

LEVERAGING QUALITY IMPROVEMENT AND PREDICTIVE ANALYTICS TO DECREASE MISSED APPOINTMENTS

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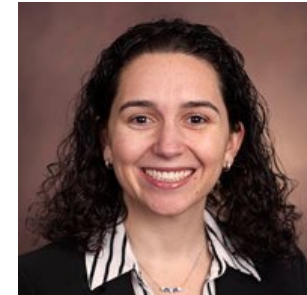
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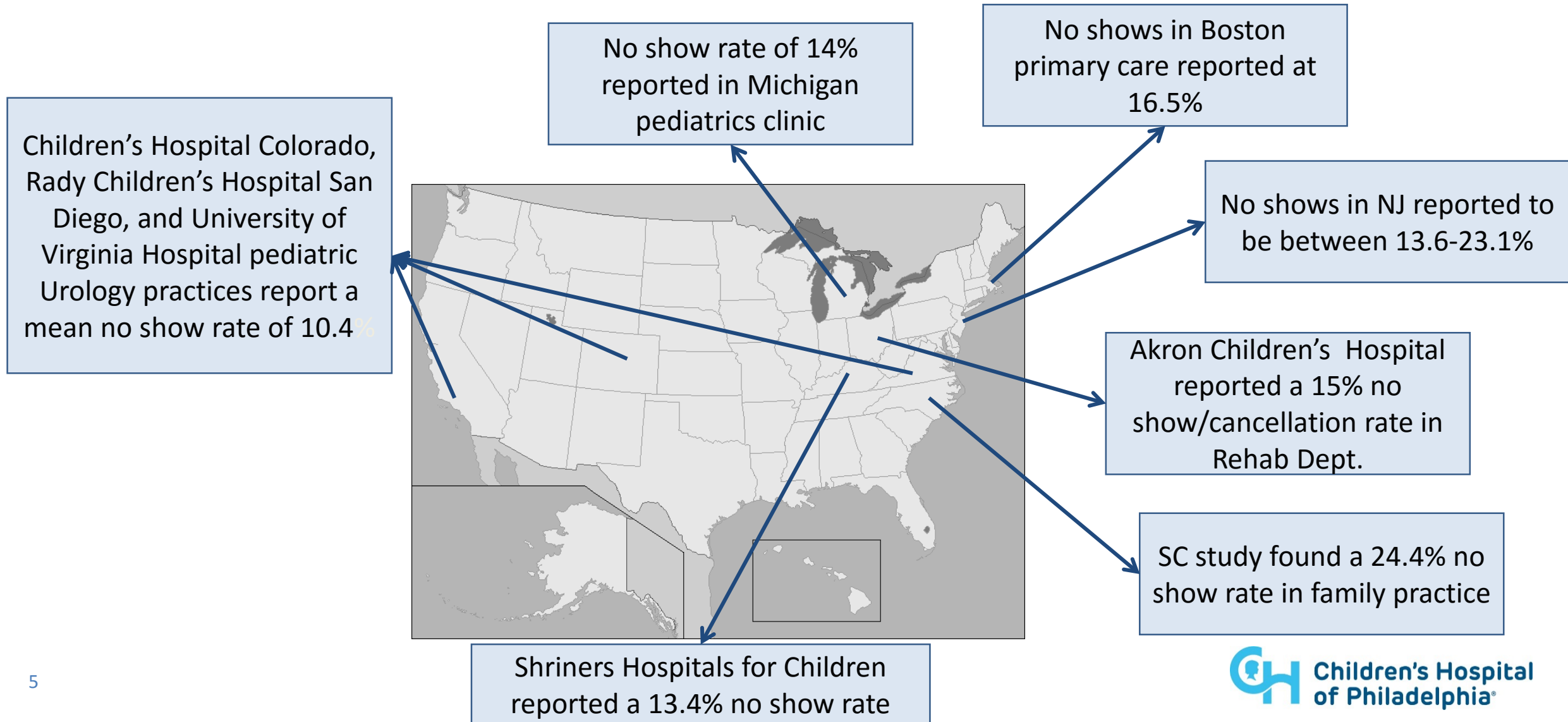


Learning Outcomes

- Describe how to use data and predictive analytics to identify patients that are more likely to miss appointments
- Describe how to reduce missed appointments using digital health technology
- Describe how to use quality improvement to improve show rates through interventions aimed at the social determinants of health while increasing patient engagement and experience



No Shows: A Widespread Problem



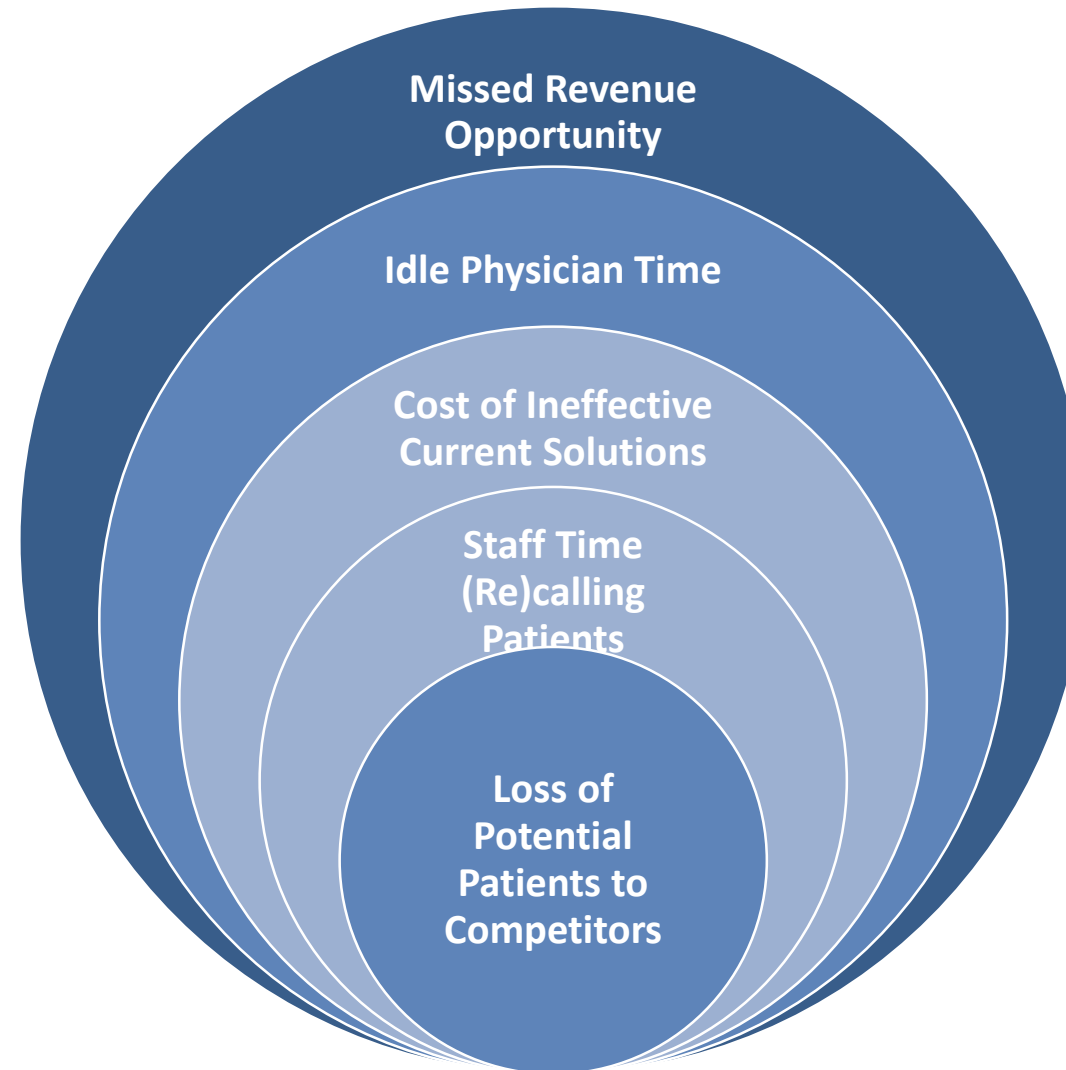
Cost of No Shows

American Medical Association Report (2009)

- Approximately 12% of appointments with doctors are missed by patients annually
- At 1 to 2 no-shows per day, lost productivity between \$100 to \$900, depending upon the visit type and procedure.
- Assuming 200 working days in a year, annual lost productivity could be anywhere between \$20,000 and \$180,000 for an individual practice.



Compounding Financial Impact



Impact of No Shows on Patients

- Frequent missed appointments can result in delays in care and have an impact on patient outcomes particularly among those with chronic disease.
- Research suggests a relationship between missed appointments and medication adherence, poor glycemic control, patient reported outcomes and mental health.



Children's Hospital of Philadelphia (CHOP)

By the Numbers

HIGHLIGHTS	FY 2016
Number of Beds	520
Hospital Admissions	29,468
Emergency Department Visits	83,771
CHOP Care Network Specialty Care Visits	406,920
CHOP Care Network, West/South Philadelphia Visits	129,352
CHOP Care Network, Suburban Visits	611,291
Day Surgery	19,578
Day Medicine	27,828
Urgent Care	18,142

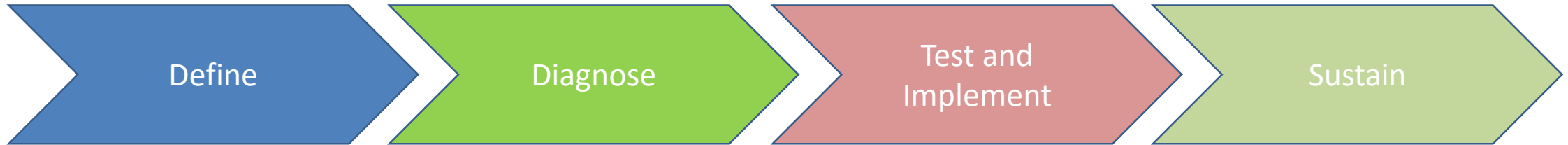


Missed Appointments at CHOP

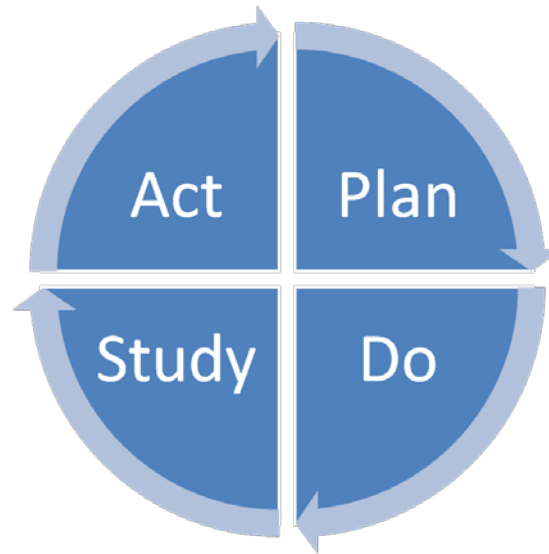
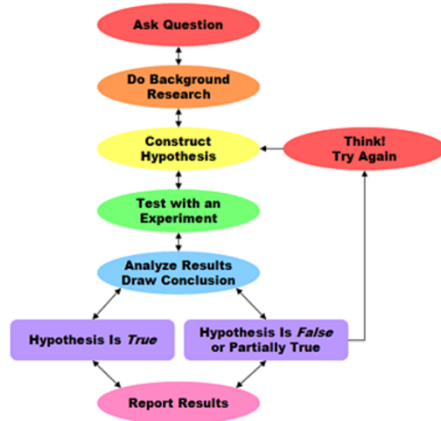
- Combined missed appointment rates for medical subspecialty and surgical outpatient visits vary between 7% and 23%
- In primary care, missed appointment rates vary between 3% and 27% with higher rates seen in the urban practices



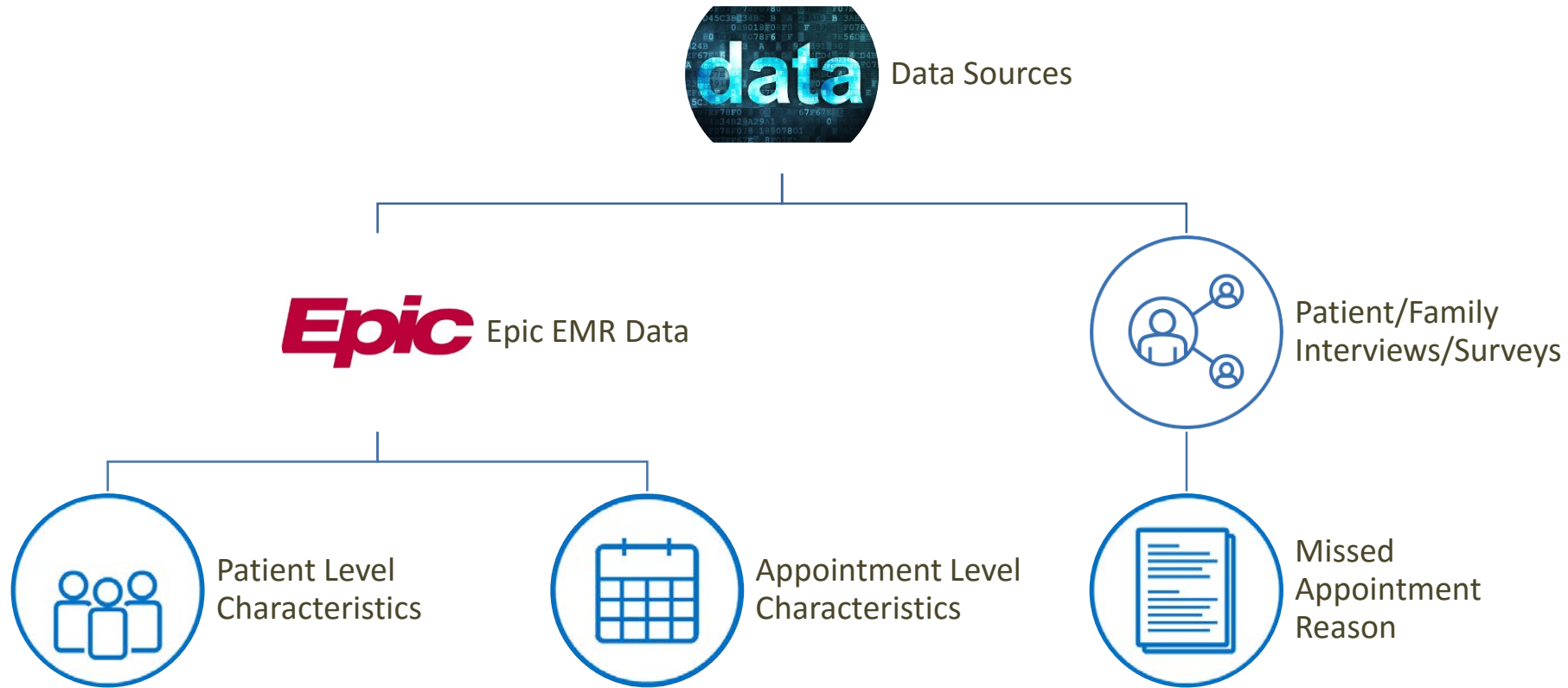
Using Quality Improvement to Reduce Missed Appointments



Scientific Method



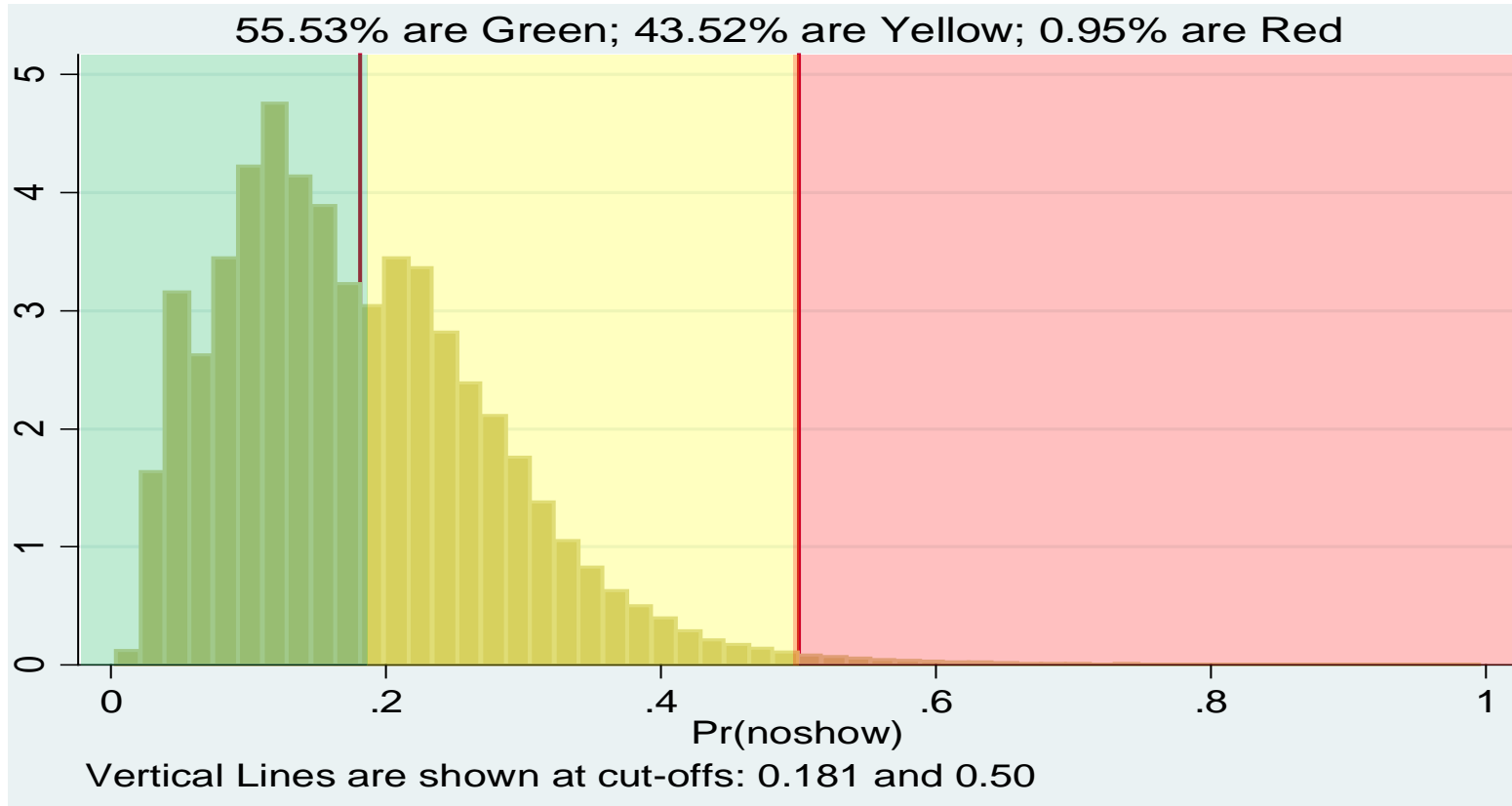
Understanding Missed Appointments



Patient Perspectives on Missed Appointments

I never received a reminder.
The bus never came.
I never check my voicemail.
why do I need this appointment?
I forgot. My transportation fell through.
I can't afford my co-payment.
My child wasn't sick anymore.
I did cancel on the day of the appointment.
My other CHOP appointment ran late.
My child was in the hospital.
I scheduled that appointment a year ago.

Modeling Patient (Family) Behavior via EMR data



Appointment/Clinic Factors

Prior No Show History

Days Scheduled in Advance

Days Since Last Appointment

Diagnosis Group

Visit Type

Session Time (AM/PM)

Calendar Month

Day of Week

Patient Factors

Age Group

Insurance Type

Distance to Appointment

Language

Race/Ethnicity

Interventions

Tier III: Targeted Patient Engagement

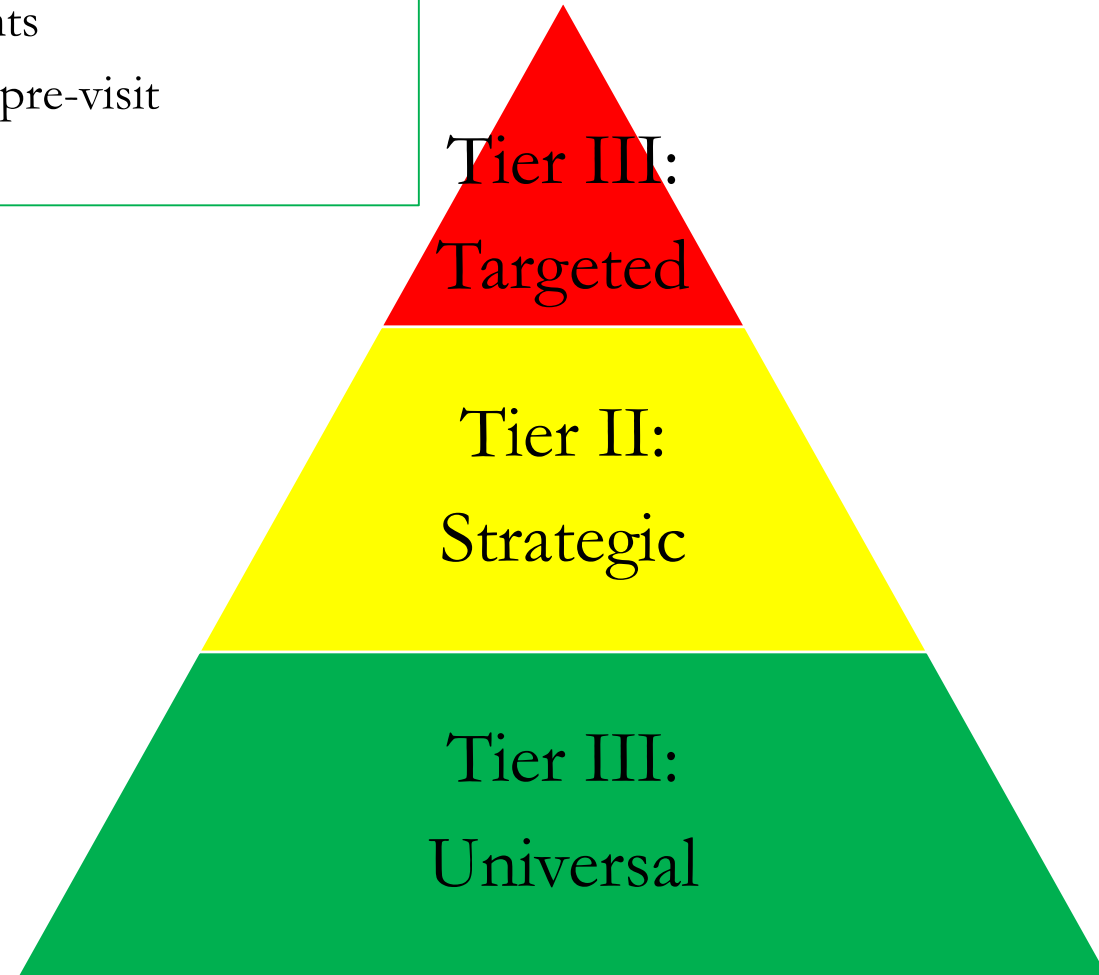
- Identify high-risk patients
- Implement customized pre-visit engagement strategy

Tier II: Strategic Overbooking

- Target overbooking using patient and clinic level data

Tier I: Universal Interventions

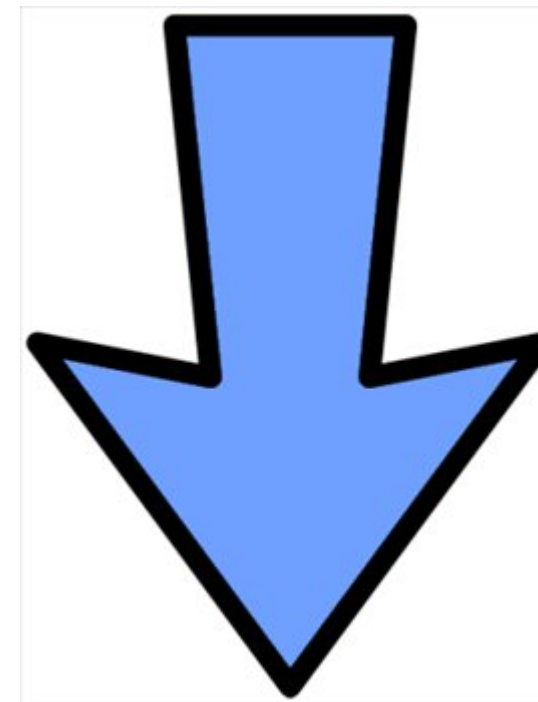
- Optimized appointment reminders
- Easier cancellation options



Yellow/Green “Casual” No Showers

Phone Script Standardization

- Created and implemented best practice appointment reminder script to reduce hang-ups
- Implemented phone reminders in 4 non-English languages (Cantonese, Mandarin, Spanish, Arabic)



**20% Reduction
in Hang Ups!**

Yellow/Green “Casual” No Showers

Text Message Reminder Utilization

- Initiated a text message reminder campaign
- Streamlined opt-in process at scheduling and registration via Epic
- Interactive text messaging pilot
- ~80% affirmation rate
- Easier ability to cancel → higher rates

THERE'S A TEXT FOR THAT!

Remind Patient Families:

“Would you like to receive appointment reminders via text message?”

“Message rates may apply based on your mobile phone carrier.”

Schedulers: Remember to add a mobile number and select “Yes” for accepting text messages.

Preferred communication: ☒ No preference ☐ Do not contact ☐ Mail ☐ Phone ☐ E-mail ☐ MyCHOP

Accept text messages? ☒ Yes ☐ No [MyCHOP Signup](#)

SSN: 000-00-0000
Aliases: 1

Contact Information

Number Type	Number
1 Home Phone	487-666-8888
2 Work Phone	
3 Mobile	

E-mail: 00000@gmail.com

Comments:

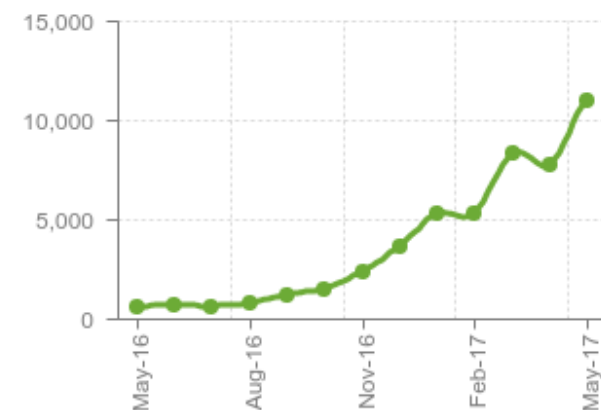
Written Language: 1 English

Spoken Language:

Patient race: 1 Other

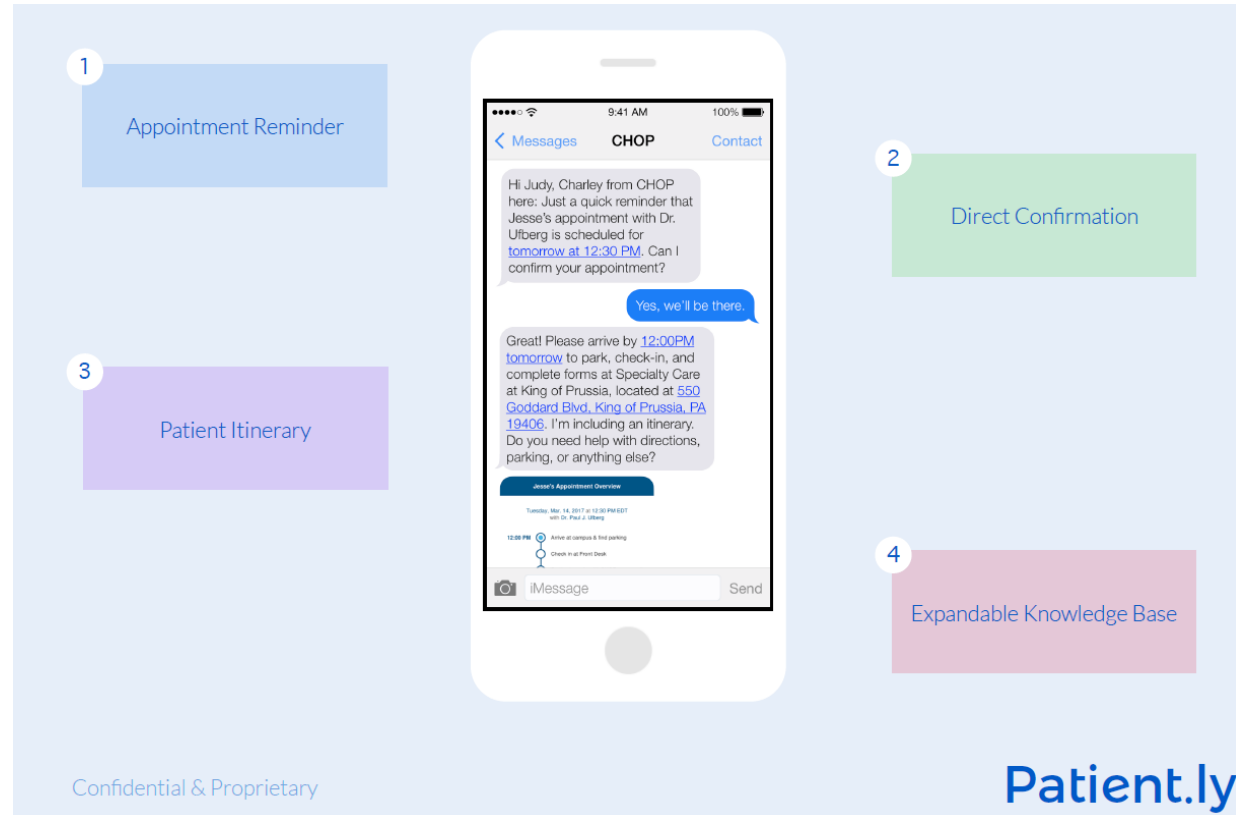
Children's Hospital of Philadelphia

SMS Appointment Reminders Sent



Yellow/Green “Casual” No Showers

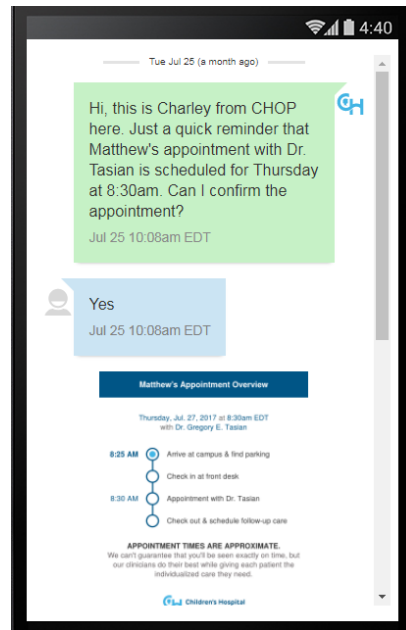
Interactive Text Message Pilot



Example: Matthew Doe

- Due for well-visit check up
- Few missed appointments, several late arrivals
- Established outreach preference and documented in Epic – Text Message
- Allowed for bi-directional patient communication via Text Message

2 days before the appointment

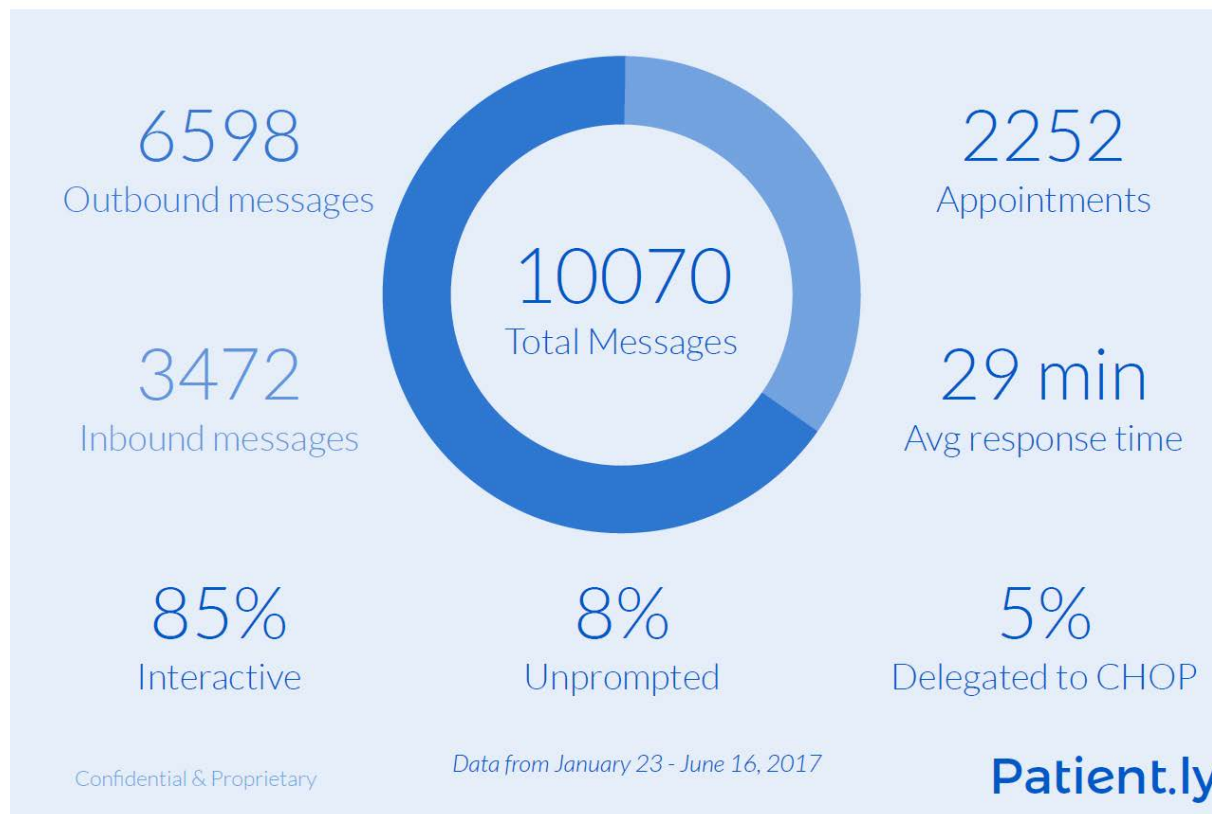


Day of the appointment

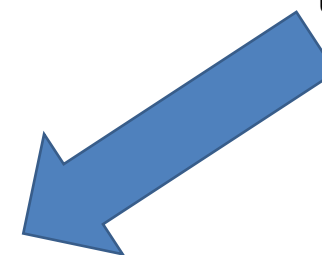


Yellow/Green “Casual” No Showers

Proof of Concept - By The Numbers

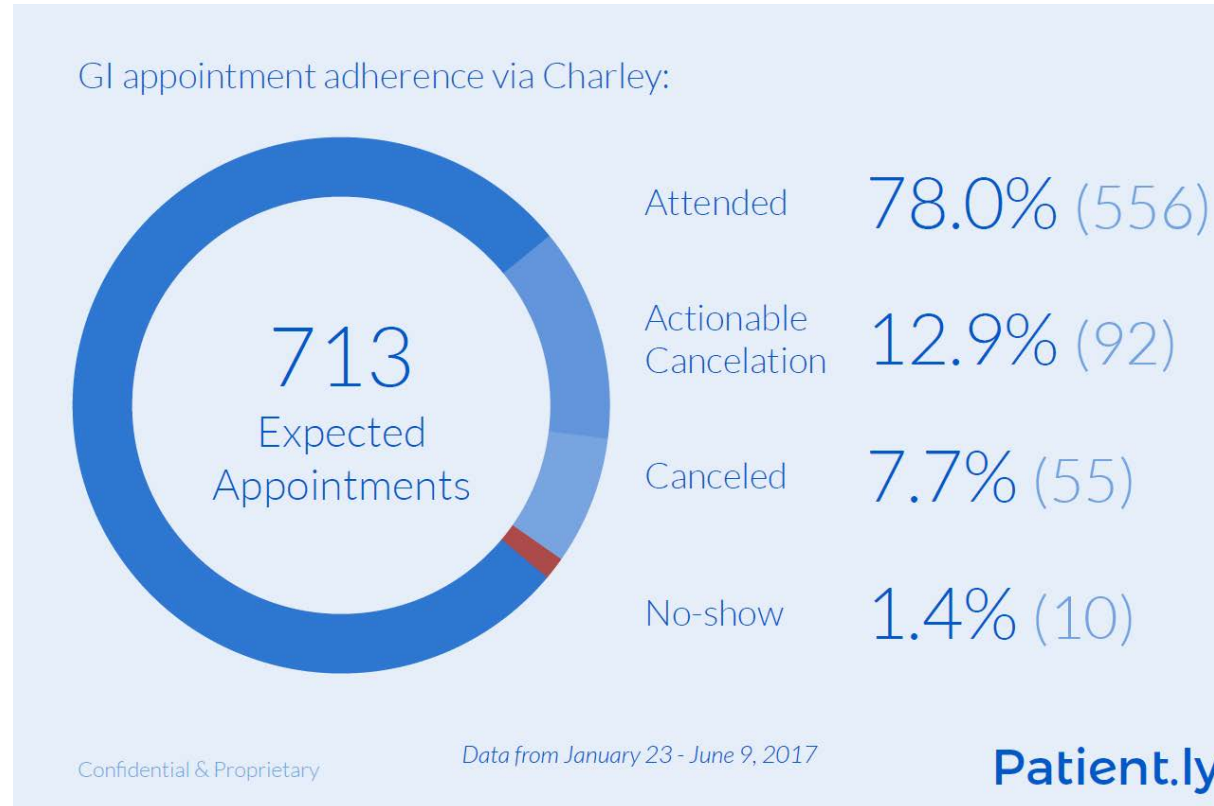


90% of patients confirm or cancel within one hour of receiving the text message!



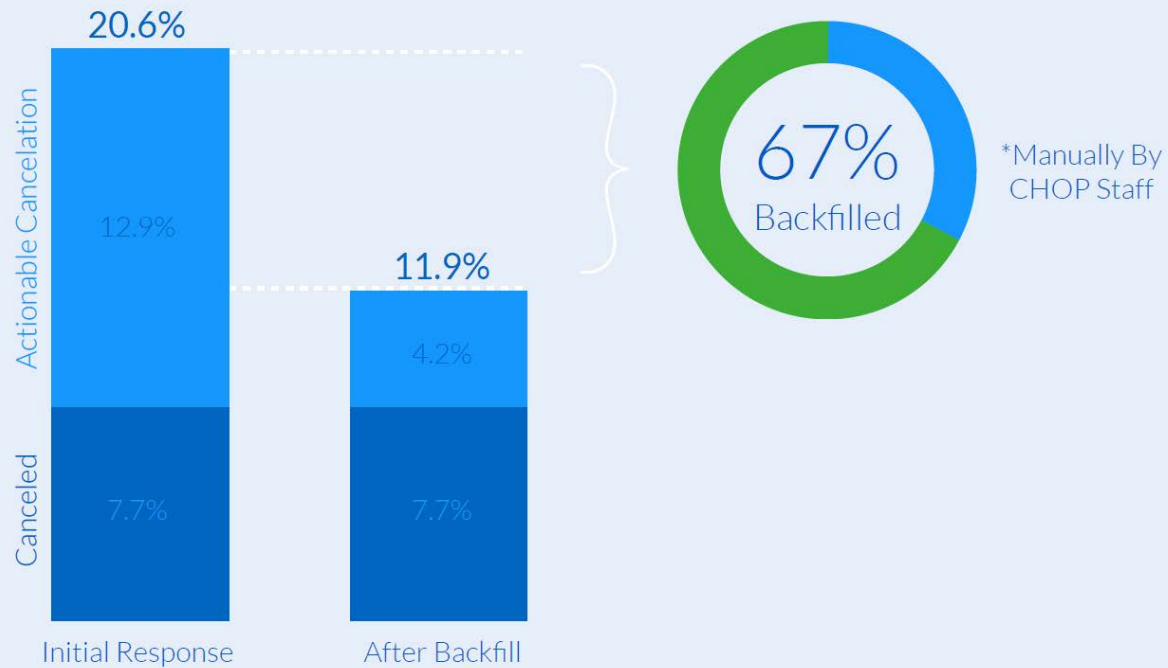
Yellow/Green “Casual” No Showers

Sample Results



Yellow/Green “Casual” No Showers

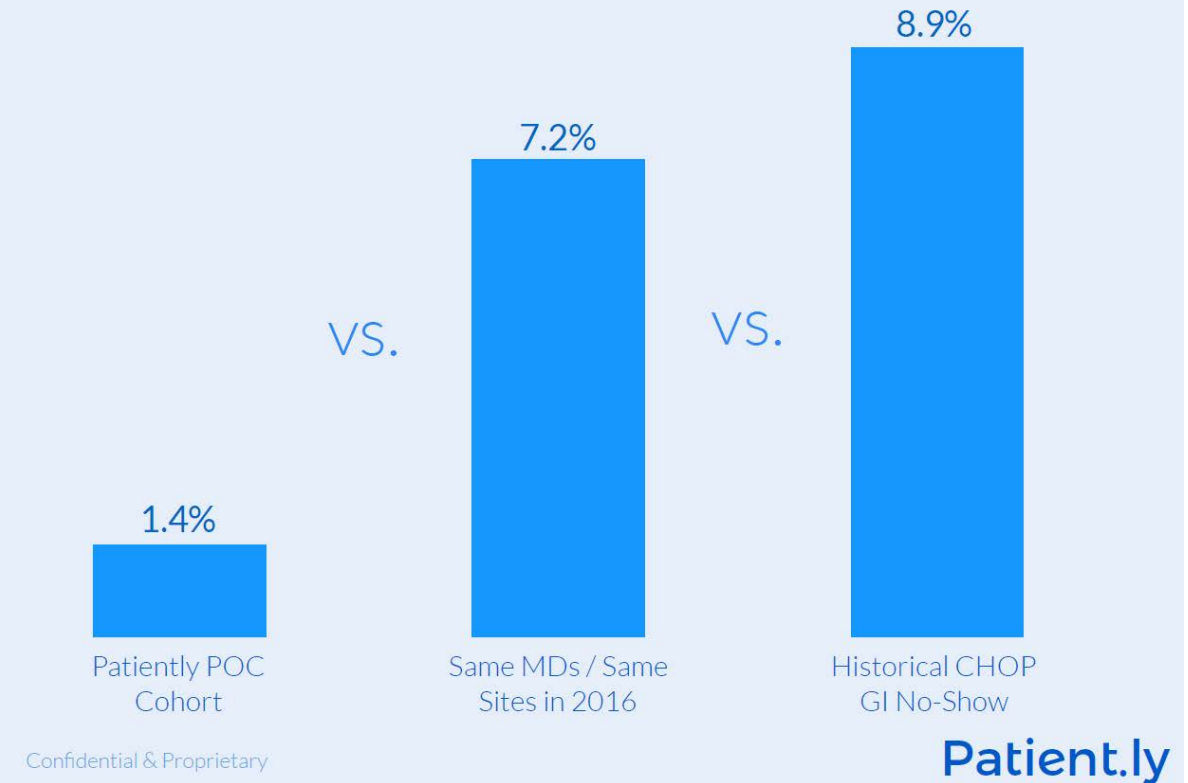
Unpacking the Cancellation Rate



Confidential & Proprietary

Patient.ly

Unpacking the No-Show Rate



Confidential & Proprietary

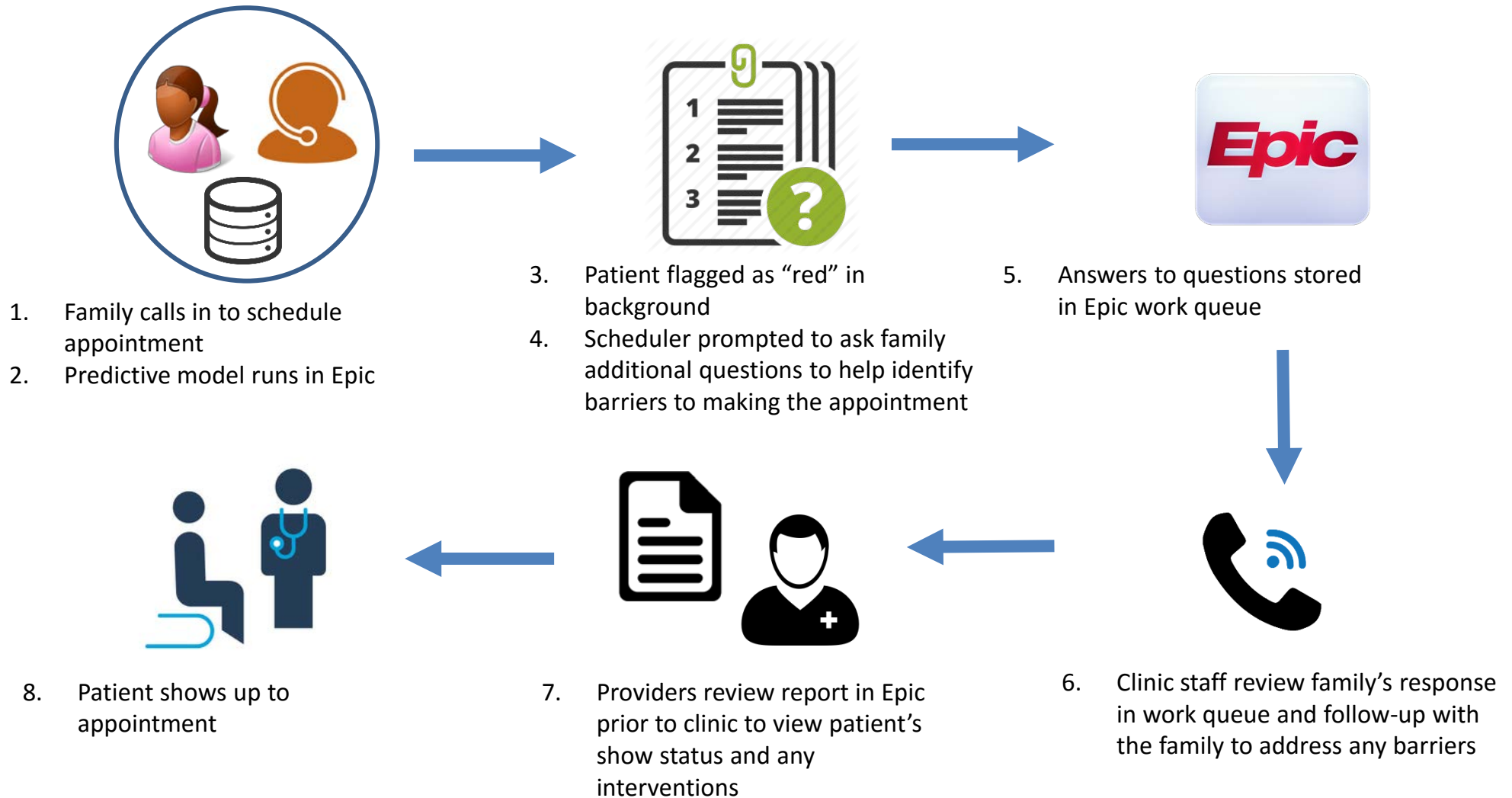
Patient.ly

Red “Chronic” No Showers

- Integrated Predictive Model into Epic
- Targeted interventions customized to patient needs
 - Clinical and financial history
 - Social determinants
 - 3.6 million Americans (including ~1 million children) miss or delay medical care because of transportation issues

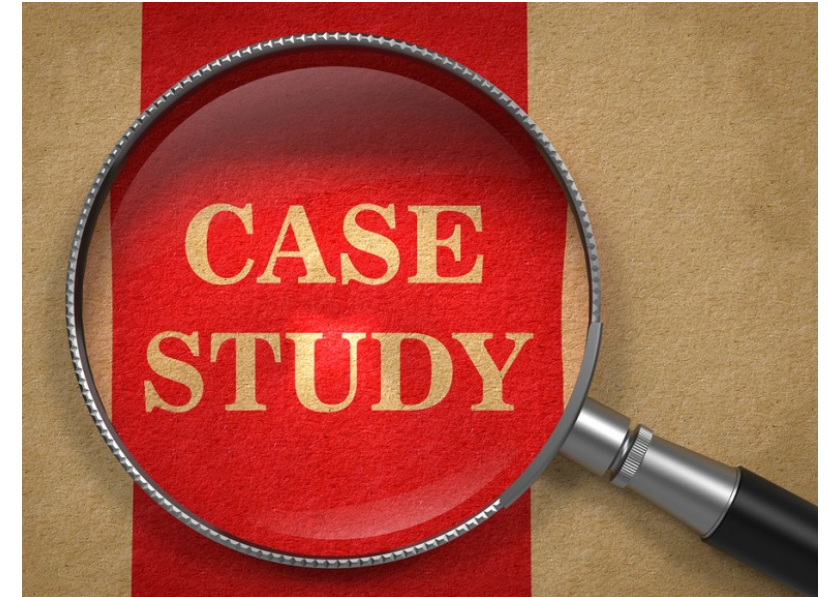


Predictive Model in Epic



Case Study

- Sam is a 16 y/o male with sickle cell disease.
- Sam was last seen in Hematology clinic in summer of 2016, with MD plan to return in 3 months.
- Sam no-showed to his next 4 scheduled appointments.
- Recently hospitalized for a pain crisis.

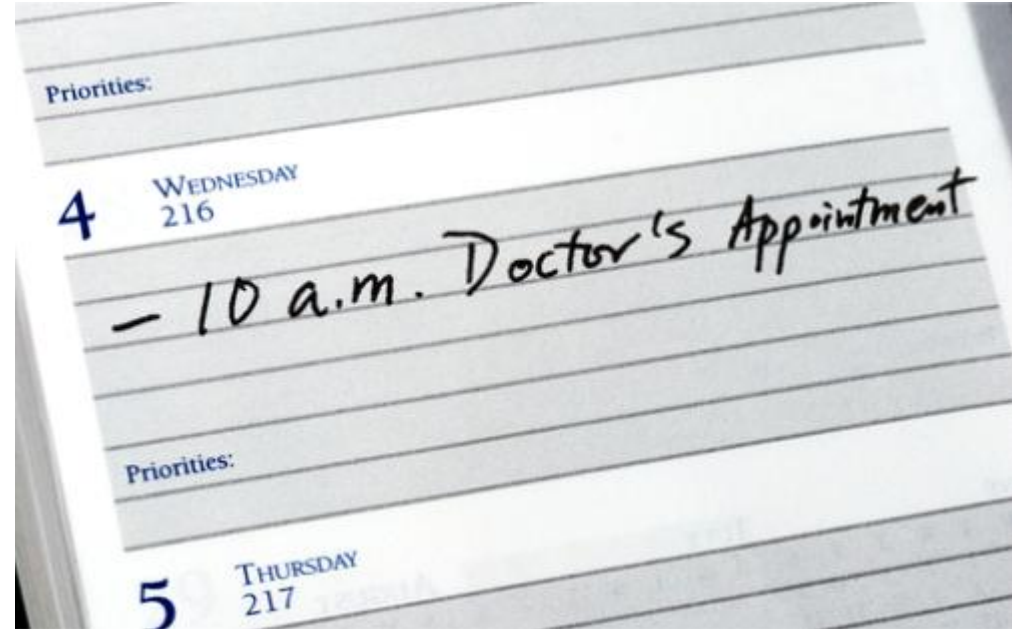


Case Study, con't...

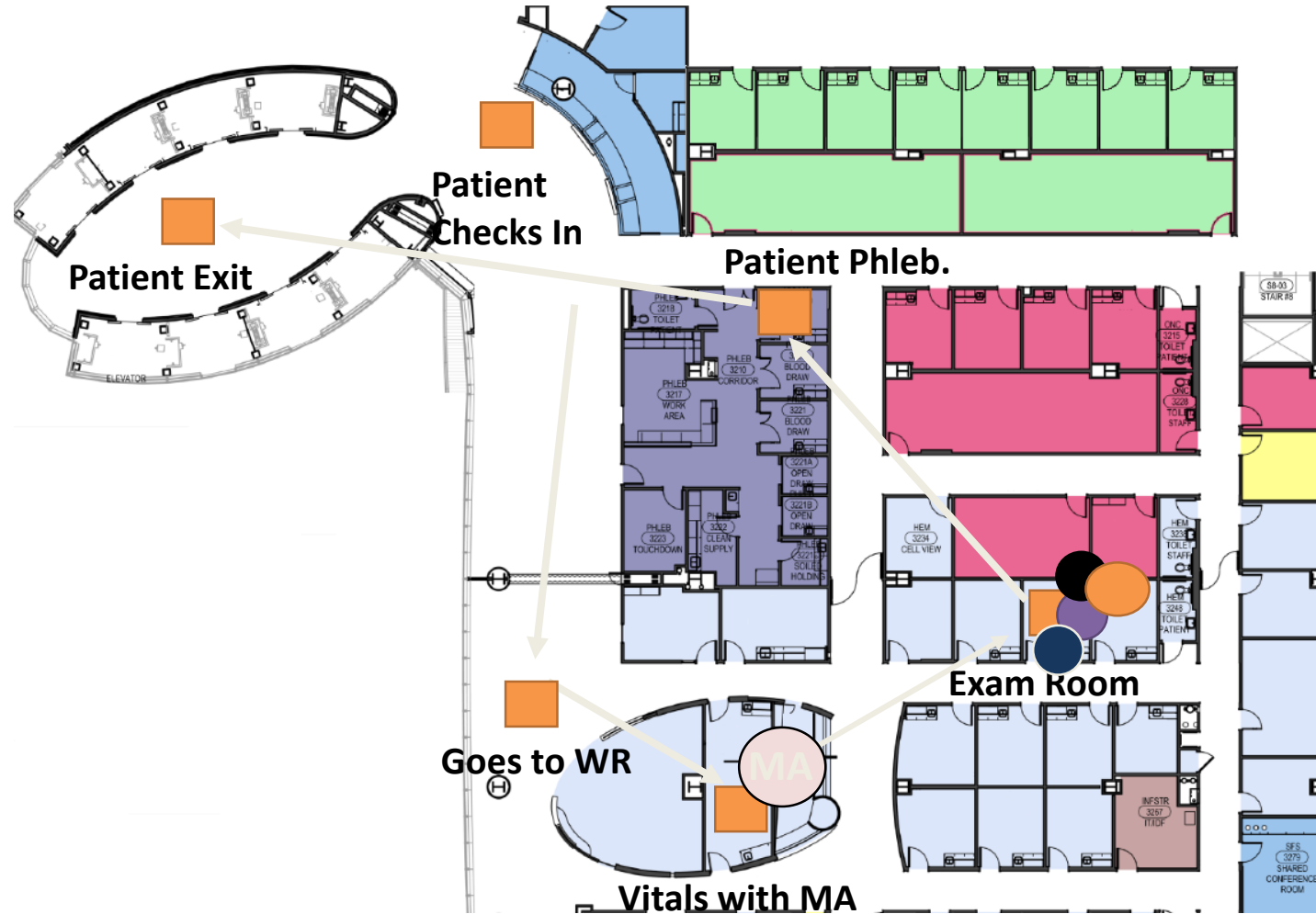
- Sam was flagged as high no show risk (i.e., red) when Mom called in August 2017 to schedule his appointment. When asked the screening questions, Mom indicated she needed transportation assistance, is having difficulty with insurance, and needed help with getting an appointment in Nephrology
- Hematology work queue user contacted sickle cell social worker for assistance with transportation, insurance specialist social worker to check insurance benefits, and complex scheduler for assistance with scheduling in Nephrology
- Team was able to assist family in scheduling multiple appointments on the same day, provided the number to transportation assistance (van ride). Sickle cell social worker relayed all of this information to Mom

Case Study Outcome

He made it!



What does this mean for clinic flow?



**Nurse, Social,
Fellow, Attending
Or Combination
visit the patient.**

Hematology Simulation: Impact of No Show Decrease

	Baseline	50% Less No Show	0% No Shows
Exam Room Time	47	47	48
Overall Time - Type 1	59	63	66
Wait Room Time	13	16	19
Vital Time	6	6	6
Wait for Attending	7	7	8
Attending Time	25	25	25

Additional Results

- Epic Predictive Model Go Live: August 2017 with 8 medical/surgical specialties and 10 sites
- 55 patients flagged as high risk for missing appointment in 2 months
- Of the 36 appointment dates that have passed:
 - 23 completed visits
 - 4 canceled appointments
 - 9 no shows*

(4 of 5 in first week of roll-out)

(1 patient unreachable)

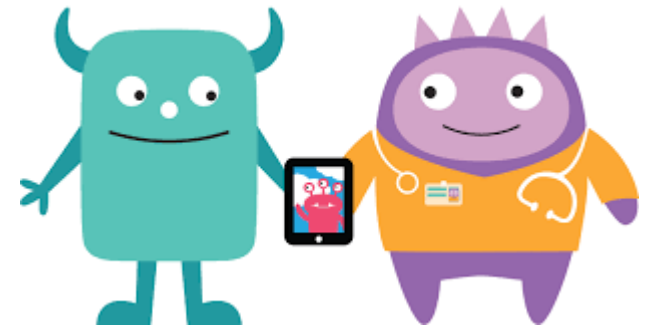
*Initiated weekly check-in with schedulers
and work queue users to fine tune process
for patient follow-up.*





Impact on Patients and Providers

- Proactive identification of barriers to attending appointments
- Intervention prior to a missed appointment
- Improved appointment adherence and follow up on clinical recommendations
- Keeping slots filled and/or greater ability to back-fill slots with advanced cancellation notification



Next Steps

- Full roll out of predictive model across all ambulatory practices
- Identify a way to store patient/parent social factors in discrete fields in Epic
- Analyze data for balancing measures:
 - Clinical Outcomes
 - Patient Experience
 - Financial Impact

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Questions



What approaches to proactively managing no shows have you utilized in your organization?