

**Learning From Mistakes:  
Error Reporting and  
Analysis and HIT**

Unit12.3: Quality  
Improvement Tools

Component 12/Unit #12 Health IT Workforce Curriculum Version  
1.0/Fall 2010 1

---

---

---

---

---

---


---

---

**Objective**

At the end of this segment, the student will be able to:

- Apply QI tools to analyze HIT errors



Component 12/Unit #12 Health IT Workforce Curriculum Version  
1.0/Fall 2010 2

---

---

---

---


---

---

---

---

**Quality Improvement Tools**



Component 12/Unit #12 Health IT Workforce Curriculum Version  
1.0/Fall 2010 3

---

---

---

---

---

---

---

---

## Flow Diagrams or Charts

QI tool that helps to analyze processes

Picture of steps of a process in sequential order

May include:

- sequence of actions
- materials or services entering or leaving the process (inputs and outputs)
- decisions that must be made
- people who become involved
- time involved at each step
- process measurements

---

---

---

---

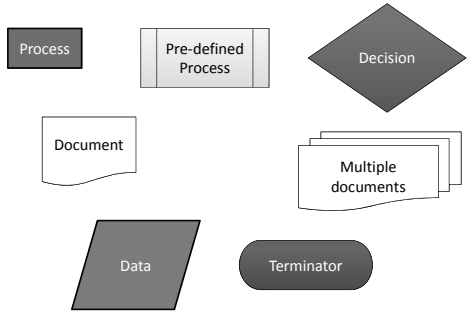
---

---

---

---

## Common Flow Chart Symbols



---

---

---

---

---

---

---

---

## Quality Improvement Tools Root Cause Analysis

- Structured problem-solving process
- Considers all potential causal or contributing factors
  - Human factors
  - System factors
- Detailed chronological list of events surrounding incident
- Premise: one can learn from one's mistakes



---

---

---

---

---

---

---

---

## Quality Improvement Tools Root Cause Analysis

### Factors to consider include:

- People (knowledge, skill, abilities)
- Procedure
- Equipment and facilities
- Communication
- Work conditions

Component 12/Unit #12

Health IT Workforce Curriculum Version  
1.0/Fall 2010

7

---

---

---

---

---

---

---

---

## Root Cause Analysis

**Story:** I taught my 17 year old daughter how to do laundry in anticipation of her living in a college dormitory. She returned home one week-end with a total body rash and oily clothes. After taking her to the dermatologist and getting prescriptions filled, I wanted to try to uncover what led to this situation.



Component 12/Unit #12

Health IT Workforce Curriculum Version  
1.0/Fall 2010

8

---

---

---

---

---

---

---

---

## RCA: Steps

- **Briefly describe event**
  - My daughter arrived home with a total body rash and oily jeans.
- **Identify affected areas/services**
  - Dorm laundry facilities
  - Our laundry facility
  - Use of laundry facilities
- **Assemble a team**
  - My daughter
  - Me
  - My daughter's dermatologist

Component 12/Unit #12

Health IT Workforce Curriculum Version  
1.0/Fall 2010

9

---

---

---

---

---

---

---

---

## RCA: Steps

- **Diagram the process (flow chart)**
  - As it was designed
  - As it is usually done
  - As it was done when event occurred
- **Identify potential root causes, e.g.**
  - Size of washing machine (diminutive versus full-sized)
  - Type of washing machine (front loader versus top loader)
  - Type/amount of detergent (too much?)
  - Length of rinse cycle (single versus double rinse)
  - Following instructions given at home in the dorm environment

Component 12/Unit #12

Health IT Workforce Curriculum Version  
1.0/Fall 2010

10

---

---

---

---

---

---

---

---

## RCA: Steps

- **Develop action plan, e.g.**
  - Use less soap and double rinse clothes after washing
  - Responsibility: My daughter
  - Implementation date: As soon as she returns to school
  - Measurement strategy: Skin assessment when she returns home and assessment of clothes for soap residue.

Component 12/Unit #12

Health IT Workforce Curriculum Version  
1.0/Fall 2010

11

---

---

---

---

---

---

---

---

## Root Cause Analysis (RCA)

**Health Care Example:** Mrs. A. received blood in the Emergency Department. Within 15 minutes, she experienced a bad reaction. Her nurse realized that she had received blood intended for another patient. She was transferred to the intensive care unit to be stabilized. The ED staff wanted to know how this could have happened so they assembled a team to identify possible causes.

Component 12/Unit #12

Health IT Workforce Curriculum Version  
1.0/Fall 2010

12

---

---

---

---

---

---

---

---

## RCA: Steps

- **Briefly describe event**
  - Mrs. A received blood intended for someone else
- **Identify affected areas/services**
  - Blood Transfusion Service
  - Medical/Nursing Staff
  - Risk Manager/Quality Improvement Staff
- **Assemble a team**
  - Manager, Transfusion Services
  - Physician Chair of QI Committee
  - Nurse managers, staff nurses
  - QI, RM, patient safety representatives
  - HIT representative

Component 12/Unit #12

Health IT Workforce Curriculum Version  
1.0/Fall 2010

13

---

---

---

---

---

---

---

---

## RCA: Steps

- **Diagram the process (flow chart)**
  - As it was designed
  - As it is usually done
  - As it was done when event occurred
- **Identify potential root causes, e.g.**
  - Flawed patient identification process
  - Faulty patient-blood product verification process
  - Inadequate staffing levels
  - Inadequate orientation, training or competence assessment

Component 12/Unit #12

Health IT Workforce Curriculum Version  
1.0/Fall 2010

14

---

---

---

---

---

---

---

---

## RCA: Steps

- **Prioritize root causes**
  - Evaluate whether these factors will cause harm in the future
  - Design interventions that reduce this probability of harm and that have a high probability of being implemented as intended given available resources (Pham et. al, 2010)
- **Develop action plan, e.g.**
  - Implement bar-code blood product verification system
  - Responsibility: HIT Project Manager
  - Implementation date: November 2011
  - Measurement strategy: Collect data on patient misidentification errors related to blood product transfusion and compare to implementation rates.
- **Evaluate results!**

Component 12/Unit #12

Health IT Workforce Curriculum Version  
1.0/Fall 2010

15

---

---

---

---

---

---

---

---

## Quality Improvement Tools Failure Mode Effects Analysis (FMEA)

- Prospective attempt to predict error modes
- Combines the likelihood of a particular process failure with an estimate of the relative impact of that error
- Produces a criticality index that allows for the prioritization of specific processes as QI targets

Component 12/Unit #12

Health IT Workforce Curriculum Version  
1.0/Fall 2010

16

---

---

---

---

---

---

---

---

## Quality Improvement Tools Failure Mode Effects Analysis (FMEA)

### FMEA is a technique by which we analyze:

- Ways in which a process/design can fail
  - Why it might fail
  - How it can be made safer/better

### Premises on which it is based:

- Don't have to wait for errors to happen
- Can anticipate errors/adverse events
- Can do things to reduce risk of harm

Component 12/Unit #12

Health IT Workforce Curriculum Version  
1.0/Fall 2010

17

---

---

---

---

---

---

---

---

## Failure Mode Effects Analysis

Story: Before I had children, I invited one of my high school friends and her family, including a toddler, to dinner. I was worried that her toddler would somehow manage to hurt himself in my house, which was designed for a childless couple.

Component 12/Unit #12

Health IT Workforce Curriculum Version  
1.0/Fall 2010

18

---

---

---

---

---

---

---

---

## FMEA: Steps

Select a high risk process, one that is known to have problems, and assemble a team (my husband & I)



Component 12/Unit #12

Health IT Workforce Curriculum Version  
1.0/Fall 2010

19

---

---

---

---

---

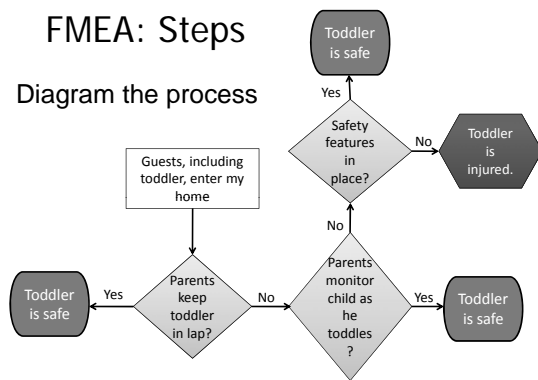
---

---

---

## FMEA: Steps

Diagram the process



Component 12/Unit #12

Health IT Workforce Curriculum Version  
1.0/Fall 2010

20

---

---

---

---

---

---

---

---

## Conduct a Hazard Analysis

Outcome Frequency	Catastrophic (4)	Major (3)	Moderate (2)	Minor (1)
High(4)	4 X 4 = 16	4 X 3 = 12	4 X 2 = 8	4 X 1 = 4
Moderate (3)	3 X 4 = 12	3 X 3 = 9	3 X 2 = 6	3 X 1 = 3
Low (2)	2 X 4 = 8	2 X 3 = 6	2 X 2 = 4	2 X 1 = 2
Remote (1)	1 X 4 = 4	1 X 3 = 3	1 X 2 = 2	1 X 1 = 1

The higher the number, the more urgent the need to prevent a failure.

Component 12/Unit #12

Health IT Workforce Curriculum Version  
1.0/Fall 2010

21

---

---

---

---

---

---

---

---

## Failure Mode Effects Analysis

**Event:** After reading several articles about laboratory specimen errors that result in lab tests being done on the wrong patients, doctors at a community office practice decide to examine the potential for this problem to happen in their office laboratory.

Component 12/Unit #12

Health IT Workforce Curriculum Version  
1.0/Fall 2010

22

---

---

---

---

---

---

---

---

## FMEA: Steps

- **Select a high risk process** (patient identification):
  - Affects a large number of patients
  - Carries a high risk for patients
  - Has known process problems identified by other organizations (e.g., *Joint Commission Sentinel Event Alert!*)
- **Assemble a team**
  - People closest to issue involved
  - People critical to implementation of potential changes
  - Respected, credible team leader
  - Someone with decision-making authority
  - People with diverse knowledge bases

Component 12/Unit #12

Health IT Workforce Curriculum Version  
1.0/Fall 2010

23

---

---

---

---

---

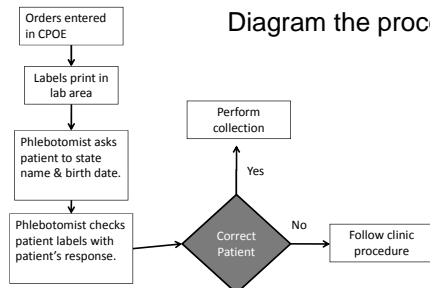
---

---

---

## FMEA: Steps

Diagram the process



Component 12/Unit #12

Health IT Workforce Curriculum Version  
1.0/Fall 2010

24

---

---

---

---

---

---

---

---



## Conduct a Hazard Analysis

	Catastrophic (4)	Major (3)	Moderate (2)	Minor (1)
Frequent (4)	4 X 4 = 16	4 X 3 = 12	4 X 2 = 8	4 X 1 = 4
Occasional (3)	3 X 4 = 12	3 X 3 = 9	3 X 2 = 6	3 X 1 = 3
Uncommon (2)	2 X 4 = 8	2 X 3 = 6	2 X 2 = 4	2 X 1 = 2
Remote (1)	1 X 4 = 4	1 X 3 = 3	1 X 2 = 2	1 X 1 = 1

The higher the number, the more urgent the need to prevent a failure.

Component 12/Unit #12

Health IT Workforce Curriculum Version  
1.0/Fall 2010

25

---

---

---

---

---

---

---

---

---

---

## Quality Improvement Tools

### RCA (Root Cause Analysis)

- Looks to the past
- How? Why? Who?
- Retrospective
- Usually retroactive
- Dissects error
- Identifies possible failure causes
- Subject to hindsight bias

### FMEA (Failure Mode Effects Analysis)

- Looks to the future
- What if...?
- Prospective
- Proactive
- Anticipates error
- Identifies possible failure modes
- Not subject to hindsight bias

Component 12/Unit #12

Health IT Workforce Curriculum Version  
1.0/Fall 2010

26

---

---

---

---

---

---

---

---

---

---

## Summary:

Root cause analysis is an effective QI tool that looks to the past for the cause of adverse events and seeks to prevent these causes in the future.

Failure mode effects analysis is another effective QI tool that uses a different approach; it anticipates adverse events and looks to the future to prevent them.

Use of flow diagrams is an important skill for both of these processes.

HIT professionals can be valuable contributors to both RCA and FMEA teams.

Component 12/Unit #12

Health IT Workforce Curriculum Version  
1.0/Fall 2010

27

---

---

---

---

---

---

---

---

---

---

# Learning From Mistakes



Component 12/Unit #12

Health IT Workforce Curriculum Version  
1.0/Fall 2010

28

---

---

---

---

---

---

---

---