Root Cause Analysis LITE
(RCA Lite)

INTRODUCTION

The root cause analysis "Lite" tool is designed to assist Ottawa Hospital teams to review an adverse event or near miss, identify root causes of the event and develop recommendations to reduce the likelihood of recurrence. This tool is intended for those adverse events that do not require a Critical Incident Review (see corporate policy on Critical Incident Reviews – ADM IX 150.)

DEFINITION

Adverse Event (AE) - can be defined as
- an unexpected or undesired incident directly associated with the care or services provided to the patient.
- an injury that occurs during the process of providing health care and results in patient injury or death;
- an adverse outcome for a patient including an injury or complication.

Critical Incident (CI) - is an incident resulting in serious harm (loss of life, limb, or vital organ) to the patient, or the significant risk thereof (i.e. near miss). Incidents are considered critical when there is an evident need for immediate investigation and response. Please refer to the Critical Incident Review Policy and notify a Risk Management Consultant at 13377 if you suspect a CI has occurred.

Near Miss (no harm event) - is an interception that prevents injury or harm to a patient and is an early warning sign for future similar mishaps that could result in patient/employee injury.

ORGANIZING RCAs

1. Determine The RCA Team

Typically a team is comprised of the involved nurses, physicians, therapists, pharmacists, and any other care providers who directly participated in the event. Someone from within the group can be identified as a Facilitator to lead the review. When such a team is created, it permits the healthcare professionals an opportunity to help create solutions to reduce the likelihood of a recurrence.

The Facilitator should collaborate with the team to collect background facts in advance of the RCA.

2. Organize REVIEW

The "lite" version of a RCA review generally takes 30 minutes to one hour. There are instances where a second meeting may be required.
- reserve a comfortable room, conducive to open discussion,
- extend invitations to identified team members.

On the invitation, identify the objectives of the review, namely to
- review and confirm sequence of events,
- define contributing factors,
- develop recommendations and
- develop a measurement tool to assess if the recommended changes have had the desired effect (e.g. audit).

3. GATHER information regarding the Incident

Prior to the review, collect and review the following:
- the chart
- relevant policies and procedures
- information from staff, gathered by interviews
- relevant literature may be helpful to determine best practices and how others may have addressed a similar problem

4. At the REVIEW

The Facilitator ensures that:
- the team members are aware of the principles of confidentiality and the need to respect the privacy of the patient and the involved caregivers,
- issues related to the care delivery system in which the event occurred are addressed, and not those related to the competencies of specific individuals,
- the review is conducted in a non-blaming environment.

Using the preliminary information collected by the Facilitator, the team:
- confirms the facts and the sequence of events and
- identifies what should have happened vs. what did happen, (a flowchart can be helpful to diagram the facts – see Sample – **Figure A**).
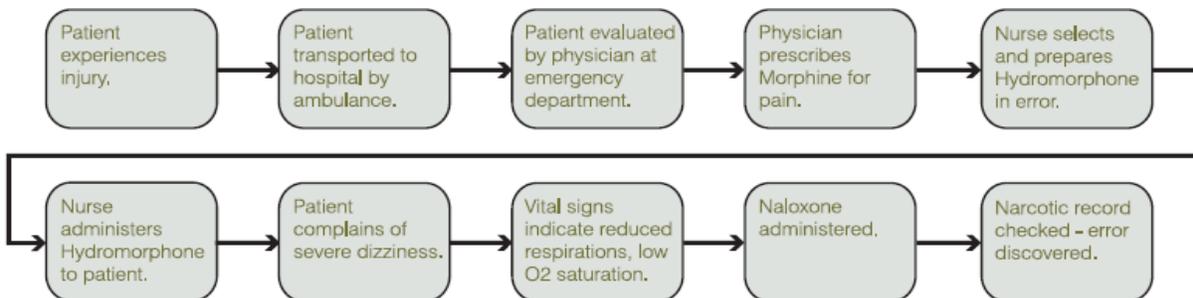

Figure A.

5. Determine CONTRIBUTING FACTORS and ROOT CAUSES

At this phase, the focus is on recognizing all system issues that may have contributed to the event. From these contributing factors the root causes are identified.

- The Root Cause is the earliest point where action could have been taken to prevent the event. To confirm this ask, "If this factor were eliminated or corrected, could this prevent a similar event?

One method of drilling down to determine the contributing factors and ultimately the root cause is by repeatedly asking the question "Why did this happen" or "Why was this done?" The following is a Sample Problem statement:

- You are on your way home from work and your car stops in the middle of the road
- Why did your car stop? (I ran out of gas)
- Why did it run out of gas? (I didn't buy any gas on my way to work)
- Why didn't you buy any gas this morning? (I had no money)
- Why didn't you have any money? (I lost it in last night's poker game.)
- Why did you lose your money in last night's poker game? (I'm not good at bluffing when I don't have a good hand – that is the root cause of this event)

So you can see that the "Root Cause" or the REAL problem is not "Running out of gas" – that is just the end product of a more "DEEPLY ROOTED problem.

Root causes can be clustered on a Fish Bone Diagram (**Figure B**.) to identify the system areas of concern such as communication, training, fatigue, policies and others.
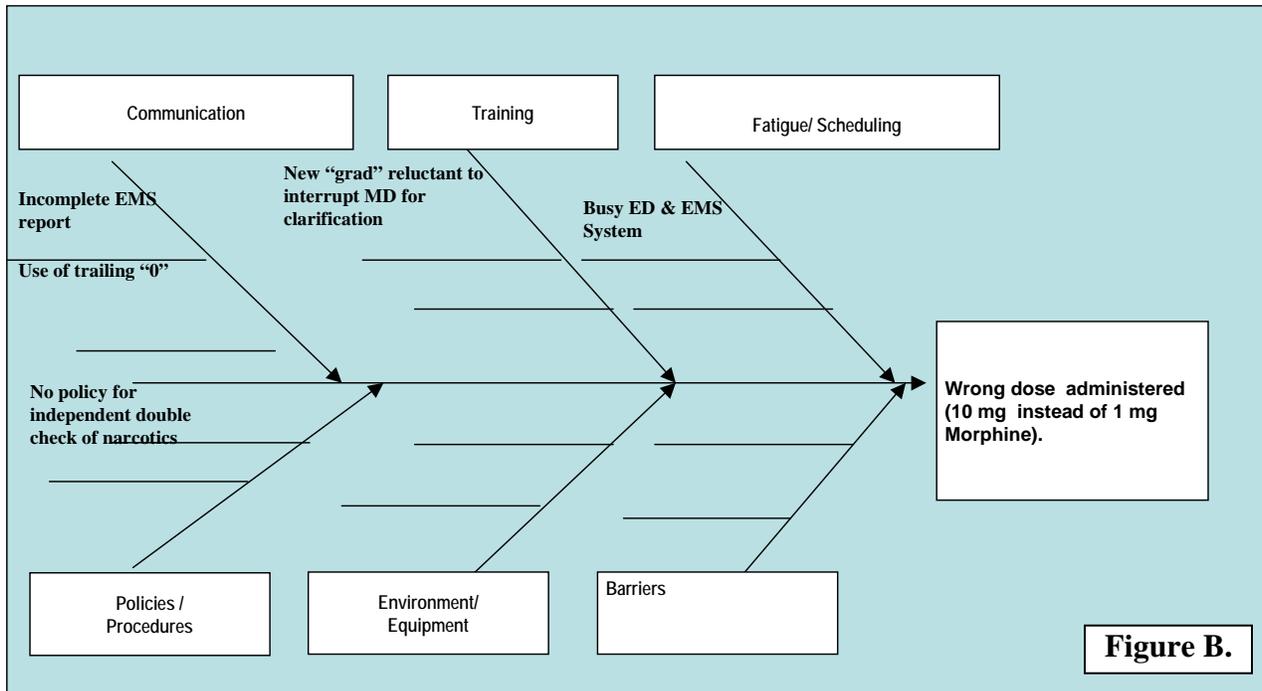
Figure B.

6. Develop ACTIONS and DETERMINE performance measurements

Some types of actions have been found to be more beneficial and effective and are outlined in the Recommended Hierarchy of Actions (See **Figure C.**)

Actions should:
- target the elimination of the root causes,
- offer a long-term solution to the problem,
- not create new problems,
- be objective and measurable
- be achievable and reasonable.
- have set time frames and
- identify the most responsible person(s) for enacting the required changes

Consider the following when developing recommendations:
- who will be affected by the actions?
- the likelihood of success
- does it support TOH mission, vision, and values?
- are there barriers to implementation?
- costs
- measurability

Recommended Hierarchy of Actions:[38]

Stronger Actions
- Architectural/physical plant changes
- New device with usability testing before purchasing
- Engineering control or interlock (forcing functions)
- Simplify the process and remove unnecessary steps
- Standardize on equipment or process or caremaps
- Tangible involvement and action by leadership in support of patient safety

Intermediate Actions
- Increase in staffing/decrease in workload
- Software enhancements/modifications
- Eliminate/reduce distractions (sterile medical environment)
- Checklist/cognitive aid
- Eliminate look and sound alikes
- Read back
- Enhanced documentation/communication
- Redundancy

Weaker Actions
- Double checks
- Warnings and labels
- New procedure/memorandum/policy
- Training
- Additional study/analysis

Figure C.

At the time of the review the team can determine what performance measures will be used to best determine if the change will result in improvement, no change, or if indeed the change resulted in new problems. Tools to assist with this step can be accessed at the following links (See **Appendix A** - Measurement Principles and Guidance; and **Appendix B** - presentation done by Ross Baker)

7. Implement the Actions

At the time of the review the "most responsible person" (MRP) for each action will agree to oversee the implementation of the recommended action and a target date. Use the "Action Plan Template" (See **Appendix C**) to document care delivery problem, recommendations/plans, MRP, measurement, target date and the ongoing status of the items. One person should be charged with maintaining and monitoring the Action Plan for completion

8. Measure/Evaluate the Effectiveness of the Actions

This step is to be done using the agreed upon performance/measurement tool(s) (see #6 above). If the desired changes have not occurred, there may be a need to revisit the proposed actions and develop new ones.

References:

1. Baker, Dr. Ross, *Measurement and Root Cause Analysis*
2. Davies, Dr. Jan M, Hébert, Dr. Philip, Hoffman, Carolyn, *Canadian Patient Safety Dictionary,* October 2003
3. G. Ross Baker, D. Barnard, J. Cervinskas, Dr. D. Kendel, S. Kutty, G. Miller, M. Marshall, W. Nicklin, M.C. Poulin, B. Salsman & Canadian Patient Safety Institute, *Canadian Root Cause Analysis Framework*, March 2006
4. The Ottawa Hospital – *Critical Incident Review Policy, September* 2005

Appendix A

Quality Improvement and Measurement:
You can't have one without the other

The Model for Improvement was first published in 1992 and provides a framework for developing, testing and implementing changes to the way things are done that will lead to improvement. The model consists of two parts. The first, the 'thinking' part, consists of 3 fundamental questions that are essential for guiding improvement work. The second part, the 'doing' part, is made up of Plan, Do, Study, Act (PDSA) cycles that will help you make rapid change.

The 'thinking' part includes 3 questions to assist you in framing your work:
- <u>Aim</u> – What are we trying to accomplish?
- <u>Measures</u> – How will we know that a change is an improvement?
- <u>Change</u> – What changes can we make that can lead to an improvement?

The 'doing' part is made up of the Plan-Do-Study-Act (PDSA) cycle.
- <u>Plan</u> – Determine objectives, what are you going to do, who will be involved, where and when will it take place, what do you predict will happen and what are you going to measure in this cycle?
- <u>Do</u> – Carry out plan, data are generated and collected in this step
- <u>Study</u> – Analyze data, compare results to predictions, summarize what was learned. Include expected and unexpected results.
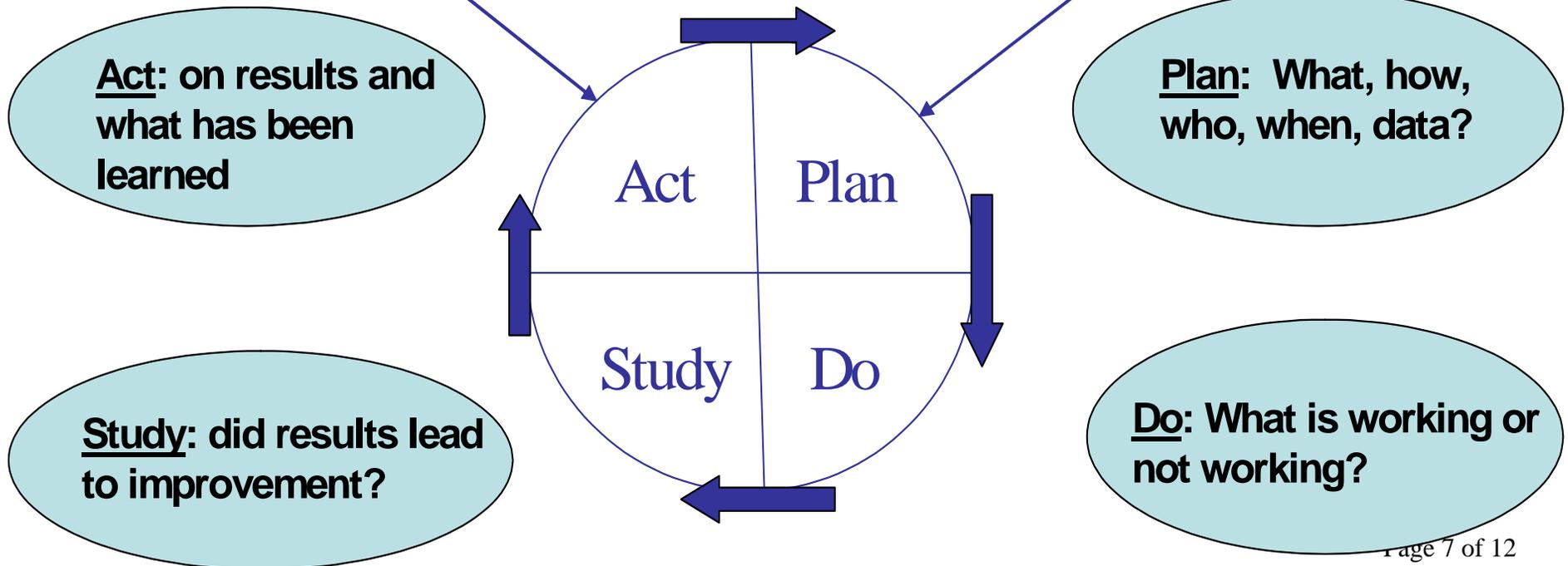- <u>Act</u> - Key indicators or measures are monitored; changes made and/or next cycle of PDSA is initiated

Some principles for using data to support improvement in busy clinical settings include[1]:
- Keep measurement simple (think big, but start small)
- Use both qualitative and quantitative data
- Seek usefulness, not perfection, in the measurement
- Write down the operational definitions of measures
- Measure small, representative samples
- Use a balanced set of process, outcome and structure measures or indicators
  Process Measure: Provides a measure of activities and tasks undertaken to achieve program or service objectives
  Outcome Measure: For patient care teams that provide direct or indirect patient care, outcome indicators should be patient related and should measure those changes in the patients' health status that can be attributed to preceding care and service (i.e. processes and structures).
  Structure Measure: Provides a measure for the type and amount of resources used by a health system or organization to deliver programs and services. Examples of structure indicators relate to amounts of money, beds, supplies and buildings.

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[1] Nelson EC, Splaine ME, Batalden PB, Plume SK. Building Measurement and Data Collection into Medical Practice. Ann Intern Med. 1998; 128:460-466

MODEL FOR IMPROVEMENT

•**Aim**: What are we trying to accomplish?

•**Measures**: How will we know that a change is an improvement?

•**Change**: What changes can we make that will result in improvement?

Act: on results and what has been learned

Plan: What, how, who, when, data?

Act | Plan

Study | Do

Study: did results lead to improvement?

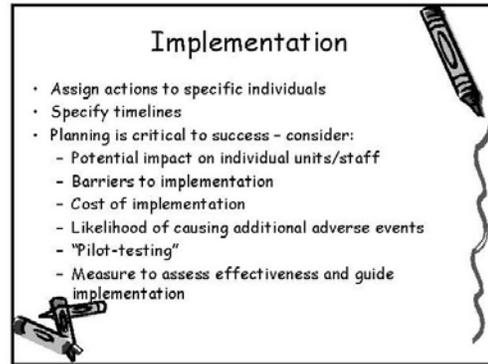**Do**: What is working or not working?

Appendix B

ROSS BAKER PRESENTATION
(read down then over to second column, then on to next page)
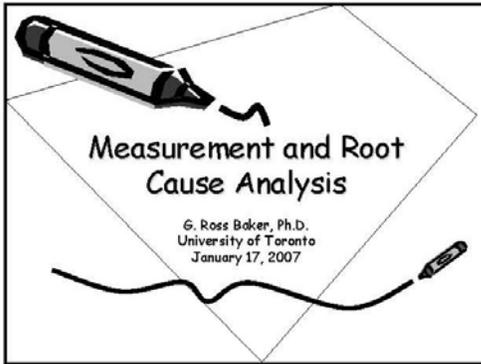
Measurement and Root Cause Analysis

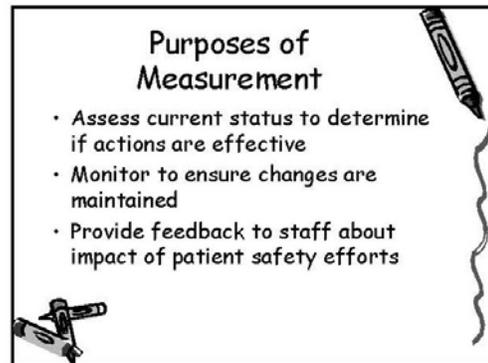G. Ross Baker, Ph.D.
University of Toronto
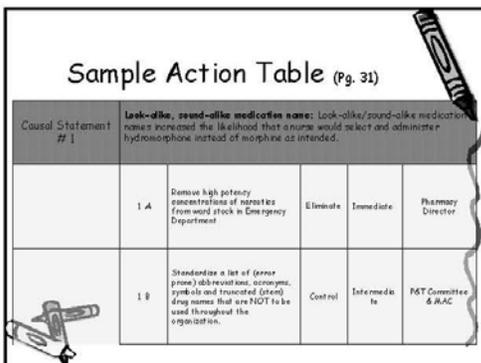January 17, 2007

Overview

- Discuss how measurement closes the loop on actions taken as a result of root cause analysis
- Identify measurement strategies and tools
- Practice the development of informative measures relevant to recommended actions

Sample Action Table (Pg. 31)

Causal Statement # 1	Look-alike, sound-alike medication name: Look-alike/sound-alike medication names increased the likelihood that a nurse would select and administer hydromorphone instead of morphine as intended.				
	1 A	Remove high potency concentrations of narcotics from ward stock in Emergency Department	Eliminate	Immediate	Pharmacy Director
	1 B	Standardize a list of (error prone) abbreviations, acronyms, symbols and truncated (stem) drug names that are NOT to be used throughout the organization.	Control	Intermediate	P&T Committee & MAC

Implementation

- Assign actions to specific individuals
- Specify timelines
- Planning is critical to success – consider:
  - Potential impact on individual units/staff
  - Barriers to implementation
  - Cost of implementation
  - Likelihood of causing additional adverse events
  - "Pilot-testing"
  - Measure to assess effectiveness and guide implementation
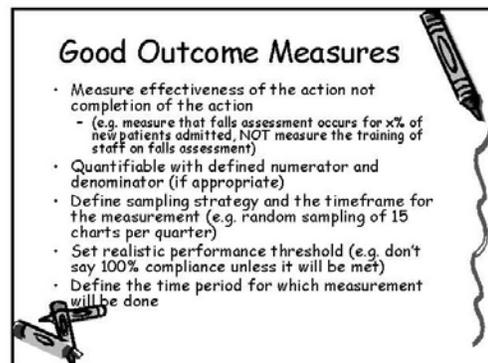

Purposes of Measurement

- Assess current status to determine if actions are effective
- Monitor to ensure changes are maintained
- Provide feedback to staff about impact of patient safety efforts

Good Outcome Measures

- Measure effectiveness of the action not completion of the action
  - (e.g. measure that falls assessment occurs for x% of new patients admitted, NOT measure the training of staff on falls assessment)
- Quantifiable with defined numerator and denominator (if appropriate)
- Define sampling strategy and the timeframe for the measurement (e.g. random sampling of 15 charts per quarter)
- Set realistic performance threshold (e.g. don't say 100% compliance unless it will be met)
- Define the time period for which measurement will be done

Outcome Measurement

- Define time period for evaluation
- Measure effectiveness of action, not just the completion of the action
- Should be quantifiable
- Where needed identify balance measures – did something else get worse?

Tips

- Emphasize practical measurement: Use small samples
- Define numerator and denominator
- Use local expertise to help determine the frequency of measurement ("one size does not fit all") and locations to measure
- Select data sources with a view to random selection – ask the questions: is this unit typical? problematic?
- Develop a data collection sheet that simplifies and guides data collection

Duration of Measurement

When is measurement complete? How will you know if the improvement is successful?

- Repeated measurement (e.g. audit) demonstrates sustained change

- When the new process is routine

- When new employees demonstrate proper procedure after orientation

Types of Measures

- Rates (where both numerator and denominator are explicitly operationalized)
  - Consent form present on charts
  - Percentage of staff trained on new infusion pumps
  - Percentage of operations with pre-operative briefings
- Counts (frequency of some event)
- Fulfilled conditions (e.g., new policy)

Measurement as a Process

For each recommended action, define:
1. What is the associated **measure**?
2. **Where** is the data/information for that measure?
3. **Who** will collect that measure?
4. **How often** and **for how long** will it be collected?
5. What is the **sample size** needed to assess performance?
6. **To whom** will the measure be reported?
7. What is the **target outcome** expected?

Morphine/Hydromorphone Incident

- <u>Action</u>: Remove high potency concentrations of narcotics from ward stock in emergency department
- <u>Measure</u>: Periodic audits of emergency department ward stock

Periodic Audit

Measure (Count)	Number of high potency concentrated narcotics (see list) found in ED ward stock
Data source	Visual inspection of ED narcotics stock by pharmacy manager and patient safety officer
Data collected by	Pharmacy manager
Collection frequency	Monthly (January to March 2007), then quarterly
Sample size	Satellite pharmacy
Report to	Director of pharmacy and Patient safety manager
Target outcome	0 high potency concentrated narcotics found

Implement a Process to Evaluate the Potential for Look-alike Meds

Recommendation: Implement a process to evaluate the potential for look-alike/sound alike products which a) allows purchase of drugs which do not look alike where possible; b) use of auxlliary labeling; c) segmentation or separation of products where possible

Morphine/Hydromorphone Incident

- Action: Standardize a list of drug abbreviations, etc. not to be used
- Measure: Number of abbreviations found in a sample of 10 charts

Look alike/Sound Alike

Measure or Count	
Data source	
Data collected by	
Collection frequency	
Sample size	
Report to	
Target outcome	

Abbreviations Audit

Measure (Count)	Number of abbreviations from list found
Data source	5 charts selected in Unit 4a, 5 charts selected in Unit 4b
Data collected by	Risk management
Collection frequency	Monthly until December 2007
Sample size	10 per month
Report to	P&T committee, MAC and patient safety manager
Target outcome	2 per month

Wrong Side Surgery

- Following a patient incident the RCA team found these root causes:
  - It was accepted practice not to complete the OR care plan
  - The guidelines for checking patient ID were not clearly defined
  - There was no recognized checking procedure prior to start the operation
  - When surgeons should see their patient is not clearly defined in OR policies
  - Anaesthesia records are not always completed

Exercise

1. Imagine you are part of the RCA team that has just identified the contributing causes to the wrong side surgery case
2. Identify one or more actions needed to address these causes (you do not have to do them all)
3. Develop measures that assess implementation of recommended actions
4. Identify balancing measures, if needed

Develop One Or More Actions And Measures

Measure or Count	
Data source	
Data collected by	
Collection frequency	
Sample size	
Report to	
Target outcome	

Conclusions

- Measurement provides an important check on the impact and sustainability of actions taken to address contributing causes
- Measurement helps inform staff and managers
- Perfect measures are often time consuming and costly
- Local expertise is useful in designing the measurement strategy
- Look for existing information where possible as a source of useful measures

Appendix C

Action Plan Template

Patient Initials and MRN: _____
Description of Incident: _____
_____

Date of Incident _____
Date of the Review _____

Issue	Recommendations/Plan for Resolution	Most Responsible Person	Measurement (Most responsible person)	Target Date	Status
1. Equipment Issues					
2. Work Environment Issues (staffing, scheduling, environment)					
3. Rules, Policies, Procedures & Protocols, Processes Issues					
4. Communication Issues					
5. Staff Factors (knowledge, skill)					
6. Patient Factors (condition, language, social factors)					