

**Systems-base root cause analysis (RCA)**

Northern Research and Quality Conference 2023  
Facilitators: Physician Quality Improvement Team

PQI PHYSICIAN QUALITY IMPROVEMENT  
northern health  
the northern way of caring

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**Disclosures & Acknowledgements**

We have nothing to disclose.

*This program was co-developed between the Physician Quality Improvement Steering Committee and Northern Health and was planned to achieve scientific integrity, objectivity and balance.*

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We are gathered to learn together on the traditional territories of the Lheidli T'enneh

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**Learning objectives**

- Explain Root Cause Analysis (RCA)
- Recognize a system-based approach to RCA
- Identify the Problem & Problem Statement
- Use the 5 whys
- Use a Fishbone Diagram

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**What is Root Cause Analysis?**

- Team-based approach to identifying the underlying cause of an incident so the most effective solution can be implemented

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**What is Root Cause Analysis?**

Goes beyond identifying the symptom ('the weed')

Goes beyond identifying a single Cause/limited single solution

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» **Root Cause Analysis asks**

- What's the problem?
- Why did it happen?
- What will be done to prevent it from happening again?

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» **Why conduct Root Cause Analysis?**

- Goes beyond the 'symptoms'
- To come up with effective solutions
- Often don't go 'deep enough'
  - ie 'Human Error' or 'Staff not trained'



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» **When do we conduct Root Cause Analysis?**

- Patient safety event
- Unexpected event
- Patterns or clusters of similar events
- Positive occurrences/Positive patterns
- 'Pebble in your shoe'

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» **Root Cause Analysis; a system-based approach**

"Every system is perfectly designed to get the results it gets. If we want better outcomes, we must change something in the system. To do this we need to understand our systems"

-Don Berwick, President and CEO, Institute for Healthcare Improvement (IHI) USA

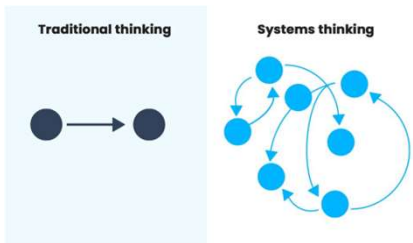
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» **Root Cause Analysis; a system-based approach**

*Go deeper than "Who messed up, at what time"*

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» **Root Cause Analysis; a system-based approach**



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### Components of the healthcare system

- **Individual** - health professionals, administration, management, patients and family
- Infrastructure
- Technology and Equipment
- Environment
- External factors

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- Individual - health professionals, administration, management, patients and family
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- **Technology and Equipment** - drugs, equipment, diagnostics, IT
- Environment
- External factors

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### Components of the healthcare system

- Individual - health professionals, administration, management, patients and family
- Infrastructure - policies, procedures, protocols, governance arrangements
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- **Environment** - physical, social, and cultural
- External factors

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### Components of the healthcare system

- Individual - health professionals, administration, management, patients and family
- Infrastructure - policies, procedures, protocols, governance arrangements
- Technology and Equipment - drugs, equipment, diagnostics, IT
- Environment - physical, social, and cultural
- **External factors** - housing, COVID, climate events, SDH

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### Components of the healthcare system

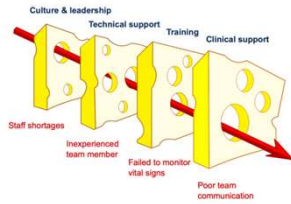
- Activity – 15 mins
- At your table:
  - Introduce yourself – name, organisation, role
  - Reflecting on the system where you work/study, provide one example for each
    - Individual
    - Infrastructure
    - Technology and Equipment
    - Environment
    - External factors

Duplicates are ok!

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## Root Cause Analysis; a system-based approach

- Defects and imperfections can exist in all parts of the system; in isolation they may not result in an incident.
- The 'swiss cheese model' = imperfections (holes) lining up = unexpected event



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## Root Cause Analysis: Key steps

1. Define the problem
2. Collect data
3. Identify root causes
4. Develop and implement solutions

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## Ground Rules

- System not the person
- Avoids blame & shame
- No negative or condescending language

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## Defining the Problem

- How would you describe the problem at hand?
- What do you see happening?
- What are the specific symptoms?
- Should be understood by everyone on the team
- Avoids: identifying a cause or solution

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## Defining the Problem

- Mary Black\*, a 75-year-old woman with a history of hypertension, is admitted for chest discomfort. She's diagnosed with a pulmonary embolism. After the appropriate laboratory and diagnostic workups are completed, Ms. Black is started on a weight-based heparin protocol infusion. When she develops severe nose bleeds and headaches, the nurse re-assesses the patient and discovers that the incorrect concentration of heparin is infusing (concentration too high). The nurse stops the infusion and notifies the physician. Orders are received for lab work and to perform a brain computed tomography (CT) scan. The lab results reveal an abnormally high partial thromboplastin time (>250 seconds), and the CT scan indicates that the patient suffered a stroke (intracranial bleed). The nurse immediately transfers Ms. Black to the intensive care unit and later enters an adverse event report into the organization's reporting system.

- *\*fictitious patient and situation*

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## Problem Statements - Activity

- See Case study # 1 –
- work together to develop to a problem statement – share out

Problem Statement: Patient suffered an unexpected stroke (intracranial bleed)

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### Step 2 - Collect Data

- What are contributing factors?
- When did the problem occur?
- Is it an ongoing pattern?
- What is the observed impact?
- What data/information would you want to know about case study # 1?

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### Step 3 – Identify Root Causes

- A sequence of events, or timeline is helpful
- Brainstorm as many causal factors as possible
  - 'Why'

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### Step 3 – Identify Root Causes

- Identify as many causes as possible
- Narrow down the underlying cause
  - Common tools:
    - 5 Whys
    - Fishbone diagram
    - Often a combination of both

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### The 5 Whys

- By repeatedly asking the question 'why?' (use five as a rule of thumb), you can peel away the layers of a problem to get to the root cause.

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### The 5 Whys

- Patient suffered an unexpected stroke (intracranial bleed)
- Because the heparin dose was too high
  - Because the wrong concentration was infusing.
  - Because the scan error was overridden
  - Because the wrong concentration went unnoticed
  - Because of the belief that the correct bag was dispensed from the pharmacy

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### The 5 Whys

Patient was late being brought into the OR

- Because there was a long wait for a trolley
- Because a replacement trolley had to be brought from elsewhere in the hospital.
- Because the original trolley had a broken wheel and safety rail
- Because it had not been regularly checked for wear
- Because there is no set maintenance schedule

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### » Advantages of The 5 Whys

- Encourages collaborative problem solving
- Inculcates the feelings of openness within the team as the outlook of every member is considered
- Simple, easy to follow without requiring any statistical analysis or additional tools
- Aids in reaching amicable consensus on areas with issues rather than fault-finding or blaming individuals

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### » Limitations of The 5 Whys

- time-consuming technique and involves deep probing and thorough evaluation of all the facts
- cannot be done in isolation
- Sometimes it's not possible to isolate a single root cause through this technique
- Need to be experienced enough to be able to ask the 'right' Why question

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### » The 5 Whys - Practice

#### •Case Study # 2

Pam leaves her house for work at her usual time of 8:15am. When she backs out of her garage, she notices that the trash can, which is kept outside of the garage since the garage is too cluttered, is knocked over and there is trash strewn all over. The knocked over trash can, and the garbage are blocking her exit. It appears that an animal (maybe a bear or dog) has knocked over the trash and ripped open the garbage bags. Pam must pick up all the garbage and gets to work 15 minutes late.

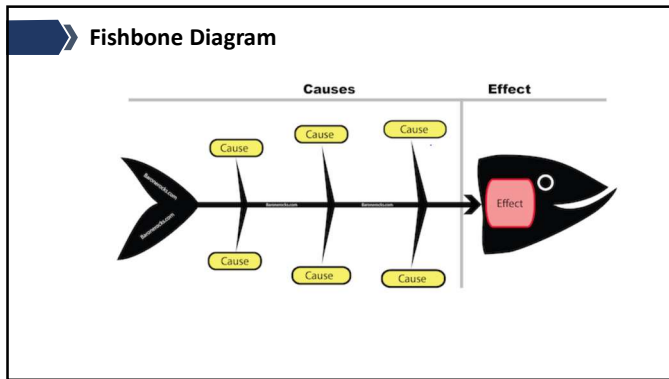
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### » The 5 Whys

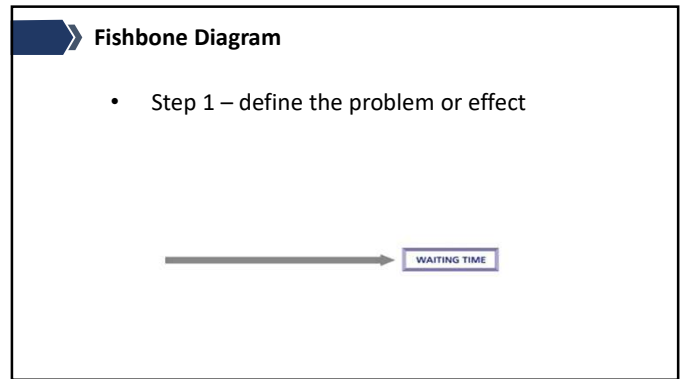
Pam was 15 minutes late for work

- Because she had to pick up trash in her driveway
- Because trash was blocking her exit
- Because a bear knocked over the trash
- Because the trash was kept outside/not in the garage
- Because the garage is too cluttered

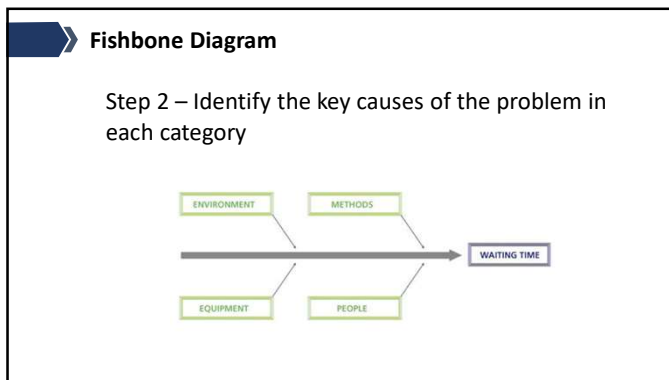
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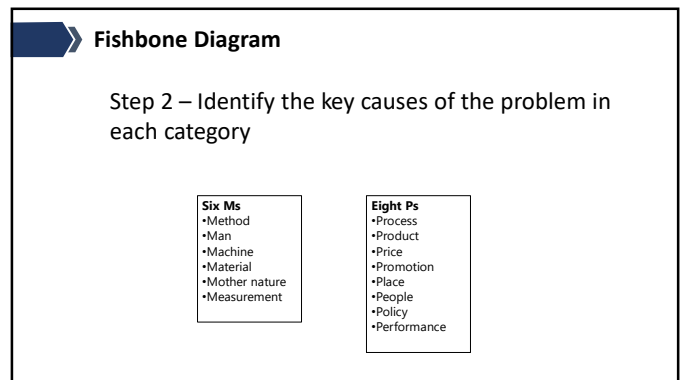
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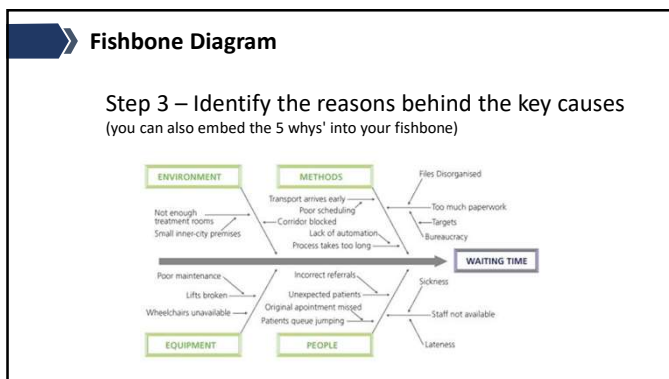
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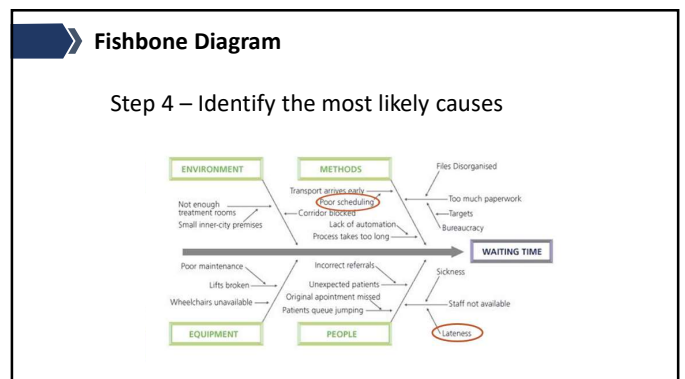
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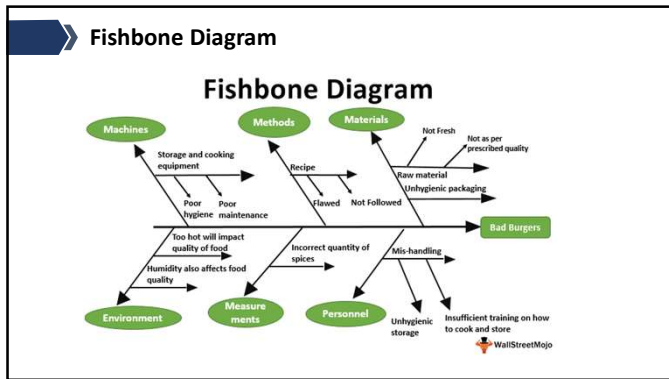


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### Fishbone Diagram

- Activity
- At your table, create a fishbone diagram addressing the problem:  
“I haven’t been meeting my exercise goals over the past month”

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### Step 4 – Develop and implement solutions

The scale is as follows:

- Strongest**
- 1. REMOVE / REDUCE THE HAZARD
- 2. REMOVE THE TARGET
- 3. GUARD THE TARGET
- 4. IMPROVE HUMAN PERFORMANCE-with good Human Factors Design
- 5. IMPROVE HUMAN PERFORMANCE-with Rules, Procedures, Signs...
- 6. IMPROVE HUMAN PERFORMANCE-with Training, Supervision...
- Weakest**

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### Wrap up

- Questions
- Any physicians, NPs, midwives in attendance – please see us after regarding CME credits

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