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Comprehensive Cancer Center

Scheduling and Patient Flow in an Outpatient Chemotherapy Infusion Center

ISERC

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Sarah Bach



CHEPS Center for
Healthcare Engineering
& Patient Safety



Collaborators

- Amy Cohn, Ph.D.
- Brian Denton, Ph.D.
- Alon Weizer, MD
- Louise Salamin, MSA, BSN, RN
- Carol McMahon, BSN, RN
- Corinne Hardecki, BSN, RN





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Current Team

- Hassan Abbas
- Max Boykin
- Jeremy Castaing
- Vanessa Morales
- Matt Rouhana
- Stephanie See





Cancer and Cancer Treatment

- Cancer Statistics
 - In 2014 there will be an estimated 1,665,540 new cancer cases
 - Second leading cause of death in the United States
- Chemotherapy Infusion Center
 - Facility where cancer treatment is given on an outpatient basis
 - Over 50% of all cancer patients receive chemotherapy treatment

Source: American Cancer Society. (2014). <http://www.cancer.org>





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- 93,319 outpatient visits annually
- 51,884 infusion treatments annually
- 5% increase in patient volume annually



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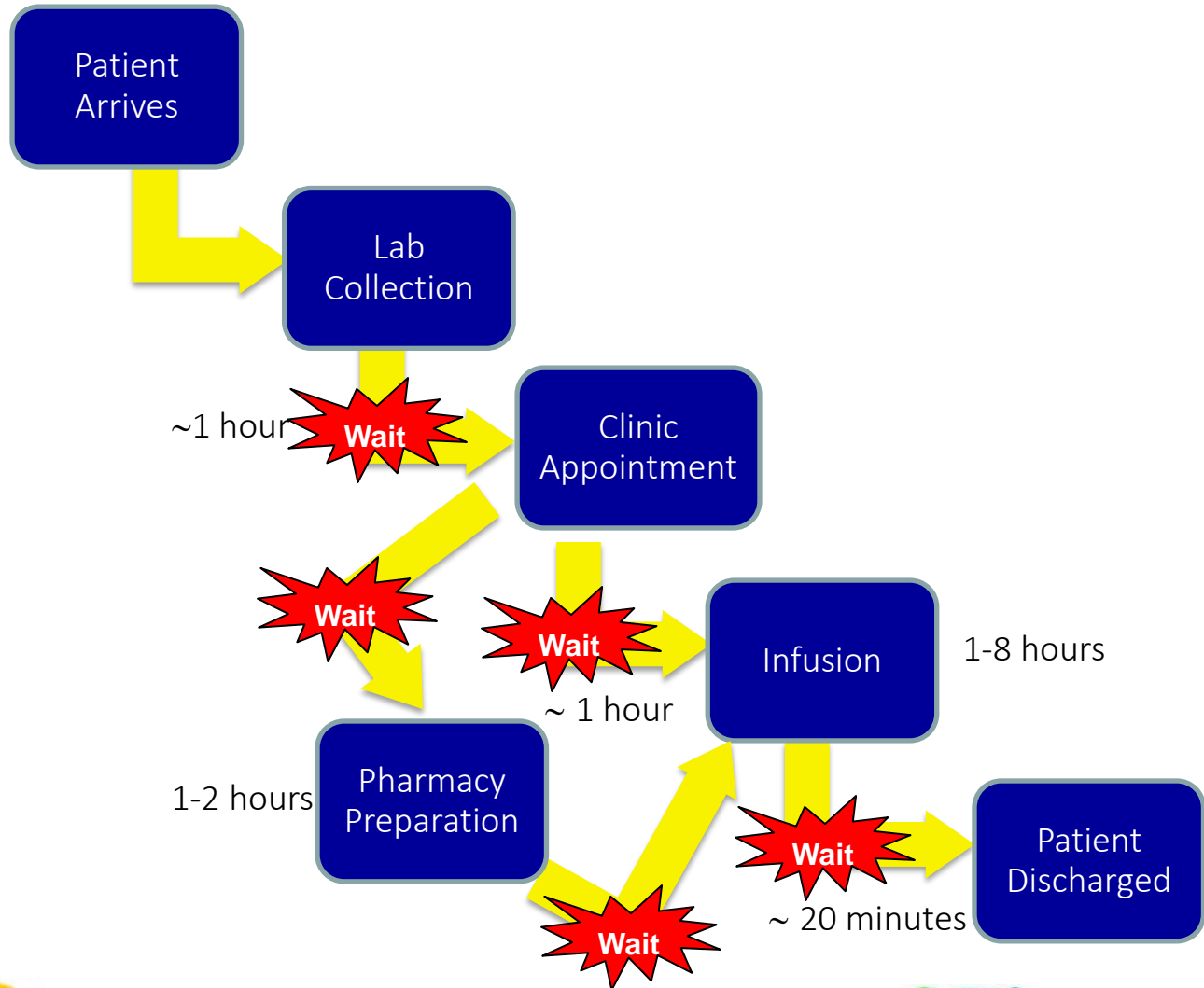
Project Goals

- Improve quality of cancer care delivery in the infusion center
 - Reduce patient waiting times
 - Reduce total length of day of operations
 - Others:
 - Promote equity in nurse workload
 - Improve patient and nurse safety
 - Reduce cost associated with pharmaceutical waste



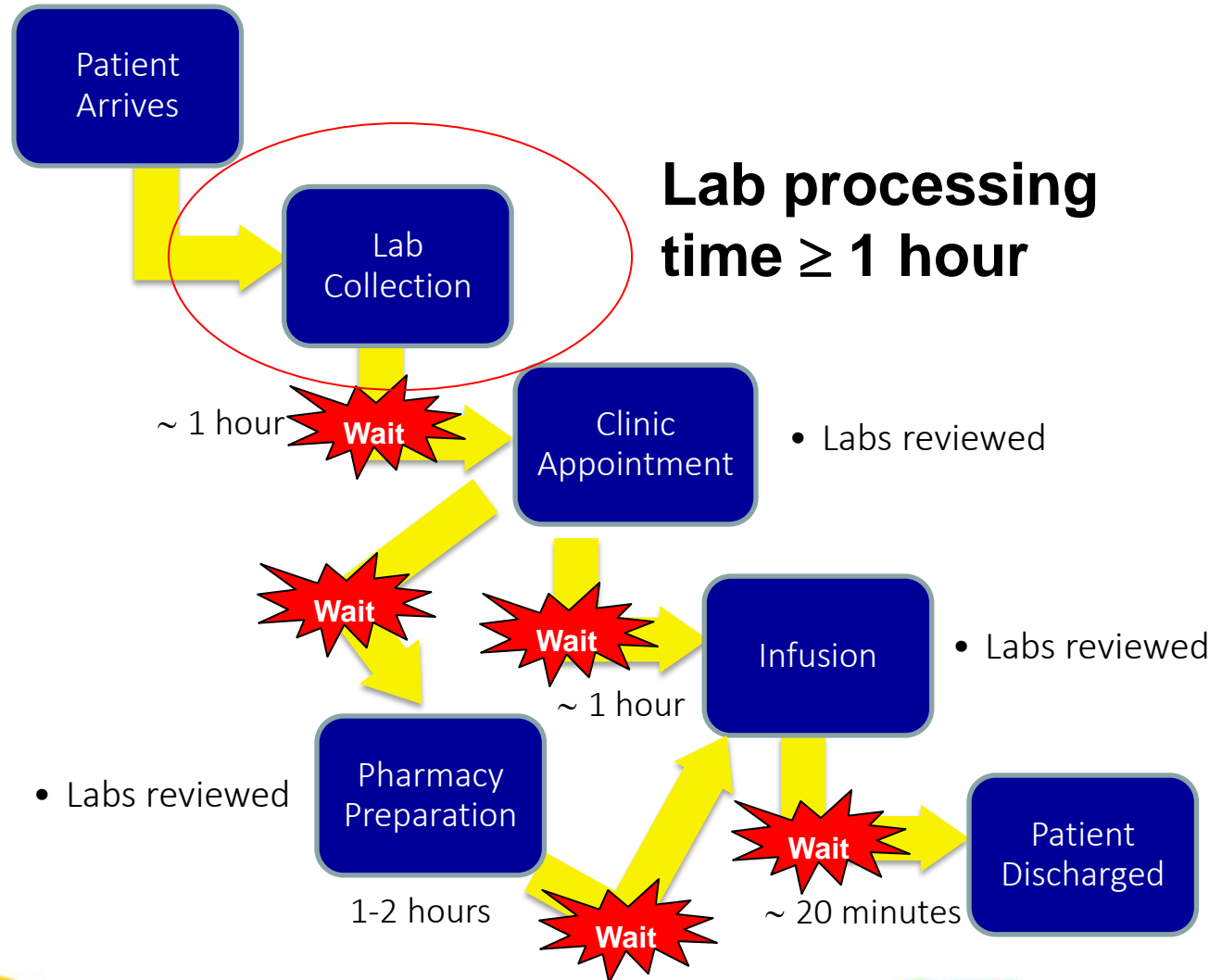


Patient Flow





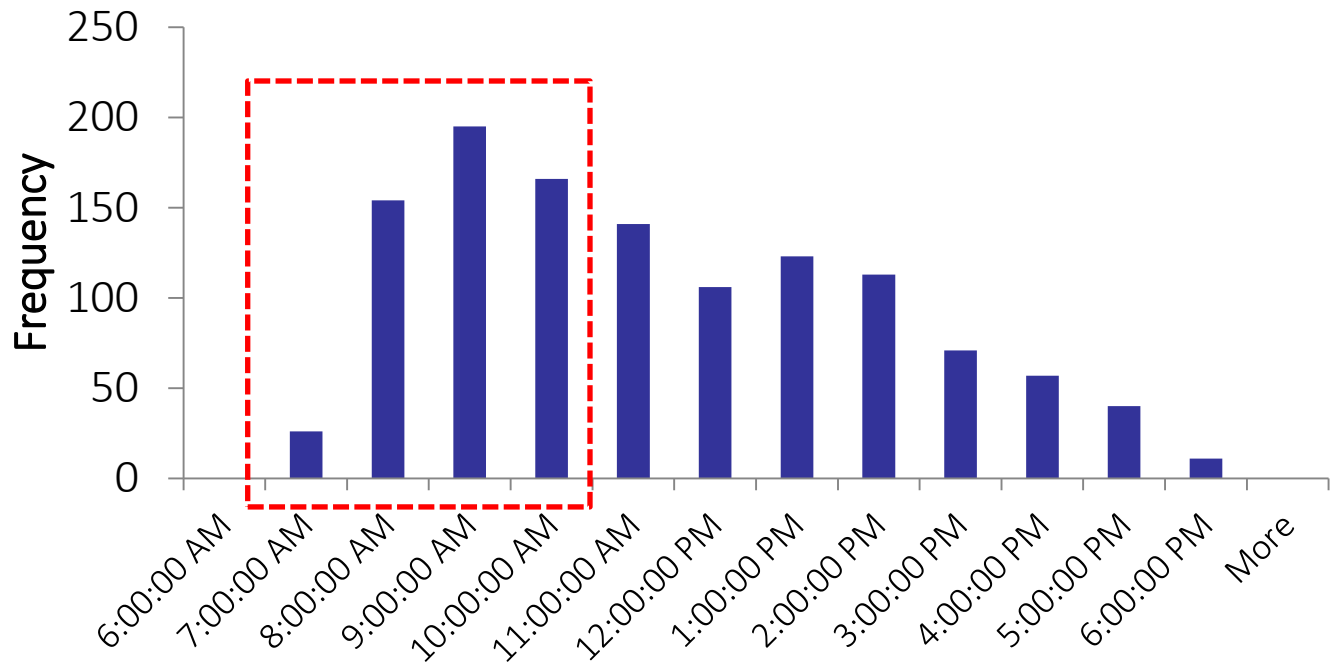
Patient Flow





Additional Motivation

Volume of Lab Patients per Hour



- Source: Electronic health record data, April 7-11, 2014
Labs can be collected within 48 hours of infusion appointment





Decoupling of Visits

Day 1:



Day 2:





Assessing Decision of Decoupling

Advantages

- Reduce patient wait times on day of infusion
- Reduce UMHS Cancer Center lab workload in morning

Disadvantages

- Patients must complete two visits

Decoupling becomes beneficial when roundtrip travel time and lab draw time < 1 hour

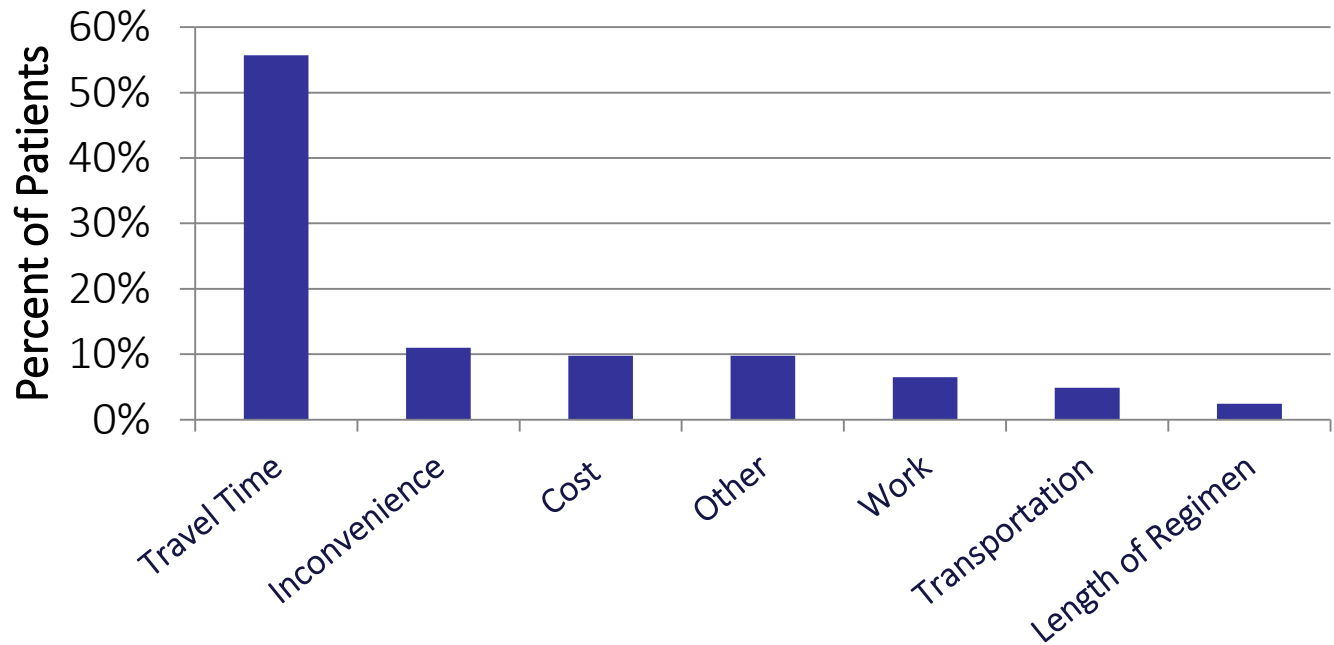




Feasibility of Decoupling Visits

- Survey results indicate 9% of patients interested in a 2 day schedule

Patient Reasons for Opposing a 2 Day Schedule



Data Source: Infusion Survey of Patients on Monday, June 10, 2013. 251 Responses.





Methods

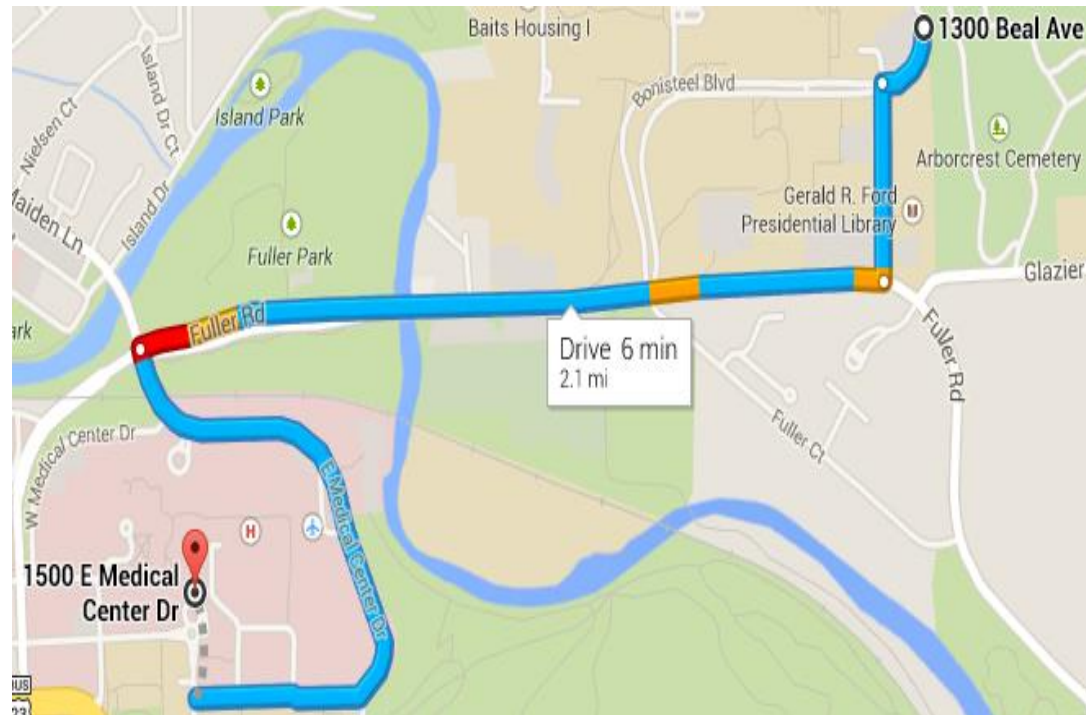
- Pulled data from electronic health record for Aug 2012 – Feb 2013 (9429 patients)
 - Patient addresses contained in this data set
- Calculate distance and driving duration for each patient address to the UMHS Cancer Center





Methods

- Google Maps API used to determine distance and driving duration between patient addresses and UMHS Cancer Center



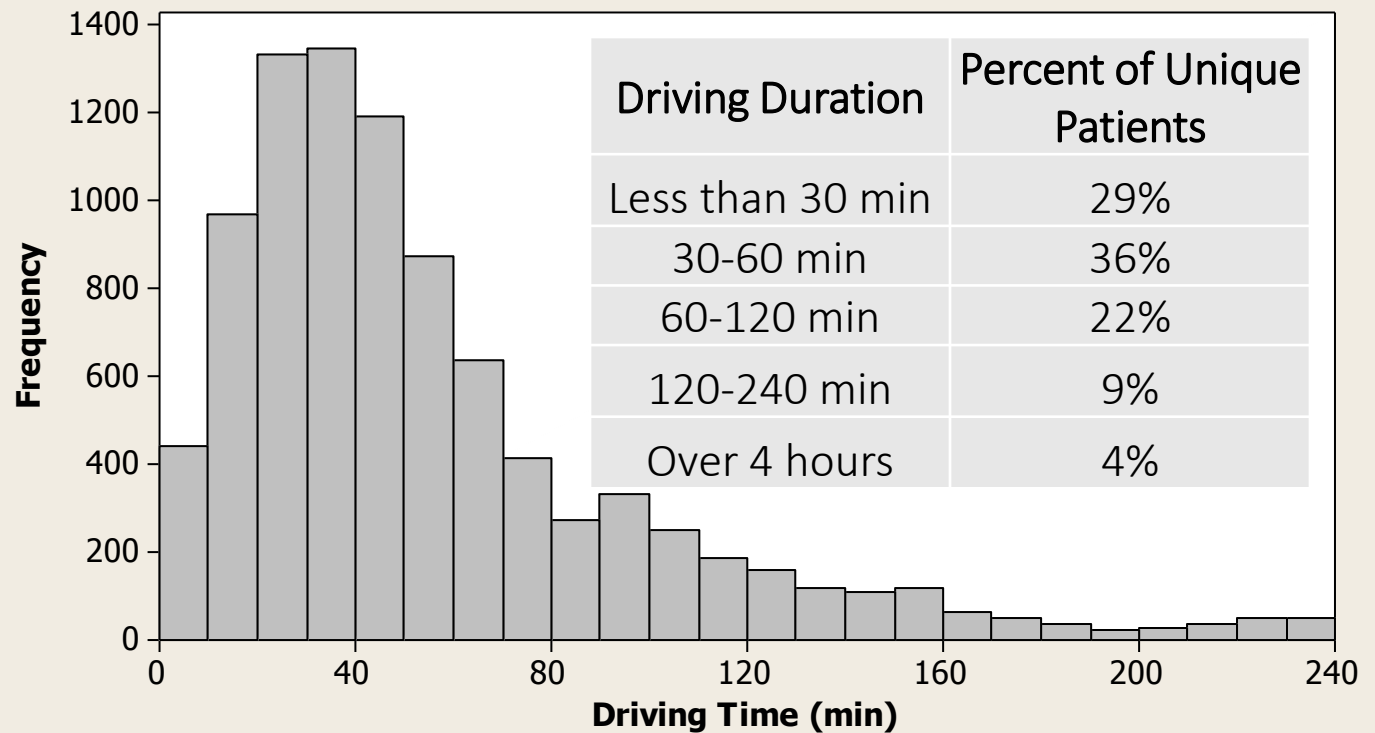


Quantifying Driving Time to UMHS

Histogram of Patient Driving Time to Cancer Center

Clarity Data Aug 2012 – Feb 2013 (9429 patients)

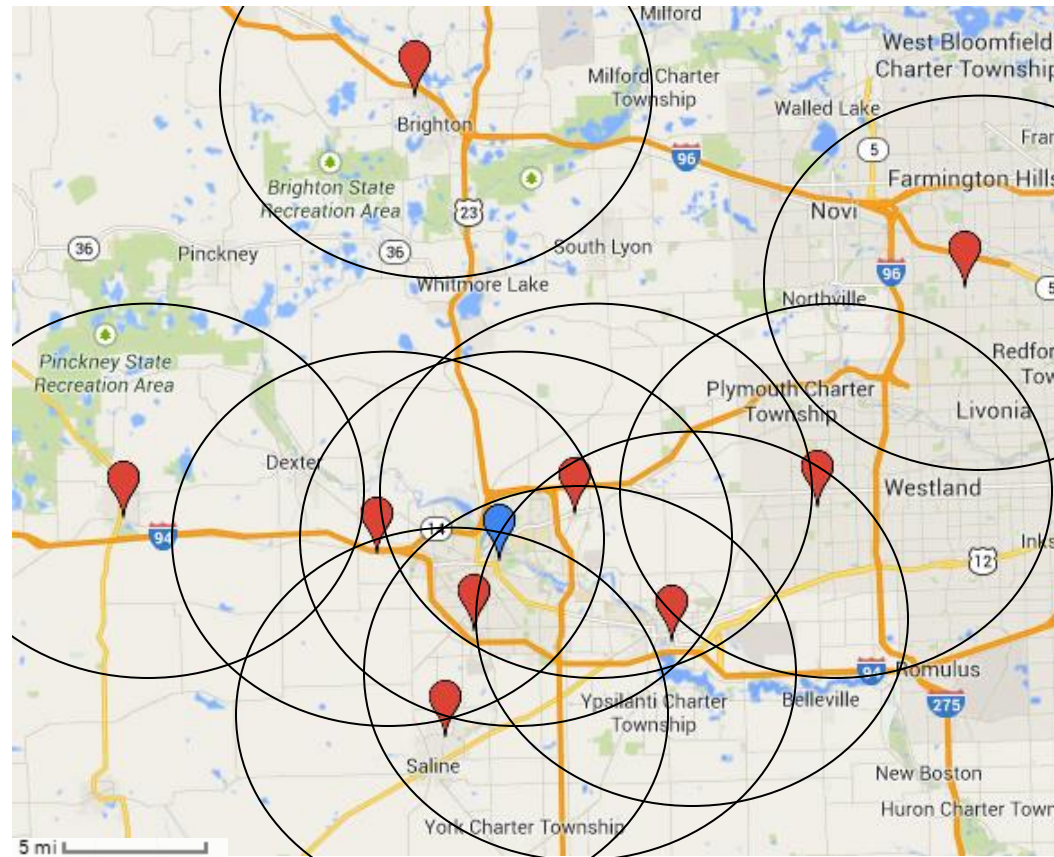
Excludes patients with driving time > 4 hours





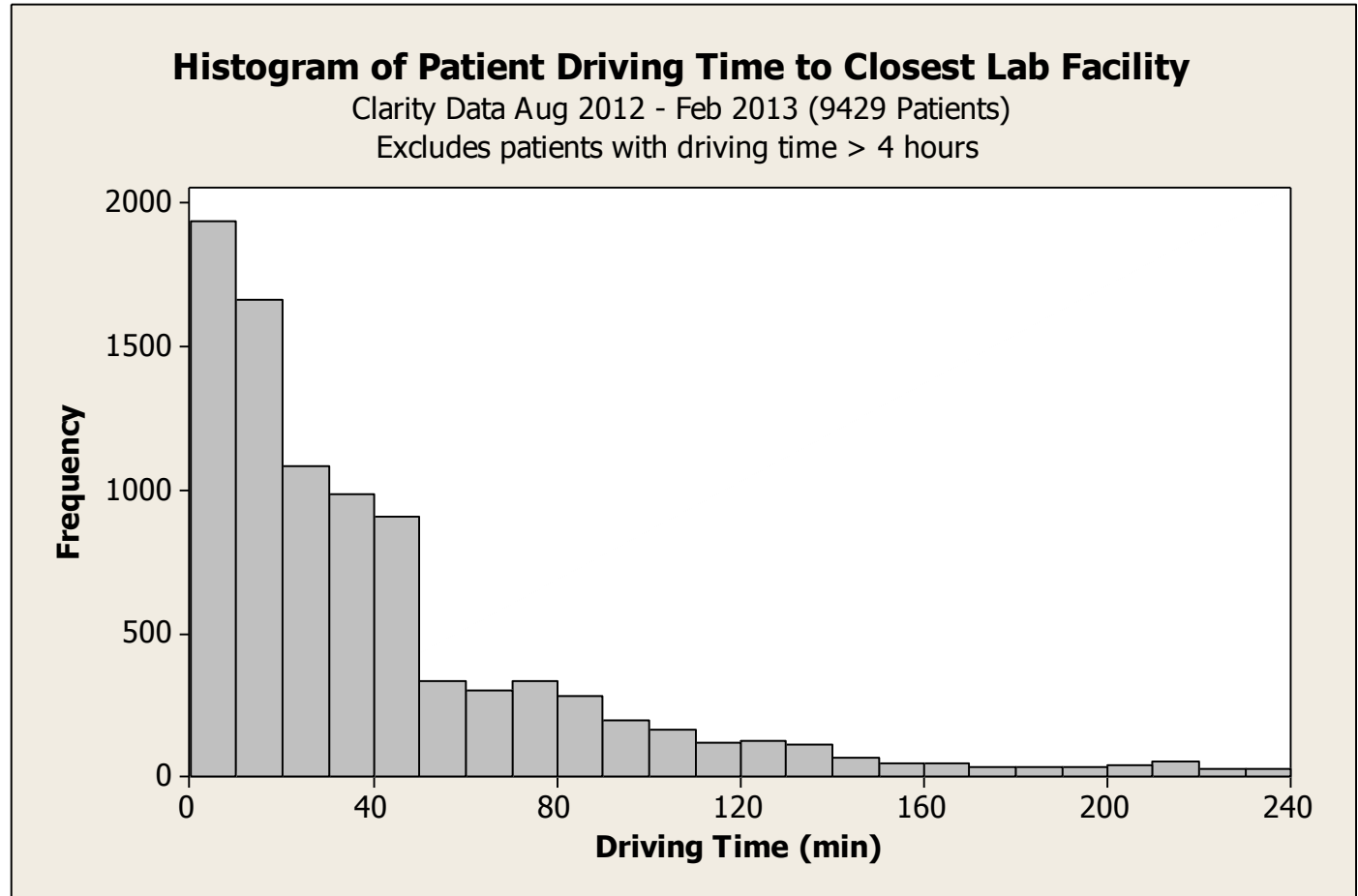
Methods

- Labs can be drawn at any of 9 satellite facilities associated with UMHS





Driving Time to Closest Lab Facility





Results of Satellite Facilities Analysis

Driving Duration	Percent of Patients to Satellite Facilities	Percent of Patients to Cancer Center
Less than 30 min	52%	29%
30-60 min	23%	36%
60-120 min	15%	22%
120-240 min	7%	9%
Over 4 hours	3%	4%





Results of Satellite Facilities Analysis

- Conservatively, encourage decoupling visits for patients within 15 minutes of satellite facility
 - 32% of patients





Conclusion

- Patients live closer to UMHS and satellite facilities than perceived by Cancer Center providers and staff
- Encourage decoupling of visits for patients within close proximity
- Educate patients on utilizing satellite facilities





Future Work

- Simulate decoupling of visits
- Investigate alternative improvements to lab process
 - “Fast track” phlebotomist
 - Prioritizing lab processing





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Thank You!
Questions?

Contact Information:
sbach@umich.edu



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