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

Session #2 – Finding and Mapping the Facts

Causal Statements to Facilitate Action

Presenters

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Objectives

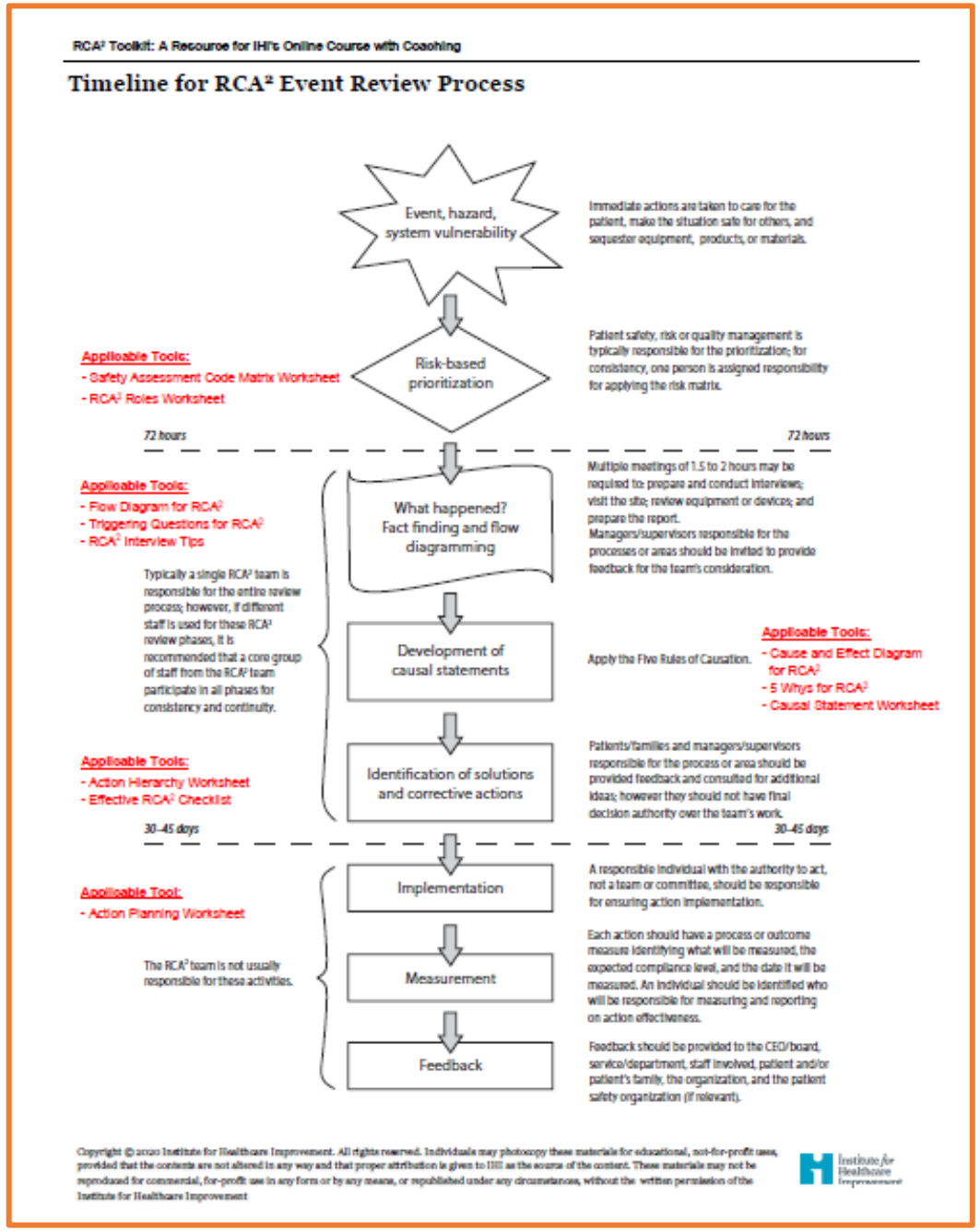
1. List the activities a Root Cause Analyses and Action team must perform within 45 days of the incident under review.
2. Practice drawing a detailed flow diagram depicting steps that led up to an adverse event.
3. Describe best practices for interviewing as part of an RCA^2 review.
4. Explain the influence of human factors engineering on Root Cause Analyses and Actions (RCA^2)
5. Apply tools to uncover the root causes of events.
6. Write a formal causal statement.
7. List five rules to ensure causal statements are plausible, fair, and actionable.

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

RCA² Timeline



RCA² Toolkit: A Resource for IHI's Online Course with Coaching

Timeline for RCA² Event Review Process

Event, hazard, system vulnerability

Immediate actions are taken to care for the patient, make the situation safe for others, and sequester equipment, products, or materials.

Risk-based prioritization

Patient safety, risk or quality management is typically responsible for the prioritization; for consistency, one person is assigned responsibility for applying the risk matrix.

Applicable Tools:
- Safety Assessment Code Matrix Worksheet
- RCA² Roles Worksheet

72 hours

72 hours

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.

Applicable Tools:
- Flow Diagram for RCA²
- Triggering Questions for RCA²
- RCA² Interview Tips

Typically a single RCA² team is responsible for the entire review process; however, if different staff is used for these RCA² review phases, it is recommended that a core group of staff from the RCA² team participate in all phases for consistency and continuity.

Development of causal statements

Apply the Five Rules of Causation.

Applicable Tools:
- Cause and Effect Diagram for RCA²
- 5 Whys for RCA²
- Causal Statement Worksheet

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.

Applicable Tools:
- Action Hierarchy Worksheet
- Effective RCA² Checklist

30–45 days

30–45 days

Implementation

A responsible individual with the authority to act, not a team or committee, should be responsible for ensuring action implementation.

Applicable Tool:
- Action Planning Worksheet

The RCA² team is not usually responsible for these activities.

Measurement

Each action should have a process or outcome measure identifying what will be measured, the expected compliance level, and the date it will be measured. An individual should be identified who will be responsible for measuring and reporting on action effectiveness.

Feedback

Feedback should be provided to the CEO/board, service/department, staff involved, patient and/or patient's family, the organization, and the patient safety organization (if relevant).

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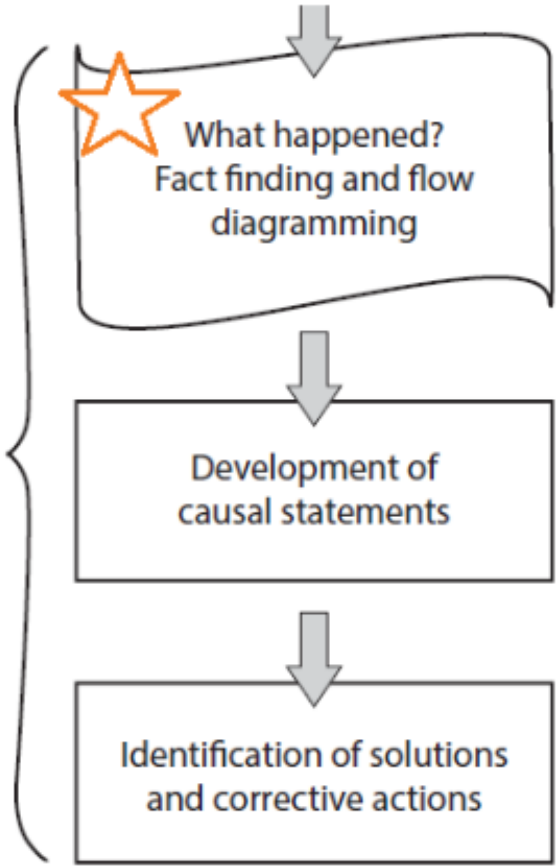
Finding and Mapping the Facts



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Apply the Five Rules of Causation.

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.

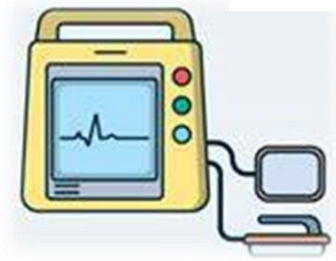
Tools to Uncover Root Causes

- Flow diagramming
- Triggering Questions and Interviewing
- Cause and Effect Diagram
- 5 Whys?
- Causal Statements

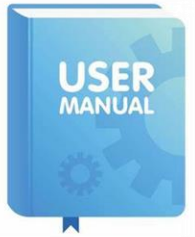
Investigating What Happened

- Develop a shared understanding of the event
  - Draw an initial flow diagram of the event

- Identify gaps in knowledge
  - “What should have happened?”
  - “What usually happens?”
  - “What happened this time?”



- Collect more information
  - Walking through or observing areas involved in event
  - Reviewing medical records
  - Examining equipment
  - Reviewing equipment manuals
  - Researching recommended practices



Flow Diagramming: Why?

- ❑ Needed to discover the true causality of the event
- ❑ Provides a full picture of the event
- ❑ Aids you in going forward with event review
  - What interviews are needed?
  - What pieces of information are needed?
- ❑ Effective way to communicate to leaders and people outside the team

Analyzing What Happened to Margaret?

Margaret is an elderly woman with dementia who has been admitted to an academic medical center for breathing problems.

Lada is a well-respected nurse on the medical unit. She has been working there for five years, and she's recently been helping new nurses get oriented to work in her part of the hospital. Today, she is working with Isaiah, who just became a registered nurse.

Jorge, a respiratory therapist, is called to see Margaret to help with her breathing. He notes that she is not getting enough oxygen using just the nasal prongs, and he switches her to an oxygen mask, which improves her symptoms. Jorge sees Lada in the hallway and says, "Hey, Lada, I upped her oxygen," as they pass each other on the way to their next tasks. It is a busy day for Jorge, who figures he will write his notes in the chart later.

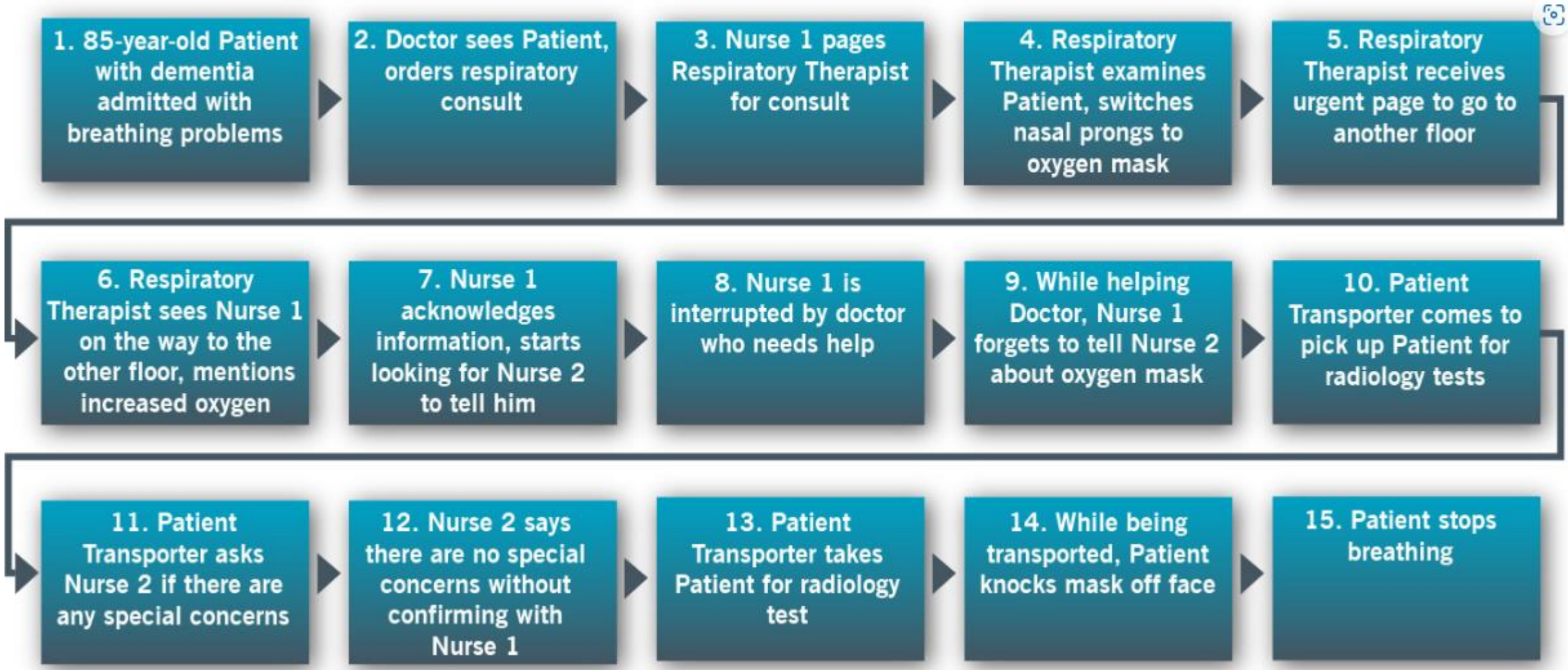
At 3 PM, Margaret is scheduled to go for a test in the radiology department on the other side of the hospital. Teddy, the patient transporter, arrives to take Margaret to her test. Lada, the experienced nurse, is in another patient's room, assisting one of the doctors with the placement of a sterile central line. When Teddy asks if there are any special concerns with Margaret, Isaiah, the new nurse, replies, "No, she's all set!" (If Isaiah had known about Margaret's oxygen mask, he would have accompanied her to the test.)

While being transported, Margaret knocks her mask off her face. When she arrives in the radiology department for her test, she is not breathing. Teddy calls the code team, but they are unable to resuscitate her.

Timeline for Flow Diagramming What Happened to Margaret?

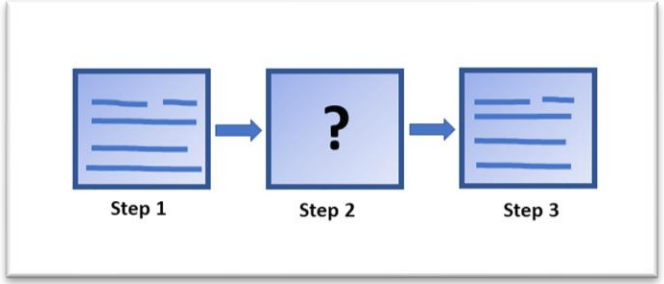
TIME	EVENT
5:45 PM	85-year-old patient admitted to the floor because of breathing problems.
6:00 PM	Doctor sees patient, orders respiratory consult.
6:15 PM	Nurse 1 pages Respiratory Therapist for consult.
6:30 PM	Respiratory Therapist examines patient, switches nasal prongs to oxygen mask
6:35 PM	Respiratory Therapist receives urgent page to go to another floor.
6:40 PM	Respiratory Therapist sees Nurse 1 on the way to the other floor, mentions increased oxygen
6:41 PM	Nurse 1 acknowledges information, starts looking for Nurse 2 to tell him.
6:45 PM	Nurse 1 is interrupted by doctor who needs help
6:50 PM	While helping Doctor, Nurse 1 forgets to tell Nurse 2 about oxygen mask.
6:55 PM	Patient Transporter comes to pick up Patient for radiology tests.
7:00 PM	Patient transporter asks Nurse 2 if there are any special concerns.
7:02 PM	Nurse 2 says there are no special concerns without confirming with Nurse 1.
7:05 PM	Patient transporter takes Patient to radiology.
7:10 PM	While being transported, Patient knocks mask off face.
7:20 PM	Patient stops breathing.

Flow Diagramming



From IHI's Redesigning Event Review with RCA2

Flow Diagramming: How?



- ❑ Begin by charting the known facts (missing steps become apparent)
- ❑ Create a timeline of significant items within the event
- ❑ Develop a list of questions based on the gaps found in the initial flow chart
  - determine who you need to talk to
  - decide where to go for answers
  - determine which team member will get answer for each question
- ❑ Compare what happened to what should have happened

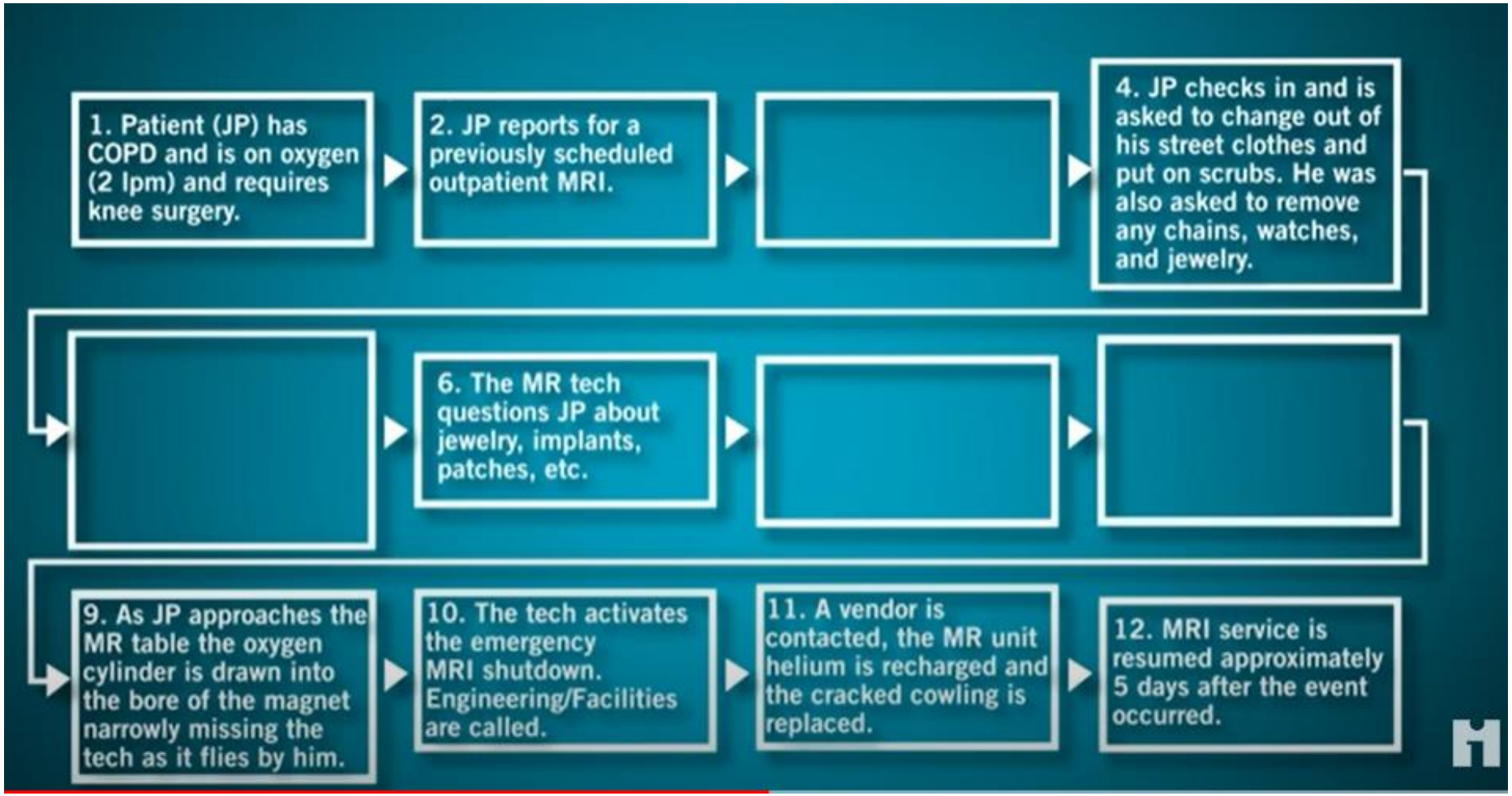
IHI Provided Case Example

JP is a 70-year-old male, with COPD and on oxygen (2L/m), requires knee surgery. Prior to a scheduled surgery his Ortho Surgeon orders an MRI. JP reports to the hospital for the scheduled outpatient MRI. JP checks in at the front desk and is asked to change out of his street clothes and put on scrubs. He is also asked to remove any chains, watches, and jewelry. The Sarah, the MRI tech, retrieves him from the Radiology changing room and asks him if he has any jewelry, implants, patches, etc. He confirms that he has left his jewelry at home and does not have any implants or patches.

As JP approaches the MR table the oxygen cylinder is drawn into the bore of the magnet narrowly missing Sarah as it flies by her. Sarah activates the emergency MRI shutdown and then notifies Engineering/Facilities of the incident.

The MR vendor is contacted and will be on site in three days. The MR service tech arrives on Day 3 post event. He recharges the MR with helium and replaces the cracked cowling. MRI service is resumed two days later.

IHI Provided Case Example



What Questions Might You Want to Ask?

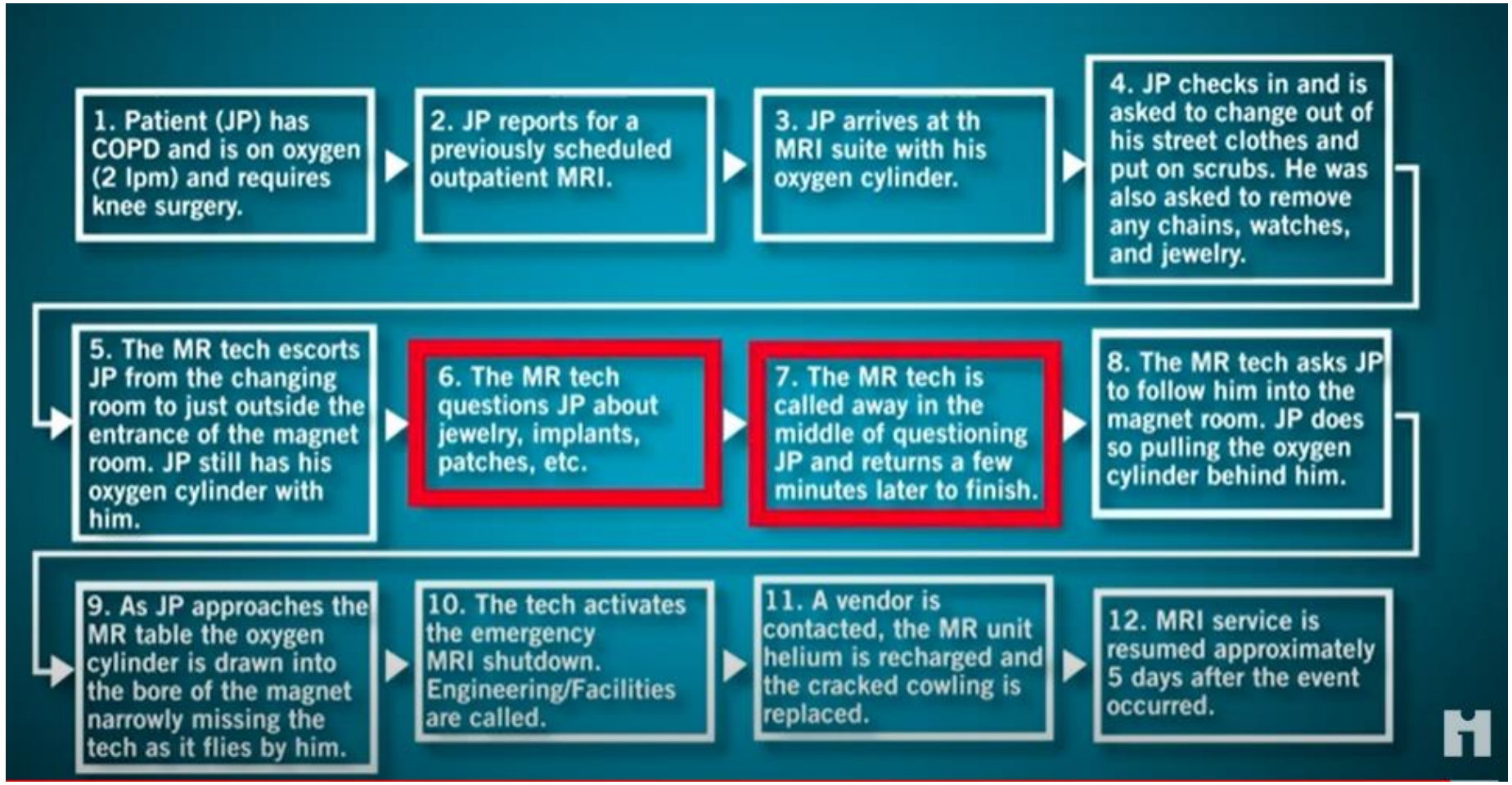
What patient information is available to the Registration staff? To the MR tech? Was there a way for them to know the patient is on oxygen?

What pre-exam information is given to patients?

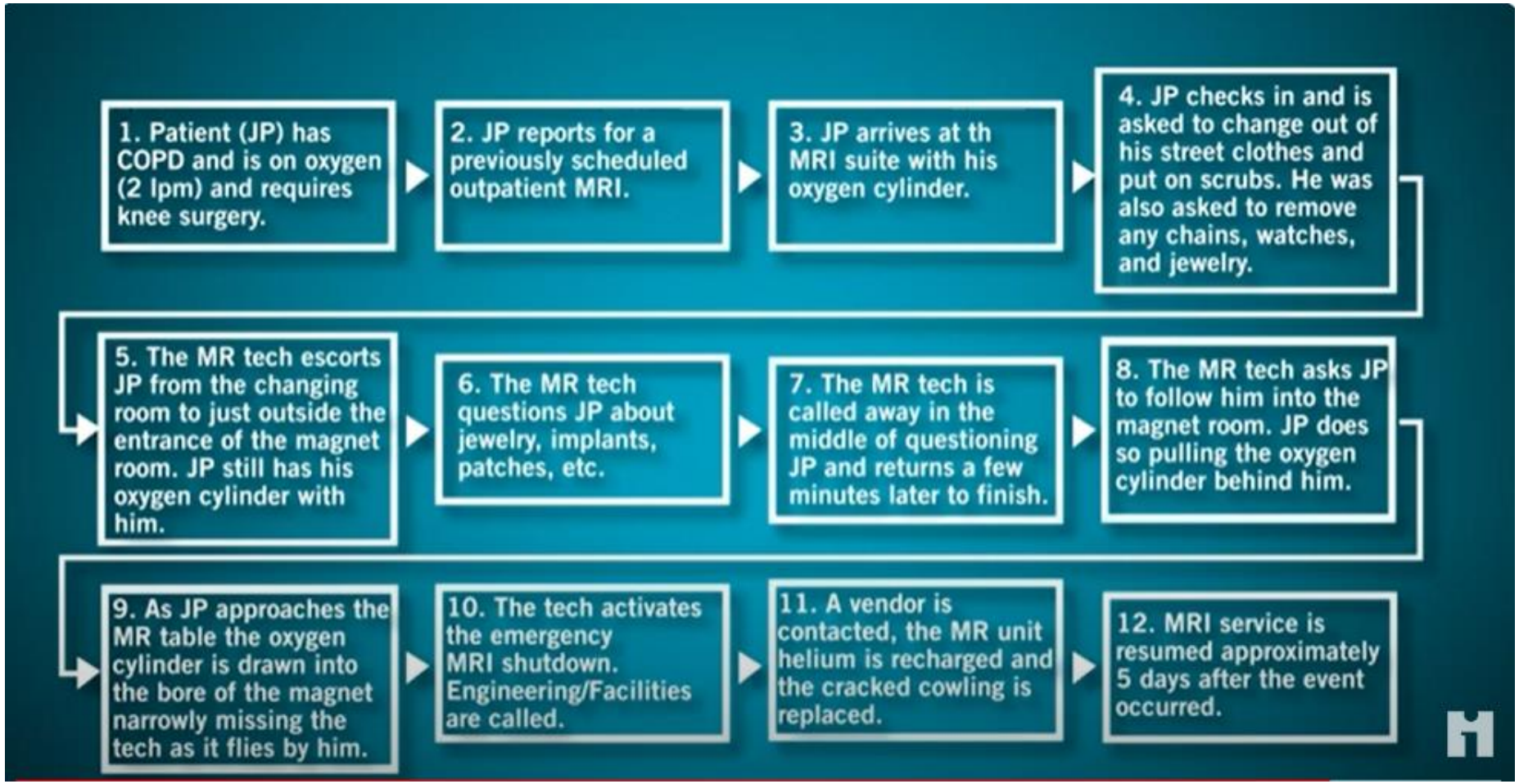
Is there a patient questionnaire for patient's scheduled for an MR to determine if there is a risk of metal? How comprehensive is the questionnaire? Is the questionnaire always completed?

What kind of MRI safety training is provided to Registration staff? To Radiology staff? To patients having this procedure?

Information Found Through Interviews

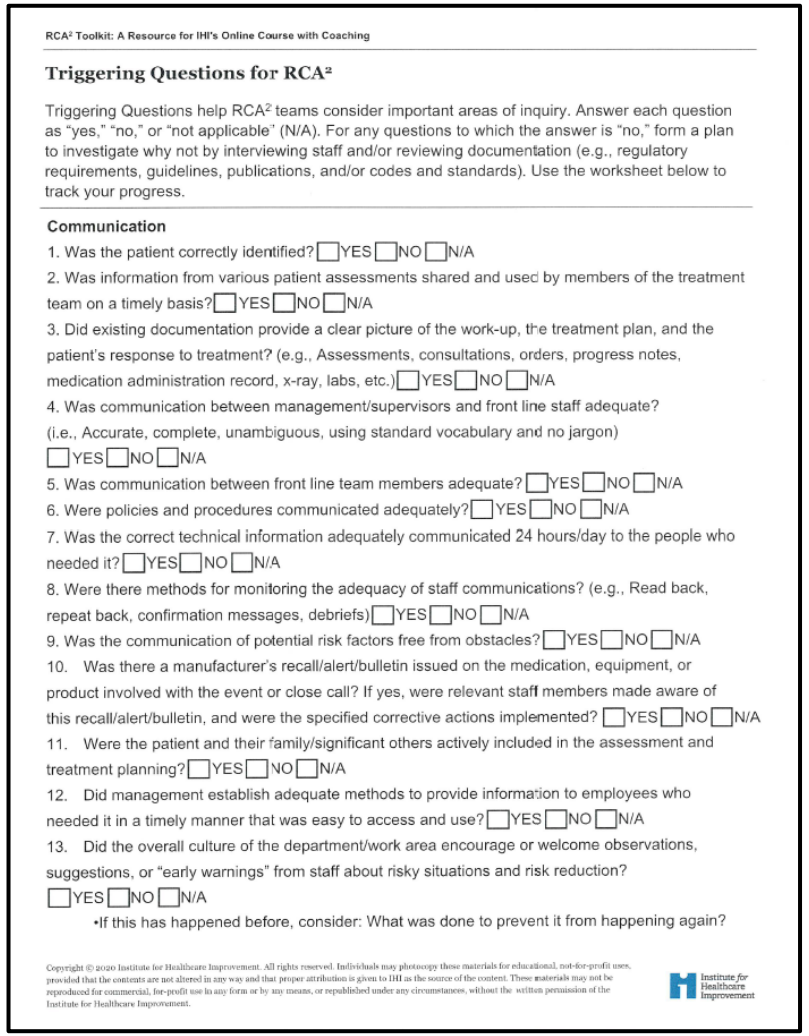


Completed Flow Diagram



How to Use Triggering Questions:

1. Have team review each question and answer as “yes”, “no”, or “not applicable”
2. Investigate any questions answered “no”
3. Refer back to the list of questions throughout the analysis



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Triggering Questions for RCA²

Triggering Questions help RCA² teams consider important areas of inquiry. Answer each question as “yes,” “no,” or “not applicable” (N/A). For any questions to which the answer is “no,” form a plan to investigate why not by interviewing staff and/or reviewing documentation (e.g., regulatory requirements, guidelines, publications, and/or codes and standards). Use the worksheet below to track your progress.

Communication

1. Was the patient correctly identified? ☐YES ☐NO ☐N/A
2. Was information from various patient assessments shared and used by members of the treatment team on a timely basis? ☐YES ☐NO ☐N/A
3. Did existing documentation provide a clear picture of the work-up, the treatment plan, and the patient's response to treatment? (e.g., Assessments, consultations, orders, progress notes, medication administration record, x-ray, labs, etc.) ☐YES ☐NO ☐N/A
4. Was communication between management/supervisors and front line staff adequate? (i.e., Accurate, complete, unambiguous, using standard vocabulary and no jargon) ☐YES ☐NO ☐N/A
5. Was communication between front line team members adequate? ☐YES ☐NO ☐N/A
6. Were policies and procedures communicated adequately? ☐YES ☐NO ☐N/A
7. Was the correct technical information adequately communicated 24 hours/day to the people who needed it? ☐YES ☐NO ☐N/A
8. Were there methods for monitoring the adequacy of staff communications? (e.g., Read back, repeat back, confirmation messages, debriefs) ☐YES ☐NO ☐N/A
9. Was the communication of potential risk factors free from obstacles? ☐YES ☐NO ☐N/A
10. Was there a manufacturer's recall/alert/bulletin issued on the medication, equipment, or product involved with the event or close call? If yes, were relevant staff members made aware of this recall/alert/bulletin, and were the specified corrective actions implemented? ☐YES ☐NO ☐N/A
11. Were the patient and their family/significant others actively included in the assessment and treatment planning? ☐YES ☐NO ☐N/A
12. Did management establish adequate methods to provide information to employees who needed it in a timely manner that was easy to access and use? ☐YES ☐NO ☐N/A
13. Did the overall culture of the department/work area encourage or welcome observations, suggestions, or “early warnings” from staff about risky situations and risk reduction? ☐YES ☐NO ☐N/A

•If this has happened before, consider: What was done to prevent it from happening again?

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[VA National Center for Patient Safety Trigger Questions Starting Point]

How to Use Triggering Questions:

1. Have team rev
   question and
   "no", or "not a
2. Investigate an
   answered "nc
3. Refer back to t
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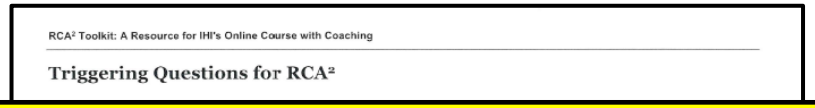
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Triggering Questions for RCA²

Six Categories for Trigger Questions

- Communication
- Training
- Fatigue/Scheduling
- Environment/Equipment
- Rules/Policies/Procedures
- Barriers

VA National Center for Patient Safety
Trigger Questions Starting Point

Questions to Explore

Communication	• Was the patient correctly identified? • Was information from various patient assessments shared and used by members of the treatment team on a timely basis?
Training	• Was there an assessment done to identify what staff training was actually needed? • Was training provided prior to the start of the work process?
Fatigue/Scheduling	• Were environmental stressors properly anticipated? • Did personnel have adequate sleep?
Environment/Equipment	• Was the work area/environment designed to support the function it was being used for? • Had there been an environmental risk assessment (i.e., safety audit) of the area?
Rules/Policies/Procedures	• Was there an overall management plan for addressing risk and assigning responsibility for risk? • Were relevant policies/procedures clear, understandable, and readily available to all staff?
Barriers	• Was the concept of "fault tolerance"'applied in the system design? (A fault tolerant system can withstand the failure of one or more barriers without the patient being harmed.) • Were relevant barriers and controls maintained and checked on a routine basis by designated staff?

Interviewing Tips for RCA^2

- Prepare the interview questions ahead of time
- Focus questions on ***what*** happened, not ***why*** it happened
- Maintain a blame-free approach

Interviewing Tips for RCA^2

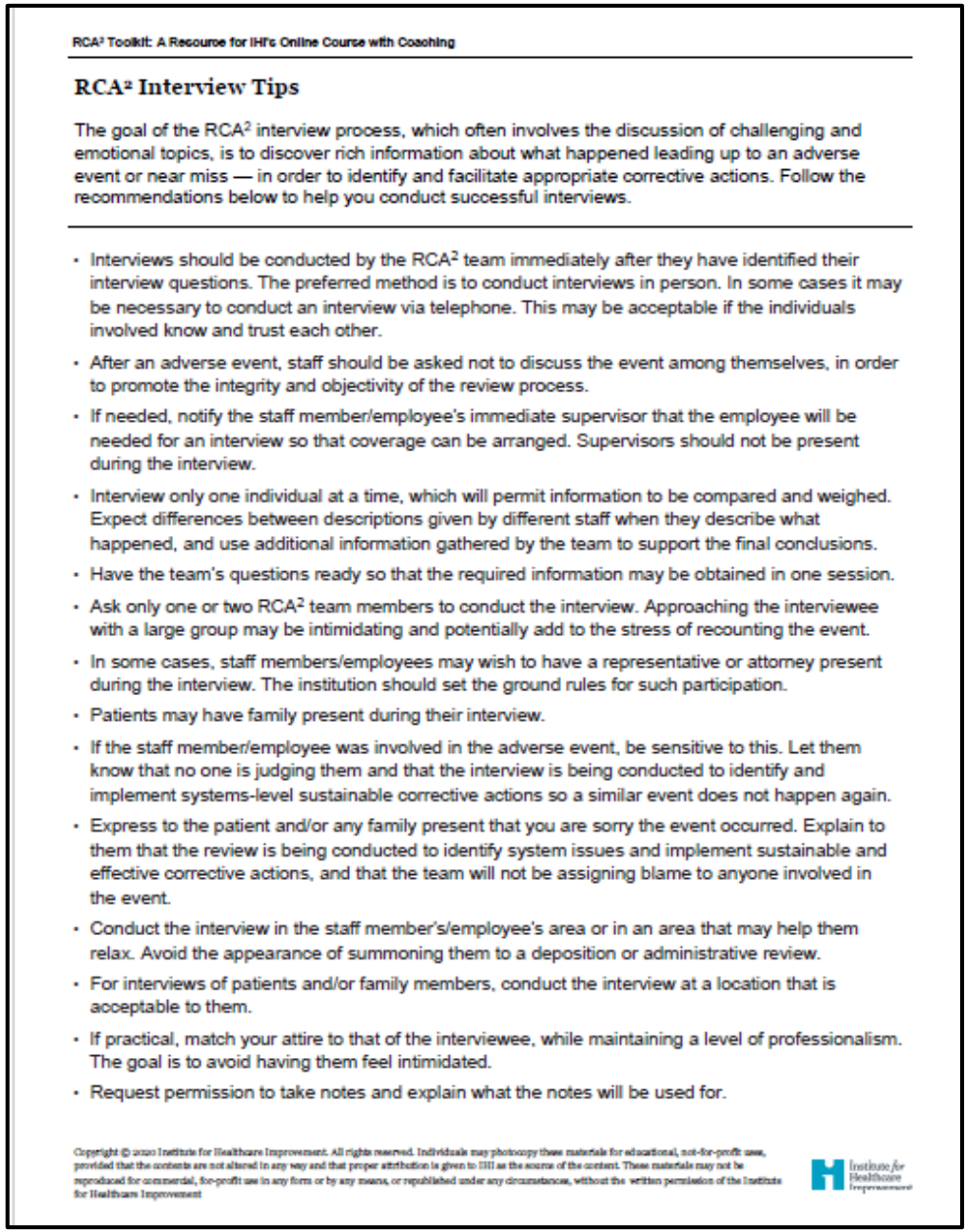
REMEMBER

- Emphasize to staff that the goal is to learn and not to place blame.
- Express to patients and family members how sorry you are that the event occurred; do this without speculating about the cause and let them know you will share the results of your investigation once it's complete

Interviewer Actions

Demonstrate ***empathy*** as you ask the difficult questions:

- I can't imagine what it would be like to have that type of mistake or I could have easily made that mistake myself. But I'm interviewing today because I'm trying to work on figuring out what might have let that happen to you.
- I know you're a great nurse and so how might that have occurred? Was there distractions? Was there something else that you had to focus on? Did you have three things that you were assigned to be thinking about at the same time? How can I better understand that so I can make our system safer?



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RCA² Interview Tips

The goal of the RCA² interview process, which often involves the discussion of challenging and emotional topics, is to discover rich information about what happened leading up to an adverse event or near miss — in order to identify and facilitate appropriate corrective actions. Follow the recommendations below to help you conduct successful interviews.

- Interviews should be conducted by the RCA² team immediately after they have identified their interview questions. The preferred method is to conduct interviews in person. In some cases it may be necessary to conduct an interview via telephone. This may be acceptable if the individuals involved know and trust each other.
- After an adverse event, staff should be asked not to discuss the event among themselves, in order to promote the integrity and objectivity of the review process.
- If needed, notify the staff member/employee's immediate supervisor that the employee will be needed for an interview so that coverage can be arranged. Supervisors should not be present during the interview.
- Interview only one individual at a time, which will permit information to be compared and weighed. Expect differences between descriptions given by different staff when they describe what happened, and use additional information gathered by the team to support the final conclusions.
- Have the team's questions ready so that the required information may be obtained in one session.
- Ask only one or two RCA² team members to conduct the interview. Approaching the interviewee with a large group may be intimidating and potentially add to the stress of recounting the event.
- In some cases, staff members/employees may wish to have a representative or attorney present during the interview. The institution should set the ground rules for such participation.
- Patients may have family present during their interview.
- If the staff member/employee was involved in the adverse event, be sensitive to this. Let them know that no one is judging them and that the interview is being conducted to identify and implement systems-level sustainable corrective actions so a similar event does not happen again.
- Express to the patient and/or any family present that you are sorry the event occurred. Explain to them that the review is being conducted to identify system issues and implement sustainable and effective corrective actions, and that the team will not be assigning blame to anyone involved in the event.
- Conduct the interview in the staff member's/employee's area or in an area that may help them relax. Avoid the appearance of summoning them to a deposition or administrative review.
- For interviews of patients and/or family members, conduct the interview at a location that is acceptable to them.
- If practical, match your attire to that of the interviewee, while maintaining a level of professionalism. The goal is to avoid having them feel intimidated.
- Request permission to take notes and explain what the notes will be used for.

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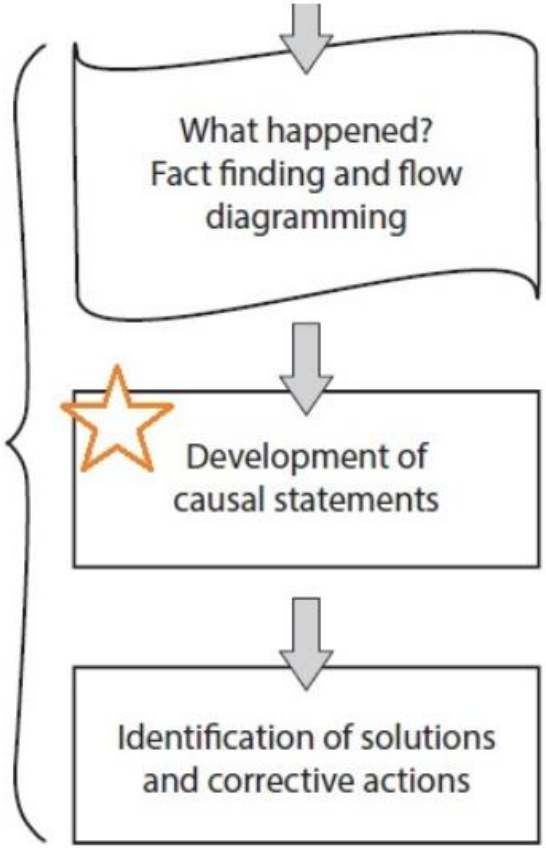
Thinking About Causes

- Only consider possible causes ***after*** you have all the information you need

- ***Then***, RCA^2 team members work together to apply their collective knowledge which includes:
  - ✓ knowledge of process under investigation
  - ✓ sequence of events that caused harm
  - ✓ knowledge of human factors engineering

Causal Statements to Facilitate Action



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Apply the Five Rules of Causation.

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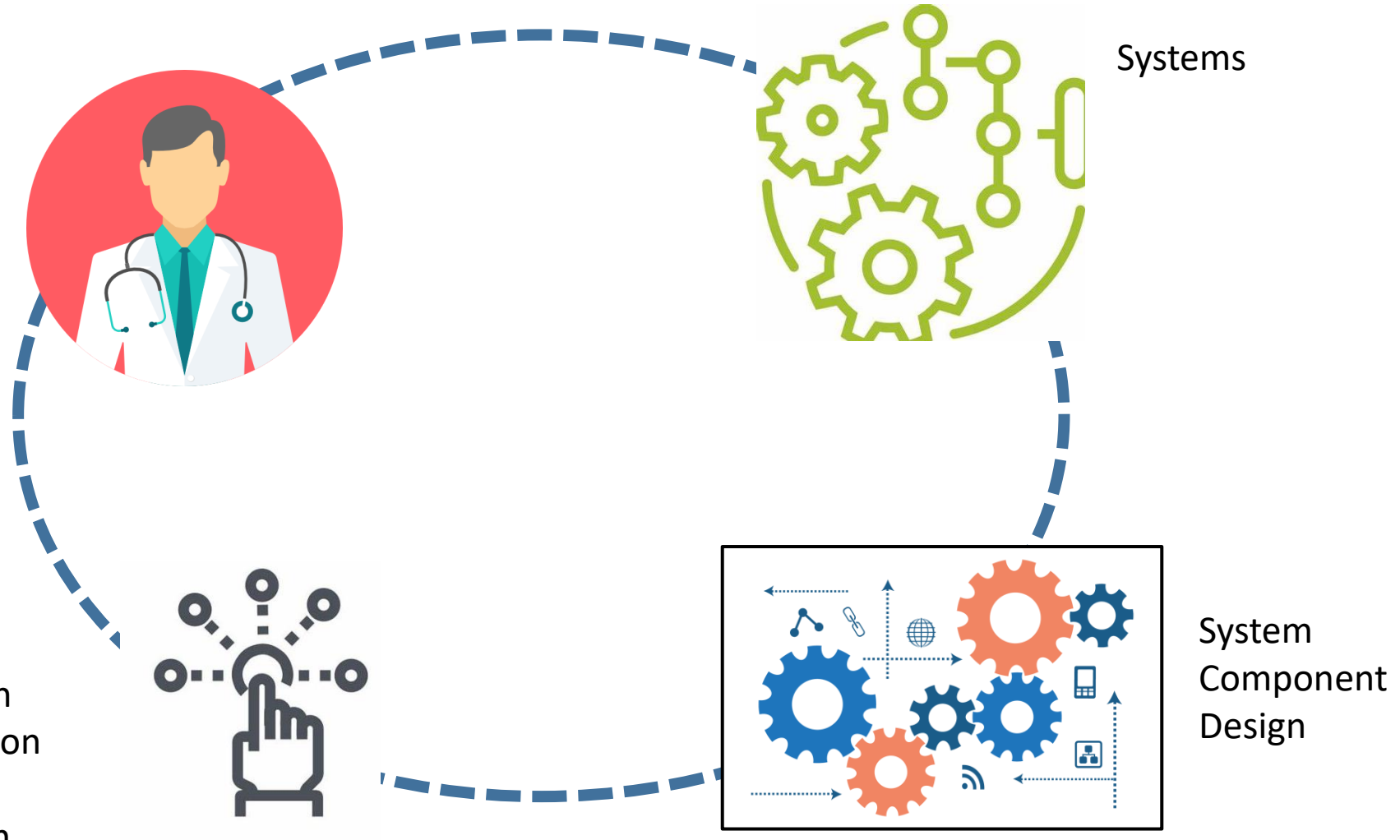
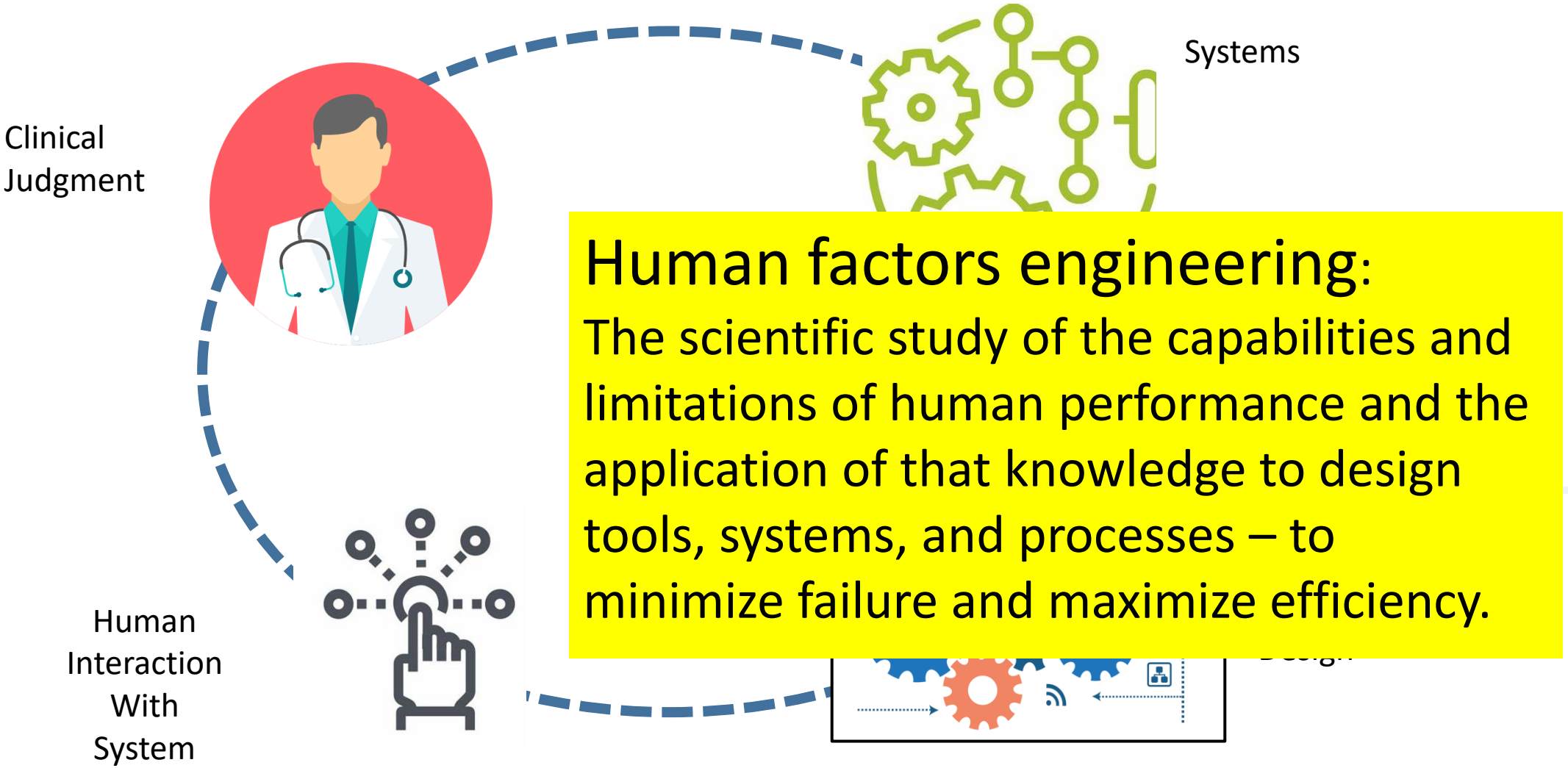
Causes of Adverse Events



Causes of Adverse Events



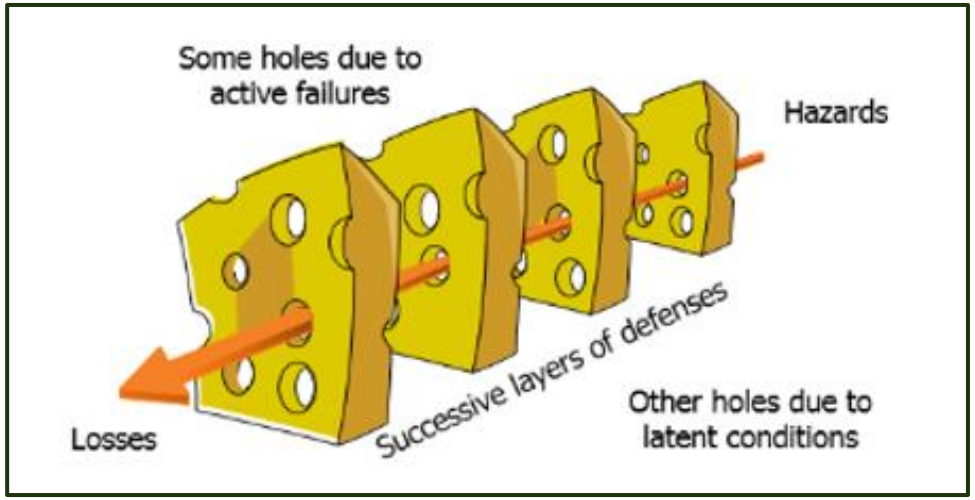
Human factors engineering:
The scientific study of the capabilities and limitations of human performance and the application of that knowledge to design tools, systems, and processes – to minimize failure and maximize efficiency.

Latent Failures

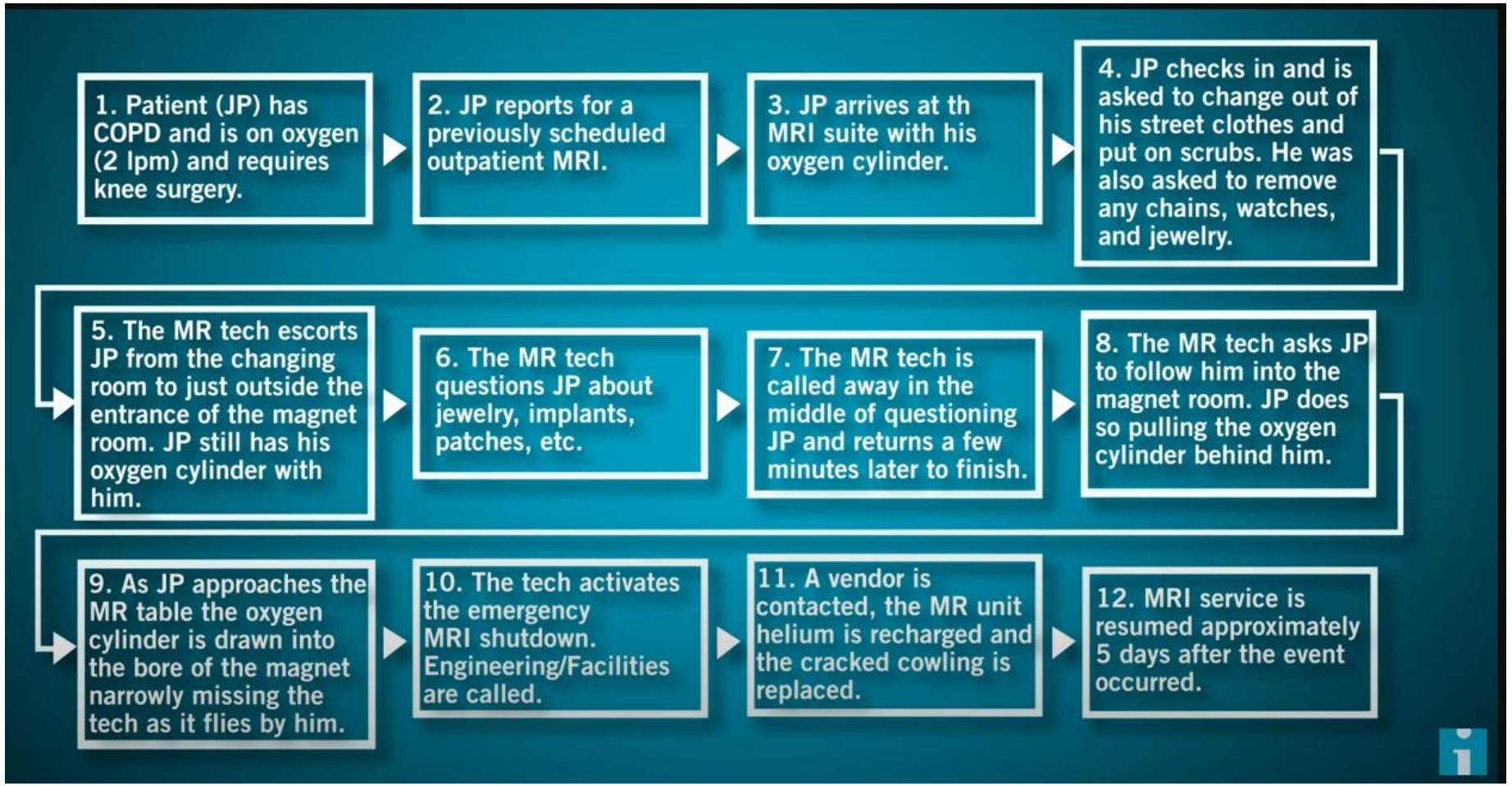
- Defects in the design and organization of processes and system
- Often unrecognized, or have become accepted aspects of the work because their effects are delayed

Active Failures

- Errors whose effects are seen immediately
- Workers on the front line might be the proximal “cause” of an active error, but the real root causes may have been present in the system for a long time



Exploring Cause and Effect – IHI Example



Creating a Cause and Effect Diagram

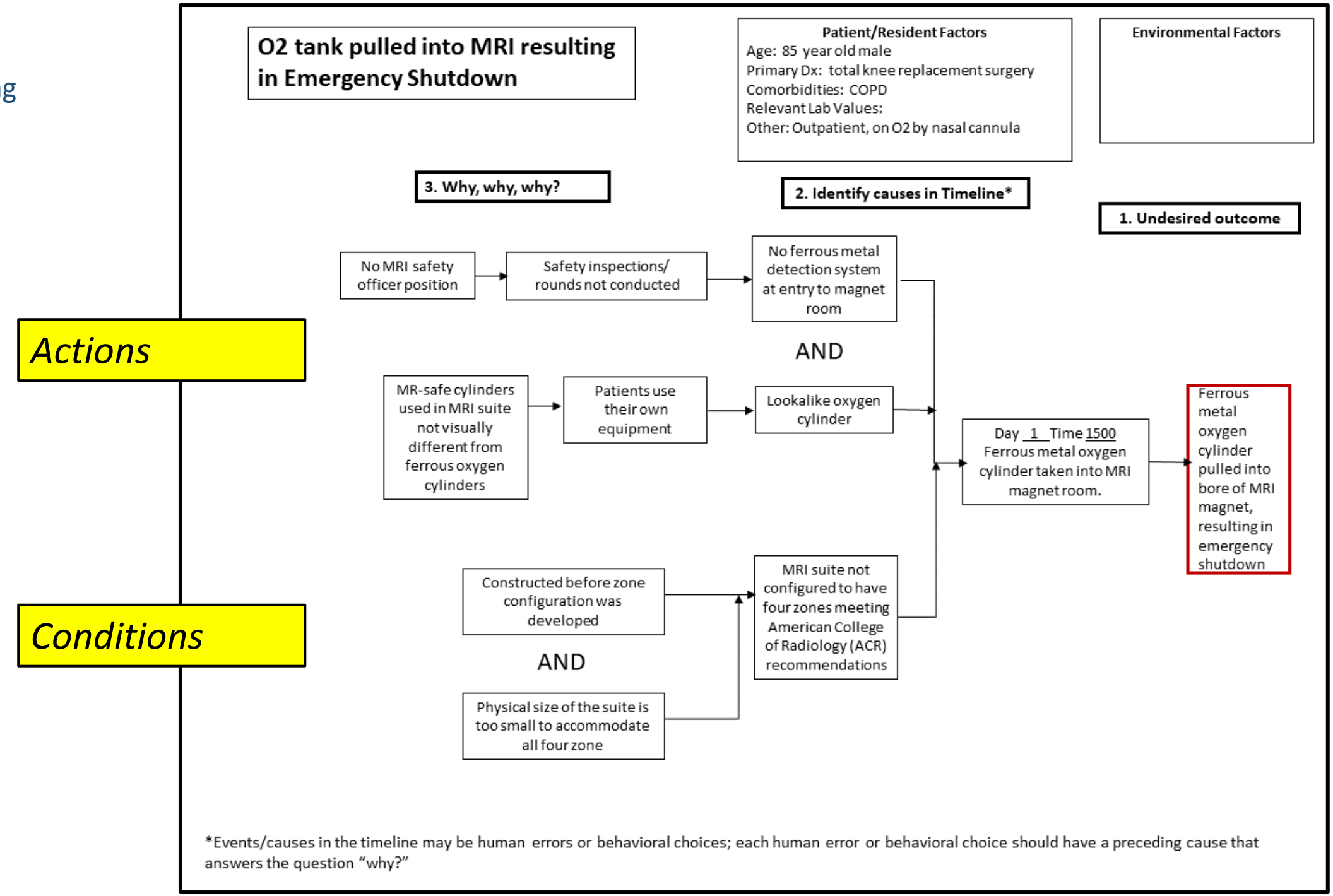
1. Begin with a problem statement representing the event it would like to avoid in the future.

2. Brainstorm all the factors that could possibly contribute to that problem

3. Divide causes into two categories, actions and conditions to help team members think about different types of “holes in the cheese”

4. For each contributing factor or cause the team thinks of, team members should ask “why? – and continuing asking “why?” again and again.

NCPS Cause Diagramming Template



5 Whys Exercise (MRI Emergency Shut Down Example)

- The patient's oxygen cylinder tank was pulled in the MRI. **Why?**
- The ferrous metal oxygen cylinder was taken into MRI room. **Why?**
- No ferrous metal detection system at entry to magnet room? **Why?**
- Safety inspections/rounds not conducted? **Why?**
- No MRI safety officer position. **Why?**

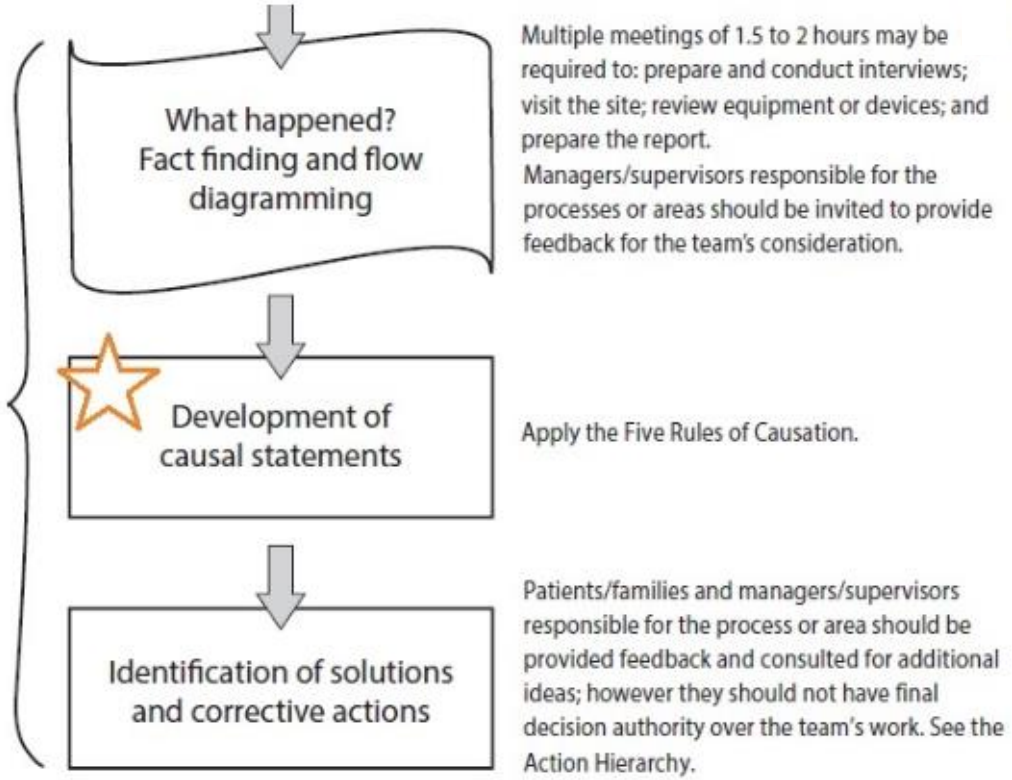
ROOT CAUSE: The Radiology department manager did not recognize the need for such a position AND did not request the MRI safety officer.

5 Whys Exercise (MRI Emergency Shut Down Example)

- The patient's oxygen cylinder tank was pulled in the MRI. **Why?**
- The ferrous metal oxygen cylinder was taken into MRI room. **Why?**
- MRI suite not configured to have four zones meeting ARC recommendations. **Why?**

ROOT CAUSE: The MRI Suite was constructed before zone configuration was developed AND the physical size of the suite is too small to accommodate all four zones.

Writing Effective and Actionable Causal Statements



Causal Statement

- Links the *causes* the team identifies to the *effects* and then back to the *main event* that prompted the RCA^2 in the first place

- Written in unambiguous terms, easily understood by stakeholders who are not part of the RCA^2 team

- Has three parts:
  1. The **cause**: "This happened…"
  2. The **effect:** "which led to something else happening…"
  3. The **event**: "which caused this undesirable outcome."

Causal Statement for Metal O2 Tank Pulled Into MRI Event

1. Cause: Because of the Radiology's managers unfamiliarity of best practices for MRI equipment safety AND not requesting an MRI Safety Officer position
2. Effect: no ferrous metal detection system was installed at the entrance to the MR room and comprehensive safety inspections/rounds were not conducted. This increased the likelihood that ferrous metal objects would accidently be brought into the MRI suite,
3. Event: leading to the metal oxygen tank being pulled into the MR and damaging it, requiring an emergency shut down.

Causal Statement for Metal O2 Tank Pulled Into MRI Event

1. Cause: Because MR-safe cylinders are not visually different from ferrous oxygen cylinders AND the practice of allowing outpatients to utilize their own equipment when they come to the hospital,

2. Effect: the likelihood that a ferrous metal oxygen cylinder would accidently be brought into the MRI suite was increased,

3. Event: leading to the metal oxygen tank being pulled into the MR and damaging it, requiring an emergency shut down.

Causal Statement for “What Happened to Margaret?” Event

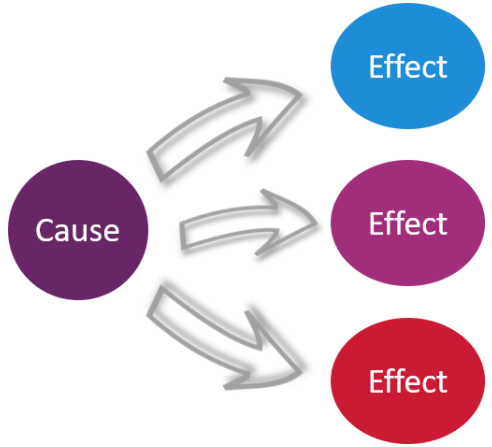
1. Cause: Because of staffing shortages on the unit AND the accepted practice that nurses could be interrupted, the nursing staff in the department faced multiple priorities and distractions.
2. Effect: These distractions pulled nurses off task and set up situations where they had to rely on memory to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

HUMAN "PERFORMANCE SHAPING" FACTORS

FACTORS THAT INFLUENCE HUMAN PERFORMANCE

INTERNAL	EXTERNAL	
INDIVIDUAL	**INDIVIDUAL**	**SYSTEM**
ALERTNESS	LIGHTING	COMPUTER-HUMAN INTERFACE
ANXIETY, STRESS, ILLNESS	NOISE	TASK COMPLEXITY
KNOWLEDGE OF TASK, PROCESS, SYSTEM, RULES	MONOTONY	CULTURE
HEARING ABILITY, VISION, HEIGHT	DISTRACTION	WORKLOAD PRESSURE
CONFIDENCE	LOOK ALIKE, SOUND ALIKE	TOOL DESIGN
ATTENTIVENESS, CONCENTRATION	PEER PRESSURE	WORKPLACE LAYOUT

5 Rules of Causation



1. Clearly show the “cause and effect” relationship
2. Use specific and accurate descriptors for what occurred.
3. Human error must have a preceding cause.
4. Violations of procedures are not root causes and must have preceding cause.
5. Failure to act is only causal when there is a pre-existing duty to act.

Practice with Five Rules of Causation

Causal statement: The event occurred because the medical resident was fatigued.

Does this violate one of the five rules of causation? Yes

If so, which one(s)? Rule 1: Clearly show the “cause and effect” relationship.

Revised causal statement: Medical residents were scheduled 80 hours per week, which led to increased levels of fatigue, which increased the likelihood that dosing instructions would be misread.

Practice with Five Rules of Causation

Causal statement: The absence of an assignment for designated nurses to check orders at specified times increased the likelihood that STAT orders would be missed or delayed, which led to a delay in therapy.

Does this violate one of the five rules of causation? No

No revision needed – it clearly shows the cause and effect relationship; uses specific and accurate descriptors for what occurred; and explained how there was no pre-existing duty to act

Practice with Five Rules of Causation

Causal statement: The techs did not follow the procedure for CT scans, which led to the patient receiving an air bolus from an empty syringe, resulting in a fatal air embolism.

Does this violate one of the five rules of causation? Yes

If so, which one(s)? Rule 4: Violations of procedure are not root causes, but must have a preceding cause.

Rewrite: Noise and confusion in the prep area, coupled with production pressures, increased the likelihood that steps in the CT scan protocol would be missed, resulting in an air embolism due to using an empty syringe.

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 2

Session 2 Optional Homework

- Flow Diagramming Exercise (using RCA^2 Case Example)
- Possible Interview Questions
- 5 Whys Exercise
- Cause and Effect Exercise

Tools and Resources

- IHI Flow Diagramming Template
- IHI Triggering Questions
- IHI Interviewing Tips
- NCPS Cause and Effect Diagram Tool
- Five Whys Tool
- Causal 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/

Thank You!

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