Project Title: Decreasing Initiation of Chemotherapy Time in Elective Patients admitted to an Inpatient Hematology Malignancy Unit

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Montefiore Medical Center
Bronx, NY

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Institutional Overview

• Montefiore Medical Center consists of eleven hospitals; a primary and specialty care network of more than 180 locations across the Bronx, Westchester County, and the lower Hudson Valley; Albert Einstein College of Medicine; an extended care facility; the Montefiore School of Nursing.

• NCI-designated Cancer Center

• In our institution, 19-20 patients are admitted per month for elective chemotherapy (non-transplant) admissions.
Problem Statement

• 86% (n=25) of patients with hematologic malignancies admitted for elective chemotherapy in the oncology unit experienced a delay (greater than 6 hours) in initiating their treatment in the period of February to March 2017.

• This delay results in:
  – an increased length of stay.
  – decreased patient satisfaction.
  – increase of resource utilization.
<table>
<thead>
<tr>
<th>TEAM MEMBER</th>
<th>ROLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stu Packer</td>
<td>Medical Director</td>
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<tr>
<td>Jalpa Sojitra</td>
<td>Oncology Pharmacist</td>
</tr>
<tr>
<td>Cheron Jacobs</td>
<td>Physician Assistant</td>
</tr>
<tr>
<td>Jennat Mustafa</td>
<td>Physician Assistant</td>
</tr>
<tr>
<td>Dana Amorese</td>
<td>Physician Assistant</td>
</tr>
<tr>
<td>Chiniqua Lee</td>
<td>Administrative Assistant</td>
</tr>
<tr>
<td></td>
<td>(manages the elective admission list)</td>
</tr>
<tr>
<td>Sandra Palmer</td>
<td>Personal Care Attendant</td>
</tr>
<tr>
<td>Ioannis Mantzaris</td>
<td>Heme malignancy attending</td>
</tr>
<tr>
<td>Jennifer Rodriguez</td>
<td>Outpatient phlebotomist</td>
</tr>
<tr>
<td>Patrina Guy</td>
<td>Outpatient phlebotomist</td>
</tr>
<tr>
<td>Brian Wagner</td>
<td>Outpatient clinic nurse</td>
</tr>
<tr>
<td>Lisa Henderson</td>
<td>Admitting/Insurance Approval</td>
</tr>
<tr>
<td>Albert Weiner</td>
<td>Patient Logistics</td>
</tr>
<tr>
<td>Jose Galeas</td>
<td>Clinical Oncology Fellow</td>
</tr>
<tr>
<td>Solitaire Coutrayer</td>
<td>Social Worker</td>
</tr>
<tr>
<td>Roy Browne</td>
<td>Director of Oncology Pharmacy</td>
</tr>
<tr>
<td>Karen Wright</td>
<td>Clinical Nurse</td>
</tr>
<tr>
<td>Susan Sakalian</td>
<td>Clinical nurse educator</td>
</tr>
<tr>
<td>Adam Binder</td>
<td>Heme Malignancy Attending</td>
</tr>
</tbody>
</table>
Cause and Effect Diagram

Orders
- Orders incomplete
  - not written
  - not signed
- not released on time
- No treatment plan applied
- Treatment regimen not clear
  - need fixing/order incorrect

Staff
- Lack of communication
  - Fellow/Attending assess patient late
- No consent for chemotherapy
  - RN unaware orders signed
- Inadequate staffing
  - RN busy with other issues
- Pre-Admission visit not scheduled

Diagnostics/Labs
- Labs not drawn in hospital
- Labs not available
- Next rounding labs causes
- Urine alkalinization
  - Labs not drawn
- Lab parameters not met
  - Treatment specific labs not
- Tx specific labs needed

Room taken by other patient

Problem Statement
Initiation to Chemotherapy

Pharmacy
- No chemotherapy in pharmacy
  - Too far from floor
  - Short staffed
  - Shortage of drugs other than chemotherapy
  - IT issues

Patient
- Patient preference
  - Patient arrived late
    - Transportation
- Lack of patient centered care
  - Pharmacy closed
  - IT issues
- Patient sick
  - Patient has no IV

Bed Availability
- Not knowing exact LOS
  - Insurance auth lapac
- Room not clean
  - No plan to move patients post

ASCO®  QUALITY TRAINING PROGRAM™
Diagnostic Data

Ideal - average length of stay according to chemotherapy regimen duration vs. Actual Length of stay – time from admission to discharge
Time from admission to chemotherapy

Defined from time of vital signs taken at admission until time of discharge order in EMR.

Patients presented with acute illness that needed eval prior to chemo.
Median Times to Steps in Process

- Patient admitted
- Admission to labs drawn (median: 162 min)
- Labs drawn to resulted (median: 72 min)
- Admitted to 1st chemo signature (median: 319 min)
- 1st to 2nd signature (median: 19.5 min)
- 2nd signature to nursing releasing chemo (median: 25.5 min)
- Nurse release to pharmacy production (median: 19 min)
- Pharmacy production to chemo administration (median: 194 min)
Aim Statement

- Our AIM is to reduce the time from admission to initiation of chemotherapy by 76% from a median of 25 hours to a median of 6 hours by December 2017.
Measures

• **Measure**: Time from admission to chemotherapy (Defined from time of vital signs taken at admission until time of chemotherapy administration)

• **Patient population**: Patients admitted for elective chemotherapy
  - **Exclusions (if any)**: Patients who are acutely ill on arrival for elective admission.

• **Calculation methodology**: We are measuring difference in time between admission and key process measures. i.e.
  - Time from admission to laboratory exam results
  - Time from admission to chemotherapy signed
  - Time from chemotherapy signed to chemotherapy released by nurse

• **Data source**: EMR

• **Data collection frequency**: Every two weeks

• **Data quality (any limitations)**: Admission time/date is based on initial vital sign, which may not be reflective of time patient arrives to the floor.
Diagnostic Data
Time From Admission to Labs Resulted

Median = 4.75
Time from Admission to 1st chemotherapy signature

Chemotherapy delay due to acute illness on admission.

Median 5.32 hours
Time from Production to chemotherapy administered

Median = 2.8 hours
Time from Admission To Chemotherapy by Regimen

Chemotherapy Regimen

EPOCH/raltegravir with interferon
DHAP
HiDAC
High Dose Methotrexate
HyperCVAD MA Part A
HyperCVAD MA Part B
ICE
VIP
## Prioritized List of Changes (Priority/Pay-Off Matrix)

<table>
<thead>
<tr>
<th>High Impact</th>
<th>Easy</th>
<th>Difficult</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labs drawn on day of admission prior to coming to floor</td>
<td>- Implementation of new IDT rounds workflow to improve discharge planning</td>
<td>- “Relocate” patient when chemotherapy is done, while awaiting discharge</td>
</tr>
<tr>
<td>Obtain consent for chemotherapy prior to admission</td>
<td>- Pharmacy reviews plan morning of admission</td>
<td>- Pre admission visit to streamline process</td>
</tr>
<tr>
<td>Alkalinize urine prior to admission (PO tablets) / (IVF as outpatient transition to inpatient)</td>
<td>- Improve communication between nursing and physician through modifications in EMR</td>
<td>- Complete orders before admission</td>
</tr>
<tr>
<td>Low Impact</td>
<td></td>
<td></td>
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<tr>
<td>- Outpatient central line placement</td>
<td></td>
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</tbody>
</table>

**Ease of Implementation**
- High
- Low
# PDSA Plan (Tests of Change)

<table>
<thead>
<tr>
<th>Date of PDSA cycle</th>
<th>Description of intervention</th>
<th>Results</th>
<th>Action steps</th>
</tr>
</thead>
<tbody>
<tr>
<td>6/22/17</td>
<td>Improve communication between nursing and physician through modifications in EMR</td>
<td>Neutral – No change in time from signature to nurse releasing the chemotherapy.</td>
<td>Change – In addition to EMR modifications, ensure that we discuss new chemotherapy plans and direct admissions during interdisciplinary rounds.</td>
</tr>
<tr>
<td>7/19/17</td>
<td>Change work flow so labs drawn in clinic before admission if patient arrived before 4pm</td>
<td>Positive – Significant decrease in time from admission to labs resulted as labs processing while patient being registered for admission.</td>
<td>Adopt - Initially had an administrator working with admissions to coordinate process, but as it has become part of the workflow, admissions office is now integrated it into their process.</td>
</tr>
<tr>
<td>7/28/17</td>
<td>AB reviewed admission list and reminded outpatient providers to alkaninize urine prior to admission and encourage prompt chemotherapy signatures for elective admissions</td>
<td>Positive – More patients coming in with urine pH &gt;7.5 and chemotherapy being signed in a more timely fashion.</td>
<td>Adopt - Open discussion with providers to keep them involved in process.</td>
</tr>
</tbody>
</table>
Materials Developed

Columns added to multi-provider workflow so can see when treatment plan has been signed

<table>
<thead>
<tr>
<th>Signed Tx Plan</th>
<th>Next Treatment Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Tx Plan</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>9/30/2017</td>
</tr>
<tr>
<td>No</td>
<td>10/6/2017</td>
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<tr>
<td>No</td>
<td>10/5/2017</td>
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<tr>
<td>Yes</td>
<td>9/30/2017</td>
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<tr>
<td>Yes</td>
<td>10/2/2017</td>
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<tr>
<td>No</td>
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<tr>
<td>No</td>
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<tr>
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<tr>
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<tr>
<td>Yes</td>
<td>12/22/2016</td>
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<tr>
<td>Yes</td>
<td>9/29/2017</td>
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<tr>
<td>No</td>
<td>9/22/2017</td>
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</tbody>
</table>

Admission labs template for providers

- Complete blood count
- Basic Metabolic Panel
- Liver tests
- Lactic Dehydrogenase
- Uric Acid
- Type and Screen
- Prothrombin time
- Partial Thromboplastin time

Display to physicians that the later in the day the patient arrived, the longer it takes for the physician to sign the chemotherapy
Change Data

Time from Admission to Labs Resulted

PDSA 1

PDSA 2

PDSA 3

Time in Hours

Goal

Alkalization delay

CVC complication

Admitted on antibiotics.

Lab delay

UCL

Labs taken refer to UA

CL

15.03

16.38

14.075

5.19

5.65

1.41

2.493

5.00

10.00

15.00

20.00

25.00

1

2

3

4

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Patient
Change Data

Time from Admission to 1st Chemotherapy Signature

PDSA 1

Chemo delayed due to SOB

Admitted on antibiotics.

PDSA 2

PDSA 3

Time in Hours

Patient

Time from Admission to 1st Chemotherapy Signature

UCL

CL

Goal

Change Data

PDSA 1

PDSA 2

PDSA 3

Admitted on antibiotics.
Change Data

Time from Last MD Signature to Nurse Releasing Chemo

- **PDSA 1**: Admitted on antibiotics.
- **PDSA 2**: CVC delay, CVC complication.
- **PDSA 3**: No documented event, Admitted on antibiotics.

UCL: 2.81
CL: 0.72
Goal: 0.5
Change Data

Time From Admission to Start of Chemotherapy

Median time to chemotherapy after PDSA 3 is 10 hours.
Conclusions

• By implementing new admission workflows, optimizing our use of the EMR to communicate among providers, and improving pre-admission planning we were able to decrease time from admission to initiation of chemotherapy by 60% (initial median 25 hours, new median 10 hours).

• Improvement still needed to meet our goals and fully standardize the processes as part of our daily workflow.
Median Times to Steps in Process after PDSA

Median 234 min  New median 127 minutes

- Patient admitted
- Admission to labs drawn (median: 162 min)
- Labs drawn to resulted (median: 72 min)
- Admitted to 1st chemo signature (median: 319 min) (New median 222 Minutes)
- 1st to 2nd signature (median: 19.5 min)
- 2nd signature to nursing releasing chemo (median: 25.5 min)
- Nurse release to pharmacy production (median: 19 min)
- Pharmacy production to chemo administration (median: 194 min)
Next Steps/Plan for Sustainability

• We will focus next on decreasing time from chemotherapy production to chemotherapy administration.

• We plan to have continuous meetings with all staff involved in the process showing our improvement as well as looking for feedback.

• Continue to send E-mails congratulating staff for their hard work, that serve as reminder for the changes we have made to the admission process.