

Root Cause Analysis Toolkit

Background

According to the U.S. Centers for Disease Control and Prevention (CDC), healthcare acquired infections (HAIs), and other adverse events continue to cause significant morbidity and mortality among patients treated in the U.S., adding billions of dollars in costs. To address this issue, the American Recovery and Reinvestment Act of 2009 and the Patient Protection and Affordable Care Act of 2010 both include provisions aimed at reducing HAIs, including increased measurement and reporting requirements and financial penalties for providers with high HAI rates.

In order to prevent HAIs, a process is needed to define the problem, investigate the cause, and develop actions for minimizing and preventing future infections. Root cause analysis (RCA) is a process, which is used to investigate and categorize the root cause of events. The RCA tool helps to define what happened, how it happened and why it happened, allowing practitioners to understand and prevent future occurrences.

An RCA helps identify factors related to the system and processes that are in place. This toolkit has been designed to encourage facilities to use as a systematic and formalized approach when conducting an RCA. Although we encourage you to use this toolkit in its entirety, the different tools in each section can be used individually to best fit the needs of your hospital.

Summary of Events

Instructions

- 1) When beginning a Root Cause Analysis it is important to first develop a team, which should include a representation of every discipline involved in the process.
- 2) All team members should participate in a brainstorming session, prior to constructing any diagrams.
- 3) Start by having team members begin to answer crucial questions, which will allow members to begin to reconstruct processes that led to an event.
- 4) The sentinel event column is an optional field that can be used if necessary. A sentinel event as defined by The Joint Commission is "an unexpected occurrence involving death or serious physical or psychological injury."

Process Flow Chart

Instructions

- 1) In order to answer the "why" question, have team members analyze and ask questions which will lead to additional findings, including departures from policies and procedures. An adjunct table is included to help with the analysis. The table can be used in conjunction with the Process Flow Chart to identify steps in the process that may have led up to the sentinel event. Information identified in this analysis can be transferred to the Process Flow Chart diagram.
- 2) Determine the frame or boundaries of the process. Clearly define where the process under study starts (inputs) and ends (final output). Team members should agree to the level of detail they must show on the Flowchart to clearly understand the process and identify problem areas.
- 3) Determine the steps in the process. Brainstorm a list of all major activities, inputs, outputs, and decisions on a flipchart from the beginning of the process to the end.
- 4) Sequence the steps. Arrange the steps in the order they are carried out. Use sticky notes so you can move them around.
- 5) Draw the Flowchart using the appropriate symbols.
- 6) The process symbol which is rectangular in shape represents and demonstrates any kind of processing function. A brief description of any activity should be included.
- 7) The terminal symbol which is oval in shape reflects the start and stop point. When this symbol is used as a start symbol, it would then depict a trigger action that sets the process flow into motion.
- 8) The flow line connectors show the direction in which the process flows for the diagram.
- 9) Once all of the necessary information has been inserted into the process map, begin to finalize the flow chart. Some questions to consider asking: Is this process running the way it should? Are people following the process as charted? Is there a consensus on what the process should be? Is there anything redundant in this chart? Add what is missing.

Fishbone Diagram

Instructions

- 1) Team members should now begin to brainstorm and generate a list of factors and causes. An adjunct table is included to help with the analysis. The table can be used in conjunction with the Fishbone diagram to identify additional factors associated with the effect. Information identified in this analysis can be transferred to the diagram.
- 2) Begin to construct the Fishbone diagram by placing the problem statement in the effect box.
- 3) Once the problem statement has been identified, begin to list the factors or steps in the process. Connect them to the “backbone” of the fishbone chart.
- 4) Place the brainstormed causes and factors into the appropriate categories.
- 5) Ask “Why” repeatedly for each cause listed on the bones. “Whys” should be continuously asked and addressed until no other further conclusion can be made.
- 6) Discuss results with additional staff members and with representatives of Administration. This should be conducted when a thorough evaluation has been completed. Suggestions and comments on the findings should be addressed. Solutions to the issue should be discussed during review of the diagram.

Five Whys

Instructions

Before constructing the diagram, all participating team members should ask a series of “Why” questions. An adjunct table is included to help with the analysis. The table can be used in conjunction with the Five Whys diagram to identify gaps in the processes or systems involved.

- Information identified in this analysis can be transferred to the Five Whys diagram
- Begin to think of the problem statement that needs to be addressed in the diagram.
- Starting from the problem statement, begin to repeatedly ask “why did this occur?”
- Five times is a good rule of thumb, but not the magic number to find the issue related to the problem.

An everyday example:

Problem Statement - You are on your way to work and your car gets a flat tire.

Why did you get a flat tire? Ran over nails in the garage. If you stopped here and "solved" the problem by sweeping up the nails, did you miss the mark?

Why were there nails on the garage floor? The box the nails were in on the shelf was wet, the box fell apart and nails fell from the box onto the floor.

Why was the box wet? There was a leak in the roof and it rained hard last night.

PDSA Worksheet

Instructions

- 1) Once all of the diagrams are developed, analyzed and assessed, participating team members should begin the PDSA worksheet.
- 2) Team members should designate and assign specific roles and responsibilities, i.e. Team Leader, Physician Champion.
- 3) An AIM Statement should be developed. This statement defines the achieved outcomes or goals.
- 4) The main problems identified in the RCA should be addressed and evaluated.
- 5) Based on the identified problems, suggestions for improvements in the process should be established.
- 6) Complete the intervention or steps that need to be executed. It is important to designate and assign roles to each team member once interventions are identified.
- 7) Discuss with all participating team members the events that took place once the intervention was initiated.
- 8) Study the measures and results of the test.
- 9) Make any necessary adjustments or modifications to the plan.

Please adjust all diagrams as necessary to fit the needs of your facility

Summary of Events

What happened?	Sentinel Event (Optional)	What are the details of the event? (Give a brief Description)	Example: What contributing factors lead to the patient contracting a BSI?
		When did the event occur?	Date, day of week, time?
		What area/service was impacted?	Example: Surgery, ICU, Transplant unit?

Process Flow Chart Adjunct Table

This toolbox is an option resource that can be used in conjunction with the Process Flow chart. The information below is provided as an example. Please change all necessary information to fit the needs and structure of your facility.

Level of Analysis	Questions	Findings
Why did it happen? (The process or activity in which the event occurred)	What are the steps in the process as designed?	Use the flow chart diagram below for guidance – the process should be flowcharted so critical steps can be identified.
	Is it the sterilization process?	Example: Line inserted without using sterile technique.
	Skin preparation process?	Example: CHG not used, patient did not have contraindication.
	Environmental cleaning?	Example: Poor environmental conditions.
	Staff competency?	Example: Supplemental staff unaware of policy/lack of training.
	Insertion site selection?	Example: Internal jugular or femoral site used.

Date of Incident: _____

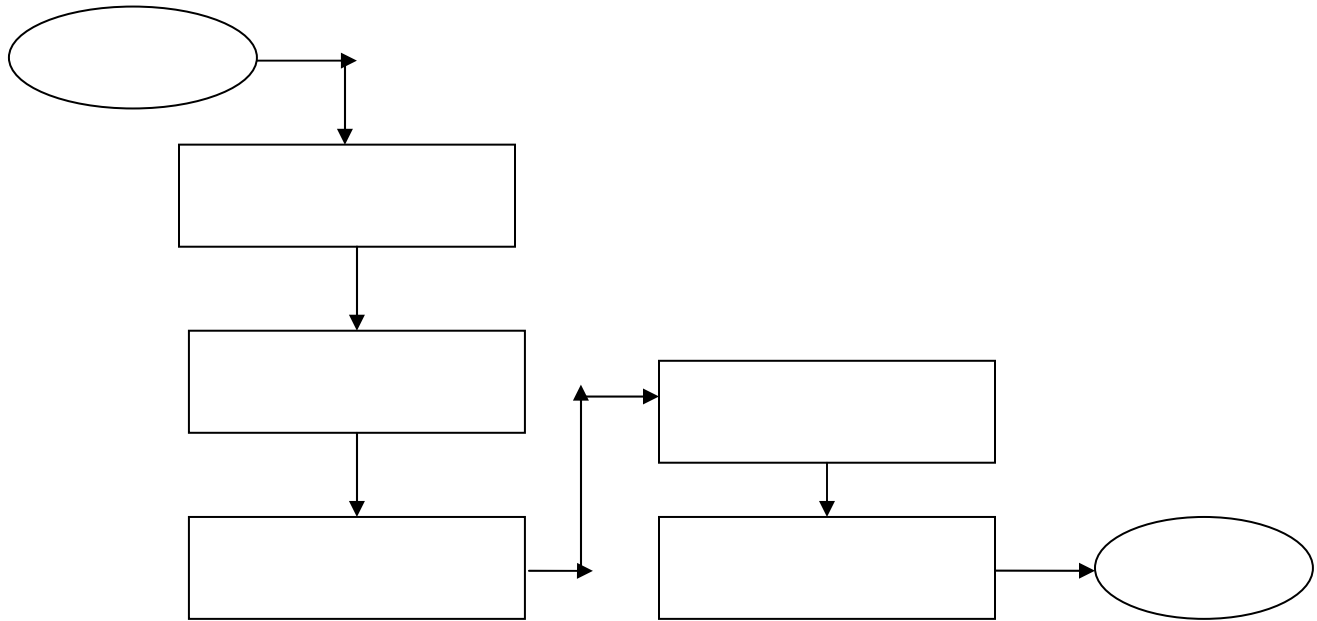
Unit: _____

Name of Staff/Title: _____

Today's Date: _____

Process Flow Chart

Process	Terminal	Connector
Rectangle designates an activity or task performed in the process <div style="border: 1px solid black; width: 100%; height: 30px; margin-top: 10px;"></div>	Ovals identifies the beginning or end of a process or origin <div style="border: 1px solid black; width: 100%; height: 30px; border-radius: 15px; margin-top: 10px;"></div>	The connector symbol is used to indicate a continuation of the flow of the diagram <div style="border: 1px solid black; width: 100%; height: 30px; margin-top: 10px; position: relative;"> → </div>



Fishbone Diagram Adjunct Table

This toolbox is an optional resource that can be used in conjunction with the Fishbone Diagram. The information below is provided as an example. Please change all necessary information, to fit the needs and structure of your facility.

Level of Analysis	Questions	Findings
What were the most proximate factors? (Typically “special cause” variation)	What steps were involved in (contributed to) the event?	Use the fishbone diagram for guidance – the cause and effect diagram should uncover potential problems or failures under each step
Human Factors	What human factors were relevant to the outcome?	Example: Staff pressured due to time constraints and lack of available support staff.
Equipment Factors	How did the equipment performance affect the outcome?	Example: Staff not trained properly on correct equipment usage.
Environmental Factors	What factors directly affected the outcome?	Example: Instruments were not cleaned adequately before inputting into the sterilizer.
Methodical Factors	Are they truly beyond the organizations control?	Example: Staff observed taking shortcuts during procedure.
Material Factors	Are there any other factors that have directly influenced this outcome?	Example: Vital materials are missing from the central line kit.

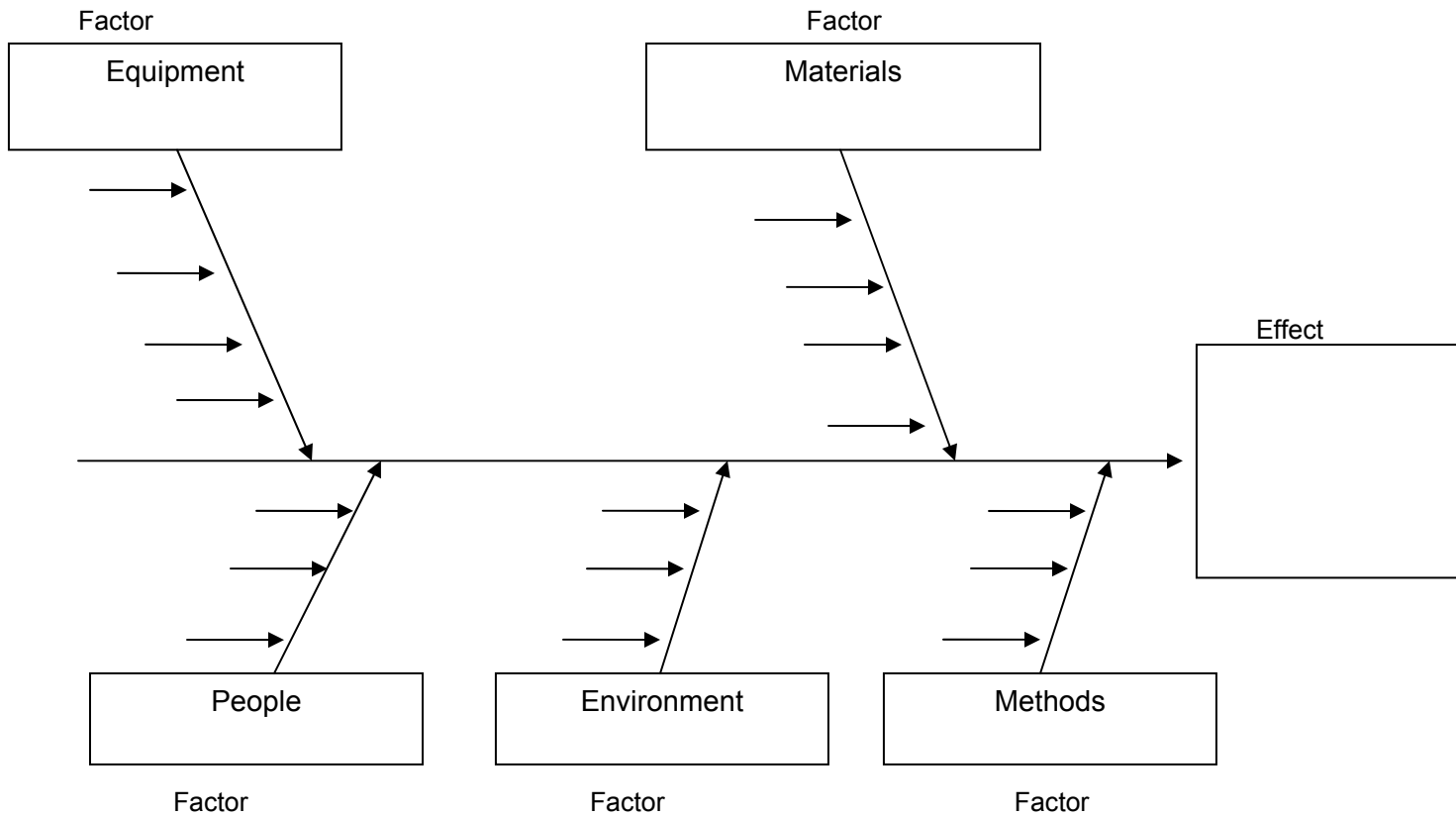
Date of Incident: _____

Unit: _____

Name of Staff/Title: _____

Today's Date: _____

Fishbone Diagram



The Five Whys Adjunct Table

This toolbox is an optional resource that can be used in conjunction with the Five Why's Diagram. The information below is provided as an example. Please change all necessary information, to fit the needs and structure of your facility.

Level of Analysis	Questions	Findings
Why did that happen? What systems and processes underlie those proximate factors?	How did actual staffing compare with ideal levels?	Example: What does the department do if they are "short staffed" for the day? Who prioritizes?
	To what degree is staff properly qualified and currently competent for their responsibilities?	Example: Residents have not demonstrated adequate competency on central line insertion practices.
	Were the necessary and appropriate tools available and accessible for use?	Example: Miscommunication found between staff members. Forms are not readily accessible for frontline staff.
	How can orientation and inservice training be improved?	Example: Brainstorm and listen carefully to the front-line caregiver who knows best what will and will not work.
	To what degree is all necessary information available when needed?	Example: Critical information omitted from the patient's report.

Date of Incident: _____

Unit: _____

Name of Staff/Title: _____

Today's Date: _____

The Five Whys

Problem Statement:

(One sentence description of the event)

WHY

WHY

WHY

WHY

WHY

WHY

Root Cause

1.	
2.	
3.	

PDSA Worksheet

Team Members:

Team Leader:

Physician Champion:

AIM Statement (what do you want to achieve):

Define the main problems found when conducting the RCA.

- 1.
- 2.
- 3.

What changes can be made that will result in improvement?

- 1.
- 2.
- 3.

How will you know that the improvement is a result of the change?

Plan:

What are the interventions/steps that need to be done	Person Responsible	Date to begin	Where to be done

Do: Describe what happened during the test.

Study: What were the measures and results of the test?

Measures	Baseline	Results

Act: What modifications, if any, need to be made?