



# **MORBIDITY & MORTALITY TOOL KIT FOR LOW AND MIDDLE INCOME COUNTRIES (LMIC)**



# INDEX

Introduction to the Toolkit	3
General introduction	3
Toolkit development group	3
Needs analysis	4
<b>How to use the Toolkit</b>	<b>5</b>
<b>Definitions</b>	<b>6</b>
<b>What is quality improvement: Its application to morbidity and mortality</b>	<b>10</b>
Stages of Quality Assessment Cycle	12
Quality Indicators	13
Risk management techniques	15
<b>Process analysis and quality improvement tools</b>	<b>17</b>
Introduction	17
The learning organization: Capturing process and outcome failures	17
Quality Assessment tools to measure process and reliability	18
Failure Modes and Effects Analysis	24
<b>Risk Management Tools: An Introduction to Root Cause Analysis</b>	<b>28</b>
What?	28
Why?	28
When?	28
Who?	28
How?	29
The major steps in an RCA investigation	29
Solutions	30
Challenges	33
<b>Improving Systems</b>	<b>36</b>
Improve Communication	37
Team Building Strategies	37
Develop a safety culture	38



Incident reporting systems	38
<b>Searching for evidence-based literature</b>	<b>41</b>
<b>Performing a clinical audit</b>	<b>44</b>
The Audit Cycle	44
Why do this audit?	45
Indicators	46
Proposed standard for best practice	46
<b>Organizing a departmental morbidity and mortality meeting</b>	<b>48</b>
Purpose of a Morbidity and Mortality Meeting	48
Setting the stage	48
Goals of the Morbidity and Mortality Meeting	48
Structure of the morbidity and mortality meeting	49
<b>Morbidity &amp; Mortality Tool</b>	<b>53</b>
<b>List of Contributors</b>	<b>55</b>



## INTRODUCTION

Patient safety is a serious global public health concern. Studies have suggested that there is a 1 in 300 chance of a patient being harmed during health care. Once patients are harmed, Morbidity and Mortality (M & M) meetings are used to analyse cases with adverse outcomes and identify the underlying causes to bring about process changes, improve practices and patient safety. In many hospitals in lower- and middle-income countries (LMIC) this peer review mechanism does not yet exist, either due to unfamiliarity with the process or lack of human resources. In many of the smaller hospitals, only a single anaesthesia provider may cater to the surgical workload. In response, the World Federation of The Societies of Anaesthesiologists (WFSA) Safety and Quality of Practice Committee initiated the Mortality and Morbidity Toolkit project to develop a practical resource that includes the essential elements for anaesthesiologists to do analyse patient morbidity and mortality events and to improve their patient care.

A **toolkit** is intended to guide frontline staff using a collection of authoritative and adaptable resources that can be implemented using practical approaches for addressing key issues. Toolkits provide a collection of open-source techniques and open access design, technical, and implementation resources that can help you plan and effectively implement M & M meetings in your hospital. The toolkit was developed after conducting an extensive needs-analysis survey in five LMICs and following a group consensus of the committee members. We have also included background reading materials to guide the readers on essential topics related to advancing patient safety and risk management. Each chapter provides a suggested reading list for deep reflection and further self-learning to support optimal care delivery.



## **Toolkit development group**

The Toolkit development group was comprised of a sub-committee of the WFSA Safety and Quality of Practice Committee (SQP). The members were from both LMIC and High-Income Countries (HIC). LMICs were represented by members from Pakistan (Fauzia Khan), Nigeria (Bisola Onajin-Obembe), Lebanon (Rola Hammoud), the Philippines (Erlinda C Oracion) and Sri Lanka (Anuja Abayadeera), and the HIC by members from Australia (Philip Blum) and USA (Paul Barach).

## **Needs analysis**

A “needs assessment” was conducted to identify and determine the patient safety needs, examine the nature, and causes of continuous patient harm, and set priorities for future education and training action. The needs analysis survey was completed in 2018 among anaesthesiologists working in five LMICs including Pakistan, Lebanon, Nigeria, the Philippines, and Sri Lanka. The survey results indicated a compelling need for an easy- to-use resource that would provide practical tools and information to increase learning from adverse events. We have also included background reading to guide the readers on essential topics related to advancing patient safety and risk management. Each chapter provides a suggested reading list for further self-learning.



## **HOW TO USE THIS TOOLKIT**

The Toolkit should be used as a guide in setting up a patient safety program. When a patient undergoing anaesthesia is harmed or dies you must first write down the sequence of events while fresh in your mind. The next step is to collect all relevant information from patient notes, talking to other involved providers and your documentation. The next step is to fill in all relevant information in the Morbidity and Mortality form provided (see page 54). Consider the questions “Why did it happen?”, “What happened?”, “Who was involved?”, “Where did it happen?” and clearly start to identify further steps needed by you and/or by the institution / hospital to prevent such an event from occurring again. While you want clear and concise answers, you want to avoid answers that are too simple and overlook important details. Set up a meeting with your administrator/administrators and discuss your findings and analysis with them. Discuss what can be done practically to prevent harm to other patients. Assign responsible parties as needed. Create a timeline on what needs to be done and what is possible given your resources. Set a further date to review changes and assess their impact.



## **DEFINITIONS**

### **PATIENT SAFETY**

Patient Safety is a health care discipline that aims to prevent and reduce risks, errors, and harm that occur to patients during provision of health care. <https://www.who.int/news-room/fact-sheets/detail/patient-safety>

### **INCIDENT**

An “incident” is an event that, under slightly different circumstances, could have been an accident.

National Research Council, Assembly of Engineering, Committee on FF Airworthiness Certification Procedures, Improving Aircraft Safety: FAA Certification of Commercial Passenger Aircraft. Washington, D.C.: National Academy of Sciences, 1980.

### **ACCIDENT**

Unplanned, unexpected, and undesired event, usually with adverse consequences.

Committee on Quality of Health Care in America, Institute of Medicine. To Err is Human: Building a Safer Health System. Washington, DC: National Academy Press, 1999.

### **ERROR**

An **error** is something you have done which is considered to be incorrect or wrong, or which should not have been done.

<https://www.collinsdictionary.com/dictionary/english/error>

Failure to perform intended action that was correct given the circumstances.



*Thomas MJ, Studdert DM, Burtsin H, et al. Incidents and types of adverse events and negligent care in Utah and Colorado. Med Care 2000;38:261-271.*

Failure to complete action as intended, or use of wrong plan to achieve aim.

*Dedication to, Essays on the First Hundred Years of Anesthesia: Sykes WS, Volume 1, pp.1, Churchill Livingstone, London, 1960.*

Medical errors can be defined as the failure of a planned action to be completed as intended or the use of a wrong plan to achieve an aim (commission). The definition also includes failure of an unplanned action that should have been completed (omission).

[https://sphweb.bumc.bu.edu/otlt/mph-modules/hpm/americanhealthcare\\_quality/AmericanHealthCare\\_Quality4.html](https://sphweb.bumc.bu.edu/otlt/mph-modules/hpm/americanhealthcare_quality/AmericanHealthCare_Quality4.html)

## **ACTIVE ERROR/FACTOR**

An active error is one that occurs at the level of the front-line operator and whose effects are felt almost immediately.

<https://psnet.ahrq.gov/glossary-0>

## **LATENT ERROR/FACTORS**

A latent error (or latent conditions) refers to less apparent failures of organization or design that contributes to the occurrence of errors or allowed them to cause harm to the patient.

<https://psnet.ahrq.gov/glossary-0>

## **NEAR MISS**

Case where an accident was narrowly averted or an error that almost happened but was prevented.



*Baker SP, O'Neill B, Ginsburg M, Guohua L. The Injury Fact Book, 2nd edition, New York: Oxford University Press, 1992.*

## **ROOT CAUSE**

A **root cause** is defined as a factor that caused a nonconformance and should be permanently eliminated through process improvement.

<https://asq.org/quality-resources/root-cause-analysis>

Root cause analysis (RCA) is a widely used method deployed following adverse events in health care. RCA seeks to understand what happened and why and to identify how to prevent future incidents.

*Bagian JP, Gosbee J, Lee CZ, Williams L, McKnight SD, Mannos DM. The Veterans Affairs root cause analysis system in action. Jt Comm J Qual Improv. 2002;28:531-545.*

## **CONTRIBUTING FACTORS**

These are additional reasons, not necessarily the most basic reason, that an event has occurred.

<https://www.patientsafety.va.gov/professionals/publications/glossary.asp>

## **SENTINEL EVENTS (SE)**

These are defined by the Joint Commission as “are unexpected occurrences involving death or serious physical or psychological injury, or risk thereof. SE is a patient safety event that results in death, permanent harm, or severe temporary harm.

<https://www.jointcommision.org/resources/patient-saety-topics/sentinel-event/>

## **OUTCOME**



Health outcomes are changes in health that result from measures or specific health care investments or interventions.

<https://www.cihi.ca/en/outcomes>

## **TOOLKIT**

The term has been used to describe a combination of educational materials including templates, instruction sheets, literature reviews, videos, and posters, presented in a variety of formats (hard copy, web).

*Barac R, Stein S, Bruce B, Barwick M. Scoping review of toolkits as a knowledge translation strategy in health. BMC Med Inform Decis Mak. 2014;14:121. Published 2014 Dec 24. doi:10.1186/s12911-014-0121-7*



## **WHAT IS QUALITY IMPROVEMENT?**

### **Its application to Morbidity and Mortality**

**Erlinda C Oracion**

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Clinical anaesthesia practice is known as a model for quality and safety in medicine. In the 1999 Institute of Medicine reported, "To Err is Human: Building A Safer Health System," anaesthesia was explicitly identified as "an area in which very impressive improvements in safety have been made." Despite the safety of modern anaesthesia, anaesthesiologists must still strive to further reduce anaesthesia-related morbidity and mortality. Newer developments in anaesthetic techniques have facilitated quality anaesthesia service delivery. Numerous factors such as increased awareness among the patient population, newer drugs, advanced monitoring, and professional competitiveness have mandated quality control and anaesthesia assurance.

The risks associated with anaesthesia are certainly recognized, and anaesthesia is a model for patient safety improvements. One of these improvements is the continuous monitoring of adverse outcomes following anaesthesia and the systematic development of strategies to minimize the adverse effects.

**Quality assessment/improvement** is a set of methods used to measure and improve the delivered care and performance against pre-established criteria or standards. It is an organized



process that assesses and evaluates health services to improve practice and quality of care. The quality assessment aims to ensure a high standard of anaesthetic care focusing on patient safety during the perioperative period, risk reduction, and continuous quality improvement through self-examination.

The **morbidity & mortality (M&M)** meeting is a dedicated time for physicians to discuss adverse events among colleagues candidly and has been a long tradition in anaesthesia. It is a crucial component of both workplace and work-based learning, as well as continuing professional development (CPD). Goals are to provide the physicians with the opportunity to discuss patient care aspects where the physician did not anticipate nor intend the outcome and to review errors and adverse events openly and reflectively. However, the lack of a consistent approach contributes to a substantial variation in the quality and the educational outcomes. In recent decades, the discourse around medical errors has shifted from individual responsibility to a systems-based orientation. The M&M conference needs to be structured in a standardized way to emphasize patient safety and quality improvement. Therefore, we must find ways to merge the case-based M&M conference which is focused on individual responsibility, with systems-based departmental or institutional programs.

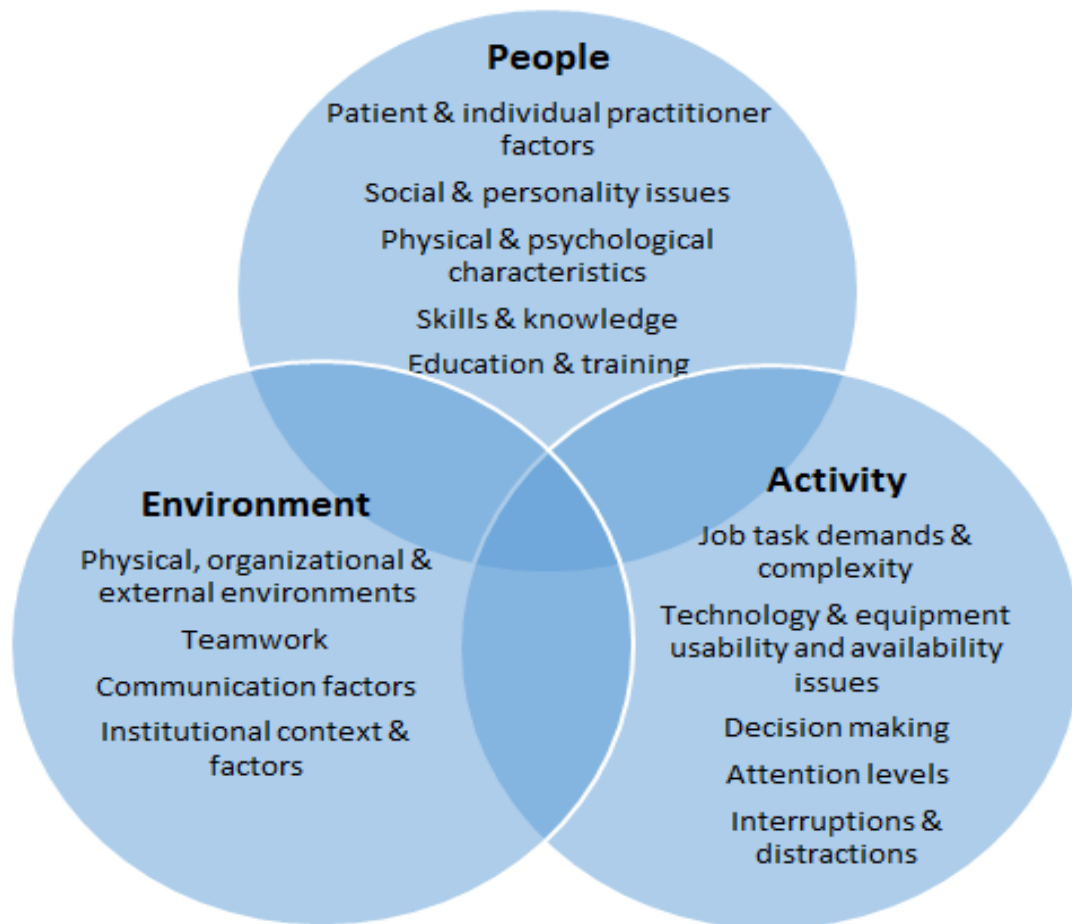
The M&M meeting can be revisited and refined through quality improvement systems-based methods to serve as a patient safety strategy for bringing adverse events to the surface. It can also serve as a mechanism to understand causation. Implementation of timely interventions is essential as well.

Applying a **system's approach** to the mortality and morbidity review process aids understanding and supports improvement in the safety and quality of patient care.

There are three principles involved in using the systems approach in mortality and morbidity analysis. (Figure 1) These are:

- Understanding system relationships and interactions
- Actively seeking multiple perspectives
- Defining the system boundary





**Figure 1: Systems approach in mortality and morbidity analysis**

### **Stages of Quality Assessment Cycle**

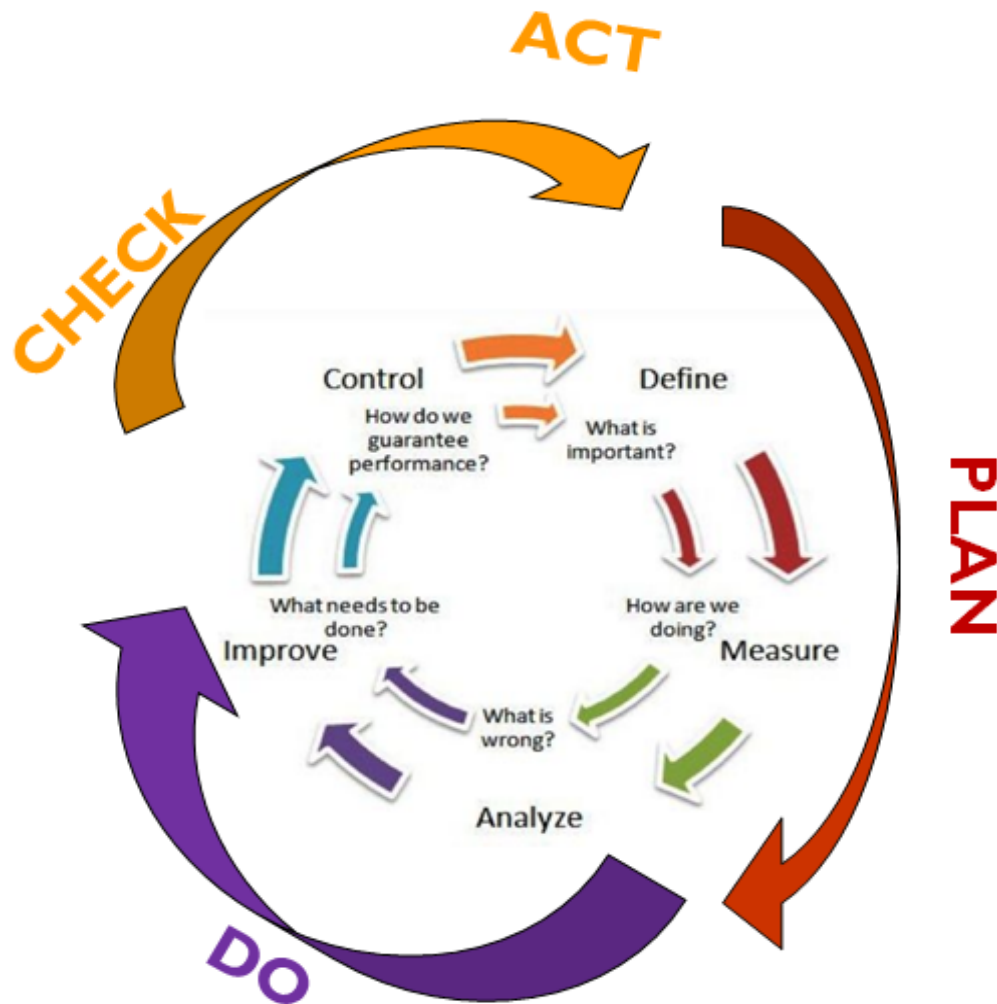
The four stages of the self-maintained quality assessment cycle are shown in Figure 2 and are:

- problem identification (Define & Measure)
- problem analysis (Analyse)
- problem correction (Improve)
- evaluation of corrective actions (Check).

Quality assessment is a measurable entity for defining and calibrating measurement parameters (indicators) from available data gathered from the hospital anaesthesia environment. Problem identification comes from the accumulation of performance measures. Safety, effectiveness, and



patient experience about the whole anaesthetic procedure are critical indicators to measure the quality of anaesthesia in modern clinical practice.



**Figure 2: The four stages of quality assessment cycle**

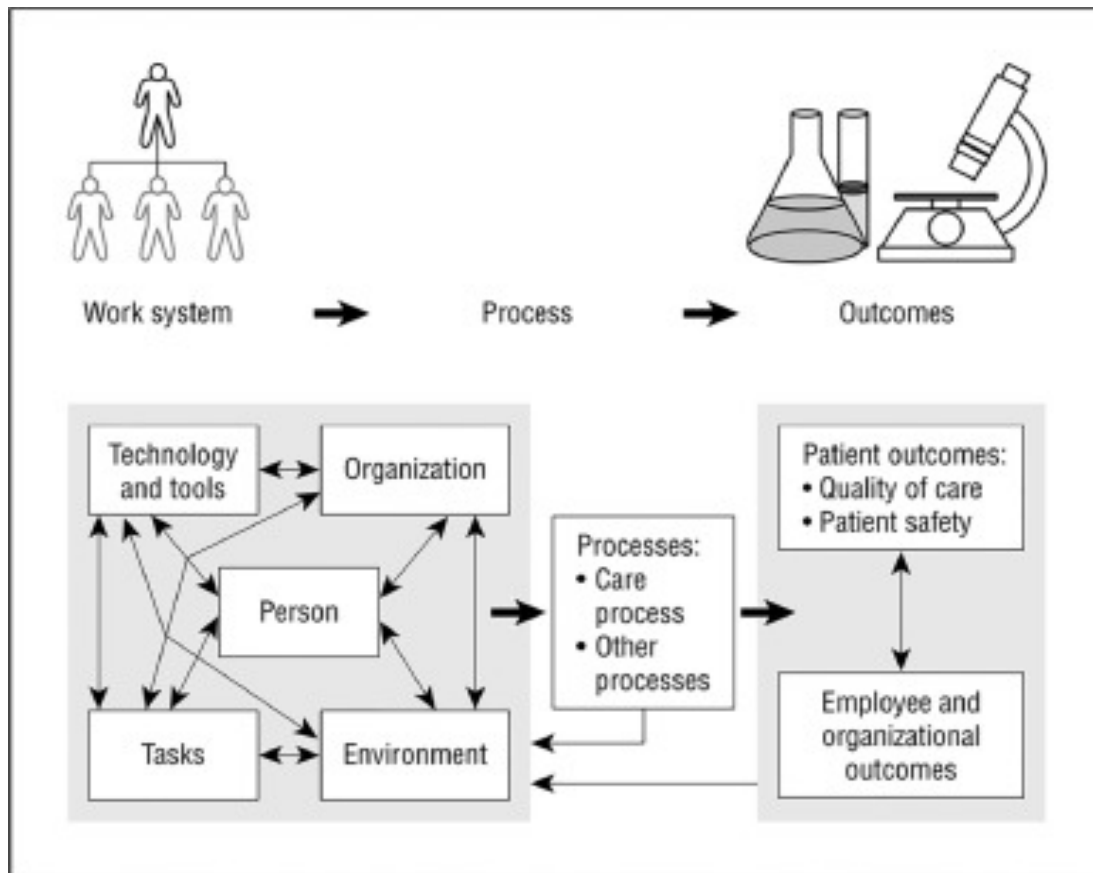
### **Quality Indicators (Figure 3)**

There are four types of quality indicators

- Structure
- Process
- Outcome



- Sentinel indicators



**Figure 3: Types of quality indicators**

The latter signals a quality defect, independent of outcomes, and easier to analyse by statistical methods, and are closely related to processes and main targets of quality improvement. The three approaches to studying the problems (indicators) are:

- peer review
- quantitative methods
- risk management techniques

Qualified anaesthesiologists and other trained clinicians should perform peer reviews. The review process should be clarified, and conclusions based on standards of practice and literature references will improve its validity. The quantitative methods are statistical analyses applied to the collected data and presented in a graphic format (histogram, Pareto diagram, control charts).



## **Risk management techniques**

These include:

- *Critical incident analysis* establishing an objective relationship between a 'critical' event and the associated human behaviours
- *System accident analysis*, based on the fact that accidents continue to occur despite safety systems and sophisticated technologies, checks of all the process components leading to the unpredictable outcome and not just the human factors.
- *Cause-effect diagrams* to facilitate the problem analysis in reducing its causes to four fundamental elements (persons, regulations, equipment, process).

The definition and implementation of corrective measures are the third steps of the evaluation cycle. The Hawthorne effect is an outcome improvement before the performance of any corrective actions. Verification of the implemented activities is the final and mandatory step in closing the evaluation cycle.

The assessment and measurement of specific quality indicators helps to determine the perioperative outcome in anaesthesia and surgical practice. A positive impact of the feedback mechanism cannot be under-emphasized while improving the delivery of quality anaesthesia services.

A systems-based approach can help to minimize the culture of blame and encourages an openness amongst professionals that translates into an environment of safety. Ultimately, the core of our practice resonates with a desire to provide our patients with safe and excellent anaesthesia.

## **References and Suggested Readings:**



1. Bechtold ML, Scott S, Nelson K, Cox KR, Dellsperger KC, Hall LW. Educational quality improvement report: outcomes from a revised morbidity and mortality format that emphasised patient safety. *Qual Saf Health Care*. 2007;16(6):422-427.
2. Schwarz D, Schwarz R, Gauchan B, et al. Implementing a systems-oriented morbidity and mortality conference in remote rural Nepal for quality improvement. *BMJ Qual Saf*. 2011;20(12):1082-1088.
3. Calder LA, Kwok ES, Adam Cwinn A, et al. Enhancing the quality of morbidity and mortality rounds: the Ottawa M&M model. *Acad Emerg Med*. 2014;21(3):314-321.
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6. What is PTAHF? Available from: [www.ptahf.org](http://www.ptahf.org)
7. Anaesthesia Patient Safety Foundation Newsletter. Available from: [www.apsf.org](http://www.apsf.org)
8. Holden RJ. People or systems? To blame is human. The fix is to engineer. *Prof Saf*. 2009;54(12):34-41.



## **PROCESS ANALYSIS AND QUALITY IMPROVEMENT TOOLS**

**Paul Barach**

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### **Introduction**

Quality anaesthetic care is a fundamental goal to our tradition and training but defining and measuring quality in anaesthesia presents special challenges. Anaesthesia causes of preventable injuries and errors, such as from medication errors, continue to occur even after 30 years of applied research. Safe and reliable healthcare organizations differentiate themselves by focusing on improving their service and performance processes and are guided by process-improvement initiatives to advance patient care. Continuous quality improvement (CQI) offers an approach, a set of tools, and a way of thinking about how to more effectively study, assess, and improve surgical flow, safety, including addressing and reducing variations in surgical processes and operations.

Quality improvement should become a central part of the work of anaesthesiologists where the patient is the central focus of the service, and all members of the team are focused on optimal and safe care of the patient moving through the perioperative arena. The performance improvement tools below can help anaesthesia care providers ask better questions after a patient has been harmed and how best to drive improvement of the value and flow of anaesthesia care.

### **The Learning Organization: Capturing Process and Outcomes Failures**



Exceptional outcomes in complex surgical care depends on the integration of individual, team, technical, and organizational factors. A continuum of cascade effects exists from apparently trivial incidents to near misses and full-blown adverse events. Consequently, learning organizations quickly grasp that the same processes and patterns of causes of failure and their relationships precede both adverse events and near misses. Getting clinicians to report these events requires psychological safety-an environment that fosters truth-telling trust and a culture of management support. Information about quality and safety comes in many different forms. Data may come in hand-written records, electronic reports and may come from electronic event reporting systems and in unrelated verbal daily safety check-ins. Lastly, quality and safety data can come from the patients experience assessment either from postoperative telephone calls made to every outpatient, or from the patient experience team in the form of a survey or free text comments.

### **Quality Assessment Tools to Measure Processes and Reliability**

There are four main quality assessment and improvement tools that are recommend for anaesthesiologist to improve the process, flow and outcomes of anaesthesia and surgical care.

These are

1. Process maps
2. Ishikawa diagrams
3. Run charts
4. Control charts

The tools help visualize, analyse, and track process and outcome data for both individual and groups of patients and can be used routinely by clinicians to evaluate and improve their care.

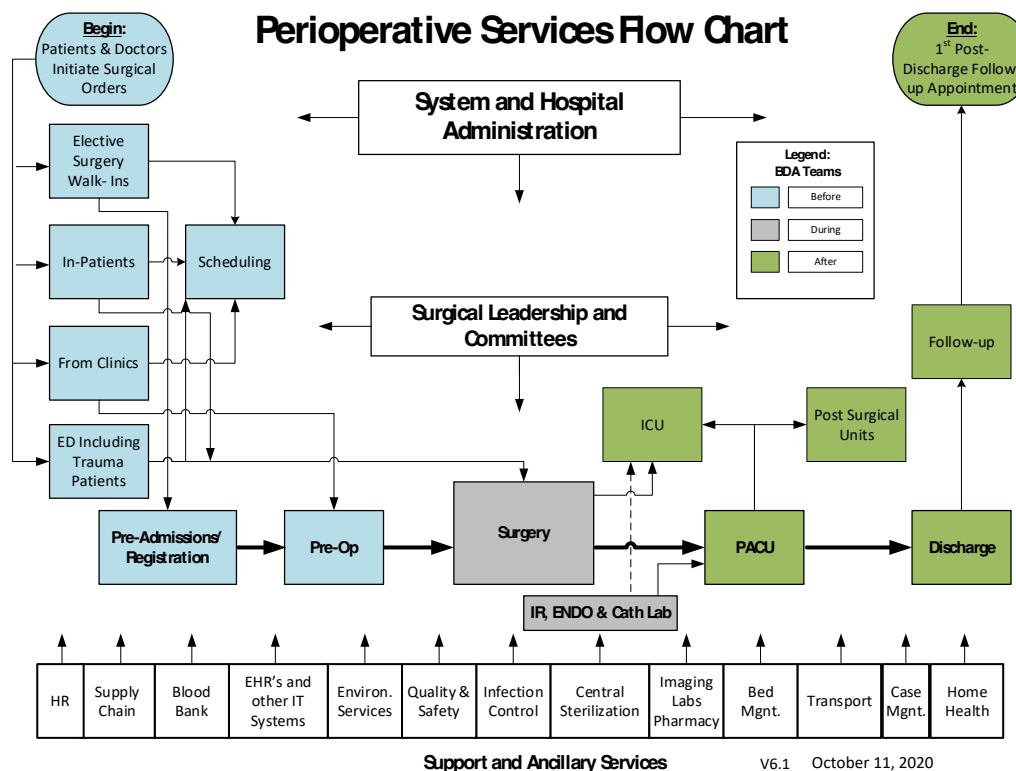
The tools can be used to achieve measurable improvements in the efficiency, effectiveness, performance, accountability, and outcomes of surgical quality in services or processes of care.

#### **1. Process maps** (Figures 1 and 2)

Process maps are the most important quality assessment and improvement tool. A process map or a flowchart is a visual representation of the care process that is created with information



provided by team members. The process mapping exercise can help clinicians clarify through visualization what they know about their environment and determine what they want to improve about it. The process maps use common flow chart symbols and can describe the current state or baseline, the improved state in transition, and the optimal state. This exercise can help clinicians share their assumptions and expectations. It can also provoke insights from reflecting on their current state. More importantly, clinicians gain insight on how to improve the process of anaesthesia care or how to overcome perceived barriers to its improvement. Working with clinicians to understand how they perceive safe care is essential to sustain their interest and engagement in long-term continuous improvement.



**Figure 1. A process map of surgical services that starts before patient is admitted to hospital and continues through to their post-operative recovery at home<sup>1</sup>**

<sup>1</sup> Barach P. Designing the future of surgical services, Monument Health, 2021.

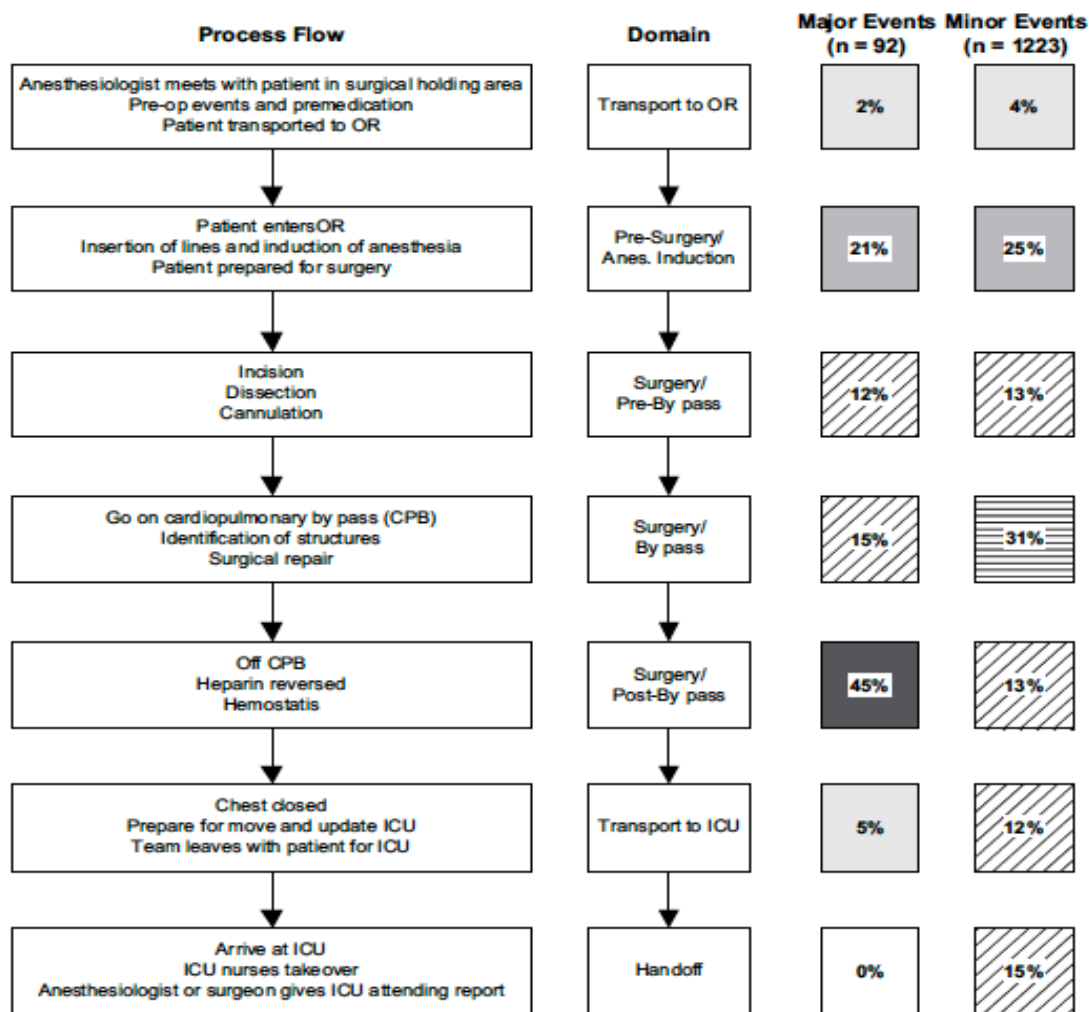


Process mapping describes precisely what an individual provider is required to do and when, in terms of cognitive processes, actions, or both, to achieve the system's goal. Data are collected from observations or interviews that carefully break down complex clinical processes into discrete, measurable, and clear tasks. Ultimately, improving patient outcomes requires appreciating the inherent links between process and results. Process maps help focus improvement efforts, not just for the individual, but for the entire clinical microsystem. Visualizing the process can also help identify inefficiencies (e.g., parallel, or redundant processes that have emerged for whatever reason), clarify roles, and reduce ambiguity among team members, all of which can help coordinate patient care across services and microsystems.

It is important to map the current process, not the desired process, to best identify opportunities for improvement. Once the process has been graphically depicted, several questions arise to generate improvement ideas:

- What is the goal of the process?
- Does the process work optimally as it should for the patient and for the clinician?
- Are there obvious redundancies or complexities?
- How different is the current process from the ideal process?





**Figure 2. A process map showing the relative incidence of minor and major adverse event data in cardiac surgery\***

\*Barach, P., Johnson, J., Ahmed, A., et al. Intraoperative Adverse Events and their impact on Pediatric Cardiac Surgery: A Prospective Observational Study. *Journal of Thoracic and Cardiovascular Surgery* 2008 Dec; 136 (6): 1422-1428.

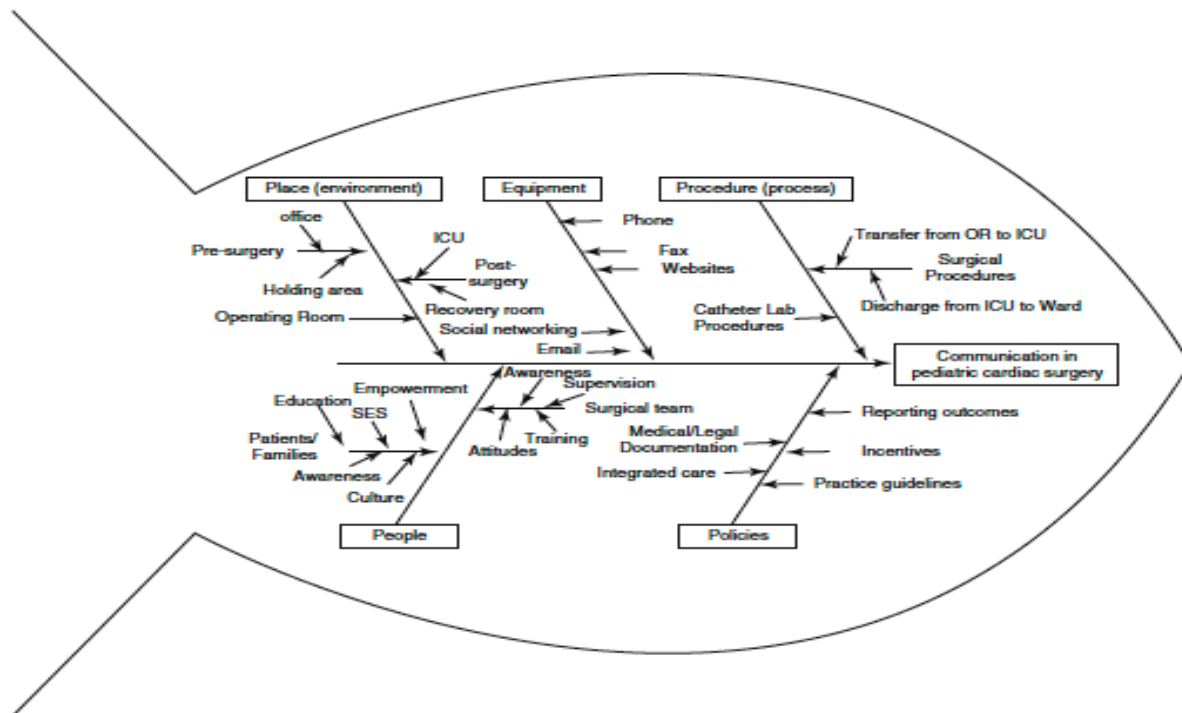
## 2. Ishikawa diagrams (Figure 3)

Ishikawa diagrams, also known as “cause-and-effect diagrams,” or “fishbone diagrams,” are visual representations of the sources of variation in a clinical process. The diagram is often created by brainstorming with key stakeholders or during a M&M investigation to identify the causes of patient harm. The causes can be allocated to five general main headers/categories:



place (environment), equipment, procedures, and methods (processes), people (patients and providers), and policies.

Routine surgical root cause analysis with Ishikawa diagrams can be very powerful in analysing surgical adverse events. A detailed analysis in one major hospital over 4 years (Table 1) established the fact that excellent surgical outcomes depend on integrating individual, team, technical, and organizational factors. (Table 1)



**Figure 3: An Ishikawa diagram for cardiac surgery**

\*Johnson J, Barach P. Quality improvement methods to study and improve the process and outcomes of pediatric cardiac surgery. Prog Pediatr Cardiol. 2011;32(2):147–154.

**Table 1: Results of surgical adverse event root cause analyses**



**Table 9.1** Results of a surgical adverse event root cause analysis

Theme	Issues identified
Failure to recognize or respond appropriately to the deteriorating patient within the required time frame	<ul style="list-style-type: none"> <li>• Postsurgery complications</li> <li>• Postoperative sepsis</li> <li>• Postoperative hyponatremia</li> </ul>
Workforce availability and skills	<ul style="list-style-type: none"> <li>• Orientation, training, and supervising new or junior members of the surgical team, especially outside normal working hours</li> </ul>
Transfer of patients for surgery	<ul style="list-style-type: none"> <li>• Difficulty in organizing an OR for surgery</li> <li>• Failure to hand over information about patient acuity</li> </ul>
Trauma management	<ul style="list-style-type: none"> <li>• Coordination and response of trauma teams</li> <li>• Clinical decision-making process for trauma patients</li> <li>• Coordination of care between multiple clinicians</li> </ul>

(continued)

Theme	Issues identified
Access to emergency operating room	<ul style="list-style-type: none"> <li>• Antepartum hemorrhage and emergency cesarean</li> <li>• Urgent orthopedic procedure</li> <li>• Urological complications requiring urgent OR</li> </ul>
Missed diagnosis	<ul style="list-style-type: none"> <li>• Thoraco-lumbar fracture in a trauma patient</li> <li>• Brain abscess mistaken for cerebral metastasis</li> <li>• Subarachnoid hemorrhage thought to be drug overdose</li> </ul>
Unexpected procedural complications	<ul style="list-style-type: none"> <li>• Airway obstruction after thyroidectomy</li> <li>• Failed intubation</li> </ul>
Sentinel events	<ul style="list-style-type: none"> <li>• Wrong-site procedure—spinal fusion at wrong level</li> <li>• Retained surgical products requiring surgical removal</li> </ul>

Adapted from Cassin B, Barach P. Making sense of root cause analysis investigations of surgery-related adverse events. *Surg Clin North Am* 2012;1–15. doi:[10.1016/j.suc.2011.12.008](https://doi.org/10.1016/j.suc.2011.12.008)

\* Cassin B, Barach P. Making Sense of Root Cause Analysis Investigations of Surgery-Related Adverse Events. *Surg Clin North America* 2012, 1-15, doi: 10.1016/j.suc.2011.12.008.

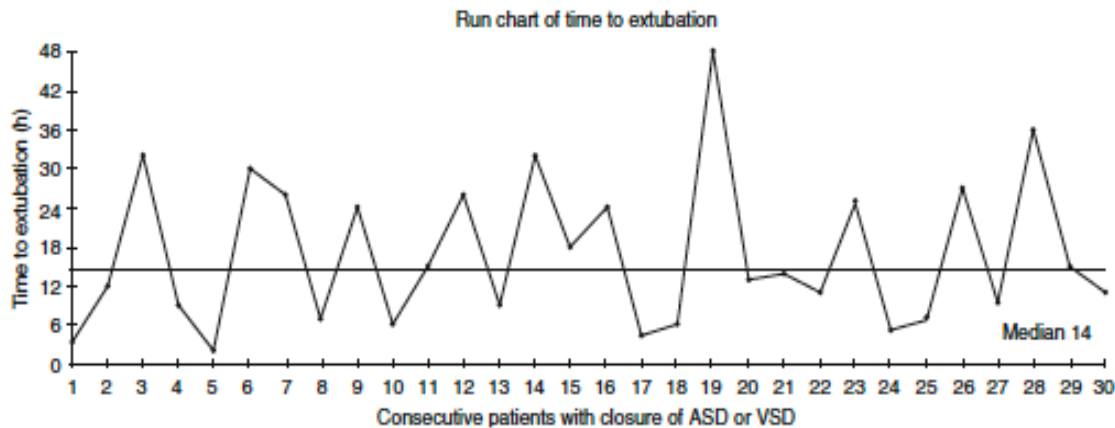
### 3. Run charts (Figure 4)

A run chart is a graphic representation of process performance data tracked over time and is particularly useful because the run charts can reveal subtle changes over time that would otherwise go noticed. The run chart is a simple plot of a measurement over time with a line drawn at the median value. Important uses of the run chart for improvement are to:

- Display data to make process performance visible
- Determine whether tested changes improve the process or endpoints
- Determine whether the changes are lasting



- Allow for a temporal view of data versus a static view



**Figure 4. A run chart of time-to-extubation for patients undergoing closure of atrial septal defect and ventricular septal defect in the ICU\***

\*Johnson J, Barach P. Improving Pediatric Cardiac Care with Continuous Quality Improvement Methods and Tools. In Barach P, Jacobs J, Laussen P, Lipshultz S. (Eds), Outcomes Analysis, Quality Improvement, and Patient Safety for Pediatric and Congenital Cardiac Disease. Springer Books, New York, NY, 2014, SBN 978-1-4471-4618-6

#### 4. Control charts (Figure 5)

Control charts display data over time and provide upper and lower control limits of variation that help determine whether a process is stable or unstable. The control limits are calculated using median values and the moving ranges of the data. The factors leading to instability must be addressed before the process can be improved. We define two types of variation in a process: “Common cause variation” is the usual, historical, quantifiable variation in a system, and might include fluctuations in the severity of a patient’s risk factors, the skills of operating team members, or changes in equipment settings. Common cause variation suggests that improving patient outcomes will require changing the processes that produced the results.

“Special cause variation” is unusual, not previously observed, and non-quantifiable variation in surgical procedures. Special cause variation is the result of factors extraneous to the process, for example, variation introduced by a new surgeon, management drive for more productivity, or



equipment breaking during a procedure. It is not possible to predict (or control) variation caused by special causes.

If the control chart indicates that the process is currently under control (i.e., it is stable, with variation only coming from sources common to the process), then the data from the process can be used to predict the future performance of the process. If the chart indicates that the process is not under control, the chart can help determine the sources of variation, which can then be eliminated to bring the clinical process back under control. These data can inform the surgical team about when to act, but also, especially in systems that are constantly tweaking their systems, when to hold and not to act, depending on the cause of the variation.

Control charts are appropriate for analysing data from procedures that are performed frequently, and consistently, and are relatively standardized such as with cardiac and orthopaedic surgery.

## Control Chart of Surgical Infections (SSI)

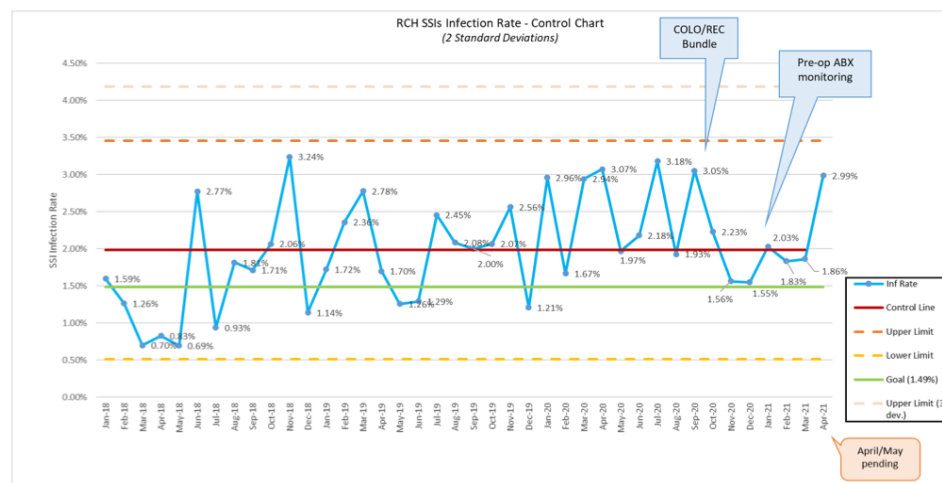


Figure 5: A control chart of Surgical Site infections by months<sup>2</sup>

## Failure Modes and Effects Analysis (FMEA-Figure 6)

<sup>2</sup> Barach P. Designing the future of surgical services, Monument Health, 2021.



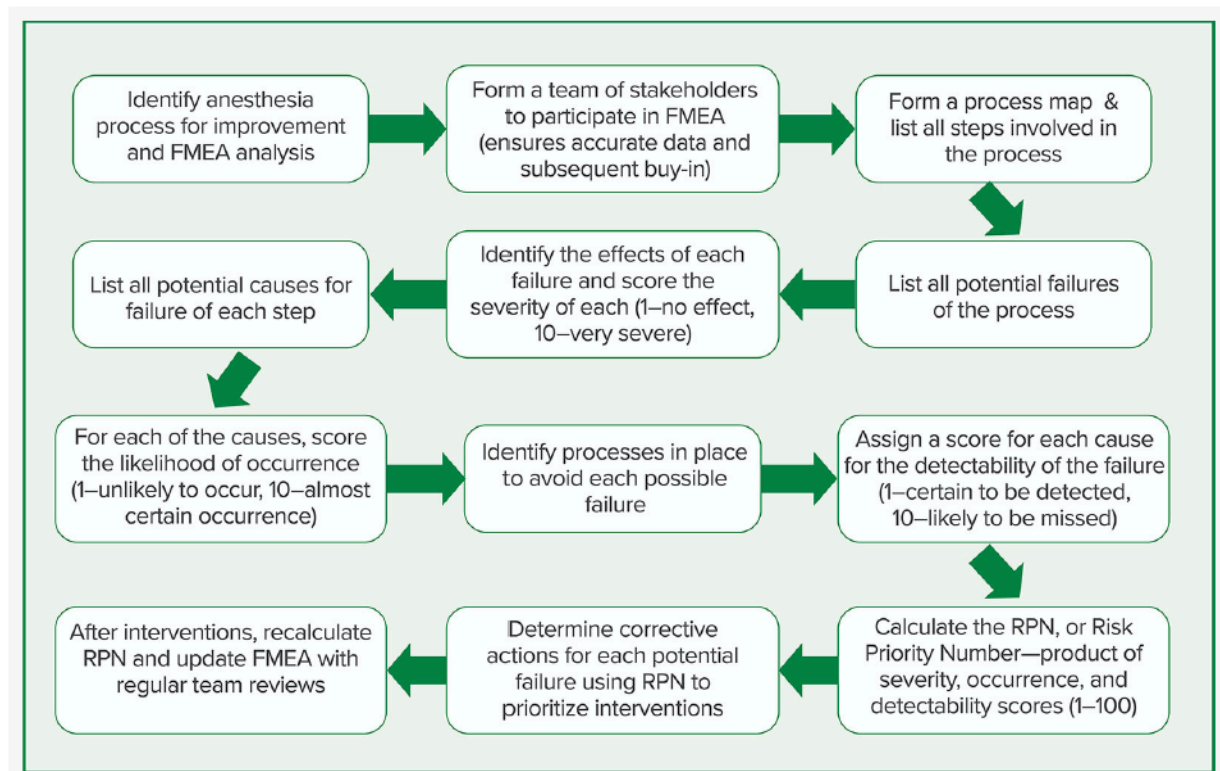
A FMEA is a useful tool to prospectively analyse workflows through the perioperative suite. A team brain storming may identify that an aspect of surgical operations within the perioperative suite is not performing as intended. The analysis of the failure modes and effects involves identifying the elements and their sequence in the procedure under review, the conditions that could result in failure at each step, the effects of each failure on the performance of the procedure, the likelihood that the failure could occur under local conditions, the impact of the failure on patient safety, and what remedial action could reduce the risk of failure.

Measurable activities in the perioperative setting include standardized processes with multiple steps performed in sequence such as when administering medications. FMEA is a useful adjunct to an adverse event investigation to help break a procedure or protocol into separate steps using a process mapping methodology and consider the stages where something unexpected happened or there is potential for the sequence to break down. Rather than look at the prevailing conditions in the perioperative suite, the FMEA looks specifically at human interaction with technology or equipment and the potential for procedural failure at a systems level.

An example of an adverse event where the consequences of a procedural failure needed to be mapped out involved a patient who had a spinal fusion performed at the incorrect level. The local neurosurgical practice for sighting and marking of spinal levels was a contributing factor to the adverse event. The FMEA identified that the timing of access to radiological images was critical as was the ability of the members of the surgical team to visualize and confirm the spinal level with the radiology team. A key finding was that the position of the surgeon relative to the patient and the position of the assisting surgeon on the opposite side of the operating table could give the perception of different spinal levels depending on the viewing angle. Visualization of the radiological image was not always completed at the same time by each surgeon due to movement within the operating room relative to the position of the viewing box. During the adverse event, this was compounded by the fact that the two surgeons did not provide clear verbal confirmation to each other or to others on the team in the room about the spinal level to be operated on.



The FMEA suggested the high probability of recurrence suggested by the FMEA led to a change in the local procedure whereby both surgeons had to provide clear verbal confirmation citing specific anatomical markers and read-back their interpretation of the radiology image to the entire OR team. Before the investigation, the neurosurgeons had varying individual practice for sighting and marking spinal levels. The FMEA provided an opportunity to develop a consistent and reliable practice for marking sided surgical and anaesthesia procedures.



**Figure 6: Application of FMEA and the steps involved for an anaesthesia process\***

\*George Tewfik, G. Proactive Perioperative Risk Analysis: Use of Failure Mode and Effects Analysis (FMEA). Anesthesia Patient Safety Newsletter. Volume 36, No. 1, February 2021.

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## **RISK MANAGEMENT TOOLS**

### **AN INTRODUCTION TO ROOT CAUSE ANALYSIS**

**Phil Blum**

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#### **What?**

Root Cause Analysis (RCA) is a structured process to review an adverse incident. It investigates the chain of events and identifies the underlying causes which resulted in the incident. Analysis delves deep to find answers based on hidden causes rather than the most apparent or superficial

- (1). The response to the incident is included in the review. A resilient system will minimize patient harm after an incident whereas “failure to rescue” can result in significant injury or death
- (2). The aim is to be fair and thorough; using recognized analytical methods to develop sound implementable and achievable recommendations.

#### **Why?**

Humans will always make mistakes and health care systems are complex. It is easy to blame an individual for a bad outcome, but individual errors should be viewed as consequences rather than causes (1). There are latent (hidden) errors in system design that wait quietly with the potential to



facilitate and exacerbate human error. RCA is a tool to reduce healthcare system vulnerability to human error and mitigate poor outcomes if an error occurs. Systems should be designed such that it is difficult for people to do the wrong thing and easy for people to do the right thing (1).

### **When?**

RCA is usually performed for an adverse incident where the outcome was poor or the potential for significant harm was high (a near-miss). The investigation process should begin as soon as practical. The longer the time between the incident and the RCA, the harder it is to gather reliable information. An RCA should not be performed for incidents involving deliberate malevolent or criminal acts.

### **Who?**

A team of independent multidisciplinary senior clinicians should be assembled. A leader should be appointed who is responsible for following the process to completion. The team should avoid bias and personal opinion. It will be evidence based and free to present information and recommendations without fear.

### **How?**

All meetings and interviews undertaken during a review are conducted in a non-confrontational manner. RCA avoids judging an individual's competence as that does not strengthen the system in the long run (3). Patient and staff are de-identified. "Hindsight bias" should be avoided when assessing an incident. The course of action needed to prevent an incident may appear obvious in retrospect, but the situation needs to be looked at based on the information available at the time of decision making (3).

### **The major steps in an RCA investigation (3):**

What happened? Identify.

1. Define the problem and its severity
2. Gather the information – documentation, interviews, and relevant current policy/protocols



3. Identify a timeline of events

Why did it happen? Analyse.

4. Identify root causes

What can be done to prevent it happening again? Resolve.

5. Identify the best solutions based on a scale of effectiveness
6. Develop recommendations
7. Write a report

Has the risk of it happening again been reduced? Resolve

8. Implementing solutions and long term-follow up

When thinking about why an incident has occurred, consider clearly describing the cause-and-effect relationship. Every action or decision a person makes (the proximate cause) must have underlying contributing factors and deeper causes. Contributing factors are important and may have influenced the proximate cause e.g., working a long shift to cover a sick colleague.

Eliminating these factors alone would not prevent the event from happening again though.

Deeper causes can be more easily identified by drilling down further by continuing to ask “why?” Helping to understand the “why?” may be facilitated using a variety of frameworks, for example, an Ishikawa (Fishbone) diagram (1) or bow-tie methodology (2).

The Ishikawa diagram is like a fish skeleton. The ribs and fins being the many potential human and system causes. These join at the backbone and are directed towards the incident represented by the fish head. Human causes may be divided into competency, consciousness, communication, critical thinking, and compliance. System causes include policy and protocol, structure, technology and environment, process, and culture (1).

## **Solutions**

Solutions should be SMART (Specific, Measurable, Achievable, Relevant and Timely) (3).

Solutions may be easy to implement but usually are not very effective in reducing the risk of the



critical incident happening again. Weak but easy solutions include written warnings and labels, new policies, and re-education. Stronger actions include the use of checklists/cognitive aids, reducing distractions and more effective use of skill mix. The strongest actions are usually difficult to successfully implement and include changing the organization's cultural approach, changing building architecture, and standardizing equipment (1).

### **An example**

Let us take an example, a case where a patient is given the incorrect surgical prophylactic antibiotic by the anaesthesia provider prior to surgery. The patient has a known allergy to that antibiotic and subsequently develops severe anaphylaxis.

The patient developed a mild anaphylactic reaction after taking a 1<sup>st</sup> generation cephalosporin orally for a urinary tract infection prescribed by a local family practitioner. The patient developed a rash, urticaria and facial oedema which resolved rapidly with intramuscular adrenaline (epinephrine).

The patient presents two years later for an elective urological procedure. He describes his cephalosporin allergy to the junior ward doctor on his admission to hospital and it is documented deep in the thick progress notes of the patient.

An anaesthetic provider has been up all-night working 18hrs straight covering a sick colleague. She is under time pressure to start the first case for the elective morning list. The day anaesthetist is running a few minutes late. The surgeon is angry and pacing. The night anaesthetist does a pre-anaesthetic assessment, obtains an accurate allergy history and is just about to write it on the anaesthetic chart when the flustered day anaesthetist arrives. There is a rushed handover as the surgeon stands over both. The night anaesthetist forgets to mention the patient's allergy history during the handover.



The day anaesthetist takes the patient into theatre. A WHO surgical safety checklist takes place. The anaesthetist is busy checking his machine and drawing up induction drugs and misses participating during the checklist. No one asks the patient if she has any allergies during the checklist.

The harried anaesthetist gives the patient the standard 1<sup>st</sup> generation cephalosporin intravenously soon after induction and the patient develop an anaphylactic reaction requiring an adrenaline (epinephrine) infusion, crystalloids, and intubation. Surgery is not performed. The anaphylaxis is well managed, and the patient is extubated 6hrs later with no sequelae but is understandably angry.

So, the proximate error is the anaesthetist giving the wrong drug resulting in anaphylaxis. It would be easy to blame the day anaesthetist for not being more careful. The junior doctor knew so why didn't she? But there is a series of events, contributing factors and underlying causes for this "never" event.

What is the usual policy regarding allergy identification in the patient notes or on the patient? Was it followed? Why not? Allergies are often recorded inaccurately by clerical non-medical staff on the cover of the patient notes in this hospital. No medical staff takes any notice of it because it is inaccurate.

Is there a preadmission clinic this patient could have attended in the days before his admission where an anaesthetist could have seen this man and documented the allergy on the anaesthetic chart? Do patients regularly turn up for elective lists without being seen by an anaesthetic provider? Why?

Fatigue is an obvious contributing factor. What is the process to cover for a sick colleague? How does the culture of the theatre influence whether staff can say they are tired and that they need to be relieved?



Why did the handover fail? Is there a formal handover process? Is there a way we can improve handover? What about the pressure from the surgeon? Is that acceptable behaviour in the hospital? Why? What effect does that have on team performance? Is that something we can change?

Do anaesthesiologists regularly miss being part of the WHO surgical safety check list? Why? Why are they often too busy getting ready for case? When does their shift start in relation to the elective theatre start? Can we change the roster to change shift start and finish times? Can we change policy so that the checklist doesn't happen until everyone gives their full attention? Do the staff look at the patient notes when they do the WHO checklist? They check the consent, but do they check for allergy documentation? The answer is no as the staff say the allergy documentation in the notes is inaccurate and it's the anaesthetist's job anyway. What about identification on the patient? Well, that didn't work because allergy identification on wrist bands was inaccurate also. Can we improve allergy documentation throughout the hospital? Can we make it everyone's responsibility during the WHO checklist to make this incident never happen again?

When is the best time to administer surgical prophylactic antibiotics? Can we change behaviour, so anaesthetists give the antibiotics before the patient is anaesthetised? They can ask the patient one last time if they have any allergies as they attach the syringe to the intravenous line. Contributory factors include fatigue, the anaesthetist being late, poor rostering and the bullying surgeon. Eliminating these is helpful but on their own would not prevent a recurrence of the incident.

See Figure 1 as an example of an Ishikawa (Fishbone) diagram for this case history of anaphylaxis.

Would the following have prevented or reduced the chance of the proximate error? Maybe these are the root cause issues that need to be addressed to prevent this happening again?

- All elective patients seen by an anaesthesia provider before coming to theatre



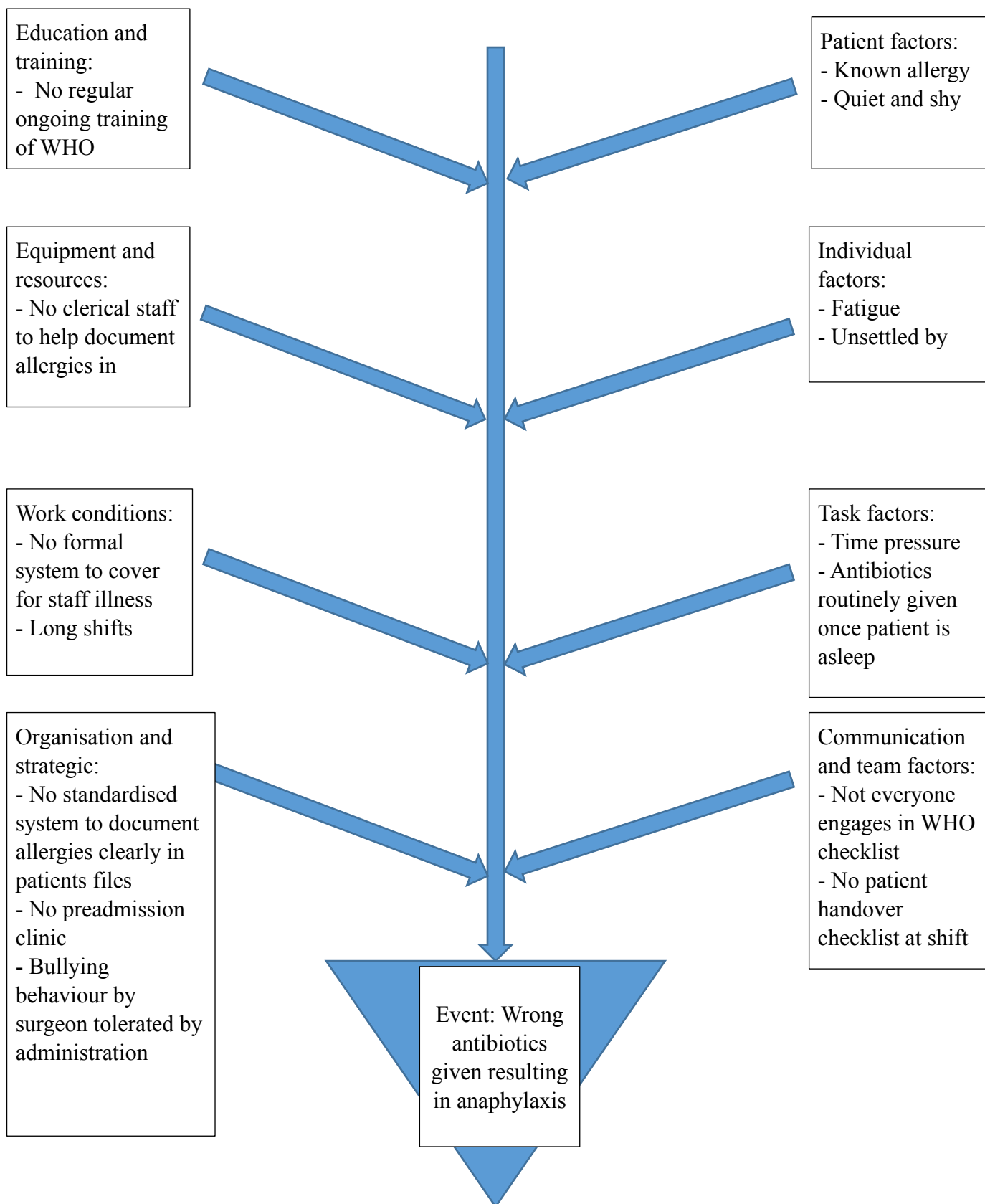
- A robust system to document known allergies clearly and accurately in the patients notes
- Formal handover checklist
- All staff involved in Surgical Safety Checklist engages the patient and includes asking the patient if they have any allergies along with name, birth date, surgical site, and side
- Staff check the allergy record in the patient notes during the surgical checklist
- Prophylactic antibiotics given to all patients prior to induction

### **Challenges**

RCA is a powerful tool to improve quality and safety for patients. Unfortunately, it is a fact that many health centres have limited budgets and resources to institute change. Broad solutions like; “We need more staff” or “We need more basic equipment” although true, may not be achievable in the short term. Follow up to see whether RCA recommendations have resulted in improvements in patient outcomes requires staff time and funds. The great challenge is to find locally appropriate solutions that are achievable and cost effective.

**Figure 1:** Ishikawa (Fishbone) diagram for case history of anaphylaxis







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## **IMPROVING SYSTEMS**

### **Rola Hammoud**

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Healthcare systems are complex by design. This complexity is potentiated by the diversity of the human resources, the number of interfaces between human and technology and by the multiple handovers of information. Those are predisposing factors for error occurrence.

To establish a safety culture, healthcare organizations employees are encouraged to report errors and near misses in a very objective way. Such reporting enhances learning in a fair and just environment far from blame and shame aiming towards a shared responsibility.

Reporting errors is important to identify gaps in our systems. Correction of those gaps is fundamental for system improvement. This “systems approach” will enhance patient safety and promote safe environments for patients, families, and staff.

Whenever an error is reported, a thorough investigation using various tools (Ishikawa fishbone, Root Cause Analysis) is conducted to identify gaps in the system that might have contributed to the occurrence of the error or near miss.

The operating room setup is a small sample of a healthcare organization. The number and diversity of employees add complexity to this environment where humans, technology, biology, pharmacology, and physiology all interact together making the risk of mishaps and adverse events to increase. The coordination between members of the operating room team (surgeons, anaesthesiologist, nurses, and technicians) is important to prevent the occurrence of errors.

Actions that help in creating a safe operating room environment include:

- Improving communication skills and handover processes among operating room staff
- Use of efficient team building strategies (Team STEPPS\*, CUSP\*\*)



- Ensuring adequate staffing ratio
- Optimization of patient condition before surgery
- Use of checklists before the induction of anaesthesia (WHO safe surgery checklist or other)
- Maintaining safe equipment needed for anaesthesia and surgeries.
- Developing and maintaining safe practices for medication use.
- Ensure proper infection control program
- Maintaining the continuity of care during day and night and during weekdays and weekends
- Developing a safety culture based on a non-hierarchical and open communication
- Having an adverse event and error-reporting system for all operating room staff

\*Team STEPPS is an evidence-based set of teamwork tools, assumed at optimizing patient outcomes by improving communications and teamwork skills among health care professionals.

\*\* CUSP- The Comprehensive Unit-based Safety Program

These elements can enhance both learning and contribute to patient safety whether by preventing errors from happening or by identifying those and setting improvement actions.

### **1. Improve communication**

The effective communication consists of a clear and accurate message (verbal or non-verbal) from a transmitter that is delivered to a receiver. The message shall be clear and audible. The recipient is requested to be focused and undistracted to ensure effectiveness in transmission of the information.

Communication in the operating room where many stakeholders (surgeons, anaesthesiologists, nurses, technicians, and administrators) are interacting and where many distractions take place



(monitors, alarms, phones etc.) is a very challenging process. It needs to be effective to ensure teamwork and safe patient care.

Standardizing communication process in the OR has proven its effectiveness in ensuring safe care. Thus, surgical checklists and time-out procedures are now implemented in OR setups as per the recommendations of the WHO. The “Safe Surgery Checklist” is now a universal tool that identifies three phases of a procedure; “Sign in” before the patient goes to sleep, “Time out” before the incision and “Sign out” at the end of the procedure. On each step, OR staff completes the checklist as a team. The postoperative debriefings are also effective in team functioning to ensure proper continuity of care.

## **2. Team building strategies**

Perioperative communication can be improved through new strategies. Team STEPPS was developed by the US Department of Defence and the Agency for Health Care Quality and Research (AHRQ) in 2005 and was developed based on risk management programs to enhance safety in the air traffic industry in 1973. It was adopted by The Department of Health and Human Services Agency for Healthcare Quality and Research (AHRQ) to improve patient safety (Plonien & Williams, 2015) and implemented in healthcare.

TeamSTEPPS, focuses on five elements: “Team Structure, Communication, Leadership, Situational Monitoring, and Mutual Support”. “STEP – Status of the patient, team members, environment, and progress toward goals”. TeamSTEPPS® involves a series of tools, briefings, and debriefings to allow better communication and create a culture of safety.

Over two-thirds of surgical adverse events result of poor communication and poor teamwork (Tibbs and Moss; 2014). Communications can also be improved with another tool like SBAR – situation, background, assessment, and recommendations, which is used in improving patient handovers between health care providers. Approximately 39% of the errors in the operating room are preventable. Evidence shows that using those tools is associated with improved operating room efficiency and decreasing rate of errors.

## **3. Develop a safety culture**



The safety culture is the product of values, attitudes, perceptions, competencies, and behaviours that determine the commitment to an organization's safety management. It is based on speaking up and reporting errors without any fear, for the objective of systems improvement. It is a learning culture based on sharing experiences in an open forum free of blame and on fairness in judgment where people are reassured after a human error and punished after a reckless behaviour.

Speaking up in a “No blame, no shame” environment is essential to encourage errors reporting and allow systems improvement. It is essential to have in the operating room processes in place for reporting.

#### **4. Incident reporting systems**

Incident reporting and investigation was first used in aviation in the 1940s to improve safety and performance. Incident reporting was introduced in anaesthesiology and is recommended to gather information about adverse events in hospital care.

Adverse events can be collected from patient medical records review, from patients' complaints or from self-reporting. 'Near-miss events can only be detected by self-reporting, or via reports from other team members.

Around 20% of the incidents reported are the result of violation from existing protocols.

Key factors that help encourage open reporting about and learning from every adverse event include:

- Open non-punitive reporting culture
- Self-reporting of adverse events
- A thorough analysis to learn from events, get details of the number, type, risk and causes
- Adequate feedback to the reporter
- Clear definitions and benchmarking with other operating rooms



Investigating and analyzing incidents in the operating rooms require engagement of surgeons, anaesthesiologists, and nurses. It is recommended to use a standardized framework for analysis of events.

Incident reporting may capture only 4% to 50% of adverse events. This underreporting is due to clinical factors, time constraints, lack of a hospital policy and training on types of incidents and lack of anonymity and feedback.

Upon investigating errors in the operating room, staff are asked to remember the smallest details in a blameless way, and the process is described and compared to the system process to identify gaps. All gaps identified are called opportunities for improvement (OFI). Specialized teams with hospital leadership on board will act on improving those OFI. This can be done by adding resources (human, supplies or equipment), correcting procedures, revisiting policies, adding boundaries, and checking lists, adding tools for better communication, monitoring practices and most of all commitment and follow up from leadership.

These OFI represent the potential gaps in a system where we need to study, investigate, and act upon to have safer practices and ensure better care for our patients in the operating room.

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## SEARCHING FOR EVIDENCE BASED LITERATURE

**Fauzia Anis Khan**

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Evidence-based medicine (EBM) is defined as the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patient (1). A revised version came later which defines it as a systematic approach to clinical problem solving which allows the integration of the best available research evidence with clinical expertise and patient values (2).

The aim in using this methodology is to decrease the bias either due to personal opinions or lack of awareness of literature regarding a clinical question.

### **Steps to Search for Best Evidence**

Certain steps need to be followed to search for best scientific evidence.

**Step 1: Construct a clear question** which you need the answer. The question has four components based on PICO principle or pneumatic.

P = Patients/ context problem (what/who)



I = Intervention or action which is being studied/ or exposure

C = Comparison or the relationship. What is the main alternative to compare with the intervention?

O = Outcome or effect of intervention

**Step 2: List all keywords** to be used in your search and consider editing all synonyms (these are possible words with the same meaning.)

**Step 3: Decide on the literature and databases** that you would search.

### ***Commonly Used Databases***

Following are the commonly used databases:

- *Medline* is the medical database compiled by National Library of Medicine of USA.
- *PubMed* is the freely available version of MEDLINE. Pub Med retrieves the citations i.e., title, authors, journal and abstract. If a free full text is available a link is provided.
- *COCHRANE Library*: Cochrane is a global independent network that provides high quality, summarized information to make health care decisions. Currently, there are nearly 7500 Cochrane systematic reviews published in the Cochrane library.
- *EMBASE* (Excerpta Medica DataBASE): This is a biomedical and pharmacological bibliographic database of published literature produced by Elsevier (Netherlands) which covers 8500 journals. ([www.elsevier.com/solutions/embase](http://www.elsevier.com/solutions/embase)). Access needs subscription
- *CINHAL*: It is the cumulative index to Nursing and Allied Health ([www.cinahl.com](http://www.cinahl.com)). It contains information from 1982 and relates more to nursing and allied health.

### ***Other Sources***

Other sources that can be used are:

- *Clinical Practice Guidelines*: These are systematically developed statements to assist practitioners and patients. These are not fixed protocols (some of the websites are NIH clinical practice guidelines, NICE guideline)



- *Up To Date* ([www.uptodate.com](http://www.uptodate.com)) is an evidence based, physician authored clinical decision support resource. UpToDate mobile application needs to be downloaded. Use of up to 2 devices is free of charge.

*Journals:* Many journals have their websites available on the internet that can be accessed freely. The journal website indicates which article can be downloaded free. Other articles may be available with payment.

*Websites:* One of the barriers in Lower-and Middle-Income Countries (LMIC) is the availability or cost of electronic resources and time constraints.

*Textbooks:* Can be used but can be behind current evidence by a few years.

*HINARI:* provides free or very low cost online access to major journals in biomedical and related social sciences to local, not for profit institutions in developing countries. (<http://who.int/hinari/about/en>)

If after searching the above sites you have too many results, use filters to reduce the numbers. For example, you can limit the results to “reviews” only or put a limit according to time.

**Step 4: Evaluate synthesize and review the evidence.** Look at the quality and type of papers. Not all evidence sources are of similar merit. The hierarchy of evidence from top to bottom is systematic review, RCTS, observational studies, case studies, reports, and expert opinion. Have a system for recording of evidence. Making a summary table at this stage helps. Make the table outlining the studies, its designs, population, outcome, and findings.

**Step 5:** After evaluating the level of evidence, see the strength of the findings and see if they are significant. Are the benefits of intervention worth the risk & costs.

**Step 6:** Last but not the least, implement the change in your practice, if feasible.



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## **PERFORMING A CLINICAL AUDIT**

### **Anuja Abayadeera**

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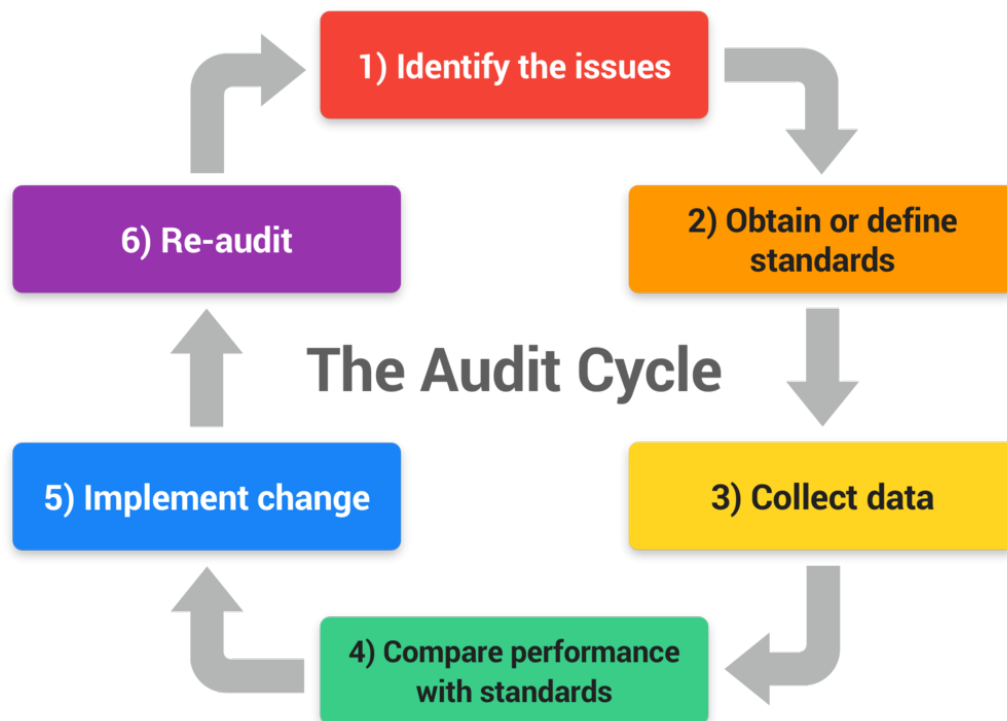
The clinical audit consists of measuring a clinical outcome or a process, against well-defined standard. Audit is a quality improvement measure and is one of the 7 pillars of clinical governance. It allows health care institutions to show where their service is doing well and where it is falling short of standards. It allows them to continually improve patient care, look for



deficiencies, and allow for changes for the better. Re auditing the same aspect following changes made and closing the cycle would see whether beneficial changes have taken place (1).

### Steps of a Clinical Audit

Clinical audits are based on a cycle with several steps.



**From East Midland Emergency Medicine educational media**

1. Identify a problem
2. Define a standard based on a local or international standard
3. Collect data – on a day or over a week, etc
4. Analyse the data against the standard
5. Implement the change towards the standard
6. Re audit after a period by re-doing Steps 1-5.



Involvement in audit is good as you will help to improve patient care, shows your interest in a field, learn many skills such as teamwork and time management. You will also be able to present your audit at meetings, publish it, and use it as part of your appraisal and assessments.

In planning your own audit, you are free to select an area of your choice. Use the SMART criteria to plan the audit.

- i. **Specific** – choose an area of your interest and keep it simple.
- ii. **Measurable** – it should be some aspect you can audit against a local, national, or international standard.
- iii. **Achievable** – have 1-2 outcomes and the data should be easily collectable. Ensure that you have the required facilities to start. E.g., Data sheets, computer access.
- iv. **Realistic**- audit what you are familiar with and what you have access to.
- v. **Timely** – choose a topic that you can do in a short period, keeps you motivated and allows room for re-audit.

Remember to get the required permissions from your department, hospital authorities, and individual consultants. It is important to involve all team members early so that implementation of change is easier, and they would provide constructive feedback. Involving seniors will allow easy implementation of the implementation process. Re-auditing is mandatory. An audit that has a higher number of patients and an easy change to implement is easier to re-audit.

### **An Example**

An example of an audit that can be done during the intraoperative period is the “**Compliance to WHO surgical safety check list**” (2).

#### ***Why do this audit?***

The checklist identifies a set of surgical standards that can be applied in all operating theatres and aids improved communication and leadership. The core document focuses on correct site surgery, haemorrhage, antibiotic prophylaxis, airway management and allergy. There are three stages of checks.

1. ‘Sign In’ before the induction of anaesthesia
2. ‘Time Out’ before skin incision



3. 'Sign Out' before the patient leaves the operating room

### ***Indicators***

#### **Sign In**

- i. % Patients should confirm his/her identity and the site, procedure and consent should be checked?
- ii. % Surgical sites marked prior to the point of anaesthesia?
- iii. % Anaesthetic machine and medication check complete?
- iv. % Any risk factors including allergy, difficult airway, aspiration, or major blood loss should be communicated, and appropriate plans put in place?

#### **Time Out**

- i. % Team members introduced themselves by name and role?
- ii. % Surgeon, anaesthetist, and registered practitioner verbally confirm: patient's name, procedure, site, position and communicate any critical events/concerns?
- iii. % Care bundles for surgical site infection and thromboprophylaxis undertaken?

#### **Sign Out**

- i. % The name of the procedure been recorded?
- ii. % Confirmed that instruments, swabs, and sharps counts are complete (or not applicable)?
- iii. % Specimens been labelled appropriately?
- iv. % Any equipment problems been identified that need to be addressed?
- v. % Key concerns for recovery and management of this patient are noted?

### ***Proposed standard for best practice***

#### **Sign In**

- i. 100% of patients should confirm their identity and the site, procedure and consent should be checked.



- ii. 100% surgical sites marked prior to the point of anaesthesia (where deemed appropriate).
- iii. 100% anaesthetic machine and medication check complete.
- iv. 100% risk factors including allergy, difficult airway, aspiration, or major blood loss should be communicated, and appropriate plans put in place.

#### Time Out

- i. 100% team members introduced themselves by name and role.
- ii. 100% surgeon, anaesthetist and registered practitioner verbally confirm: patient's name, procedure, site, position and communicate any critical events/concerns.
- iii. 100% care bundles for surgical site infection and thromboprophylaxis undertaken.

#### Sign Out

- i. 100% the name of the procedure been recorded.
- ii. 100% confirm that instruments, swabs, and sharps counts are complete (or not applicable).
- iii. 100% specimens been labelled appropriately.
- iv. 100% any equipment problems been identified that need to be addressed.
- v. 100% key concerns for recovery and management of this patient are noted.

***Suggested data to be collected*** are the indicators identified.

There are common reasons for failure to meet the standard. They are time pressures, lack of information to staff, lack of leadership, treating as a tick box exercise and poor communication. In summary, audit is a good way to learn more about a certain aspect, show interest and learn new skills. Always plan well and re-audit. Try to present your results locally and internationally and publish.

#### **Selected References and Suggested Readings:**

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## **ORGANIZING A DEPARTMENTAL MORBIDITY AND MORTALITY MEETING**

**Bisola Onajin-Obembe**

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### **Purpose of Conducting a Morbidity and Mortality Meeting**

The purpose of a departmental morbidity and mortality meeting is to learn and to avoid mishaps from happening in future. The meeting should offer all the participants an opportunity to reflect and engage. It should offer much more than the usual meeting where a group of people come together to discuss the issues on an agenda. While a morbidity and mortality meeting can improve communication and promote coordination, it is better described as a peer review discussion of events that occurred perioperatively during the care of patients that resulted in complications or death.

### **Setting the stage**

Morbidity and mortality meetings are extremely sensitive because of the nature of the events. It is therefore important to have a healthy department with good interpersonal relationships between colleagues and members of the team. A good rapport between members of the department, trust, and respect, as well as maintaining a cordial relationship and transparency in the department are pre-requisites for the success and outcomes of morbidity and mortality meetings. The meeting should not be perceived as a gathering for apportioning blames or conflict resolution.

### **Goals of the Morbidity and Mortality Meeting**



The long-term purpose is to make morbidity and mortality meeting an acceptable culture at all levels of the health care facility. Reporting near misses will help team members develop communication skills, as well as form a habit of error disclosure. The department must establish a non-punitive culture in eliminating error and develop a culture of no-fault. Every member of the department, irrespective of their status should feel at ease and look forward to participating in such meetings.

The goals, although not limited to the following, include **five interacting principles** that constitute a learning organization:

1. ***Collaborative Learning Culture (Systems Thinking)***: To help anaesthesiologists and their team members review the morbidity associated cases and mortalities or near misses within the context of the hospital and considering current practices. By the end of the meeting, participants should be able to see loopholes in patient care, as well as appreciate what needs to be improved, safety measures to be taken, and areas of good practice that need further strengthening.
2. ***Having a lifelong learning mind-set (Personal Mastery)***: The members of the department become lifelong learners by creating a forum for learning from the mistakes made. This provides personal mastery and the enablement to prevent errors from occurring in future.
3. ***Room for Innovation (Mental Models)***: The meeting enables auditing and re-auditing of practice within the hospital. It ensures that the practice is in line with international best practice.
4. ***Forward-Thinking Leadership (Shared Vision)***: Creating an open mind-set to see possibilities rather than difficulties. The members of the department are able to ignite change within themselves, their teams, the department, and the hospital to improve the outcome of anaesthesia management and patient care for the future.
5. ***Knowledge Sharing (Team Learning)***: Serves as an important learning avenue where information, skills and expertise are exchanged within the department. Knowledge sharing is important for members to be able to perform better, and eventually leading to higher performance, as well as reduction in morbidity and mortality.



## Structure of the morbidity and mortality meeting

A meeting is only as good as its structure. The major planning tool is the agenda, or outline of major discussion points. Most meetings focus on a presentation, discussions and remarks, and the plan of action.

To get the best from morbidity and mortality meetings the *structure should include*:

1. ***A regular routine, organizing team and timeline***: The morbidity and mortality meeting must be sustainable. The department must therefore determine how often the meetings should be held. A team should be responsible for organizing and coordinating the meeting as well as ensure that all morbidity or mortality are presented as at when due. The timeline should consider how soon after a near miss, morbidity or mortality should the case be shared or presented. If it is too late, other events may have overtaken the incident.
2. ***Participants at the meeting***: It is important to send out a notice of the meeting, the invitation and preliminary agenda to key participants and stakeholders. It may be necessary to invite multidisciplinary teams directly involved in the incident. These may include surgical, obstetrics, trauma, anaesthesia, and critical care, as well as nursing teams. In some instances, participants may be invited from medical laboratory, and radiology or pharmacy. This is important to enable collaboration, cooperation, and communication across specialties.
3. ***Create a relaxed meeting environment***: Avoid a controlled, sterile, uninviting, oppressive, strictly managed classroom environment. It is important to develop a collaborative environment. A dedicated venue, time and day should be assigned for such meetings, and this should be communicated early enough to the members of the department and those involved in the presentation including those from other departments.
4. ***Roles and responsibilities***: During the meeting, there should be a predetermined case for presentation. The roles and responsibilities of presenting members must be clear.



Considering that critical incidents usually involve a team, there must be a team head as well as time for questions, answers, and discussions. The facilitator must ensure that only relevant questions are asked and must discourage fault finding.

5. ***Simple standard reporting and presentation system***: The format of presentation must be technologically appropriate for the department. The use of flip charts, cardboards and white boards are easy, user-friendly and do not depend on electrical power supply. The use of visual aids like power point presentation will require a projector, computer, and the skills to prepare slide decks, including a reliable source of electrical power supply. It is important to keep the report in a retrievable format in the department for future reference.
6. ***Ensuring a blame free scenario***: During discussion, avoid the blame game. Keep in mind that the team leader and the members of the team in charge of the patient at the time of the incident may feel deep shame, guilt, and a sense of failure. Most individuals involved would probably be going through an emotional time.
7. ***Encourage contributions from all participants, a constructive discussion, debate, and value different opinions***. Use non-threatening language and focus on interactive learning.

At the end of the morbidity and mortality meeting ***recommendations/outcomes*** are expected.

These should include:

1. Recognition of errors, teaching ways to prevent them, and the value of disclosing them thereby contributing to the education of the team.
2. Process and system failure should be identified and addressed. We must assume that when things do not go the way it is supposed to, our systems are at fault, or we did not follow the system correctly.
3. Develop error reporting projects – if you do not report errors, it will happen again, and this can lead to morbidity and mortality.
4. Recommendations must be made to eliminate errors or near misses, improve patient safety and outcome. We must also share safety tips.



In conclusion, a departmental morbidity and mortality meeting, if meticulously organized, will ensure a better patient outcome through learning, reflecting, and engaging multidisciplinary and departmental teams.

### **Selected References and Suggested Readings:**

1. Medical Errors: Focusing More on What and Why, Less on Who. *Journal of Oncology Practice* 2007;3(2):66–70.
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## MORBIDITY & MORTALITY TOOL

### Background Information

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### Patient Demographics and Information

Age \_\_\_\_\_ ASA status \_\_\_\_\_ Gender Female ☐ Male ☐  
Other \_\_\_\_\_  
Co-morbidity \_\_\_\_\_

Surgical procedure \_\_\_\_\_

Elective \_\_\_\_\_ Emergency ☐

Pre-operative assessment done ☐ Yes ☐ No

Time between pre-op assessment and surgery \_\_\_\_\_

Type of anaesthesia: General ☐ With ETT? Yes ☐ No ☐

Regional ☐ Combined general and regional ☐

Pre-Induction parameters: Heart rate \_\_\_\_\_ BP \_\_\_\_\_ SaO<sub>2</sub> \_\_\_\_\_ Temperature \_\_\_\_\_

Respiratory rate \_\_\_\_\_

### Nature of Incident (what happened)

Event: Airway ☐ Neurological ☐  
CVS ☐ Others ☐  
Respiratory ☐ Death within 24 hours ☐

### Timing of Incident (when did it happen)

Timing on 24 hours clock \_\_\_\_\_

### Where did it happen?

Induction ☐ High dependency unit ☐  
Maintenance ☐ Intensive care unit ☐  
Reversal ☐ Ward ☐  
Recovery Room ☐

### How did it happen? (Sequence of pre-event leading to event)

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**Why did it happen?**

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**What were the active factors? (See definition of active factors)**

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**What were the latent factors? (See definition of latent factors)**

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**What are the steps to be taken to modify practice if a similar case presents again?**

Individual practice change (By whom and when?)

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Institutional practice change (By whom and when?)

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**What will be your next step?**



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## CONTRIBUTORS

- Abayadeera A. Professor in Anaesthesiology, Department of Anaesthesiology and Critical Care, Faculty of Medicine, University of Colombo, Sri Lanka.
- Barach P, Professor; Faculty Thomas Jefferson University School of Medicine, PA, USA.; Sigmund Freud University, Vienna, Austria
- Blum P, Senior Staff Anaesthetist, Department of Anaesthesia, Top End Health Services, Royal Darwin Hospital, Casuarina, NT, Australia.
- Hamoud R, Anesthesiologist, and Chief Medical Executive, Clemenceau Medical Center, Dubai, UAE.
- Khan FA, Professor of Anaesthesiology, Faculty of Medicine, Aga Khan University, Karachi, Pakistan.
- Onajin-Obembe B, Professor of Anaesthesiology, Faculty of Clinical Sciences, College of Health Sciences, University of Port Harcourt Teaching Hospital, River State, Nigeria.
- Oracion EC, Senior Consultant Anaesthesiologist, Rizal Medical Center, Cardinal Santos Medical Center, The Medical City, Metro Manila, Philippines; Senior Consultant



Anesthesiologist and Board of Directors, Craniofacial Foundation of the Philippines,

Philippines.