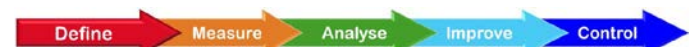


Transformation@ADHB: The Golden Hour

Ashvindev Singh

Quality Improvement Scientific
Symposium

10th October 2019



Adult Haematology patients

The Golden Hour a new pathway to treat Neutropenic

Sepsis

Remember the 4 critical steps

- 1 Patient identified as having a fever, had chemo OR presents with Alert Card
- 2 Take central and peripheral blood cultures
- 3 Use Tazocin standing order
- 4 Patient receives appropriate and timely care

Launch date
1 May 2019

60

60 mins from door to antibiotics
Remember, it's about *timing*

There is a new nurse-led pathway to ensure Adult Haematology Neutropenic Sepsis patients receive the appropriate antibiotic within 60 minutes of arrival. This will be available across AED/CDU/SSIP at the current stage.

Visit HIPPO, under Haematology to find out more.



Welcome Haere Mai | Respect Manaaki | Together Tūhono | Aim High Angamua



AUCKLAND
HEALTH BOARD
Te Toka Tūmahi

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Te Toka Tūmahi

Problem Statement:

Patients with haematological cancer are at risk of developing chemotherapy-related neutropenic sepsis and may not be receiving appropriate empiric antibiotic treatment within an acceptable time frame after admission to Auckland Hospital.

Accepted target = within sixty minutes of recognition of sepsis.



Goal:

At least 70% of all haematology related neutropenia admissions to receive antibiotics within sixty minutes of admission

Why are we doing this?

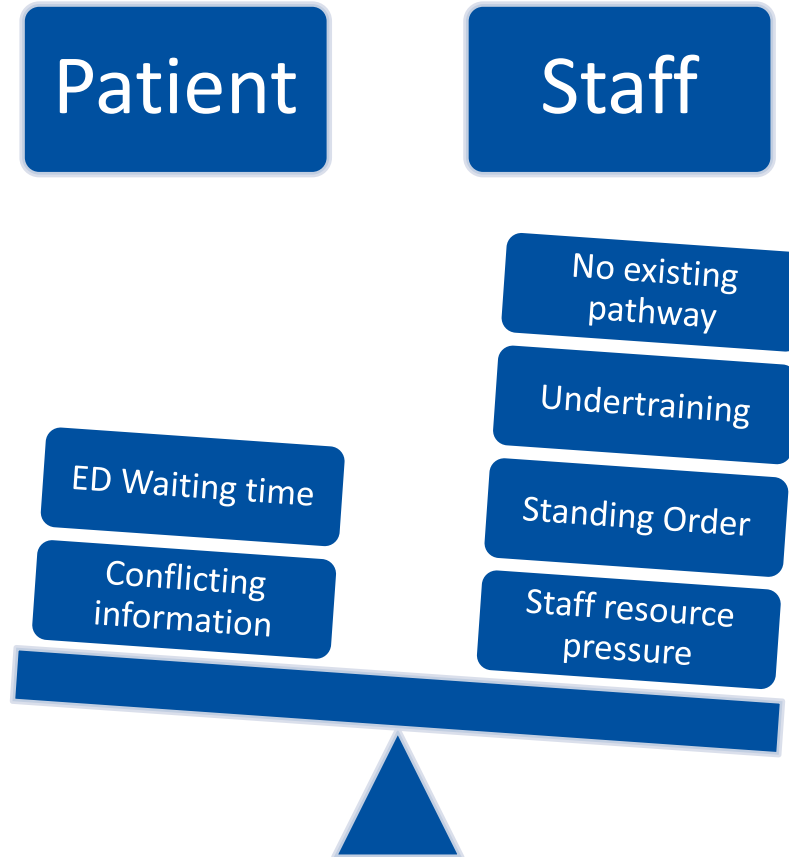


Voice of the Customer



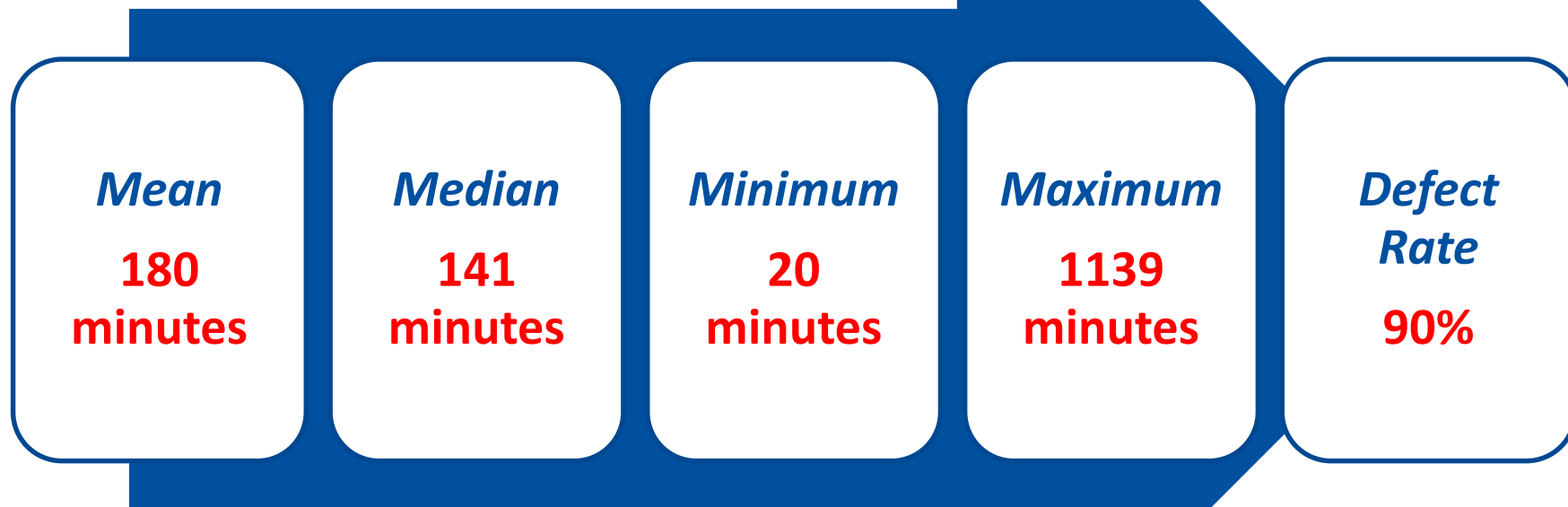
Patient

Staff



Baseline Scorecard

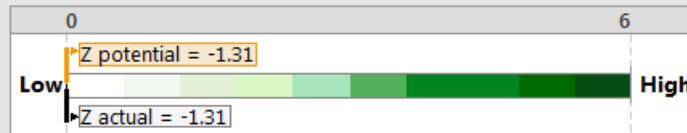
Goal: 60 Minutes



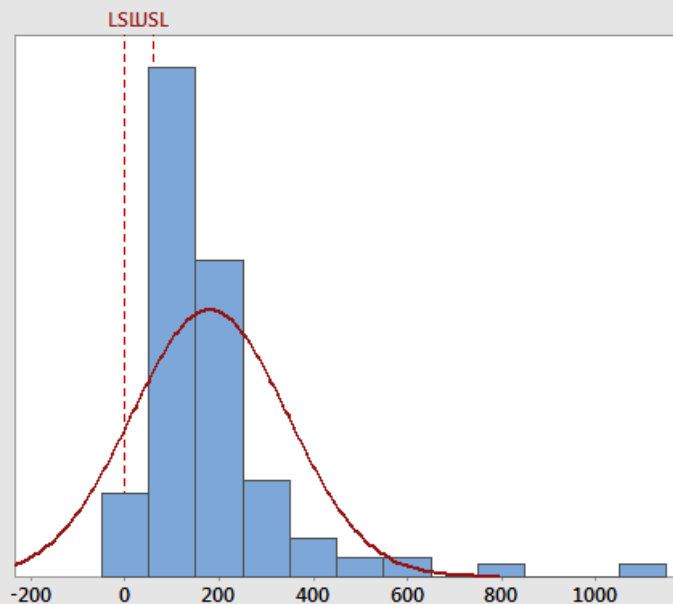
Baseline Performance

Capability Analysis for Time to Antibiotics (minutes) Summary Report

How capable is the process?



Actual (Overall) Capability
Are the data inside the limits?



Customer Requirements

Upper spec	60
Target	*
Lower spec	0

Process Characterization

Mean	179.74
Standard deviation (overall)	165.91
Actual (overall) capability	
Pp	0.06
Ppk	-0.24
Z.Bench	-1.31
% Out of spec	90.41
PPM (DPMO)	904090

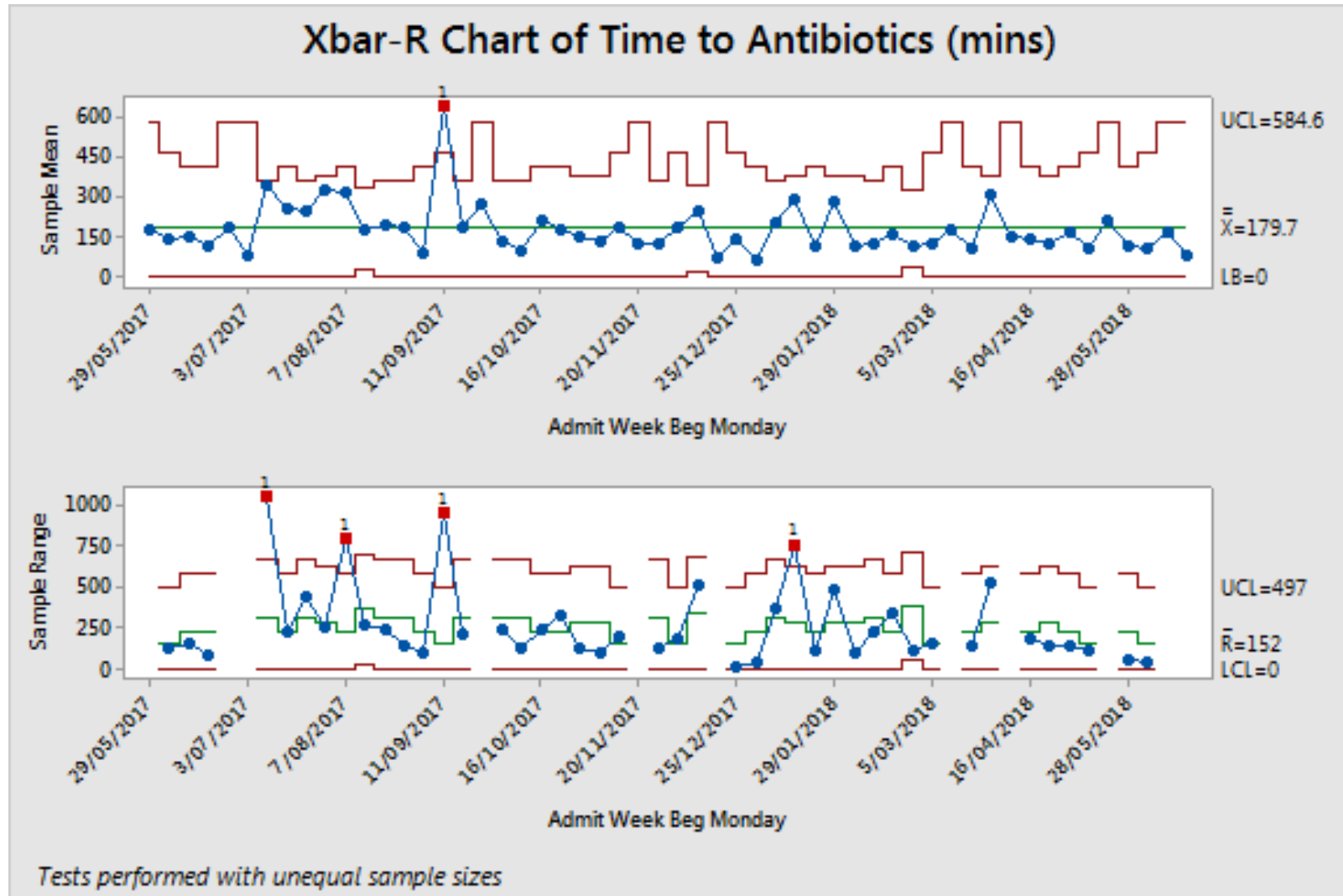
Comments

- The defect rate is 90.41%, which estimates the percentage of parts from the process that are outside the spec limits.

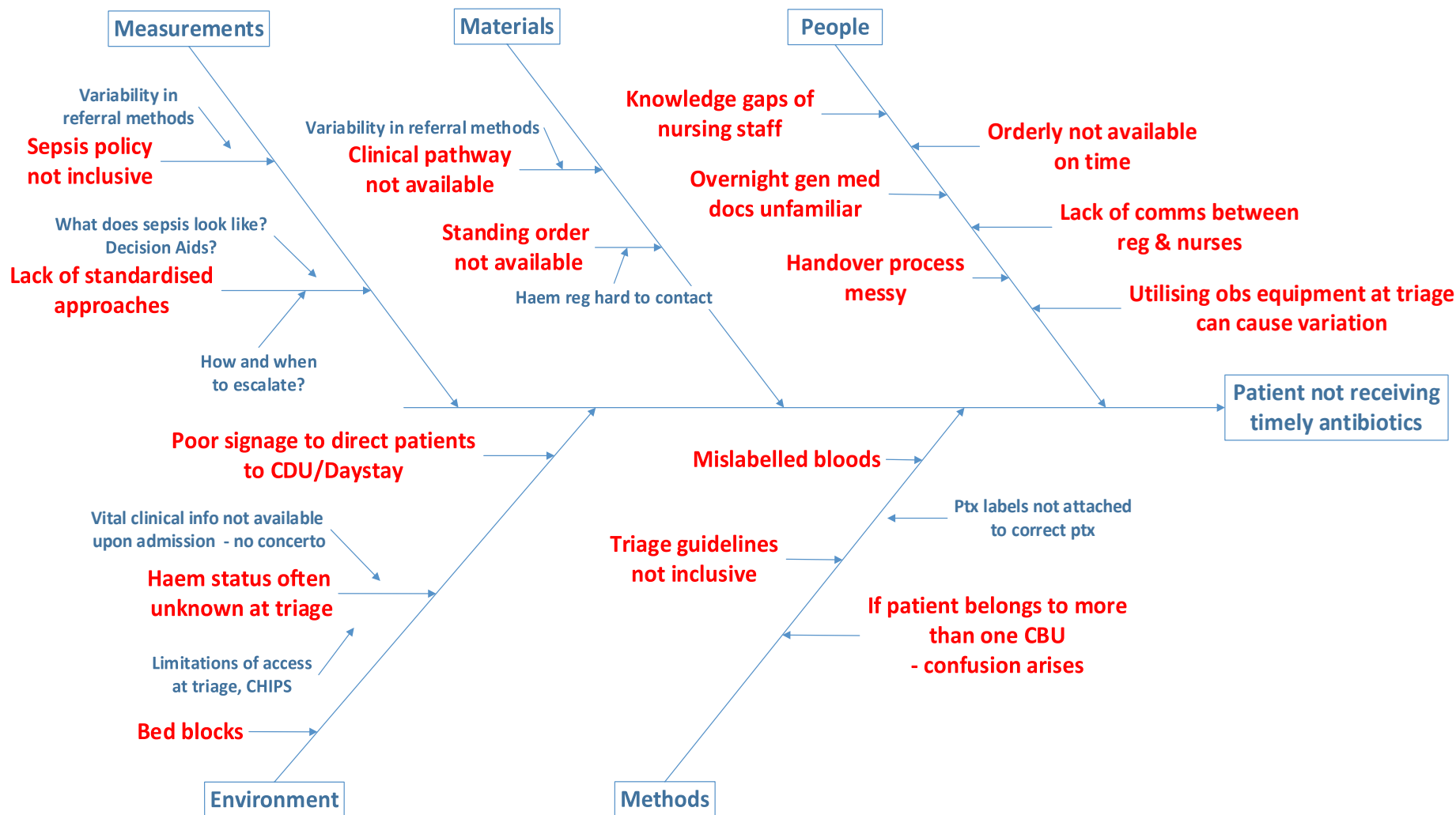
Actual (overall) capability is what the customer experiences.

Potential (within) capability is what could be achieved if process shifts and drifts were eliminated.

Baseline Performance



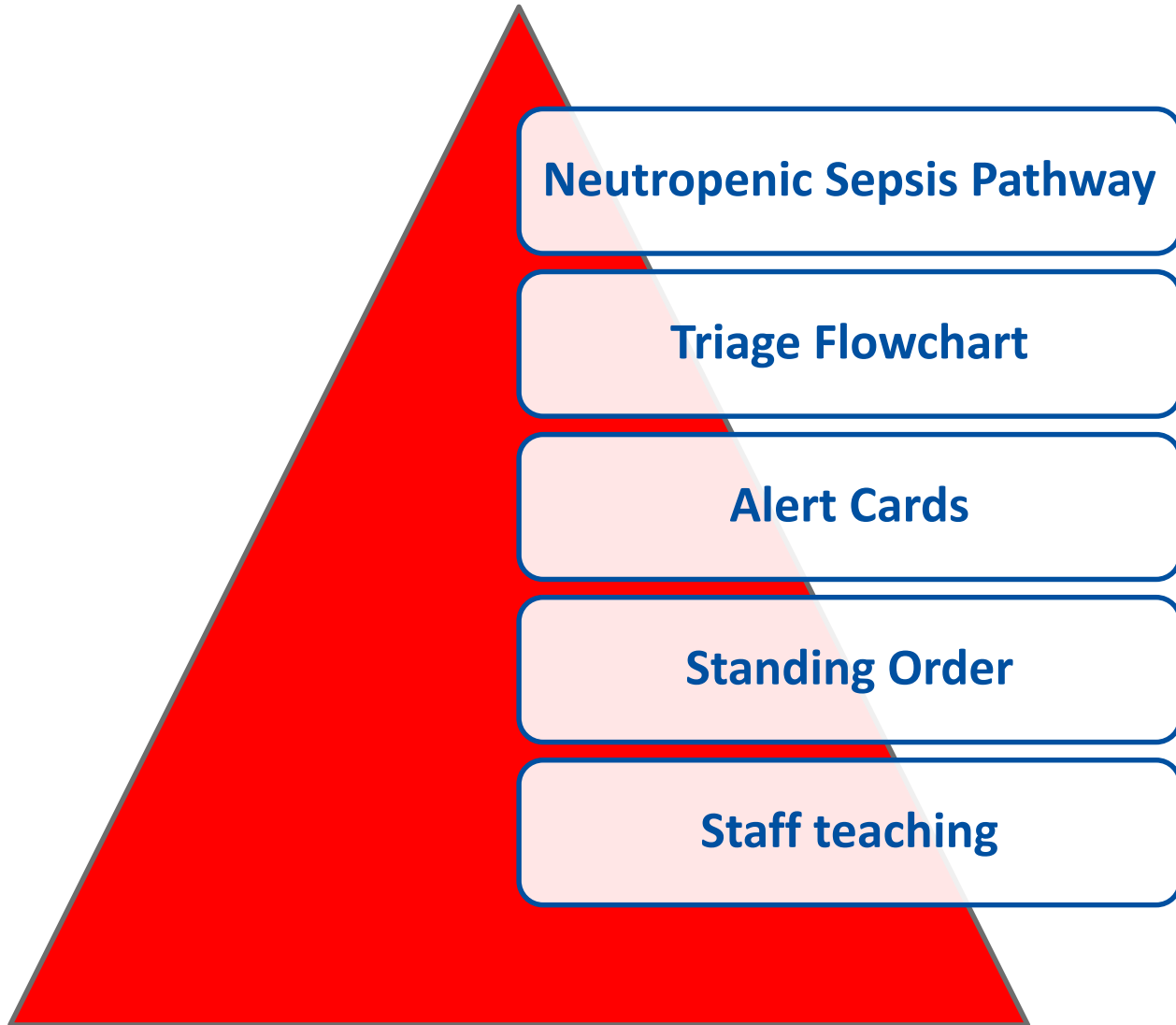
Generating Potential Root causes



Confirming Root Causes

<i>Rating of importance to customer</i>		9	9	8	7	6	
<i>Item Number</i>		1	2	3	4	5	
<i>Process Outputs</i>		<i>Patient seen quickly</i>	<i>Abx at PoC</i>	<i>Nurse skill mix</i>	<i>Haem reg avail</i>	<i>Patient ownership</i>	
<i>Process Inputs</i>							<i>Total</i>
1	Clinical pathway availability	9	9	9	9	0	297
2	Neutropenic sepsis policy updated	9	0	9	0	0	153
3	Standing order availability	2	9	9	0	0	171
4	Handover communications	9	0	0	9	0	144
5	Calls to RMO being answered	9	0	0	9	0	144
6	Orderly available to take patients	9	0	0	0	9	144
7	Comms between reg & Nurse	9	0	9	9		216
8	Nursing staff knowledge about providing care to haem patients	9	9	9	9	9	286
9	Patient label accuracy	0	0	9	0	9	126
10	Better information @ Triage	9	0	0	0	9	135
11	Bed availability	0	0	0	0	0	0
12	Patient education at discharge /last chemo/discharge pack	0	0	0	0	9	54

Selected solution(s)



Adult Haematology Neutropenic Sepsis RN Pathway

Patient Label

NEUTROPENIC SEPSIS IS A MEDICAL EMERGENCY

1. Does your Haematology patient have a known or suspected Infection?

Does your patient have the following risk factors?

- History of fever or rigors
- Neutropenia or recent chemotherapy (< 4 weeks)
- Haematology Chemotherapy Alert card



2. Triage as per the AUSTRALASIAN TRIAGE SCALE: DESCRIPTORS FOR CATAGORIES 2016

Triage 2: "Suspected sepsis (Physiologically unstable) OR Febrile Neutropenia"

Triage RN does not need to phone the specialty team as the CBU will be Haematology

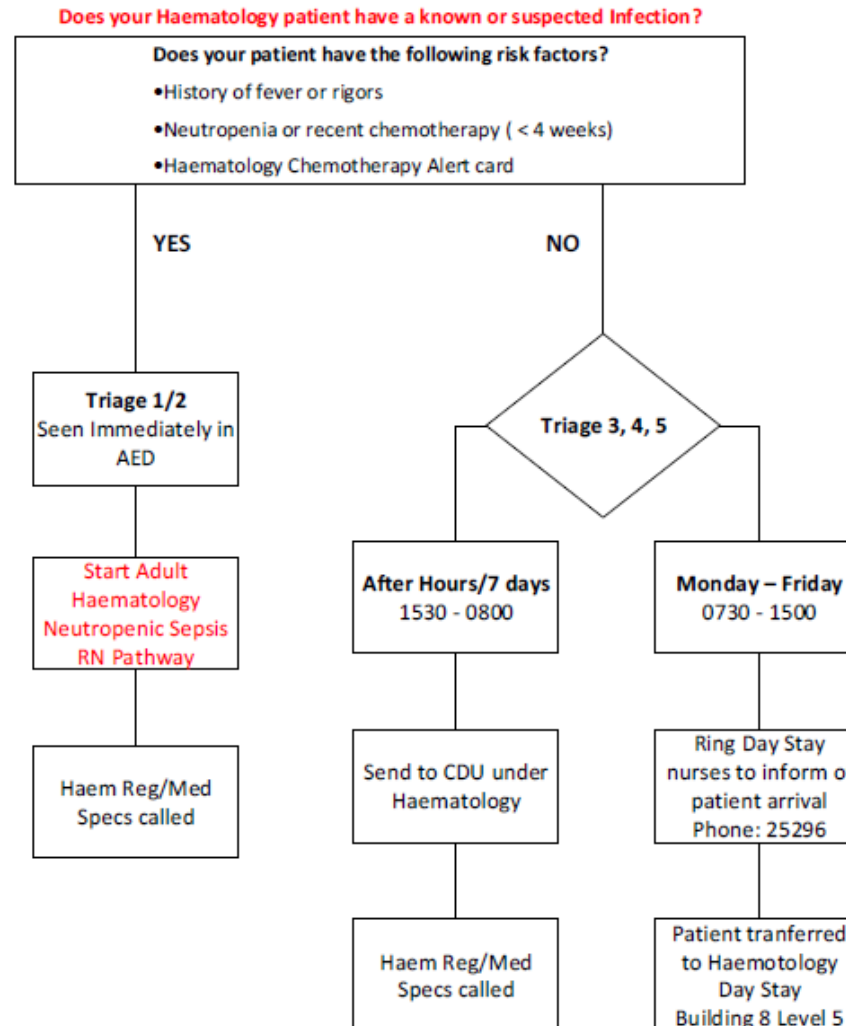
Clerical team to contact team on patient arrival (0800 - 2200 Haematology/2200 - 0800 Med Specs)



3. To be placed (as per AED/ CDU house rules) in a single room or isolated from other patients
4. Nursing assessment started AND concerns escalated to Clinical Charge Nurse
5. Venous access and bloods
 - a. Blood cultures: Peripheral and central cultures (all lumens) are essential. However if RN is unable to access central line, then a peripheral culture is acceptable. Accessing specialist central catheters/ports should not delay administration of antibiotics. Please document if not done so specialist team can do ASAP.
 - b. Routine bloods: FBC, U+E, LFT, Coag Screen and VBG (for lactate and pH)
6. Start antibiotics ASAP – Standing order antibiotics should be administered and documented

Triage Flowchart

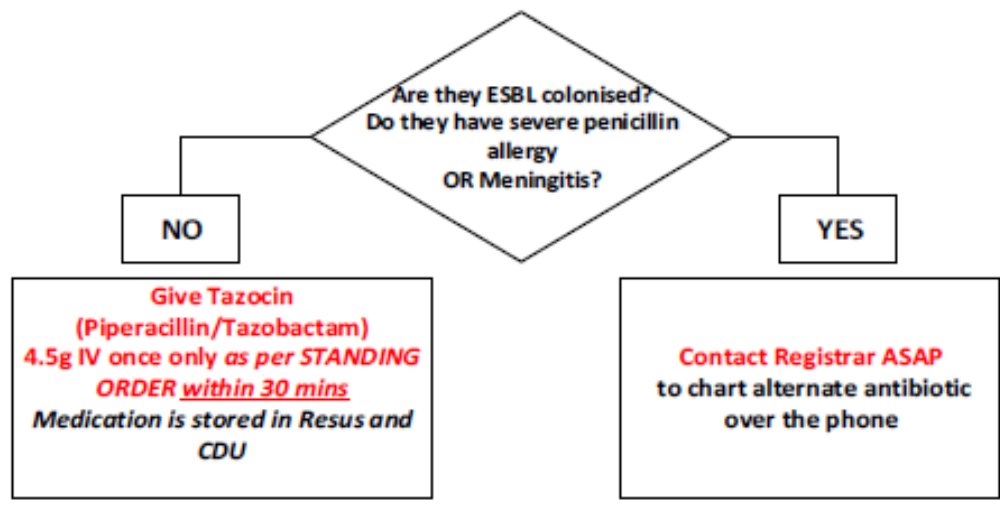
HAEMATOLOGY PATIENT PRESENTATION TO TRIAGE



Standing Order

HAEMATOLOGY Suspected Febrile Neutropenia Standing Order Sticker					Given by
Date	Medicine Piperacillin + Tazobactam	Route IV	Initiator's signature	Time given	
Dose 4.5 g	Special Instructions First dose ideally given within 30 minutes of arrival Only the first dose can be given via Standing Order		Prescriber's signature	Date & Time	

STANDING ORDER



Medication administration guidelines & standing order document are available on the Pharmacy intranet site

Alert Cards

IMPORTANT



ED Staff & Primary Care

This patient is at risk of Neutropenic Sepsis, which is a **Medical Emergency**.

Refer to your Adult Haematology
Neutropenic RN Pathway
to treat immediately.

Admit under Haematology.

Haematology Chemotherapy ALERT CARD

Name:

NHI:

Chemotherapy Regime:

Chemotherapy Issue Date:

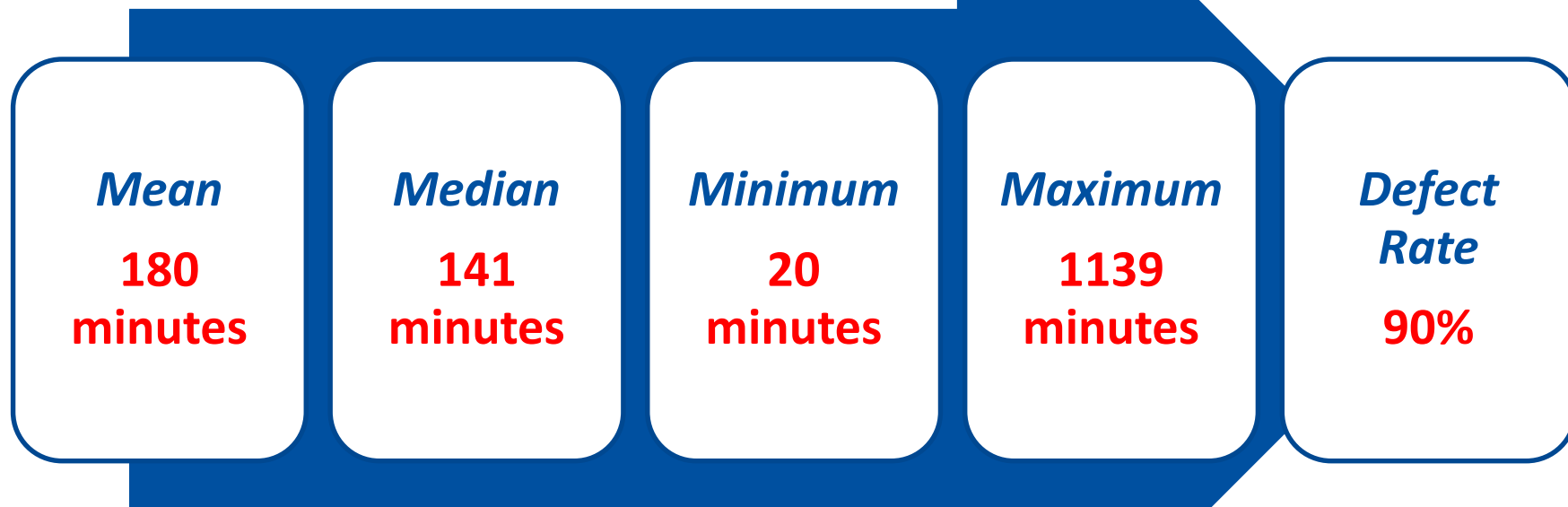
Chemotherapy Finish Date:

8AM - 4:30PM Phone: 09 307 2829

AFTER HOURS Phone: 09 307 4949 EXT: 21800

Baseline Scorecard

Goal: 60 Minutes



Pilot Results

Goal: 60 Minutes

Mean

55 minutes

Median

50 minutes

Minimum

30 minutes

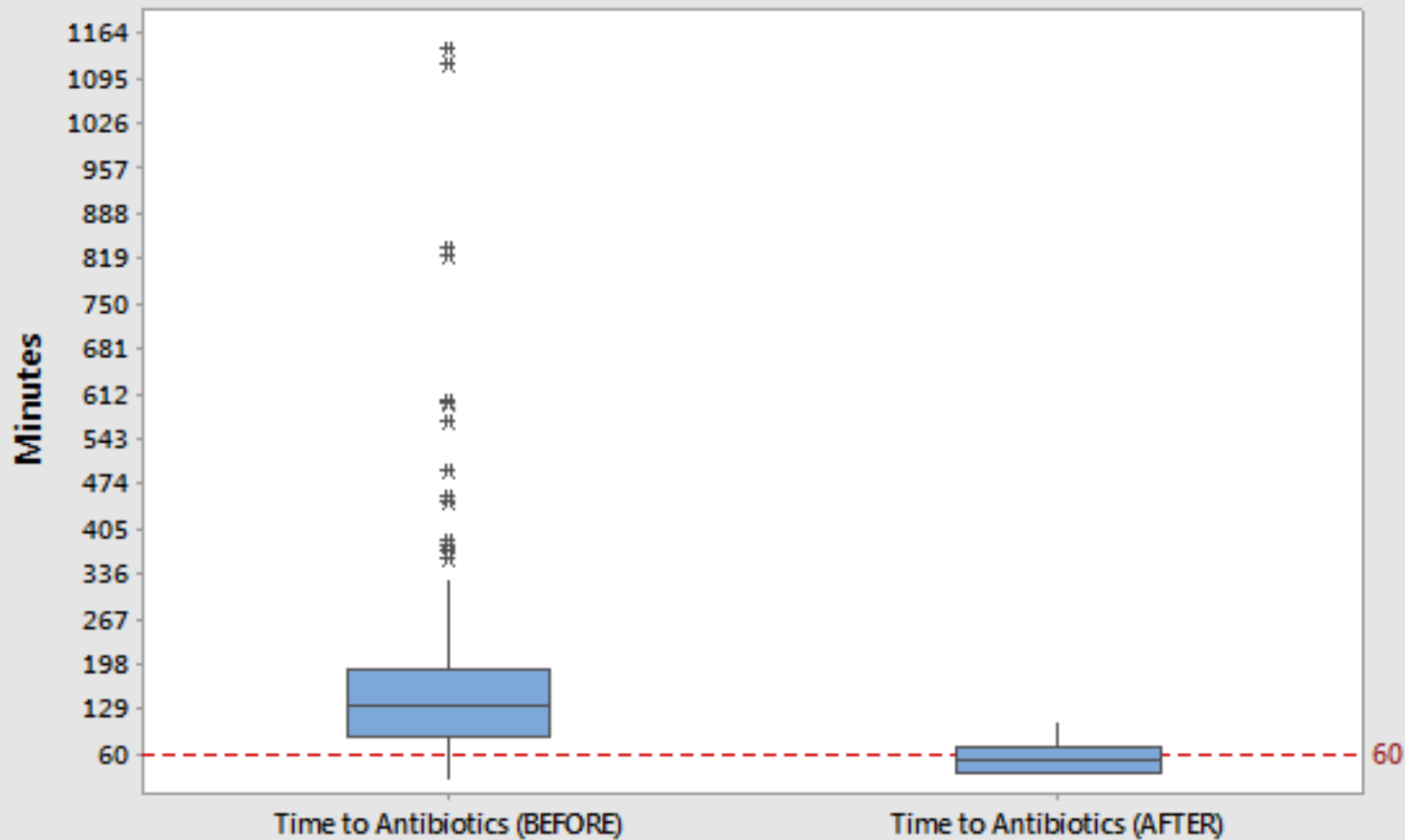
Maximum

109 minutes

**3-fold improvement of time to
antibiotics**

Improvement

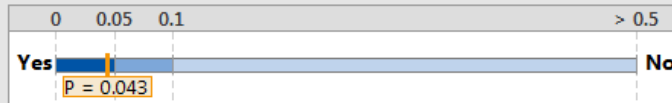
Boxplot of Time to Antibiotics (BEFORE), Time to Antibiotics (AFTER)



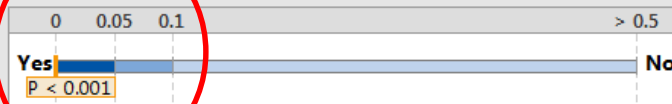
Improvement

Before/After I-MR Chart of Time to Antibiotics (minutes) by Before/After Summary Report

Was the process standard deviation reduced?



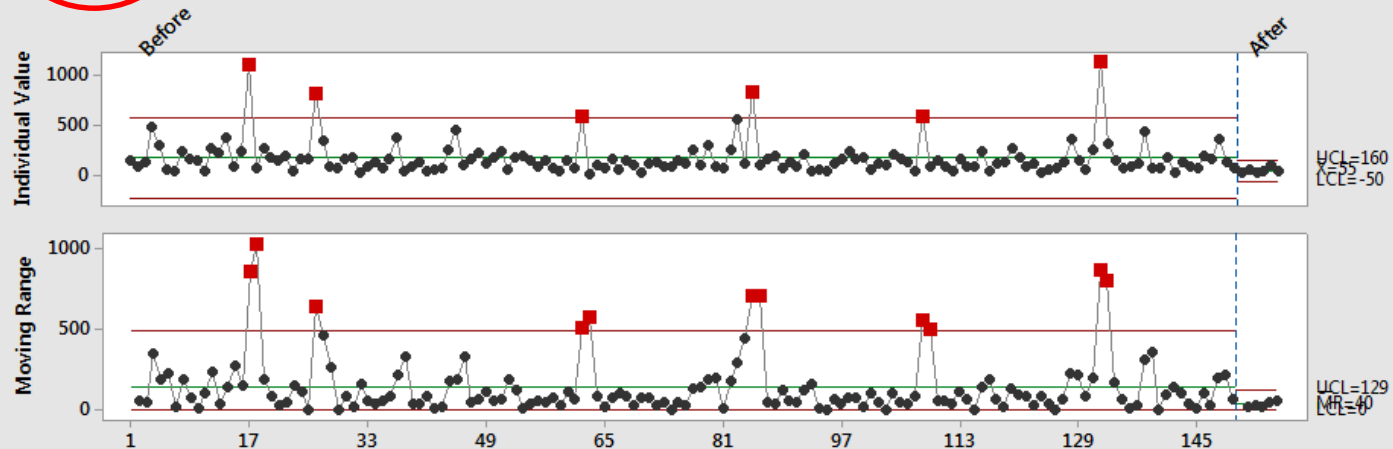
Did the process mean change?



Comments

After a process change, you may want to test whether the standard deviation or mean changed:

- The standard deviation was reduced by 73.6% ($p < 0.05$).
 - The mean is significantly lower ($p < 0.05$). Make sure the direction of the shift is an improvement.
- Consider whether these changes have practical implications.



Stage	N	Mean	StDev(Within)	StDev(Overall)	
Before	150	181.55	132.90	173.17	Control limits use StDev(Within)
After	6	55.167	35.106	28.778	

4 months later

Goal: 60 Minutes

Mean

65 minutes

Median

54 minutes

Minimum

36 minutes

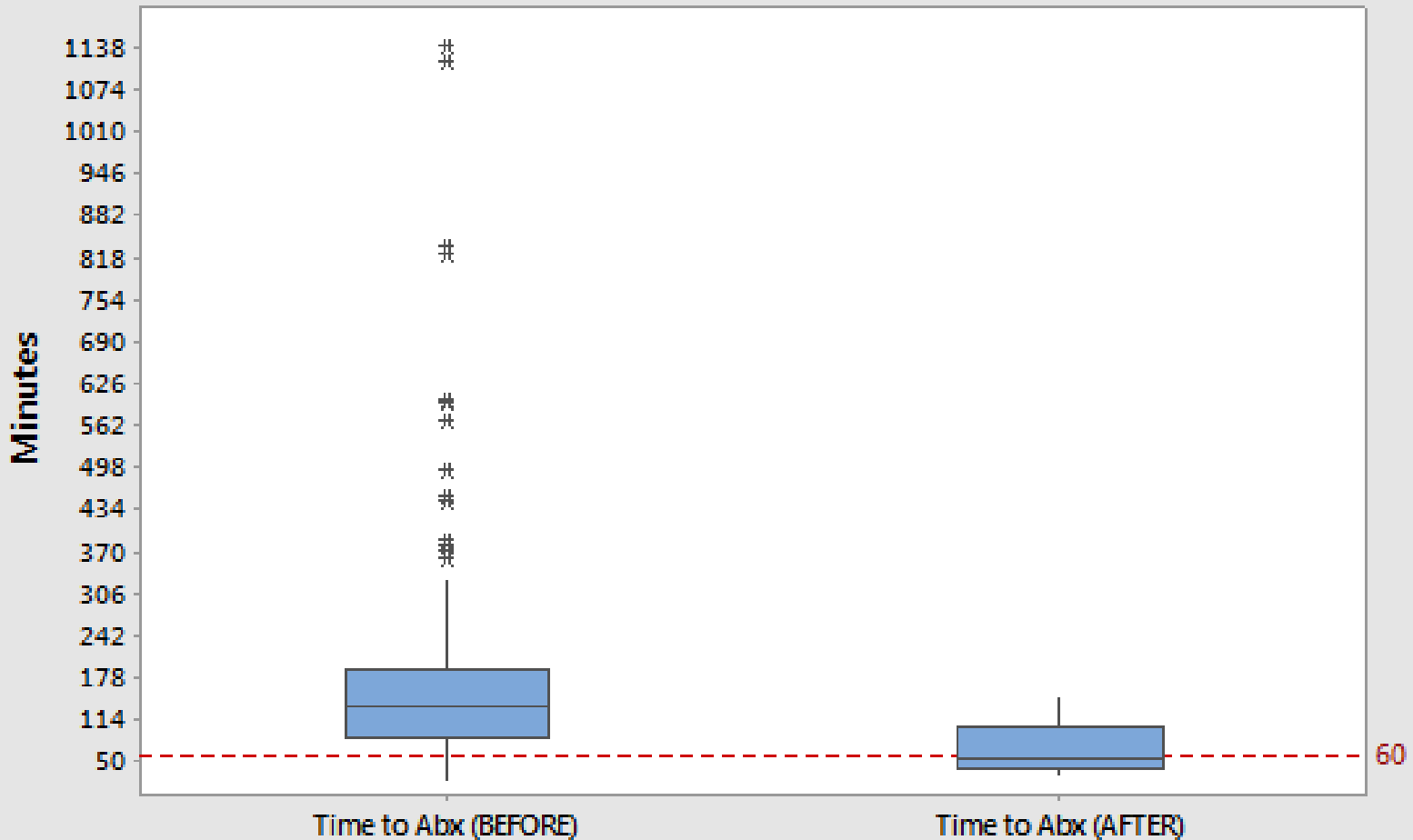
Maximum

151 minutes

Still maintaining an almost 3-fold improvement of time to antibiotics

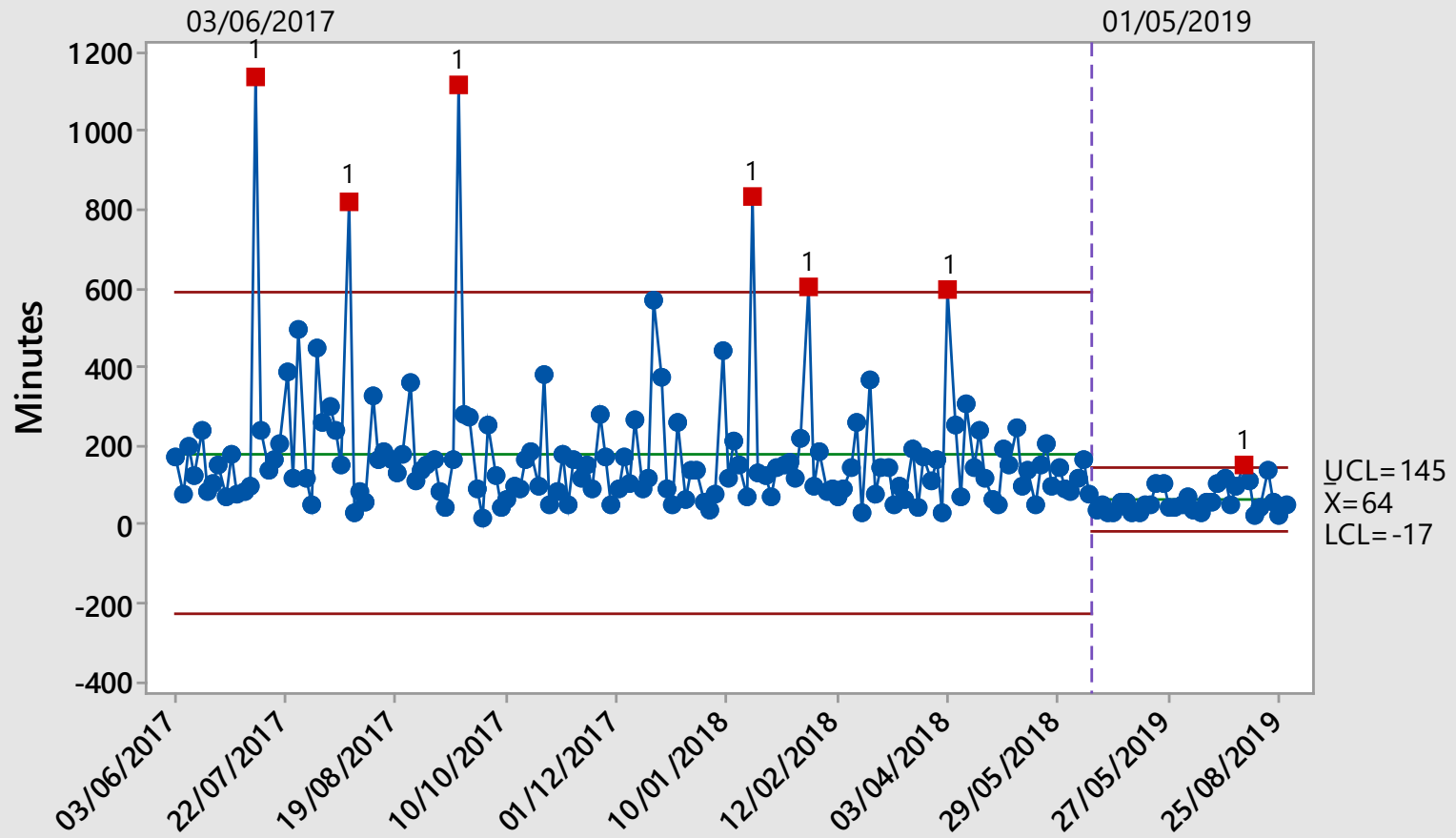
4 months later

Boxplot of Time to Antibiotics (BEFORE), Time to Antibiotics (AFTER)



Control Chart

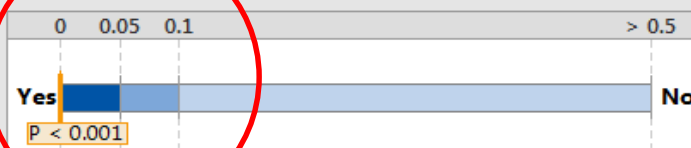
Time to Antibiotics (Pre & Post Implementation)



Hypothesis Test

2-Sample t Test for the Mean of Pre & Post Implementation Summary Report

Do the means differ?

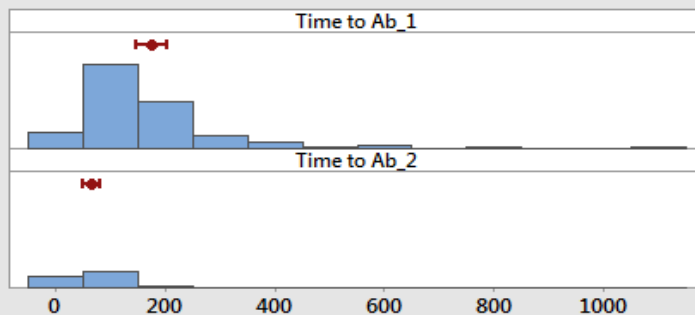


The mean of Time to Ab_1 is significantly different from the mean of Time to Ab_2 ($p < 0.05$).

95% CI for the Difference
Is the entire interval above or below zero?



Distribution of Data
Compare the data and means of the samples.



Individual Samples

Statistics	Time to Ab_1	Time to Ab_2
Sample size	156	26
Mean	176.69	66.577
95% CI	(149.6, 203.8)	(51.944, 81.210)
Standard deviation	171.61	36.228

Difference Between Samples

Statistics	*Difference
Difference	110.12
95% CI	(79.584, 140.65)

*Difference = Time to Ab_1 - Time to Ab_2

Comments

- Test: You can conclude that the means differ at the 0.05 level of significance.
- CI: Quantifies the uncertainty associated with estimating the difference in means from sample data. You can be 95% confident that the true difference is between 79.584 and 140.65.
- Distribution of Data: Compare the location and means of samples. Look for unusual data before interpreting the results of the test.

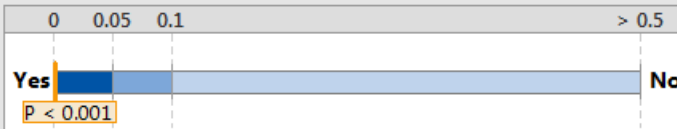
Hypothesis Test

Before/After Capability Comparison for Time to Antibiotics (BEFORE) vs Time to Antibiotics (AFTER) Summary Report

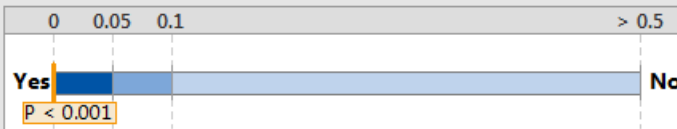


Reduction in % Out of Spec
% Out of spec was reduced by 44% from 86.19% to 47.96%.

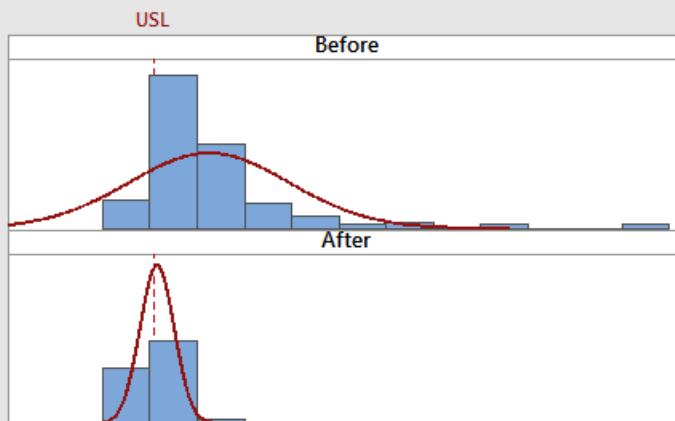
Was the process standard deviation reduced?



Did the process mean change?



Actual (Overall) Capability
Are the data below the limit?



Lower Spec	Customer Requirements Target	Upper Spec
*	*	60

Process Characterization

Statistics	Before	After	Change
Mean	176.69	66.577	-110.12
StDev(overall)	171.61	36.228	-135.38
Actual (overall) capability			
Pp	*	*	*
Ppk	-0.36	0.02	0.38
Z.Bench	-1.09	0.05	1.14
% Out of spec	86.19	47.96	-38.24
PPM (DPMO)	861929	479577	-382351

Comments

Before: Time to Antibiotics Pre After: Time to Antibiotics Post

- The process standard deviation was reduced significantly ($p < 0.05$).
- The process mean changed significantly ($p < 0.05$).

Actual (overall) capability is what the customer experiences.

Potential (within) capability is what could be achieved if process shifts and drifts were eliminated.

Clinical Benefit



Patient & Staff Benefit

Each increase of 1 h in the TTA raised the risk of mortality within 28 days by 18%

Evidence of reduced LOS – on average 8 days vs. 13 days



1. Reducing time in AED
2. Reduced admission to ICU

Back to their loved ones quicker

Future Service Transformation

Patient Alert Cards

• **Completed**

On-going training and education sessions

• **Every 6 months**

Investigating clinical benefits

• **Under review**

Ward Triage & Referral Processes

• **3-6 months**

Acute Cancer & Blood mobile team

• **24 months**

Lessons learned

- **Teamwork is critical to achieving success**
- **Transformative change is *disruptive*.**
- **All assumptions need to be verified**
- **Relationships are crucial**
- **Try to avoid 'inertia' by data**