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Searching primary care records for predefined triggers may expose latent risks and adverse events

Paul Bowie, Lyn Halley, Jill Gillies, Neil Houston and Carl de Wet

Introduction

In the past decade, the 'global trigger tool' method has been implemented in many acute hospitals in the United Kingdom (UK) and worldwide to help estimate the prevalence of adverse events found in these settings using medical record reviews.^{1,2} As part of the nascent patient safety agenda in UK primary care, there is growing interest in this approach to measure and monitor harm rates found in electronic patient records.³ Related development work is ongoing across the UK home countries, although differences in purpose and practical application may be evolving.⁴⁻⁶

The global trigger tool is commonly associated with the Institute for Healthcare Improvement (IHI), a US-based organisation (www.ihl.org) with experience in providing technical advice to the NHS and other international health care systems on how to make specific areas of patient care safer. However, this consultancy work is mostly confined to acute hospital settings, while the global trigger tool is often a single intervention in a wider programme of improvement.

Despite the curious name, the global trigger tool does not necessarily score highly on the creativity index. At a basic level it involves the rapid, structured and focused review of medical records by clinicians trained in this task – perhaps the oldest form of clinical audit – so in this sense it could arguably be labeled more of a 'pseudo-innovation' than a novel concept.⁷ A 'trigger' is simply defined as an easily identifiable flag, occurrence or prompt in a patient's record that alerts reviewers to *potential* adverse events that had previously been undetected (see Box 1 for primary care examples).

The original purpose of the 'trigger tool' as applied in hospital-based care was to serially estimate 'rates of harm' found in small samples of ward based medical records. In this way external reviewers could 'objectively' determine and monitor harm rates across local hospital systems over time and inform clinical teams of progress. The potential disbenefits of this approach are a lack of 'sharp-end ownership' of these data which may hamper collective improvement efforts, while additionally there is no attempt to investigate why identified harm events occurred.²

From a primary care perspective, it is becoming clear that there may be major feasibility and statistical challenges to be overcome if this original measurement purpose is ever to become a frontline reality in this setting.⁸⁻⁹ However in one sense the focus on measuring harm rates in clinical settings is a distraction, as there are arguably greater risk management benefits to be gained from applying trigger review as a rapid method of audit and feedback.

In this article we describe how the trigger review process is evolving as part of the Health Foundation-funded Safety Improvement in Primary Care (SIPC) pilot programme in Scotland.¹⁰ We also share specific threats to patient safety uncovered by clinicians undertaking structured reviews of electronic patient records as part of the programme. By considering these threats, we believe primary care teams in the UK and internationally can rapidly and feasibly put this learning into practice to identify and mitigate the risks of harm to patients that are outlined.

Patient safety and primary care

The great majority of patient contacts take place in primary care.¹¹ High volume and ageing populations, new technology, powerful medications, imperfect systems, increasing clinical complexity and managing uncertainty are some of the factors which combine to intensify the risks of harm to patients in general practice.¹²⁻¹³ In the UK evidence of the key threats to patient safety in this setting is limited compared to acute hospital care, where most related improvement activity was – until recently – concentrated.¹⁴⁻¹⁵

Our restricted knowledge of what goes wrong and how this can impact on the safety of patient care is largely derived from multiple but methodologically limited information sources such as: complaints systems; feedback from patients; medico-legal cases; fitness-to-practice hearings; incident reporting systems; and significant event analyses.¹⁶⁻¹⁷ Taken together it is evident that patient safety is being compromised and perhaps not infrequently. In response, recent policy pronouncements¹⁰ and research initiatives¹⁸ have prioritised the need for concerted action to make primary care safer.

About the SIPC programme

From March 2013, SIPC has ambitions to become the first known programme to implement targeted safety improvements in primary care on a national basis. Its underlying

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Box 1 Examples of 'triggers' and their rationale⁸

Trigger	Description and rationale for use
1. Timing of consultation	>3 contacts with the practice in any given period Df a week (this can include telephone calls, consultations with nurse/GP or home visits)
2. Place of consultation	Any home visit, whether by the GP or by a nurse from the practice serves as a trigger
3. Frequency of consultation	>10 consultations for the period Df review (12 months)
4. Changes to medication	Has any "repeat medication" been added or cancelled in the period under review?
5. Adverse drug events/allergies	Has a new "read code" for allergy/adverse drug event been added to the record in the year under review?
6. New clinical read code	Has a high priority clinical "read code" been added to the record in the period under review?
7. Abnormal blood results	Specific abnormalities in U&E, LFT, INR and FBC levels served as a trigger
8. Out-of-hours and/or A&E	Attendance at either Df these services in the period under review served as a trigger
9. Hospital admission/discharge	Has the patient been admitted to a hospital for any intervention, management or procedure? The patient should have been admitted for at least one night
10. >1 outpatient appointments in last year	More than one outpatient appointment or hospitalised as a day-case during the period under review

A&E, accident and emergency department; FBC, full blood count; GP, general practitioner; INR, international normalised ratio; LFT, liver function test; U&E, urea and electrolytes.

methodology adheres to the short-term learning and action principles which characterize the IHI Breakthrough Collaborative Series.¹⁹ The Phase 1 pilot commenced in May 2010 with recruitment of 20 general practice (GP) teams in three regional health authorities, rising to around 40 practices currently. A key aim was to raise awareness of patient safety concepts and provide training in different improvement methods to selected GP team members at organised learning sets (usually a GP, a GP manager and GP Nurse). They then returned to frontline practice to share and implement this learning (during the action period phase) with further aims to reduce incidents of harm and improve the reliability of specific aspects of health care delivery. In Phase 1 patients with a diagnosis of heart failure or taking high risk medication (Methotrexate or Warfarin) were selected as the clinical focus for improvement efforts.

Structured review of electronic patient records

Currently safety incidents are reported by patients, identified directly by clinicians or highlighted by colleagues as part of routine practice (or are not highlighted at all for whatever reason). However some incident types cannot be detected so palpably. Systematically reviewing medical records for previously undetected incidents and threats can provide the GP team with a whole new perspective on patient safety.²⁰ It also offers valuable opportunities to take pre-emptive action before harm can occur or pinpoint learning needs where patients were found to be unintentionally but avoidably injured.

By adopting a more structured and methodical approach the trigger review process helps facilitate a quicker, targeted evaluation of the medical record – potentially offering greater cost-benefits than a full open record

review which can be time-consuming and cumbersome in comparison. In the SIPC programme, the trigger review process is one of five core interventions being implemented by participating GP teams alongside clinical care 'bundles' (to improve the reliability of evidence based care provision); Plan-Do-Study-Act (PDSA) cycles (to facilitate small, rapid improvements in care processes); safety climate assessment (to help teams build a team-based safety improvement culture); and capturing patient experience (to learn from patients about improving safety). Full details of the method suggested for screening electronic patient records (Figure 1) as part of the review process were recently published.⁸⁻⁹

At least two clinicians and an administrator from each participating GP team were trained in the trigger review method with follow-up advice and support provided at practice level. Each team applied the process on a minimum of 20 randomly chosen electronic records from a predefined practice population (e.g. patients on the heart failure register) on a quarterly basis for 12 months. Incident data and brief narrative descriptions were uploaded to a spreadsheet and reviewed by programme leaders (NH & JG) and the evaluation team (PB, LH & CdW). We jointly selected and agreed on a small core number of incidents that we judged to be highly important or indicative of recurring themes that would be of strong interest to others.

Threats to patient safety

The trigger review process helped to identify important risks to patient safety in medical records that may have remained undetected unless specific action was taken to screen for them (see Table 1). We readily acknowledge that most primary care clinicians will be acutely aware of the risks of harm associated with the threats that we highlight. However, it is arguably unlikely that many will have

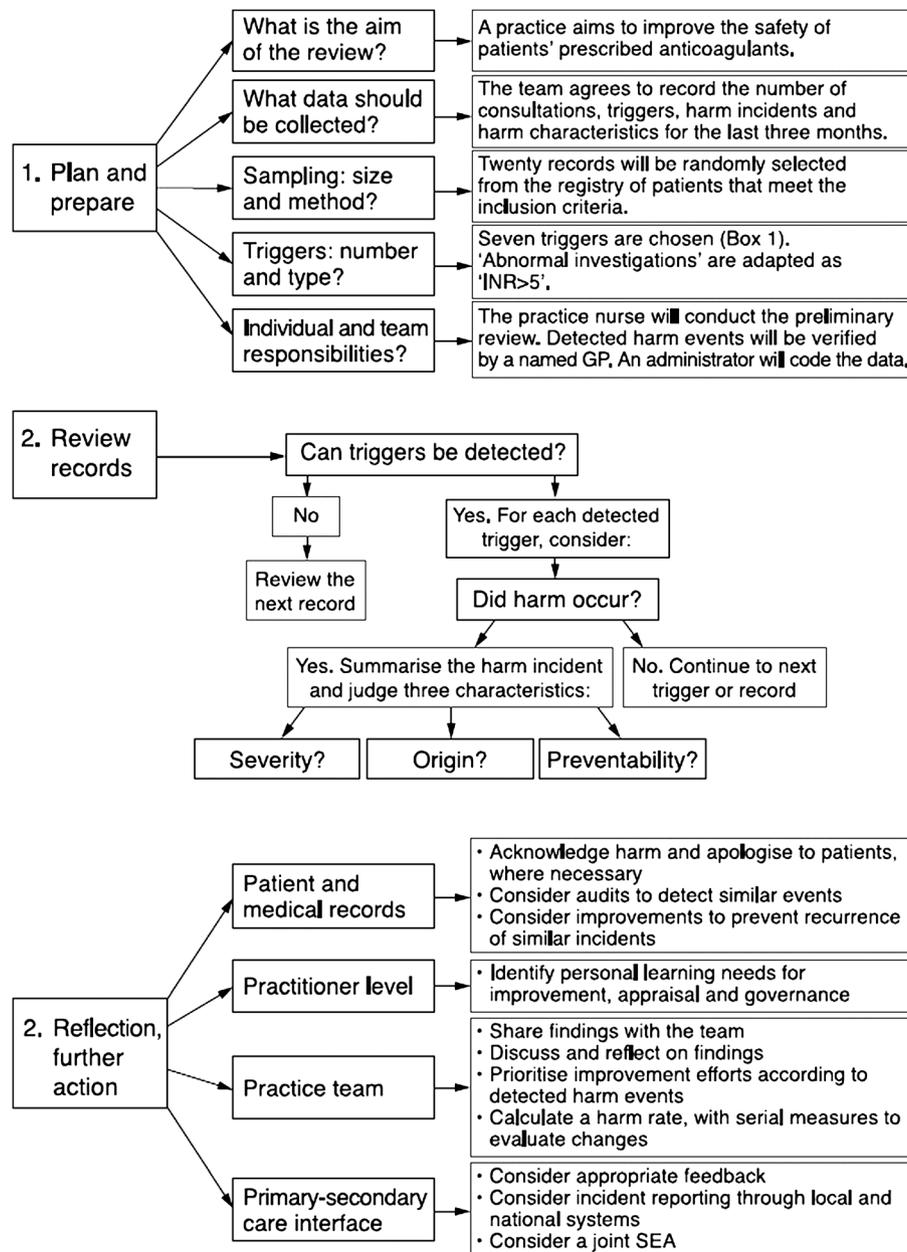


Figure 1 A trigger tool process for primary care⁹

considered the real possibility that evidence of these threats might currently reside in their own records, or that their local systems may be at significant risk.

Suggested recommendations

We believe it is possible that a significant proportion of general medical practices will find confirmatory evidence of at least one of the latent risks or undetected patient safety incidents that we highlight. The recommendations we outline in Table 1 to help mitigate these potential hazards can be implemented for the most part without additional training or resources using existing practice improvement

systems (e.g. significant event analyses, team briefings and meetings, medication reviews, chronic disease audits and routine clinic appointments).

Proactively screening for each incident risk is a relatively speedy task and potentially offers practice teams important learning opportunities to make patient care safer. We would suggest that GP teams choosing to implement some or all of the recommendations will find it practically feasible, highly relevant to the safety agenda and educationally beneficial. For those who are inexperienced in this domain, participation in this type of exercise may be a first step in openly acknowledging the patient safety problem and beginning the process of building a safety culture within their team and organisation.

Table 1 Selected safety incidents and threats identified by the trigger review process during the first 12-months of SIPC

Detected incidents	Implications and rationale for action	Possible harm reduction strategies
An elderly housebound patient was admitted to hospital with a fragility fracture after several accidental falls. Hypotension from multiple antihypertensive agents was implicated. She had not had contact with any practice team member for seven years previously.	Housebound patients are particularly vulnerable to harm e.g. through poly-pharmacy, multiple co-morbidities, social isolation and advanced age. ^{16,17}	Compile a register of housebound patients. Also consider annual face-to-face reviews by a clinician as minimum care
A patient was co-prescribed Morphine, Cocodamol and Dihydrocodeine without clinical justification.	Co-prescribing of analgesics is potentially unsafe e.g. increased frequency, severity and types of side effects. ¹⁸ Drug efficacy may be reduced.	Audit analgesic prescribing of patients receiving opiates.
A patient with rheumatoid arthritis presented with symptoms and signs suggestive of pneumonia. He required two courses of oral antibiotics and months to recover. Not discontinuing his Methotrexate may have contributed to the delayed recovery.	DMARDs suppress a patient's immune response to infections. Temporarily stopping it may lead to quicker resolution of infection.	Agree and implement a specific antibiotic policy for patients prescribed DMARDs in the practice.
A patient took her 'weekly dose' of Methotrexate over the course of the week, rather than on the same day.	Methotrexates dosing intervals and ambiguous drug administration directions have previously been identified as significant safety risks. ¹⁹	Check and document patient understanding of medication administration intervals during regular nurse-led review clinics. ²⁰
A patient prescribed Warfarin presented with symptomatic anaemia. His INR was therapeutic and had been checked regularly but his haemoglobin had not been checked during the previous three years.	Anticoagulants, including Warfarin, increase the risk of occult bleeding. Routine haemoglobin checks may alert teams timely.	Consider checking patients' prescribed anticoagulation blood count at least annually.
An elderly patient was co-prescribed Warfarin, Aspirin and Diclofenac. A gastro-protective agent was not offered or prescribed.	There is seldom clinical justification for co-prescribing Warfarin and NSAIDs. In selected patient groups gastro-protective drugs may help to reduce adverse incidents.	Audit patients prescribed Warfarin to check for co-prescribing of NSAIDs. Audit relevant patient groups and offer or prescribe regular gastro-protective treatment if indicated.
A patient presented with symptomatic atrial fibrillation after her Tildiem were discontinued. There was no record why, when or who stopped it and she did not know.	Continuity of care requires access to adequate documented information about clinical decision-making.	Remind all clinical team members periodically to record their rationale for changing medication in records and whether they informed patients.
A patient re-consulted with an allergic reaction to a prescribed antibiotic. Further review found similar incident years before that had not been coded.	Allergic drug reactions may be prevented through adequate warning systems and patient education. ²¹	Develop and implement a practice protocol to clearly and adequately document adverse drug events and monitor compliance.
A patient was admitted as a hospital emergency and found to have hyperkalaemia. Further review found that a blood sample two weeks before had been reported as haemolyzed but that the test had not been repeated.	Failure to act on investigation results is a perennial safety problem. ²²	Discuss your system for dealing with investigations. What additional fail safes could be put in place?

Spectrum of patient safety incidents

The evidence thus far suggests that the typology of safety incidents and latent risks uncovered by structured reviews of medical records tend to differ in general terms from those highlighted by complaints, significant event analyses, proto-incident reporting systems, medico-legal claims, feedback from patients and other methods. There appears to be limited crossover in how these incidents and potential risks come to the attention of the primary care team. If we are to take patient safety seriously in primary care then perhaps a linked multi-method strategy may be necessary to make more sense of the spectrum of safety-related incidents that can and do occur. For example, previously undetected incidents highlighted by record review might necessitate a

significant event analysis being undertaken by the care team to learn more about why this circumstance arose, or act as a necessary prompt to conduct a more orthodox criterion based audit study to quantify the extent of the initial problem highlighted.

Evidence is emerging from SIPC pilot implementation sites suggesting that some GPs much prefer the trigger review approach over SEA and are in favour of one technique replacing the other (Lyn Halley, Personal Communication). We may need to educate the primary care team about the full spectrum of patient safety incidents that can occur in routine practice if only to counter the false impression that structured record review is a 'magic bullet' in patient safety improvement terms.

Wider application of trigger review

Given that trigger review of records is a key part the Scottish Government's patient safety programme for primary care to be implemented nationally from March 2013, it makes sense that current GPs and future medical leaders have opportunities to learn about the technique and apply it in practice.

A core element of a planned pilot safety and improvement programmed for general practice specialty training (GPST) in the west of Scotland deanery is the expectation that GP trainees and their educational supervisors test out this approach to reviewing medical records to identify patient safety-related learning needs. The main aim of the pilot is to investigate the feasibility of applying the method in the specialty training environment and shed some light on the educational and improvement impact of such an approach. Similar pilot work is also planned around how trigger reviews can inform the GP appraisal system in Scotland.

Other than GP nurses, who have the same access to records as their medical colleagues, the potential for a structured review of records to be undertaken by other clinical groups (e.g. community pharmacists or community nurses) is predicated on the depth and completeness of the patient information contained in the records they hold and access. It is unclear whether there is enough information in the records to justify this type of audit approach.

Implementation challenges

A potential advantage of the trigger review approach in primary care compared to hospital settings is one of local ownership. In hospital care external reviewers (normally ward nurses or occasionally junior medical staff) are often deployed to measure and calculate rates of harm in the records under review using a proforma and 'tick box' method. Frontline hospital clinicians may lack ownership and a willingness to act on findings, while there is also concern about the robustness of the statistical method employed.^{21–22} Whereas in the SIPC process it is applied (internally) by clinical reviewers to identify and make judgements on incidents of preventable harm – our experiences suggests that accurate and reliable measurement is too complex, although others may disagree – providing an opportunity for them to engage in the activity and identify problems and improvement opportunities in their own setting. Paradoxically this goes beyond the complexities of measurement and may involve a greater degree of active reflection, cognitive input and team-working on the part of the primary care clinician – it may be more problematic to 'teach' this mindset than to instruct individuals on how to follow a tick-box protocol.

A number of other challenges are still to be resolved. Can 'any' GP or practice nurse conduct such a trigger review? Early indications are that this may not be the case, as there appears to be varying ability to link individual triggers identified (Box 1) with sub-optimal care found in the

record. In terms of training the relevant clinical workforce how do we build the necessary capability to achieve a critical mass? So far training has involved short awareness-raising sessions coupled with one-to-one teaching which is clearly not sustainable on the scale required. A short e-learning module and train-the-trainer course options are under consideration but these may not be sufficient either.

Similar to clinical audit and significant event analysis there will be variation in the standard of trigger reviews undertaken by clinicians. We may need to consider how best we can assess the quality of this activity and provide meaningful feedback. Also, if we assume that this approach is a valuable patient safety intervention, we need to research the benefit (if any) of 'structured review' compared to simply asking GPs and others to 'openly review' electronic patient records without the use of predefined 'high yield' triggers. Finally, it is currently unclear but important to know what the opportunity cost and added value would be in terms of participating in this process compared with other patient-safety related activities.

Conclusions

As the trigger review process is adapted and further refined it is clearly evolving from its original 'measurement' purpose to a less contentious and potentially more informative method of identifying patient safety-related learning needs for the primary care team. Our early programme findings suggest that the review process is uncovering largely known but undetected adverse events and latent risks that are of high relevance to GP teams in the UK and elsewhere.

We acknowledge that our descriptive list of incidents and recommended actions is a limited technical device which only provides a potential means to discover these possible risks and adverse events, rather than offering concrete solutions to the issues identified. It is vitally important to recognise that successfully reducing some or all of the established risks goes well beyond unearthing local evidence that they exist, and will be heavily dependent on overcoming many of the socio-cultural barriers to learning and improvement prevalent in general practice and wider primary care.²³

References

- 1 Griffin FA, Resar RK. IHI Global Trigger Tool for measuring adverse events. IHI Innovation Series. Cambridge (MA): Institute for Healthcare Improvement, 2007
- 2 Good VS, Saldana M, Gilder R, Nicewander D, Kennedy DA. Large-scale deployment of the Global Trigger Tool across a large hospital system: refinements for the characterisation of adverse events to support patient safety learning opportunities. *BMJ Qual Saf* 2011;20:25–30
- 3 The Scottish Government. Delivering quality in primary care national action plan: implementing the Healthcare Quality Strategy for NHS Scotland. The Scottish Government, Edinburgh 2010:1–18
- 4 National Patient Safety Agency. Seven Steps to Patient Safety in Primary Care: The full reference guide. NPSA, London (2006)

- 5 NHS Institute for Innovation and Improvement. The Primary Care Trigger Tool http://www.institute.nhs.uk/safer_care/primary_care_2/background.html accessed 27th November 2011
- 6 Good Practice Wales. The Development of a Global Trigger Tool for Primary Care <http://www.goodpracticewales.com/Article.aspx?ArticleID=20456> accessed 27th November 2011
- 7 Walshe K. Pseudoinnovation: the development and spread of healthcare quality improvement methodologies. *Int J Qual Health Care* (2009) 21 (3):153–159
- 8 de Wet C, Bowie P. A preliminary study to develop and test a global trigger tool to identify undetected error and patient harm in primary care records. *Postgraduate Medical Journal* 2009;85:176–180
- 9 de Wet C, Bowie P. Screening electronic patient records to detect preventable harm: a trigger tool for primary care. *Quality in Primary Care* 2011;19(2):115–125
- 10 Healthcare Improvement Scotland. Patient Safety in Primary Care. 2011; Available at: http://www.healthcareimprovementscotland.org/programmes/patient_safety/patient_safety_in_primary_care.aspx, Accessed 7th September 2011
- 11 Hippisley-Cox J, Fenty J, Heaps M. Trends in consultation rates in general practice 1995 to 2006: Analysis of the QRESEARCH database. 2007;1:1–29
- 12 Kostopoulou O, Delaney BC, Munro CW. Diagnostic difficulty and error in primary care—a systematic review. *Fam Pract* 2008 Dec;25(6):400–413
- 13 Sturmberg JP. Systems and complexity thinking in general practice: part 1 – clinical application. *Aust Fam Physician* 2007 Mar;36(3):170–173
- 14 Sandars J, Esmail A. The frequency and nature of medical error in primary care: understanding the diversity across studies. *Fam Pract* 2003 Jun;20(3):231–236
- 15 Vincent C. *Patient Safety*. Edinburgh: Elsevier Churchill Livingstone; 2006
- 16 Wetzels R, Wolters R, van Weel C, Wensing M. Mix of methods is needed to identify adverse events in general practice: a prospective observational study. *BMC Fam Pract* 2008;9:35
- 17 Thomas EJ, Petersen LA. Measuring errors and adverse events in health care. *J Gen Intern Med* 2003 Jan;18(1):61–67
- 18 LINNEAUS Euro-PC. Learning from international networks about errors and understanding safety in primary care. 2011; Available at: <http://www.linneaus-pc.eu/>. Accessed 7th September 2011
- 19 Institute for Healthcare Improvement. The Breakthrough Series: IHI's Collaborative Model for Achieving Breakthrough Improvement. IHI Innovation Series white paper 2003
- 20 Woloshynowych M, Neale G, Vincent C. Case record review of adverse events: a new approach. *Quality & Safety in Health Care* 2003 Dec;12(6):411–415
- 21 Benning A, Ghaleb M, Suokas A, et al., Large scale organisational intervention to improve patient safety in four UK hospitals: mixed method evaluation. *BMJ* 2011;342:d195
- 22 Benn J, Burnett S, Parand A, et al., Studying large-scale programmes to improve patient safety in whole care systems: challenges for research. *Soc Sci Med* 2009;69:1767–76
- 23 Bosk CL, Dixon-Woods M, Goeschel CA, Pronovost PJ. The art of medicine: reality check for checklists. *The Lancet* 2009;374:444–445

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