NATIONAL INSTITUTE FOR HEALTH AND WELFARE

Patient record data and patient safety monitoring: reviewing the evidence on trigger tools

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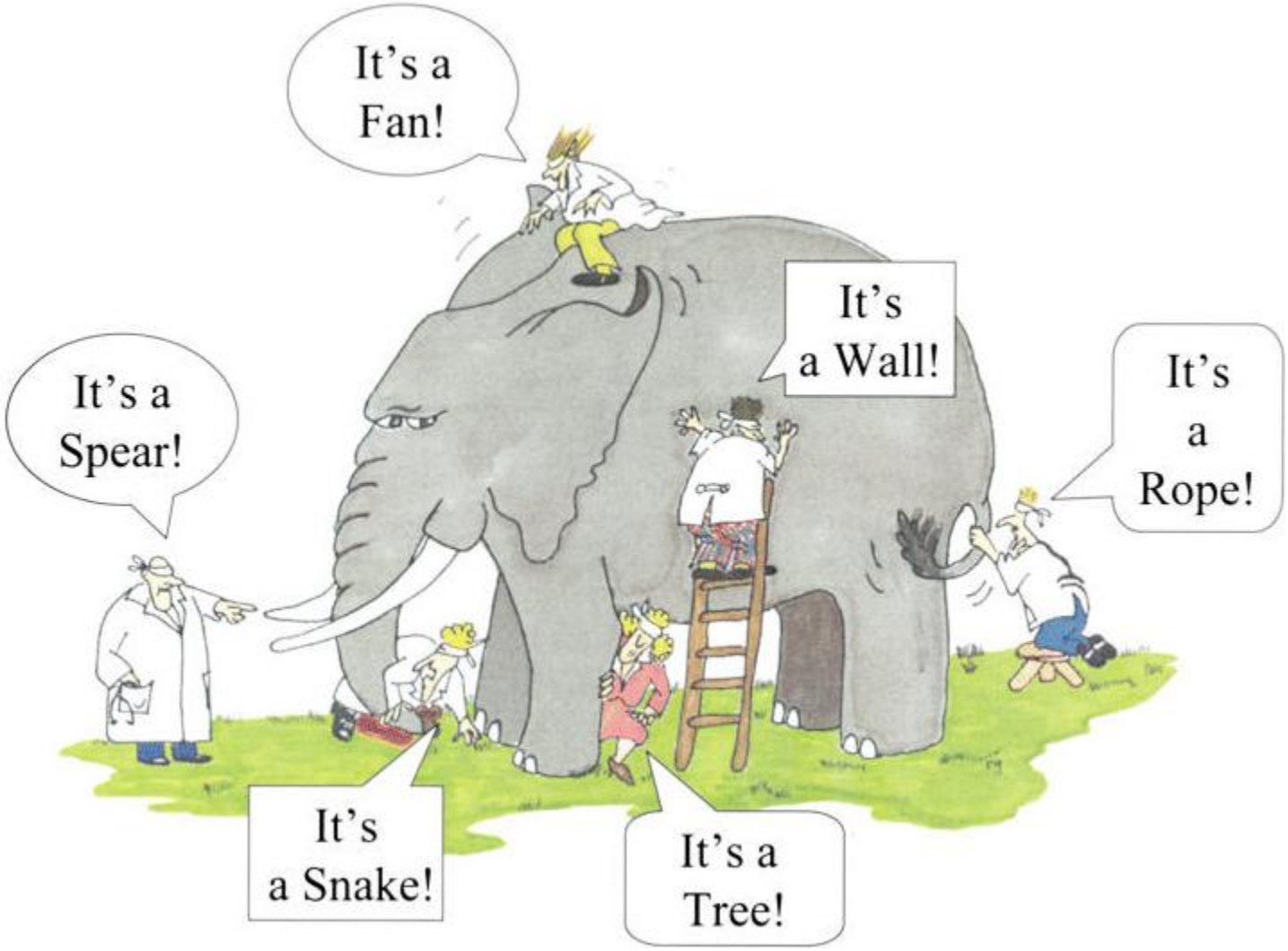
Understanding patient safety…



Global Trigger Tool

- a (paper-based) method developed by the IHI* in the US
- Structured review criteria (”triggers”) combined with specific training for review and implementation guidance – address reliability problems
- Emphasis: Patient HARM - Actual ADVERSE EVENTS; *not* errors or near-misses
- Purpose: means for following patient safety levels **within an organisation** over time, allowing **longitudinal comparisons** and **assessment of** patient safety **measures implemented**.
  Also, identify **target areas for improvement**.

* Institute for Healthcare Improvement

GTT – Development history

- Computerized versions of trigger tools (1990)

  Classen et al. Computerized surveillance of adverse drug events in hospital patients. JAMA 1991;266:2847-51
- Paper-based IHI trigger tool for ADEs (1999 – 2003)
- Various other trigger tools (primary care, surgery, pediatric, ICU) (2002-2006)
- **GTT: Development start 2004 – publication 2007**

FOCUS

- Address the shortcomings of full structured record review (according to Harvard Medical Practice study) and lack of computerized hospital environments

GTT: current status & trends

- Currently used in several national scale initiatives:
  - Medicare services (as part of combination of methods)
  - Scottish Patient Safety Programme
  - Nordic countries: Sweden, Norway, Denmark (pilot)
- Move towards cross-organisational comparisons, even though originally explicitly presented as not fit for the purpose
  - Prerequisites: standardization of measures; agreement on preventability
- Increased demand for & exploration of automation (eg. Kaiser Permanente, Swedish Patient Safety Initiative)

Background

- Nordic Ministers Council work on healthcare quality indicators

Partnership:

- Tampere University Hospital & National Institute for Health and Welfare (THL)

Two complementary objectives:

- Testing suitability and applicability of an adapted trigger tool for adverse events detection in neurosurgery and neurology patients through Electronic Patient Record (EPR) systems
- Exploring requirements and potential barriers for implementation of **automated trigger tools** through *structured* EPR systems in Finnish hospitals – **suitability** of the national **core data set**.

Methods

- **Literature review**
  - Phase 1: Focus on supporting the neurosurgery pilot and scoping the field
  - Phase 2: (Computerized) Trigger tools in OvidMedline- and EBM databases (6/2010)
    - Experiences and approaches used
    - Implementation requirements & success factors
    - Development needs for structured EPRs
  - Phase 3: Update (7/2011) & **analysis of the GTT evidence**
- **Minimum data set and trigger cross-tabulation** (GTT & Neurosurgery pilot triggers)
  - Assess the coverage of coded data for trigger identification
  - Identify development areas

GTT: What has been studied

- 8 studies, focusing on:
  - development and evaluation (1 study)
  - performance features (2 studies – focus on different types of reviewer teams)
  - comparisons with other methods (AHRQ Patient Safety Indicators and organisations' voluntary incident reporting systems – 2 studies)
  - examples of utilization either within or across large health systems or in national level programmes (3 studies).

How it has been studied

- Retrospective, cross-sectional studies of medical records of discharged patients.
- Adult acute and/or long term inpatient care in US hospitals (2-10 participating hospitals) – exception: one study in Thailand.
- Two-stage record review (lots of variations)
- Size sample: The number of records reviewed by the GTT method varied from 65 to about 2400.
- Duration of analysis period: one to six years (except Thailand: one month of hospitalizations)

Inter-rater Reliability

- Variable, depending on:
  - object of review (presence of an AE, severity, preventability)
  - type of reviewers compared (nurses vs. physicians, internal vs. external reviewer teams etc).
- Levels (*k* co-efficient) of agreement:
  moderate to substantial (0,40 -0,80)
  sometimes stronger agreement - internal reviewers in the study of Sharek et al.
  (Health Services Research 2011; 46(2):654-678)

Results reporting I

Measure	# of studies	Results
Adverse events per 1,000 patient days	4	41.6 - 91
Adverse events per 100 admissions	5	18,1 - 49
Percent of admissions with an adverse event	4	25 – 33.2

Results reporting II

Severity

- National Coordinating Council for Medication Error Reporting and Prevention (NCC MERP) classification.
- >50% of events assigned to category E (temporary harm to the patient that required intervention).

Preventability

- assessed in 3 studies – results published in 2
- subjective judgement of the physician reviewers and variations of a 4-level Likert scale
- 51.7% and 63.1% preventable injuries
  (last study not reported yet)

Resources for GTT implementation

- Review – IHI estimates:
  3 -4 hours of mid-level staff time for each reviewer
  about 30 minutes of physician time (per data point).

IN ADDITION:

- Modification or fitting of the method to local context
- Training
- Development, testing and validation of a tool for application in a previously unexplored clinical domain

Structured record review: the criticism

- Relies heavily on patient records, hence dependent on the **quality of documentation**. If adverse events are not documented properly, they will not be detected.
- Dependent on **trigger criteria**: only those adverse events are detected that result in one of the trigger criteria of the review method.
- **Interobserver variability** is very high, especially with regard to the judgements on causality and preventability. Generally moderate interobserver agreement scores (according to the *k* statistic).
- **Retrospective** method – no direct impact on patient care of those included
- **Resource intensive** – more suitable for research rather than management

GTT: the criticism

- Relatively new method (2003 -2007) – most of its assessment from developer team members (objectivity?)
- Limited evidence (8 studies until June 2011)
- Development phase: highly resource intensive (e.g.IHI medication tool: 86 hospitals, review of 2837 records)
- Reliability of reviewers: variable
- Validity and interpretation of the results
- **Preventability not assessed**
- Moderate resource savings (screening) – still need to review when triggers are found + additional resources needed (training, adaptation etc)

GTT: the strengths

- Large number of events detected compared to other detection methods
- Events which would have gone unnoticed by other standard methods

Bringing monitoring to the hospital level

Use of the GTT can **supplement** incident reporting and other interventions as:

- a way of understanding the **types of adverse events**;
- and following up **changes in adverse event levels** occurring in an organisation

Adding new features for learning

- Baylor Health Care System (BHCS) – an integrated healthcare delivery system in North Texas.
  Eight general acute care hospitals, two inpatient cardiovascular hospitals and two rehabilitation/long term acute care hospitals *(Good et al, 2011)*.
- BHCS developed fields to permit further characterisation of AEs to identify learning opportunities. A structured narrative description of each identified AE facilitated text mining to further characterise AEs.
- Swedish MAG – same feature through portal application
- Clear connection between the **assessment of preventability (as well as the description of adverse events)** and the use of the GTT for learning and improvement.

GTT Implementation advice the Nordic view

- Experiment with internal and external reviewers – former more reliable
- Reproducibility: good training, same team for over a year, suitable place to work, true to methodology, log of harm cases & discussions
- Plan who should have access to the results and how they will be disseminated
- Assistance by an experienced statistician (hotline at hospital or regional level) in the final processing of data
- Continuous national level development and validation, assessment in an international environment (proposed Nordic Cooperation on GTT)

Implementation cornerstones

- Ensure **Documentation/Data Quality** completeness, accuracy
- Agreement on the **core patient safety definitions** – particularly adverse events and preventability
- Alignment of **human and organisational factors**
  - Leadership commitment
  - Clinician involvement
- **Combine different methods** for patient monitoring to get a more comprehensive & accurate picture (e.g. voluntary reporting, trigger tools, registers)
- Think the **whole process cycle** of implementation & follow up: from development and training, to feedback for learning and action for improvement

Computerized trigger tools

Computerization of trigger tools

- View of IHI:
  - many triggers can be directly captured from IS, particularly medication and lab values (time saving)
  - preceded by record selection process
  - **some triggers not possible to automate - require review of progress notes**
- NOTE:
  Purpose is still the post-hoc assessment of harm incidence

Automation of the GTT

Sweden

- Semi-automated method based on data mining for identification of triggers – risk profile/selection & review remain manual
- Combination with incident report (description)
- Use in analysing cases of patient deaths (all cases in Karolinska 2008, subset Neurosurgery 2009)
- Follow-up of experiences from wide use of both the manual method and the automated tool (08/2011)

Kaiser Permanente

- Automation based on coded data – specific data fields
- Challenges: multiple locations of relevant data & local configurations

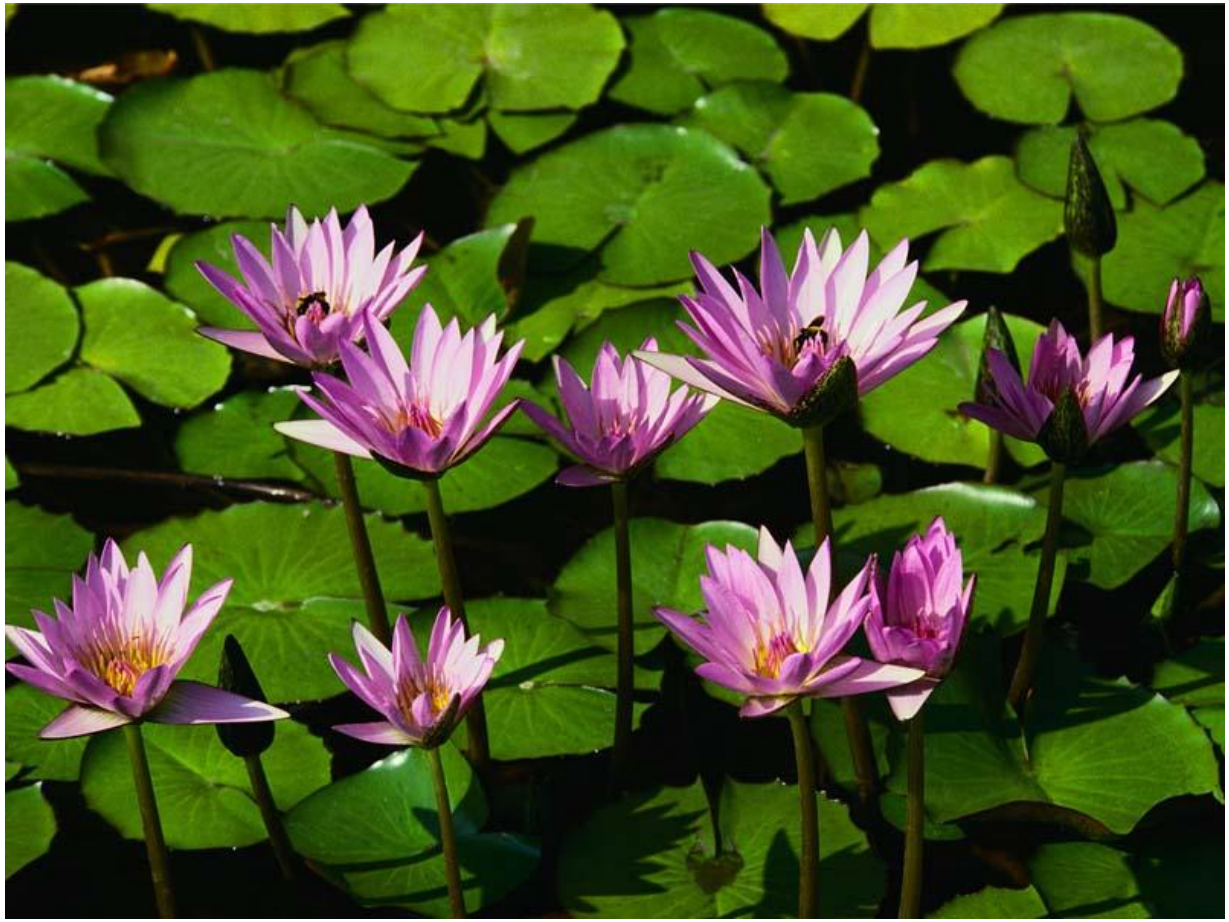
Computerized trigger tools: Findings

- Most computerized trigger implementations concern Adverse Drug Events
- Experiences in organisations with:
  - long tradition in ICT utilization
  - In-house development of tailored health-IT systems
- Critical success factors:
  - Simple & reliable access to relevant clinical data, ideally in coded form
  - Combination of data from disparate systems – data warehouse
  - Clinician involvement & relevance of system output
  - Commitment of clinical resources & institutional support to improve quality of care

Future target: Real-time systems

- Measurements through real-time surveillance provide an additional safety net allowing **intervention**
  - **DSS:** focus on **prevention**
  - **Retrospective surveillance/reporting**: **detection**
- Requirement: moving beyond manual reporting to **both electronic data analysis and automated tools for notification**
- **Coded data:** essential, but must be also available in real-time (not post-hoc)
- Verifying accuracy of the system is critical to avoid too many false alarms
- **Preventability** of AE challenging to determine

Thank you!



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