Optimizing Pharmacy Workflows Early Compounding Process

Jessica M. Lemoine, PharmD, MS,
Pharmacy Operations Manager, Infusion Pharmacy Services
Miami Cancer Institute, Baptist Health South Florida

Ernesto Perez, PharmD
Pharmacy Supervisor, Infusion Pharmacy Services
Miami Cancer Institute, Baptist Health South Florida

Objectives

- Describe the workflow inefficiencies that led to increased compounding turnaround times, decreased Pharmacy, Nursing and Patient experience
- Discuss the New Early Compounding Process and barriers for implementation
- Analyze impact of the New Early Compounding Process measured by compounding turnaround time and IV compounding capacity

Overview of Infusion Practice Model
(Prior to New Early Compounding Process)

- 60 Infusion Chairs (excludes BMT and PMU)
- Eight (8) Infusion Clinical Pharmacist
  - Same Day Clinical Review
    - Four (4) First and Second Check (CW2, CW5, 4W, 4N)
  - Future Clinical Review
    - Two (2) First Checks Pharmacists (FW2, CW3)
    - One (1) Future Second Check (CW1)
  - IV Room Workflow
    - One (1) DoseEdge Pharmacist
- Ten (10) Pharmacy Infusion Technicians
  - Eight (8) Hazardous Compounding Technicians
  - Two (2) Non-Hazardous Compounding Technicians

Future vs Same Day Workflow

Future Workflow:

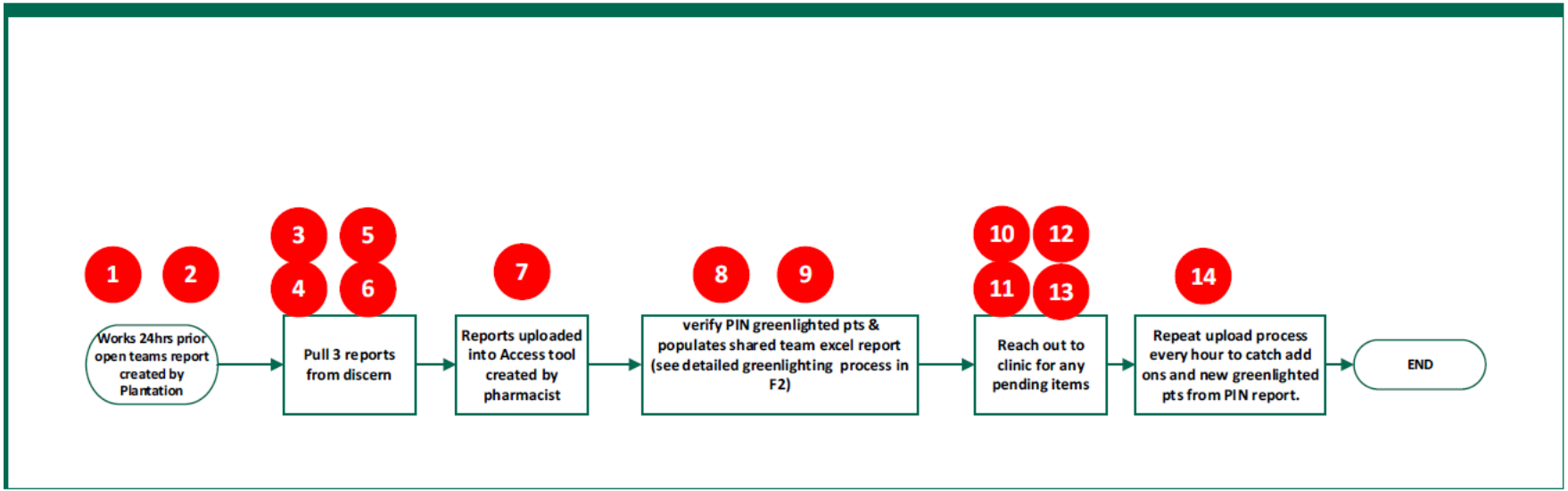
- Patients are reviewed by Pre-Infusion Nurse 24 hours prior to treatment to ensure patient has authorization and appropriate documentation
- Pharmacist clinically reviews patients, performs 1st checks and qualify them for Early Compounding (EC) List Process
  - Patient is considered eligible for the EC List if the Pharmacist, has labs, Provider progress notes and clearance for Infusion
- 2nd Check occurs the day of treatment as early as 6AM
- Compounding of patients on the EC list occurs between 6AM-11AM on the day of the patient's infusion visit

Same Day Patients:

- Patients scheduled for labs and/or office visit on DOT
- All Same Day patients are 1st and 2nd checked by Pharmacist after any pending clarifications are resolved
- Compounding occurs as the orders are processed for infusion

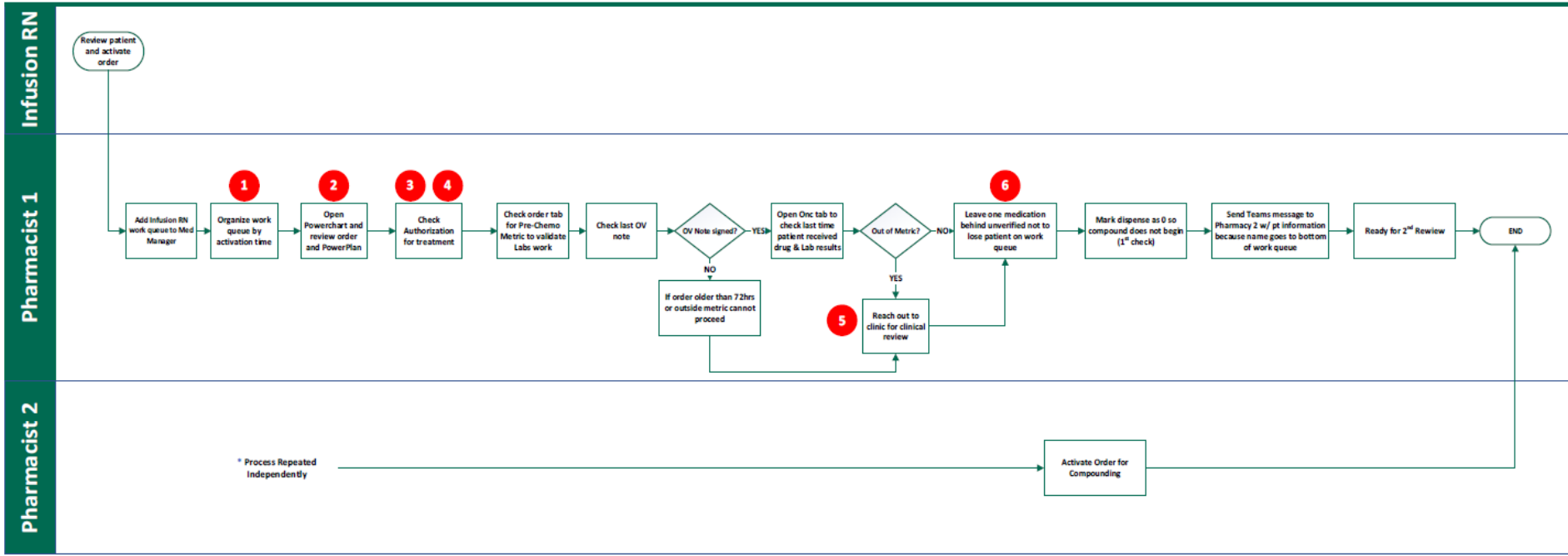
Future Pharmacy Workflow

Working Today for Tomorrow

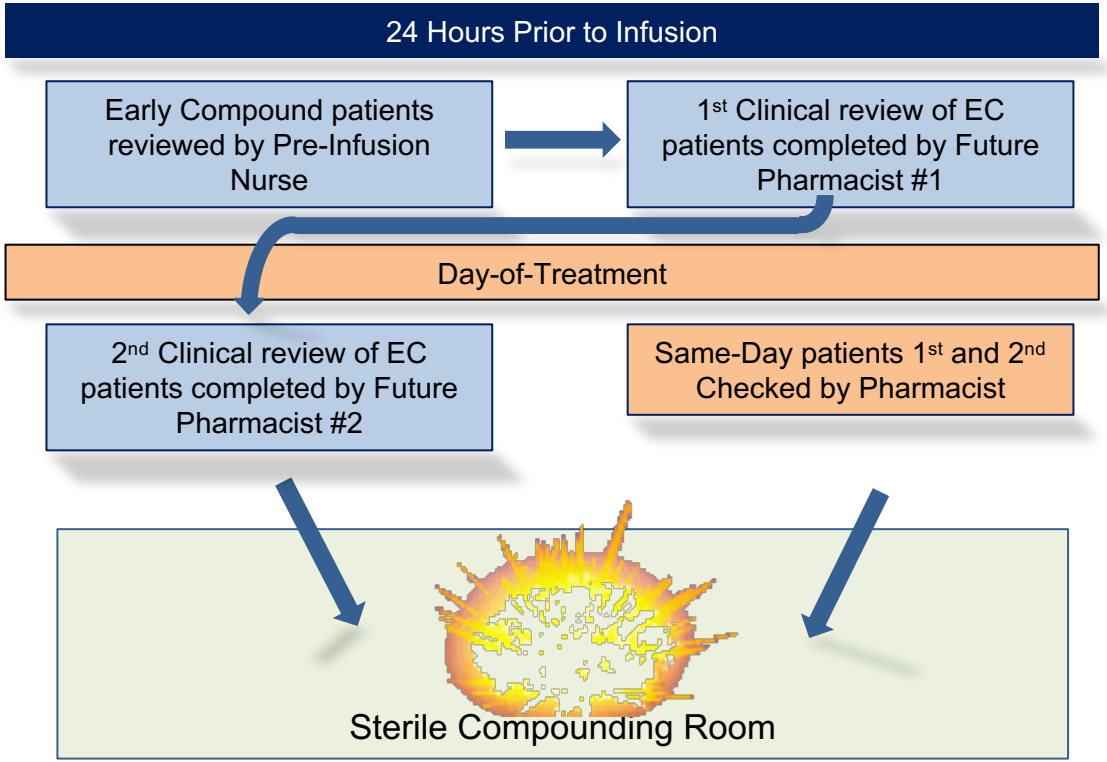


Same Day Pharmacy Workflow

Working Today for Today



When Great Things Collide…

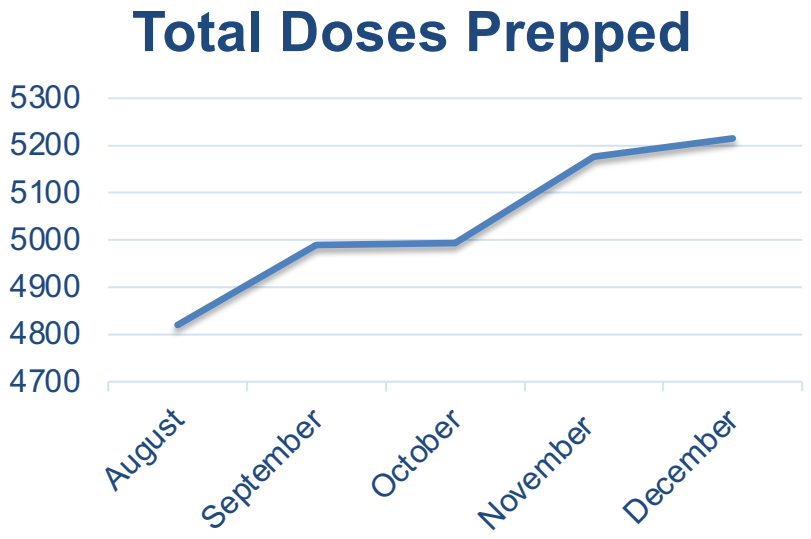


Convergence of the EC process and Same Day Patients workload led to high volume of doses compounded per hour surpassing capacity, leading to bottleneck in IV Room

Adding Fuel to the Fire….

Increased Patient Volumes

Month	Doses Prepared
August	4820
September	4990
October	4994
November	5176
December	5,215



Adding Fuel to the Fire….

Infusion Strategic Initiatives

- Shift in Scheduling Template
  - Increased volumes of morning appointments
  - Congestion in peak compounding time
- Lean TASS Program Implementation
  - Artificial Intelligence (AI) Tool that optimizes Chair and Nursing Utilization
  - Creating efficiencies on the Nursing end that Pharmacy was not position to support
- Nurse Pull Method “TJMAXX Line”
  - Reduced Nursing bottlenecks by randomizing patients to Nurses versus a pre-determined Nursing assignment
  - Impact on medication delivery model and increased the frequency of order activation

Downstream Effects

- Increased Compounding Turnaround Time
- Poor Nursing and Patient Experience
- High Stress IV Room Environment
  - Increased fatigue / staff burnout
  - Increased risk of medication errors

“The Saving Grace”

EARLY COMPOUNDING

- EC Process was working as designed however, it was not positioned for success
- EC Compounding activities occurred too late in the process
- **A**NSWER: EC Process MUST be **shifted to the day** ... to prevent the ...ive... genc... th... dies of w... ...atie... and S... e Da... atie... the ... R...oor

Sterile Compounding Room

Implementation Barriers: Shifting the EC Process to Day Prior

- In order to shift the Early Compounding Process to the day prior to treatment, two main barriers needed to be addressed:
  1) Medication Charging Method:
     - Charge on Dispense (COD) vs Charge on Administration (COA)
  2) Adjustments in Staffing Model
     - Support increased evening shift workload

Implementation Barriers: Charge on Dispense

- Payers require that patients are charged on the same day they receive the infusion
- Charge on Dispense (COD) vs Charge on Administration (COA)
  - Charge on Dispense (COD)
    - Medication charge is triggered by the dispensation of the dose from Pharmacy
  - Charge on Administration (COA)
    - Patient is charged when the Nurse barcode scans medication and documents the administration of the medication on the MAR

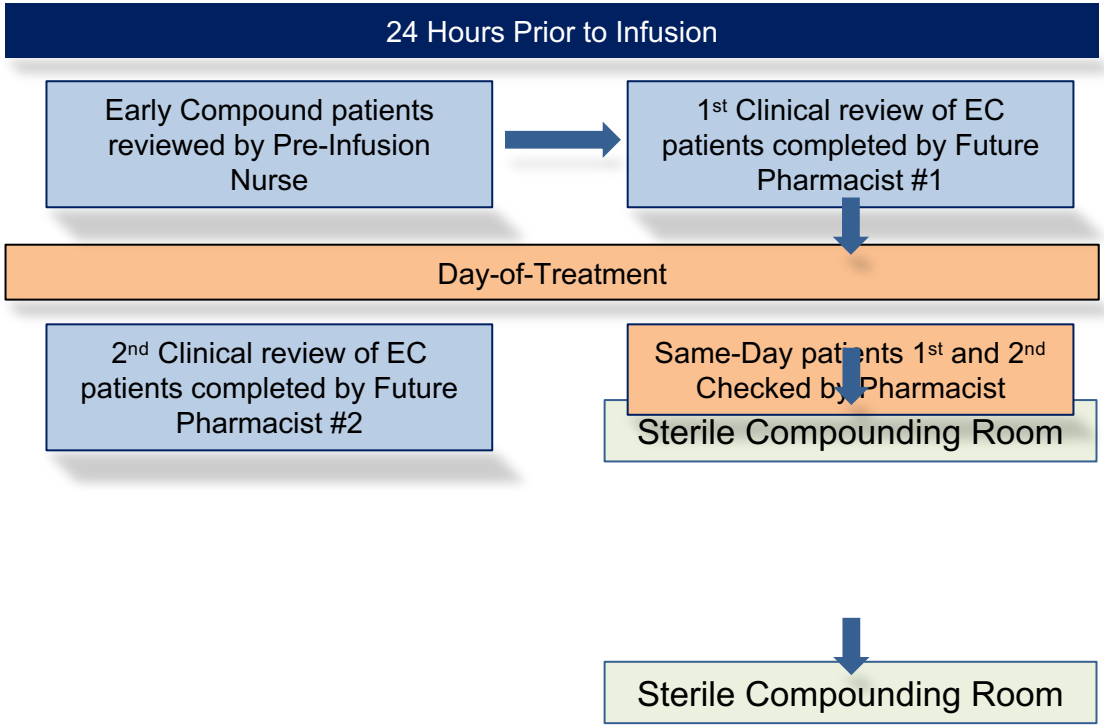
The Transition: COD to COA

- MCI was a COD facility
- In February 2022, Pharmacy developed a multi-disciplinary group and re-invigorated the project
  - Reviewed departmental workflows
  - Identified which areas were eligible for COA vs COD
  - Worked through IT /Cerner limitation and develop new charging strategy at the Pyxis level
  - Implemented new medication administration process- order and barcode scanning in areas that did not barcode scan
  - Ensure Charges were dropping correctly
- As of September 1st, 2022, MCI was able to transition to a COA environment
  - Allows the flexibility to compound the medication at any point in time as long as it did not exceed the required Beyond Use Date (BUD) for the medication

Implementation Barriers: Staffing Model Change

- A shift in staffing model was needed to support Early Compounding Process on the day prior to infusion
  - Pharmacist Future Workflow:
    - The 2nd clinical review need to transition to the day prior to infusion
    - Additional support for order verification and compounding was needed in the afternoon
  - Technician Workflow:
    - Additional Technician compounding personnel needed to perform Early Compounding prior to day of treatment

Implementation Barriers: Staffing



- Updated Staffing Model
  - 2nd Clinical review for Future patient transition to 24hr prior to infusion
  - Expand IV Room Pharmacist coverage to evening hours
  - Recruit for afternoon compounding Technician support

Implementation Barriers: Staffing Model Change

- Staffing Mitigation Strategies
  - Per Diem Pharmacist support
  - Re-organized pharmacist roles to support 1st and 2nd check day prior
  - Early morning pharmacist re-purposed to DoseEdge function
  - Adjusted DoseEdge shift hours to have more afternoon coverage
  - Shifted morning Technician support to afternoon and created a 10 hour shift model

Assessment of Pharmacy Workflow Prior to New EC Process

Capacity Expectations

Compounding Capacity
(Routine TAT) x (# of Techs)

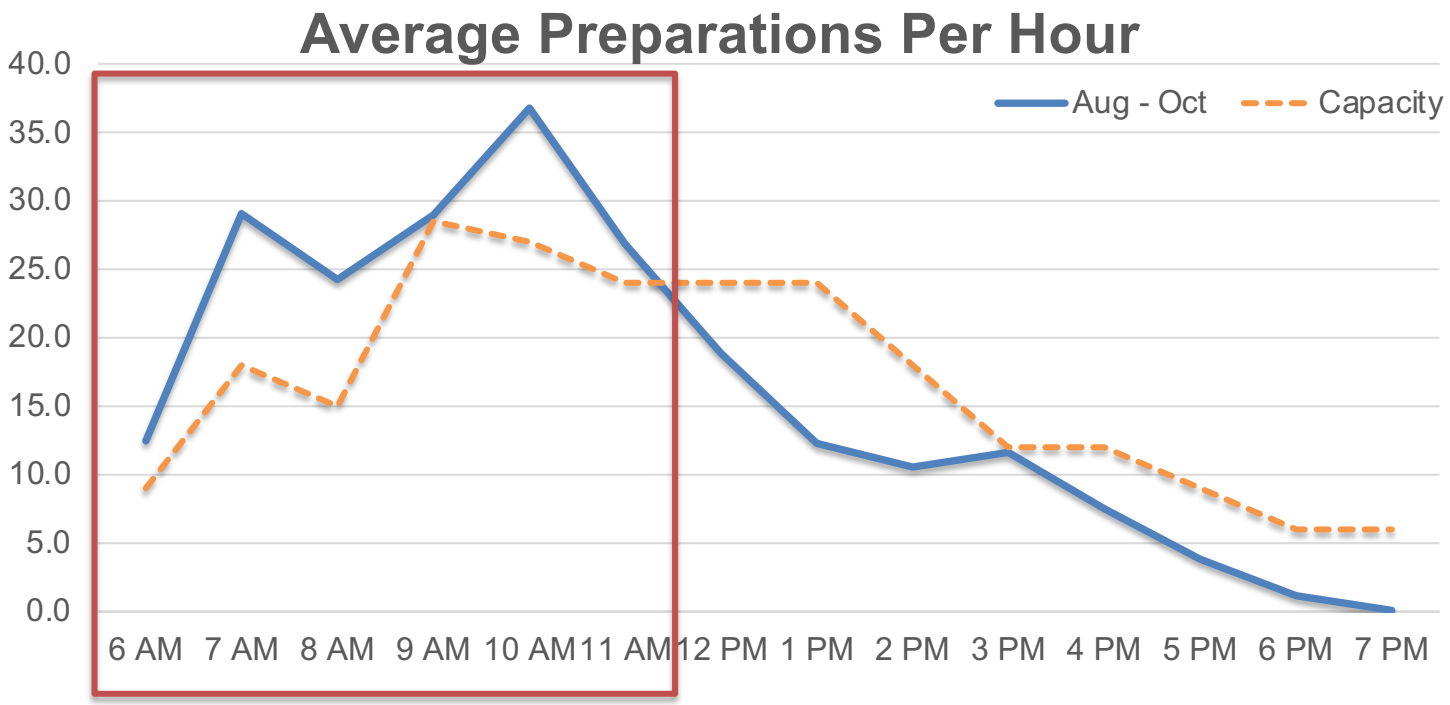
TAT	Minutes
Simple Prep	10 (±2)
Complex Prep	20 (±5)

Compounding Capacity		
Time	Techs	Preps/Hr
6:30 AM	3	9
7 AM	3	18
8 AM	2.5	15
9 AM	4.75	28.5
10 AM	4.5	27
11 AM	4	24
12 PM	4	24
1 PM	4	24
2 PM	3	18
3 PM	2	12
4 PM	2	12
5 PM	1	9
6 PM	1	6
7 PM	1	6

Reality

Compounding Volumes 2022			
Time	August	September	October
6:30 AM	13.1	12.0	12.3
7 AM	25.7	29.8	31.8
8 AM	20.2	24.7	28.0
9 AM	23.8	30.5	32.6
10 AM	34.7	35.3	40.4
11 AM	24.2	26.4	30.0
12 PM	19.5	18.5	18.6
1 PM	13.0	13.0	10.9
2 PM	10.7	11.2	9.7
3 PM	11.8	12.3	10.9
4 PM	7.7	7.4	7.3
5 PM	4.1	4.0	3.4
6 PM	1.2	1.5	0.7
7 PM	0.0	0.3	0.0

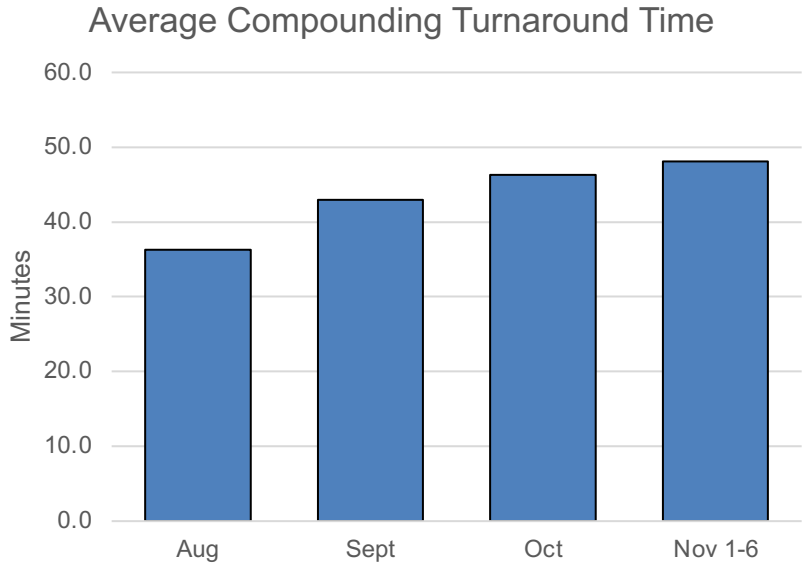
Assessment of Pharmacy Workflow



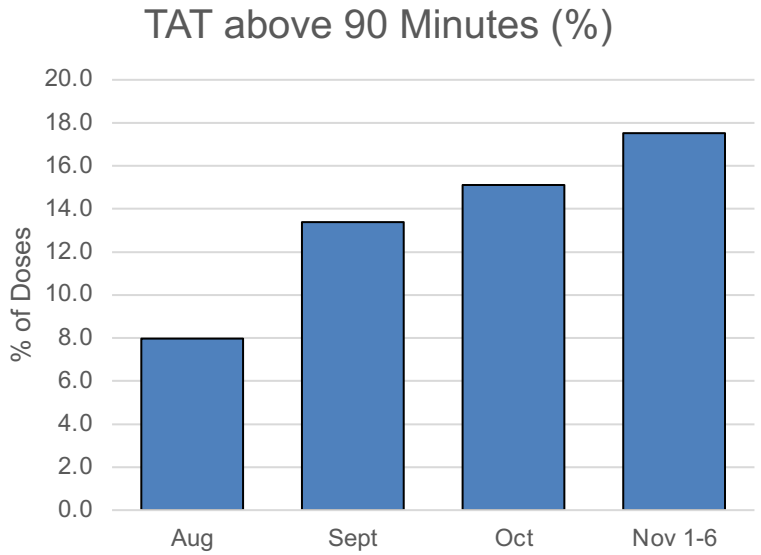
Assessment of Pharmacy Workflow Prior to the New EC Compounding Process

- Impact on Compounding Turnaround Time
  - Turnaround Time (TAT)
    - TAT = Verification Time + Compounding Time
    - Verification Time = Time from order activation to completion of 2nd clinical review
    - Compounding Time = Time pending in the work queue + Time spent in preparation

Assessment of Pharmacy Workflow: Impact on Compounding Turnaround Time



Month	Aug	Sept	Oct	Nov 1-6
Average TAT (Min)	36.3	43.0	46.3	48.1



Month	Aug	Sept	Oct	Nov 1-6
TAT above 90 Mins (% of doses)	8.0%	13.4%	15.1%	17.5%

Implementation of Optimized Early Compounding Process

- November 6, 2022
  - Two (2) additional compounding technicians hired for the afternoon shift
  - Updated Pharmacy Compounding Capacity

Compounding Capacity
(Routine TAT) x (# of Techs)

TAT	Minutes
Simple Prep	10 (±2)
Complex Prep	20 (±5)

Compounding Capacity		
Time	**Techs**	**Preps/Hr**
6:30 AM	3	9
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2 PM	3	18
3 PM	2 +1	12.9
4 PM	2 +2	17.2
5 PM	1 +2	12.9
6 PM	1 +2	12.9
7 PM	1 +1	8.6

Implementation of Optimized Early Compounding Process

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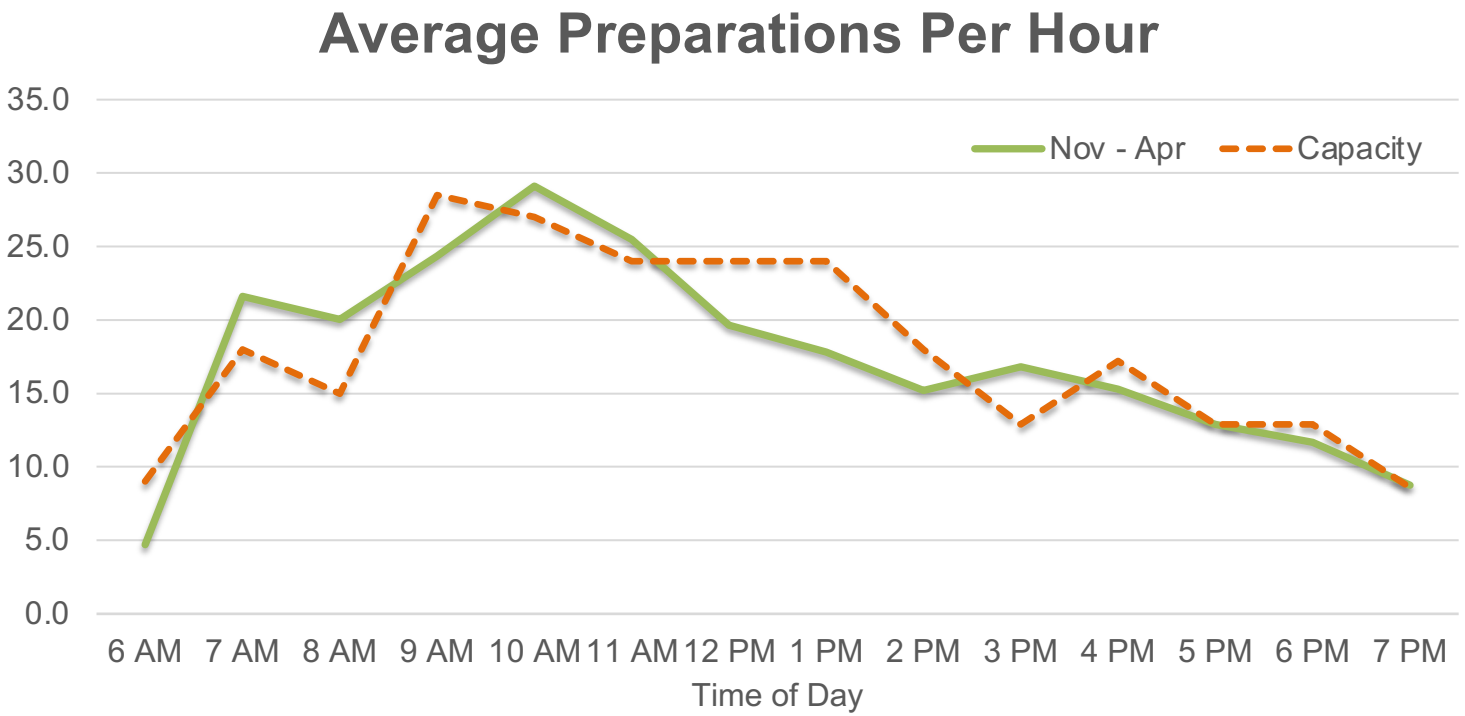
1 PM	4	24
2 PM	3	18
3 PM	2 +1	12.9
4 PM	2 +2	17.2
5 PM	1 +2	12.9
6 PM	1 +2	12.9
7 PM	1 +1	8.6

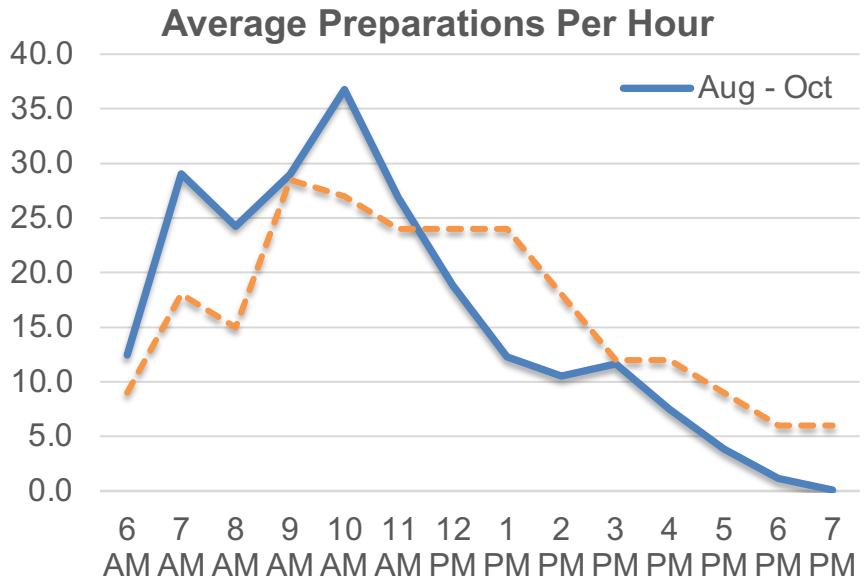
Compounding Volumes (New EC Process)						
Time	Nov	Dec	Jan	Feb	Mar	Apr
6:30 AM	5.2	5.1	5.5	3.9	4.4	4.2
7 AM	24.8	21.1	20.4	21.9	22.7	18.8
8 AM	21.6	19.0	19.6	19.4	20.9	19.9
9 AM	27.9	23.5	21.8	25.3	23.0	24.8
10 AM	32.2	28.8	27.0	28.2	27.7	30.8
11 AM	26.4	27.5	24.7	24.6	23.4	26.4
12 PM	18.6	21.5	21.0	18.5	17.5	20.8
1 PM	16.2	21.0	18.9	16.4	16.0	18.4
2 PM	16.1	14.2	16.7	14.1	14.1	16.2
3 PM	19.4	13.3	17.5	15.1	16.2	19.4
4 PM	16.1	14.8	18.1	12.4	15.2	15.3
5 PM	14.0	13.1	13.5	11.4	12.6	12.8
6 PM	12.8	11.4	13.8	9.7	10.7	11.8
7 PM	10.4	10.2	10.9	7.9	7.4	5.8

Impact on Compounding Capacity

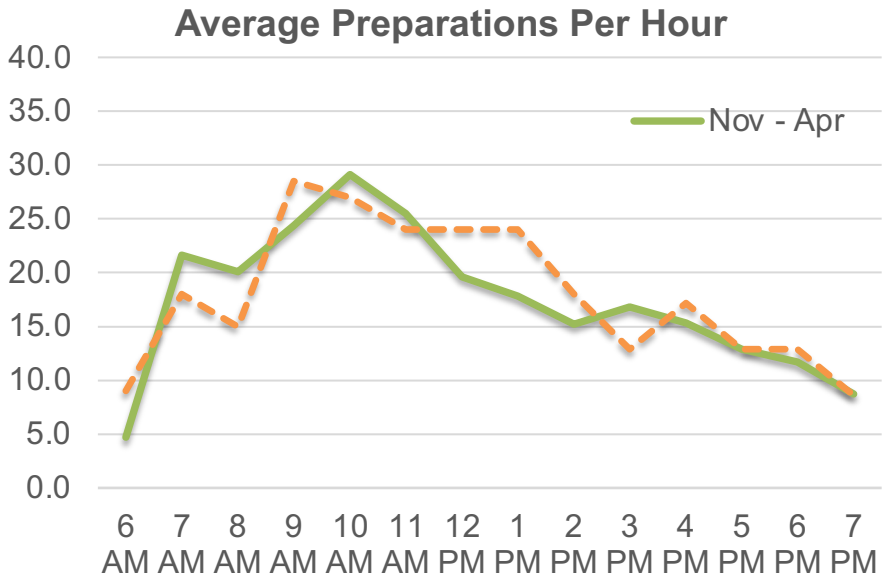


Impact on Compounding Capacity

BEFORE New EC Process

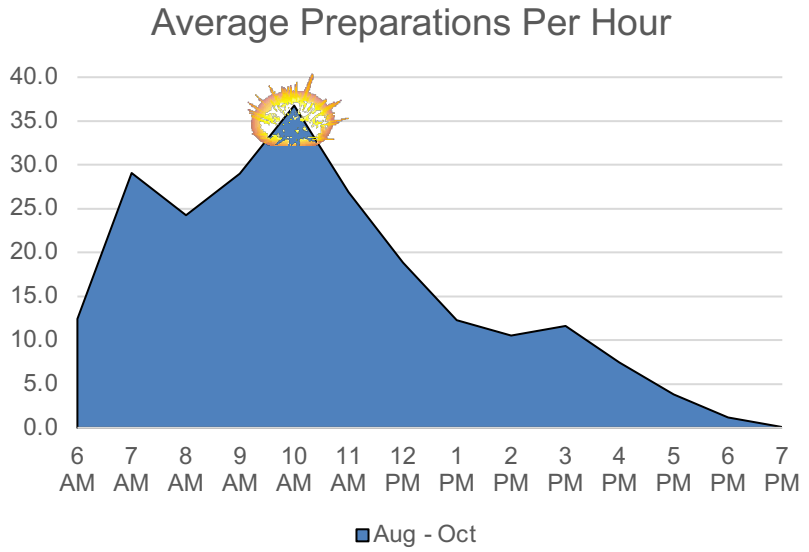


AFTER New EC Process

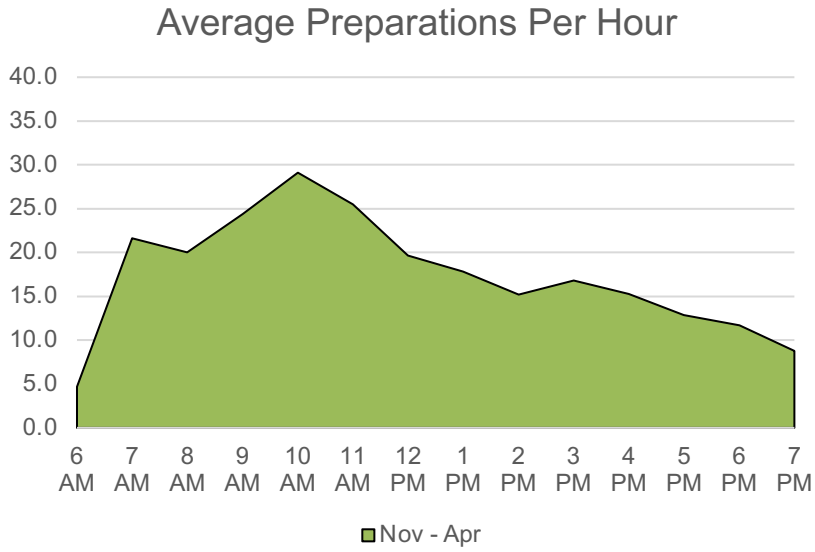


Impact on Compounding Capacity

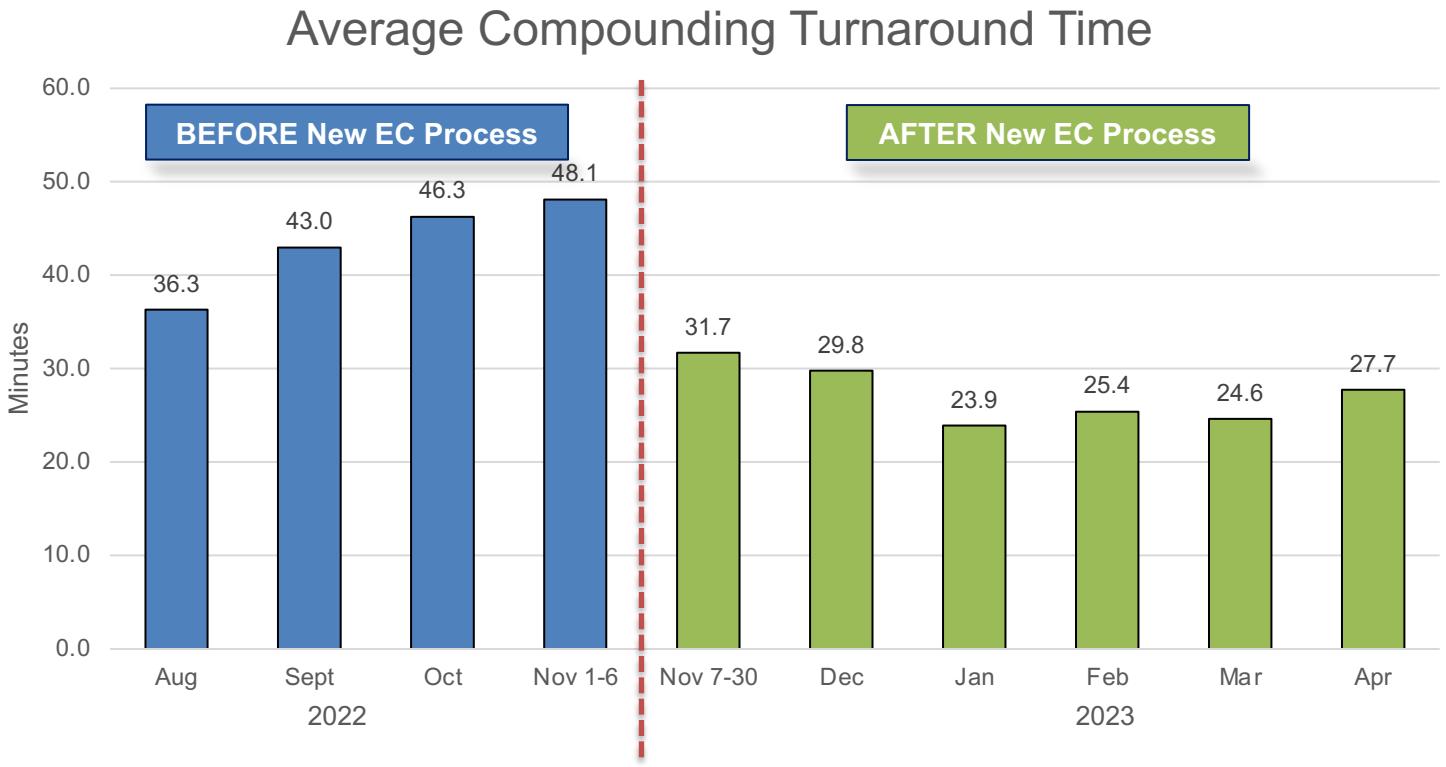
BEFORE New EC Process



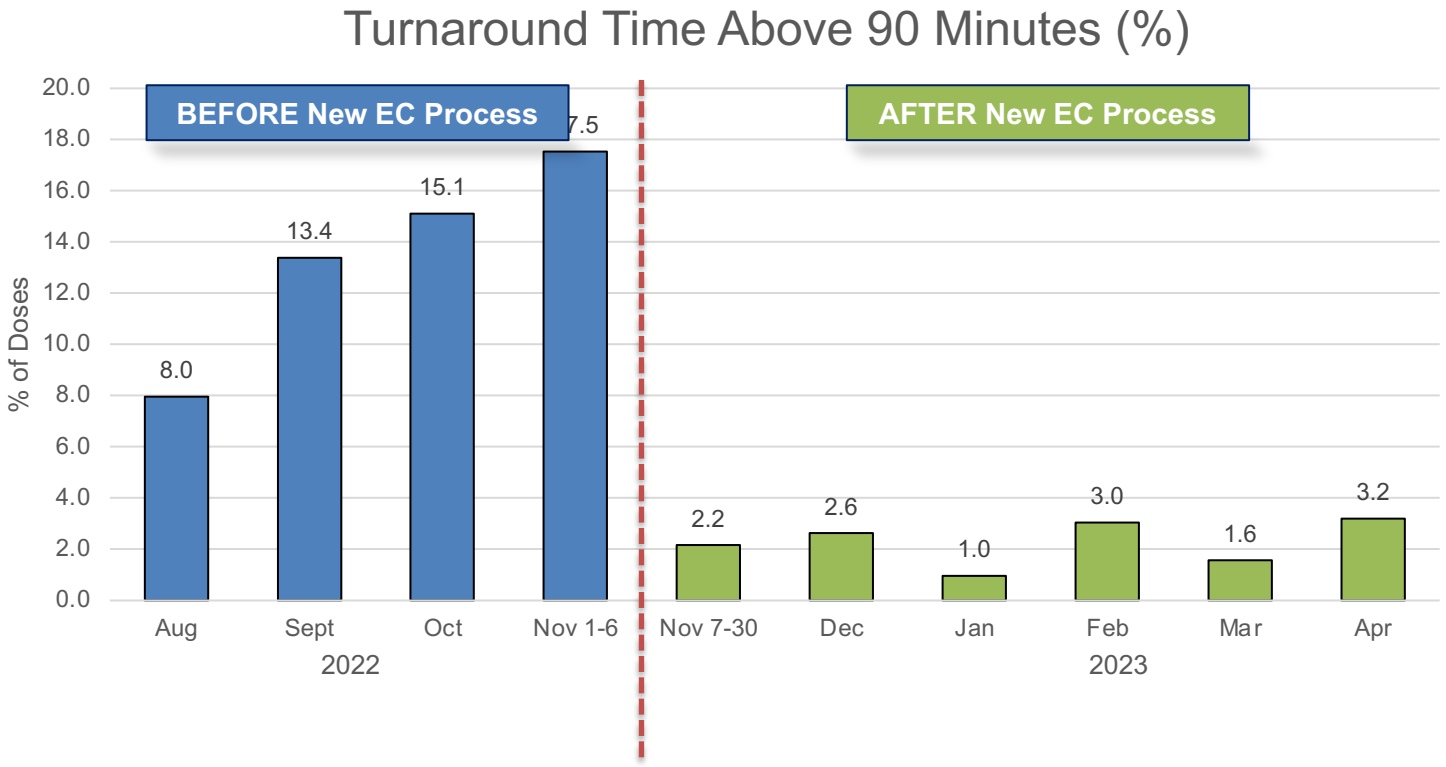
AFTER New EC Process



Optimized Early Compound Process: Impact on Compounding Turnaround Times



Optimized Early Compound Process: Impact on Compounding Turnaround Times



Progress Continues

Early Compound Doses Prepared the Day Prior to Infusion			
	Month	EC Doses Prepared Day Prior	Total EC Doses
2022	Aug	0	1,651
	Sept	0	1,724
	Oct	0	1,714
	Nov	918	1,608
	Dec	1,134	2,410
2023	Jan	1,502	2,592
	Feb	1050	2086
	Mar	1425	2716
	Apr	1392	2550
	May 1-5	462	562

Percent of EC Doses Prepared the Day Prior		
	Month	Percent
2022	Aug	0.0%
	Sept	0.0%
	Oct	0.0%
	Nov	57.1%
	Dec	47.1%
2023	Jan	57.9%
	Feb	50.3%
	Mar	52.5%
	Apr	54.6%
	May 1-5	75.8%

Progress Continues

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	Month	Percent
2022	Aug	0.0%
	Sept	0.0%
	Oct	0.0%
	Nov	57.1%
	Dec	47.1%
2023	Jan	57.9%
	Feb	50.3%
	Mar	52.5%
	Apr	54.6%
	May 1-5	75.8%

- IV Room Workflow Improvement
  - Prior to May 1st, the daily cleaning was completed during the hours of 4PM to 6PM
  - As of May 1st, the daily cleaning has transitioned to 6AM.
  - This has led to an increase in compounding capacity in the afternoon shift

Progress Continues

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	Oct	0.0%
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	Feb	50.3%
	Mar	52.5%
	Apr	54.6%
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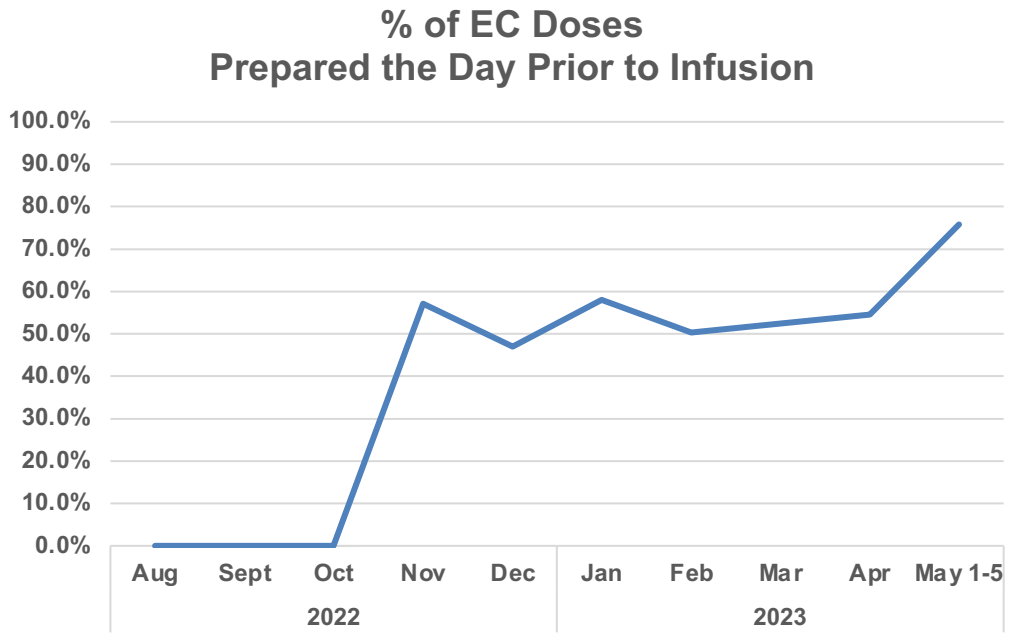

Final Thoughts

- Implementation of an improved Early Compounding Process has allowed the Pharmacy department to:
  - Increase compounding capacity while reducing demand on compounding personnel
  - Reduce compounding turnaround time
  - Improve Pharmacy, Nurse and Patient experience

Acknowledgments

- Clinical Pharmacists and Compounding Technicians at Miami Cancer Institute
- Samer Hay, PharmD, BCOP – Data Analysis
- Nursing Leadership
- Pharmacy Informatics

Q & A Session