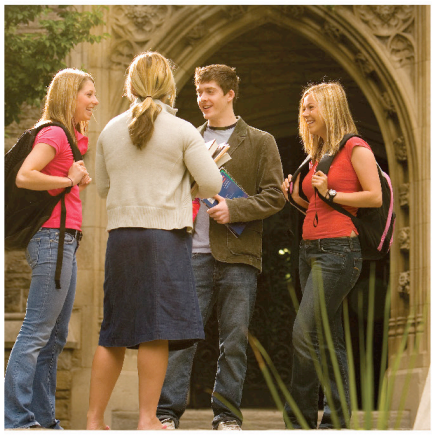
McMaster University

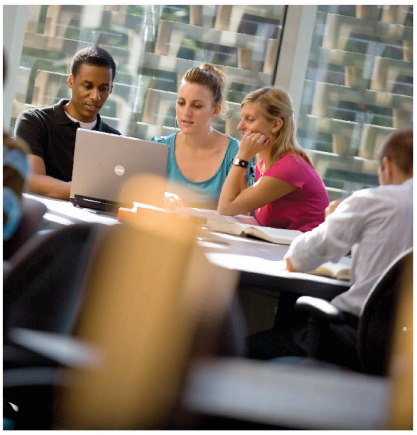
McMaster HEALTH FORUM

IDENTIFYING WHEN, WHY AND HOW TO ANALYZE AND LEARN FROM DEATHS WITHIN HEALTHCARE SETTINGS

RAPID SYNTHESIS (30-DAY RESPONSE)



17 SEPTEMBER 2015



EVIDENCE >> INSIGHT >> ACTION

Rapid Synthesis:
Identifying When, Why and How to Analyze and Learn from Deaths in Healthcare Settings

17 September 2015

McMaster Health Forum

For concerned citizens and influential thinkers and doers, the McMaster Health Forum strives to be a leading hub for improving health outcomes through collective problem solving. Operating at regional/provincial levels and at national levels, the Forum harnesses information, convenes stakeholders, and prepares action-oriented leaders to meet pressing health issues creatively. The Forum acts as an agent of change by empowering stakeholders to set agendas, take well-considered actions, and communicate the rationale for actions effectively.

Authors

Michael G. Wilson, PhD, Assistant Director, McMaster Health Forum, and Assistant Professor, McMaster University

Amanda C. Hammill, MA, Lead, Evaluation, McMaster Health Forum.

Timeline

Rapid syntheses can be requested in a three-, 10-or 30-business day timeframe. This synthesis was prepared over a 30-business day timeframe. An overview of what can be provided and what cannot be provided in each of the different timelines is provided on McMaster Health Forum's Rapid Response program webpage (http://www.mcmasterhealthforum.org/policymakers/rapid-response-program).

Funding

The rapid-response program through which this synthesis was prepared is funded by the Ontario Ministry of Health and Long-Term Care through a Health System Research Fund grant entitled 'Harnessing Evidence and Values for Health System Excellence.' The McMaster Health Forum receives both financial and in-kind support from McMaster University. The views expressed in the rapid synthesis are the views of the authors and should not be taken to represent the views of the Ministry of Health and Long-Term Care or McMaster University.

Conflict of interest

The authors declare that they have no professional or commercial interests relevant to the rapid synthesis. The funder played no role in the identification, selection, assessment, synthesis or presentation of the research evidence profiled in the rapid synthesis.

Merit review

The rapid synthesis was reviewed by a small number of policymakers, stakeholders and researchers in order to ensure its scientific rigour and system relevance.

Acknowledgements

The authors wish to thank Matthew Hughsam and Ben Li for their help with summarizing some of the literature for this rapid synthesis. We are especially grateful to Elizabeth Alvarez and Michelle Shouldice for their insightful comments and suggestions.

Citation

Wilson MG, Hammill AC. Rapid Synthesis: Identifying When, Why and How to Analyze and Learn from Deaths in Healthcare Settings. Hamilton, Canada: McMaster Health Forum, 17 September 2015.

Product registration numbers

ISSN 2292-7980 (print)
ISSN 2292-7999 (online)

KEY MESSAGES

Question

- What approaches and processes can be used to identify when, why and how to analyze and learn from deaths within healthcare settings?

Why the issue is important

- Each year more than1,000 children and youth (0-19 years of age) die in Ontario, and some of these deaths offer opportunities to learn from the circumstances of the death.
- The Office of the Chief Coroner of Ontario is evaluating its current approach to reviewing the deaths of children and youth.
- Understanding approaches and processes that could be used to enhance efforts to identify when, why and how to analyze and learn from child deaths is important for ensuring high-quality reviews of deaths.

What we found

- We did not identify any systematic reviews that directly address this question, but we identified 37 primary studies and non-systematic reviews with some relevance to the question.
- These studies and reviews focused on a range of aspects associated with child death review approaches, death review approaches in healthcare settings, and 16 non-systematic reviews that focused on improving the use of research evidence in guideline development (as one possible complementary process that could be drawn on to inform child death review processes).
- Child death review approaches
    - An intervention consisting of collaborative process improvement and injury prevention decision support found measurable improvements in child death review team functioning and in the quality of recommendations provided.
    - Suggestions to enhance child death review processes that were identified in several studies include: 1) having clear objectives, guidance and supports; 2) robust information dissemination to reviewers combined with focused discussion during meetings; 3) effective and efficient team processes; and 4) using standardized data input processes and definitions at the individual child death review level, as well as greater standardization and aggregation of data at a national level in order to identify trends in child mortality
    - Suggestions to enhance the development and use of recommendations to inform the design and implementation of initiatives to prevent future child injuries and deaths were identified from three studies, which focused on: 1) collaboration with key stakeholders; 2) framing of recommendations; 3) improving the evidence-base for making recommendations; and 4) improving the functioning of child death review team processes and quality of recommendations.
- Death review processes in healthcare settings
    - Ten primary studies and one non-systematic review found a range of process-related benefits as well as positive views and experiences for five hospital-based review processes (three-day standardized mortality review, death and adverse event review, standardized mortality review plus education for reviewers, electronic mortality review and emergency department death audits).
    - These studies also profiled or assessed three approaches to collecting and using data and evidence to inform death reviews, which included interventions to enhance and increase the utility of information in mortality reviews, tools to identify and measure harm to hospitalized children, and patient-safety measurement systems.
- The series of 16 non-systematic reviews about improving the use of research evidence in guideline development provide recommendations related to: developing guidelines for producing guidelines, priority setting, group composition and consultation processes, managing conflicts of interest, group processes, identifying relevant outcomes, deciding what evidence to include, synthesis and presentation of evidence, grading evidence and recommendations, integrating values and consumer involvement, incorporating cost considerations, incorporating equity considerations, adaptation and transferability, and reporting guidelines.

QUESTION

What approaches and processes can be used to identify when, why and how to analyze and learn from child deaths within healthcare settings?

WHY THE ISSUE IS IMPORTANT

Each year more than 1,000 children and youth (0-19 years of age) die in Ontario.(1) The Office of the Chief Coroner has consistently investigated between 43-49% of these deaths each year,(1) and many of these investigations offer opportunities to learn from the circumstances of the death, although the extent to which these deaths are the result of modifiable factors (i.e. preventable) is currently unknown. The Office of the Chief Coroner of Ontario (OCC), which requested this rapid synthesis, has significant experience in undertaking death reviews – approximately 15% of the deaths of children and youth in Ontario are subject to review by an expert death committee of the OCC, in addition to adult deaths which are also reviewed in certain circumstances. The OCC is evaluating the current approach to reviewing the deaths of children and youth, with the objective of providing high quality death reviews to promote and advance death prevention. The OCC is interested in the experiences of the healthcare system, including hospitals, to inform an approach to analyzing and learning from these deaths. Specifically, the OCC was interested in the circumstances under which hospitals and other care providers conduct reviews of deaths, the criteria used for selection of occurrences, the objectives of reviews, the process undertaken, and the ways in which data, information and recommendations are collected and used.

Box 1: Background to the rapid synthesis

This rapid synthesis mobilizes both global and local research evidence about a question submitted to the McMaster Health Forum's Rapid Response program. Whenever possible, the rapid synthesis summarizes research evidence drawn from systematic reviews of the research literature and occasionally from single research studies. A systematic review is a summary of studies addressing a clearly formulated question that uses systematic and explicit methods to identify, select and appraise research studies, and to synthesize data from the included studies. The rapid synthesis does not contain recommendations, which would have required the authors to make judgments based on their personal values and preferences.

Rapid syntheses can be requested in a three-, 10-or 30-business-day timeframe. An overview of what can be provided and what cannot be provided in each of these timelines is provided on the McMaster Health Forum's Rapid Response program webpage (http://www.mcmasterhealthforum.org/policymakers/rapid-response-program)

This rapid synthesis was prepared over a 30-business day timeframe and involved five steps:

1) submission of a question from a health system policymaker or stakeholder (in this case, The Office of the Chief Coroner of Ontario);
2) identifying, selecting, appraising and synthesizing relevant research evidence about the question;
3) drafting the rapid synthesis in such a way as to present concisely and in accessible language the research evidence; and
4) finalizing the rapid synthesis based on the input of two merit reviewers.

WHAT WE FOUND

We did not identify any systematic reviews that directly addressed this question, but we identified 37 primary studies and non-systematic reviews (e.g., jurisdictional scans/overviews and descriptive reviews) with some relevance to the question. These studies and reviews focused on a range of aspects associated with child death review approaches,(2-11) death review approaches in healthcare settings,(12-22) and improving the use of research evidence in guideline development (as one possible complementary process that could be drawn on to inform child death review processes).(23-38)

Childhood death review processes

The 10 primary studies and non-systematic reviews that we identified about childhood death review processes included:

- three non-systematic reviews comparing international approaches to child death review (25 countries in total);(2-4)
- one study reviewing cross-national child death review program standards, procedures and best practices in the United States;(5)
- three studies on child death review approaches specific to Child Death Overview Panels (CDOP) in England;(6;7;11) and
- three studies focused on improving recommendations and enhancing injury prevention in child death review.(8-10)

The non-systematic reviews (2-4) compared death review processes across countries and found that there is considerable variation both within and across countries. One of the reviews noted that improving child death reviews requires a better understanding of these varied processes and identification of features that can be harnessed to improve them, and the development of recommendations following child death review.(2) Given this, we summarize below findings from the remaining studies and non-systematic reviews included in this section as they relate to processes for child death review and to the development of recommendations.

Processes

Six of the studies and non-systematic reviews we identified related to processes. Three of these were about CDOP in England (6;7;11) and the other three focused on the ways in which data and information are collected and used.(3-5) The studies about CDOP in England focused on pediatrician panel members,(6) the experiences of a CDOP in a large urban area,(7) and on developing effective CDOP programs across the country.(11) Three themes for improving child death review processes were identified in these studies through interviews and surveys with key stakeholders (clinicians, bereavement counsellors, policymakers, researchers, child death review panel/team members, and other experts). First, the studies emphasized the importance of having clear objectives as well as guidance (e.g., terms of reference, protocols and procedures) and supports (audit and governance systems) in place to ensure the achievement of the objectives.(11)

Second, the studies noted that robust information dissemination to reviewers combined with focused discussion during meetings is essential. Study participants noted that not all deaths can be reviewed to the

Box 2: Identification, selection and synthesis of research evidence

Research evidence (systematic reviews and primary studies) was identified by searching Health Systems Evidence (www.healthsystemsevidence.org) and PubMed. In Health Systems Evidence, we searched for "death review" in the title and abstract as well as two topic categories under delivery arrangements (quality monitoring and improvement systems, and safety monitoring and improvement systems) for any overviews of reviews of systematic reviews or systematic reviews relevant to death review processes.

In PubMed, we conducted two searches for literature related to child death review processes: 1) (death review AND child) AND (practice*[tiab] OR adjusted[tiab]); and 2) ((("death"[MeSH Terms] OR "death"[All Fields]) AND ("review"[Publication Type] OR "review literature as topic"[MeSH Terms] OR "review"[All Fields])) AND ("child"[MeSH Terms] OR "child"[All Fields])) AND (qualitative[tiab] OR themes[tiab]). We then conducted two searches for literature related to death review processes in healthcare settings (i.e., not limited to child death review: 1) ((hospital mortality [MeSH Terms]) AND (medical audit[MeSH Terms] OR death review)) AND (practice*[tiab] OR adjusted[tiab]); and 2) a related article search for one highly relevant article.(13)

The results from the searches were assessed by one reviewer for inclusion. A document was included if it fit within the scope of the questions posed for the rapid synthesis.

For each review we included in the synthesis, we documented the focus of the review, key findings, last year the literature was searched (as an indicator of how recently it was conducted), methodological quality using the AMSTAR quality appraisal tool (see the Appendix for more detail), and the proportion of the included studies that were conducted in Canada. For primary research (if included), we documented the focus of the study, methods used, a description of the sample, the jurisdiction(s) studied, key features of the intervention, and key findings. We then used this extracted information to develop a synthesis of the key findings from the included reviews and primary studies.

same depth, and approaches to data collection and review are time consuming. Suggestions to address these challenges included:

- providing collated information (rather than relying on original case records) and sharing all information prior to meetings;(7;11)
- supplementing a limited data set of categorical information with narrative information;(11)
- ensuring consistent liaising with coroners;(6;7)
- 'triaging' (i.e., clinical review/filtering) of cases prior to review meetings to ensure the focus is on deaths where uncertainties or recommendations are likely to arise;(6;7)
- discontinuing, reducing or devolving neonatal reviews to a separate hospital-based or other expert review process;(6)
- convening themed meetings for deaths related to specialty services (e.g., cardiac deaths) with invited specialists;(6)
- incorporating findings from other processes such as rapid response, hospital mortality and morbidity reviews;(6;7;11) and
- developing relationships with other processes such as serious case reviews.

The last theme identified in the studies related to team membership. Specifically, study participants identified the need for effective and efficient team processes, noting that this can be facilitated by ensuring members are appropriate to the role, motivated and committed, are senior-level and multidisciplinary professionals, and that trust exists among group members.(6;11)

Three non-systematic reviews focused on the ways in which data and information are collected and used.(3-5) The first review, a literature review of 81 papers focused on internal reporting processes for child death review, identified several problems with the ways in which data and information that record and classify child deaths are collected. These problems include:

- inaccuracies in the process of death certification;
- restrictions imposed by reliance on single causes of death and different systems for grouping cause of death; and
- the inability of data/information management systems to go beyond identification of what a child died from to consideration of how and why the child died.(3)

The second review profiled child death review processes in six countries (Australia, Canada, England, New Zealand, the U.S., and Wales) and emphasized that addressing the above issues requires standardized data input processes and definitions at the individual child death review level, as well as greater standardization and aggregation of data at a national level (e.g., in Canada or the U.S. where child death review is conducted at provincial or state levels). The review noted that such approaches to data collection and aggregation are needed to facilitate the identification of trends in child mortality.(4)

Lastly, a review of active child death review programs in 48 states and the District of Columbia focused on standardized procedures and best practices, and found a lack of consistency among programs in data collection methods, which created difficulty in obtaining accurate national data. The review notes that although a data collection tool and online reporting system have been developed by the National Maternal and Child Health Center for Child Death Review, and using them is a recommended procedure, only 47% of state programs reported using the data collection tool and only 41% reported data to the National Center.(5)

Ways in which recommendations are developed and used

Three studies focused directly on identifying and addressing the quality and value of recommendations and injury prevention in child death review.(8-10) Two of these studies (8;10) focused on identifying issues with child death review processes, while the third study (9) evaluated an intervention designed to improve the functioning of teams and the quality of interventions.

Of the two studies focused on identifying issues, the first conducted a retrospective review of more than 1,000 child death review team reports, and based on written recommendations from the reports, concluded that child death review teams typically do a better job at 'assessing the problem' than at 'proposing solutions'.(10) In addition, the study noted that follow-up of the written recommendations is often not addressed as part of the reports. The second, a qualitative study, conducted interviews and document analyses related to five high-profile child death inquiries held in Ireland between 1993 and 2010, and found that there was an insufficient focus on the learning of lessons or prevention of future child deaths in the inquiry or review recommendations in these five cases.(8)

The third study (a before-after study) evaluated an intervention designed to improve the functioning of child death review teams and the quality of recommendations they provide.(9) The intervention consisted of collaborative process improvement and access to injury prevention decision support, which included:

- technical assistance and training activities such as teleconferences and annual in-person training events;
- access to a website providing quality-rated evidence for injury prevention interventions for five mechanisms of injury-related child death most likely to be useful to child death review teams operating in a public health system; and
- a recommendation-writing template based on available guidelines.

The study found that the intervention led to measurable improvements in child death review team functioning and in the quality of recommendations generated.(9)

Suggestions to enhance the development and use of recommendations to inform the design and implementation of initiatives to prevent future child injuries and deaths were also identified in these three studies and others included in this section, and are summarized in Table 1. The suggestions focus on four areas: 1) collaboration with key stakeholders; 2) framing of recommendations; 3) improving the evidence-base for making recommendations; and 4) improving the functioning of child death review team processes and quality of recommendations. In considering these suggestions, a study conducted in England cautions that too great a focus on procedures can divert careful reflection and the ability to identify and learn from deeper issues.(11)

Table 1: Suggestions to enhance the development and use of recommendations to inform the design and implementation of initiatives to prevent future child injuries and deaths

Child death review component	Suggestions
Collaboration with key stakeholders	• Engage and collaborate with key stakeholders in the process of developing and writing recommendations to ensure that recommendations are informed by relevant sources of information, knowledge and expertise, and to facilitate ownership of the recommendations among relevant groups.(8;10) • Involve families and solicit feedback from them as part of the child death review process, given that they can contribute key information that can be incorporated into the review and development of recommendations.(3;4;9-11)
Framing of recommendations	• Recommendations that are oriented primarily towards the organization, management and delivery of professional public services should be presented in a way that clearly identifies the rationale for change, the relevant evidence used to develop the recommendations, and who will be responsible for their implementation.(8) • Recommendations that are too numerous, impractical, expensive, lack relevance or are out of step with current social norms are unlikely to be implemented.(9) • Implications of recommendations for the wider system must be clearly set out, and recommendations that focus on cumbersome and expensive procedures could reinforce an adversarial and forensic approach that may not be helpful for the majority of child protection work.(2)

Use of evidence	• The evidence base to draw from for the development and implementation of recommendations for prevention initiatives can be improved by incorporating a model of individual review, cross-case review and themed review.(10) • Conduct process evaluations to provide documentation of both the relevance and the effectiveness of child death review team processes.(10)
Team functioning and quality of recommendations	• Pediatrician child death overview panel members surveyed in the United Kingdom suggested that multi-agency seminars that facilitate networking, pooling of data and sharing learning from review processes would improve the practice of the panels.(6) • Incorporating a two-tier review process consisting of a technical team to review cases and an action team to create/promote recommendations might serve to improve both team functioning and the quality of recommendations.(10) • Provide those involved in child death review with technical assistance and training activities in order to increase abilities to use best practice evidence in recommendations, and provide clear and specific written recommendations.(9)

Death review processes in healthcare settings

We identified 10 studies and one non-systematic review related to processes and approaches to death review in healthcare settings, which focus on:

- hospital-based death review processes, including:
  - three-day standardized mortality review,(12)
  - death and adverse event review,(13)
  - standardized mortality review plus education for reviewers,(14)
  - an electronic mortality review,(15) and
  - emergency department (ED) death audits;(16;17) and
- approaches to collecting and using data and evidence to inform death reviews, including:
  - interventions to enhance and increase the utility of information in mortality reviews,(18;19)
  - tools to identify and measure harm to hospitalized children,(20;21) and
  - patient safety measurement systems for use in healthcare settings.(22)

Hospital-based death review processes

We summarize in Table 2 the characteristics of the five different hospital-based death review processes that we identified, as well as the key findings from the evaluation of each.

Approaches to collecting and using data and evidence to inform death reviews

We summarize in Table 3 findings from four studies and one non-systematic review about the characteristics of the three different approaches to collecting and using data and evidence to inform death reviews, as well as the key findings from evaluations of them.

Table 2: Summary of hospital-based death review processes and key findings from evaluations of them

Process	Process description	Key findings
Three-day standardized mortality review in 11 U.S. hospitals (12)	• Trained nurse reviewers identified potential adverse events and adverse drug events using a tool that includes a set of qualitative questions related to preventable harm and the use of appropriate care settings (termed 'deep-dive' questions). • Adverse events were reviewed and validated at the next level by a physician, and qualitative patient narratives that provided insight into the involved systems and human complexity of the events were developed for each adverse event. • A leadership conference with medical and operational leaders was then held to review the data and the narratives and to identify strategies to improve and monitor care.	• Charts of the most recent 50 consecutive deaths of patients who were 17 years or older at 11 U.S. hospitals were examined by a team consisting of quality and risk management staff, operational staff (nurses) and physicians using a three-day standardized mortality review process. • Having a trained nurse reviewer use a modified version of the Global Trigger Tool for screening prior to clinician or team review improved the process in terms of saving time for and promoting greater engagement of physicians and senior-level staff at the next level of the process. • The use of the standardized mortality review process in addition to information provided by the modified Global Trigger Tool supported the identification of the relative frequency of 10 categories and levels of potential harm. • The 'deep-dive' questions were then used to identify potential areas for improvements and, when combined with the quantitative data and patient narratives, the cases were made more patient-centred and compelling for senior leadership to address once reviewed.
Death and adverse event review process at a seven-site, 1,000-bed regional tertiary care facility in Hamilton, Canada (13)	• The process utilizes two trained patient safety specialist reviewers (nurses) to review charts using a modified Global Trigger Tool for all adult deaths within 72 hours, whenever possible. • Any adverse events or quality of care issues that are identified are referred to an interdisciplinary death review committee that includes physicians, profession chiefs, and quality and patient safety team members, which develops recommendations and follow-up strategies to prevent reoccurrence. • Recommendations and strategies developed through the committee are then forwarded to appropriate stakeholders to support implementation.	• Findings were based on chart reviews of 1,817 patient deaths and a survey of 18 death review committee members and 48 stakeholders. • The chart review in the study found that in a six month period, charts accepted for 2nd level review increased from 15.4% to 57%.(13) Findings from the survey indicated that the majority (82%) of death review committee members rated primary screening of charts by patient safety specialist reviewers as 'very valuable to having excellent value', and found the new process an efficient use of time and an improvement on occurrence reporting. The majority of death review committee members (82%) and stakeholders (67%) also rated the impact of the death and adverse event review process on improving patient safety as 'good to excellent', although 67% of stakeholders agreed that the sharing of learning from the death review is an area for improvement. • The authors conclude that the use of trained patient safety specialist reviewers and the modified trigger tool for primary screening prior to committee review promotes physician engagement and saves time by enabling committee members to focus on events with suspected issues versus all deaths. In addition, this and the previous study both concluded that a key strength of the standardized mortality review process is the involvement of multidisciplinary teams which promotes a focus on prevention of patient deaths as a shared priority.(12)
Standardized mortality review plus education for residents and fellows in a department of internal	• A modified morbidity and mortality conference process for residents and fellows in a department of internal medicine emphasizing patient safety principles and system-based practice interventions, called the Patient Safety Morbidity	• Findings are based on a survey of participant attitudes towards patient safety and conference redesign before and after the implementation of a revised morbidity and mortality format emphasizing patient safety. • During the 11 consecutive monthly conferences, attendance increased from 41 to 50 ($p < 0.03$), and six of the 20 survey items showed significant mean change in the attitudes of

medicine training program at an academic teaching hospital in the U.S. (14)	and Mortality Conference (PSMMC). • Process includes a full group root system cause analysis of why the event occurred, and identification of gaps in quality contributing to the outcome, followed by smaller group work, moderated by a trained facilitator, on solutions to prevent recurrences and challenges to moving from observations into actions. The larger group then outlines a departmental action plan with responsibility for items assigned. • Follow-up includes documenting meeting outcomes, developing and disseminating monthly performance improvement reports, and tracking system actions to ensure completion.	residents and fellows, with four of these occurring towards the goals and objectives of the new PSMMC, including the view that an effective morbidity and mortality conference should focus on how a doctor should have performed, and the belief that positive departmental changes were likely to result from the analysis of medical errors and subsequent improvement actions. Eleven of the remaining 14 responses changed in the preferred or desired direction, but did not reach statistical significance. • Associated with cases discussed during the 11 months, conference participants identified 150 contributing factors and made 121 system improvement recommendations, of which facilitators determined that 39 (32%) should be pursued based on likelihood of achieving high impact changes. These targeted changes were assigned to department/facility representatives with 23 (59%) improvements implemented within a year, 11 (28%) partially implemented or in progress, and five (13%) abandoned due to impracticality or redundancy. • Categories of system changes successfully implemented included enhancements in information technology, development of new educational programs, and modifications to medical documentation. • Focusing morbidity and mortality conferences on supporting a culture of patient safety and systems review rather than blame and shame provided a safe setting for expressing concerns, an increased awareness of unsafe conditions, and encouraged active participation in the design of interventions to improve healthcare systems.
Electronic mortality review in a 763-bed academic teaching hospital in the United States (15)	• The electronic mortality review process was built around stakeholder input on seven consensus principles related to: o infrastructure for data collection (must be electronic); o reporting (data should be aggregated and trended across departments); o scope (process should cover all deaths); o source (front-line clinician input could provide more information than a third party, with input from the entire care team preferable); o speed (must be quick and efficient to take into account non-preventable deaths); o timing (should be completed 48-72 hours after death to allow completion from memory); and o additional review (if required). • Following the death of a patient, a prompt sent to a minimum of two team members to complete a review and a short survey.	• During the first 12 months of the electronic mortality review process the electronic review prompt was triggered upon the deaths of 1,068 patients, and clinicians provided suggestions for improvement in quality of care in 7.7% (191/2491) of completed reviews, and reported that 4.8% (50/1052) of deaths may have been preventable. • Quality and safety issues contributing to potentially preventable inpatient mortality included delays in obtaining or responding to tests (15/50, 30%), communication barriers (10/50, 20%) and healthcare associated infections (9/50, 18%). • The authors conclude that the high response rate and timeliness of response demonstrate a willingness on the part of clinicians to provide information related to quality and candid opinions related to potential error and preventability.
ED death audits (16;17)	• One of the included studies evaluated audit process for deaths occurring within 48 hours of admission,(16) and a second study audited deaths	• 48-hour audit of emergency department deaths o 303 deaths were reviewed in the study, of which 75 were in the ED, and 228 were within 48 hours of admission.

	occurring less than a week after admission through an emergency department.(17)	○ A major hospital review was recommended by the ED auditor in four (5%) of ED deaths and 11 (5%) of deaths within 48 hours, with only three and seven of these, respectively, having previously been reported to the hospital's independently operated Incident Investigation and Monitoring System (IIMS), and assigned a severity code high enough to warrant a root-cause analysis or review by the medical superintendent of the hospital and other senior clinicians.(16) ○ Auditing deaths within 48 hours of admission, as well as those in the ED, identified 33 additional recommendations and actions compared with auditing ED alone, or relying on employee reports to the hospital's IIMS. • Audit of deaths occurring less than a week after admission to an ED ○ Case notes of 95 patients attending an ED over a four-month period who died within seven days of admission to an ED (2.95% of admissions) were audited using a modified typology of critical incidents concentrating on the detection of preventable deaths. ○ The audit identified misdiagnosis in 13.6% (n=13) of cases, and an unclear diagnosis in 4.2% (n=4) of cases. ○ Among the cases that involved errors, 5.26% were unpreventable deaths, 3.15% of deaths were definitely preventable, 3.15% were probably preventable, and 6.31% were possibly preventable deaths. ○ The authors note a strength of their approach concentrating on detection of preventable deaths was the opportunity provided to identify faults in the system rather than blaming individuals, and to initiate changes to documentation procedures and review practice of training junior doctors, among other initiatives.(17)

Table 3: Summary of approaches to collecting and using data and evidence to inform death reviews and key findings from evaluations of them

Approach	Approach description	Key findings
Interventions to enhance and increase the utility of information in mortality reviews (18;19)	• In one study, an implicit judgment method for reviewing hospital case notes was evaluated. Case notes were reviewed by physicians who provided structured written comments addressing care at three points and on care overall, and providing a score on overall quality of care.(19) Comments were then reviewed to evaluate how well reviewers provided structured short judgment notes on quality of care, and appropriate care scores.(19) • The second study undertook a qualitative analysis of causes and contributory factors underlying patient harm in 52 case narratives linked to preventable deaths and written by physician reviewers who addressed a structured set of questions, and	• Implicit judgment case review ○ Commentaries were written to support judgment scores of care provided in 119 cases of patients who died in hospital were analyzed (7.6% of 1,566 cases reviewed). ○ A combination of implicit judgments (i.e., based on clinicians' knowledge and experience) and explicit explanatory comments (i.e., assessing the quality of processes of care using a set of predetermined criteria) combined with related quality of care provided a way to effectively review both poor and high-quality care.(19) • Change analysis narrative review ○ Using change analysis to analyze case narratives of 52 hospital deaths led to an average of three problems in care (with a range of 1-8) associated with preventable death per case being identified, with more than 70% of those being related to omissions in care. Additionally, an average of five contributory factors (with a range of 1-10) were identified per patient. ○ Analyzing case narratives of deaths judged to be preventable using change analysis can

	provided a brief narrative account of the circumstances for each case.(17)	provide a better understanding of the nature of problems in care underlying the deaths and identification of multiple omissions (delineated from acts of omission) across the care pathway. • Both studies conclude the approaches provide timely methods to evaluate deaths, which can facilitate quicker learning from and more tailored responses to identified patient harm.
Tools to identify and measure harm to hospitalized children (20;21)	• In a retrospective study, electronic medical records (EMR) were reviewed independently by two trained nurse primary reviewers for any of the Global Trigger Tool (GTT) triggers. A more focused review for adverse events was undertaken if one or more triggers were identified, and a level of harm assigned. This would then be reviewed by a physician validator for a decision on whether an adverse event occurred and its severity.(20) • A second study developed and tested a trigger tool for use in the neonatal intensive care unit (NICU) using a retrospective chart review. A neonatal nurse or neonatologist trained in chart review methods reviewed selected charts for the presence or absence of each of 17 triggers. Any trigger identified prompted an in-depth review for the presence of associated adverse events, and any identified adverse events were reviewed by clinician specialists to determine whether they could have been prevented, identified earlier, or mitigated.(21)	• GTT in pediatric settings o 404 triggers were detected (1.7 triggers per patient), and 88 adverse events were identified. o Rates of 36.7 adverse events per 100 admissions and 76.3 adverse events per 1,000 patient-days were calculated, and no adverse events leading to deaths were identified. o Although a two-to-three times higher harm rate was detected utilizing the GTT than found previously with different metrics in this pediatric setting, the authors conclude the tool could be made more effective with further modification, including removal of adult-oriented modules and entire modules of less-useful triggers. • Chart review of 749 patients from 15 NICUs with a minimum two-day NICU stay (a total of 17,106 NICU days evaluated) were randomly selected (n=749) and found that: o chart review utilizing the trigger tool found adverse event rates in the NICU setting are substantially higher than previously described; o 2,218 triggers (2.96 per patient), and 554 unique adverse events (0.74 per patient) were identified; o more than half (56%) of all adverse events were deemed preventable, which included 16% that could have been identified earlier, and 6% that could have been more effectively mitigated; o only a small percentage (8%) of adverse events had been identified in occurrence reports; and o a NICU-focused trigger tool can be efficient and effective at identifying adverse events.
Patient safety measurement systems for use in healthcare settings (22)	• This non-systematic review provides an overview of the Healthcare Performance Improvement (HPI) Safety Event Classification System (SEC), outlining the levels of harm, assessment and the implications of known complications. • The SEC serves as the foundation for the calculation of the Serious Safety Event Rate (SSER), a volume-adjusted measure of those events occurring from a deviation from accepted performance standards and resulting in moderate to severe patient harm or death.	• None available (based on a non-systematic review)

Processes for developing clinical guidelines and recommendations

The literature related to processes for developing clinical guidelines and recommendations has the potential to offer many insights for how to develop and implement similar evidence-based processes and recommendations as part of death reviews. While the literature in this area is substantial, we have summarized in Table 4 the key recommendations from a series of 16 articles about improving the use of research evidence in guideline development.(23-38)

Table 4: Summary of key recommendations from 16 articles about improving the use of research evidence in guideline development

Guideline development stage	Key recommendations
Guidelines for guidelines (23)	• Organizations developing and implementing guidelines for guidelines should obtain buy-in and feedback from various stakeholders, including regional and national representatives, and those who will be involved in guideline development • Guideline for guideline development should involve an experienced, independent committee that evaluates existing guideline development methods or updates existing guidelines • Resources such as manuals, example guidelines and training sessions can be helpful supports for those developing guidelines
Priority setting (31)	• Guidelines for problems associated with a high burden of illness in low- and middle-income countries or new and emerging diseases and problems lacking good quality guidelines should be prioritized • Feasibility of guideline development and implementation should be considered in priority setting • The priority setting process should be systematic and transparent, involving consultation with stakeholders such as potential end users and the public
Group composition and consultation process (32)	• Optimal group composition means including a broad group of stakeholders (e.g. consumers, health professionals, managers and policymakers), individuals with content and technical/methodological expertise, and an effective leader to facilitate collaboration and contributions from all panel members • Training and support should be made available to members of the panel who may not be familiar with all of the methods and processes used to develop recommendations
Managing conflicts of interest (33)	• Disclosure forms should be specific, detailed and structured to gather as much information on competing interests as possible • Management strategies should be selected on a case-by-case basis • Conflict of interest policies can be enforced through mechanisms such as a standing committee to review all financial disclosure statements, or a policy mandating the disclosure of financial ties
Group processes (34)	• The selected group leader should be appropriately qualified and responsible for facilitating inclusive group processes • Several evaluations comparing formal consensus methods such as Nominal Group Technique (NGT) and the Delphi method indicated that formal methods generally perform better than informal methods, but that it is difficult to discern which of the formal methods (NGT and Delphi) is best.
Determining which outcomes are important (35)	• Outcome identification methods should be transparent and explicit, starting with identification of outcomes associated with an intervention and involving those affected, including consumers and people from diverse cultures • Both desirable (e.g. cost savings) and undesirable effects (e.g. burden) should be considered, and patient-important outcomes (e.g. quality of life) should be prioritized over indirect outcomes (e.g. cholesterol levels) • Outcome ranking should be done by relative importance, informed by research on values and preferences where possible, and done in specific settings in cases where outcome importance varies depending on culture

Deciding what evidence to include (36)	• Evidence of the effects of the interventions or actions being considered is the most important type of evidence for informing recommendations • Decisions concerning the range of included study designs should be made explicitly and should take into account the characteristics of the interventions being considered, available evidence and availability of time and resources • Lack of evidence should not be confused with evidence of no effect, and any uncertainty should be acknowledged
Synthesis and presentation of evidence (37)	• Existing reviews should be used or updated if possible, given the resources required to prepare a systematic review • Existing systematic reviews should be assessed for quality using standard criteria such as A MeaSurement Tool to Assess Reviews (AMSTAR), and for relevance to the questions being asked • The findings of systematic reviews should be accompanied by additional information to inform recommendations (factors that modify expected effects, needs, values, costs and availability of resources), any assumptions about values and any factors that may vary depending on setting • Systematic review findings should be summarized through evidence tables presenting benefits, harms and costs, and including assessments of evidence quality and summaries of findings for each outcome
Grading evidence and recommendations (38)	• A transparent, systematic approach to evaluating the quality of evidence and strength of recommendations is important to facilitate critical appraisal and prevent errors • Approaches to grading should have wide international support and be suitable for a broad range of recommendation types • The Grading of Recommendations Assessment, Development and Evaluation (GRADE) approach is endorsed by WHO and increasingly used by a number of other international organizations
Integrating values and consumer involvement (24)	• The values used in making recommendations should be explicit and directly informed by those affected • Recommended methods for integrating values include quantitative methods (e.g. conjoint-based methods, willingness to pay, standard gamble, time trade-off) and qualitative methods (e.g. one-to-one interviews, focus groups, Delphi technique, and citizens' juries) • Where there is uncertainty about values that are critical to a decision, this should be stated and reflected in the strength of the recommendation
Incorporating considerations of cost-effectiveness, affordability and resource implications (25)	• Cost-effectiveness is ideally considered during the evidence gathering and synthesizing stage • Cost-effectiveness analyses can be quantitative (e.g. listing of costs, modelling exercise) or qualitative (e.g. commentary outlining economic issues under consideration) • Resource implications should include at minimum a qualitative description of the amount of resources needed and available
Incorporating considerations of equity (26)	• Differential effects across disadvantaged and advantaged populations should be considered • Organizational changes are likely important to address inequities; consideration should be given to identifying the best ways to provide support for the necessary structural changes • Indicators of social and economic status should be used to monitor effects of implementing recommendations on disadvantaged populations
Adaptation, applicability and transferability (27)	• Internationally developed recommendations are favourable because they allow for pooling of resources, prevent unnecessary duplication, and involve broader scientific expertise • Transferability of recommendations, including modifying factors, variation in needs, values and costs, and the availability of resources, should be considered systematically • International networks that support evidence-informed health policies, such as the Evidence-informed Policy Network (EVIPNet) should be used for adapting and implementing recommendations
Reporting guidelines (28)	• Reports should be structured using headings that correspond to those suggested by the Conference on Guideline Standardization • Reporting templates should provide decision-makers with the relevant evidence necessary to inform a decision and offer practical methods for incorporating the evidence in a specific context • Information required to judge the quality, applicability and adaptability of a guideline should be reported

Disseminating and implementing guidelines (29)	• Passive approaches are generally ineffective and unlikely to result in behaviour change • Promising interventions include educational outreach and reminders • NorthStar is an available tool that provides users with information, checklists, examples and tools based on current research on how to best design and evaluate implementation strategies
Evaluations (30)	• The AGREE II instrument is an internationally developed, validated, easy-to-use and transparent checklist for appraising the quality of guidelines and recommendations • Guidelines should be monitored routinely to determine whether they are in need of updating; it is recommended to reassess guidelines every three years • Study designs that can be used to evaluate the impact of guidelines include randomized designs (e.g. cluster randomized trials), observational study designs (e.g. interrupted time series analyses), controlled before-after studies and uncontrolled before-after studies

REFERENCES

1. Office of the Chief Coroner, Province of Ontario. Report of the Paediatric Death Review Committee and Deaths Under Five Committee. Ontario: Office of the Chief Coroner; 2012.
2. Axford, N and Bullock, R. Child death and significant case reviews: International approaches. Edinburgh: Information and Analytical Services Division, Scottish Executive Education Department; 2005.
3. Fraser J, Sidebotham P, Frederick J, Covington TM, Mitchell EA. Learning from child death review in the USA, England, Australia, and New Zealand. The Lancet 2014;384(9946):6-12.
4. Vincent S. Child Death Review Processes: A Six-Country Comparison. Child Abuse Rev 2014 March 1;23(2):116-29.
5. Shanley JR, Risch EC, Bonner BL. U.S. Child Death Review programs: Assessing progress toward a standard review process. American Journal of Preventive Medicine 2010 December;39(6):522-8.
6. Allen L, Lenton S FAU - Fraser J, Fraser JF, Sidebotham P. Improving the practice of child death overview panels: A paediatric perspective. Arch Dis Child 2014 November 11;(1468-2044 (Electronic)).
7. Mazzola F, Mohiddin A, Ward M, Holdsworth G. How useful are child death reviews: a local area's perspective. BMC Res Notes 2013 July 26;6:295.
8. Buckley H, O'Nolan C. Child Death Reviews: Developing CLEAR Recommendations. Child Abuse Rev 2014 March 1;23(2):89-103.
9. Johnston BD, Bennett E FAU - Pilkey D, Pilkey DF, Wirtz SJ FAU - Quan L, Quan L. Collaborative process improvement to enhance injury prevention in child death review. Injury Prevention 2011;17(Suppl 1):i71-6.
10. Wirtz SJ, Foster VF, Lenart GA. Assessing and improving child death review team recommendations. Injury Prevention 2011;17(Suppl 1):55-63.
11. Sidebotham P, Fox JF, Horwath JF, Powell C. Developing effective child death review: A study of 'early starter' child death overview panels in England. Injury Prevention 2011;17(Suppl 1):i55-63.
12. Lau H, Litman KC. Saving lives by studying deaths: using standardized mortality reviews to improve inpatient safety. Jt Comm J Qual Patient Saf 2011 September;37(9):400-8.
13. Zimmerman R, Pierson S, McLean R, McAlpine SA, Caron C, Beth MB et al. Aiming for zero preventable deaths: using death review to improve care and reduce harm. Healthc Q 2010;13 Spec No:81-7.
14. Bechtold ML, Scott S, Dellsperger KC, Hall LW, Nelson K, Cox KR. Educational quality improvement report: outcomes from a revised morbidity and mortality format that emphasised patient safety. Postgrad Med J 2008 April;84(990):211-6.
15. Provenzano A, Rohan S, Trevejo E, Burdick E, Lipsitz S, Kachalia A. Evaluating inpatient mortality: a new electronic review process that gathers information from front-line providers. BMJ Qual Saf 2014;24(1):31-7.
16. Clunas S, Whitaker R, Ritchie N, Upton J, Isbister GK. Reviewing deaths in the emergency department: deaths in the department or deaths within 48 h. Emerg Med Australas 2009 April;21(2):117-23.
17. Nafsi T, Russell R, Reid CM, Rizvi SM. Audit of deaths less than a week after admission through an emergency department: how accurate was the ED diagnosis and were any deaths preventable? Emerg Med J 2007 October;24(10):691-5.

18. Hogan H, Healey F, Neale G, Thomson R, Black N, Vincent C. Learning from preventable deaths: exploring case record reviewers' narratives using change analysis. J R Soc Med 2014 September;107(9):365-75.

19. Hutchinson A, Coster JE, Cooper KL, Pearson M, McIntosh A, Bath PA. A structured judgement method to enhance mortality case note review: development and evaluation. BMJ Qual Saf 2013 December;22(12):1032-40.

20. Kirkendall ES, Kloppenborg E, Papp J, White D, Frese C, Hacker D et al. Measuring adverse events and levels of harm in pediatric inpatients with the Global Trigger Tool. Pediatrics 2012 November;130(5):e1206-e1214.

21. Sharek PJ, Horbar JD, Mason W, Bisarya H, Thurm CW, Suresh G et al. Adverse events in the neonatal intensive care unit: development, testing, and findings of an NICU-focused trigger tool to identify harm in North American NICUs. Pediatrics 2006 October;118(4):1332-40.

22. Throop, C and Stockmeier, C. SEC℠ & SSER℠ Patient Safety Measurement System for Healthcare. Virginia Beach: Healthcare Performance Improvement, LLC; 2009. Report No.: HPI 2009-100.

23. Schunemann HJ, Fretheim A, Oxman AD. Improving the use of research evidence in guideline development: 1. Guidelines for guidelines. Health Res Policy Syst 2006;4:13.

24. Schunemann HJ, Fretheim A, Oxman AD. Improving the use of research evidence in guideline development: 10. Integrating values and consumer involvement. Health Res Policy Syst 2006;4:22.

25. Edejer TT. Improving the use of research evidence in guideline development: 11. Incorporating considerations of cost-effectiveness, affordability and resource implications. Health Res Policy Syst 2006;4:23.

26. Oxman AD, Schunemann HJ, Fretheim A. Improving the use of research evidence in guideline development: 12. Incorporating considerations of equity. Health Res Policy Syst 2006;4:24.

27. Schunemann HJ, Fretheim A, Oxman AD. Improving the use of research evidence in guideline development: 13. Applicability, transferability and adaptation. Health Res Policy Syst 2006;4:25.

28. Oxman AD, Schunemann HJ, Fretheim A. Improving the use of research evidence in guideline development: 14. Reporting guidelines. Health Res Policy Syst 2006;4:26.

29. Fretheim A, Schunemann HJ, Oxman AD. Improving the use of research evidence in guideline development: 15. Disseminating and implementing guidelines. Health Res Policy Syst 2006;4:27.

30. Oxman AD, Schunemann HJ, Fretheim A. Improving the use of research evidence in guideline development: 16. Evaluation. Health Res Policy Syst 2006;4:28.

31. Oxman AD, Schunemann HJ, Fretheim A. Improving the use of research evidence in guideline development: 2. Priority setting. Health Res Policy Syst 2006;4:14.

32. Fretheim A, Schunemann HJ, Oxman AD. Improving the use of research evidence in guideline development: 3. Group composition and consultation process. Health Res Policy Syst 2006;4:15.

33. Boyd EA, Bero LA. Improving the use of research evidence in guideline development: 4. Managing conflicts of interests. Health Res Policy Syst 2006;4:16.

34. Fretheim A, Schunemann HJ, Oxman AD. Improving the use of research evidence in guideline development: 5. Group processes. Health Res Policy Syst 2006;4:17.

35. Schunemann HJ, Oxman AD, Fretheim A. Improving the use of research evidence in guideline development: 6. Determining which outcomes are important. Health Res Policy Syst 2006;4:18.

36. Oxman AD, Schunemann HJ, Fretheim A. Improving the use of research evidence in guideline development: 7. Deciding what evidence to include. Health Res Policy Syst 2006;4:19.

37. Oxman AD, Schunemann HJ, Fretheim A. Improving the use of research evidence in guideline development: 8. Synthesis and presentation of evidence. Health Res Policy Syst 2006;4:20.

38. Schunemann HJ, Fretheim A, Oxman AD. Improving the use of research evidence in guideline development: 9. Grading evidence and recommendations. Health Res Policy Syst 2006;4:21.

39. Pattinson RC, Say L, Makin JD, Bastos MH. Critical incident audit and feedback to improve perinatal and maternal mortality and morbidity. Cochrane Database Syst Rev 2005;(4):CD002961.

40. Baker, G. Ross, Norton, Peter, and Canada. Patient safety and healthcare error in the Canadian healthcare system: A systematic review and analysis of leading practices in Canada with reference to key initiatives elsewhere: a report to Health Canada. Ottawa: Health Canada; 2002.

41. Hochstadt NJ. Child death review teams: A vital component of child protection. Child Welfare 2006;85(4):653-70.

APPENDICES

The following tables provide detailed information about the systematic reviews and primary studies identified in the rapid synthesis. The ensuing information was extracted from the following sources:

- systematic reviews - the focus of the review, key findings, last year the literature was searched and the proportion of studies conducted in Canada; and
- primary studies - the focus of the study, methods used, study sample, jurisdiction studied, key features of the intervention and the study findings (based on the outcomes reported in the study).

For the appendix table providing details about the systematic reviews, the fourth column presents a rating of the overall quality of each review. The quality of each review has been assessed using AMSTAR (A MeaSurement Tool to Assess Reviews), which rates overall quality on a scale of 0 to 11, where 11/11 represents a review of the highest quality. It is important to note that the AMSTAR tool was developed to assess reviews focused on clinical interventions, so not all criteria apply to systematic reviews pertaining to delivery, financial or governance arrangements within health systems. Where the denominator is not 11, an aspect of the tool was considered not relevant by the raters. In comparing ratings, it is therefore important to keep both parts of the score (i.e., the numerator and denominator) in mind. For example, a review that scores 8/8 is generally of comparable quality to a review scoring 11/11; both ratings are considered "high scores." A high score signals that readers of the review can have a high level of confidence in its findings. A low score, on the other hand, does not mean that the review should be discarded, merely that less confidence can be placed in its findings and that the review needs to be examined closely to identify its limitations. (Lewin S, Oxman AD, Lavis JN, Fretheim A. SUPPORT Tools for evidence-informed health Policymaking (STP): 8. Deciding how much confidence to place in a systematic review. *Health Research Policy and Systems* 2009; 7 (Suppl1):S8).

All of the information provided in the appendix tables was taken into account by the authors in describing the findings in the rapid synthesis.

Appendix 1: Summary of findings from systematic reviews about death review processes

Focus of systematic review	Key findings	Year of last search/ publication date	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada
No relevant systematic reviews were identified for this rapid synthesis				

Appendix 2: Summary of findings from primary studies about child and complimentary death review processes

Focus of study	Study characteristics	Sample description	Key features of the intervention(s)	Key findings
Six-country comparison of child death review processes to identify good practice to inform policy and practice around prevention (4)	*Publication date:* 2013 *Jurisdictions studied:* Australia, New Zealand, the United States, Canada, England and Wales *Methods used:* Multiple case study design including documentary analysis, semi-structured interviews, observation	Case studies in six countries (New Zealand, England and Wales each as a single case, five states in Australia, eight states in the U.S. and two provinces in Canada) (n=18) Interviews with "over 100" key informants and observations during child death review meetings (U.S., England), and two-day meeting of 67 state coordinators (U.S., Canada)		A wide variation in the organization of child death review teams, cases reviewed and how reviews are performed is noted within and across the six countries studied. The importance of standardized data input processes and definitions at the individual child death review level is emphasized, as is greater standardization and aggregation of data at a national or state level (e.g., in Canada and the U.S.) to facilitate the identification of trends in child mortality. Using a model that incorporates an individual review, a cross-case review and themed review of child deaths would provide a greater evidence base for the development and implementation of prevention initiatives. Involvement of families in the process can contribute key information and should be incorporated into child death review processes.
Learning from child death review in the U.S., England, Australia, and New Zealand (3)	*Publication date:* 2014 *Jurisdictions studied:* U.S., England, Australia, New Zealand *Methods used:* Literature review	Review of 81 papers relevant to internally reported processes for child death review		The following were identified as lessening the value of systems that record and classify child deaths to developing public health strategies for the reduction of child mortality: inaccuracies in the process of death certification; restrictions imposed by reliance on single causes of death and different systems for grouping cause of death; inability of systems to go beyond identification of what the child died from to consideration of how and why the child died; lack of engagement and scrutiny at local or national levels; insufficient focus on learning of lessons or prevention of future child deaths; and little involvement of, or feedback to, families.
Review of child death review programs focusing on standardized procedures and best practice recommendations (5)	*Publication date:* 2010 *Jurisdiction studied:* USA	Representatives of 48 states and the District of Columbia (with active child death review programs)		Almost all child death review programs had legislation enacted to support the program, and nearly half (45%) of the programs conducted child death reviews at the local level with state-level advisory. A lack of consistency among programs was identified in: case review (e.g., 14 programs (31%) report conducting a full review of all child deaths from birth to age 17

Focus of study	Study characteristics	Sample description	Key features of the intervention(s)	Key findings
	Methods used: Telephone interviews and program review			years, while the remaining 34 programs report typically reviewing sudden infant death syndrome cases, "unexpected / unexplained" deaths, cases that involved child maltreatment, and deaths that appear to be preventable); data collection methods; training requirements (e.g. just over half of child death review programs offer member training, but a large variability in training requirements exists across the country); the use of best-practice recommendations; and funding for programs.
Child death and significant case reviews: International approaches (2)	*Publication date:*2005 *Jurisdictions studied:* Australia; Belgium; Brazil; Bulgaria; Canada; England; Germany; Ireland; Israel; Jordan; Netherlands; New Zealand; Northern Ireland; Norway; Portugal; Romania; Scotland; South Africa; South Korea; Spain; Sweden; Switzerland; U.S.; Wales. *Methods used:* Literature review, internet search, document analysis, questionnaire, some follow up by telephone interviews	Questionnaire distributed to 24 selected researchers, managers, policymakers and practitioners known as international experts in 24 countries (response n=14; with information received by discussion only from four countries)		All 24 countries surveyed had a system for reviewing child deaths and serious injuries when abuse and neglect were contributory factors, but considerable variation exists. The main differences were found in: the predictability of a review occurring; the existence of a standing group to commission and undertake the review; whether the impetus behind an inquiry was the fact of death or an attempt to understand the abuse that caused it; criteria for cases to be investigated; the mandate (legal or professional); coroner and police roles in commissioning inquiries; scope of inquiry; the relationship of abuse and neglect investigations to monitoring arrangements of other causes of harm to children; quality of the information systems informing reviews; costs of inquiries; and the arrangements for publication, dissemination of findings. The authors emphasize that a universal child death review process is unlikely, but awareness of and addressing identified system features that hinder the work of child death reviews can only improve process and functioning.
Improving the practice of child death overview panels (CDOPs) from a pediatric perspective (6)	*Publication date:* 2014 *Jurisdiction studied:* England *Methods used:* Online questionnaire, descriptive statistics and thematic qualitative analysis of responses	The sample included 84 of 93 CDOP pediatricians (designated for all unexpected deaths of children under 18 years of age in England).		The functions of CDOPs identified by pediatricians as 'most important' were learning from cases (30%), identification of modifiable factors (29%), and prevention of future child deaths and/or improving child health (27%). Identified themes for improvement included: discontinuing, reducing or devolving neonatal reviews to hospital-based or other expert review (32%); convening themed meetings for deaths related to specialty services (e.g., cardiac) with invited specialists (48%); ensuring appropriate professionals attend CDOPs to improve efficiency (26%); and instituting a process for clinical review/filtering of cases ('triage') prior to meetings, to ensure discussion focuses on deaths where there are uncertainties or recommendations are likely to arise. Other suggestions to increase effectiveness included: improving links with coroners; employing a dedicated CDOP nurse; sharing data electronically with non-CDOP agencies; maximizing available data by including

Focus of study	Study characteristics	Sample description	Key features of the intervention(s)	Key findings
				morbidity and mortality information; and holding multi-agency seminars to network, pool data, and share learning.
Child death review process from a local area perspective (7)	*Publication date:* 2013 *Jurisdiction studied:* England *Methods used:* Retrospective case review; thematic qualitative analysis of semi-structured key stakeholder interviews; consultation with bereavement counsellors	Case notifications to a local Child Death Overview Panel (CDOP) (n=208) Stakeholder interviews (n=18) (included a mix of those who attend CDOP meetings and others who are a part of the child death review process)		Of 208 cases notified, 105 (50.5%) were reviewed to completion by CDOP. Sixty-one cases notified (29.3%) underwent a rapid response meeting. Of those reviewed to completion, 65 (61.9%) were completed within 12 months of notification. Seventy-eight (74.2%) of deaths occurred in children less than one year of age. Modifiable factors were identified in 28 cases (26.7%), while a decision was unreachable due to inadequate or no information in eight cases (7.6%). Themes identified from stakeholder interviews included: issues arising from CDOP meetings (e.g., difficult terminology used, delays in case completion, need for forms and information to be shared prior to meetings, lack of a triage system for cases that do not need to come to CDOP); a need for better information gathering (e.g., gaps in completion of forms, more liaison with coroner for post-mortem information, need to incorporate findings from other processes such as rapid response, hospital Mortality and Morbidity findings into the information gathering system); a lack of lesson sharing (among the CDOP membership and CDOPs nationally); and the bureaucratic and time consuming nature of the child death review process.
Developing effective child death review through a study of 'early starter' child death overview panels in England (11)	*Publication date:* 2011 *Jurisdiction studied:* England *Methods:* Survey, semi-structured interviews, structured observations and document analysis	Child Death Overview Panel (CDOP) sites selected from 24 Local Safeguarding Children Boards. Two sites had not established a CDOP within the timescale of the project, but were included to facilitate an understanding of the processes involved in CDOP establishment (n=9) Demographic audits by selected CDOPs (n=9) Interviews with the chairs of the sites (n=9) CDOP meetings (n=9) were attended at eight sites		Key themes emerging in relation to CDOP systems and structures included the importance of motivated and committed individuals, a clear purpose/guidance, flexibility in structure to address local variability, involvement of senior level multidisciplinary professionals, trust among members, protocols and procedures, audit and governance systems, and the development of clear relationships with other processes such as Serious Case Reviews. In relation to CDOP processes and functions, most panels felt that not all deaths could be reviewed to the same depth. Approaches to data collection and review were noted as time consuming, and meetings ran more smoothly when collated information was provided rather than relying on original case records. Supplementing a limited data set of categorical information with narrative information was identified as the best approach. Standard approaches to liaison and information sharing needed developing (no teams had involved parents in the review process); analytical frameworks had yet to be developed and the main emphasis was on learning broad lessons from all deaths rather than individual case issues. Based on the above themes, 11 recommendations for developing CDOPs are provided, which indicate that: 1. new child death overview panels should be established in accordance with any national guidance, taking account of the local situation and in

Focus of study	Study characteristics	Sample description	Key features of the intervention(s)	Key findings
				consultation with neighbouring areas; 2. each panel should define their terms of reference, to include the purposes and functions of the panel, membership, chairing and administration, relationships with other processes, information sharing, outputs and lines of accountability; 3. the CDOP should have a core membership, with representatives of the local key agencies, including public health, pediatrics, social care, and police as a minimum, and with the option for the core membership to be supplemented by co-opted members from other disciplines; 4. panels should consider how they can appropriately include lay representatives; 5. panels should establish mechanisms for appropriately informing and involving parents and other family members in the child death review process; 6. each panel should appoint an administrative team to support its work; 7. CDOPs should meet on a regular basis to review all deaths of children normally resident in their area; 8. each panel should establish operational procedures for the smooth running of the child death review processes and should monitor their implementation and output (this will include procedures for notification, information gathering, collation and analysis of the information gained, overviews of all deaths, and outcomes); 9. each panel should establish systems for safe storage and use of data gathered for the child death overview processes; 10. each panel should ensure that training is provided for all members, including co-opted members; and 11. each panel should monitor the function and outcomes of its CDOP and any related processes, and should have clear accountability to an overseeing organization or agency.(11) (p. i59)
Developing CLEAR (Case for change; Learning oriented; Evidence; Assign responsibility; Review) recommendations from child death inquiries and reviews (8)	*Publication date:* 2014 *Jurisdiction studied:* Ireland *Methods:* Document analysis; elite interviews; focused key informant conversations	Five high profile reports from child death inquiries held in Ireland between 1993 and 2010 Semi-structured interviews: n=21 participants including former inquiry team members, three chairs, professionals who had given evidence to inquiries, and professionals involved in implementation of Inquiry recommendations within the Health Service		The study found that inquiry or review recommendations are unlikely to be implemented if they are too numerous, impractical, expensive, lack relevance, or are out of step with current social norms. To ensure that recommendations are informed by relevant sources of information, knowledge and expertise, a collaborative approach is necessary. The participation of key stakeholders in the process of recommendation development facilitates the promotion of ownership. The authors provide a template for developing inquiry recommendations that are oriented primarily towards the organization, management and delivery of professional public services: CLEAR. Recommendations should be framed to clearly identify the rationale for change, promote learning, cite the relevant evidence and identify who or what organization(s) will be responsible for their implementation.

Focus of study	Study characteristics	Sample description	Key features of the intervention(s)	Key findings
		Executive (HSE)/health boards, the Department of Health/Department of Children and Youth Affairs and An Garda Síochána 21 key informant interviews with staff in government offices and organizations		
Improving child death review team recommendations (10)	*Publication date:* 2011 *Jurisdiction studied:* U.S. *Methods used:* Descriptive analysis of child death review team written recommendations using an assessment instrument consisting of four components (divided into 10 dimensions) to score the quality of recommendations	Written recommendations from 21 randomly selected, publicly-available state and local child death review team reports (n=1,093)		Child death review team reports scored highest in the problem assessment component (mean score: 2.7/dimension), followed by written recommendations (2.2/dimension), and action on recommendations (1.9/dimension). Among the highest ranked dimensions, the average scores were only in the mid-range of quality on the assessment scale. Results suggest child death review teams are not as strong in 'proposing solutions' as indicated by their written recommendations, and that child death review team reports often do not address follow-up of their written recommendations. Guidelines offered to help child death review teams enhance the likelihood of producing effective recommendations that prevent future child injuries and deaths include valuing the process of developing and writing recommendations, bundling together similar cases so recommendations are based on multiple deaths, utilizing a two-tier review process (a technical team to review cases and an action team to create/promote recommendations), ensuring effective team leadership, and tracking successes to document relevance and effectiveness of child death review team processes.
Collaborative process improvement to enhance injury prevention in child death review (9)	*Publication date:* 2010 *Jurisdiction studied:* U.S. *Methods used:* Before/after study; retrospective report review	Four intervention child death review teams and 21 comparison child death review teams in Washington State Completed report forms reviewed during baseline period: 40 intervention and 40 comparison groups. Completed report forms reviewed post-intervention: 30 intervention groups and 26 comparison groups	The intervention teams were provided with a series of technical assistance and training activities including teleconferences, annual in-person training events, and access to a website providing quality- rated evidence for injury prevention. The interventions included five mechanisms of injury-related child death that were most likely to be useful to child death review	Collaborative process improvement and access to injury prevention decision support resources led to measurable improvements in child death review team function and in the quality of recommendations generated. No significant differences were found in the proportion of injury specific data elements completed between comparison and intervention teams at baseline. The mean proportion complete for comparison team cases in follow-up was 0.56, while in intervention team cases in follow-up the mean proportion was 0.88. The mean quality score in recommendations generated by intervention teams increased significantly from 4.3 to 7.6, but there was no significant change in the comparison teams. The quality of prevention recommendations submitted by intervention teams improved in the domains 'reference to best practices' and 'specificity and clarity of written recommendations' (with no change noted in any domain among comparison group teams).

Focus of study	Study characteristics	Sample description	Key features of the intervention(s)	Key findings
			teams operating in a public health system; and a recommendation writing template based on available guidelines.	
The role and function of child death review teams and their contributions to child welfare in practice, prevention and policy (41)	*Publication date:* 2006 *Jurisdiction studied:* U.S. *Methods used:* Descriptive review	Not applicable	Not applicable	Organization and structure of child death review teams vary, but share common functions to investigate preventable child deaths and identify their causes, identify changes necessary to prevent future deaths, collect data to identify trends to formulate public policy, develop public health and prevention initiatives, and help allocate public resources for children. Contributions of child death review teams include improved interagency communication leading to better management of future cases, intervention for surviving and at-risk siblings, improved criminal and civil prosecution, reduction of misclassifications of child death causes, improved services to high-risk families, improved data collection for the study of child deaths, and increased public education and communication about child deaths and child abuse prevention.
Using standardized mortality reviews to improve patient safety (12)	*Publication date:* 2011 *Jurisdiction studied:* U.S. *Methods used:* Retrospective chart review, and qualitative abstraction of hospital harm events to create 'patient narratives'	Charts of the most recent 50 consecutive deaths of patients >16 years old at 11 hospitals, examined using a three-day standardized mortality review (SMR) process by a multidisciplinary team including quality and risk management staff, operational staff (nurses) and physicians	Trained nurse reviewers identify potential adverse events, adverse drug events using Institute for Healthcare Improvement global trigger tool and 2x2 mortality matrix, elements of U.K. National Health Service 3x2 matrix and 'dive deep' questions (related to preventable harm and the use of appropriate care settings) through chart abstraction. Physician review and validation follows De-identified patient narratives (highlighting involved systems and human complexity of events) were developed. A leadership conference (with medical and	SMR identified the relative frequency of several categories and levels of potential harm. 'Dive deep' questions identified potential areas for improvements, and combined with quantitative data made SMRs more compelling for senior leadership when reviewed. Multidisciplinary teams were identified as a key strength of SMR (promoting a focus on prevention of patient deaths as a shared priority). Time is a barrier to implementing the SMR process and support from senior leaders is crucial. Limitations of the SMR process included: relative inefficiency in identifying patients who may have suffered harm when only reviewing the last 50 consecutive hospital deaths; and retrospective nature of the MR process.

Focus of study	Study characteristics	Sample description	Key features of the intervention(s)	Key findings
			operational leaders) was held to review data/narratives and identify strategies to improve and monitor care	
Using a death and adverse event review process to improve clinical care and reduce harm (13)	*Publication date:* 2010 *Jurisdiction studied:* Canada *Methods used:* Retrospective chart review using the Global Trigger Tool (modified to include screening criteria identified in the Canadian Adverse Events study and criteria identified by hospital physicians and interdisciplinary practice chiefs); questionnaire	Chart review n=1,817 deaths in a seven-site, 1,000 bed regional tertiary care facility Survey of 18 interdisciplinary death review committee (DRC) members (i.e., physicians, profession chiefs, quality and patient safety team members) Survey of 48 stakeholders (i.e., clinical managers, directors involved in DR process)	The modified Global Trigger Tool is used by trained patient safety specialist reviewers (PSSR) to review all adult deaths within 72 hours. Any charts with identified adverse event or quality of care issues are referred to the DRC for recommendations and follow-up strategies to prevent reoccurrence, which are then forwarded to appropriate stakeholders.	Use of trained PSSRs (nurses) and the modified trigger tool for primary screening prior to DRC review promotes physician engagement and saves time by enabling DRC to focus on events with suspected issues versus *all* deaths. In a six month period charts accepted for 2nd level review increased from 15.4% to 57%. The majority of DRC members (82%) rated primary screening of charts by PSSRs as 'very valuable to having excellent value' and found the new process an efficient use of time and an improvement on occurrence reporting. The majority of DRC members (82%) and stakeholders (67%) rated the impact of the death and adverse event review process on improving patient safety as 'good to excellent', although 67% of stakeholders agreed that the sharing of learning from the DR is an area for improvement.
Investigation of emergency department death audit process that includes deaths occurring within 48 hours of admission (16)	*Publication date:* 2009 *Jurisdiction reviewed:* Australia *Methods:* Retrospective chart review	The hospital Incident Investigation and Monitoring System (IIMS) was searched for major incident reports involving death A total of 303 deaths reviewed, including 75 deaths in the emergency department (ED) and 228 deaths within 48 hours of admission from the ED		The ED auditor recommended no further action in 66/75 (88%) ED deaths and 195/228 (86%) 48-hour deaths. A major hospital review was recommended in 4/75 (5%) ED deaths and 11/228 (5%) 48-hour deaths (only three and seven of these, respectively, had been detected by the hospital's IIMS). The audit identified 10 of 13 deaths notified to the IIMS and the remaining three did not involve errors relevant to the ED. Internal review was recommended in one ED death and eight 48-hour deaths. Authors conclude that auditing deaths within 48 hours of admission as well as deaths in the ED identifies additional recommendations and actions compared with ED deaths alone, or relying on spontaneous reports to the IIMS.
Audit of deaths less than a week after admission through an emergency department to identify the accuracy of emergency department (ED) diagnosis and whether any deaths were preventable (17)	*Publication date:* 2007 *Jurisdiction reviewed:* U.K. *Methods*: Retrospective review	Patients attending an ED over a four month period who died within seven days of admission (n= 95 cases, 2.69% of admissions) Case notes reviewed included: paramedics' notes,	Case notes were reviewed against a checklist and summarized in individual patient summary sheets. Summary sheets were subject to blinded review and cases where care	82.1% (n=78) patients who died following ED admission were adequately diagnosed and managed in the ED; 13.6% (n=13) cases were misdiagnosed; and 4.2% (n=4) had an unclear diagnosis. Among the cases that involved errors, 5.26% were unpreventable deaths, 3.15% deaths were definitely preventable, 3.15% were probably preventable and 6.31% were possibly preventable deaths. The authors note that concentrating on detection of preventable deaths in

Focus of study	Study characteristics	Sample description	Key features of the intervention(s)	Key findings
		ED case cards, inpatient medical notes, death certificate book entries and details of postmortem findings	provided by the ED could have been improved were reviewed, errors were identified and deaths were classified as preventable or unpreventable using a modified typology of critical incidents.	their review provided an opportunity to identify faults in the system rather than blaming individuals
A revised morbidity and mortality format emphasizing patient safety (14)	*Publication date:* 2008 *Jurisdiction reviewed:* U.S. *Methods:* Before-after study using a survey to measure participant attitudes towards patient safety and conference redesign	Ninety residents and fellows in a department of internal medicine training program at an academic teaching hospital participated in the initial survey; 58 completed the follow-up survey	A patient-safety multi-morbidity conference (PSMMC) format focused on distinguishing between a culture of blame/shame and a culture that promotes safety through a system analysis of adverse events, identifying gaps in quality contributing to an adverse outcome, identifying strategies to close gaps, participating in a modified root cause analysis, and action plan development.	Associated with cases discussed during the 11 months, conference participants identified 150 contributing factors and 121 system improvement recommendations. Multiple improvements in the quality of patient care were initiated as a result of the new format. Facilitators determined that 39 (32%) of the system recommendations should be pursued based on likelihood of achieving high impact changes, and these targeted changes were assigned to department/facility representatives with 23 (59%) improvements implemented within a year, 11 (28%) partially implemented or in progress, and five (13%) abandoned due to impracticality or redundancy. Categories of system changes successfully implemented included enhancements in information technology, development of new educational programs, and modifications to medical documentation. Limitations include the lack of multiple populations being examined and minimal participation from department fellows.
Development, implementation and performance of an electronic mortality review method that gathers information from front-line providers (15)	*Publication date:* 2014 *Jurisdiction studied:* U.S. *Method:* Case study and retrospective chart review	Patient deaths: n= 1,068 Electronic notifications sent to clinicians: n=2,869 (a minimum of two per death including the attending and first responder) Completed electronic mortality reviews: n= 2,547 (89%) Patient deaths with at least one clinician death review using the instrument: n=1,052 (99%).	Patient deaths trigger an immediate email notification to clinicians to provide their assessment by completing a mortality review instrument for which a link is provided. Reminders are sent at 72 hours, and weekly for six weeks. The short questionnaire addresses four categories of system level events that may contribute to preventable death (healthcare associated infections, common hospital associated complications, delays in	The tool was developed in response to an inventory of current mortality review processes in a 763-bed academic teaching hospital which found that case selection and depth of review varied by department (ranging from 59% routinely reviewing all deaths to 14% reviewing none), and that a method for aggregating potential contributing factors to mortality did not exist. The process for the electronic review was built around stakeholder input on seven consensus principles related to reporting (data should be aggregated and trended across departments), scope (process should cover all deaths), source (front-line clinician input could provide more information than a 3rd party, with input from the entire care team preferable), speed (must be quick and efficient to take into account non-preventable deaths), timing (should be completed 48-72 hours after death to allow completion from memory), and additional review (if required) During the first 12 months of the review process clinicians provided suggestions for improvement in 7.7% (191/2,491) of completed reviews, and reported that 4.8% (50/1,052) of deaths may have been preventable. Quality and safety issues contributing to potentially preventable inpatient

Focus of study	Study characteristics	Sample description	Key features of the intervention(s)	Key findings
			responding to tests or procedures, and communication problems between clinical teams). Clinicians provide a brief summary of the patient's course, code status, if it changed during hospitalization, their opinion on the preventability of death, and a preventability score from 1-5 (with 4 and 5 being preventable).	mortality included delays in obtaining or responding to tests (15/50, 30%), communication barriers (10/50, 20%) and healthcare associated infections (9/50, 18%). An independent, blinded chart review of a sample of clinician reviews by the researchers detected potential preventability in 10% (2/20) of clinician reported cases as potentially preventable, and of 20 cases rated as non-preventable by clinicians, the blinded reviewer rated 0% as preventable. Authors conclude that the high response rate and timeliness of response demonstrate a willingness on the part of clinicians to provide information related to quality and candid opinions related to potential error and preventability. As a result of the study, a mortality review committee was established to review deaths for which any respondent had reported a potential error, provided any free text responses, or made a suggestion for improvement, and improvement efforts resulting from committee review include improved weight-based decision support around anticoagulant use, mechanisms surrounding hand-offs for outside hospital transfers, and enhanced staffing for consults in specific circumstances
Application of change analysis to narrative reports made by hospital death reviewers to increase the utility of information in the analysis of patient harm(18)	*Publication date:* 2014 *Jurisdiction studied:* U.K. *Method:* Qualitative, retrospective case record review of 1,000 deaths in acute National Health Service Trusts in 2009 Change analysis was used to derive case narratives from the case record-based mortality review	52 preventable hospital deaths	The reviews were undertaken by 17 recently retired generalist physicians, trained and supported by expert reviewer advice. Reviewers addressed a structured set of questions, and provided a brief narrative account of the circumstances for each case.	Analysis of the case narratives of deaths judged to be preventable using change analysis provides a better understanding of the nature of problems in care underlying the deaths, and in the identification of multiple omissions (delineated from acts of ommission) across the care pathway which the authors conclude can facilitate more tailored responses to identified patient harm. An average of three problems in care associated with preventable death per case were identified (range 1–8), with more than 70% being related to omissions in care, and an average of five (range 1–10) contributory factors were identified per patient.
Development and evaluation of a structured judgment method to enhance mortality case note review (19)	*Publication date:* 2013 *Jurisdiction studied:* U.K. *Methods:* Retrospective chart analysis of commentaries written by trained physician reviewers in support of judgment scores of care provided for cases of death in 20 hospitals	Total case notes (n=566) from 40 physicians in 20 hospitals Total analyzed (deaths only): (n=119) (7.6% of the cohort)	Implicit judgment method, combining structured reviewer comments with quality of care scores, to assess care of people who die in hospital	A combination of implicit judgments (i.e., based on clinicians' knowledge and experience), and explicit explanatory comments (i.e., assessing the quality of processes of care using a set of predetermined criteria), combined with related quality of care scores provides a way to effectively review the spectrum of care provided for people who die in hospital. A key advantage of the method is it can be used to evaluate deaths in a timely manner, and facilitate quicker learning from both poor and high quality care.

Focus of study	Study characteristics	Sample description	Key features of the intervention(s)	Key findings
Measuring adverse events and levels of harm in pediatric inpatients with the Global Trigger Tool (GTT) (20)	*Publication date:* 2012 *Jurisdiction studied:* U.S. *Methods used:* Retrospective chart review	Random sample of 20 inpatient electronic medical records (EMR) reviewed monthly for a year (n=240)	EMRs were reviewed independently by two trained nurse primary reviewers for any of the stage three surgical module triggers. A more focused review for adverse events was undertaken if one or more triggers were identified, and a level of harm assigned. The chart was then reviewed by a physician validator for a decision on adverse events and severity.	The GTT was useful in detecting a wide range of AEs during the study. A two-to-three times higher harm rate was detected with the GTT than found previously with different metrics in this pediatric setting. A total of 404 triggers were detected (1.7 triggers per patient), and 88 adverse events were identified. Rates of 36.7 adverse events per 100 admissions and 76.3 adverse events per 1,000 patient-days were calculated. Sixty-two patients (25.8%) had at least one adverse event during hospitalization, and 18 (7.5%) had more than one event identified. Three-quarters of the events were category E (temporary harm). Two events required intervention to sustain life (category H). No deaths were reported. The authors note that the presence of adult-oriented modules and entire modules of less-useful triggers suggest a need for modification if the GTT is to be used effectively in pediatric environments.
Neonatal intensive care unit (NICU) focused tool for adverse event detection (21)	*Publication date:* 2006 *Jurisdiction studied:* U.S. *Methods used:* Chart review	Patients from 15 NICUs with a minimum 2-day NICU stay were randomly selected (n=749 charts)	A neonatal nurse or neonatologist trained in chart review methods reviewed selected charts for the presence or absence of each of 17 triggers. Each trigger identified prompted additional in-depth review for the presence of associated AEs. AEs not associated with a trigger were also noted. Each identified trigger and any AE were reviewed to determine whether they could have been prevented, identified earlier, or mitigated more effectively.	Chart review utilizing the trigger tool identified 2,218 triggers (2.96 per patient), and 554 unique adverse events (0.74 per patient). The positive predictive value of the trigger tool was 0.38. The most common adverse events identified were nosocomial infections, catheter infiltrates, and abnormal cranial imaging, and adverse event rates were higher for patients <28 weeks' gestation and <1500 g birth weight. More than half (56%) of all adverse events were deemed preventable;,16% could have been identified earlier, and 6% could have been mitigated more effectively. Only a small percentage (8%) of adverse events had been identified in occurrence reports. Authors conclude that adverse event rates in NICU setting are substantially higher than previously described, and the NICU-focused trigger tool is efficient and effective at identifying adverse events.
Safety Event Classification System and Serious Safety Event Rate patient safety measurement system for healthcare (22)	*Publication date: 2009* *Jurisdiction:* U.S. *Methods used:* Review			The review provides an overview of the HPI Safety Event Classification System, outlining the levels of harm, assessment and the implications of known complications. The Safety Event Classification System serves as the foundation for the calculation of the Serious Safety Event Rate, a volume-adjusted measure of those events occurring from a deviation from accepted performance standards and resulting in moderate to severe patient harm or death.

McMaster University

McMaster HEALTH FORUM

>> Contact us

McMaster Health Forum
1280 Main St. West, MML-417
Hamilton, ON Canada L8S 4L6
Tel: +1.905.525.9140 x 22121
Email: mhf@mcmaster.ca

>> Follow us

mcmasterhealthforum.org
healthsystemsevidence.org
healthsystemslearning.org

tinyurl.com/mhf-iTunesU
tinyurl.com/mhf-YouTube
tinyurl.com/mhf-Facebook
tinyurl.com/mhf-Twitter

EVIDENCE >> INSIGHT >> ACTION