

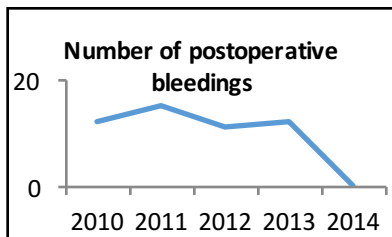
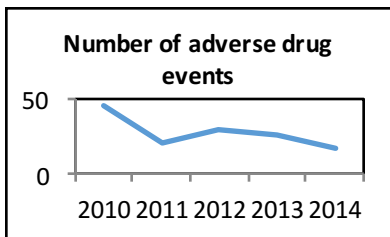


Measuring adverse events - for whom?

Kjersti Mevik, Tonje Hansen, Alexander Ringdal, Ellen Deilkås, Barthold Vonen

Why measure adverse events?

- Recognize and acknowledge
- Learn from the past
- Monitor the rate



How to measure adverse events?

- Voluntary incident reporting
- Quality indicators
- Record reviews
- ??

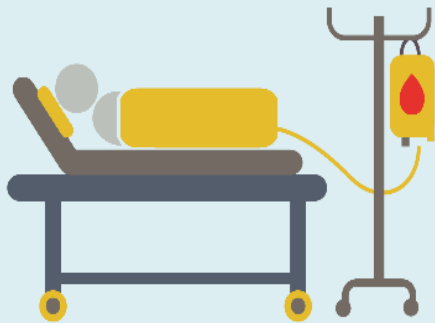


What about an automatic strategy?

- Health professionals are only humans, not infallible
- The technology would help us to perform better!
- Time saving
- Objective



HOSPITALISED PATIENT



CLINICAL DATA



SCREENING TOOL



IDENTIFYING ADVERSE EVENTS



What we did



First step

- Moving from manual to automatic

The Global Trigger Tool (GTT)

- **manually review** of record samples
 - two primary reviewers look for 57 “triggers” (or clues)
 - in-depth review of triggered records to decide if an adverse event* is present
 - maximum **20 minute per record per reviewer**
 - a **secondary reviewer** authenticates the findings



* *Unintended physical injury resulting from or contributed to by medical care that requires additional monitoring, treatment or hospitalization, or that results in death (Griffin and Resar, 2009).*

Triggers

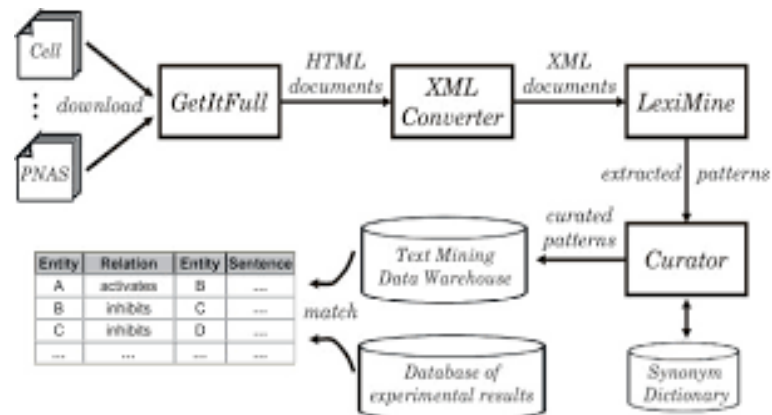
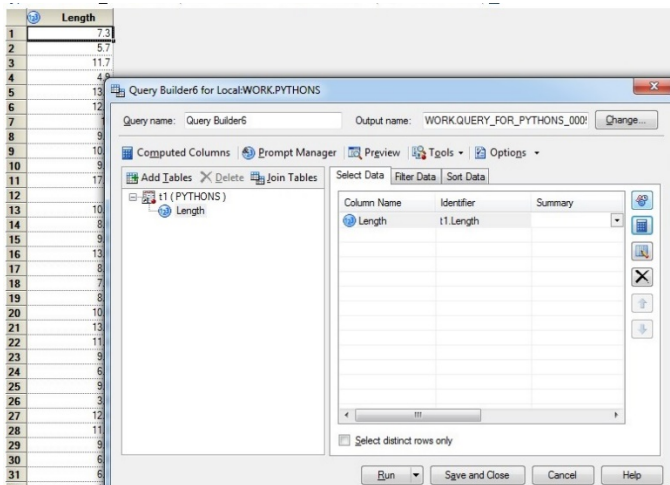
Care module Triggers	Medication Module Triggers
Transfusion or use of blood products	Clostridium difficile positive stool
Code/arrest/rapid response team	INR greater than 6
Acute dialysis	Glucose less than 2.8
Positive blood culture	Rising BUN or serum creatinine greater than 2 times baseline
X-ray or Doppler studies for emboli or DVT	Vitamin K administration
Decrease of greater than 25% in hemoglobin or hematocrit	Benadryl (Diphenhydramine) use
Patient fall	Romazicon (Flumazenil) use
Pressure ulcers	Naloxone (Narcan) use
Readmission within 30 days	Anti-emetic use
Restraint use	Over-sedation/hypotension
Healthcare-associated infection	Abrupt medication stop
In-hospital stroke	Other
Transfer to higher level of care	Intensive Care Module Triggers
Any procedure complication	Pneumonia onset
Other	Readmission to intensive care
	In-unit procedure
	Intubation/reintubation
Surgical Module Triggers	Perinatal Module Triggers
Return to surgery	Terbutaline use
Change in procedure	3rd- or 4th-degree lacerations
Admission to intensive care post-op	Platelet count less than 50,000
Intubation/reintubation/BiPap in PACU	Estimated blood loss > 500 ml (vaginal) or > 1,000 ml (C-section)
X-ray intra-op or in PACU	Specialty consult
Intra-op or post-op death	Oxytocic agents
Mechanical ventilation greater than 24 hours post-op	Instrumented delivery
Intra-op epinephrine, norepinephrine, naloxone, or romazicon	General anesthesia
Post-op troponin level greater than 40 ng/l	Apcar score <7 after 5 minute
Injury, repair, or removal of organ because of accidental injury	Induced labour
Change in anesthesia procedure	Emergency Department Module Triggers
Insertion of artery catheter or central venous catheter	Readmission to ED within 48 hours
Surgery more than 6 hours	Time in ED greater than 6 hours
Any operative complication	

What is automatic trigger identification?

- computerized algorithms:

- » Indexed variables-> queries

- » Free text-> text mining analysis



(e.g., differentially expressed genes A and D)

Examples of trigger algorithms

Trigger	Method	Codes/procedures	Text Mining Synonyms (examples)	Text mining Exclusion (examples)	Modeling technique
Transfusion or use of blood products	Procedure codes	REGG00 RPGG05 RTGG00	No	No	Structured
Patient fall	Text Mining og ICD-10 codes	W0n5	fall falls fall fell tumbles tumbled stumble stumbled	Anastomoses fell on place Blood pressure is falling	Combination

Triggertreff

Trigger	Funnet i	Dato	Kommentar	Slett
C1	...	12.03.2013 00:00	Indikasjonen [101] ble funnet.	✘
C1	...	12.03.2013 00:00	Indikasjonen [101] ble funnet.	✘
S1	...	13.03.2013 00:45	-	✘
C11	Epikrise - kode T81.4	15.03.2013 00:00	Pasienten pådrar seg en postoperativ dyp sårinfeksjon som må reopr. og beh med antibiotika	✘
C6	Lab.ark.	11.03.2013 00:00	Pasientens Hb-verdi reduseres fra 12.4 ved innkomst til 8.8 (30% red)	✘
M10	Medikamentkurven	09.03.2013 00:00		✘

Registrer skade

Grad	Type	Spesialitet	Skaden inntraff
E	1 - Allergisk	AK - Akuttmottak	innenfor avdeling

Deciding if an adverse event is present- still manual review

Registrer skade

Grad	Type	Spesialitet	Skaden inntraff
E	1 - Allergisk	AK - Akuttmottak	innenfor avdeling

Reports are easily made

NORLANDSSYKEHUSET NORLANDSSYKEHUSETS HELSE NORD

ASJ - Automatisert strukturert journalundersøkelse

Startside | **Trigger rapporter** | Skaderapporter | Driftsrapporter | Skaderegistrering

Skader siste 6 mnd

Antall innleggjelser med minst 1 skade pr 201304-1: **8** ▲

Antall skader pr 1000 liggedøgn pr 201304-1: **32,7** ▲

Skaderegistrering

Driftstatus

2013-09-30

Klart for registrering

Skadehistorikk

ASJ skadehistorikk Nordlandssykehuset.

Skadekategori	2012	2013
E	3	5
F	3	3

Triggerresultater

ASJ triggerliste for perioden 25.05.2012 til 25.05.2013. Nordlandssykehuset.

Done | Local intranet | 100% | 09:20

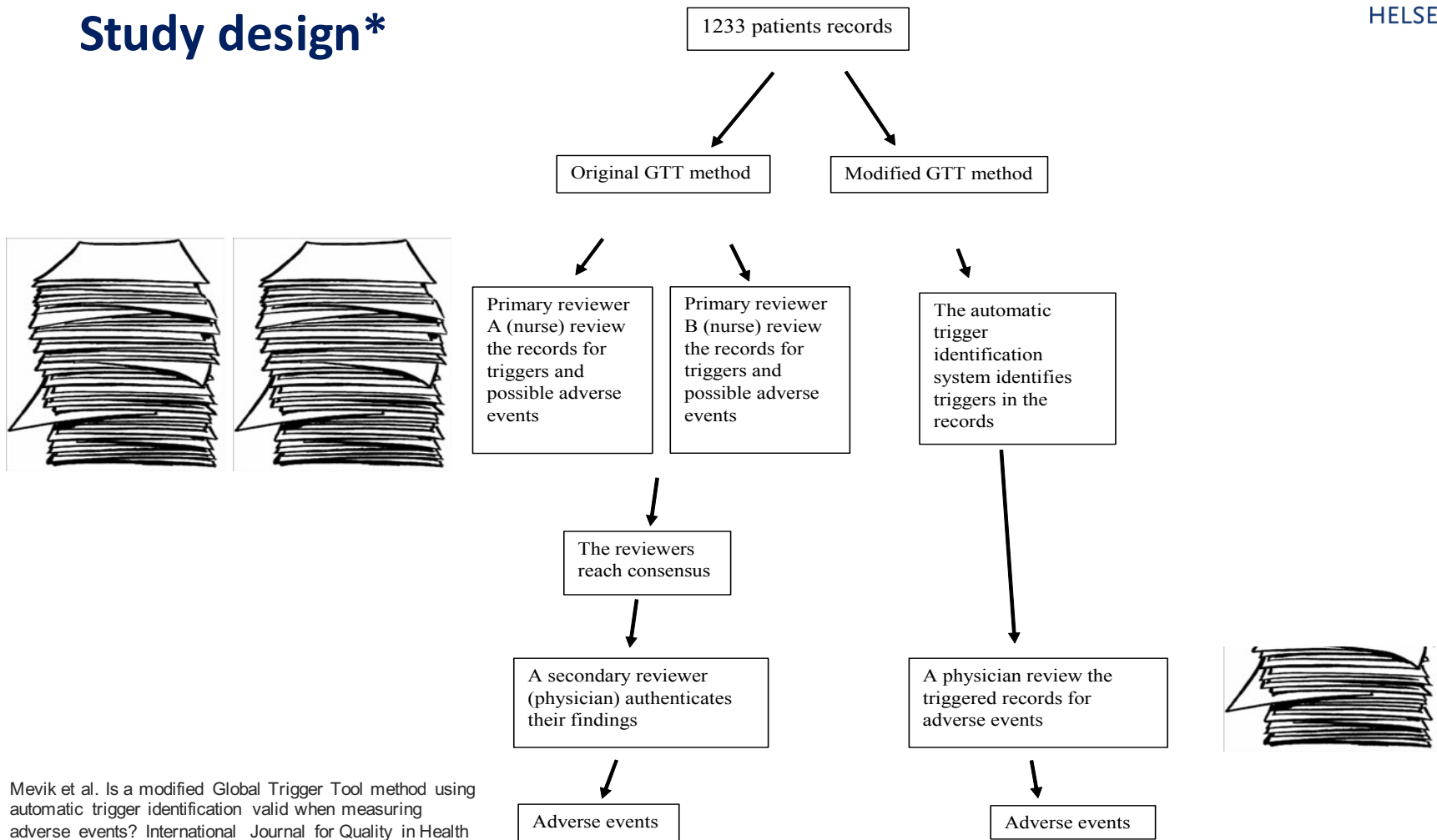
Limitations of the system

- Require documentations that will alert the system
- Expensive to install
- False positive/negative triggers

Second step

- Evaluating the automatic trigger system

Study design*



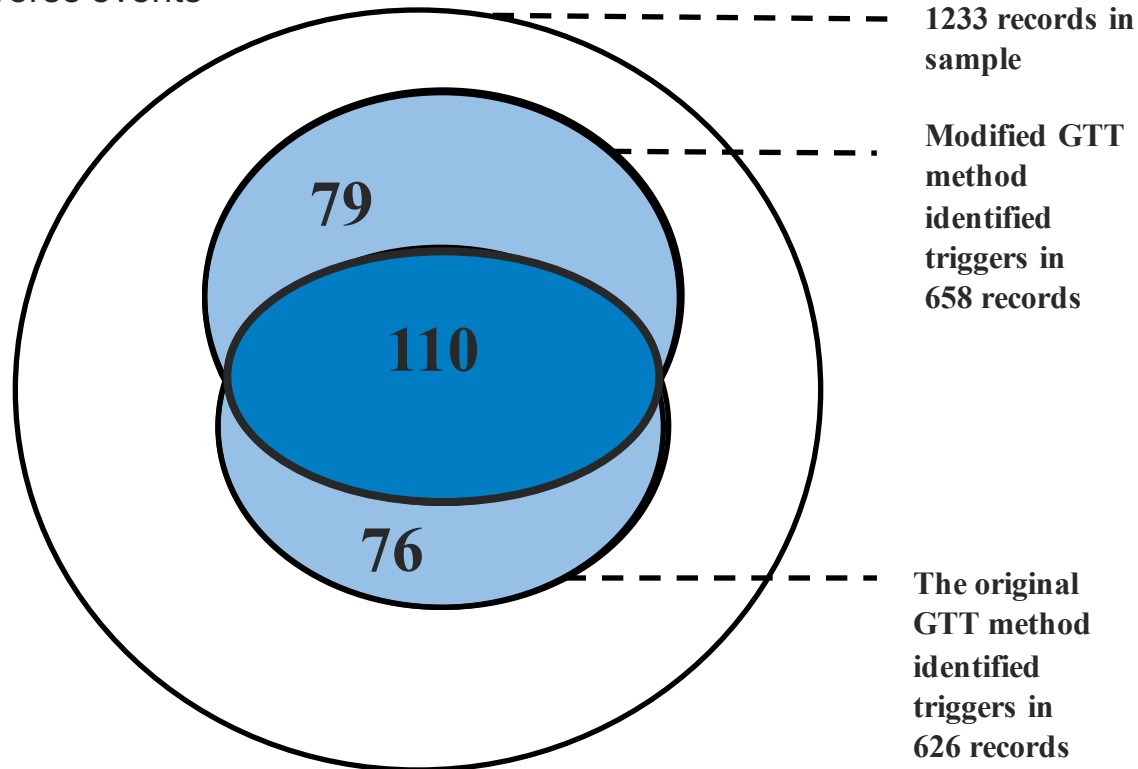
Mevik et al. Is a modified Global Trigger Tool method using automatic trigger identification valid when measuring adverse events? International Journal for Quality in Health Care. In press. 2018

Original GTT method vs modified GTT method

- No difference in number of triggered records (626 vs 658)
- No difference in number of adverse events (216 vs 214)
- Large difference in review time (411 vs 23 hours)

Venn diagram

110 common records with adverse events



Strengths

- «All» triggers are identified
- All patients records can be screened
- As good as the established method for measuring adverse events
- Time saving
- Total number – more reliable measurement

Next step



Options

- Include/exclude triggers
- Screen all records on daily basis
- Alert system
- Act upon the actual patient to prevent adverse events





Thank you
Takk
Tack
Kiitos
Dank
感謝