Nebraska Coalition for Patient Safety Webinar Series: Improving Your RCA² Processes

Session #3 – Actions to Build Safer Systems

RCA² Audit Tools

Presenters

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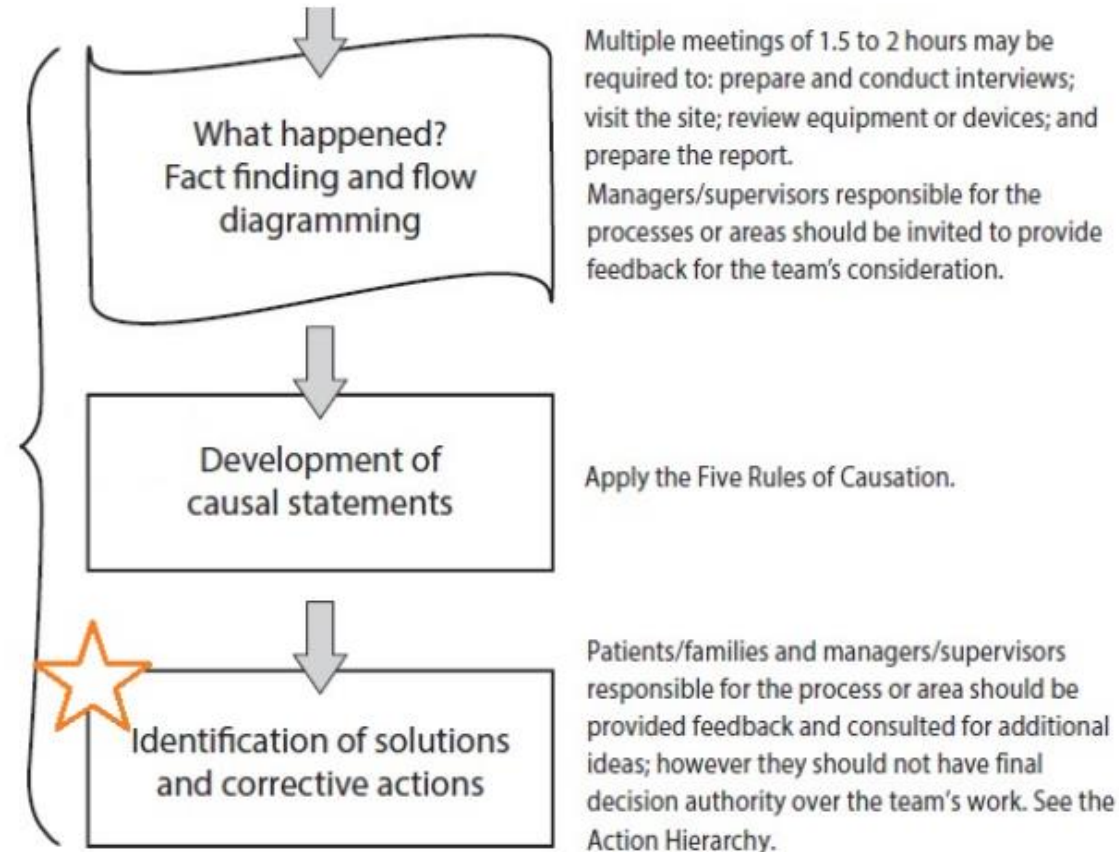
Objectives

1. Describe how a RCA² review can lead to the improvement of health care and the prevention of future errors.

2. Differentiate between actions that have high, medium, and low impact when working to improve safety.

3. Describe how setting goals and tracking measures are critical in the improvement process.

4. Explain the use of an RCA² audit tool to determine the effectiveness of your event investigation and resulting RCA² investigation.

Acknowledgment

The content of this presentation is taken from a variety of sources which include:

- Institute for Healthcare Improvement
- Veterans Health Administration National Center for Patient Safety
- Actual events reported to NCPS
- The Joint Commission
- National Center for Human Factors in Healthcare

Identification of Solutions and Corrective Actions

What happened?
Fact finding and flow diagramming

Multiple meetings of 1.5 to 2 hours may be required to: prepare and conduct interviews; visit the site; review equipment or devices; and prepare the report.
Managers/supervisors responsible for the processes or areas should be invited to provide feedback for the team's consideration.

Development of causal statements

Apply the Five Rules of Causation.

Identification of solutions and corrective actions

Patients/families and managers/supervisors responsible for the process or area should be provided feedback and consulted for additional ideas; however they should not have final decision authority over the team's work. See the Action Hierarchy.

Recommendations for Action

- Look at risks found during investigation that were not part of the current RCA^2 event review

- Look at the type of human error that occurred
  - was it knowledge based?
  - was it rules-based?
  - was it skill based?

Types of Human Error

❖ **Knowledge based –** error occurs when people are not used to doing a task or are not properly trained
: Address through education and training
: Leadership has an accountability

❖ **Rules based** – we perceive a situation, our brain scans for a rule (usually learned education or experience) and when we misapply the rule this type of error occurs

❖ **Skills based ("automation error") -** a well developed skill pattern exists in your brain (developed through practice and repetition of an act) which has become so routine you don't even think about the task while you're doing it
: slip – what you intended to do didn't turn out the way you thought it would
: lapse – you forgot to do something

Skills Based Errors – "Automation Error"

- **Training will NOT impact**

- **In healthcare, slips and lapses often the result of:**
  - the design of the technology
  - the device in use
  - something that occurs around what we are using (distractions, interruptions)

- **We often default to less effective modalities to fix the problem (post a sign, label and say, "Don't forget to do _____".) Instead, we should:**
  - study the environment, work conditions, dissect the tasks to be done
  - focus on understanding human capabilities in context
  - identify high risk areas and mitigate

- **Error rates will not decrease if you discipline the person or terminate their employment.**

Types of Actions Addressing System Level Problems

- Standardizing equipment
- Ensuring redundancy, such as using double checks or backup systems
- Using forcing functions that physically prevent users from making common mistakes
- Changing the physical architecture
- Updating or improving software
- Using cognitive aids, such as checklists, labels, or mnemonic devices
- Simplifying a process
- Educating staff
- Developing new policies

Action Hierarchy

- Focusing on the conditions under which individual providers and care teams work

- Redesigning workflow and adding defenses to avert errors

- Minimizing the conditions that lend themselves to procedural violations

- Putting mechanisms in place to mitigate unsafe acts that may inevitably occur
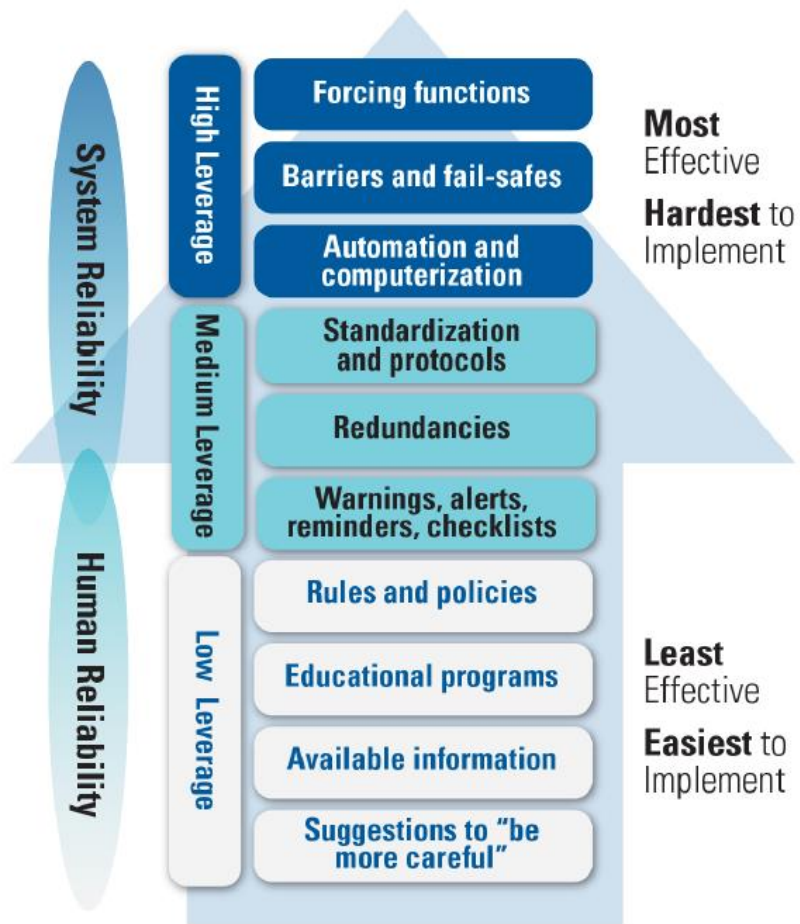
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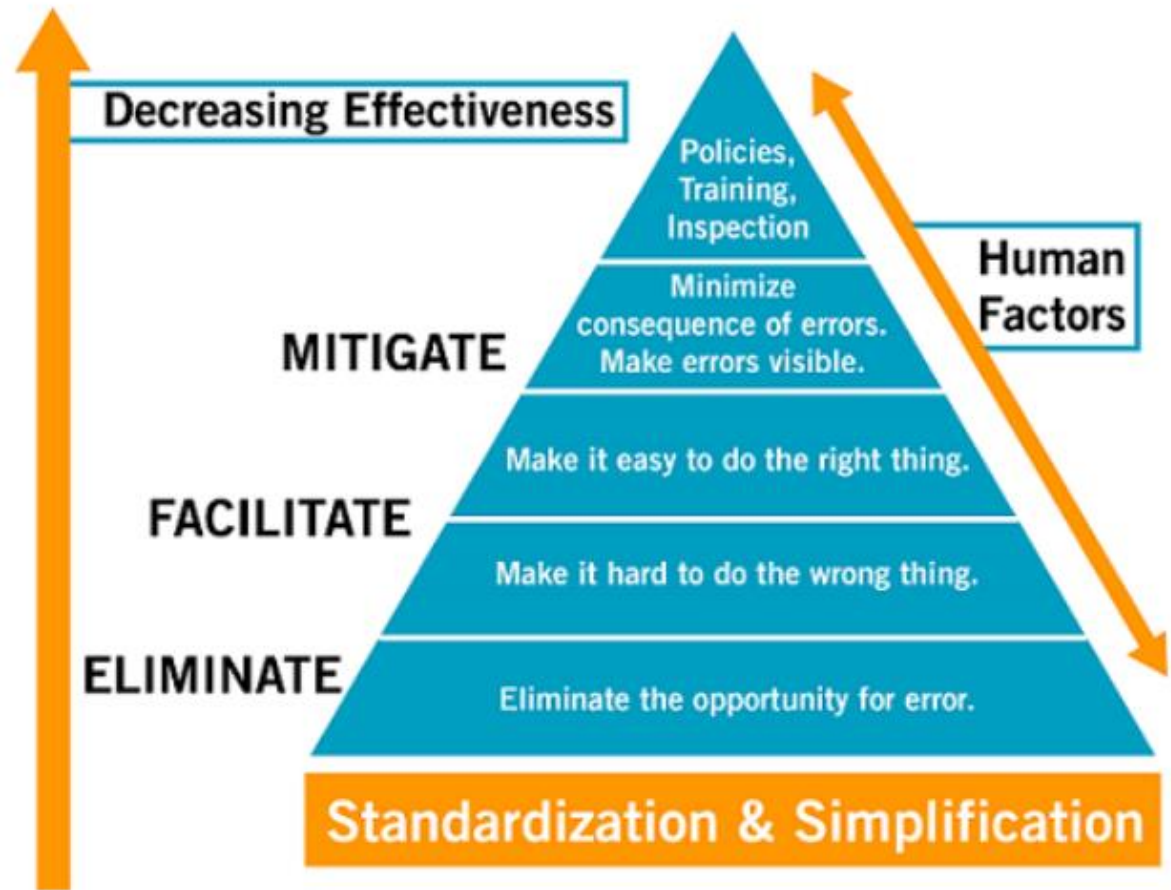
From Kaiser Permanente health system

Examples of system changes to mistake proof a system

Stronger	
	Architectural/physical plant changes
	Example: Replace revolving doors at the main patient entrance into the building with powered sliding or swinging doors to reduce patient falls.
	New devices with usability testing
	Engineering control (forcing function)
	Simplify process
	Standardize on equipment or process
	Tangible involvement by leadership

From IHI's Redesigning RCA[2]

Examples of system changes to mistake proof a system

Intermediate	
	Redundancy
	Example: Use two RNs to independently calculate high-risk medication dosages.
	Increase staffing/decrease workload
	Software enhancements, modifications
	Eliminate/reduce distractions
	Education using simulation-based training, with periodic refresher sessions and observations
	Checklist/cognitive aids
	Eliminate look- and sound-alikes
	Standardized communication tools
	Enhanced documentation, communication

From IHI's Redesigning RCA[2]

Examples of system changes to mistake proof a system

Weaker	Double checks
	Example: One person calculates dosage, another person reviews their calculation.
	Warnings
	New procedure/memorandum/policy
	Training

From IHI's Redesigning RCA[2]

Action Strength

Write a new hospital policy about patient transport

○ Stronger

○ Intermediate

○ Weaker

Action Strength

Write a new hospital policy about patient transport

○ Stronger

○ Intermediate

X Weaker

Weaker: Although they are useful to establish expectations, policies don't usually change behavior on their own and can be difficult to enforce.

Action Strength

Remove unnecessary and dangerous steps from a process.

○ Stronger

○ Intermediate

○ Weaker

Action Strength

Remove unnecessary and dangerous steps from a process.

X Stronger

○ Intermediate

○ Weaker

Stronger: This simplifies the process and so makes it less prone to error

Action Strength

Add more nurses to a unit.

○ Stronger

○ Intermediate

○ Weaker

Action Strength

Add more nurses to a unit.

○ Stronger

X Intermediate

○ Weaker

Intermediate: A decreased workload may decrease errors because staff members are not rushing around as much. However, adding more people doesn't automatically lead to safer care.

Action Planning

- What is being measured

- When

- By whom

- Should include both *process* and *outcome* measures

Process and Outcome Measures

Process Measures: confirm the action has been implemented

Outcome Measures: tell you whether the action was effective.

Example: If you were testing new technology to improve staff use of alcohol-based hand gel, you might have these measures:

• **Process measure**: Observe 100 staff-patient encounters over a 7-day period with a goal of 95% compliance.

• **Outcome measure**: Measure hospital-acquired infections (HAI) transmitted by staff-patient contact with a goal of a 20% reduction.

IHI QI 101: Introduction to Health Care Improvement

Action Planning

Causal statement: The lack of a ferromagnetic detection system at the entrance into the MRI room increased the likelihood that the patient's oxygen cylinder would be permitted in the room, resulting in the cylinder being drawn into the bore of the magnet, the magnet being quenched, and the room being out of service for five days.

Action recommendation: Install a ferromagnetic detection system by February 1, 2024 at the entrance to all four MRI magnet rooms.

From IHI's Redesigning RCA[2]

Using RCA2 to Improve Patient Safety

1. A causal statement has three parts: The cause: "This happened…" The effect: "…which lead to something else happening…" The event: "…which caused this undesirable outcome."

2. Each causal statement should trigger at least one intermediate-level action recommendation which should be expressed as an aim statement.

Using RCA2 to Improve Patient Safety

1. A causal statement has three parts: The cause: "This happened..." The effect: "...which lead to something else happening..." The event: "...which caused this undesirable outcome."

2. Each causal statement shoul[d] recommendation which shou[ld]

Aim Statement
Clearly state:
- How good
- By when
- For whom

Using RCA2 to Improve Patient Safety

1. A causal statement has three parts: The cause: "This happened…" The effect: "…which lead to something else happening…" The event: "…which caused this undesirable outcome."

2. Each causal statement should trigger at least one intermediate-level action recommendation which should be expressed as an aim statement.

3. The measurement plan, including:
   - what will be measured
   - how it will be measured
   - for how long

Creating Sustainable Actions (the 2nd A in RCA[2])

- Creating ownership by having a designated responsible person

- Having a measure of success (a metric)

- Having a timeline

RCA² Action Planning Worksheet

For RCA² to improve patient safety, causes must be identified, corrective actions must be implemented, and actions' effectiveness must be measured. Use the worksheet below to help your team take these steps.

1. A causal statement has three parts: The cause: "This happened…" The effect: "…which led to something else happening…" The event: "…which caused this undesirable outcome."

Causal Statement #1	E.g. The lack of a ferromagnetic detection system at the entrance into the MRI room increased the likelihood that the patient's oxygen cylinder would be permitted in the room, resulting in the cylinder being drawn into the bore of the magnet, the magnet being quenched, and the room being out of service for five days.

2. Each causal statement should trigger at least one intermediate-level action recommendation (see the Action Hierarchy), which should be expressed as an aim statement. That is, it should clearly state "how good, by when, for whom."

Action(s)	E.g. Install a ferromagnetic detection system by September 30, 2019 at the entrance to all four MRI magnet rooms.
Person responsible	

3. A measurement plan, including what will be measured, how, and for how long, should be in place for each action. Measures may be process or outcome measures.

Measure(s)	E.g. On May 10, 2020, five ferrous objects including an oxygen cylinder will be passed by the ferromagnetic sensors of each detector and 100% will result in alarms sounding in the adjacent MR Control Room.
Person responsible	

When Action Planning Remember *Stronger Actions* Improve *Systems* and Will Lead to *Sustainable Improvement*

Actions	Ideas
Stronger Actions These tasks require less reliance on humans to remember to perform the task correctly.	
• Architectural/physical plant changes • New devices with usability testing • Engineering control (forcing function) • Simplify process • Standardize on equipment or process • Tangible involvement by leadership	
Intermediate Actions These tasks are less effective than the strongest level actions but more effective than the weakest level.	
• Redundancy • Increase in staffing/decrease in workload • Software enhancements, modifications • Eliminate/reduce distractions • Education using simulation-based training, with periodic refresher sessions and observations • Checklist/cognitive aids • Eliminate look- and sound-alikes • Standardized communication tools • Enhanced documentation, communication	
Weaker Actions These tasks require more reliance on humans to remember to perform the task correctly.	
• Double checks • Warnings • New procedure/memorandum/policy • Trainings	

Return to What Happened to Margaret? Scenario

Because of staffing shortages on the unit and the accepted practice that nurses could be interrupted, **[Cause]** the nursing staff in the department faced multiple priorities and distractions. These distractions pulled nurses off task and set up situations where they had to rely on their memory to ensure they completed critical tasks. This increased the likelihood that handoffs and transfers would be incomplete **[Effect]**, leading to inadequate oxygenation during Margaret's transfer and contributing to her death. **[Event]**

Action Recommendation for What Happened to Margaret? Scenario

Which is the better action recommendation?

o Within two months, all patients receiving supplemental oxygen should wear pulse oximeters at all time, including during transport. These oximeters should measure the oxygen saturation of patients' blood and sound an alarm if the levels are too low.

o Improve care for patients receiving oxygen.

Action Recommendation for What Happened to Margaret? Scenario

Which is the better action recommendation?

X Within two months, all patients receiving supplemental oxygen should wear pulse oximeters at all time, including during transport. These oximeters should measure the oxygen saturation of patients' blood and sound an alarm if the levels are too low.

○ Improve care for patients receiving oxygen.

The action recommendation that is much more complete, and includes a deadline, is the better one.

Action Recommendation for What Happened to Margaret? Scenario

The RCA2 team recommends for following action. Create a checklist for patient transporters, to be implemented on this unit with six weeks. The checklist should include the item, "Receive report from nurse responsible for patient," and should include a space for both the nurse and the transporter to sign off before transport.

Where does a checklist as an error-reducing strategy fall within the action hierarchy?
○ Weaker
○ Intermediate
○ Stronger

Action Recommendation for What Happened to Margaret? Scenario

The RCA2 team recommends for following action. Create a checklist for patient transporters, to be implemented on this unit with six weeks. The checklist should include the item, "Receive report from nurse responsible for patient," and should include a space for both the nurse and the transporter to sign off before transport.

Where does a checklist as an error-reducing strategy fall within the action hierarchy?

○ Weaker

X Intermediate

○ Stronger

A cognitive aid, such as in the form of a checklist, is an intermediate-level action to improve safety.
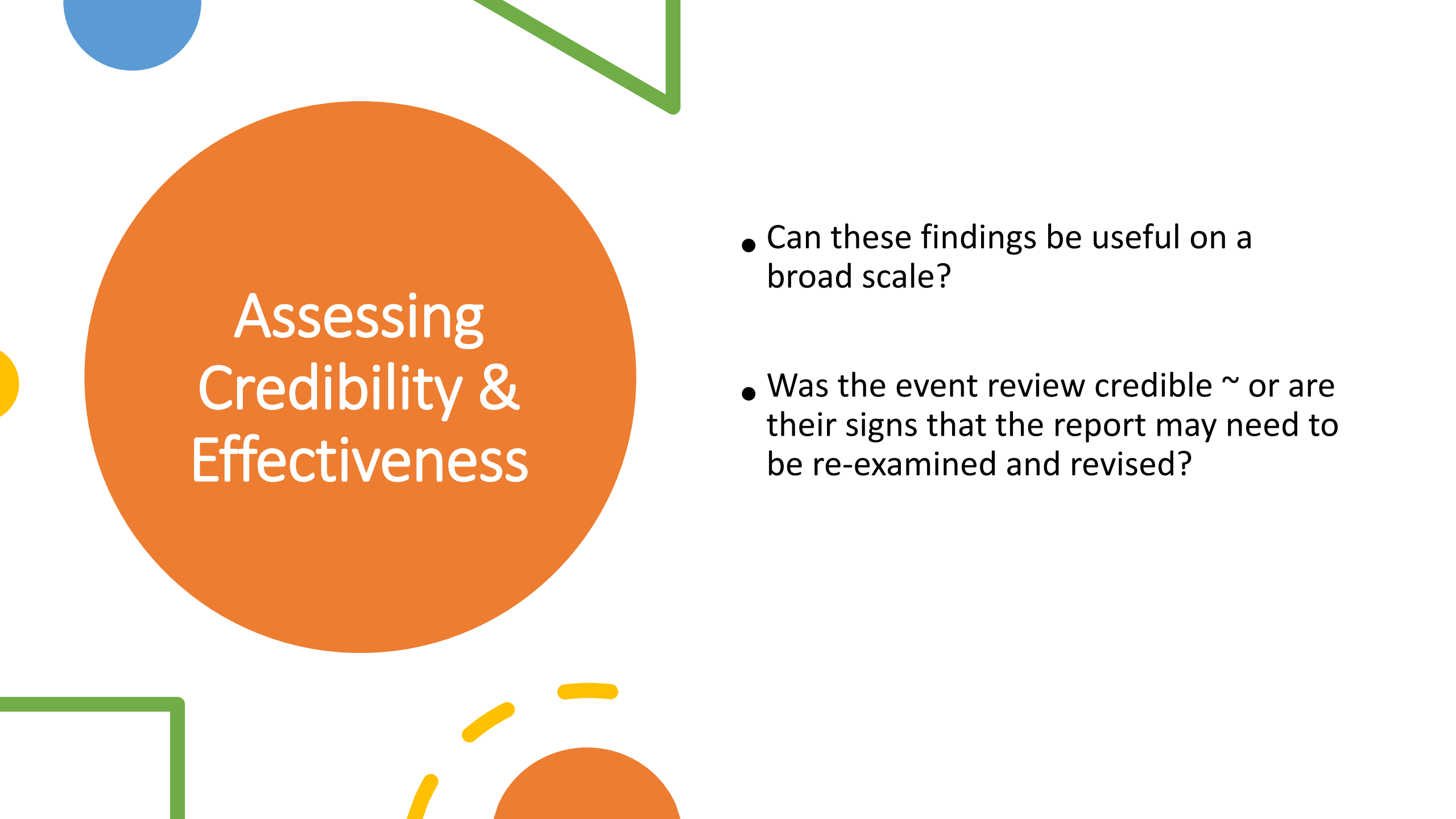
Engaging Key Stakeholders

- Staff and patient or families involved in the incident

- Senior leaders

- Board of Directors

- Heads of departments involved in the event

- Members of the Quality Improvement Department

Final Report

- A description of the *RCA² team members*

- A description of the *investigative methods* the team used to gather and interpret information

- A clear description of what happened, with a *final flow diagram*

- The root causes and contributing factors you identified, in the form of *causal statements*

- Recommendations for how to prevent the error from occurring again, in the form of *action recommendations*.

Senior Leaders Ongoing Accountability

- Percent of contributing factors written to meet the Five Rules of Causation
- Percent of RCA^2 reviews with at least one stronger or intermediate strength action
- Percent of actions that are classified as stronger or intermediate strength
- Percent of actions that are implemented on time
- Percent of actions completed
- Audits or other checks that independently verify hazard mitigation has been sustained
- Staff and patient satisfaction with the RCA^2 review process
- Response to AHRQ survey questions pertinent to the RCA^2 review process
- Percent of RCA^2 results presented to the board

Assessing Credibility & Effectiveness

- Can these findings be useful on a broad scale?

- Was the event review credible ~ or are their signs that the report may need to be re-examined and revised?

RCA Audit Tools

From the VHA's RCA Guidebook

NCPS
VHA National Center for Patient Safety
Safer Systems • Safer Care

Station ID Number:	RCA Case Number:		Analyst Initials:		
RCA Quality Element	**Quality Indicator Measure**			**Evaluated Points**	**Total Points**
RCA Team Composition (4 points)	1. Multidisciplinary =1				
	2. Appropriate disciplines / SME for event being investigated =1				
	3. 1 non-SME =1				
	4. Approximately 5 members total =1				
Initial Flow (5 points)	5. Must use shapes, arrows, and text to depict all elements of the event =1				
	6. Must have start and end point in chronological order =1				
	7. Must have more than 1 box depicted =1				
	8. Should be substantive and not simply a reproduction of the "brief description text" in Q1-7 =1				
	9. Must identify questions and/or gaps in the process steps to be used for investigation =1				
Initial Understanding (4 points)	10. Must use narrative form to depict all elements of the event =1				
	11. Must discuss known facts in chronological order =1				
	12. Should be substantive and not simply a reproduction of the "brief description text" in Q1-7 =1				
	13. Must identify questions and/or gaps in the process steps to be used for investigation =1				
Triage Questions (1 Point)	14. All Triage questions addressed =1				
Final Flow (5 points)	15. Must use shapes, arrows, and text to depict all elements of the event =1				
	16. Must have a start and end point in chronological order =1				
	17. Should differ substantially from the initial flow diagram =1				
	18. Must address the questions and/or gaps noted in the initial understanding of the event =1				
	19. Must depict a comprehensive understanding of the event reflective of findings derived from interviews, simulations, research, and analysis =1				
Final Understanding (5 points)	20. Must use narrative form to depict all elements of the event =1				
	21. Must discuss known facts in chronological order =1				
	22. Should differ substantially from initial understanding =1				
	23. Must address the questions and/or gaps noted in the initial understanding of the event =1				
	24. Must depict a comprehensive understanding of the event reflective of findings derived from interviews, simulations, research, and analysis =1				
Cause and Effect Diagram (4 points)	25. Diagram begins with the primary effect of consequence not wanted to recur =1				
	26. Primary effect is connected to a causal action =1				
	27. Primary effect is connected to a causal condition =1				
	28. Causes end at point of ignorance, or where it is no longer value-added or reasonable to continue =1				

28

From IHI's Redesigning RCA

Make sure you can say "YES" to each item below:

1. There are contributing factors identified, and the contributing factors include supporting data or information.
☐ YES ☐ NO

2. Individuals are NOT identified as causing the event; causal factors do not point to human error or blame.
☐ YES ☐ NO

3. Stronger or intermediate-strength actions are identified.
☐ YES ☐ NO

4. Causal statements comply with the Five Rules of Causation.
☐ YES ☐ NO

5. Corrective actions are identified, and they appear to address the system vulnerabilities identified by the contributing factors.
☐ YES ☐ NO

6. Action follow-up is assigned to an individual, not a group or committee.
☐ YES ☐ NO

7. Actions have completion dates and meaningful process and outcome measures.
☐ YES ☐ NO

8. The event review took 45 days or fewer to complete.
☐ YES ☐ NO

9. There is confidence that implementing and sustaining corrective action will significantly reduce the risk of future occurrences of similar events.
☐ YES ☐ NO

RCA Audit Tools

![NCPS - VHA National Center for Patient Safety - Safer Systems • Safer Care]

Station ID Number:	RCA Case Number:		Analyst Initials:		
RCA Quality Element	**Quality Indicator Measure**			**Evaluated Points**	**Total Points**

RCA Team Composition (4 points)

1. Multidisciplinary = 1
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3. 1 non-SME = 1
4. Approximately 5 members total = 1

RCA Quality Element	Quality Indicator Measure	Evaluated Points	Total Points
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From the VHA's RCA Guidebook

Make sure you can say "YES" to each item below:

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2. Individuals are NOT identified as causing the event; causal factors do not point to human error or blame.
   ☐ YES ☐ NO

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   ☐ YES ☐ NO

4. Causal statements comply with the Five Rules of Causation.
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5. Corrective actions are identified, and they appear to address the system vulnerabilities identified by the contributing factors.
   ☐ YES ☐ NO

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   ☐ YES ☐ NO

7. Actions have completion dates and meaningful process and outcome measures.
   ☐ YES ☐ NO

8. The event review took 45 days or fewer to complete.
   ☐ YES ☐ NO

9. There is confidence that implementing and sustaining corrective action will significantly reduce the risk of future occurrences of similar events.
   ☐ YES ☐ NO

From IHI's Redesigning RCA

Improving Safety to Prevent Future Harm

- Completeness – comes from following the recommendations of the RCA² reports, with respect to timeliness, team composition, effective and comprehensive interviewing, and identifying contributing factors and root causes.

- Credibility – comes from being comprehensive, impartial, and connected to the relevant evidence

- Actionability – comes from an understandable report with recommended actions that are specific enough to lead to improvement and strong enough to reduce the chances the errors will happen again.

Joint Commission Criteria for Acceptable RCA

Thorough: analysis must do the following:

- Repeatedly ask "Why?" until the analysis identifies the systemic causal factors associated with each step in the sequence that led to the sentinel event
- Focus on systems and processes, not solely on individual performance
- Determine the human and other factors most directly associated with the sentinel event and the process(es) and systems related to its occurrence
- Use the analysis to help determine where redesign might reduce risk
- Inquire into all areas appropriate to the specific type of event
- Identify risk points and their potential contributions to this type of event
- Determine potential improvement in processes or systems that would tend to decrease the likelihood of such events in the future or determine, after analysis, that no such improvement opportunities exist

Joint Commission Criteria for Acceptable RCA

Credible, analysis must do the following:

- Be clear (understandable information)
- Be accurate (validated information and data)
- Be precise (objective information and data without internal inconsistencies)
- Be relevant (focus on issues related or potentially related to the sentinel event)
- Be complete (cover all causes and potential causes)
- Be systematic (methodically conducted)
- Possess depth (ask and answer all of the relevant "Why" questions and explain any "not applicable" finding)
- Possess breadth of scope (cover all possible systemic factors wherever they occur)
- Reflect diverse perspectives (include a process owner or designee, a patient or family member when appropriate, and individuals close to the process under review)

Joint Commission Criteria for Acceptable RCA

Acceptable, the corrective action plan must do the following:

- Identify changes that can be implemented to reduce risk, or formulate a rationale for not undertaking such changes
- Identify, in situations in which improvement actions are planned, the following:
  - ❏ Who (by title) is responsible for implementation
  - ❏ When the action will be implemented (including any pilot testing)
  - ❏ How the effectiveness of the actions will be evaluated
  - ❏ How the actions will be sustained
  - ❏ The point at which alternative actions will be considered if improvement targets are not met
  - ❏ At least one stronger or intermediate-strength action

NCPS Audit Results

- NCPS RCA Audit Tool

- The purpose of the RCA Audit Tool is to be used to determine areas in need of improvement to conduct root cause analyses that are credible, thorough, and acceptable

Credible RCA	Number of RCAS Documenting Considerable Evidence
Constructed a detailed timeline	4/10
Investigated key events in the timeline by asking why multiple times	6/10
Understood/viewed the environment in which the event occurred	5/10
Integrated perspectives of front-line staff involved in event	4/10
Integrated perspectives of clinical experts	4/10
Integrated perspectives of managers	6/10
Integrated information from all relevant disciplines	7/10
Integrated perspectives of patient/family	2/10
Thorough RCA	
Constructed causal map or causal statements to determine root causes	3/10
Identified all relevant root causes	5/10
Acceptable RCA	
Specifies actions that will reduce the risk of recurrence	8/10
Incudes stronger or intermediate actions	7/10
Specifies process and outcome measures for improvement (VHA)	3/10

RCA^2 Tools Discussed in this Training

- SAC Matrix
- RCA^2 Team Roles
- Flow diagramming the incident
- Triggering Questions
- Cause and Effect Diagram
- 5 Whys for RCA^2
- Causal Statement
- **Action Hierarchy**
- **Effective RCA^2 Checklist**

Session 3

Optional Homework & Tools

- Using the IHI Action Planning Worksheet develop an action plan for the RCA^2 Case Example we have been using throughout this course
- Using one of the three RCA^2 audit tools presented today, evaluate a previous RCA your organization has conducted (we would appreciate discussing members' findings in the RCA^2 January Safe Table)

Tools and Resources

- IHI Action Hierarchy Worksheet
- IHI Action Planning Worksheet
- IHI Effective RCA^2 Checklist
- VHA RCA Audit Tool
- IHI Aim Statement Worksheet

Exercises, Tools, and Resources will be sent to you via email and when the session is complete will be downloadable from the NCPS website.

Resources

- **Institute for Healthcare Improvement (IHI) https://www.ihi.org/**
- **IHI RCA2 Tools and Action Hierarchy Tool http://www.ihi.org/resources/Pages/Tools/RCA2-Improving-Root-Cause-Analyses-and-Actions-to-Prevent-Harm.aspx**
- **Veteran's Health Administration Center for Patient Safety https://www.patientsafety.va.gov/**
- **Institute for Safe Medical Practices (ISMP) https://www.ismp.org/**
- **Joint Commission, RCA Framework (2017). https://www.jointcommission.org/-/media/tjc/documents/resources/patient-safety-topics/sentinel-event/rca_framework_101017.pdf**
- **Ratwani, R., Understanding the skill-based error problem; National Center for Human Factors in Healthcare MedStar Health.**

www.ehcca.com/presentations/qualitycolloquium12/ratwani_t2.pdf

Thank You!

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