Delivering More Value and a Better Experience to Patients:
Insights from Internal Improvement Successes and External Collaborations

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System Overview & Scope

Atrium Health

Health System Overview

- Founded in 1940s as Charlotte Memorial Hospital *(public, not for profit)*

- 1990 became Carolinas HealthCare System with Carolinas Medical Center as Flagship

- Carolinas HealthCare System becomes **Atrium Health in** 2018

- 31,000 patient encounters daily

- Over 70,000 teammates serving North & South Carolina and Georgia

Acute Care Facilities	**Freestanding Emergency Departments**
Provider Practices & Urgent Care Centers	**Cancer Institute & other specialty services**
Academic Medical Centers	**Surgical & Rehabilitation Centers**
Behavioral Health Centers	**Home Health Providers**
Hospice & Palliative Care Services	**Nursing Homes**

Atrium Health Laboratory Services Scope

- **Facility Testing Locations**
  - 12 Acute Care Facilities
    - Clinical Lab Services at each facility
    - 3 sites with Anatomic Pathology Services
  - 6 Free Standing EDs

- **Phlebotomy Services – Outreach Market**
  - 15 Patient Service Centers
  - 10 Provider Office Locations
  - Multiple Skilled Nursing Facilities
  - Inpatient Team at Carolinas Medical Center

- **Reference Lab Testing – Core Lab**
  - Serves approximately 3000 Providers in over 900 Medical Offices

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Atrium Health Laboratory Services Scope

- **Clinical Laboratory Departments**
  - Chemistry
  - Hematology
  - Microbiology
  - Blood Bank
  - Cytogenetics
  - Molecular Diagnostics
  - HLA Transplant
  - Coagulation

- **Anatomic Pathology Departments**
  - Cytology
  - Histology

- **2018 Total Testing Volume** ~ 11,693,600

Tools to Build and Support Our Culture of Improvement

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Building a Culture of Improvement for Patient Safety and Teammate Engagement

- **Developing a Lean Management System in Laboratory Services**

  - Developing the culture

  - Coaching for behaviors

  - Making problems visible

  - Structure for Problem-Solving

Building a Culture of Improvement for Patient Safety and Teammate Engagement

- **Applying Lean Tools**

  - Managing for Daily Improvement (MDI) Huddle Boards
    - Daily teammate huddles
    - Weekly leader huddles

  - A3 Practical Problem-Solving Methodology
    - Experiential class for leaders
    - Active application

  - 5 Whys
    - Real-time

  - Standard Work

  - Spread

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Building a Culture of Improvement for Patient Safety and Teammate Engagement

Building a Culture of Improvement for Patient Safety and Teammate Engagement

ATRIUM HEALTH INVESTIGATION & FEEDBACK REPORT

Internal or External Problem (circle one)

Issue / Opportunity Information

ITEM#, PROCESS or PATIENT ID	
DATE	
REPORTED BY	
REPORT WRITER	
A3 TEAM	
DEPARTMENT	
IMPACT or COST TO THE CUSTOMER	

Problem Description

Standard/Target	Actual

10

Containment

How?		Who?	
Where?		When?	Start Date / Tracking Detail

10

Grasp the Situation

Problem characteristics, point of cause, history and other supporting data

10

Investigation - Ishakawa

MAN MACHINE

MATERIAL METHOD

Symbols

ITEM	STD	ACT	J/MENT	ITEM	STD	ACT	J/MENT

10

Investigation - 5 Why

1	2	3

Root Cause

25

Countermeasure

Date	Date	Date
Resp	Resp	Resp

20

Yokoten

YOKOTEN Standardization

5

Confirmation

Responsible Sign-Off Distribution

10

Building a Culture of Improvement for Patient Safety and Teammate Engagement

Standard Work – Operational Method Sheet

WIS Element #	Process Name	Title:					Process Ref:	OMS Page
								1 of 1

#	ITEM	MAJOR STEPS	KEY POINTS	REASON FOR KEY POINTS	STANDARD	TIME	PHOTOGRAPH(s)	
1								

= safety	'=knack	: visual check	= verification	TOTAL TIME:	0	

REVISION	REVISION DETAIL		LDR	G/L	Prepared By
					DATE

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Building a Culture of Improvement for Patient Safety and Teammate Engagement

Activity Tracker

Action Plan — Atrium Health

Title:		Department:			Management Owner:		Date:
Review Team:							Next Review:
Environmental Situation Summary:							

Timeline

🟩 = Original Plan 🟨 = In Jeopardy 🟥 = Behind Schedule 🟦 = Actual Week

Target Improvement

| Core Objective:			Planned Completion Date(s)	Weekly																				Status / Comments	Impact
Action Step	Owner			7/12/19	7/19/19	7/26/19	8/2/19	8/9/19	8/16/19	8/23/19	8/30/19	9/6/19	9/13/19	9/20/19	9/27/19	10/4/19	10/11/19	10/18/19	10/25/19	11/1/19	11/8/19	11/15/19	11/22/19	11/29/19	12/6/19		
1																										
2																										
3																										
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5																										
6																										
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9																										
10																										

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Collaborative Improvement and Lessons Learned Along the Way

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Collaborating to Improve

- **Ambulatory Provider Practice**
  - Complaint about cancelled tests

- **Lab Team Responded Using A3 Thinking**
  - What problem are we trying to solve?
  - Impact of problem – the "so what"
  - Containment
  - Grasp the situation through data to find the point of cause
  - Brainstorm direct causes and confirm or deny through observation
  - 5 Why direct cause to get to the root cause
  - Implement countermeasures
  - Measure and audit

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What Problem Are We Trying to Solve?

- During a two-week time frame, there were a total 707 cancelled lab orders to a target of 0.
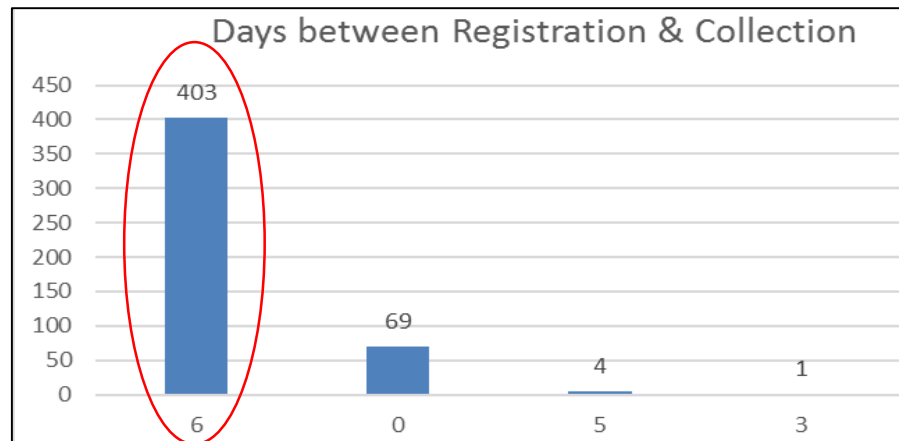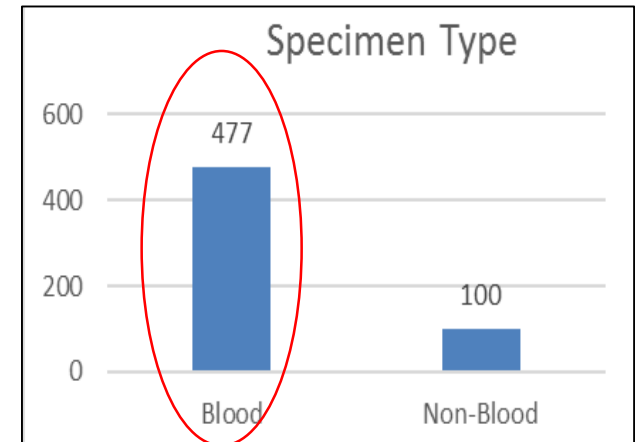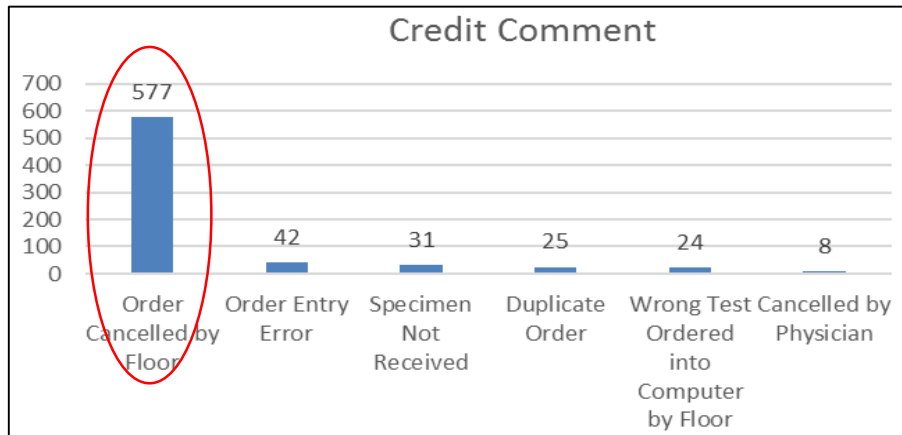
Sometimes It Goes Awry…

- **What Happened…**
  - Brainstormed possible causes
  - Went to Gemba to see
  - What we found
    - 22 of 26 Patients did not go to Patient Service Center to have blood drawn on same day lab order was entered
    - 4 of 26 Patients had duplicate orders entered which auto-cancelled

- **Ambulatory Provider Practice's response**

- **Where did we go wrong?**

- **Now what?**

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No Shortage of Problems to Solve!

- **Separation of Ambulatory Site Patient Testing from Acute Care Facility In-Patient Testing**
    - Core Laboratory built to focus on ambulatory market
    - Acute Care Facility narrowed focus to better serve inpatients for routine & stat testing

Pre-analytic Defects

June 2015
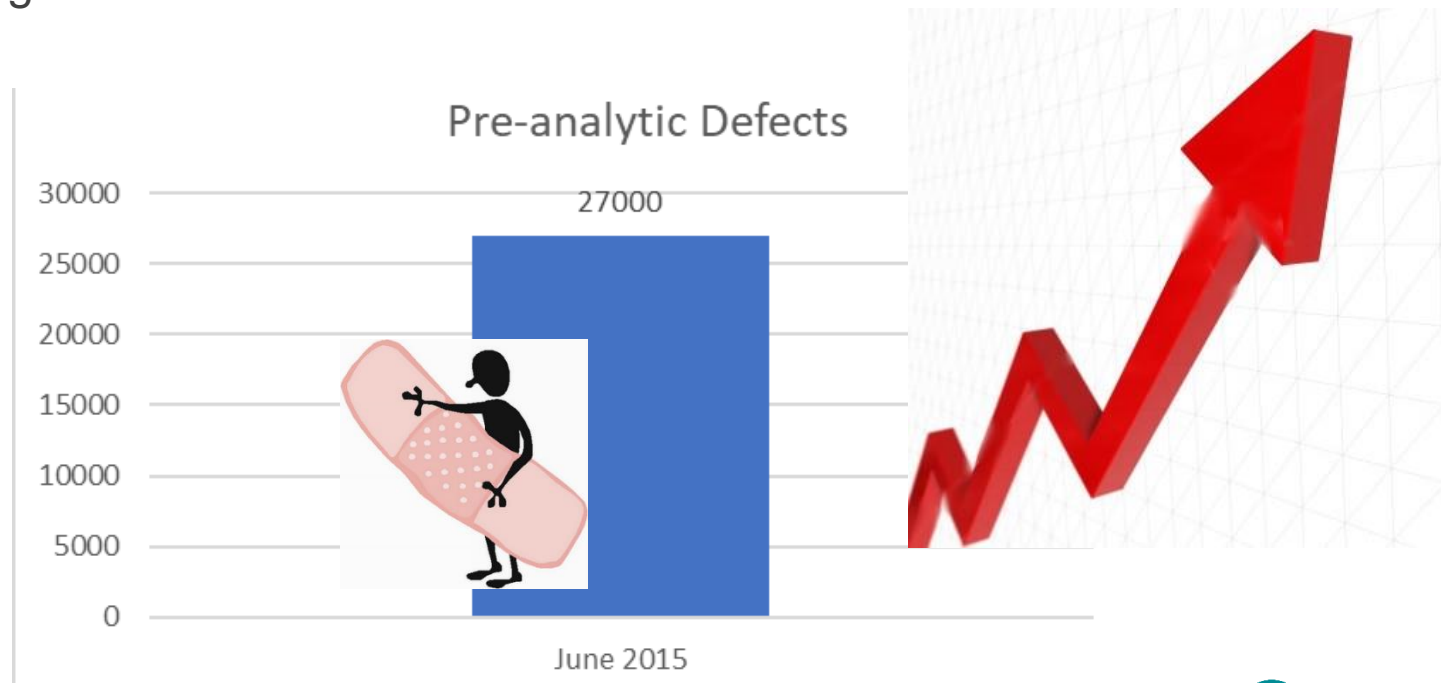
Core Lab Incoming Defects

- **What we were seeing… Data we collected:**
  - CPOE sites missing SQ label
  - Wrong container type
  - Incomplete or missing Provider information
  - Incorrect or missing date of service
  - Incorrect or missing dx code
  - Incorrect labeling
  - Incorrect or missing location code
  - Specimen received on a cancelled order
  - Incomplete or missing order
  - Missing or conflicting patient identifiers
  - Incorrect specimen processing

- **Account Executives to the rescue!**
  - Contact the highest defect contributor each day
  - This is like drinking the ocean…. or playing "Whack-A-Mole"… or both!

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Collaboration Take 2

- **Built a collaborative team**
  - Laboratory Leadership, Client Services & Account Executives and then we asked…

- **Who can we partner with to help us influence?**
  - Ambulatory Patient Safety
  - Ambulatory Quality
  - Information & Analytics Services
  - Performance Excellence Center

- **Using data to broaden the visibility of the problem**
  - Showing the impact

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Daily Defect Report – Making it Visible

Defects by Location 9/20/2017

Row Labels	Count of Call Type
Charlotte Pediatric Clinic Steele Creek	**7**
NO CPOE LABEL DEFECT	1
RGT SPEC LABEL DEFECT	3
RGT SPEC SPIN DEFECT	3
Shelby Women's Care	**5**
RGT SPEC LABEL DEFECT	5
Union Family Practice	**5**
RGT SPEC SPIN DEFECT	5
McAlister OBGYN Associates Denver	**3**
RGT SPEC LABEL DEFECT	3
Huntersville Oaks Lakeview Inn	**3**
RGT SPEC DX CODE	1
RGT SPEC ORDER DEFECT	2
East Lincoln Primary Care	**2**
RGT SPEC ORDER DEFECT	1
RGT SPEC SPIN DEFECT	1
Piedmont OBGYN Steele Creek	**2**
NO CPOE LABEL DEFECT	2
Huntersville Oaks Lakeview Inn	**2**
RGT SPEC ORDER DEFECT	2
NorthPark	**2**
NO CPOE LABEL DEFECT	1
RGT SPEC SPIN DEFECT	1

LTACH	**2**
NO CPOE LABEL DEFECT	2
Neurosciences Institute Matthews	**1**
RGT SPEC ORDER DEFECT	1
Sharon Towers HCC Dementia	**1**
RGT SPEC ORDER DEFECT	1
Pageland Family Medicine	**1**
RGT SPEC LABEL DEFECT	1
Eastover OBGYN MMP	**1**
NO CPOE LABEL DEFECT	1
Wingate University Health Center	**1**
RGT SPEC DX CODE	1
Eastridge Family Medicine	**1**
RGT SPEC SPIN DEFECT	1
NORTHPARK OBGYN	**1**
RGT SPEC LABEL DEFECT	1
Foot & Ankle of the Carolinas Matthews	**1**
RGT SPEC ORDER DEFECT	1
Presbyterian Hospital Charlotte	**1**
RGT SPEC DX CODE	1
CH Urgent Care Cabarrus	**1**
RGT SPEC LABEL DEFECT	1
CHS Teammate Health Northeast	**1**
RGT SPEC ORDER DEFECT	1
Charlotte Eye Ear Nose & Throat Associates Eye	**1**
RGT SPEC DX CODE	1
Myers Park Pediatrics 2nd Floor	**1**
NO CPOE LABEL DEFECT	1

Huntersville Oaks Piedmont Lodge	**1**
RGT SPEC DX CODE	1
Carolina Digestive Health Associates Monroe	**1**
RGT SPEC ORDER DEFECT	1
Levine Children's Specialty Center MCP	**1**
RGT SPEC ORDER DEFECT	1
OrthoCarolina University North Tryon	**1**
RGT SPEC DOS DEFECT	1
Cabarrus Family Medicine Prosperity Crossing	**1**
RGT SPEC ORDER DEFECT	1
CHS Pediatric Urology	**1**
NO CPOE LABEL DEFECT	1
Charlotte OBGYN Northcross	**1**
RGT SPEC ORDER DEFECT	1
Sharon Towers 3 Skilled Med A	**1**
RGT SPEC DOCTOR DEFECT	1
MMG Pineville	**1**
RGT SPEC CONTTYPE DEFECT	1
CHS Teammate Health Annex	**1**
RGT SPEC PAT IDENT DEFECT	1
Mt Gilead Medical Services	**1**
RGT SPEC ORDER DEFECT	1
Urology Specialists of the Carolinas University	**1**
RGT SPEC DX CODE	1
MYERS PARK MEDICAL SPEC.	**1**
NO CPOE LABEL DEFECT	1
Carolina Neurological Clinic Randolph	**1**
RGT SPEC ORDER DEFECT	1
Myers Park OBGYN	**1**
RGT SPEC SPIN DEFECT	1
Grand Total	**61**

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Collaborative Approach

- **Data led us to Ambulatory Site MP**
  - Brainstorming, observations, and 5 Why process led us to root cause
  - Identified countermeasure: Implemented Pod Printing
  - Measured improvement

- **Next iteration led us to Behavioral Health Practice**
  - Same A3 approach followed
  - Identified countermeasure: Computer Physician Order Entry process implemented
  - Measured improvement

- **Next iteration le us to Ambulatory Site – Lincoln**
  - Same A3 approach followed
  - Identified countermeasures: Standard work around multiple collection and specimen processing tasks
  - Measured improvement
  - Spread countermeasures across all other ambulatory sites over two years

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Measuring Improvement

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PreAnalytic Defects from Outreach Market

Department/Area	CLN - Specimen Management	**Target Condition**	**50.0**	**Y**	**Report Writer:**	Julie Cooper
Opportunity/Metric	PreAnalytic Incoming Defects	**Actual**	**27.0**		**Last Updated:**	26-Sep-19

#	Countermeasures	Responsible	Start	Due	Complete	Yokoten Opp?		% Complete			
A	Containment: Core Lab correcting on arr	SM	2016	2016	Yes	No		25	50	75	100
B	CM: MP pod printing	Lori	2016	2016	Yes	No	Status of Action Items	25	50	75	100
C	CM: BH Char CPOE & SQ printer go live	Julie / Lori	Dec 2016	02/13/17	Yes	Yes		25	50	75	100
D	CM: BH Davidson CPOE & SQ printer go live	Julie / Lori	03/01/17	04/04/17	Yes	Yes		25	50	75	100
E	CM: Implement standard docs in Lincolnton	Lori / Dana	03/01/17	04/30/17	Yes	Yes		25	50	75	100

2019 Daily (Excluding Sundays)

Metrics Defining Success	3-Sep	4-Sep	5-Sep	6-Sep	7-Sep	9-Sep	10-Sep	11-Sep	12-Sep	13-Sep	14-Sep	16-Sep	17-Sep	18-Sep	19-Sep	20-Sep	21-Sep	23-Sep	24-Sep	25-Sep	26-Sep
Target Condition	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
Goal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Actual	17.0	30.0	25.0	23.0	8.0	18.0	43.0	9.0	7.0	13.0	7.0	30.0	31.0	18.0	34.0	24.0	0.0	24.0	20.0	29.0	27.0

Countermeasures, Actions & Activities (100% Complete)

Notes/Comments:

Chart — Target Condition, Goal, Actual
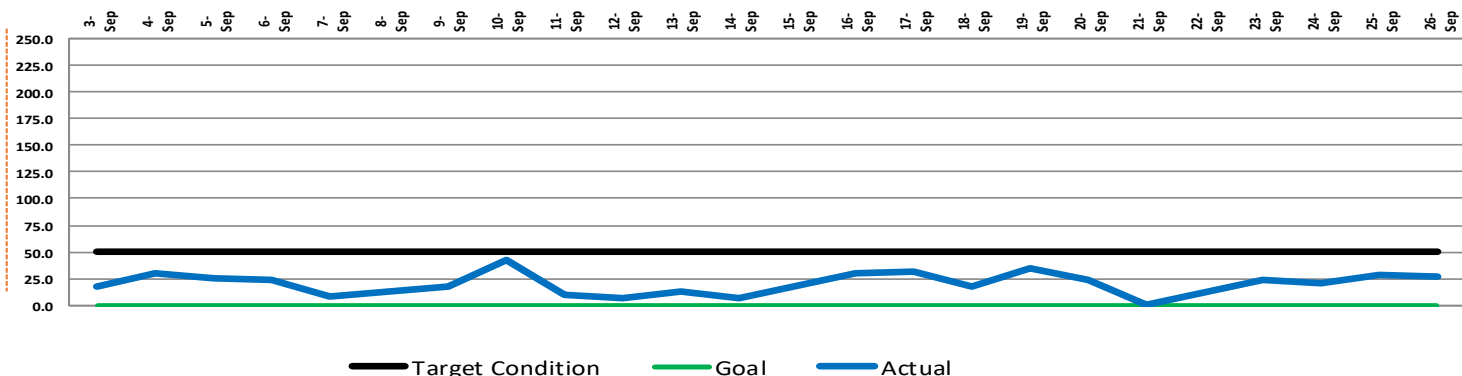
Collaborative Approach with Transplant

- **Patient complaint letter about lab in Hospital-Based Transplant Center**
  - Staff seemed incompetent, poor customer service, extended wait time, etc.

- **How We Responded**
  - Developed collaborative team
    - Transplant Clinic leaders and teammates from all clinics
    - Information & Analytic Services
    - Transplant Registration leader and teammates
    - Lab leaders and teammates from Account Executive and Phlebotomy teams
    - Patient Safety
    - Acute Care Facility leaders
    - Performance Excellence Center (Lean Process Improvement)

  - **Process Mapped Value Stream of every Transplant Clinic and Transplant Lab**
    - Liver Pre and Post Transplant
    - Liver Disease
    - Heart Failure and Transplant
    - Kidney Disease
    - Patient donors

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What Problem Are We Trying to Solve?

- **Let the data lead us to the biggest problem**
  - During the week of October 29, 2018, there were 41 patients ready for blood draw with no lab orders to a target of 0.

- **Containment**

Containment	How?	1. Check Canopy for lab orders & obtain if not present prior to seeing pt 2. Manually review EMR of 550 pts to enter orders if needed	Who?	1. Phlebotomist 2. Four (4) Transplant Clerical & Clinical Teammates		
	Where?	1. CMC Transplant Lab 2. Transplant Administrative Office	When?	1. Before calling pt to lab for blood draw 2. 1/21/19 - 2/11/19	Start Date	12/10/18 & 1/21/19
10					Tracking Detail	Gate Chart

- **Grasped the situation through the use of DATA**

Collaborative Approach with Transplant

- Brainstormed possible direct causes

- Went to Gemba to see

- Found 4 direct causes – Used 5 Why approach to get to root causes

- Liver Pre & Post Transplant Team developed and implemented countermeasures

- Measured improvement

Measuring the Impact

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No Lab Orders in Canopy

Department/Area	CMC Transplant Lab	Target Condition			Report Writer:	Julie Cooper
Opportunity/Metric	No Lab Orders in Canopy	Actual			Last Updated:	03/18/19

#	Countermeasures	Responsible	Start	Due	Complete	Yokoten Opp?		% Complete			
A	**CNMT:** Check Canopy for lab orders & obtain if not present prior to seeing patient	Phlebotomist on site	12/10/18	12/10/18	12/10/18	No		25	50	75	100
B	**CNMT:** Manually review EMR of 550 pts to enter orders if needed	Jerome Menendez	01/21/19	02/11/19	02/11/19	No		25	50	75	100
C	**CM:** Implement communication process for care plan changes	Jerome Menendez	12/17/18	12/24/18	12/24/18	Yes		25	50	75	100
D	**CM:** Implement Transplant roles/resp rotation	Jerome Menendez	12/17/18	12/31/18	12/31/18	Yes		25	50	75	100
E	**CM:** Implement 1-yr lab schedule w/ renewal reminder at mth 11	Jerome Menendez	12/31/18	12/31/18	12/31/18	Yes		25	50	75	100
F	**CM:** Implement process for Provider to enter orders before pt leaves exam room & CMA/RN audit order entry before depart summary given to	Kristin Mulkey	12/31/18	12/31/18	12/31/18	Yes		25	50	75	100
G	Removed CNMT B	Joslyn Brown	02/12/19	02/12/19	02/12/19	No		25	50	75	100
H	Removed CNMT A	Lori Kantor	03/18/19	03/18/19	03/18/19	No		25	50	75	100

Status of Action Items

October 2018 - March 2019

Metrics Defining Success	29-Oct	5-Nov	12-Nov	19-Nov	26-Nov	3-Dec	10-Dec	17-Dec	24-Dec	31-Dec	7-Jan	14-Jan	21-Jan	28-Jan	4-Feb	11-Feb	18-Feb	25-Feb	4-Mar	11-Mar	18-Mar
Goal 'No Order' defects	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Actual 'No Order' defects	41	11	17	3	4	11	2	17	9	3	1	0	1	2	7	1	3	1	0	1	2
Actual 'No Order' defects (Liver Mon AM)	20	2	4	0	2	3	0	1	3	0	0	0	0	1	0	0	0	0	0	0	0
Countermeasures, Actions & Activities (100% Complete)							A		C	D, E, F						B	G				H

Notes/Comments:

Measuring the Impact

Atrium Health
No Lab Orders in Canopy

Department/Area	CMC Transplant Lab	**Goal**	0	**R**	**Report Writer:** Julie Cooper
Opportunity/Metric	No Lab Orders in Canopy	**Actual**	1		**Last Updated:** 08/12/19

#	Countermeasures	Responsible	Start	Due	Complete	Yokoten Opp?	% Complete			
A	CNMT: PSC review next day lab schedule to ensure future orders entered for Liver pts	Shauna Starr-Madyun	07/25/19	07/25/19	07/25/19	No	25	50	75	100
B	CM: Set CMA Canopy view to 'All Patients'	Paul Hagemann	07/30/19	07/30/19	07/30/19	Yes	25	50	75	100
C	Removed containment A	Shauna Starr-Madyun	08/02/19	08/02/19	08/02/19	No	25	50	75	100
D							25	50	75	100
E							25	50	75	100

Status of Action Items

March 2019 - Aug 2019

Metrics Defining Success	25-Mar	1-Apr	8-Apr	15-Apr	22-Apr	29-Apr	6-May	13-May	20-May	27-May	3-Jun	10-Jun	17-Jun	24-Jun	1-Jul	8-Jul	15-Jul	22-Jul	29-Jul	5-Aug	12-Aug
Goal 'No Order' defects	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Actual 'No Order' defects	9	5	1	2	2	1	2	1	0	0	0	1	0	1	0	4	8	3	0	4	2
Actual 'No Order' defects (Liver Mon AM)	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	4	7	2	0	1	1
Countermeasures, Actions & Activities (100% Complete)																		A		B	

Notes/Comments:

NOTE: View previous Gate Chart to see cause/effect relationships of containment implementation and removal as well as countermeasure implementation.

Week of July 15: Observed Liver CMA workflow; changed her Canopy view from IP to view all pts (ambulatory & IP); checked CMA's permissions - all ok

Line chart legend: ■ Goal 'No Order' defects ■ Actual 'No Order' defects ■ Actual 'No Order' defects (Liver Mon AM)
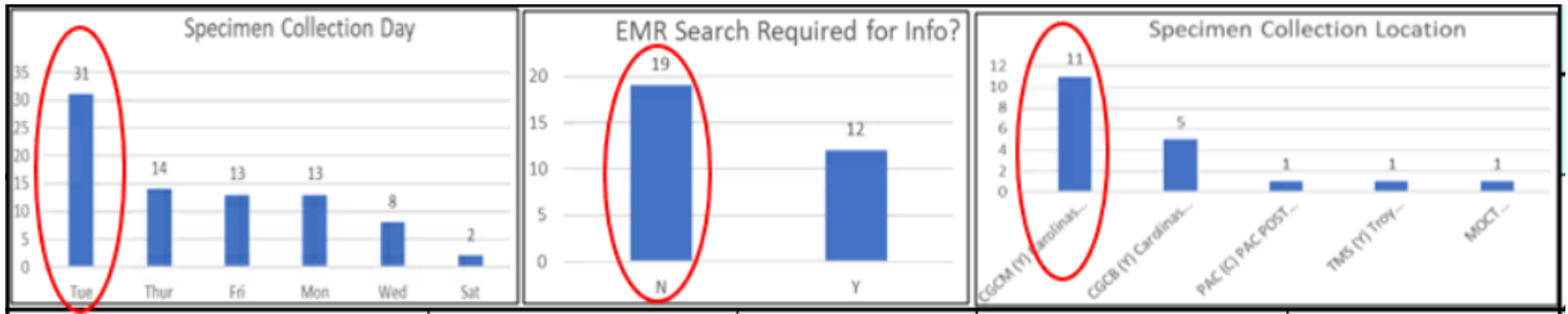
Collaborating to Improve in the Hospital

- **Anatomic Pathology receives many requisitions with missing or incorrect information on a daily basis.**

- **Created a collaborative team**
  - Pathology leaders and teammates
  - Information & Analytic Services
  - OR teammates
  - Lab Account Executives

- **Used the data to state the problem**
  - During the week of July 22-27, 2019, there were 81 requisition defects to a target of 0.

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Collaborating to Improve in the Hospital

- **Grasped the situation through the use of data**

- **Now the problem becomes more manageable**
  - During the week of July 22-27, 2019 there were 11 requisition defects from CGCM-MCP on a Tuesday that didn't require an EMR search for info to a target of 0.

Collaborating to Improve in the Hospital

- **Brainstormed to identify possible direct causes**

- **Contacted CGCM-MCP to go to Gemba and see**
  - Contacted the Department Leader
  - Appealed to their experience and the impact the problem has on their department
  - Asked them to partner with us for benefit of the Patient and Teammates
  - Gemba is scheduled for next steps in process

- **This is getting easier…**

What We've Learned

- **What Worked?**
  - Including relevant partners external to the Lab and the area(s) submitting defects and/or experiencing the pain
  - Connecting everything to the patient AND to pain points of teammates or departments
  - Committing to working over an extended time frame – BE PATIENT!
  - Involving front line teammates
  - Showing teammates the gate chart and relating the results on paper to what they experience in their daily work

- **Challenges?**
  - **Influencing others to:**
    - Use a different method of problem solving
    - Understand value of applying a containment
    - "Trust the process" of A3 problem-solving rather than jumping to conclusions about solutions
    - Take time to do real-time 5 Whys
    - Audit new standard processes

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Final Thoughts

- **Collaborative partnerships**
  - It's not easy at first but as with all things you continue to do, it gets easier

- **Power of data**
  - It's hard for people to deny what the data shows
  - Takes the emotion and argument out of the way

- **How we sustain**
  - Keep the conversation and relationship going after the problem-solving tasks are complete
  - Continue to measure the improvement (GateChart) and make it visible
  - Talk with your collaborative partners about what the GateChart shows and connect it to the success (or pain) they feel in their daily workflow

- **Why we do it?**
  - It works!

Collaborating to Improve