



Improving Turn Around Time in a Hospital Based CT Division Using the Kaizen Method

Quality Improvement Reports
RSNA 2020 Annual Meeting

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Background and Current State

Hospital Based CT Department

Background

- Kaizen = Lean approach to creating continuous improvement
- Based on the idea that small, ongoing positive changes can reap major improvements
- Developed in manufacturing to lower defects, eliminate waste, boost productivity, encourage worker purpose and accountability, and promote innovation.
- Multidisciplinary group formed including – radiology leadership, CT leadership, process improvement specialist, CT technologists, radiology nursing, front desk staff, and informatics support.

Current State

- Standard work not clear
- Flow of work inconsistent
- Delays and patients not ready
- Epic stages are not being done the same across people
- Low individual tech accountability
- Poorly defined CT Coordinator Role
- Role of techs not clearly defined
- Lots of phone calls to the coordinator/interruptions
- CT Coordinator gets an overwhelming amount of work
- Scanning wrong patients does occur – 2 wrong in last 3 months (3 this year)

Project Purpose and Goals

- Setting – Hospital based diagnostic CT imaging division.
- Goal – Decrease turn around time for inpatients, outpatients and ED patients each by 20% without negatively impacting patient safety.
- Baseline data and value stream maps obtained prior to Kaizen, spanning outpatient CT with and without contrast, ED CT, and inpatient CT.
- A 1 week Kaizen focused improvement event occurred, led by a facilitator trained in process improvement with the assistance of staff experienced in these events, from another hospital in the Enterprise.
- Staff were trained in lean methodology prior to the week. Additional leadership and administrative support was offered to assist in data analysis during the week.

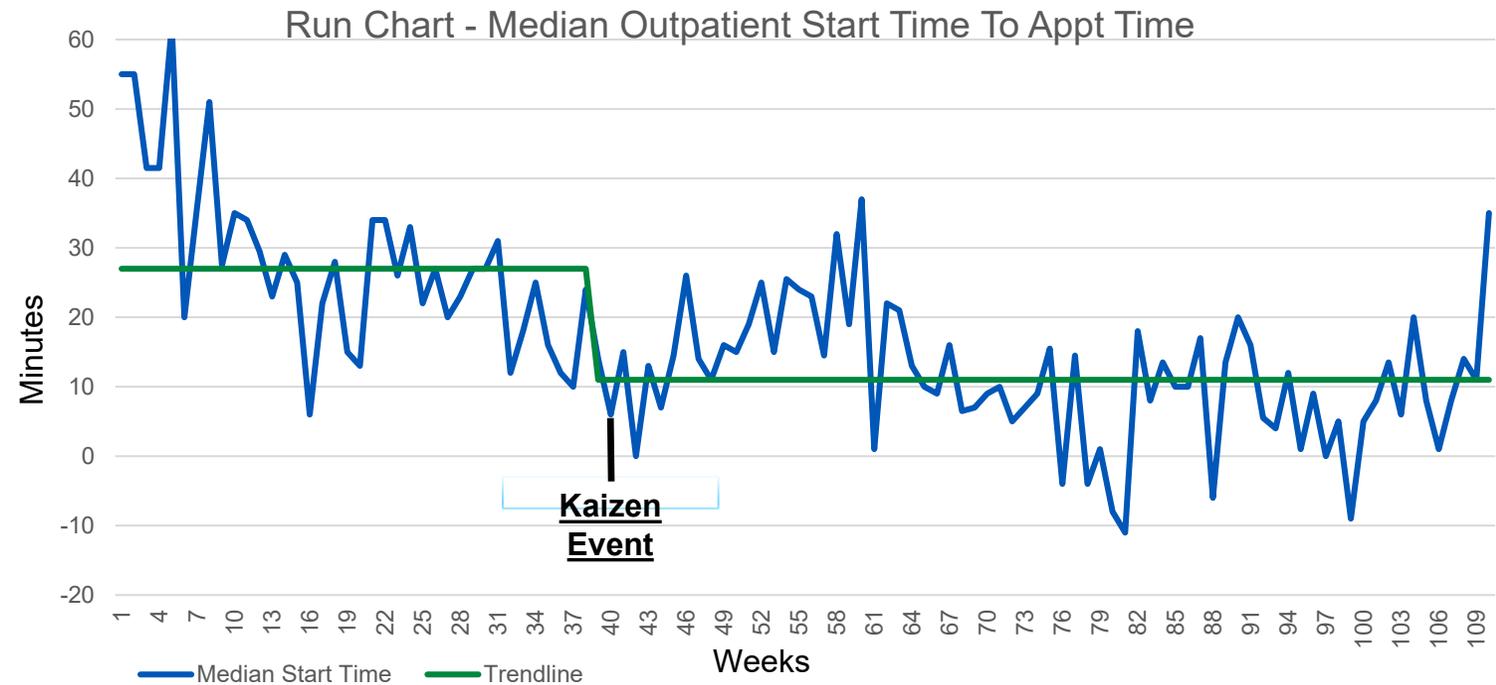
Data: Goal

Decrease TAT for inpatients, outpatients and ED patients each by 20% without negatively impacting patient safety by 8/9/19

	Baseline (May/June 2019)	Post Kaizen	% Decrease
Inpatient TAT	265 minutes	122 minutes	54%
ED Response	61 minutes	43 minutes	29%
OP TAT	71 minutes	39 minutes	45%

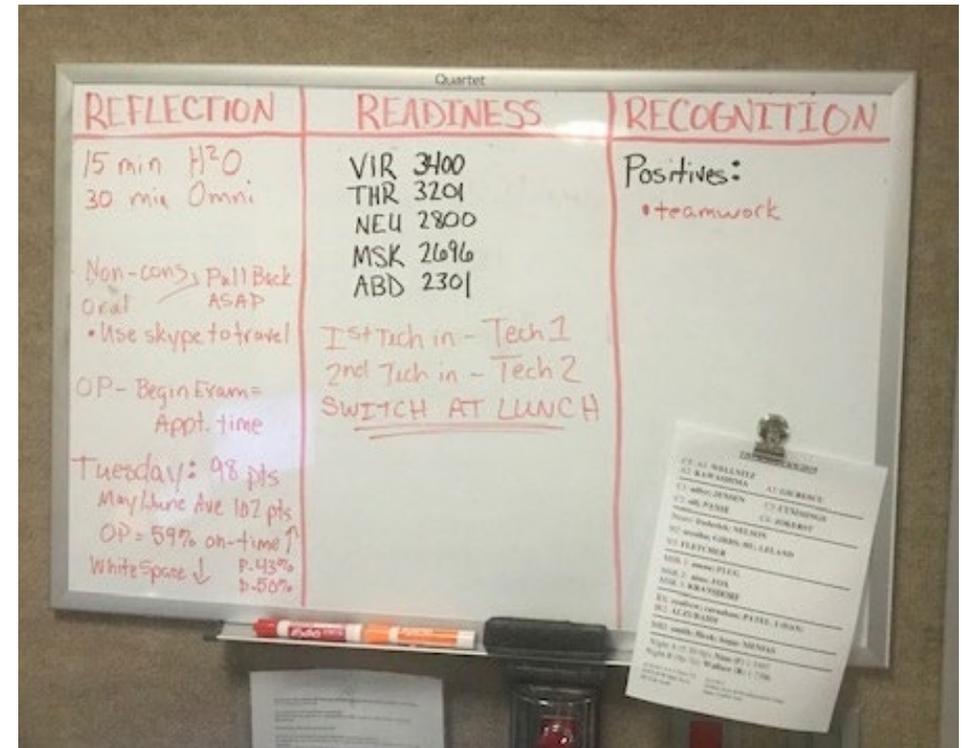
Data: Other Benefits & Counterbalance Measure

- Long term sustained reduction in outpatient start time
- Resultant decrease in the counterbalance measure sustained over time



Key Interventions

- Multiple daily meetings were held during the Kaizen event
- Interventions all focused on creation of standard work for all relevant roles
- Standard work developed by front line staff participating in Kaizen
- Proposed standard work repeatedly tested throughout the week and tweaked based on results of small PDSA cycles
- Department leadership and lead staff present to ensure that standard work is followed by all staff



Example of Standardized Work - Technologists

- Standardized lunches and breaks
- No writing on control sheets – using Epic tabs
- Signs to cut down on traffic through control room
- Reduce interruptions from phone calls that could be routed other places
- EVS – clean at 6 am and 6 pm
- Reminders to ED about patient ready
- Train all techs on Shorthand and Protocolling

Technologist Responsibilities (Switch at Lunch)

Tech 1 (7:00 and 8:30)	Tech 2 (9:30 and 10:00)
	1. Phone Call to ED/1 West for NON-CON
	2. Begin Exam (transport 'in progress' for inpatients)
	3. Transport Patient (ED/OP Subwait)
4. Pull E-Protocol/Verify Protocol	
5. Load Contrast	
6. Both Techs Verify Correct Patient / Exam	
7. Transfer Patient to Table	
	8. Position Patient on Table
	9. Check IV 1st
	10. Hook Up Contrast
	11. Inject Contrast
12. Scan	13. Work Up Next Patient
14. Transfer Patient Off Table (Tech 2 Back to Step 1)	
15. Recon and End Exam	
16. Chart Contrast	
17. Clean Room/Set Up For Next Patient (Tech 2 Back to Step 1/Tech 1 Back to Step 4)	
	Protocol when scanner empty(primary coordinator support)
CT 1 Tech When Available: Use skype to Communicate with Coordinator Help Coordinator Protocol ED Patients and Work Up and Scan	
Shared Responsibilities	
Stock Room	
Set Up Epic Tabs as Follows: Tech Details, Proto Summary, Labs, LDA's, CareTeam, Notes, Upcoming Appts, Control Sheet	

Standard Work

CT Coordinator

- Using Epic notes and exam events for communication
- Standardized Epic columns and tabs across techs
- Round trip transport for inpatients
- Color coded lines in Epic
 - Salmon – ED
 - Light Green – Inpatient
 - Light Yellow – Outpatient
- Skype for communication to DOS and CT1
- MRI transport can help transport CT patients in morning

Nursing

- ‘Department Exit’ is being done by nurses
- Standardized Nursing Assessment
- Communicate through notes – no running of control sheet to coordinator
 - Write on IV ‘keep’
- Care team updating nurse resource timely

Desk Staff (DOS)

- Clothing assessment at check in – no notes
- If need to be changed take to subwait right away
- Non-con – no screening form - techs pull from lobby
- Oral/NO IV – assess allergies and sign at check in and put drink time in notes – techs pull from lobby
- Oral/IV and IV – bring back at 30 min mark
- Define and train on changing guidelines

Keys to Ensure Continued Success

- Continue to train and deploy standardized work
- Leadership on site daily
- Standard work audits
- Huddles, huddle board, and improvement board for communication
- Leader standard work for Gemba
- Signing off of protocols
- 5S all the scan rooms
- Establish standard work at other CT site
- Lean education for leaders and frontline staff
- Communication and teamwork is key
- Sustainment is key
- Little changes go a long way
- Team buy in and attitudes is key
- Getting frontline staff involved in process improvement is key
- Multidisciplinary collaboration is key
- Share best practices
- Control phase important/Training
- Standard work helps hold folks accountable