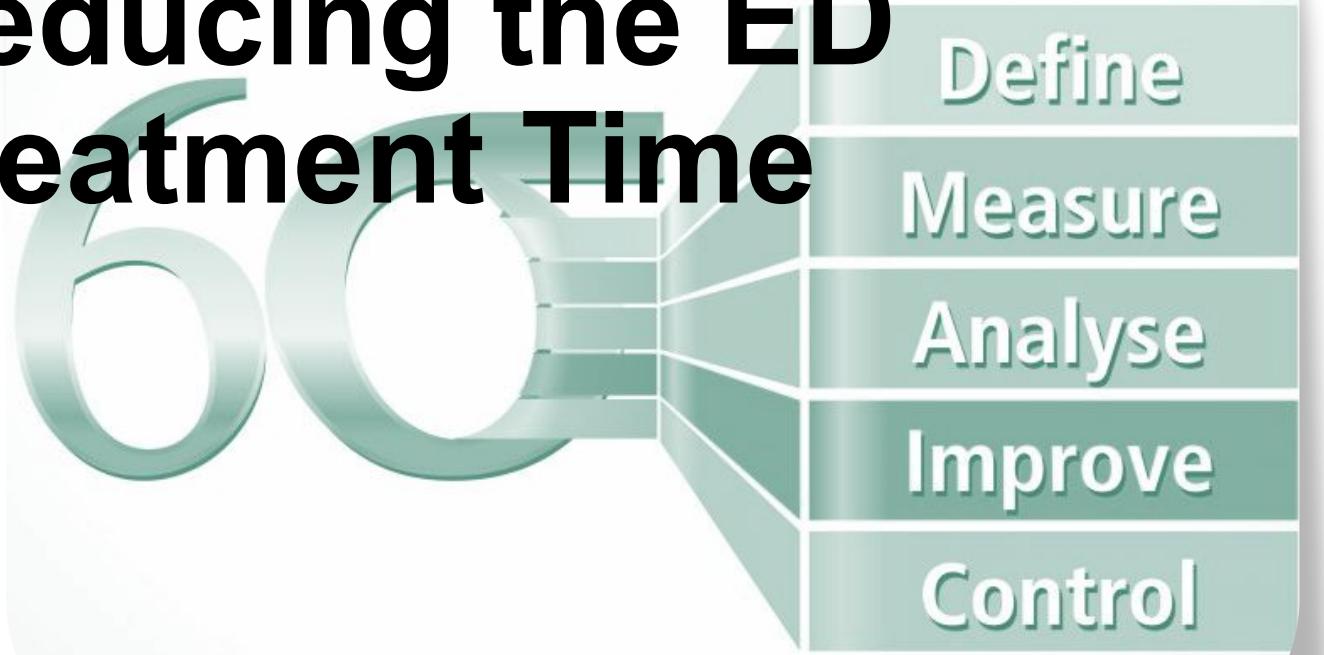
RIT

Reducing the ED Treatment Time



Jeremy Lau, Brendan McDermott, Chaitanya Prasanna Patwardhan, Sagar Ramesh Modale

Outline

Project Charter

- **Problem Statement**
  - NY State Hospital treatment time is significantly above the national average
- **Project Objective**
  - Goal is to reduce the length of stay in the emergency room
- **Project Scope**
  - Treatment times in New York State Emergency Room Department

Project Charter

- **Response Variable:**
  - Treatment Time in minutes
- **Defect Definition:**
  - Any treatment time longer than 90 minutes
- **Quantification of Problem:**
  - Conditions: Inadequate staff, not enough equipment, excess number of patients
  - Extent: National average is 90 minutes, NY State average is 170 Minutes
  - Performance: Treatment times over 90 mins and satisfactory level of patients after discharge
  - Time Frame: Data set looks at 2020 NY State averages
  - Specifications: Reduced time of stay should result in improved customer satisfaction and increased revenues

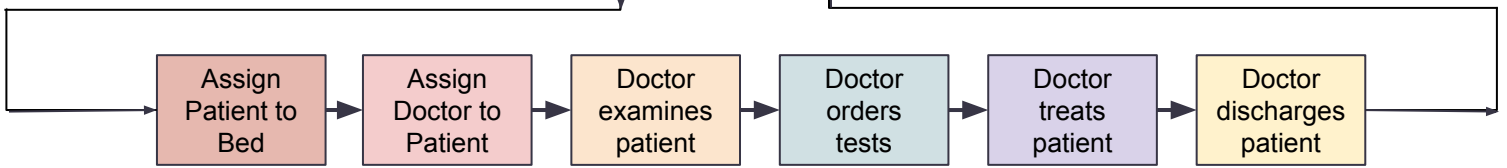
DEFINE

- **SIPOC** - Helped visualize the process from beginning to end
- **CTQ** - Helped define key services that the patients needed
- **Histogram** - Helped summarize and visualize the the wait times (discrete data)

DEFINE – SIPOC

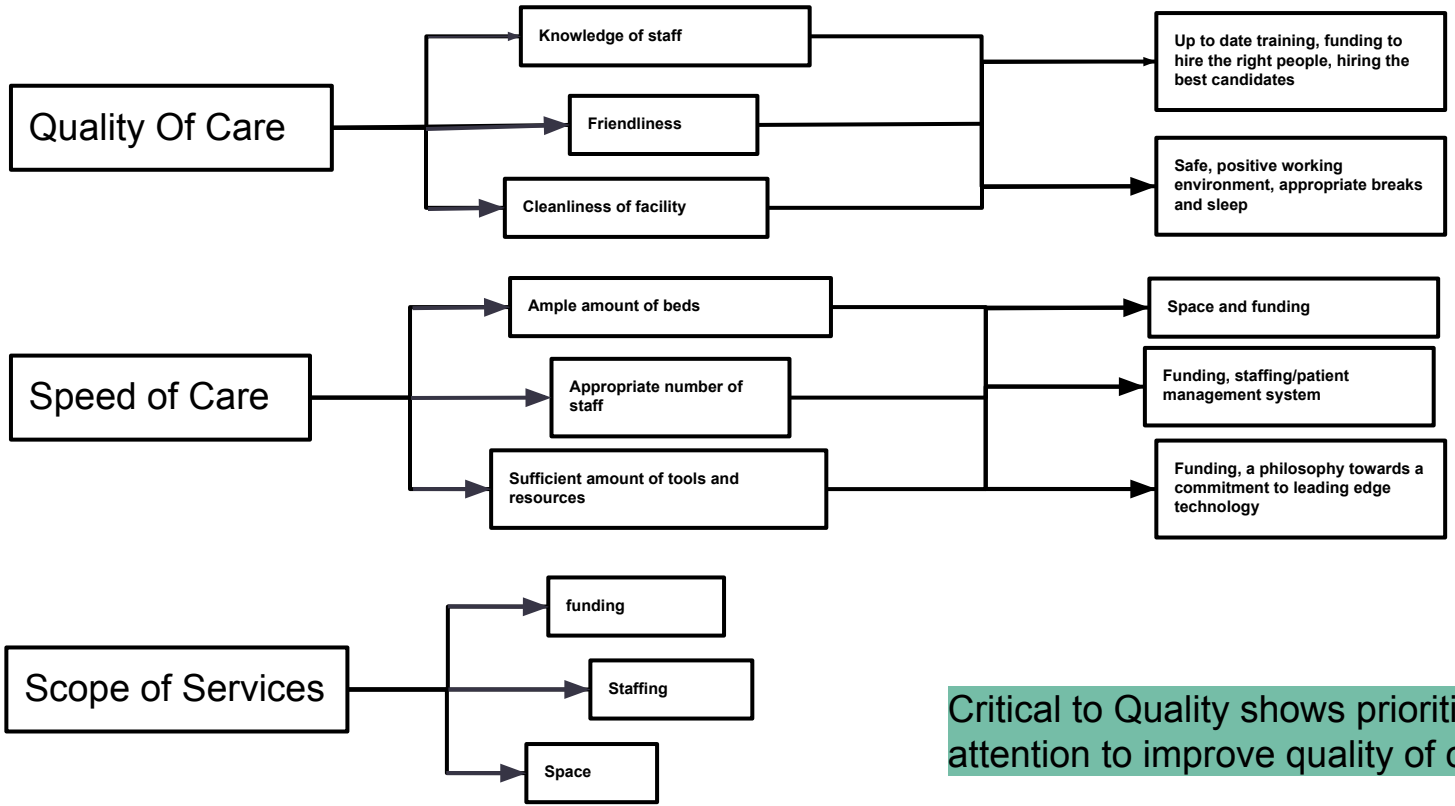
DEFINE

Suppliers	Inputs	Process	Outputs	Customers
• Patient • Nurse • ED Doctor.	• Medical Records • Patient Symptoms • RX Information • ED Activity Log	• ER Treatment	• Discharge Documents • Prescriptions • Physicians Notes • ED Activity Log • Empty ED Bed	• Patient • ED Doctor • ED Manager • Nurses • Lab Personnel



DEFINE – CTQ

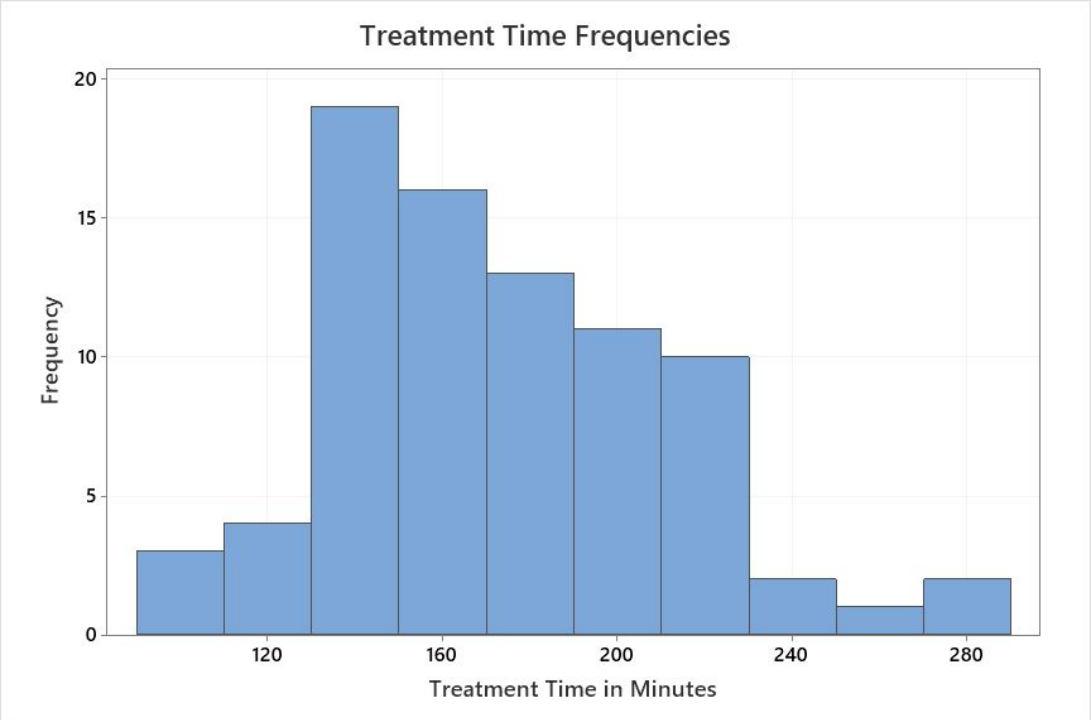
DEFINE



Critical to Quality shows priorities that need more attention to improve quality of care

DEFINE – Histogram

DEFINE



Created a histogram to show treatment time frequencies in New York State Emergency Room department

MEASURE

- **Descriptive statistics** - Summarized data to represent entire population to help analyze data easily and quickly
- **Capability analysis** - Helped assess if the system is able to meet requirement specifications
- **Hypothesis test** - Showed the distribution of data and helps assess the data to show any significant differences

MEASURE – Descriptive Statistics

MEASURE

Statistics

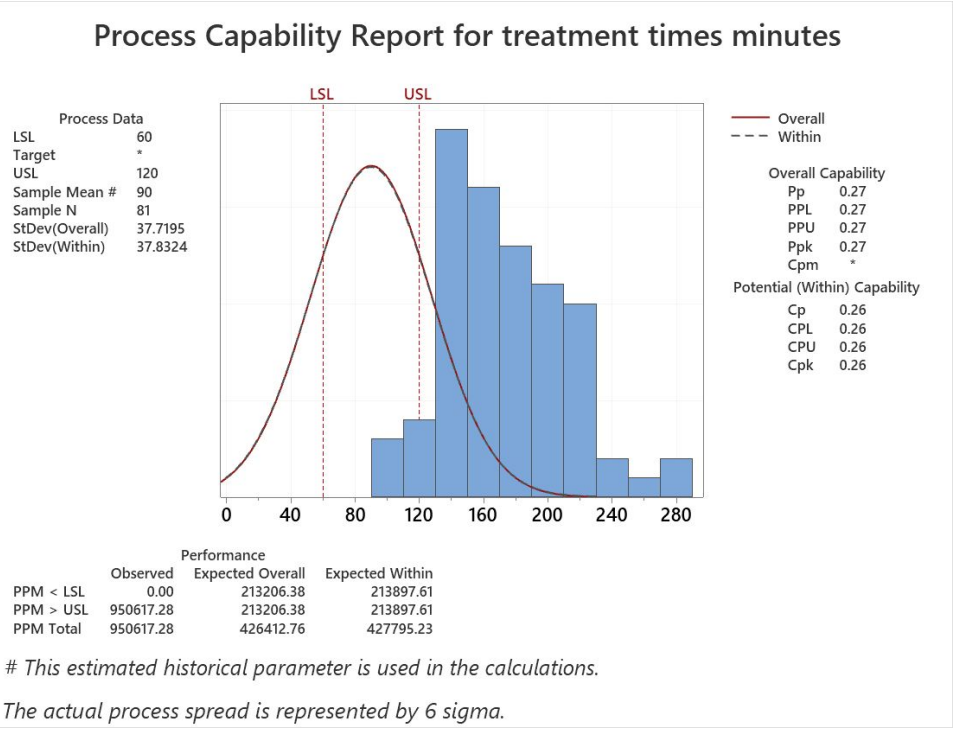
Variable	N	N*	Mean	SE Mean	StDev	Minimum	Q1	Median	Q3
treatment times minutes	81	0	174.06	4.19	37.72	104.00	146.50	169.00	202.00

Variable	Maximum
treatment times minutes	287.00

- Mean of data is 174.06 minutes
- Standard deviation is 37.72 minutes
- Minimum time of 104 minutes
- Median time of 169 minutes
- Maximum time of 287 minutes

MEASURE – Capability Analysis

MEASURE



- Value of Cpk and Cp is 0.26 which is low.
- Not capable nor centered.
- Lower specification limit is 60
- Upper specification limit is 120
- The graph is skewed to left

MEASURE – Hypothesis Test

MEASURE

Test

Null hypothesis	$H_0: \mu = 90$
Alternative hypothesis	$H_1: \mu \neq 90$

T-Value	P-Value
20.06	0.000

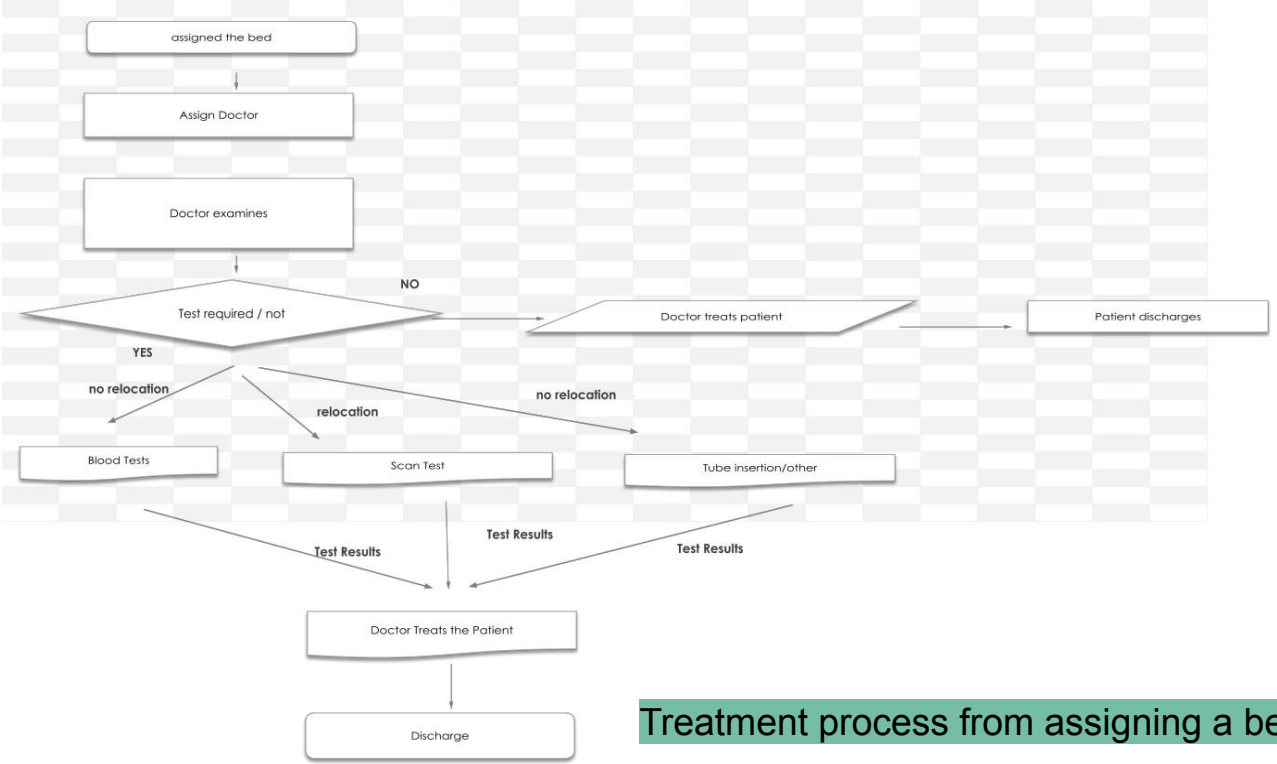
- Null is set to 90 because that is the accepted average treatment time
- T-value of 20.06 which compares the data of what is expected under the null hypothesis.
- P-value of 0.00
- Reject null hypothesis, in favor of the alternative

ANALYZE

- **Flow chart**- Graphical tool that depicts distinct steps of a process in sequential order
- **5 Why**- Fully understand the root cause of a problem so that solutions or improvements may be identified
- **Fishbone diagram**- Graphical method for hypothesizing a chain of causes and effects, sorting out potential causes, and organizing relationships between variables

ANALYZE – Flow chart

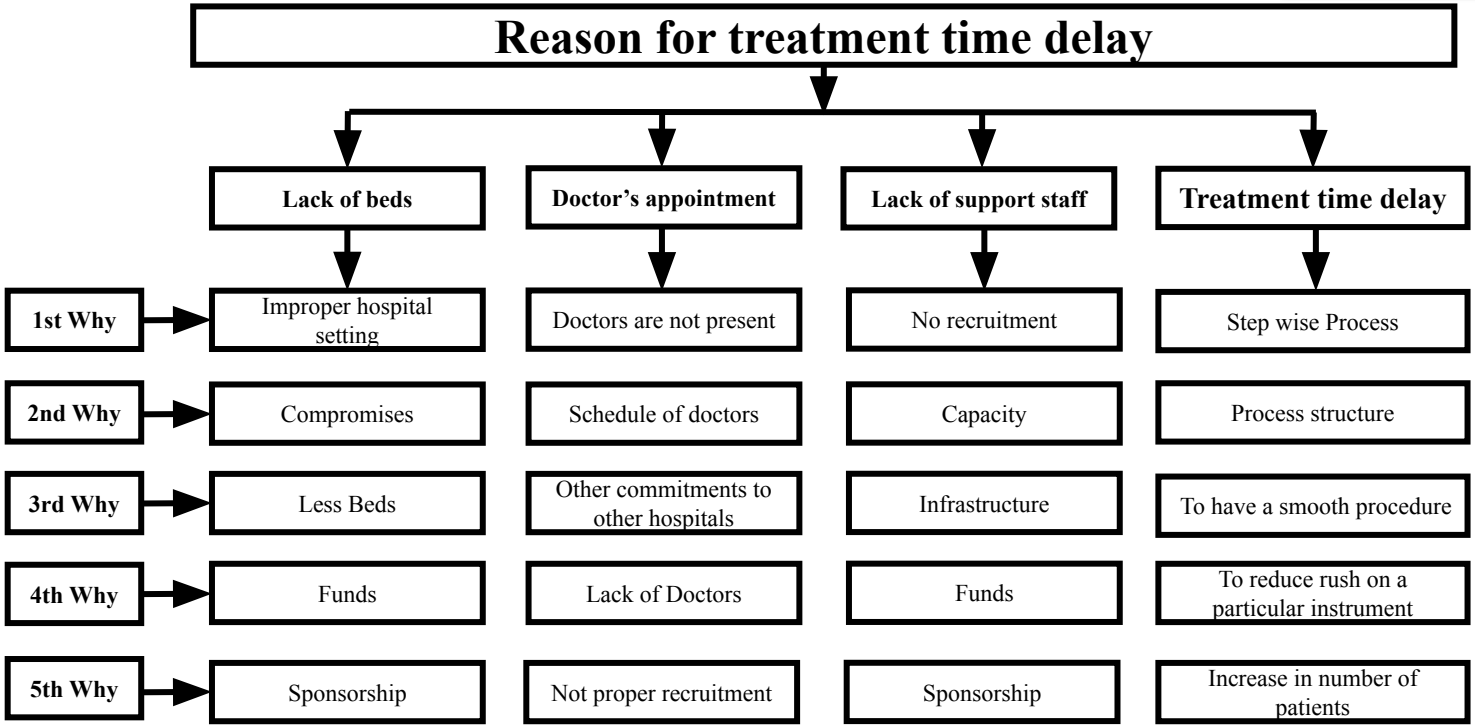
ANALYZE



Treatment process from assigning a bed to discharge

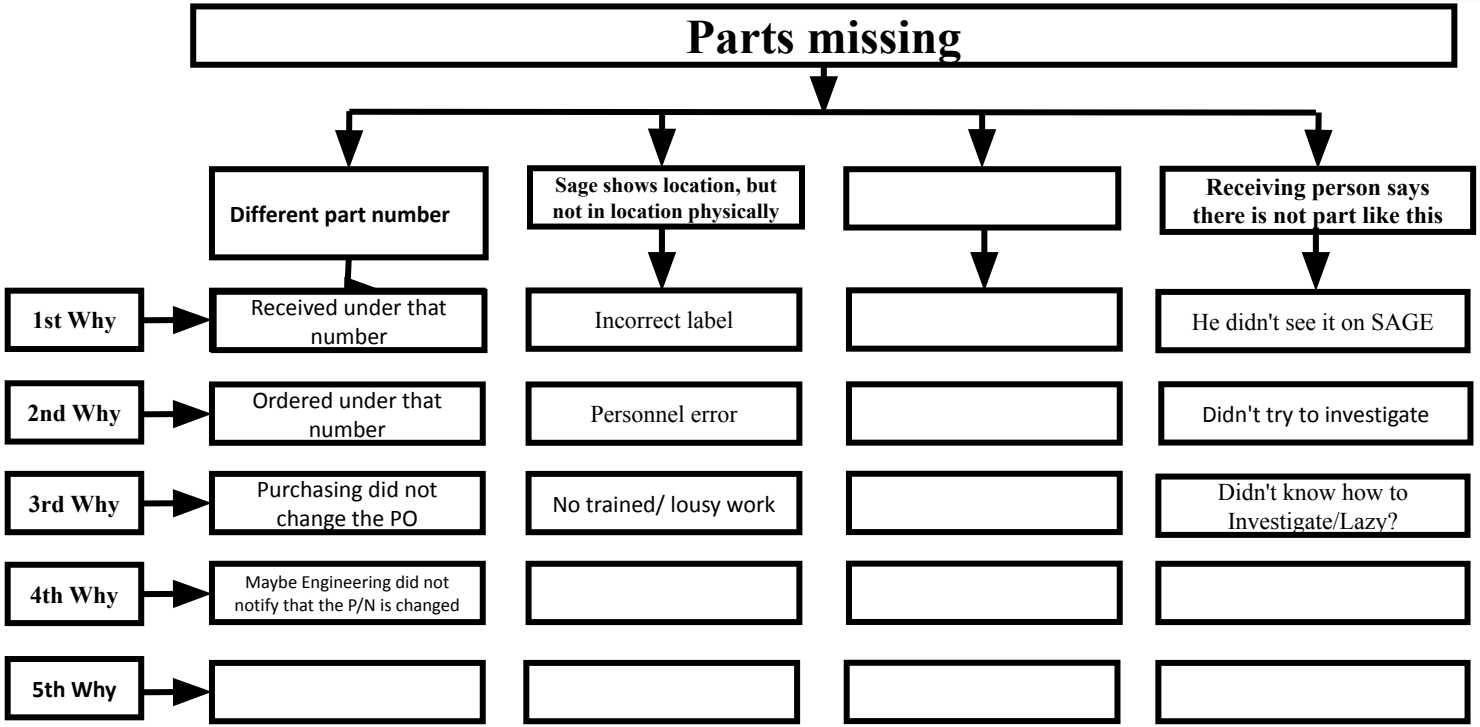
ANALYZE – 5 Whys

ANALYZE



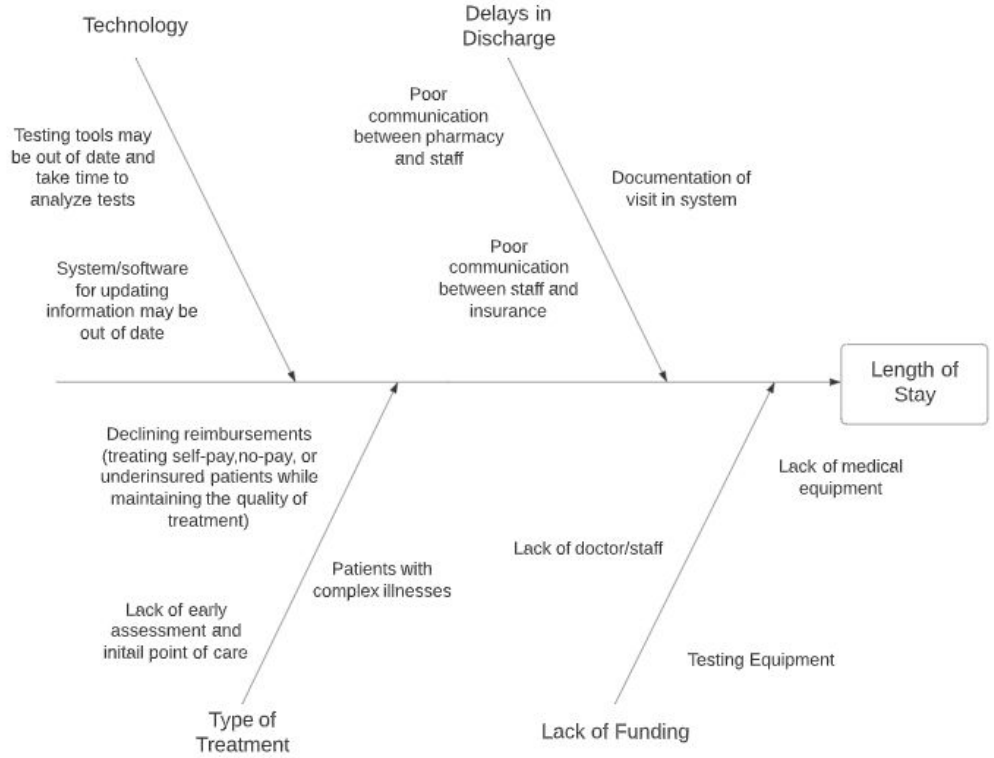
ANALYZE – 5 Whys

ANALYZE



ANALYZE – Fishbone

ANALYZE



Fishbone diagram shows the causes for the patient length of stay in the emergency room department

IMPROVE

- **Selection matrix** - Chart that helped identify, analyze, and rate the strength of each potential solution
- **5's** - Helped mapped out the workplace to make it clean, safe, and well organized to reduce waste and optimize productivity
- **Improved flow chart** - Helped visualize the steps of the process in sequential order

IMPROVE – Selection Matrix

IMPROVE

Solution Selection Matrix

Project Goal

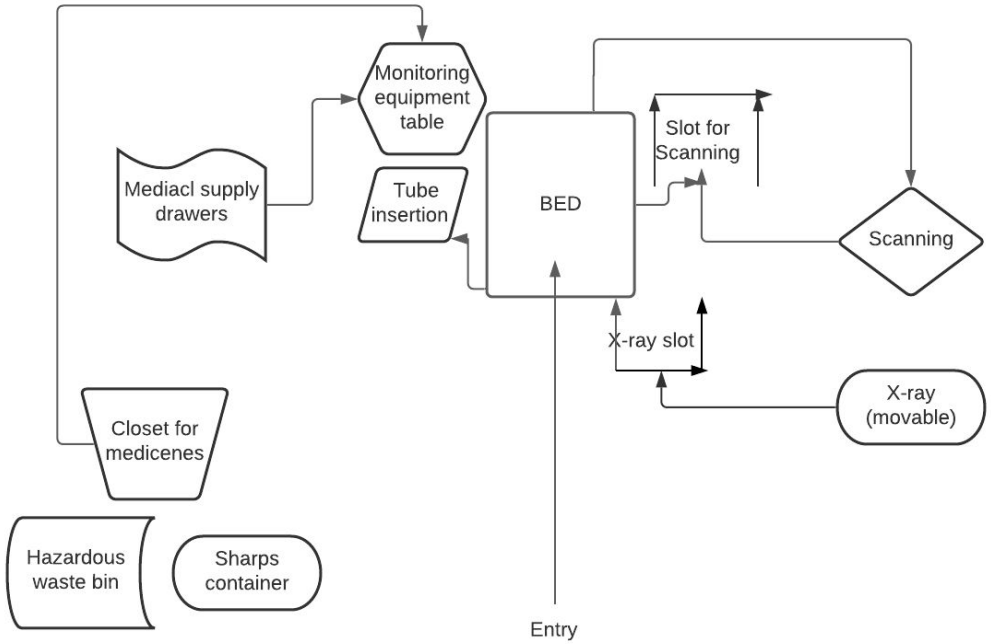
Enter Goal Statement below:
(As stated on Project Charter)

Please rank each solution for each criteria by using the 1-5 Scale as indicated below

	Very Low (less good)		Moderate		Very High (best)		
	1	2	3	4	5		
Potential Solution (Provide Brief Description)	**Potential to Meet Goal**	**Positive Customer Impact**	**Cost to Implement (1 = $$$ & 5 = $)**	**Stakeholder Buy-in**	**Time to Implement (1 = Long 5 = Quick)**	**Total Score**	**Implement? Yes/No**
Weighted Criteria	**10**	**9**	**8**	**7**	**5**		
Assemble a multi-functionality room(have all the required equipments)	5	4	2	3	3	*138*	Yes
Accurately staffing the ED (according to the rush at a time)	3	2	5	4	4	136	No
Upgrade and invest in advanced technology (high quality equipments)	4	3	3	3	4	132	No

IMPROVE – 5's

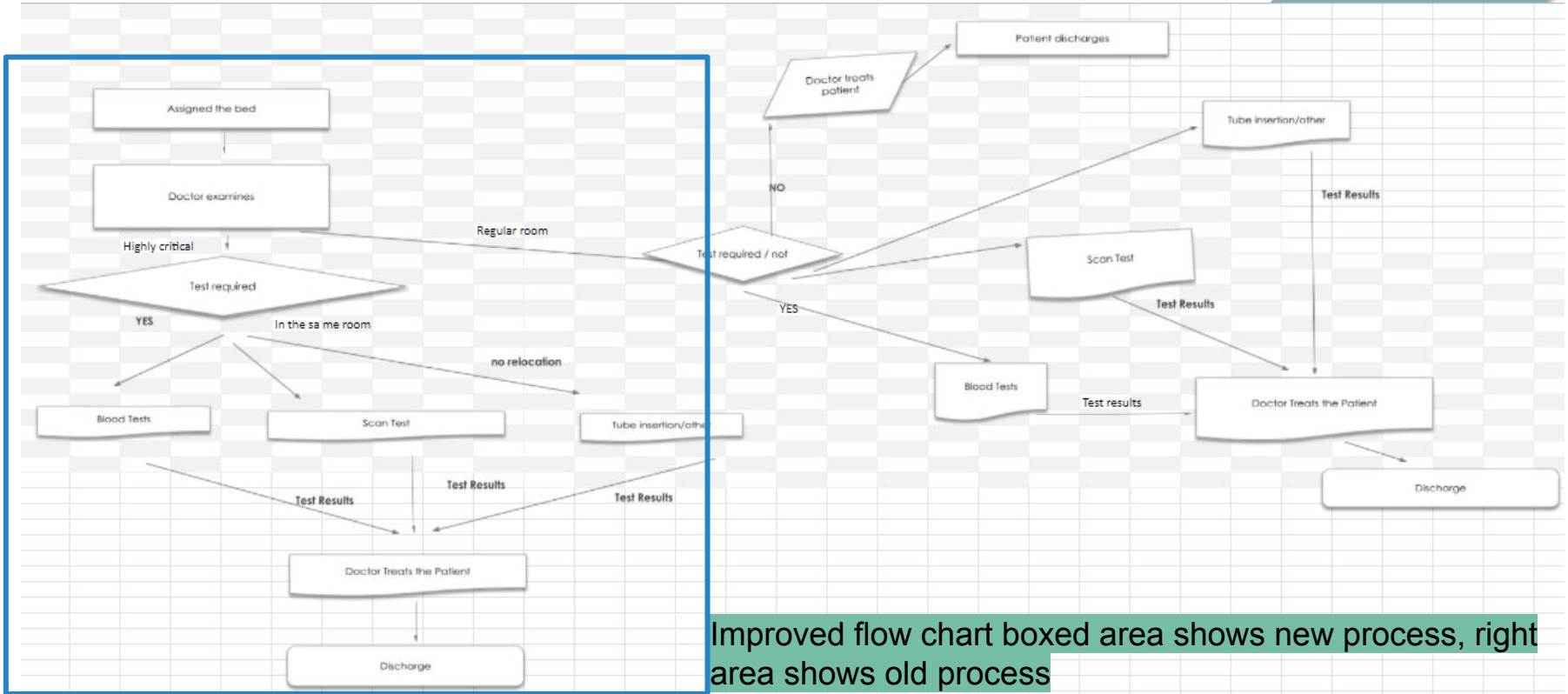
IMPROVE



Created a standard multifunctional room

IMPROVE – Improved Flow Chart

IMPROVE



Improved flow chart boxed area shows new process, right area shows old process

CONTROL

- **SOP** - Standard operating procedure helps describe the step-by-step process
- **Mistake proofing** - Helped make whoever is restocking or reorganizing the equipment avoid any possible mistakes and defects by preventing, correcting, and drawing attention to human errors as they occur
- **Checklist** - Helped ensure that all tools and equipment are back in designated spot

CONTROL – NEW SOP

CONTROL

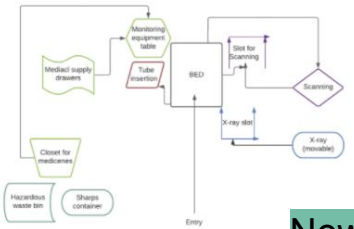
Standard Operating Process
Maintaining Material Equipment Room

Department: Emergency Room

Purpose:
To establish uniform guidelines for setting up the equipment room after each patient. All medical workers are required to follow this SOP.

Definitions:
MS: Medical Staff

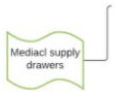
Procedure:
1. Dispose any waste materials into proper bins
    a. Infectious waste
    b. Hazardous waste
    c. General waste
2. Every equipment should be at it's allocated site if moved around. (color coded)



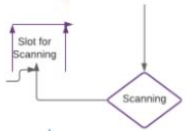
a. X-ray machine placed in the blue taped area

b. Hazardous waste bins in teal taped area

c. Medical supply placed back into drawers and closet located in green area



d. Scanning machine moved back into purple taped area

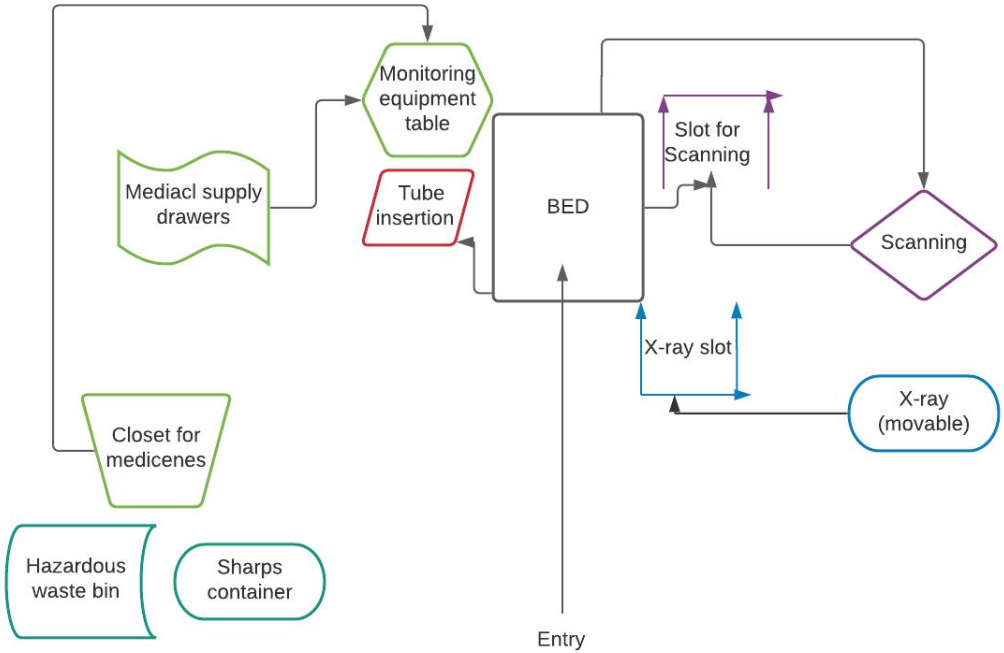


3. Organize and restock any used equipment (syringes, tongue depressors, vials)
4. Sanitize and wipe down surfaces that have been touched
5. Shutdown any equipment or tools
6. Sign book with timestamp to show room has been cleaned

New SOP was created for new material equipment room with instructions for placement of tools

CONTROL – Mistake Proofing

CONTROL



Standard multifunctional room with areas labeled and colored coded

CONTROL – Checklist

CONTROL

Multifunctional Room Check Sheet			
	Date / Time	Done / (Initials)	Supervisor check
X-ray machine in its place?			
Trash bin emptied?			
Hazardous waste bin emptied?			
Scanning machine reset and on its place?			
Medical drawers restocked according to the SOP?			
Monitoring equipment table organized according to SOP?			
Sharps bin emptied?			
Medicine closet checked and stocked? (SOP)			
Room cleaned and sanitized			

Questions

References

D'Angelo, J. (2020, September 28). *Five challenges facing emergency medicine*. Five challenges facing emergency medicine | Northwell Health. Retrieved November 22, 2021, from https://www.northwell.edu/news/five-challenges-facing-emergency-medicine.

Individual Hospital Statistics for New York. American Hospital Directory - Individual Hospital statistics for New York. (n.d.). Retrieved November 22, 2021, from https://www.ahd.com/states/hospital_NY.html.

https://www.northwell.edu/news/five-challenges-facing-emergency-medicine - Fishbone data reference