

LEAP™ Analysis
SYSTEM ANALYZED: Emergency Room
Basic FMEA

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Interim Triage FMEA



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LEAP™ Analysis-Basic FMEA Explanation

The following Basic FMEA was conducted to help us determine the most significant events in our facility that would require a thorough Root Cause Analysis (RCA). This analysis was intended to look at probabilistic events. The analysis delineated which events were most critical to the system in an effort to justify a detailed RCA.

Below is a quick overview of the Basic FMEA process used to determine our facility's Significant Few events:

#	Steps	Description
1.	Define the System to Analyze	Define the scope of the analysis by describing where the process begins and ends.
2.	Define the Team Charter (Terminal Objective)	Define why this team was put together and when will they know they have been successful.
3.	Define Probability and Severity	Define the criteria for selecting a certain value for Probability and Severity.
4.	Define Loss	Define what is a loss in the current business environment, for the system chosen to be analyzed.
5.	Draw a Process Flow Diagram	Describe the system chosen to analyze in the form of a block diagram showing the process sub-systems.
6.	Fill Out the Basic FMEA Worksheet	Obtain the necessary event data to populate the Basic FMEA worksheet.
7.	Identify the Significant Few	Identify the events that represent the 80% of the losses.
8.	Issue a report	Communicate results.
9.	Conclusion Summary	Summarize conclusions drawn from the analysis.
10.	Recommendations	Delineate the preferred path forward.

Step 1 - Define the System to Analyze

Before beginning the analysis, we defined which system we wished to analyze. This was, in essence, an effort to determine the scope of the analysis; where it began and where it ended.

In this analysis our System to Analyze was identified as:

Emergency Room

Step 2 - Define the Team Charter (Terminal Objective)

We had to state the reason that the team was formed in a one or two paragraph statement. This served as the focal point for the team to clearly state it's purpose and objective.

This team is chartered to conduct an unbiased analysis of the Emergency Room. The "Significant Few" events will be identified and recommended to management for further Root Cause Analysis (RCA). All findings and recommendations will be submitted to management for review and approval.

Step 3 - Define Probability and Severity

Because the Basic FMEA is a probability analysis technique, certain assumptions had to be made with regards to the criteria for their values. Below are the tables that were chosen to reflect the criteria for selecting Probabilities and Severities in this analysis:

Level	Probability	Level	Severity
Frequent	4	Catastrophic	10
Occasional	3	Major	7
Uncommon	2	Moderate	4
Remote	1	Minor	1

Step 4 - Define Loss

What is the definition of loss in the system we have chosen to analyze? This will often vary from business to business, department to department and economic environment to economic environment. This was a necessary step to focus our efforts and develop a common understanding of what is a loss to us in this system, today.

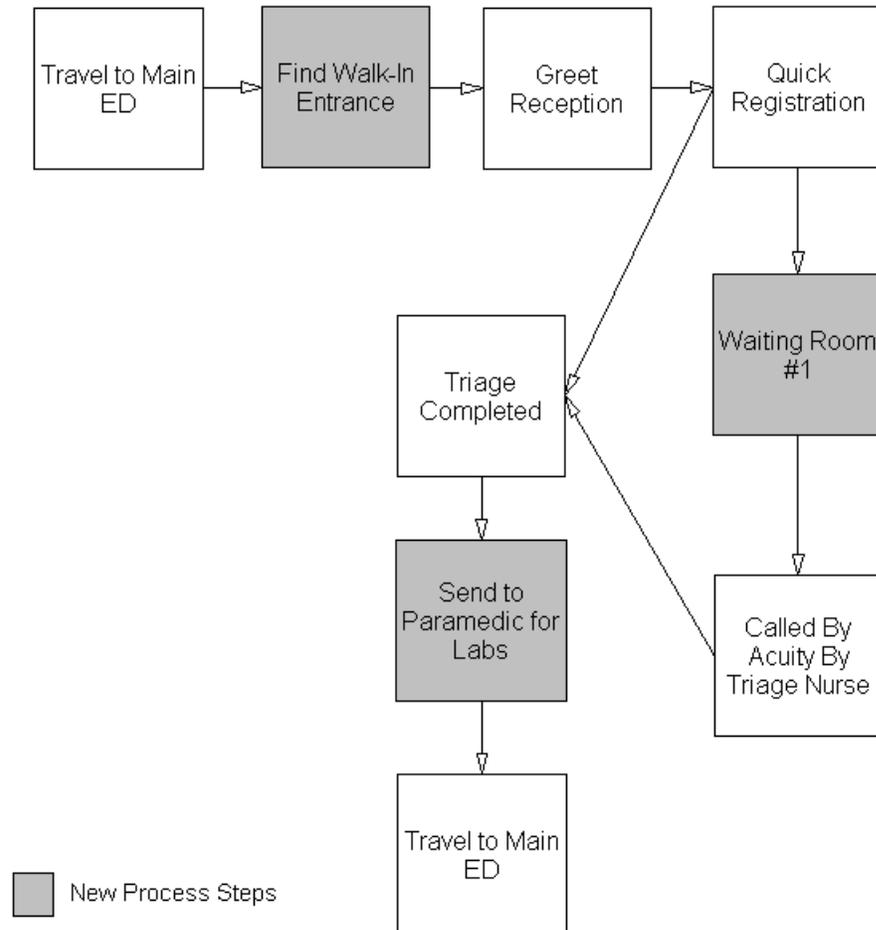
In this analysis, our Loss was defined as:

Any delay in treatment in ER

Step 5 – Draw a Process Flow Diagram

At this point we needed to map out the sub-systems of the process we chose to analyze. We used the typical flow charting symbols to develop a simple block diagram to depict the process flow.

In this analysis, our Process Flow Diagram was represented as:



Step 6 – Fill Out the Basic FMEA Worksheet

We now determined where the data would come from to fill out our Basic FMEA worksheet. Several sources were available such as interviews, existing databases, logs, etc. We used the most reliable data source at our disposal.

Once the data was collected and formatted into our worksheet, we did a simple calculation to generate our total loss, for each event in the analysis. The calculation was done automatically in the LEAP™ software as follows:

$$\text{Probability} \times \text{Severity} = \text{Rank Prioritization Number (RPN)}$$

In this analysis, our Basic FMEA Spreadsheet resulted in the following:

Subsystem	Event	Mode	Probability	Severity	RPN
Waiting Room #1	Family Rejoins Pt in Waiting Room #1	Delay to Getting to Main ED	4	7	28
Travel to Main ED	Delay to Main ED	Multiple Travel Routes	4	7	28
Called By Acuity By Triage Nurse	Delay to Triage	Patient Backlog	3	7	21
Greet Reception	Adverse Pt Event	Lack of Staff for Transport	3	7	21
Travel to Main ED	Unable to Get to Main ED	Main ED at Capacity	3	7	21
Travel to Main ED	Deterioration of Pt Acuity	Travel Distance to Main ED	3	7	21
Greet Reception	Utilize the Wrong Entrance	Unfamiliar with Interim Entrance	3	6	18
Called By Acuity By Triage Nurse	Wrong Acuity Assignment	Vague Presentation from Pt	3	6	18
Travel to Main ED	Delay in Treatment	No Parking Available	3	6	18
Called By Acuity By Triage Nurse	Labs Re-Processed in Main ED	Nursing Competency Assessment	3	6	18
Find Walk-In Entrance	No Access to Entrance	Over-Crowding	4	4	16

Subsystem	Event	Mode	Probability	Severity	RPN
Quick Registration	Wrong Pt Called Back	Lack of Organization	4	4	16
Travel to Main ED	Unable to Find Proper Entrance	Poor Signage	4	4	16
Triage Completed	No Protocol for Labs	Lack of Administrative Policies	2	7	14
Greet Reception	Pt Dissatisfaction	Poor Signage	3	4	12
Greet Reception	No Receptionist Available	High Pt Volume	3	4	12
Called By Acuity By Triage Nurse	Wrong Acuity Assignment	Nursing Competency	3	4	12
Waiting Room #1	Pt Walks Out	Excessive Wait Times	3	4	12
Waiting Room #1	Pt Condition Worsens	Excessive Wait Time	3	4	12
Greet Reception	Bypass Receptionist	Excessive Queueing at the Desk	3	4	12
Travel to Main ED	Death	Poor Signage	1	10	10
Quick Registration	Delay to Quick Register	Excessive Pt Volume	2	2	4
Quick Registration	Delay to Get Quick Registered	Not Captured at Rec. Desk	2	2	4
Quick Registration	Incorrect or Lack of Information	Poor Delivery of Info from Pt/ Family	2	2	4
Travel to Main ED	Leave the Campus	Campus Congestion	3	1	3
Send to Paramedic for Labs	No Paramedic Available	Pt Transport	2	1	2
Called By Acuity By Triage Nurse	Improper Order to Main ED	Wrong Triage Classification	1	1	1

Step 7 - Identify the Significant Few

The concept of the Significant Few was derived from a famous Italian Economist named Vilfredo Pareto. Pareto stated that 'In any set or collection of objects, ideas, people and events, a FEW within the sets or collections are MORE SIGNIFICANT than the remaining majority'. Consider these examples:

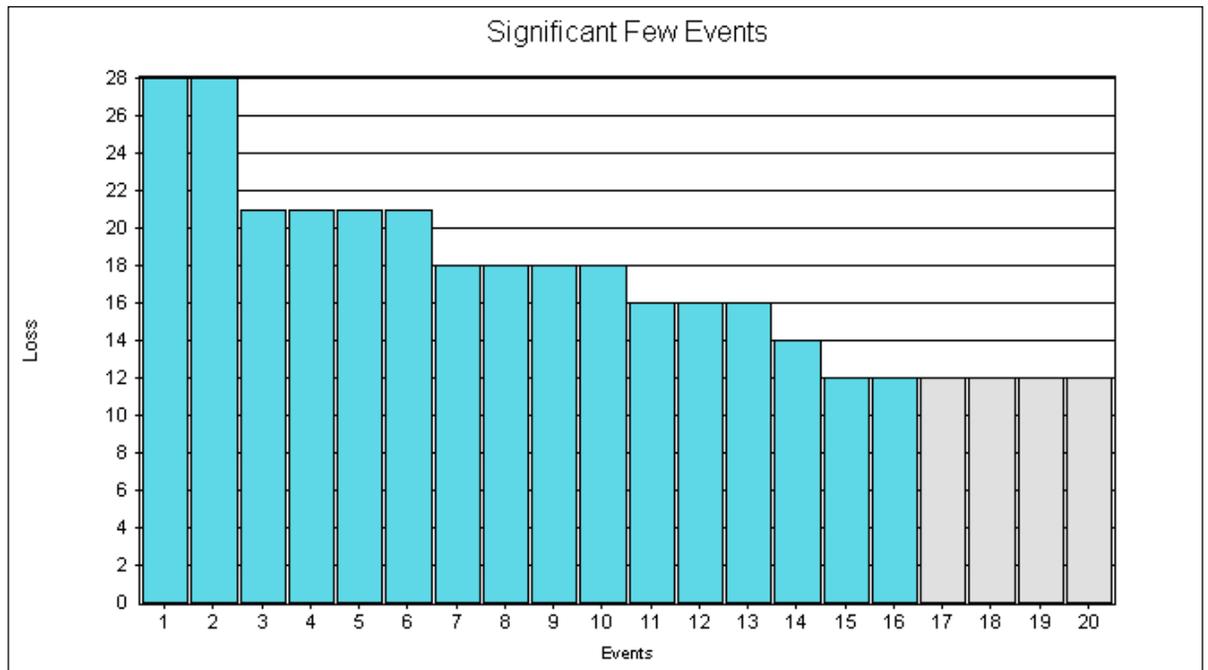
- 80% of a banks assets are representative of 20% or less of its customers
- 80% of the care given in a hospital is received by 20% or less of its patients
- 80% of the losses in a manufacturing plant are caused by 20% or less of the events

This means that we only have to perform RCA on 20% or less of our events to reduce or eliminate 80% of our facilities losses.

In order to determine the 'Significant Few', we performed a few simple steps (with the help of the LEAP™ software):

- Totaled all of the events in the analysis to create a global total loss.
- Sorted the total loss column in descending order (i.e. highest to lowest)
- Multiplied the global total loss column by 80% or .80. This gave us the 'Significant Few' loss figure that we will need to determine what the 'Significant Few' events are in our facility.
- We went to the top of the total loss column and begin adding the top events from top to bottom. When the sum of these losses is equal to or greater than the 'Significant Few' loss figure then those events are your 'Significant Few' events.

In this analysis, our Significant Few events were identified as:



ID	Event	Mode	RPN
1	Family Rejoins Pt in Waiting Room #1	Delay to Getting to Main ED	28
2	Delay to Main ED	Multiple Travel Routes	28
3	Delay to Triage	Patient Backlog	21
4	Adverse Pt Event	Lack of Staff for Transport	21
5	Unable to Get to Main ED	Main ED at Capacity	21
6	Deterioration of Pt Acuity	Travel Distance to Main ED	21
7	Utilize the Wrong Entrance	Unfamiliar with Interim Entrance	18
8	Wrong Acuity Assignment	Vague Presentation from Pt	18
9	Delay in Treatment	No Parking Available	18
10	Labs Re-Processed in Main ED	Nursing Competency Assessment	18
11	No Access to Entrance	Over-Crowding	16
12	Wrong Pt Called Back	Lack of Organization	16
13	Unable to Find Proper Entrance	Poor Signage	16
14	No Protocol for Labs	Lack of Administrative Policies	14

ID	Event	Mode	RPN
15	Pt Dissatisfaction	Poor Signage	12
16	No Receptionist Available	High Pt Volume	12

The total value of the Significant Few losses is 299.2

Step 8 – Issue a report

As with any analysis, it was important to communicate our findings to all interested parties. Our report includes the following items:

- An explanation of the analysis technique.
- The event definition that was utilized.
- The process flow diagram that was utilized.
- The results displayed graphically as well as the supporting spreadsheet lists.
- Recommendations of which events are candidates for Root Cause Analysis.

In summary, Basic FMEA is a fantastic tool for limiting our analysis work to only those things that are of significant importance to the facility. We cannot perform Root Cause Analysis on everything. However, we can use this tool to help narrow our focus to what is 'most' important.

Step 9 – Conclusion Summary

The interim triage process at Reliability Medical Center (RMC) will begin on XX/XX/XX and will be operational for approximately eleven months. The work team identified 28 potential events that may result in an adverse patient event or outcome.

Upon calculation, it was demonstrated that 17, or just fewer than 50% of the events were within the "significant few". The "significant few" represents those events that could potentially result in the most harm to the patient. A Risk Priority Number (RPN) is calculated by multiplying the event's probability by the severity. The higher the RPN, the more likely the event is to happen with higher associated harm to the patient. In this case, 17 items were found to cause 80% of the risk associated with the Interim Triage Process as revealed by the RPN value of 310, which is 80% of the overall RPN of 386. Our analysis showed that 50% of the potential failures would cause 80% of the total risk with this new process.

The results seem to show a significant amount of potential risks/failures in the process. "Modes" or reasons for failure such as patient over-crowding and poor signage were the two modes that seemed to be the cause of more than one potential failure.

This prospective analysis of the Interim Triage Process was a great exercise for staff and physicians to participate in. It seemed to enlighten many of them and force them to analyze a process and its potential failures before an adverse event occurs. Through identification of the potential failures and potential harmful patient events, the team was able to develop specific action plans before the walk-in entrance became operational.

Step 10 – Recommendations

Upon prospective review of the interim triage process, the work team recommends that specific action plans be created to address the events under the significant few. The action plans will focus on the sub-systems that present the most potential risk to patients.

BFMEA Action Plan: RMC Interim ED Triage

1. Mode: Travel to Main ED

Action: Prospective failures to occur because of multiple travel routes
Identification of proper route for patients and family members to use. Red plastic handrail covers to be used to signify proper travel route to main ED. Responsibility: RJL

2. Mode: Travel to Main ED

Action: Prospective failures to occur because of lack of transport staff.
Plan A will be to hire five new transport staff to cover the area 24/7. Plan B will be to utilize current transport staff and offer overtime shifts to cover the area.
Responsibility: RB

3. Mode: Travel to Main ED

Action: Prospective failures to occur because of travel distance to main ED.
Transport staff and volunteers to be utilized. Volunteers to be stationed near the exit of the triage area. Establish position within volunteer corps that roams between the main ED and triage route to assist patients. Responsibility: LL

4. Find the walk-in entrance, Utilize the wrong entrance.

Action: Potential failure mode due to the patient being unfamiliar with the interim entrance on the RMC campus. Public relations and marketing staff to devise PR campaign around public awareness of the new traffic patterns and location of walk-in entrance. Responsibility: LL

5. Find the walk-in entrance, Poor Signage.

Action: Map out key locations around the campus that are traditionally seen as major thoroughfares. Develop specific wording for the signs. Responsibility: RJL

In order to determine the efficacy of the action plans developed, the team proposed a few measurable results that will be tracked as the new process gets underway. The first indicator, as stated in the objectives, is the patient satisfaction scores on five key indicators: Overall quality of care, Quality of Nursing Care, Total Time Spent, Likelihood of Recommending Friends/Relatives and Overall Teamwork between Doctors, Nurses and Staff. The team will look for scores that are statistically significant from the previous quarter. The results will be an indicator of the effectiveness of the action plan. The team will also track patient complaints as well as the patient walkout rate from the ED.

Relative to patient safety indicators, patient and visitor falls will also be tracked.

To ensure that the measurable indicators mentioned above are regularly tracked and presented to management, the BFMEA work team will routinely meet to discuss the results and create a monthly report to Senior Leadership that highlights progress achieved relative to the action plan.