Scheduling Dynamics of a Weight Management Program

Moses Chan

Center for Healthcare Engineering and Patient Safety

Scheduling Dynamics of a Weight Management Program

Moses YH Chan, MSE
Amy Rothberg, MD
William Herman, MD, MPH
Amy Cohn, PhD

May 23, 2016

Research Team

Amy Cohn, PhD[1,2]　　　Amy Rothberg, MD[3]　　　William Herman, MD, MPH[3]

Students[1]
Henry Ballout
Cara Cheshire, BSE[2]
John Li[2]
Pranjal Singh, BA[2]
Joseph Sorenson[4]

[1] Center for Healthcare Engineering and Patient Safety, University of Michigan, Ann Arbor
[2] Department of Industrial and Operations Engineering, University of Michigan, Ann Arbor
[3] Department of Internal Medicine, University of Michigan Health System
[4] Department of Computer Science and Engineering, University of Michigan, Ann Arbor

CENTER FOR
HEALTHCARE ENGINEERING & PATIENT SAFETY
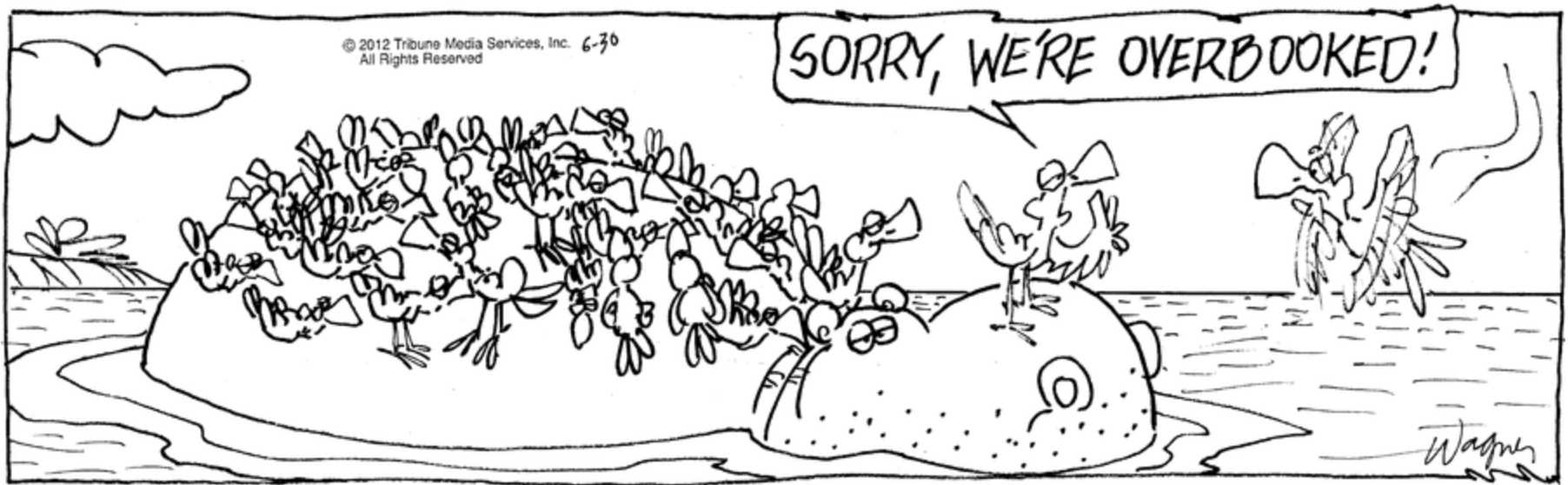UNIVERSITY OF MICHIGAN

Weight Management Program

- 2-year program designed by Amy Rothberg, MD
  - Promote weight reduction
  - Support behavioral change
- Basic eligibility
  - BMI ≥ 32 kg/m^2 with 1 or more comorbidities
  - BMI ≥ 35 kg/m^2
- Program timeline

0   6   12   18   24

months
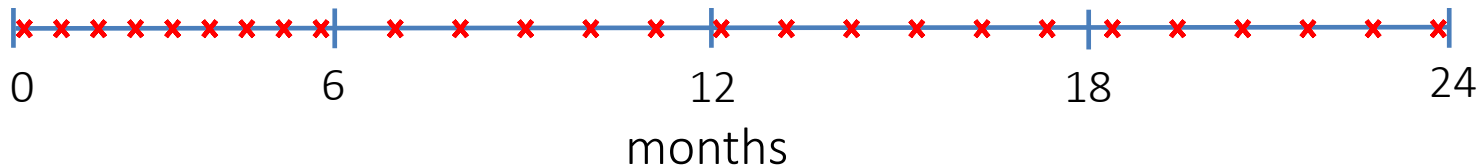
What's the problem?

- Patients waiting too long to get into program

Database approach

- Data: 2 spreadsheets **daily**
  - Prospective appointment, provider availability data
- Design MySQL-based database
- Store information about appointments in rolling horizon basis
  - → Appointment schedule snapshots
- Compare snapshots from one day to another

Database example

Appointment		Snapshot Date		
Date	Time	5/25	5/26	5/27
5/27	09:00	A *Cancelled*		C *Created*
	09:15			
	09:30			
	09:45	B	B *Cancelled*	
	10:00	Buffer		
	10:15			B *Created*

Case study

Provider A cancels
Reschedules for Provider B
Patient cancels
Refilled

September
28

Reschedules for Provider B
Patient cancels

Appointment

Appointment

Sept 24   25   26   27   28

Main takeaways:
1. Multiple opportunities were used for one appointment
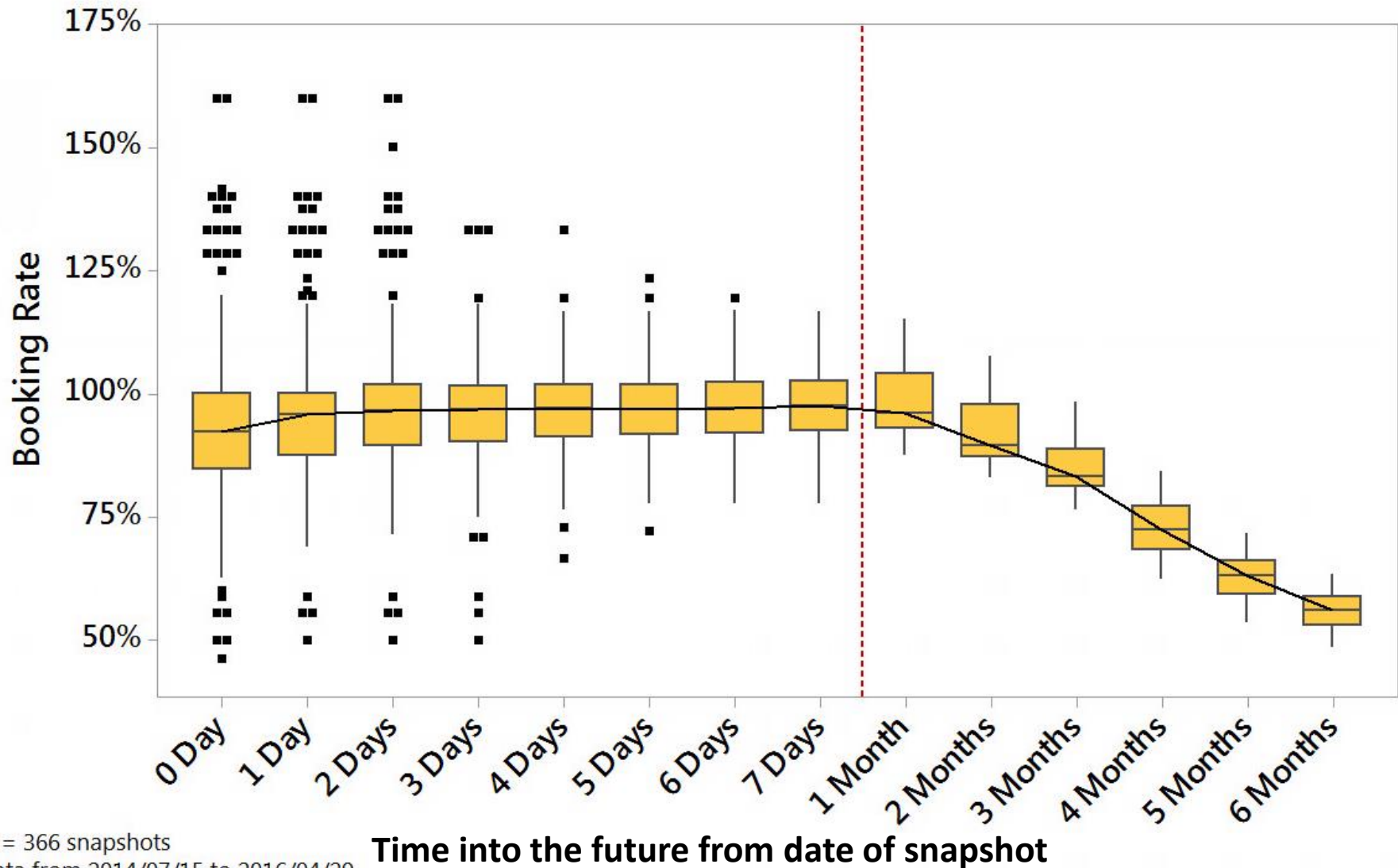2. Impact of late cancellations

Study objectives

- Understand and quantify scheduling dynamics
  - Booking rates
  - Cancellations
  - Refill of emptied slots due to cancellations
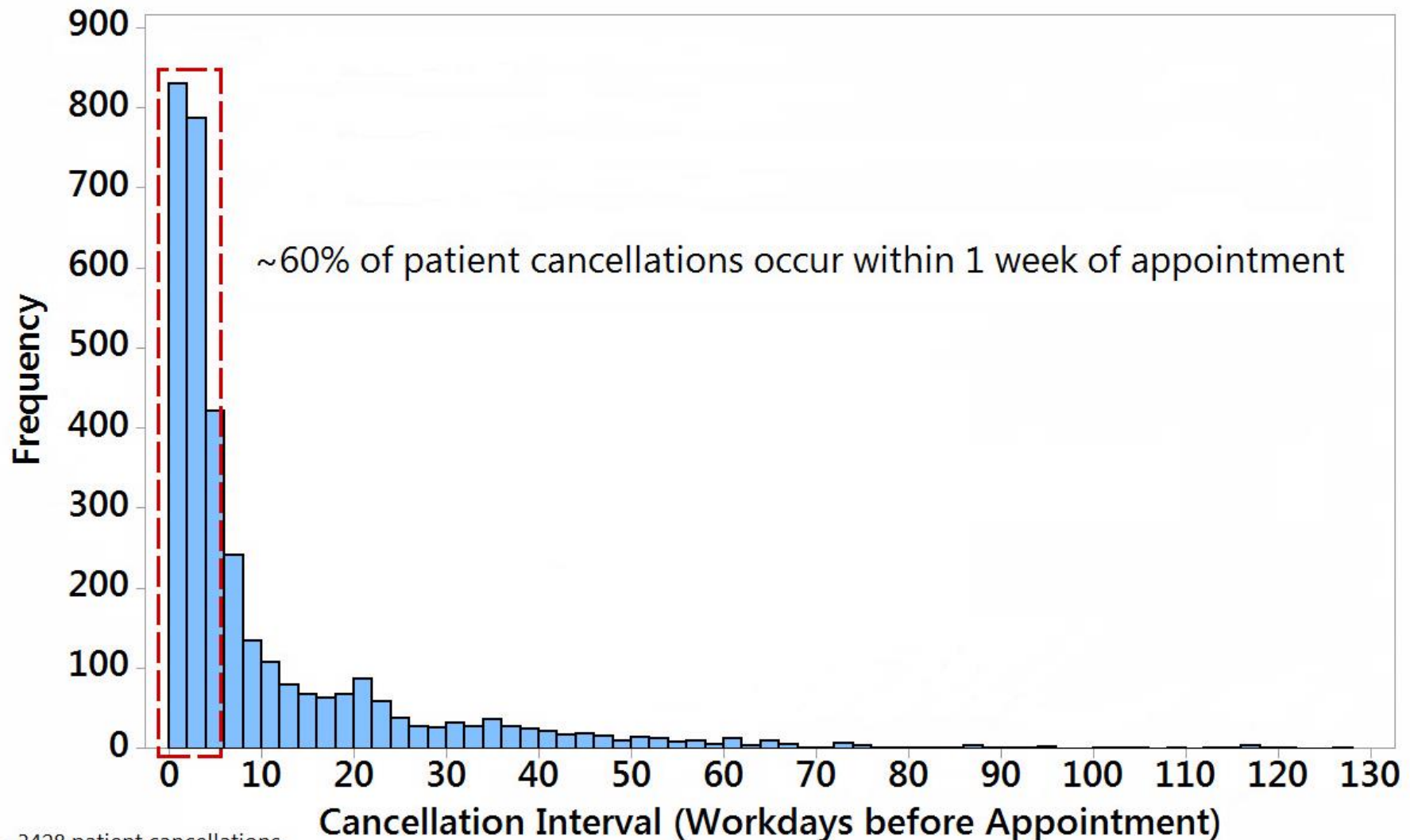
High variability in short term booking rate

Average booking rates within x time period from date of snapshot

N = 366 snapshots
Data from 2014/07/15 to 2016/04/29

Time into the future from date of snapshot

Results:
High number of late cancellations

How early do patients cancel their appointments?

~60% of patient cancellations occur within 1 week of appointment

Frequency

Cancellation Interval (Workdays before Appointment)
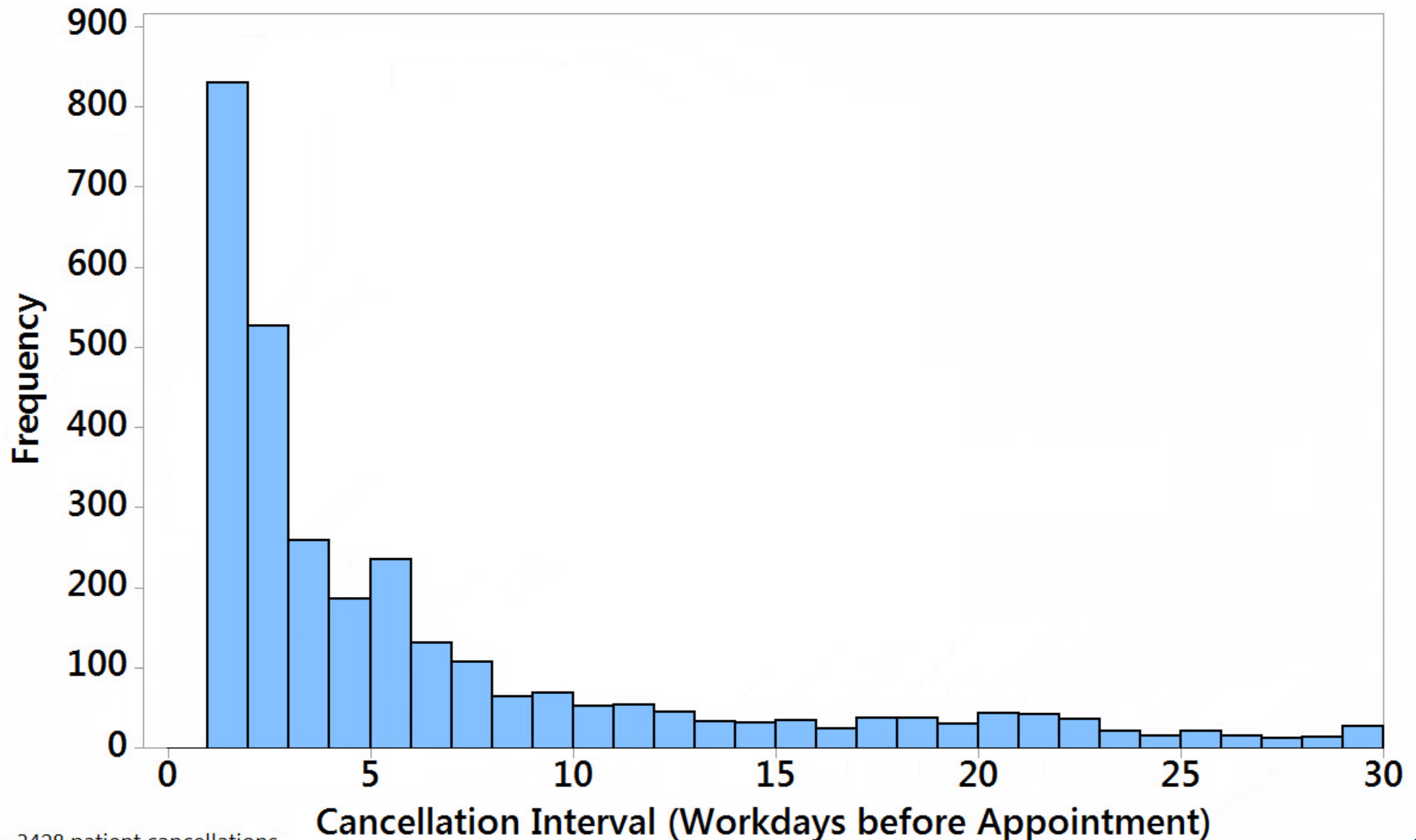
N = 3428 patient cancellations
Data from 2014/07/15 to 2016/04/29
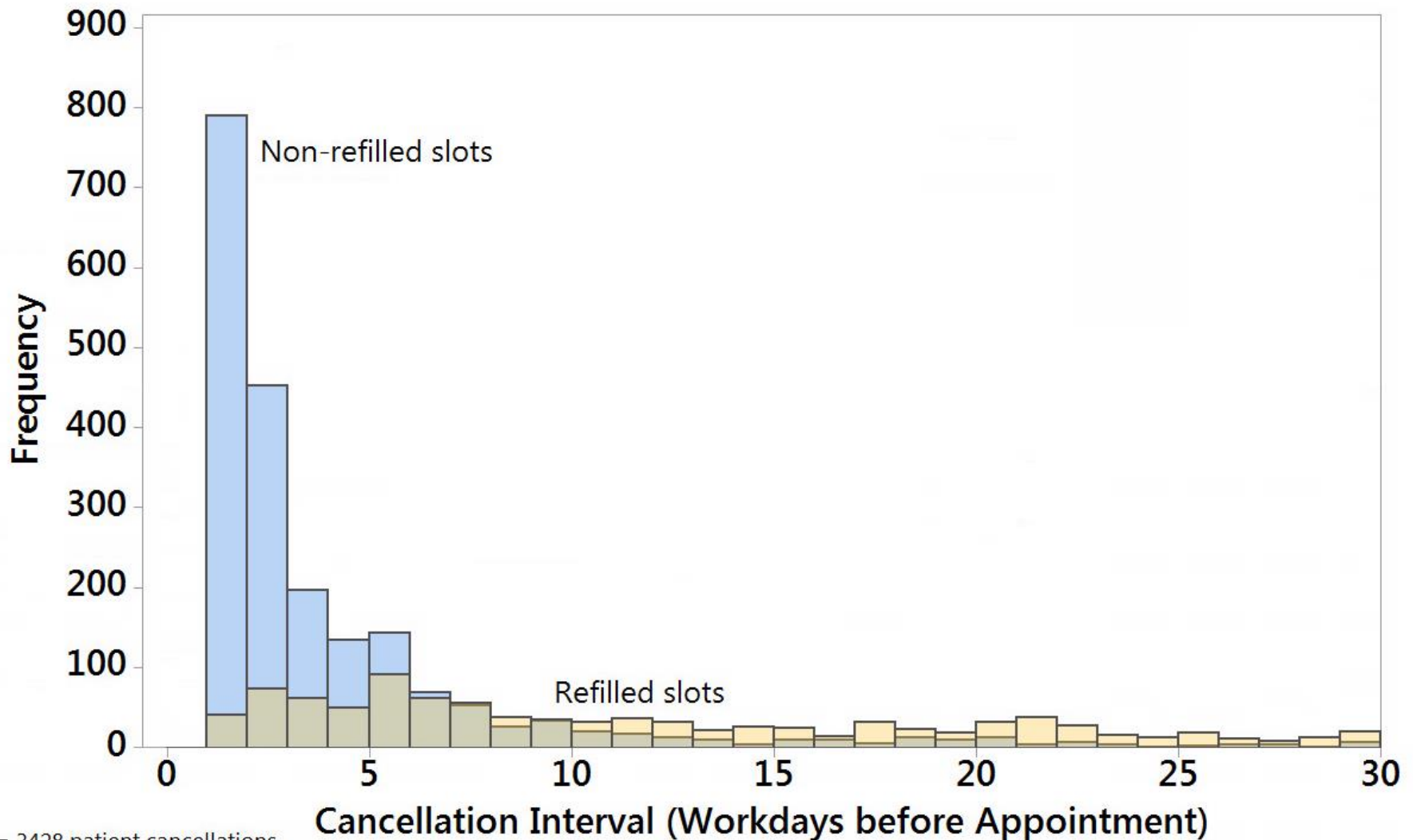
Results:
High number of late cancellations

How early do patients cancel their appointments?

N = 3428 patient cancellations
Data from 2014/07/15 to 2016/04/29

Difficult to refill slots under late cancellations

Do emptied slots due to cancellations get refilled?

N = 3428 patient cancellations
Data from 2014/07/15 to 2016/04/29

13

Difficult to refill slots under late cancellations

How likely is an emptied slot refilled after a cancellation?

N = 3428 patient cancellations
Data from 2014/07/15 to 2016/04/29
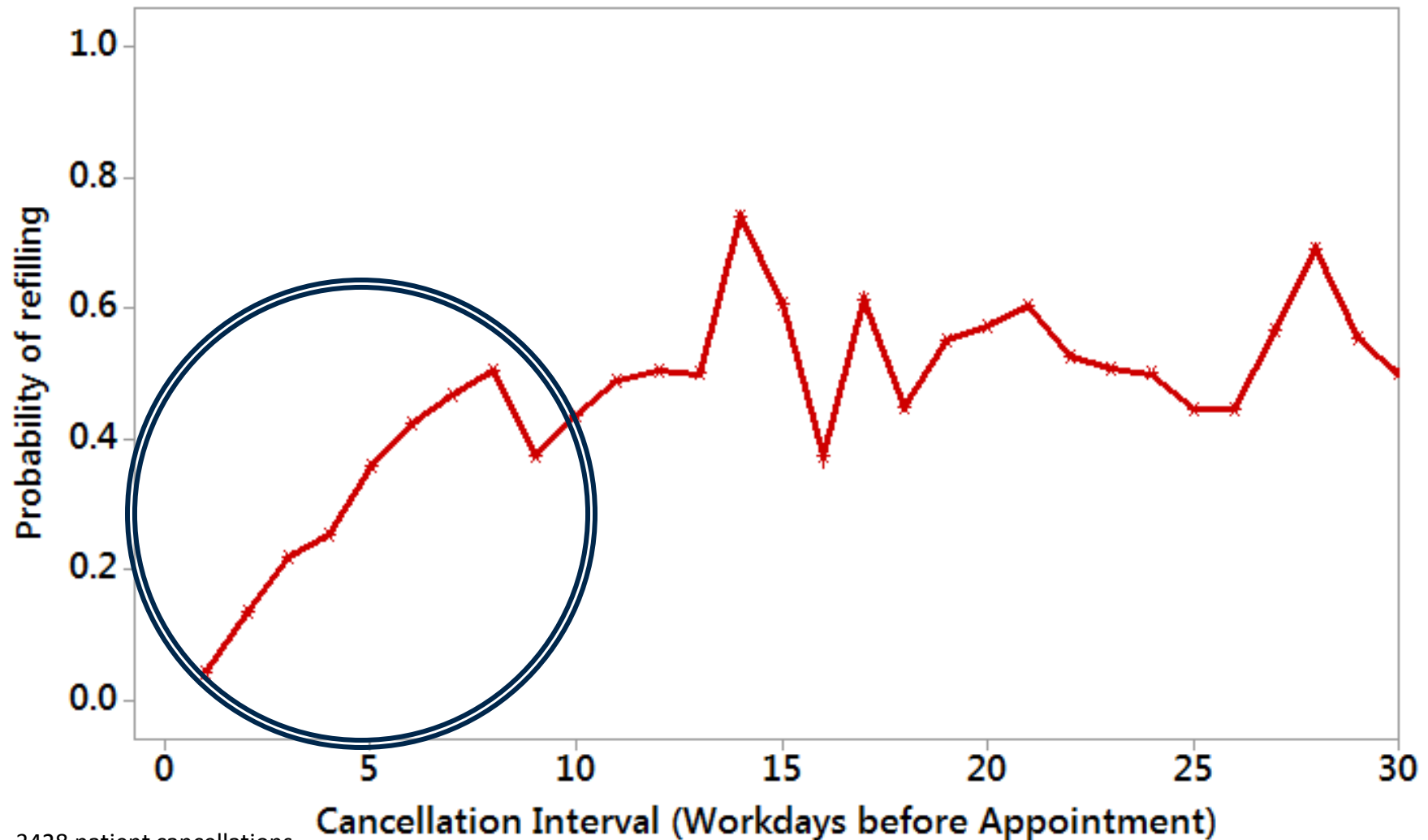
Insight from analysis

- No short-term capacity for seeing new patients
- Late cancellations impact utilization of slots

CENTER FOR
HEALTHCARE ENGINEERING & PATIENT SAFETY
UNIVERSITY OF MICHIGAN

Future work

- Understand refilling mechanism
  - Waitlist management
- Evaluate effectiveness of current reminder system

Acknowledgements

- The Metabolism, Endocrinology & Diabetes (MEND) Clinic
- Div. of Endocrinology, Dept. of Internal Medicine, University of Michigan Medical School

Thank you!

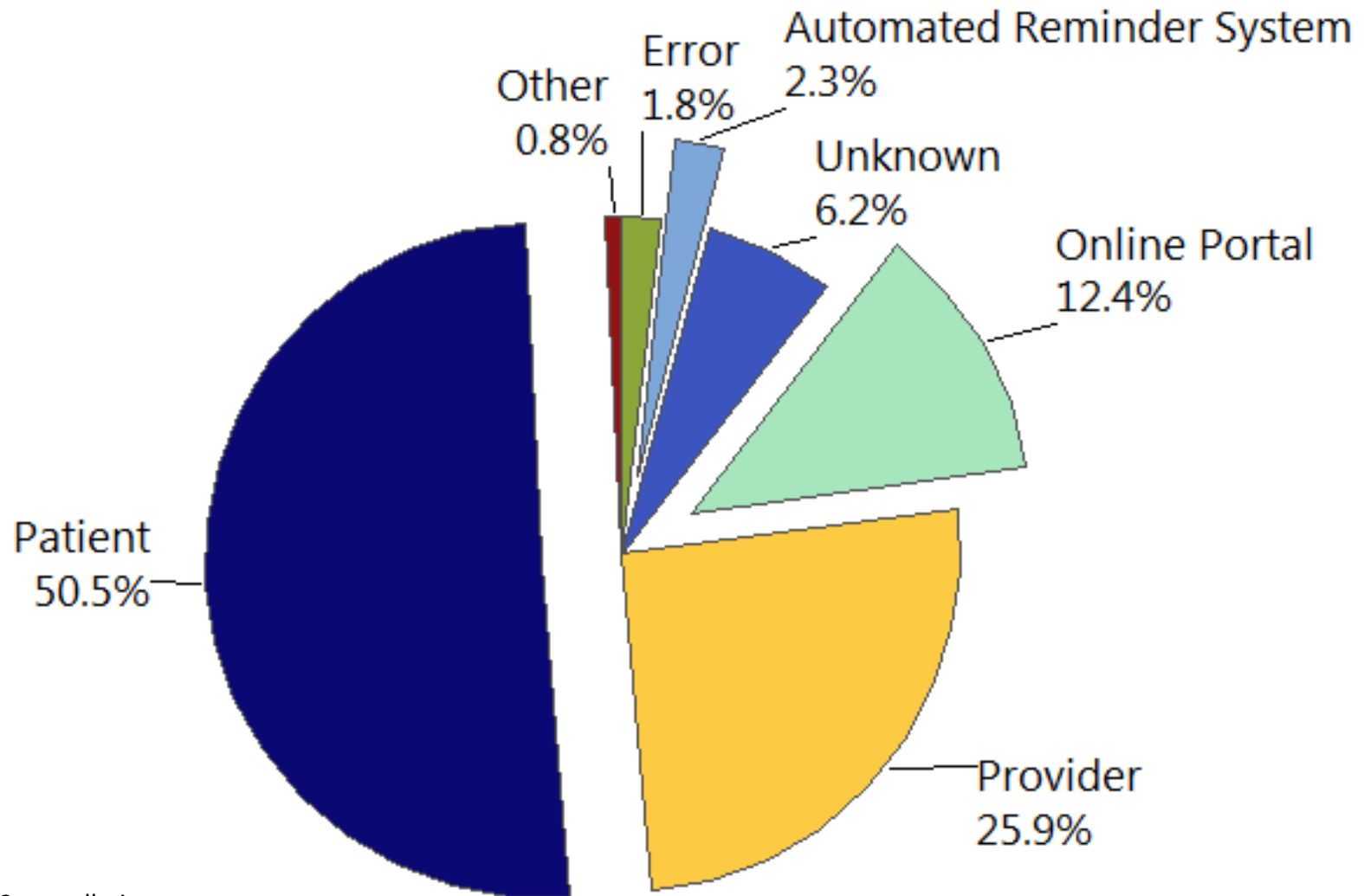Moses YH Chan
mosesyhc@umich.edu
Amy Cohn
amycohn@umich.edu
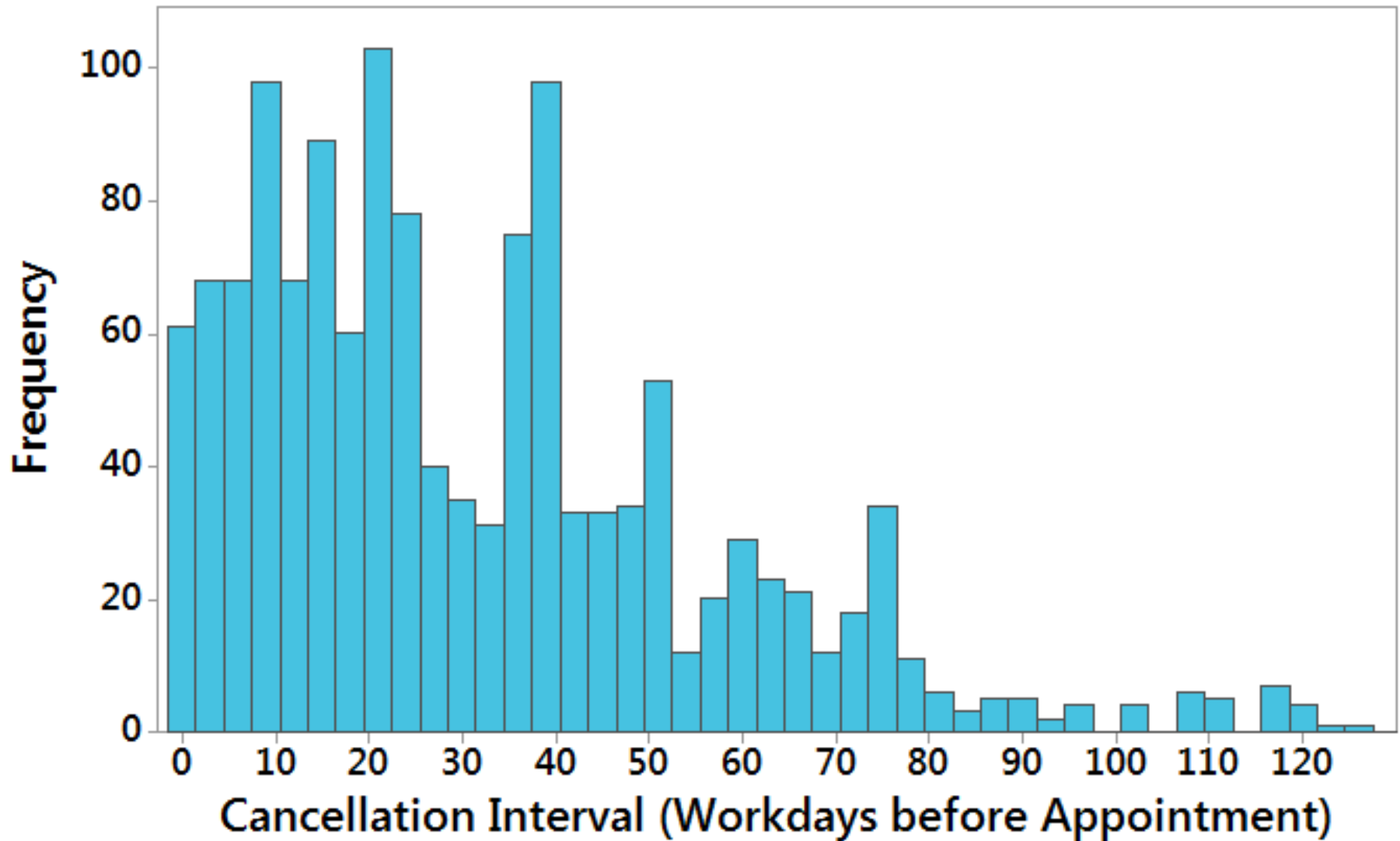Amy Rothberg
arothber@med.umich.edu

Cancellation Reasons

N = 5252 cancellations
Data from 2014/07/15 to 2016/04/29

Reschedule of cancellations & Refill of emptied slots

Rescheduled?	Count	Percent		Refilled?	Count	Percent
No	2060	**39.22**		No	3468	**66.03**
Yes	3192	**60.78**		Yes	1784	**33.97**
N=	5252	100.00		N=	5252	100.00

How early do provider cancel an appointment?

N = 1358 patient cancellations
Data from 2014/07/15 to 2016/04/29