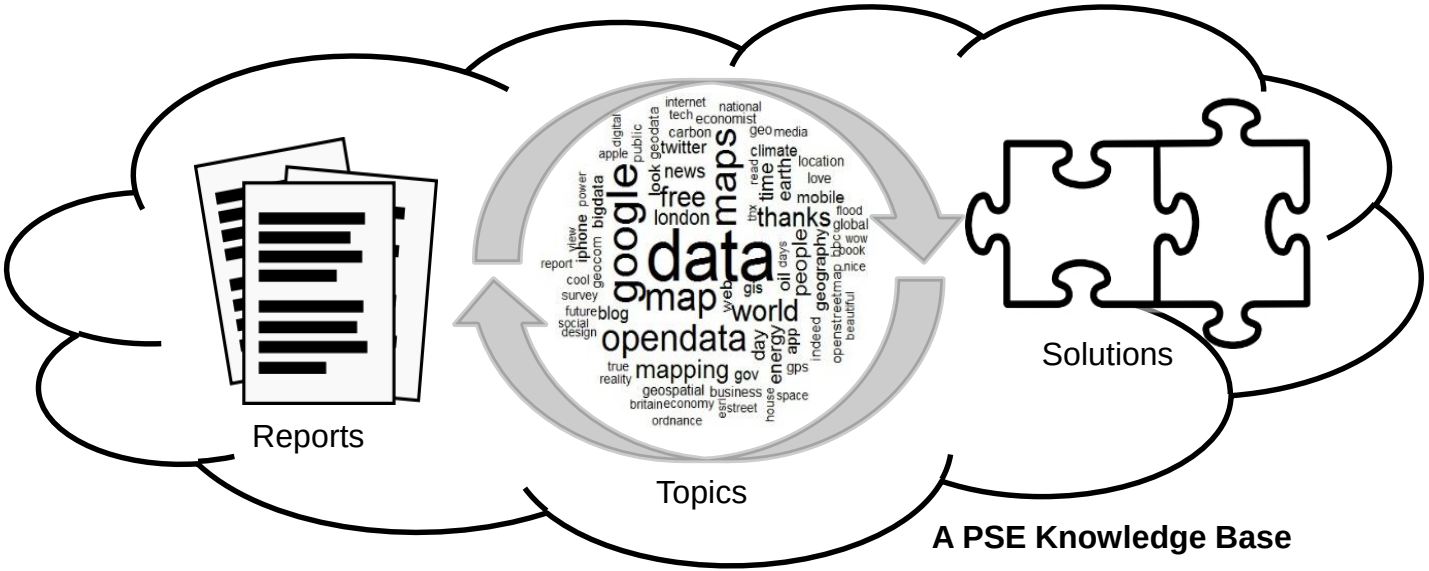
Developing a PSE Knowledge Base



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- Complete online session evaluation

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