Clinical Safety & Effectiveness
Cohort 16 Team # 7

Reducing time from CT simulation to IMRT plan approval in Radiotherapy

CENTER FOR PATIENT SAFETY & HEALTH POLICY

UT HEALTH SCIENCE CENTER™

SAN ANTONIO

The Team

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- Sponsor Department:
  - Dr Chul Ha, Chair, Radiation Oncology, UTHSCSA
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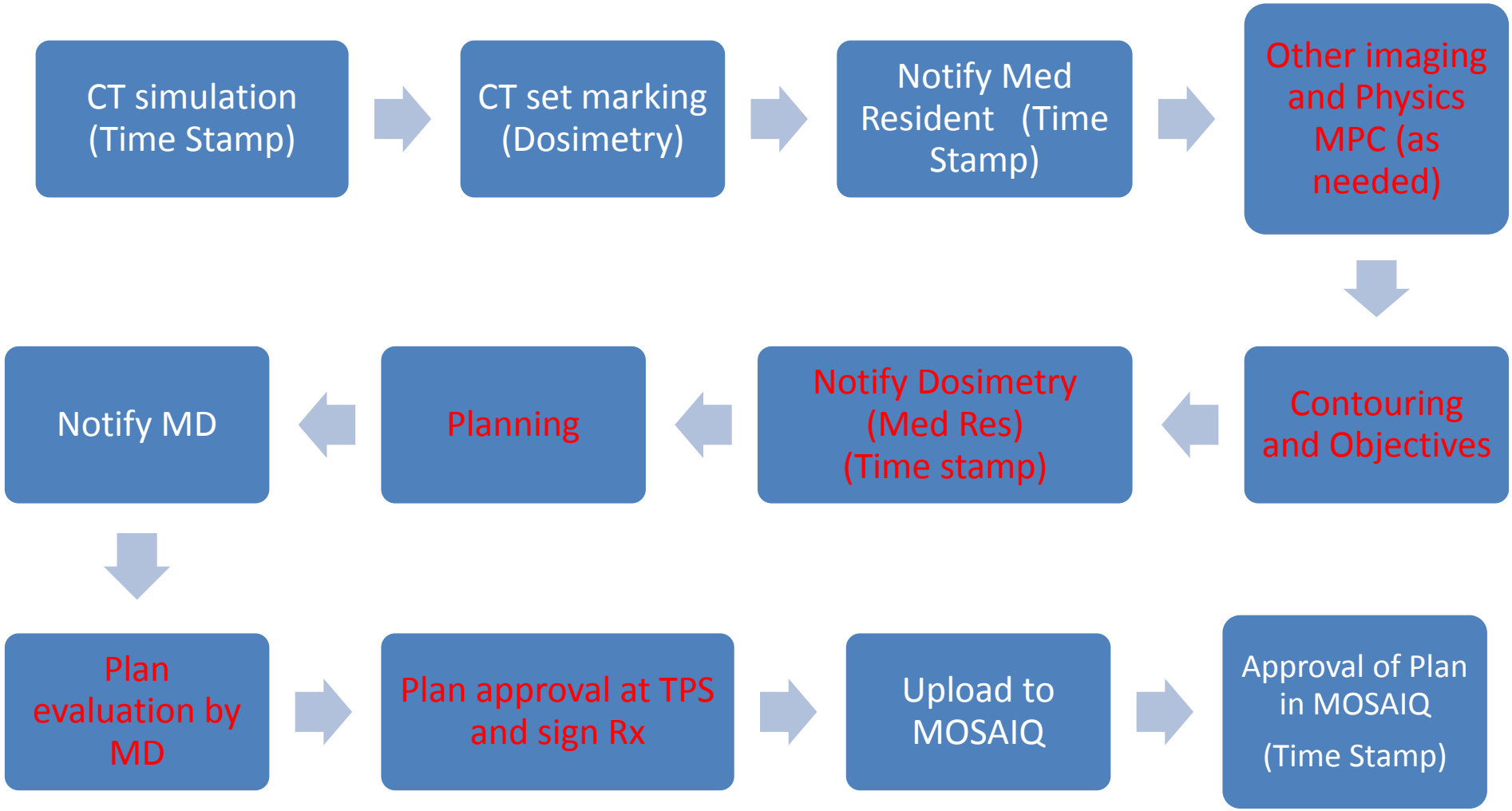
Project Milestones

• Team Created	Jan 2015
• AIM statement created	Jan 2015
• Weekly Team Meetings	Feb 2015
• Background Data, Brainstorm Sessions, Workflow and Fishbone Analyses	Feb 2015
• Interventions Implemented	April 2015
• Data Analysis	April-May
• CS&E Presentation	Graduation Date

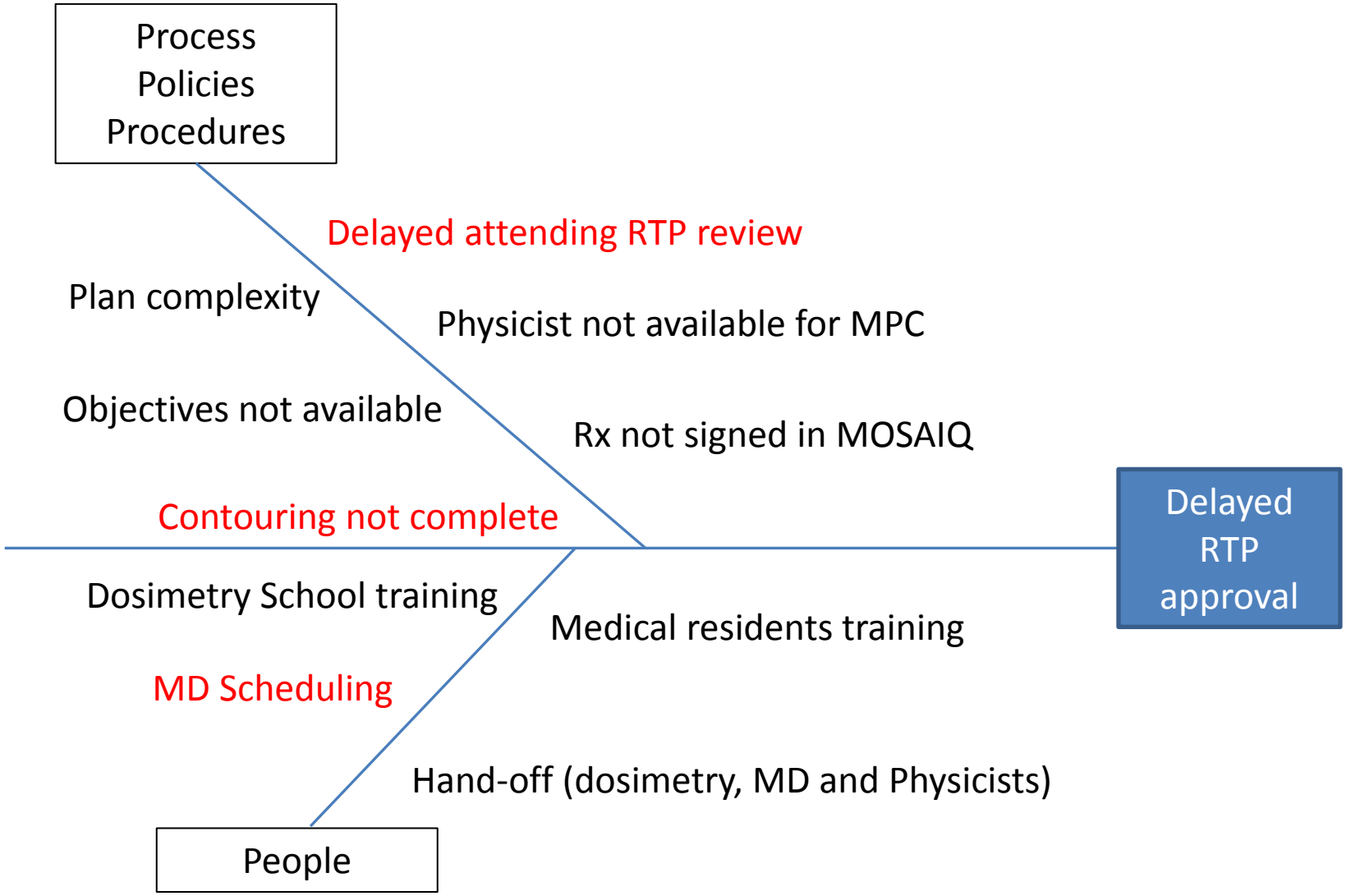
Background

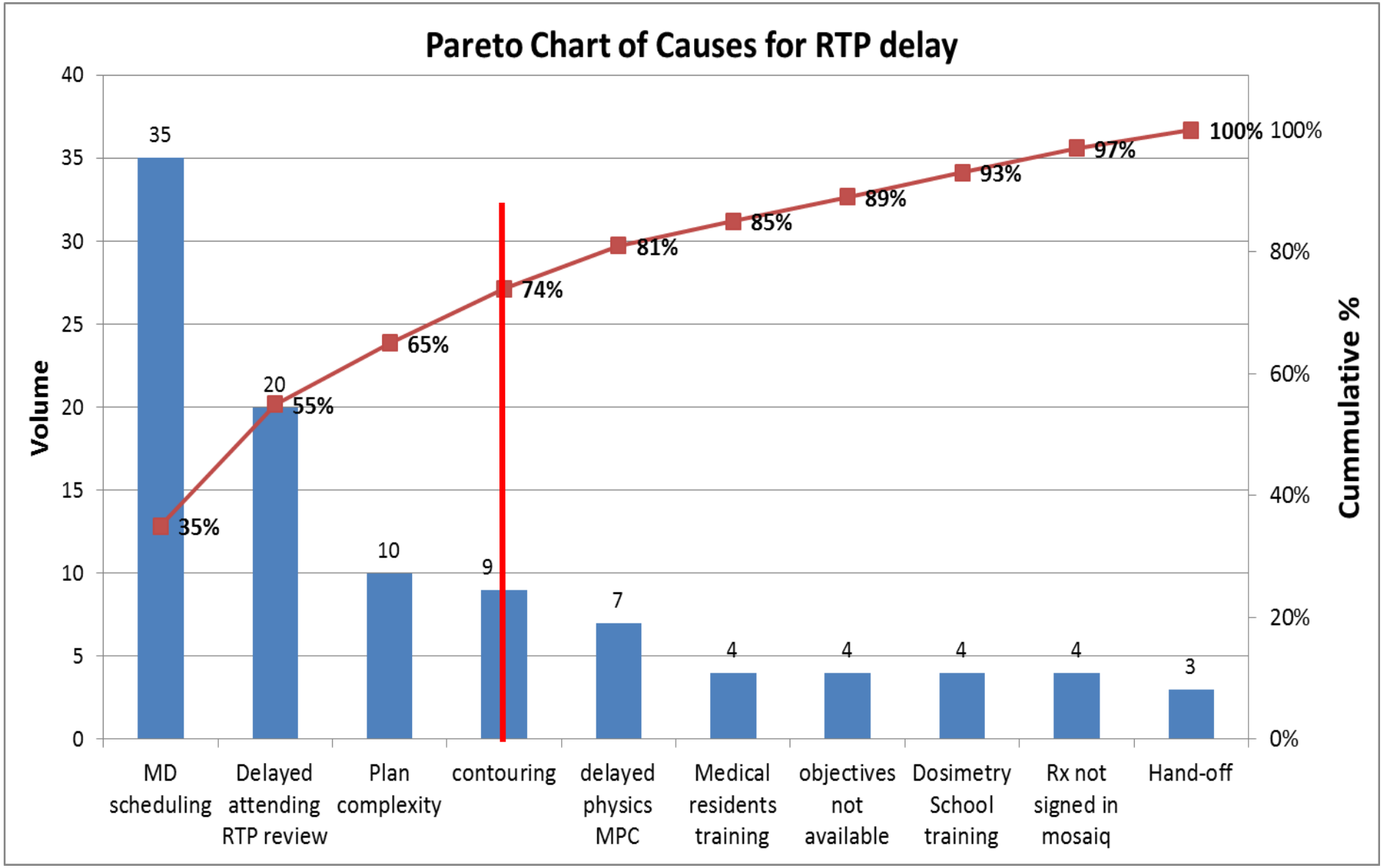
- Prolonged time between CT simulation to plan approval delays the initiation of radiation treatment.
- Rationale: The reduction of time between CT simulation and IMRT plan approval will improve quality of care and patient satisfaction.
  - Patients will be able to start their radiation therapy treatments sooner.

Flow Process from CT Simulation to Treatment Plan Approval

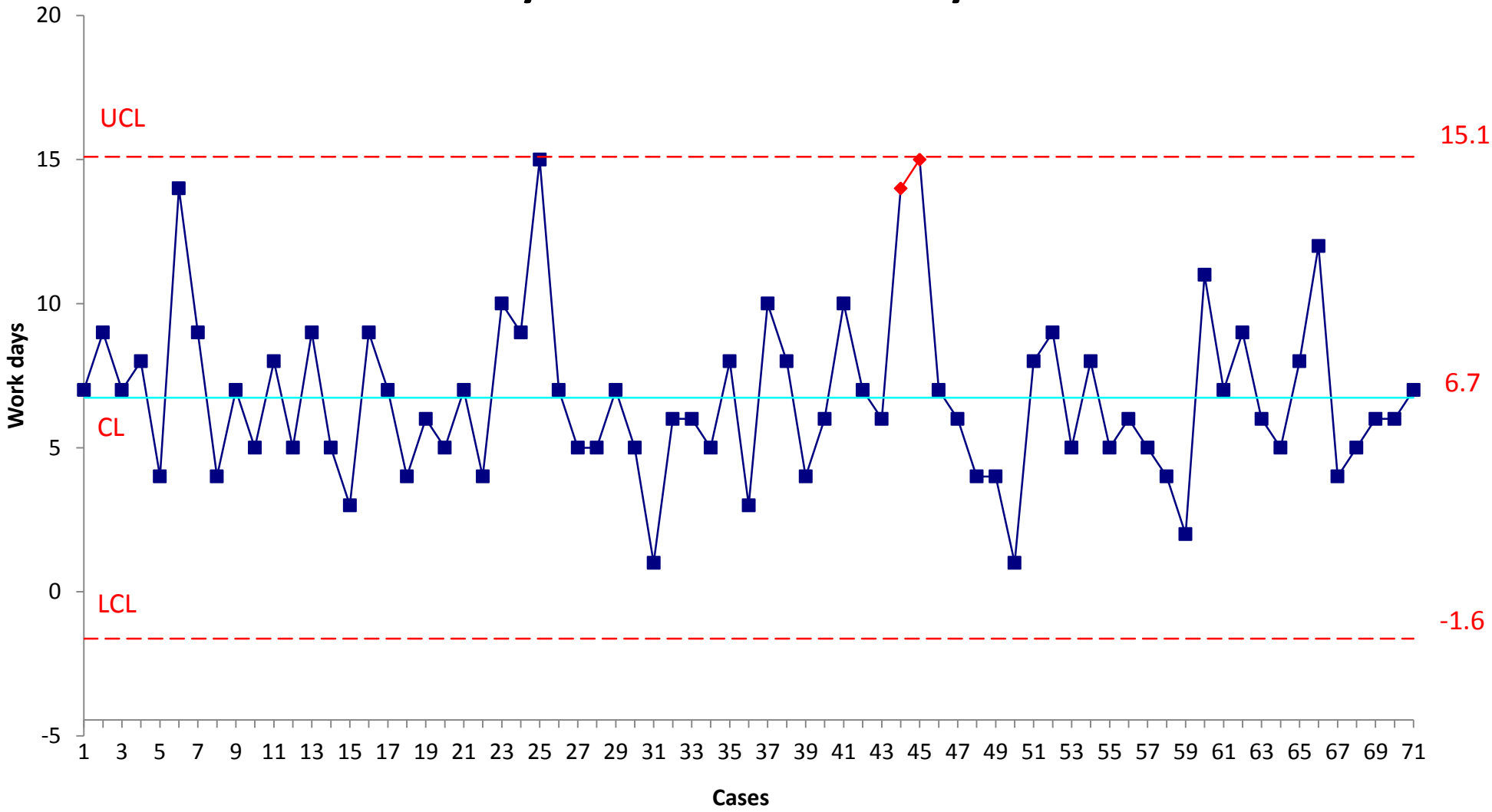


Cause And Effect Diagram
Radiation Therapy Treatment Planning




Pareto Chart of Causes for RTP delay
Volume
Cummulative %
40
35
30
25
20
15
10
5
0
100%
80%
60%
40%
20%
0%
35
20
10
9
7
4
4
4
4
3
35%
55%
65%
74%
81%
85%
89%
93%
97%
100%
MD scheduling
Delayed attending RTP review
Plan complexity
contouring
delayed physics MPC
Medical residents training
objectives not available
Dosimetry School training
Rx not signed in mosaiq
Hand-off

Mean (X) CT Simulation to Plan Approval
Cycle Time in Work Days



Interpretation: The process is stable and within the upper and lower control limits. The average of 6.73 is above the 5 work day cycle time indicated by policy.

USL	5
LSL	0
Average	6.73

Within

SAMPLE

CP should be ≥ 1.33

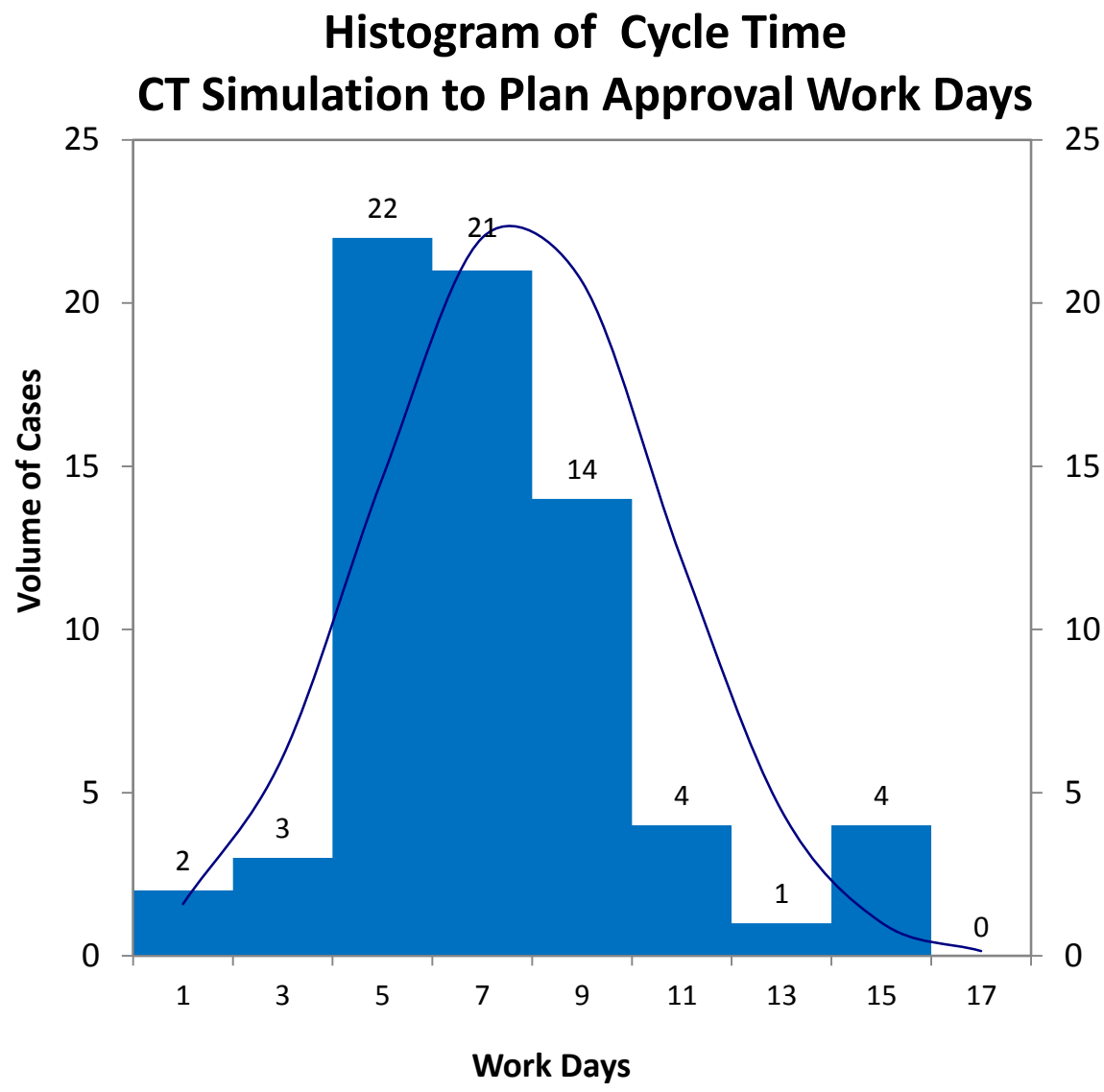
Stdev	2.79
Cp	0.30
CpU	-0.21
CpL	0.81
Cpk	-0.21
PPM	740793.32

Overall

TOTAL POPULATION

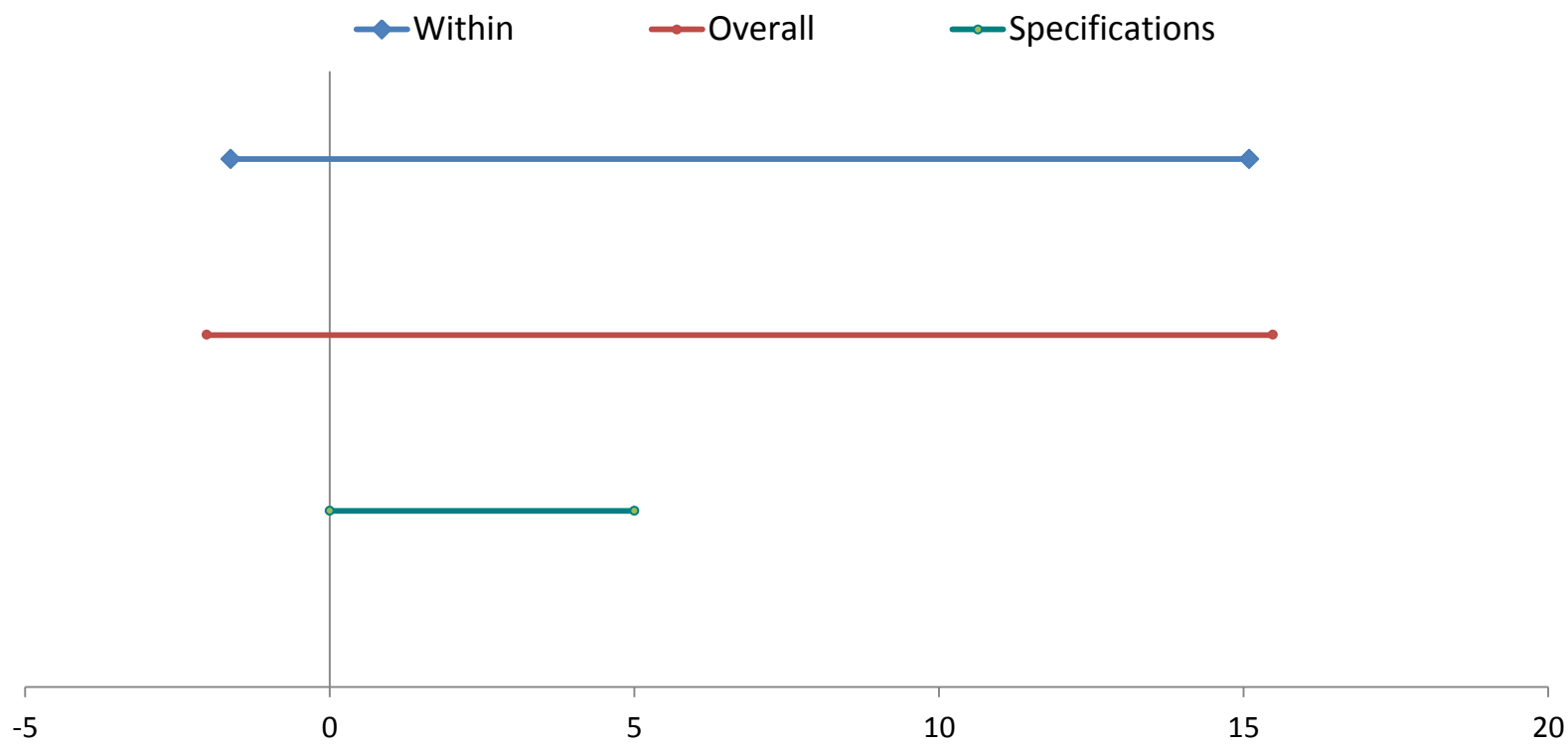
Pp should be ≥ 1.67

Stdev	2.92
Pp	0.29
PpU	-0.20
PpL	0.77
Ppk	-0.20
PPM	734176.02



Interpretation: The average of 6.73 is above the 5-work day cycle time indicated by policy. The Cp is low and recommend improvement in processes to bring the average down.

Capability Plot
CT Simulation to Plan Approval Work Days



Interpretation: The within and overall lines are well outside the specification limits of 0 to 5 work days. All 3 lines should be close to the specifications limits. This process requires improvement to ensure that the department is capable of meeting policy specification requirements.

PLAN: Intervention

Standardization

- Implement evidence based handoff.
- Monitor compliance with handoff.

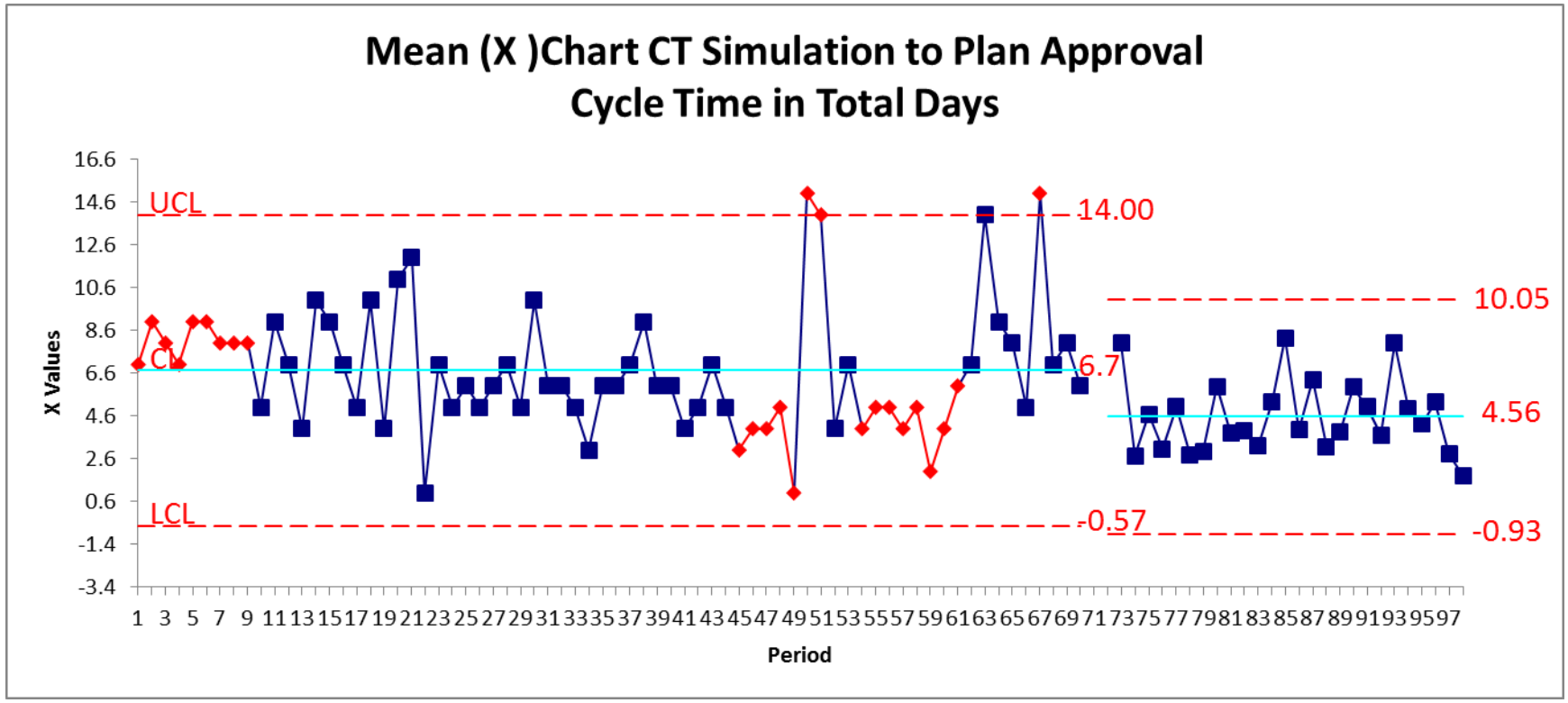
Simplicity

- Reschedule patients undergoing hormonal therapy to 5 to 7 days prior to when the treatment plan approval is needed to reduce treatment plan changes/defects, delays, waste, rework and variation. This creates a pull system.
- Use the rescheduled date to calculate the work day cycle time.

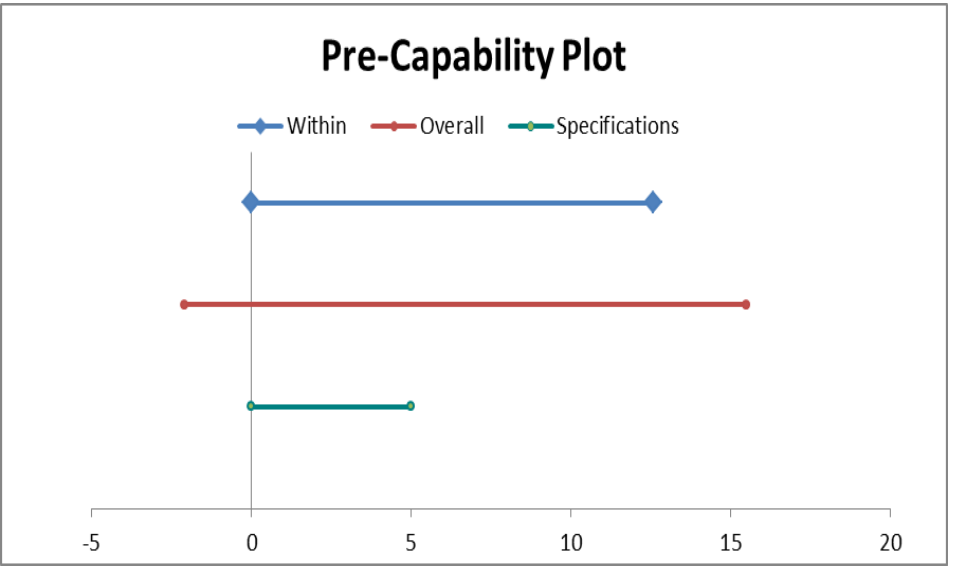
DO: Implementing the Change

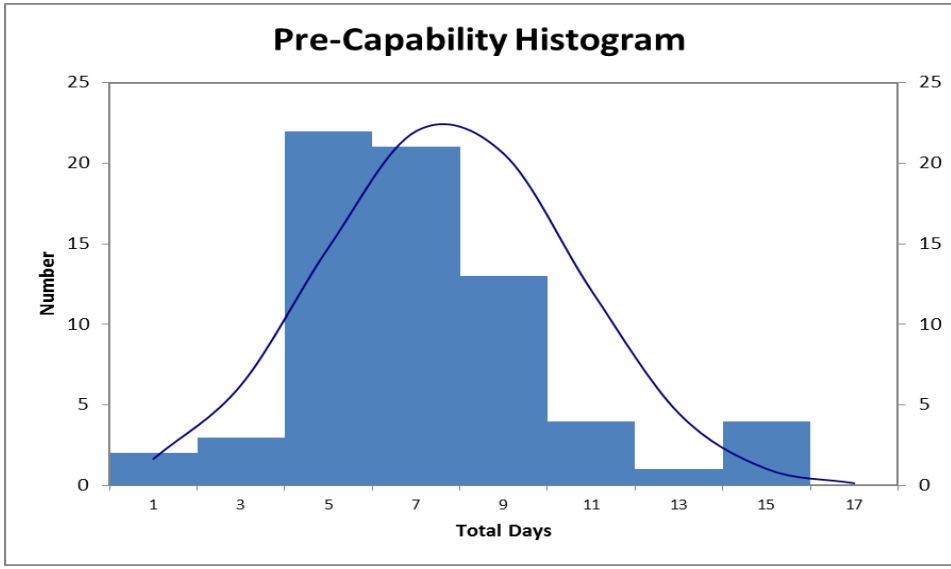
- Recording the time of:
  - CT simulation
  - Patient mark
  - Contouring of normal tissue
  - Target delineation
  - Ready for plan review
  - Plan approval
- Recording the times made everyone aware of the process and they tried to complete their task in timely manner

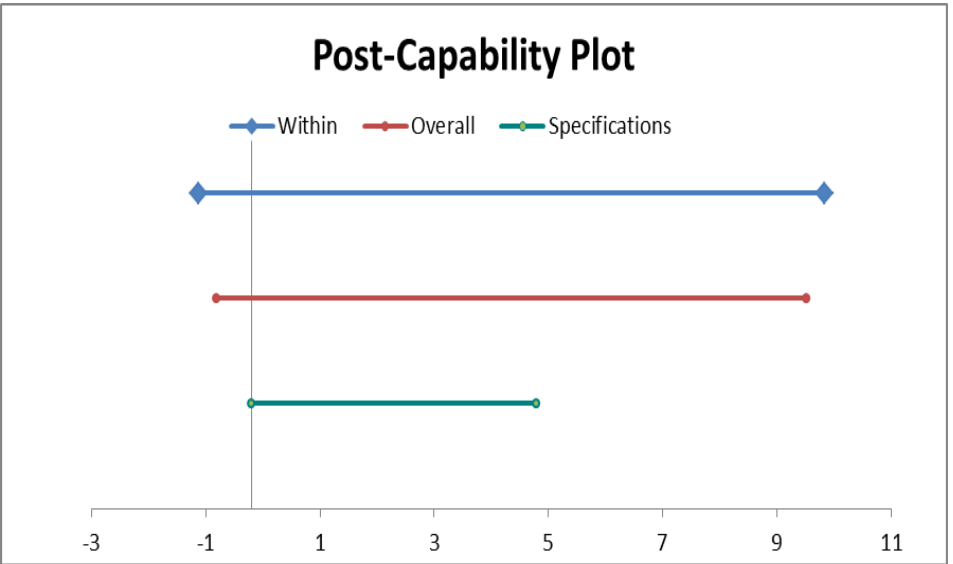
Results

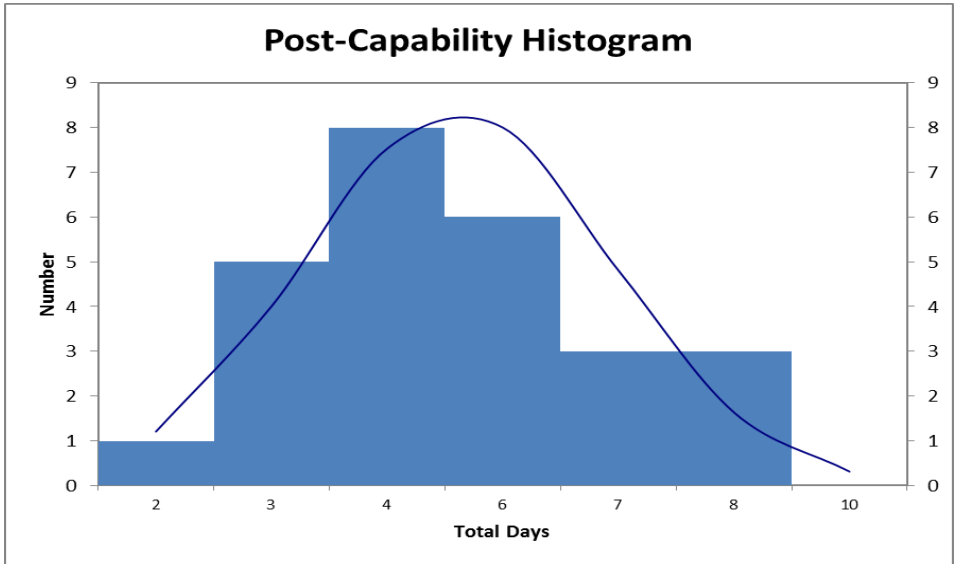

Mean (X)Chart CT Simulation to Plan Approval
Cycle Time in Total Days
X Values
Period
UCL
CL
LCL
14.00
6.7
-0.57
10.05
4.56
-0.93
16.6
14.6
12.6
10.6
8.6
6.6
4.6
2.6
0.6
-1.4
-3.4
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51 53 55 57 59 61 63 65 67 69 71 73 75 77 79 81 83 85 87 89 91 93 95 97

CHECK: Results/Impact









ACT: Sustaining the Results

The recording of the time stamp at each step of the process from CT simulation to Plan approval is implemented into our policies and procedures.

The times are recorded in the notes of our Record and Verify system

Return on Investment

Increased productivity

Increased capability

We can monitor each step of the process and intervene if needed.

Conclusion/What's Next

Decreased the number of days between CT simulation and plan approval by 2.2

Patients can start treatments sooner.

We can increase the number of patient plans to accommodate more patients

Personnel (dosimetrists, physicians, residents) need to be educated to maintain gains.

Team Picture

Thank you!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