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International Journal for Quality in Health Care, 2016, 28(6), 640–649
doi: 10.1093/intqhc/mzw115
Advance Access Publication Date: 24 September 2016
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The application of the Global Trigger Tool: a systematic review

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Accepted 30 August 2016

Abstract

Purpose: This study describes the use of, and modifications and additions made to, the Global Trigger Tool (GTT) since its first release in 2003, and summarizes its findings with respect to counting and characterizing adverse events (AEs).
Data sources: Peer-reviewed literature up to 31st December 2014.
Study selection: A systematic review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses statement.
Data extraction: Two authors extracted and compiled the demographics, methodologies and results of the selected studies.
Results of data synthesis: Of the 48 studies meeting the eligibility criteria, 44 collected data from inpatient medical records and four from general practice records. Studies were undertaken in 16 countries. Over half did not follow the standard GTT protocol regarding the number of reviewers used. 'Acts of omission' were included in one quarter of studies. Incident reporting detected between 2% and 8% of AEs that were detected with the GTT. Rates of AEs varied in general inpatient studies between 7% and 40%. Infections, problems with surgical procedures and medication were the most common incident types.
Conclusion: The GTT is a flexible tool used in a range of settings with varied applications. Substantial differences in AE rates were evident across studies, most likely associated with methodological differences and disparate reviewer interpretations. AE rates should not be compared between institutions or studies. Recommendations include adding 'omission' AEs, using preventability scores for priority setting, and re-framing the GTT's purpose to understand and characterize AEs rather than just counting them.

Key words: Global Trigger Tool, patient safety, quality of care, adverse events, systematic review

Introduction

The study of patient safety has been a policy priority since the publication of national reports [1–3] drawing attention to high rates of healthcare-associated harm [4–7]. Methods for measuring and characterizing patient safety have also attracted attention as health services, governments and researchers seek to make progress in tackling harm. These include incident reporting [8, 9], medical record review (MRR) [4], observational and ethnographic studies [10, 11], patient-experience surveys [12], routine collection of safety metrics [13] and automated data extraction from electronic medical records [14].

Two-stage MRRs were designed to provide data on the frequency and types of adverse events (AEs) [15]. The most frequently used are the 'Harvard method' (HM) [4, 5, 16, 17] and the Global Trigger Tool (GTT) [18–20]. The HM definition has a more restrictive threshold of AEs: '… result(ing) in prolongation of hospital stay, temporary or permanent disability or death' [5] compared to the GTT definition: 'additional monitoring, treatment, or hospitalization, or that results in death' [20]. Both the GTT and the HM involve a Stage 1 screening process for the presence of criteria (HM) or triggers (GTT), followed by a more in-depth manual review of the medical record for the presence of an AE (Stage 2). After AEs have been detected with the GTT, their rates may be calculated and displayed graphically over time [20]. The GTT aims to 'provide an easy-to-use method for accurately identifying AEs (harm) and measuring the rate of AEs over time' [20]. The GTT is often used as an adjunct to incident reporting to reduce the number of AEs that are undetected [20]. It can be used by teams and senior leadership to prioritize resource allocation to the most frequent or harmful AEs, thereby optimizing the impact of patient safety initiatives and to monitor improvements over time [20]. It was originally developed for adult inpatients, but has been modified for hospital specialties [21–28] and primary care [29–31].

Researchers are using the GTT for its original purpose of measuring AEs at an organizational or other level to assess the rate of harm, to assess its utility and reliability, or to compare its results with other AE data sources. Researchers are also applying a number of modifications and additions to the standard GTT such as the number of reviewers used and data fields collected. These changes are for presumably pragmatic reasons and reflect the GTT's flexibility.

We aim to describe the reasons for using the GTT, type of specialties where it is being used, and the modifications and additions to the standard GTT protocol. Additionally, we will summarize the findings with respect to counting and characterizing AEs.

Data sources

A systematic review and narrative synthesis was conducted in adherence to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement [32]. We searched MEDLINE, EMBASE and CINAHL for articles up to and including December 2014, using the search term 'Global Trigger Tool'. We also hand-searched the key journals *BMJ Quality and Safety* and the *International Journal for Quality in Health Care*. Figure 1 depicts the search strategy.

Study selection

Included were studies, published in English, which collected data (from MRR) using a variant of the GTT (including two studies that used a blended GTT–HM approach) [21, 25]. Studies using an automated process to detect triggers were excluded because a systematic review has previously been undertaken [33]. In total, 48 studies met the inclusion criteria.

Data extraction

Table 1 provides the research questions for this study, organized by categories, and a summary of the GTT protocol instructions [20]. Two authors (P.D.H., C.J.M.) extracted and compiled the study demographics, methodology and results data.

An additional research question ('what were the reasons for undertaking the study?') was also posed. These reasons were iteratively developed from reviewing the studies. For the research questions in Table 1 relating to GTT 'Methodology—sampling' and 'Methodology—data collection and analysis', we reported our findings for all 48 studies and, where appropriate, for those with the reason of measuring AE rates to assess the rate of harm (the 'AE measurement' studies).

Risk of bias in individual studies

Critical appraisal of the included studies and meta-analysis of the AE rates across studies were not undertaken due to methodological heterogeneity, including the disparate methods of using the GTT and recognition by the GTT protocol that reviewer skills will vary between organizations [20]. Despite our review being focused on the application of a tool, rather than success of an intervention, it may still be possible that publication bias affected the results of this study. For example, research that used the GTT methodology that yielded low levels of AEs, may be less likely to get published than reports of higher AE levels.

Results of data synthesis

Just over one-half (26/48, 54%) (Supplementary Table A.1) of studies cited measuring the AE rate as a reason for undertaking the research. Assessing the utility of the GTT as a measurement tool was the second most frequently cited reason (17/48, 35%). Characterizing AEs (for example using incident types, preventability, or severity) was the next most common reason (15/48, 31%), however 14/15 of these studies were also AE measurement studies. Three of the five cited reasons for undertaking the studies were related to methodological issues—assessing the GTT's utility, developing GTT specialty versions (12/48, 25%) and comparing the GTT with other AE data sources (9/48, 19%).

Demographics and methodology—sampling

The 48 studies had been conducted in 16 countries with 18 (38%) in the USA (Table 2, Supplementary Table A.2). Most (44/48, 92%) had been undertaken in hospitals with four (8%) in general practice (GP) (Table 2, Supplementary Table A.2). Adverse drug events (ADEs) only were collected in nine studies in various specialties [35–43]. Of the hospital-based studies, over half were undertaken in a single institution (24/44, 55%) (Table 2, Supplementary Table A.2). The 44 hospital studies reviewed 76 617 records, while the GP studies reviewed 2387 records.

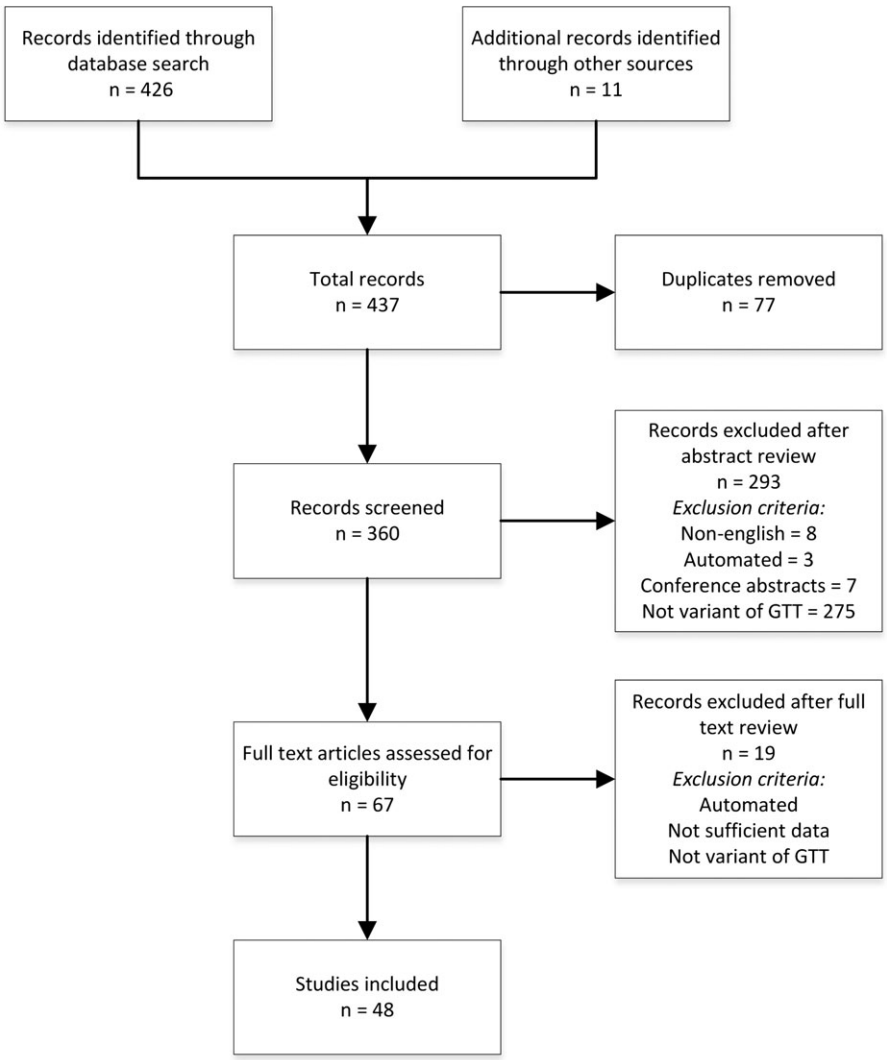


Figure 1 Systematic review process. Screened by two authors (PDH, CJM).

Sample size

One quarter (12/48, 25%) of the studies and a similar proportion of the AE measurement studies (7/26, 26%) used the GTT sampling methodology of reviewing 10 records every 2 weeks or 20 per month. The number of records reviewed in the 44 hospital-based studies ranged from 50 to 17 295 with a median of 574 and a mean of 1741 (Supplementary Table A.2). In the four GP studies, sample sizes ranged from 170 to 1289 records (mean 597) (Supplementary Table A.2), and 637 to 4117 consultations (reported for three GP studies; mean 2335).

Methodology—data collection and analysis

Definition of AE

The GTT protocol's AE definition was used in 13/48 studies (27%), and a further three (6%) used a modified version. A similar proportion of AE measurement studies (10/26, 38%) used either the GTT definition or a modification. Nine studies (19%) used the HM definition or a modified version of it; 14 (29%) used their own definition or a definition from another source. Nine studies (19%) reported no explicit definition; but a number of these stated they were using GTT methodology. Acts of omission were included in one quarter (12/48, 25%) of studies [24, 25, 28, 36, 38, 47, 49, 55–59] and 5/26 (19%) of the AE measurement studies.

Number of reviewers

The GTT protocol recommends assignment of two primary reviewers and one authenticating physician [20]. Just over one quarter of studies (13/48, 27%) (Supplementary Table A.3) and AE measurement studies (7/26, 27%) used this method. The most frequently used other method was one primary and one secondary reviewer (8/48, 17%). In nearly one quarter of studies (11/48, 23%), the method was not explicitly described.

Inter-rater reliability

Just under half of the studies (22/48, 46%) and AE measurement studies (11/26, 42%) measured inter-rater reliability (IRR) between reviewers, using either Kappa (k) scores or per cent (%) agreement. Detailed results of IRR reporting are outlined in Supplementary Tables A.4–A.7.

Table 1 Systematic review research questions and GTT protocol instructions

Research question category	Research questions	Equivalent instructions from the revised standard GTT protocol [20]
Demographic information	Country	Not applicable.
Methodology—sampling	Healthcare care type (e.g. hospital, general or family practice)	The GTT is designed to detect AEs in hospital.
	Healthcare specialty or patient type (or example surgical, intensive care unit, orthopaedics, cancer)	Designed for general adult inpatients—i.e. sampled across an entire population of discharged adult patients excluding psychiatric and rehabilitation patients.
	Number of institutions	One institution at a time.
	Sample size and frequency	The GTT protocol recommends institutions undertake 20 MRRs per month or 10 per fortnight.
Methodology—data collection and analysis	Definition of an AE	Unintended physical injury resulting from or contributed to by medical care that requires additional monitoring, treatment or hospitalization, or that results in death. Includes only those AEs related to the active delivery of care ('acts of commission') and excludes, as much as possible, issues related to substandard care ('acts of omission').
	Number of reviewers	Minimum three reviewers. Two reviewers to review triggers and search for AEs; one reviewer to confirm whether an AE has occurred.
	Use of inter-rater reliability (IRR) scores	The protocol recommends that individual hospitals do not conduct exhaustive studies to measure reliability, but does encourage teams to continually promote consistent, standard record review procedures, use of triggers and interpretation of AEs.
	Use of AEs preventability scales	The protocol recommends that there should be no attempt to measure preventability.
	Use and type of patient safety 'incident type' classification	Not specifically recommended but the protocol states that 'Hospitals have found this categorization to be useful in prioritizing areas for improvement work.'
	Scale used for level of severity of harm	Adapted classification from the National Coordinating Council for Medication Error Reporting and Prevention (NCC MERP) Index for Categorizing Errors [34].
	Methods of reporting AE rates	Three methods recommended: - % of admissions with an AE - % rate of AEs per admission - Rate of AEs per 1000 patient days
	Comparisons of AE rates obtained with the GTT to incident reporting rates	The protocol does not mention comparing results with incident reporting rates.
Findings—AE rates and characteristics	Preventable AEs	Not applicable.
	AE rates	Not applicable.
	Incident types	Not applicable.

Use of AE preventability scales

A preventability scale was used in 27/48 (56%) studies (Supplementary Table A.8) and 19/26 (73%) of AE measurement studies. Likert scales were used in 16/27 (59%) studies with a 6-point scale used most frequently (11 studies). Of those 11 studies which did not use a Likert scale, four used non-explicit reviewer interpretation.

Use of type of Patient Safety Classification

Over half of the studies (28/48, 58%) and nearly three-quarters of the AE measurement studies (19/26, 73%) used a classification to describe what went wrong (an incident type) [73]. Of the four GP studies, two used a classification. The classification systems used 4–72 categories.

Scale for level of severity of harm used

The NCC MERP [34] was used as the scale of harm in 37/48 (77%) of the studies (Supplementary Table A.9) with one using an otolaryngology adaptation [28]. Four studies did not measure the scale of harm [39, 42, 60, 65].

Methods of reporting AE rates

The percentage of admissions with an AE was the most frequent method used (36/48, 75%) followed by AEs per 100 admissions (29/48, 60%) and then AEs per 1000 patient days (22/48, 46%) (Supplementary Table A.10). The figures for AE measurement studies were 22/26 (85%), 18/26 (69%) and 17/26 (65%), respectively. All three methods were used in 10 studies (21%) with 9 of these being AE measurement studies.

Comparisons of AE rates obtained with the GTT to incident reporting rates

In eight studies (17%) a comparison of GTT data with AEs detected via incident reporting was undertaken [26, 27, 36, 47, 56, 64, 66, 72]. All of these were AE measurement studies. Incident reporting systems detected 2–8% of AEs detected using the GTT (average of 4%) (Supplementary Table A.11). Nilsson [57] reported GTT AEs detected

Table 2 GTT studies by healthcare type, country and number of hospitals

Country	*n*	Reference number
USA	18	[18, 22, 26–28, 35–37, 44–53]
Sweden	4	[54–57]
England	3	[24, 39, 58]
Netherlands	3	[38, 40, 59]
Canada	3	[21, 25, 60]
Denmark	3	[61–63]
Belgium	2	[43, 64]
Australia	2	[65, 66]
NZ	2	[42, 67]
Spain	2	[68, 69]
Korea	1	[70]
Norway	1	[23]
Scotland	1	[31]
Thailand	1	[71]
Palestine	1	[72]
Finland	1	[41]
Total	**48**	
Specialty	*n* (records)	Reference number
General inpatients	16 (44 690)	[18, 41–49, 54, 61, 64, 70–72]
Paediatric	7 (10 813)	[21–25, 36, 55]
General practice[a]	4 (2387)	[31, 35, 65, 67]
General surgical	4 (1673)	[39, 40, 50, 69]
Cancer	3 (941)	[59, 62, 63]
Intensive care unit (ICU)[b]	3 (12 842)	[52, 56, 58]
Paediatric intensive care unit (PICU)	3 (1052)	[27, 53, 66]
Geriatric[c]	2 (1690)	[38, 68]
General medical	1 (250)	[51]
General inpatient death	1 (1817)	[60]
Paediatric surgical	1 (50)	[28]
Neonatal intensive care unit (NICU)	1 (749)	[26]
Orthopaedic	1 (350)	[57]
Paediatric rehabilitation	1 (60)	[37]
Total	**48 (79 004)**	
No. of hospitals[d]	*n*	Reference number
1	24	[22, 23, 28, 37, 39–43, 51, 53–57, 59, 60, 63, 64, 66, 68–71]
2–5	8	[18, 38, 45, 49, 58, 61, 62, 72]
6–10	3	[25, 44, 47]
11–15	5	[26, 27, 36, 46, 50]
>15	4	[21, 24, 48, 52]
Total	**44**	

[a]Non-inpatient.
[b]Nilsson [56] applied the GTT to patients who had died.
[c]Suarez [68] both inpatient and outpatient.
[d]Hospital-based GTT studies only.

compared with those reported to a national repository for sentinel events. They found the repository detected 5% of AEs detected with the GTT.

AE rates and characteristics

Preventable AEs

Figure 2 shows the percentage of AEs deemed preventable by healthcare speciality or patient type. The results are highly variable with, for example, four paediatric studies ranging from 22% to 79%. In the nine general hospital studies, results ranged from 14% to 71% with six of these clustering between 50% and 63%.

AE rates

Figure 3 and Supplementary Figs A.1 and A.2 show the AE rates using the three methods. The range of admissions with an AE, for 17 general inpatient (general, general medical, general surgical) studies, varied between 7% and 40% with a cluster of nine studies between 20% and 29%. For general inpatients, the rates of AEs per 100 admissions was 8–51%. The rates of paediatric studies ranged from 9% to 34%, and three PICU studies reported rates between 56% and 62%.

Incident types

Of the 21 studies undertaken using general inpatient, general surgical or general medical patients' records, 10 used classification systems with sufficient commonality to allow comparison (Table 3). Of these, nine were AE measurement studies. In 8/10 studies, infections, medications and surgical/procedure AEs were the top three types reported, comprising 73% of all AEs reported.

Discussion

Use of the GTT is becoming more common, with 14 studies published between 2006 and 2010 and 34 between 2011 and 2014. It is being used in a wide range of specialties. The most frequent reason for undertaking a study was to measure AE rates. We found variations from the GTT protocol with respect to definitions, sample sizes and frequency of samples, use of reviewers and reporting of IRR. Additional data fields, for incident type classification and preventability, have been added, especially by the AE measurement studies. Overall, sample sizes are generally much larger than described in the GTT protocol [20] and the NCC MERP scale [34] is commonly used. Doupi [74] underlines this heterogeneity, indicating that 'every implementation of the GTT seems to be an own local variant with the two-staged review approach and the NCC MERP method of severity assessment … being the only truly stable elements across studies'. The GTT is intended to be modifiable [20] and its use across a range of sub-specialties and the variations described above are testament to its flexibility.

The limitation of potential publication bias was mentioned in the methods. Although there is no MeSH term for GTTs, given the unique combination of the three words 'global', 'trigger' and 'tools', it is likely we found all relevant studies. There is extensive overlap in the methods of the HM and GTT and some studies did not explicitly outline definitions but stated that they were using the GTT methodology. The strength of the study is that it uses instructions from the standard GTT protocol as the categories against which to assess variability in the use of the GTT.

Rates of AEs

It is often stated that 10% of acute care hospital admissions are associated with AEs. This is largely based on MRRs using the HM method. A systematic review of eight of these studies found a mean overall incidence of 9.2% [75]. Our review found that the GTT frequently detects higher rates of harm. In general hospitals, rates of AEs per 100 admissions ranged from 7% to 51% with 11 out of 12 general studies reporting more than 10% of admissions being

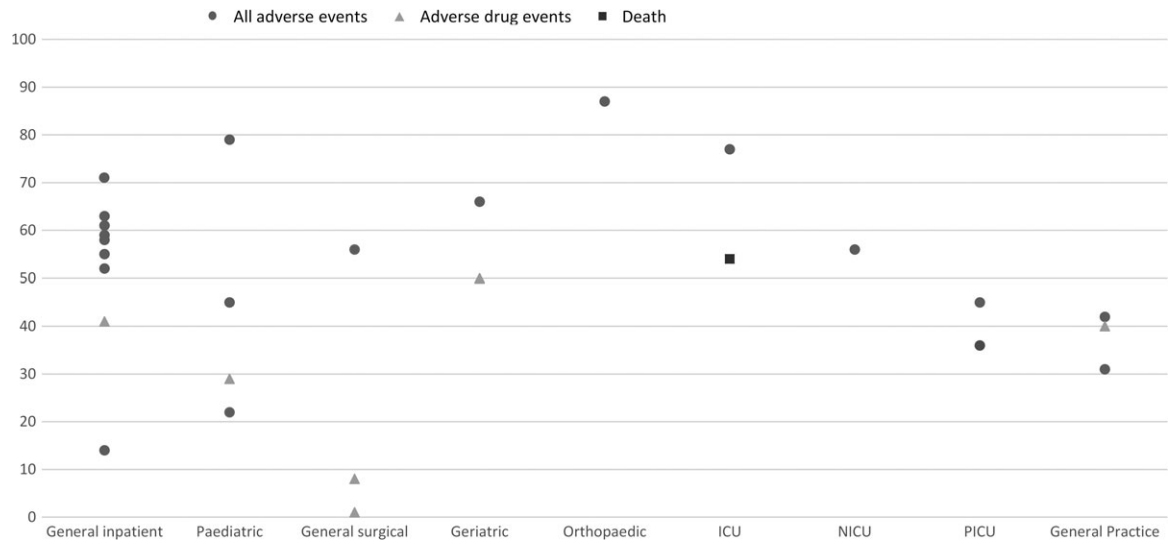
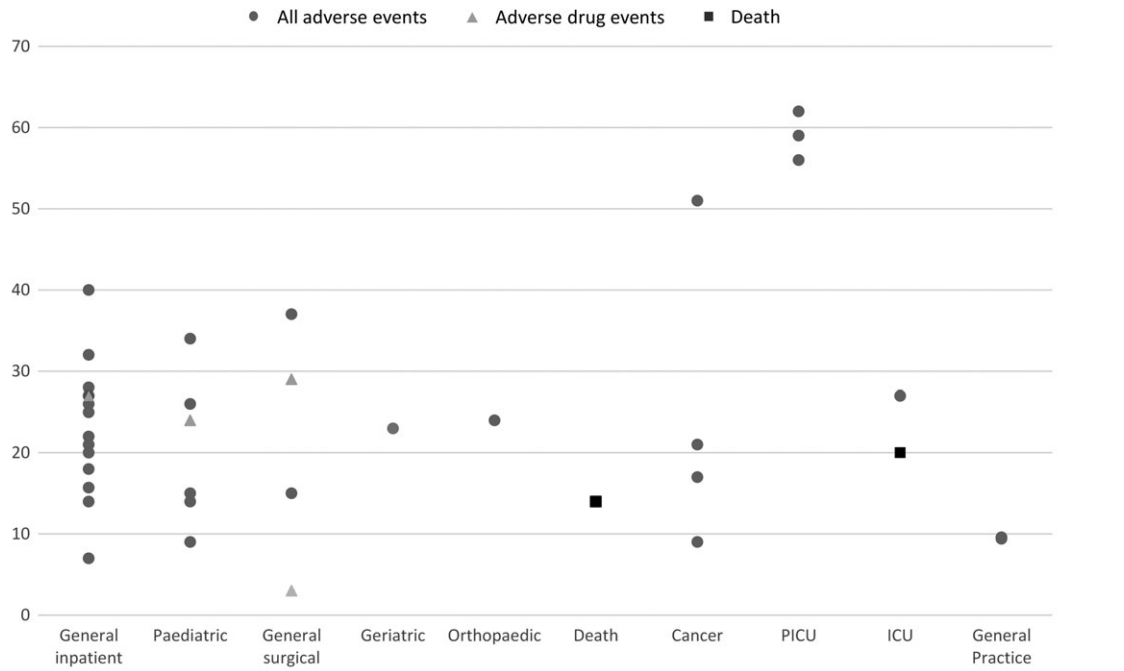


Figure 2 Level of preventability by healthcare type.



Mattson [63] is represented by two points in the graph due to presenting AE rates using both the standard GTT and oncology GTT
Cihangir [59] is represented by two points in the graph due to presenting AE rates using the GTT for Unexpectedly Long Length of Stay (UL-LOS) patients and non UL-LOS patients.

Figure 3 Per cent of admissions with an AE by healthcare type.

associated with an AE. Our results are broadly consistent with statements in the GTT protocol [20] that organizations are finding 40 AEs per 100 admissions and about 30–35% of all admissions are found to have AEs.

The five-fold difference in AE rates using the GTT in general inpatient studies highlights the challenges of collecting patient safety data reliably. Three studies found similar or even greater variations between institutions *within* their studies [24, 26, 35]. AEs which are present on admission also vary with the range being 18–40% in four studies [44, 46, 47, 64], while the GTT protocol [20] states that approximately 10% are present on admission. The GTT protocol [20] and others [54, 63, 74] note that the AE rates should not be compared between institutions due to variability in the methods. Other methodological reasons cited for variations in AE rates are listed in Table 4.

Identification of AEs is threshold-sensitive, especially at the margin. This applies to the GTT [63] both within and between studies and accords with previous between-study HM comparisons [79]. The NCC MERP [34] Category E AEs (the lowest level of harm and defined as 'temporary harm to the patient and required intervention') 'involve more judgement and at times are not as obvious, so these are less easily identified and may be missed' [20]. There are,

Table 3 Per cent of total AEs by category

Reference number	[64]	[61]	[18]	[47]	[68]	[72]	[70]	[44]	[71]	[48]
Infection	44	24	18	13	13	19	14	15	17	–
Surgical/ procedural	23	14	28	41	10	27	47	32	20	–
Medication	12	8	38	26	51	15	20	28	15	23
Pressure ulcer	8	11	3	2	2	2	8	6	2	5
Fall	1	5	1	1	0	–	4	1	1	–
Other	12	38	12	17	24	37	7	18	45	72

'–' Category not reported by the referenced study.

Table 4 Methodological reasons for variations in AE rates

Methodological reasons for variations	Reference number
Completeness of medical records (including between wards)	[25, 31, 35, 38, 40, 43, 58, 61, 72, 76]
Documentation layout and structure	[35, 61, 72]
Performance of teams changes over time	[42, 55, 61, 63, 74, 76]
Experienced teams (collecting 2–3 more AEs)	[63, 77]
Use of external or internal teams	[74, 77]
Differences in quality assurance activities (such as training, review procedures and performing mock MRRs)	[55, 61, 67]
Inclusion criteria (such as greater than 3 days admission instead of the standard 1 day)	[47]
Definitional variations	[21, 57, 67]
AEs associated with omission of care	[47]
Use of different triggers	[20]
Differing interpretations by reviewers	[26, 27, 54, 55, 58, 74, 78]
Hindsight bias and between professions variation	[61, 67]

therefore, multiple reasons why results from studies using the GTT should not be compared.

Various explanations have been proposed to explain why the GTT generally yields higher rates of AEs than the HM. Firstly, due to the HM definition's more restrictive threshold, minor AEs such as pain, small haematomas, and nausea and vomiting are more likely to be included as an AE by the GTT. Secondly, the HM studies are older and patients may have had a lower acuity [18]. However a relatively recent HM study collecting data in the Netherlands in 2004 and 2008 found rates of 4.1% and 6.2%, respectively [80].

One study has tested the HM and the GTT in orthopaedic patients using two different teams [57] and the same 'combined' definition. They found that HM identified more AEs with those associated with minimal levels of harm and particular types (mainly urinary retention, infiltrated IV infusions, pressure ulcers and Hospital Acquired Infections (HAIs)) were responsible for the differences. The authors conclude that the main differences are probably perceptual and that with implicit review, manuals cannot describe all conceivable AEs because situational and individual factors must be applied [57]. This study [57] and others [21, 51] also illustrate the flexibility of the GTT, such as being able to use a blended HM/GTT definition.

Our results show that incident reporting uncovers an average of only 4% (range: 2–8%) of the number of the AEs found using the GTT. This accords with statements in the GTT protocol [20] and a study which found incident reports detected only 7% of those detected by the HM [81]. Patient-reported incidents in hospitals, collected via a standard national patient-experience survey, significantly correlated with patient harm rates based on the GTT [12]. Incident reports may contain more detail on contributing and contextual factors than MRR and may be more useful for developing preventive and corrective strategies [82]. No gold standard for the detection of AEs exists [26, 27, 35, 36, 40, 51, 55, 61, 68] so best practice is to include all available data sources as each method captures different types of AEs [47, 49, 62]. The various methods should be viewed as 'complementary rather than interchangeable' [47].

AEs associated with omission of care

Although the GTT definition of an AE is broader than that used in HM studies, it excludes 'omissions of care'. The GTT protocol [20] uses the example that a patient not appropriately treated for hypertension, who subsequently experienced a stroke, would not have this incident captured as an AE. The problems with this approach are the level of detail in the medical record for making a judgement as to whether omission and commission were involved, and the extent to which the outcome can be attributed to the 'incident'. The GTT frequently detects HAIs, but determining whether these are commissions (applying a wound dressing that is not sterile) or omissions (not providing prophylactic antibiotics) may not be possible from medical records. AEs associated with omissions are noted as an important source of learning for improvement [75], and should be included.

Inter-rater reliability

Differences in IRR were observed for both finding triggers and AEs. IRRs ranged from little better than chance (0.34–0.40) to quite good (0.86–0.89). If an attempt to track changes within an institution is to be made, using experienced teams with at least one constant team member [83] and consistent quality assurance [20], are to be emphasized. Quality assurance should include a structured protocol for review based on the structure of the medical record, regular team-based mock MRRs, discussion and comparison of results, and ongoing monitoring and feedback [26, 61].

Preventability

We found nine different scales for measuring preventability and high variability between studies. Such differences have been noted previously [47, 54]. There are challenges associated with preventability in assessing AEs using MRRs, particularly due to subjectivity [36, 47, 53, 55, 62, 75, 76]. Based on these limitations, Schildmeijer [54] recommends that preventability scores not be used. The GTT protocol states that there should be no attempt to measure AE preventability as those which are unpreventable are only an innovation away from being preventable. The GTT protocol also argues that as the GTT is meant to track changes over time, if the definition of AEs constantly changes depending on what is deemed preventable, any measure over time would become meaningless [20]. On the other hand, the level of preventability can be used with severity and frequency as criteria for setting priorities for improvement activities and learning [36, 46, 53]. The studies whose purpose was to measure AE rates were indicating a preference to use a preventability scale. Kennerley [47] describes the 'low hanging fruit' of high preventability as HAIs and pressure ulcers and Doupi [74] describes

several studies using preventability as a process for learning. If the level of preventability is to be collected, it should not be used as an AE inclusion criterion or to make comparisons or progress, but simply as an aid to priority setting.

Classification

Over half of the GTT studies, and three-quarters of the AE measurement studies, include an incident type classification although the use of one is not explicitly recommended in the GTT protocol. Identification of clusters of like-incidents is a prerequisite for thematic analysis with respect to common features which may point to remedial strategies. This underlies the utility of a universal classification system [82], such as the International Classification for Patient Safety (ICPS) [73].

GTT purpose—measurement and learning

If a hospital reviewed 20 records per month as per the GTT protocol, and assuming an AE rate of 30%, 6 AEs would be detected per month. Based on the findings in Table 3, these would typically comprise two HAIs, two surgical AEs, one medication and one 'other'. Such use of a broad heterogeneous measure such as AE rates to track progress over time has justifiably been called into question as any changes that may have occurred due to an intervention in one area (e.g. falls) may be negated or even reversed by changes in another (e.g. medications) [84]. Table 3 over-simplifies the situation as hundreds of types of safety problems at hospital level have been previously described using the HM [85] and up to 72 categories using the GTT [44].

Given these limitations, the purpose of the GTT should be reframed as an opportunity to detect AEs, raise awareness of these locally [47] and to characterize the most frequent types of AEs [46, 56] for prioritization for quality improvement. Two of the five case studies ('Stories from Experienced Organisations') in the GTT protocol [20] use a classification system to prioritize those incident types for action (Florida and OSF Healthcare System). There is immense value in characterizing the nature of the AEs as this information can help direct limited quality improvement resources towards AEs that might be more likely to have care processes that could be productivity redesigned [46].

Conclusion

The GTT is a flexible tool which is being used in a variety of ways across a range of healthcare domains and specialties. Incident type classifications and preventability scales are frequently being used in studies aiming to measure an organization's AE rate.

The GTT yields rates of admissions with AEs for general inpatients of 7–40%. HAIs, surgical/procedural problems and medication incidents are the most commonly detected AEs. This substantial variability in the rates of AEs detected, even within institutions, precludes comparisons between studies. These are thought to be due mainly to methodological variations and differences in the mindsets and experiences of reviewers. The main advantages of using the GTT regularly are to characterize the most frequent types of AEs for prioritization for quality improvement and to increase the mindfulness of healthcare professionals with respect to patient safety by regularly drawing attention to the fact that every one in three or four patients is likely to suffer harm.

Changes that could be considered for new versions of the GTT are including 'omission' AEs and concentrating on understanding and characterizing events rather than counting them. We advocate the consistent use of a comprehensive classification, such as the ICPS, so that clusters of like events can be extracted for systematic study in order to develop preventive and corrective strategies. An estimate of preventability could also be used but only as an additional criterion in priority setting.

Supplementary material

Supplementary material is available at *INTQHC* Journal online.

Funding

This work is supported by National Health and Medical Research Council (NHMRC) Partnership Grant [APP1065898]. It is led by the Australian Institute of Health Innovation, Macquarie University. The partners in the research are BUPA Health Foundation Australia (senior partner), Sydney Children's Hospitals Network, NSW Kids and Families, Children's Health Queensland, the South Australian Department of Health, the University of South Australia (UniSA) and the NSW Clinical Excellence Commission.

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