Introduction

- Chemotherapy treatment demand exceeds ambulatory infusion capacity at University of Michigan’s Comprehensive Cancer Center
- Receiving an infusion is a complicated process involving multiple departments with the potential for many process delays
- Frequently patients cannot proceed in the process due to a delay in receiving lab results
- Goal: Reduce delays in receiving lab results to improve patient flow through the outpatient chemotherapy infusion center

Infusion Process

![Infusion Process Diagram]

Methods

- 75+ hours of observation
- Administrative appointment data, electronic health record data, lab information system data, patient demographic data
- Mapped processing for three frequently drawn infusion labs (CBCD, CMP, Type & Screen)
- Calculated patient travel time to Cancer Center and satellite lab facilities to assess whether decoupling lab visits would be feasible
- Currently planning a pilot of proposed recommendations

Lab Draw Station Data Analysis Results

- 51% of patients before 10:30 AM
- Morning bottleneck exceeds lab draw station capacity and creates delays that propagate throughout the day
- Majority of patients utilizing the Cancer Center lab are patients only going to a clinic appointment (not an infusion appointment)
- Phlebotomist staffing peaks at 2 PM which is misaligned with patient demand

Travel Time Analysis Results

- A potential solution to reducing delays in blood draw is to uncouple lab visits from following appointments meaning labs would be drawn the day before the scheduled appointment
- Google Maps API was used to calculate patient travel time to the closest of any 9 of the UMHS satellite lab facilities

<table>
<thead>
<tr>
<th>Driving Duration</th>
<th>Percent of Patients to Closest Lab Facility</th>
<th>Percent of Patients to Cancer Center</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 15 min</td>
<td>32%</td>
<td>10%</td>
</tr>
<tr>
<td>15 – 30 min</td>
<td>20%</td>
<td>19%</td>
</tr>
<tr>
<td>30 – 60 min</td>
<td>23%</td>
<td>36%</td>
</tr>
<tr>
<td>1 – 2 hours</td>
<td>15%</td>
<td>22%</td>
</tr>
<tr>
<td>2 – 4 hours</td>
<td>7%</td>
<td>9%</td>
</tr>
<tr>
<td>Over 4 hours</td>
<td>3%</td>
<td>4%</td>
</tr>
</tbody>
</table>

- With 32% of patients within 15 minutes of a lab draw facility uncoupling lab visits could be a feasible option for a significant amount of patients

Conclusions

- Current infusion process is subject to significant delays due to labs
- Labs are delayed mainly in the blood draw portion of the process
- There is potential to reduce delays in blood draw
- Uncoupling lab visits can be a solution to reduce patient wait time on the day of appointment and to potentially reduce the Cancer Center Blood Draw’s peak workload in the morning

Future Work

- Currently creating a plan to pilot the idea of uncoupling lab visits for an appropriate subset of patients
- Working with blood draw management and front line staff to implement process improvements to reduce delays such as reengineering processes, adding staff, and reducing batching

Acknowledgment

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