Healthcare improvement based on learning from adverse outcomes

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Chapter 12

Summary

SUMMARY

Quality and safety improvement is a relatively novel discipline in healthcare practice and research that solidified in the early 21st century. Since then, various systems have been installed to collect information on various types of adverse outcomes, such as adverse events, incidents and patient complaints. Data from these systems can be used to evaluate care delivered to individual cases as well as to study aggregated data for patterns, trends and other insights. However, as described in **Chapter 1,** more research is warranted to assess whether these systems actually meet the objective of continuous, systemwide learning and improvement. It was expected that existing practices could benefit from individual optimization as well as better integration, because most of this intelligence is currently stored and used in isolation. Specific research questions of this PhD thesis included:

How can we learn most effectively from various types of adverse outcomes:

(i) based on case discussions at morbidity and mortality conferences;

(ii) by integrating available information sources (e.g., incidents, patient experiences);

(iii) in the context of everyday practice that produces adverse as well as desired outcomes;

in order to continuously improve healthcare?

The first three studies presented in this PhD thesis focused on learning from morbidity and mortality conferences (M&M), during which clinicians discuss individual cases with adverse outcomes, in order to improve care for future patients (research question i).

In **chapter 2**, an American and a European academic surgical department with a long tradition of M&M practice were studied using a mixed-methods approach, including observations and surveys among 135 professionals attending M&M. Despite profound differences in the format and organization of the conference, both departments shared the same expectations and challenges. Most participants felt that the educational objective was successfully met, but more was still expected from the conference's focus on, and function for, quality improvement (QI). Yet, respondents from the site with a more active moderator and dedicated QI committee were more positive about these aspects than other respondents. In addition to confirming the well-known practice variation in M&M, this study provides indications that specific challenges for M&M might be more universal, and illustrates how practice variation can be deployed to study strengths and challenges of different formats.

The qualitative study in **chapter 3** sought to examine the more human factors involved in M&M practice, specifically identifying factors that influence M&M success, defined as a conference that drives learning and improvement. A total of 57 facilitators and barriers across 17 themes were identified based on qualitative analysis of 12 semi-structured interviews with a purposive sample of clinicians. While some of these factors related to organizational aspects, many others represented individual or team factors, such as personal motivation and group dynamics. Four team-level factors were perceived as having both positive and negative po-

tential, including ‘team spirit’, ‘hierarchy’, ‘audience composition/size’ and ‘multidisciplinary participation’. This study also provided indications on key elements of the desired atmosphere for M&M, many of which were related to the use of ‘soft skills’ (e.g. people or communication skills) to encourage and facilitate participation and input from the audience. Taken together, the barriers and facilitators appeared to affect whether one is adequately *informed*, *motivated* and *enabled* to learn and realize plans for improvement through M&M. Based on the study findings, a set of actionable recommendations was formulated, each targeting one or more of these three pathways to M&M success.

Chapter 4 presented a study that assessed the frequency, type and recurrence of lessons for future patient care identified at M&M, exploring whether these could serve as a measure of success. This study demonstrates how systematic documentation of lessons learned at M&M can be used to monitor what is learned and not learned at M&M, revealing areas for which lessons may be more difficult to realize and sustain. Over a period of 8 years, 318 lessons had been drawn from evaluations of a total of 10,883 adverse events (AEs) at weekly M&M meetings. Lessons were primarily identified for AEs that were more severe, related to (surgical) treatment, occurring in nonemergent, lower risk cases. Although most lessons concerned intraoperative technical issues with individual-level improvement, lessons that recurred over time were mostly related to postoperative and medication issues involving various disciplines, such as anticoagulation management. Thereby, this study provides empirical evidence that M&M has a tendency to focus on individual, technical issues, with challenges to realize and sustain improvement at the level of the wider system. Additional interviews with clinicians indicated that feelings of ownership and control may partially be responsible for this unevenly distributed focus.

Studies in chapters 5 through 7 assessed how the various data sources that are currently available in many hospitals, such as from incident reporting and patient surveys, could be optimally used for learning and improvement (research question ii). These studies linked data sources at the patient level which are usually isolated from each other, to explore how closer integration of these data could enhance efforts to learn and improve using this intelligence.

In **chapter 5**, data from incident and adverse event (AE) reporting systems and patient complaints handling were linked for 26,383 inpatient admissions to study relations and clustering of these events at the patient level. The study found that complaints filed for cases with incidents and/or AEs more often addressed problems related to quality and safety rather than relationship problems, which were mostly adressed by complaints for other admissions. For most co-occurring incidents and AEs, no evident clinical relationship was identified. Yet, patients with incidents were at increased risk of (a cascade of) AEs, regardless of whether these events seemed clinically related. Taken together, this study demonstrates how patient-level linkage of currently available data allows a more comprehensive approach to learn from these information, revealing complex relations that otherwise remain obscured, such as incidents emerging in the context of previous AEs. Current approaches are limited to revealing relations between events that are evident and known; after all, record reviewers or incident reporters only identify an AE as such, when they are able to find a relationship with substandard care or with the specific incident that is reported. However, this study found associations between seemingly unrelated AEs and incidents. This could suggest that these events may be able to increase patient vulnerability and complexity through an underlying mechanism, thereby triggering other, seemingly unrelated, events. Moreover, linked data enables us to study how successful our responses to initial AEs or incidents are at preventing patients from further deterioration, from which we may learn how to enhance our responsive abilities.

Chapter 6 described various problems with using patient complaints at an aggregate level for learning and QI. Although complaint letters provide unique and important information from the patient perspective, they are an elusive source of information (eg, emotive, unstructured), producing data of low and unreliable volume. These specific features of complaint letters complicate efforts to identify the specific problems that underlie the complaint, and thereby prevent formulation of an adequate plan for improvement. It is necessary but particularly difficult to identify whether a problem addressed in a complaint is related to the individual professional or a wider system problem, and whether this is incidental or more structural. This chapter offered suggestions to address these challenges, such as that hospitals could take complaints data out of isolation by integrating them and interpreting them in the context of other QI data and processes. In addition, complaints should be viewed as triggers for participative learning rather than as the sole responsibility of the treating physician, so that learning from complaints is a team effort, akin to the practice of healthcare in general.

Another type of routinely collected data regarding the patient perspective on hospital care is patient experience data. **Chapter 7** presented a study in which patient experience survey data was linked to safety reporting data to study the association between complications (aforementioned 'AEs'), incidents and patient-reported problems as well as overall patient experience. Most patients reporting problems in the survey had no complications nor incidents, confirming that patient feedback serves as a complementary source of information. Although patients with suboptimal experiences more commonly reported problems in the survey if they also had complications/incidents, this did not apply to patients with positive experiences. Among patients reporting problems, those with complications/incidents more commonly reported problems on all experience dimensions, except for 'family involvement' and 'physical comfort' (i.e. pain management), which may reflect that attention to these matters is already increased in cases with complications/incidents. Remarkably, risk of suboptimal experience was lower for patients with only complications/incidents than for patients without any complications/incidents or patient-reported problems, which may also suggest successful responses from staff to meet these patients' needs. Although patient-reported problems independently increased risk of suboptimal patient experience, complications/incidents only did so when combined with patient-reported problems on 'continuity and transition' or 'respect for patient preferences' dimensions. This finding indicates that increased attention to these matters is required in patients with complications/incidents to ensure positive experiences. Similar to chapter 5, this study illustrates how interpretation of linked data from various sources reveals valuable information for improvement.

Chapter 8 demonstrates how hospital communication data can be used to study patterns in communication between healthcare providers, as well as to provide an indication of workflow interruptions and work intensity. The objective of this study was to examine the number, distribution and content of text pages received by residents and physician assistants from a surgical department at an American tertiary academic hospital. In a period of three months, more than 48,000 text pages had been received, with an average of 3 pages per hour and a maximum of 20 per hour. Services where patients were located on the same floor or hallway exhibited remarkably less paging need per patient than services where patients were located on different floors and parts of the hospital, suggesting that the physical layout of these units may be a target for improvement to streamline communication. Natural language processing was used to quantify paging topics in this large volume of open text data. This revealed that most pages concerned medications, particularly pain medications (e.g. opioids), with pain being the most common symptom in pages. Although the hospital had previously implemented protocols for management of pain medications and a postoperative pain service for additional support, these findings highlighted that the need for paging about pain was greater than for other medical issues. Subsequently, local nursing and medical staff discussed these findings and identified the transition from intravenous to oral medication as a potential source for the great number of pages about pain, and hence as a target for improvement.

The final two chapters presented an extension of current approaches to quality and safety, by expanding the focus of learning from adverse outcomes (e.g. incidents, adverse events) to learning from everyday practice (see also Figure 1.1), which produces both adverse as well as desired outcomes (research question iii).

The study presented in **chapter 9** was one of the first in its kind to use the Functional Resonance Analysis Method (FRAM) to study a routine multidisciplinary process in healthcare, i.e., preoperative anticoagulation management. FRAM aims to understand how a process usually works and thus how it often goes right, which is key to the concept of 'Safety-II' that aims to learn from everyday practice rather than only adverse outcomes. This study demonstrated the usability and applicability of the method to increase insight in key functions for functioning of processes, as well as their interdependencies and variability. An initial FRAM model of work-as-imagined was based on guidelines, after which models of work-as-done were iteratively developed using interviews with involved clinicians from a European and Australian academic cardiothoracic surgery department. The results showed that, in both centers, work-as-done appeared to differ from work-as-imagined, and that control mechanisms had been locally developed, some of which were only used by individuals. Moreover, the models revealed how the patient's 'function' (i.e. activity or step in the process) was rather isolated, reflecting how both centers relied heavily on patients' memory and compliance.

The viewpoint presented in **chapter 10** aimed to contribute to the application of Just Culture and Safety-II theories to healthcare, with a specific focus on the process of learning from sentinel events. These theories offer guidance on how we could learn from severe and difficult events in a spirit of trust and accountability (Just Culture), with greater appreciation of the underlying process in everyday practice (Safety-II). Because the same people and system are responsible for the frequent desired outcomes as for the specific sentinel event, everyday practice may serve as a more representative starting point for a learning review. Drawing from the Just Culture and Safety-II literature, this chapter presented a set of questions that clinicians could use to guide the aftercare and learning process following sentinel events. These questions direct the focus toward collective recovery, restoration and forward-looking accountability, moving away from individual culpability. This approach more closely aligns with current efforts to support the involved clinicians ('second victims') in the aftermath of sentinel events. The presented framework first directs attention to all victims' hurts and needs, and only thereafter focuses on a learning review, in which the aim is to identify the sources of resilience that make everyday practice go right so that these can be enhanced.

In conclusion, the research in this PhD thesis highlights various challenges for learning from adverse outcomes in healthcare. Learning from individual cases at M&M is hampered by a tendency to focus on individuals rather than underlying system-level issues, and thus may benefit from greater reflectivity that triggers learning with greater appreciation of the context in which professionals work. Additional challenges are posed by cultural factors, such as the dynamics in teams and among disciplines, which underlines the need for more qualitative research on these domains. Sources of data on adverse outcomes often remain isolated from each other, but should be used in closer connection, linked at the patient level, to allow more comprehensive analyses. **Chapter 11** discussed that strengthening efforts to ensure safe care requires a more in-depth understanding of everyday practice and how this usually goes right in a complex adaptive system such as healthcare. This could be approached by, for example, assessing the role of resilient performance of healthcare professionals to ensure safety and high-quality care under the varying circumstances of everyday clinical practice.