



# Root Cause Analysis

**Presented by:**

Priya Sarjoo

Director, Business Advisory Services

October 1, 2009

# Agenda

- Definition
- Methodologies
- Problem identification
- Process understanding
- Cause identification
- Data collection & analysis
- Corrective action



# Definition

- Root Cause Analysis:
  - Component of a corrective action process whereby failures or non-conformances are identified, causes are diagnosed and actions are taken to prevent recurrence
  - Focuses on identifying possible causes, collecting and analyzing data and determining actual cause(s)
  - A generic skill that can be applied to nearly any type of problem



# Methodologies

- Various methodologies for conducting root cause analysis
  - Events and causal factor analysis
  - Change analysis
  - Barrier analysis
  - Risk tree analysis
  - Six Sigma (DMAIC)

# Problem identification

- Effective root cause analysis requires deductive or logical thinking about cause-and-effect relationships
- Example:
  - Effect: Increase in number of cancer diagnoses
  - Possible Causes: ??

## Problem identification (*continued*)

- Example:
  - Effect: Increase in number of cancer diagnoses
  - Possible Causes:
    - Increase in number of individuals tested
    - More precise testing techniques
    - Increased incidences of cancer
    - Others...



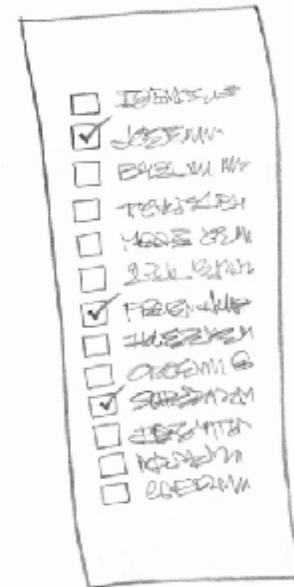
## Problem identification (*continued*)

- Root cause analysis can be ineffective when you only focus on what is most visible, or most convenient
- Example:
  - Assuming errors are one time events which will not occur again



# Problem identification (*continued*)

- Develop a thorough, succinct description which includes the following:
  - What?
  - Where?
  - Who?
  - When?
  - How much?
- Do not include or imply a cause



# Process understanding

- Develop a process flowchart
  - Process flowcharts typically include inputs, processes and outputs
  - The flowchart should be prepared using both the current state as well as the standard (or correct) process
  - A flowchart helps identify where something has gone wrong in a process
  - The flowchart can also help identify data collection points

# Process understanding (*continued*)

- Analyze each step within the flowchart for possible weaknesses
  - Lack of defined standards, incomplete process, broken process, non-compliance with process
- Focus on process failures instead of operator failure



# Cause identification

- Develop theories about what is causing the problem
  - Examine the flowchart
  - Compare to standards
  - Compare to expected procedures
  - Use a logic tree (5 whys)
  - Use a cause-and-effect diagram (4 Ps)

## Cause identification (*continued*)

- Differentiate between symptoms and causes
  - Symptoms are the *signals* that something is wrong
  - Causes are the *underlying reasons* which result in the symptom(s)
- Drill down from symptoms to system cause

## Cause identification *(continued)*

### Symptoms

- High levels of obsolete inventory

### Obvious (physical) cause

- Inventory reserve analysis worksheets are incorrect

### Underlying (system) cause

- “Virtual” warehouse locations are not pulled into the inventory aging report

## Cause identification (*continued*)

- Analyze to identify possible causes
- Narrow causes down by identifying the ones most likely to have caused the error
  - Conduct a sanity check
  - Is it logical?
  - Is it supported by the data?
  - Is it probable?

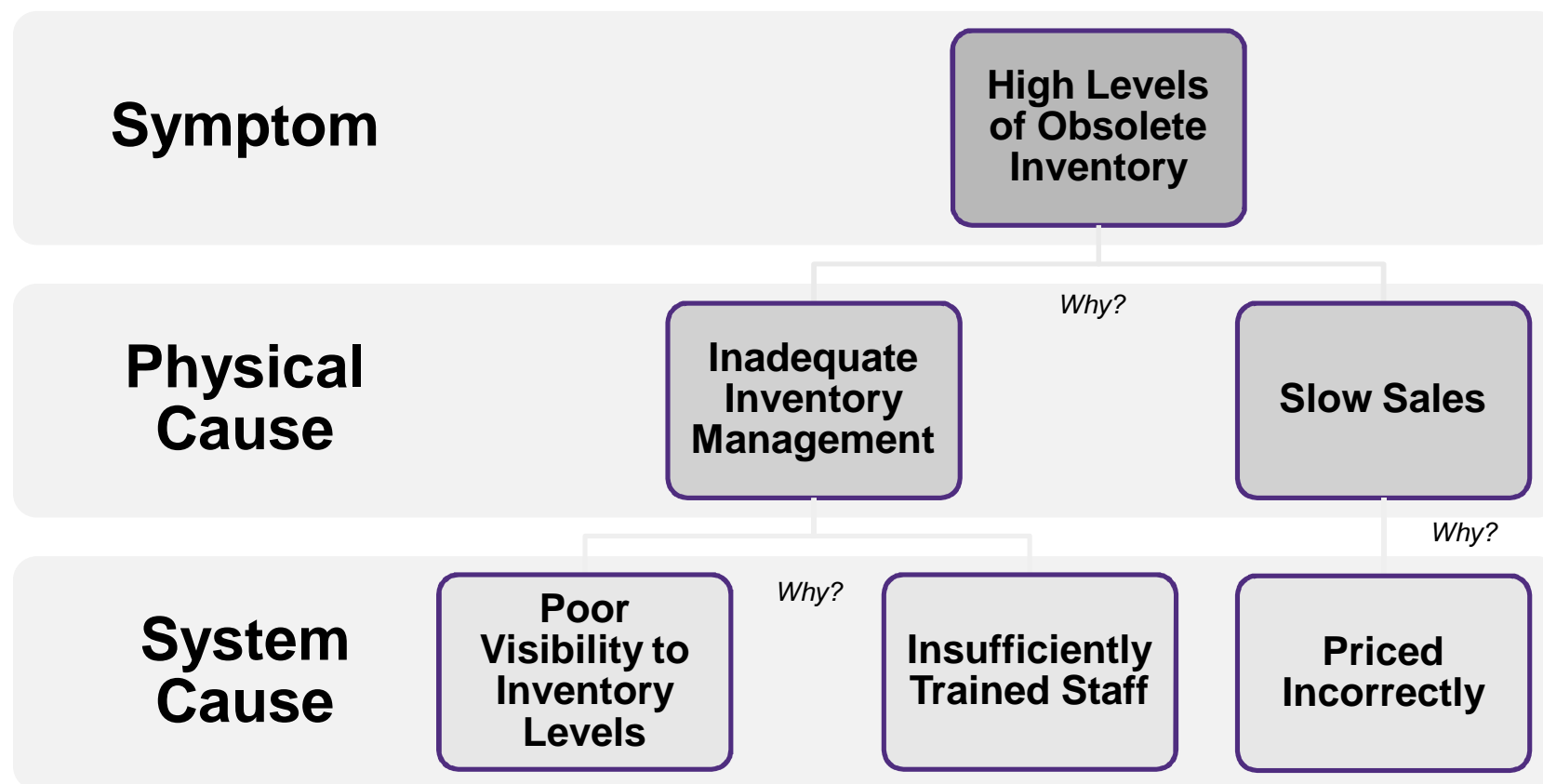


# Cause-and-effect analysis

- Drill down from symptoms to system cause
  - The “5 whys” process
    - Keep asking why something happened, until you get to a point where you can take action to correct the underlying system cause

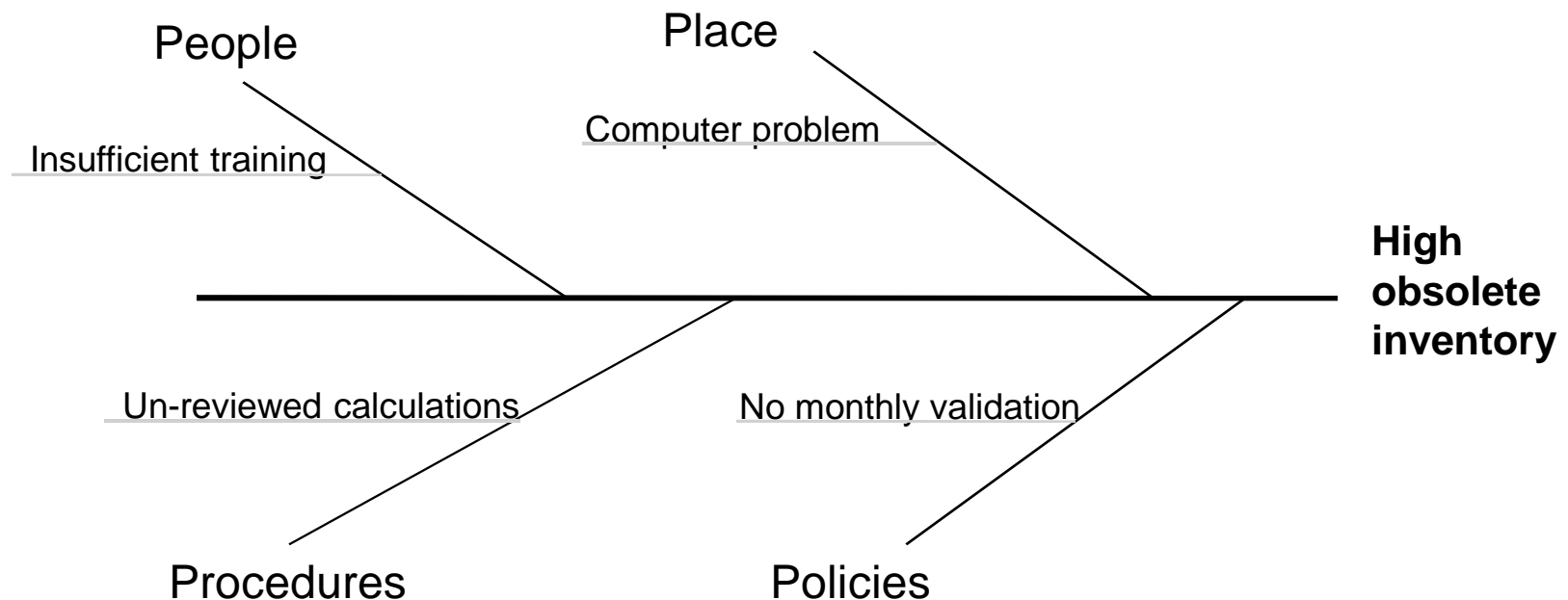


# Cause-and-effect analysis *(continued)*



# Cause-and-effect analysis (*continued*)

- Drill down from symptoms to system cause (*cont'd*)
  - The “4 Ps” process



# Data collection

- Understand cause-and-effect
- Understand the process variables and how they can be measured
- Understand the data and how it can be gathered
- Decide on analysis methods
- Gather the data



# Data collection methods

- Interview
- Observation
- Data review
- Scientific techniques



# Data analysis

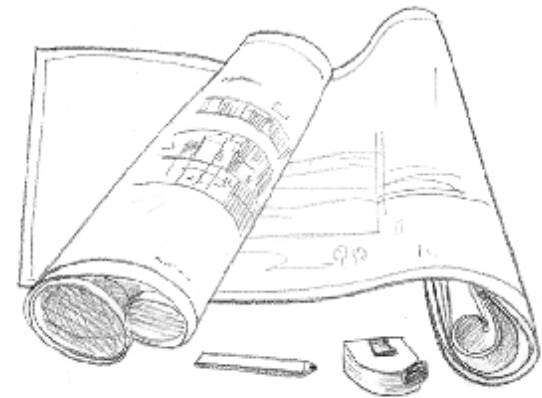
- Ensure the correct data is collected (i.e. data is pertinent to the issue under review)
- Determine the expected outcome
- Analyze the data
- Compare to expected outcome

## Data analysis (*continued*)

- Obsolete inventory example:
  - Understand standards or established procedures for inventory management
  - Develop process flowchart showing inventory inputs, processes and outputs
  - Identify data to be collected and analyzed
  - Collect inventory aging by SKU, dollars and quantity
  - Re-perform inventory reserve calculation
  - Compare to existing reserve calculation
  - Identify inconsistencies

# Corrective action

- Focus resources on where they would be best spent
  - Identify one problem/reason/cause which may have the largest impact (e.g. dollars, time, re-work, exposure, etc.)
  - Focus efforts on resolving the cause with the largest impact



# Questions

