MetroHealth

MetroHealth's Center for Clinical Informatics Research and Education (CCIRE) – SPEED ROUNDS (10/2025 prior 03/2022)

Eman Jammali, MD
Senior Clinical Informatics Fellow and Instructor of Family Medicine

Eric Kim, MD, PhD
Assistant Professor of Family Medicine

Nicholas Riley, MD, PhD
Assistant Professor of Family Medicine

Ashely Hughes, PhD
Associate Professor of Internal Medicine (WITH TENURE)

David C Kaelber, MD, PhD, MPH
Professor of Internal Medicine, Pediatrics, Population and Quantitative Health Sciences

Learning Objectives

- To understand what types of research occurs within the Center for Clinical Informatics Research and Education (CCIRE).
- To describe at least one informatics "big data" and one informatics "interventional" study undertaken by CCIRE.
- To think of at least one way that you can partner/partner more with CCIRE faculty for research in the future.

Disclosures : NONE (except our entire operational, academic, and research careers are based on leverage informatics and Epic ☺)

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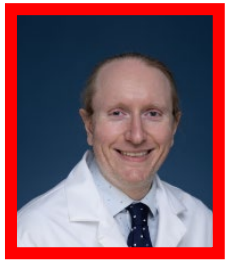
Outline

- CCIRE/Epic Background (5 min)
- Informatics Data Science/“Big Data” Studies (15 min)
- Informatics Implementation Science/“Interventional” Studies (15 min)
- CCIRE Research Informatics Resources (10 min)
- Wrap-up/Questions/Discussion (10 min)

CCIRE Faculty

Peter Greco
Internist
Director Clinical Informatics – Software Infrastructure

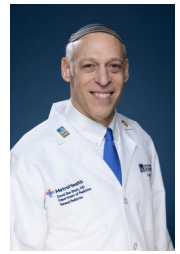
David Kaelber
Internist and Pediatrics
"Leader"/CHIO



Nicholas Riley
Family Physician
Director Clinical Informatics – Ambulatory Informatics

Yasir Tarabichi
Pulmonary/Critical Care
Director Research Informatics CHAIO

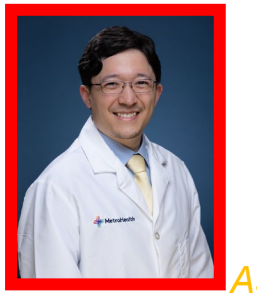
Jonathan Siff
Emergency Medicine Physician
CMIO



David Bar-Shain
Pediatrician
Director Clinical Informatics – Clinical Decision Support

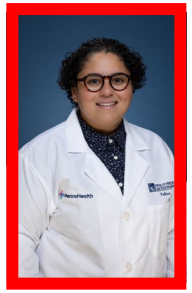
Johnbuck Creamer
Adult Hospitalist
Director Clinical Informatics – Inpatient Informatics

Ashley Hughes
Research Informatics
Research Scientist



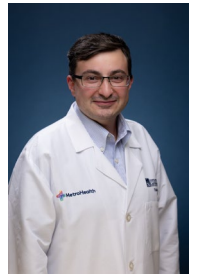
Eric Kim
Family Physician
Director Clinical Informatics - Virtual Care

Janeen Leon
Nutritionist
Associate Director Research Informatics



Eman Jammali
Family Physician
Senior Clinical Informatics Fellow

Shashank Nayak
Preventive Medicine
Clinical Informatics Fellow



Muhammad Alghanem
Geriatrics/Family Medicine
Clinical Informatics Fellow

Blue – at least partially externally funded faculty

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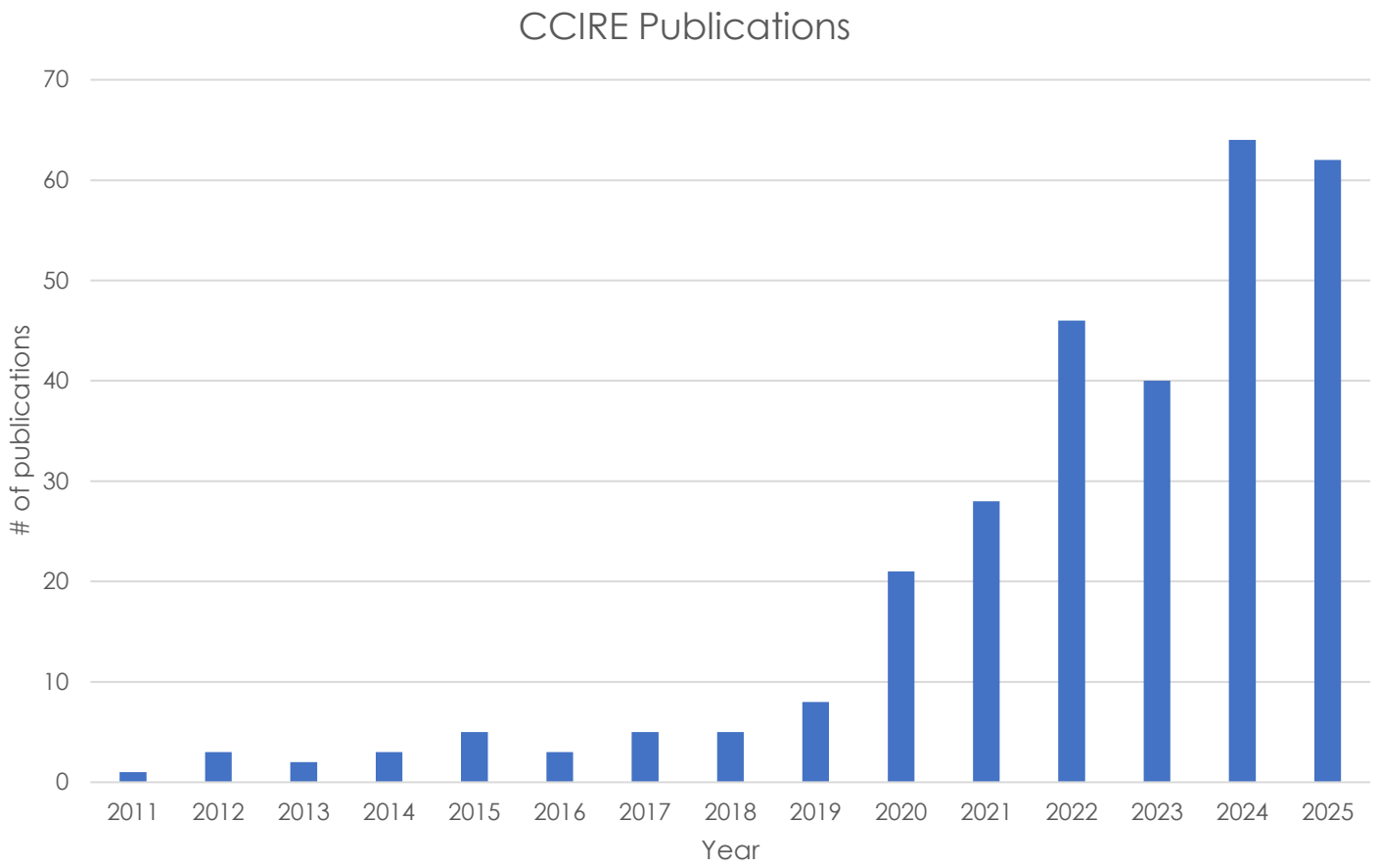
CCIRE Publications



CCIRE has had significant growth in publications in the last ~5 years!

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MetroHealth Data and Informatics Infrastructure

System Overview

- 1 tertiary care academic hospital
- 1 behavior health hospital
- 2 community hospitals
- 4 emergency departments
- 27 health centers/13 schools
- 400+ resident/fellow physicians
- 1,000+ medical staff/2,100+ nurses
- 25,000 inpatient stays/year
- 140,000 ED visits/year
- 1,500,000 outpatient visits/yr
- Recovery Resources, Corrections Care, Foster Care, Hospital @ Home, Dental Care
- Institute for H.O.P.E.^{2}, High School on Campus
- Level I Trauma Center
- Only OH Adult & Pediatric Trauma Burn Center
- Affiliated with CWRU
- Cleveland's/Cuyahoga Country's public/safety-net health care system

Epic Implementations

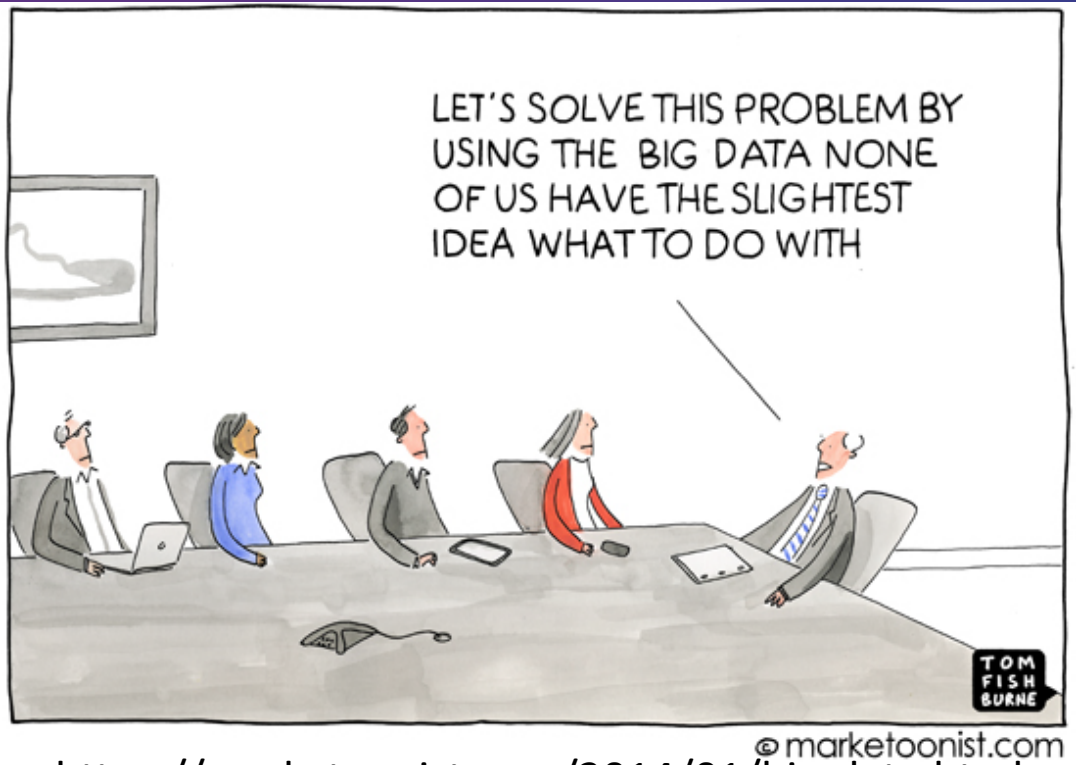
- 1999 – Ambulatory EHR (EpicCare w/ Cadence, Prelude, & Resolute)
- 2004 – EHR in ED (ASAP)
- 2009 – Inpatient EHR (Epic w/ Inpatient Willow and Beacon)
- 2011 – CareEverywhere, e-Rx, MyChart, Nurse Triage
- 2012 – Epic Enterprise Contract, MU Stage 1
- 2013 – BCMA, EpicCare Link, Welcome
- 2014 – ADT, Beaker, Bed Tracking, Anesthesia, OpTime, Research, Resolute Hospital Billing and SBO
- 2015 – Kaleidoscope
- 2017 – Stork, LGBT module
- 2018 – Infection Control, Clinical Case Management
- 2020 – MyChart Bedside, Transfer Center, UniteUs
- 2021 – Radiant, Ambulatory Willow, PM&R
- 2022 – Behavior Health Module
- 2023 – Compass Rose, Bones, Hello World SMS, Payer Platform
- 2024 – Epic 2023 (Feb), Hyperdrive, Financial Assistance, Maternal Care Companion
- 2025 – Epic 2024 (Nov), Wisdom, Hello World platform, Cheers Campaigns

Total EHR data

- 1.7 million patients
- 66 million visits
- 45 million labs/pathology
- 3 million imaging studies
- 26 years of data in Epic

1st public health care system in US to install Epic in the outpatient setting (1999)!!!
1st public health care system in US with Epic to achieve HIMSS Stage 7 EMRAM Ambulatory & Hospital recognition (2014) and revalidation (2017, 2020, 2023)!!!
1st public health care system in the US with Epic to achieve HIMSS Enterprise Davies award (2015)!!!
1st public health care system in the US with Epic to achieve KLAS Pinnacle Award
Top 1%+ of all healthcare systems in the US/World in terms of EHR implementation and use!!!!!!!

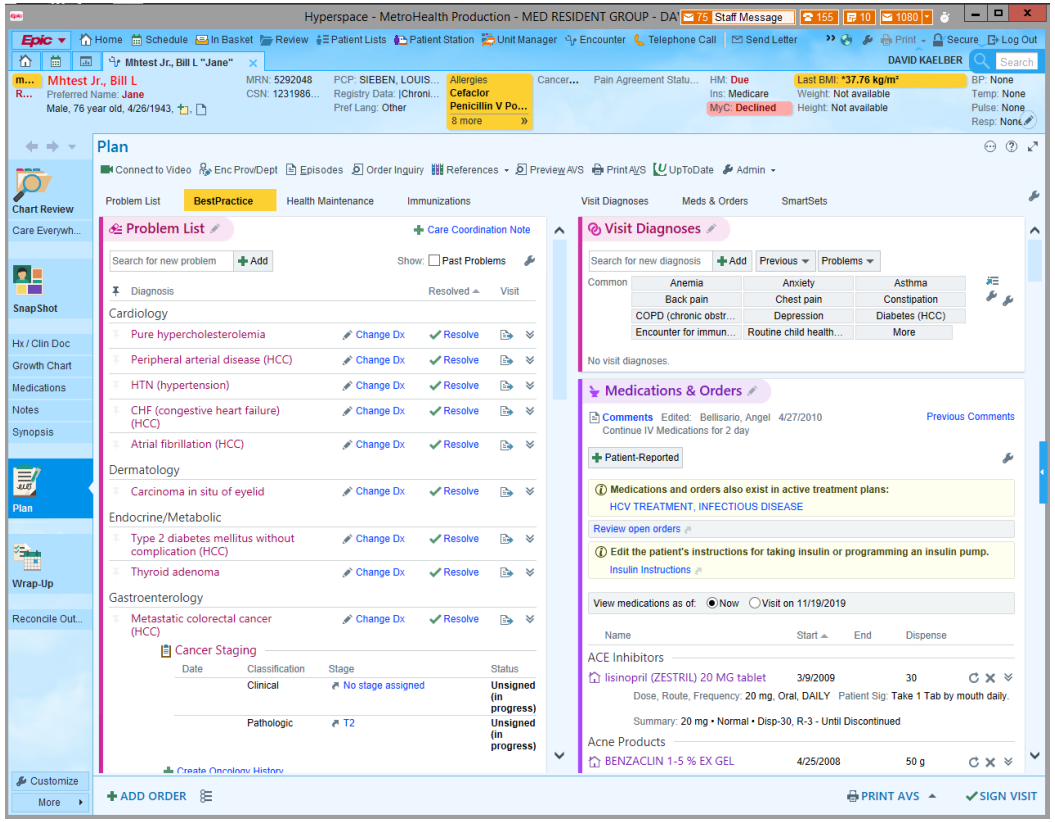
CCIRE Research Focuses



https://marketoonist.com/2014/01/big-data.html

Using electronic health record "big data"

Informatics Data Science



Studying how electronic health records can improve care

Informatics Implementation Science

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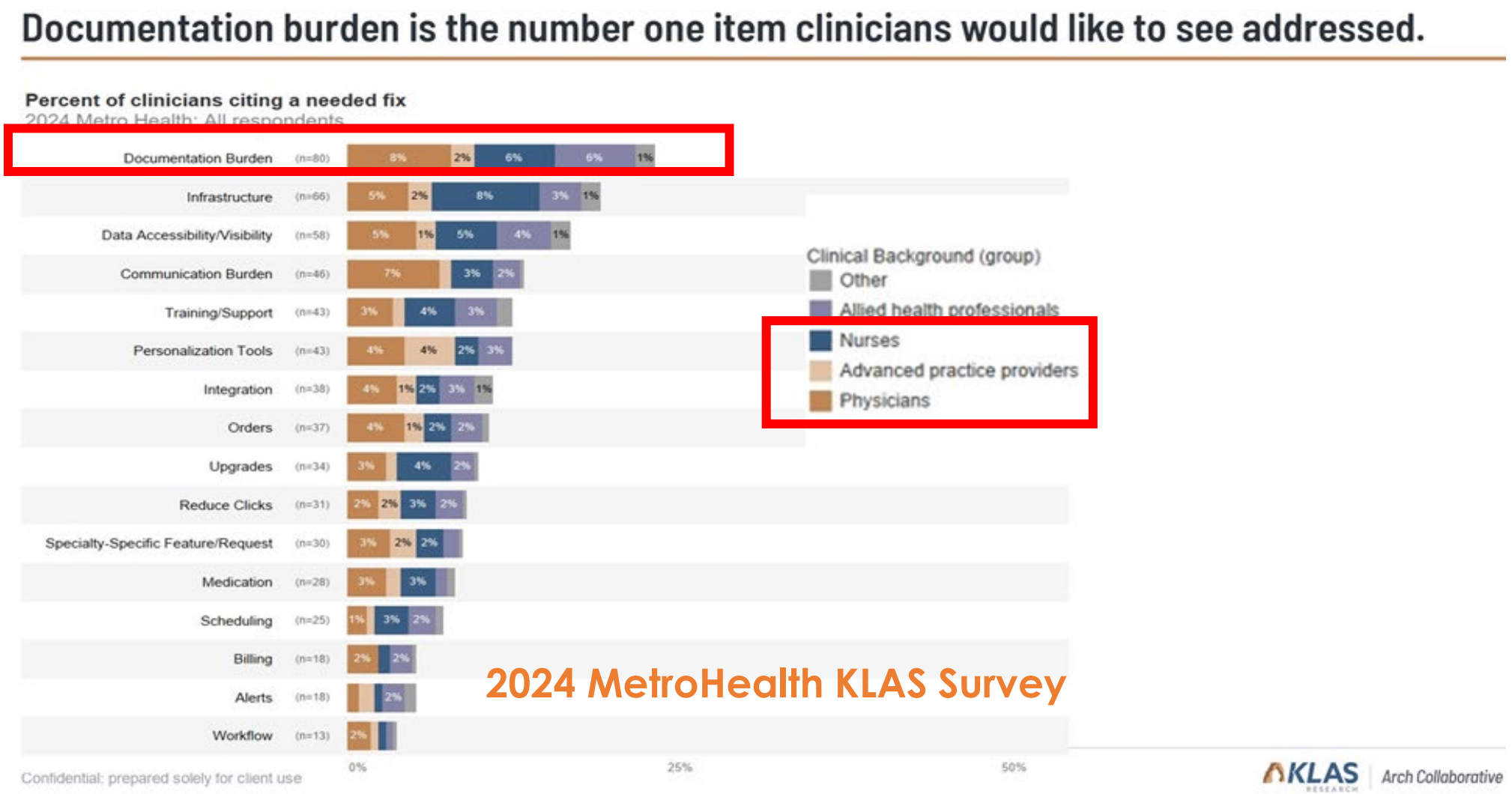
PHRI CCIRE Speed Rounds

Ambient AI Documentation Pilot – CCIRE Speed Rounds

Project Sponsor: Dr. Ellen Gelles
Project Executive Sponsor: Dr. David Kaelber
Project Operational Lead: Dr. Eman Jammali
Project Manager: Marie Velardo

Eman Jammali, MD
Assistant Professor, Family Medicine
Senior Clinical Informatics Fellow
Center for Clinical Informatics Research and Education

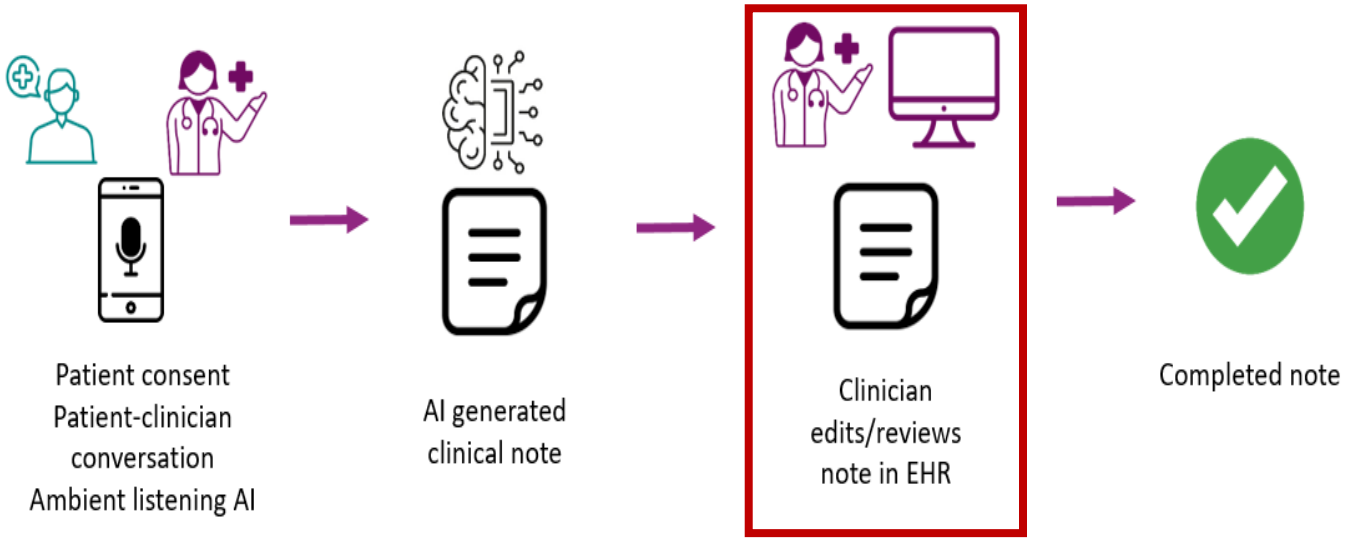
MetroHealth clinicians feel overwhelmed by administrative tasks and want tools to help

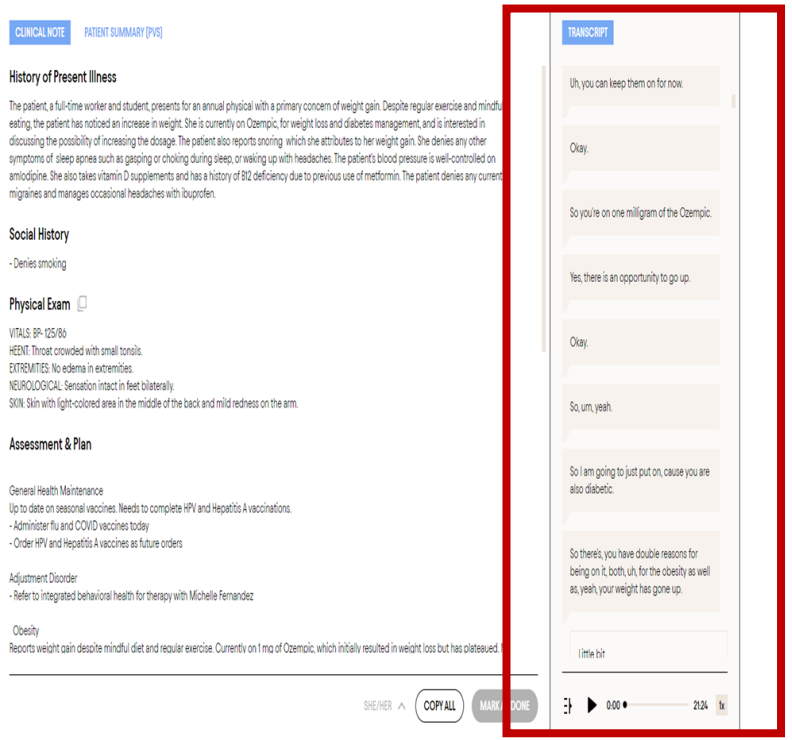


Ambient Documentation

A clinician is always in the loop!

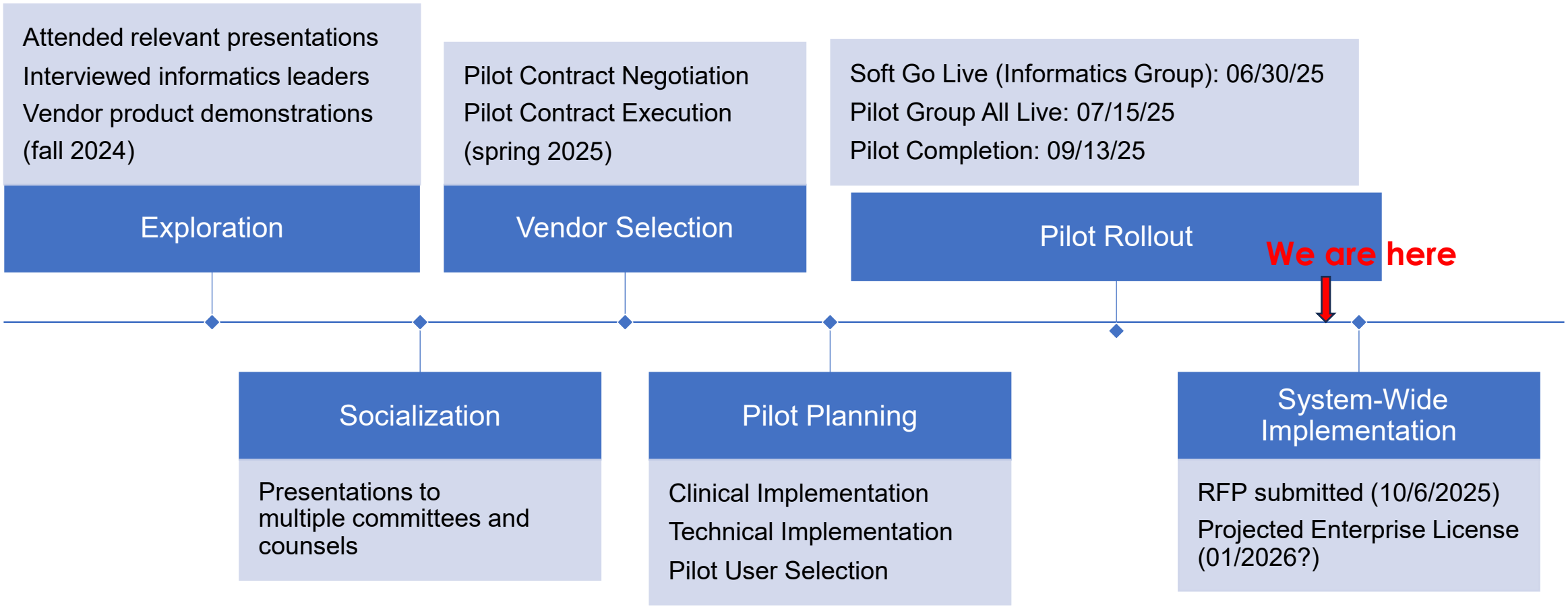
- Ambient documentation (“ambient listening”, “AI scribes”) uses natural language processing, machine learning, and contextual understanding to produce summarized real time scripts of clinician-patient encounters.





Making the EHR Work for Us, Not Vice Versa, Mishuris, R, IM 2024, Boston, Massachusetts.

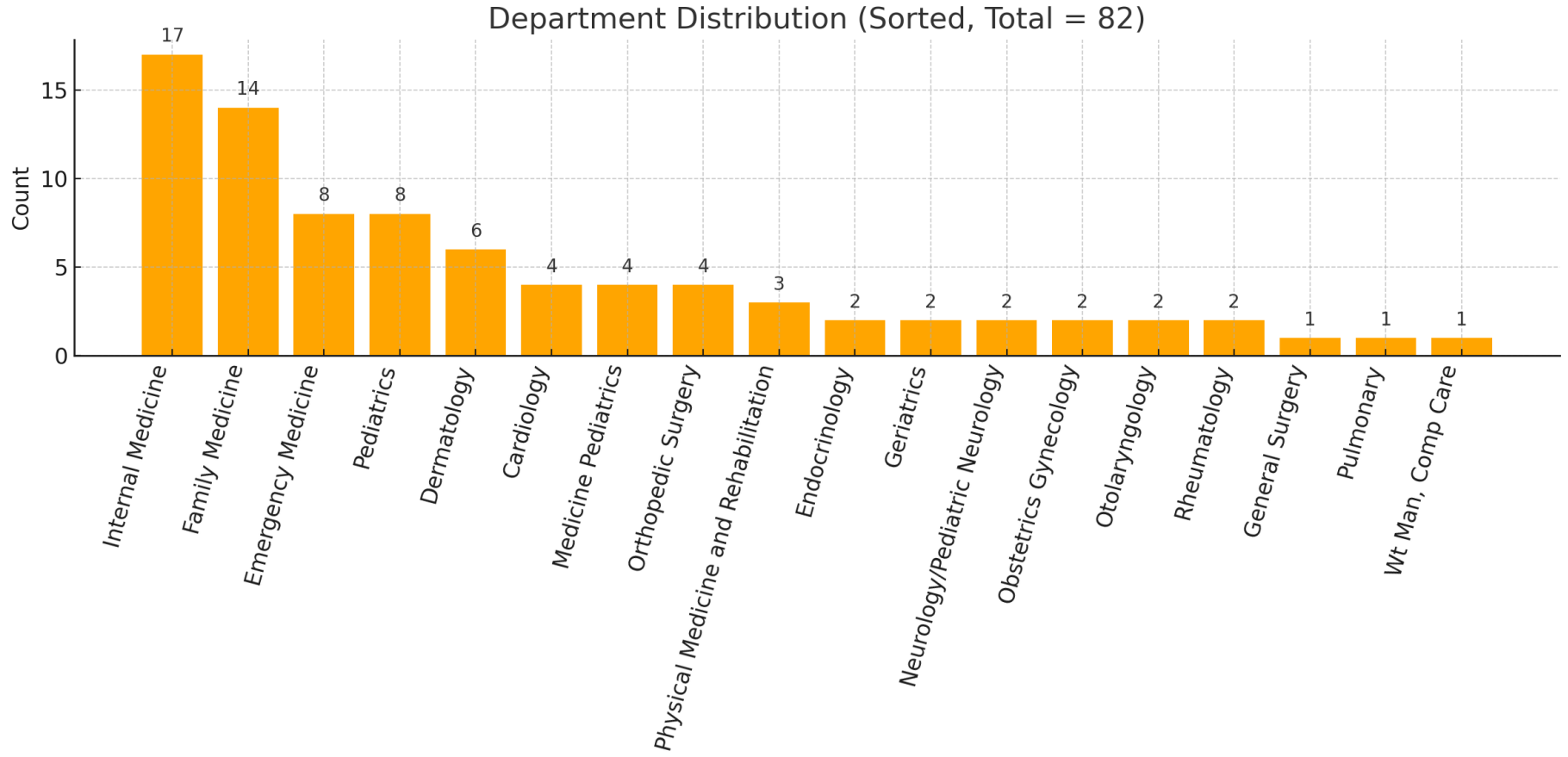
Ambient Listening (Abridge) Timeline



Abridge Pilot Group Characteristics

Pilot Cohort

N=84
51% Primary care
20% APPs
20% Scribe Users
50% Fluency Direct Users



Abridge Pilot Metrics

Domain	Metric	Measurement Source
Adoption	# of notes generated using Abridge	Abridge
	# of active and engaged users	Abridge
Clinician Experience	Likelihood to recommend (NPS)	Patient Survey
	Burn-out assessment	Patient Survey
	Cognitive load assessment	Patient Survey
	Work Outside of Work (WoW)	Epic Signal
Note Quality	Avg. note star rating (1–5)	Abridge
	Avg. note turnaround time	Abridge
	% effort reduction	Abridge
Operational Efficiency	Same-day close rate	Epic Signal
	Time in notes per encounter	Epic Signal
	~~Same-day patient availability~~	Patient Survey
Patient Experience	Undivided attention of clinician	Clinician Survey
	Visit improved compared to encounters without Abridge	Patient Survey
	Comfort with technology	Patient Survey
Financial	~~Visits per session/shift~~	MetroHealth Billing and Revenue
	Provider wRVU distribution pre-/post- use of Abridge	MetroHealth Billing and Revenue
	HCC Gap Closure Rate	MetroHealth Billing and Revenue
Scribes/Dictation Behavior	% of providers willing to eliminate or reduce scribe use	Client Survey (adapted for MH)
	M Modal use in pilot users, pre- and post- pilot	Client Survey (adapted for MH)

Abridge Pilot Results

- Utilization
- Financial
- Patient Experience
- Physician/APP Experience

Total Notes Generated
20,000+

Utilization Rates

~70 recording users weekly

Abridge Usage Rate - High Utilizers

Between 6/30/2025 and 9/12/2025 by week

DepartmentSpecialty	2025 Jun 30 – Jul 6	Jul 7 – Jul 13	Jul 14 – Jul 20	Jul 21 – Jul 27	Jul 28 – Aug 3	Aug 4 – Aug 10	Aug 11 – Aug 17	Aug 18 – Aug 24	Aug 25 – Aug 31	Sep 1 – Sep 7	Sep 8 – Sep 12
Dermatology	3.75%	63.64%	73.68%	90.65%	92.93%	93.26%	100%	98.72%	96.67%	92.31%	98.46%
OB/Gyn	0%	0%	-	60.78%	91.3%	86.36%	91.84%	91.84%	95%	93.62%	96%
Endocrinology	0%	0%	100%	0%	100%	100%	100%	77.42%	96.55%	-	57.14%
Internal Medicine	0.24%	9.92%	55.48%	72.79%	80.09%	83.14%	89.67%	86.9%	88.43%	88.57%	82.11%
Neurology	0%	0%	47.37%	70.37%	71.43%	96.88%	70%	86.67%	87.5%	92.59%	93.33%
Family Practice	12.5%	17.38%	50.59%	66.67%	77.97%	90.44%	79.2%	84.93%	83.26%	80.65%	87.76%
Neurosurgery	-	0%	0%	-	-	-	35.14%	-	100%	-	89.47%
Pediatrics	0%	0%	64.35%	76.56%	75.38%	75.75%	77.84%	72.92%	69.7%	76.47%	69.92%
Orthopedics	0%	0%	28.3%	-	71.43%	63.64%	79.59%	64.29%	90.2%	-	85.71%
Physical Medicine & Rehab/PM&R	0%	0%	51.85%	82.52%	76.32%	73.21%	65.79%	78.72%	66.36%	68.85%	72.88%
Medicine/Pediatrics	4.76%	22.95%	46.94%	39.5%	62.42%	63.95%	70.13%	69.92%	64.29%	67.24%	78.88%
Pediatric Urgent Care	0%	0%	-	100%	-	-	-	-	-	100%	100%
Express Care	0%	-	-	-	0%	90.91%	-	0%	100%	-	-
Urgent Care	0%	0%	-	-	-	-	50%	-	100%	-	-
Gastroenterology	-	-	-	-	-	0%	-	0%	0%	-	0%
Oncology Medical	0%	-	0%	0%	-	0%	0%	-	0%	-	-
Radiology	0%	0%	0%	0%	0%	0%	0%	0%	0%	-	0%
Total*	**3.77%**	**10.24%**	**54.52%**	**69.8%**	**77.61%**	**81.18%**	**80.11%**	**80.73%**	**83.35%**	**81.77%**	**81.94%**

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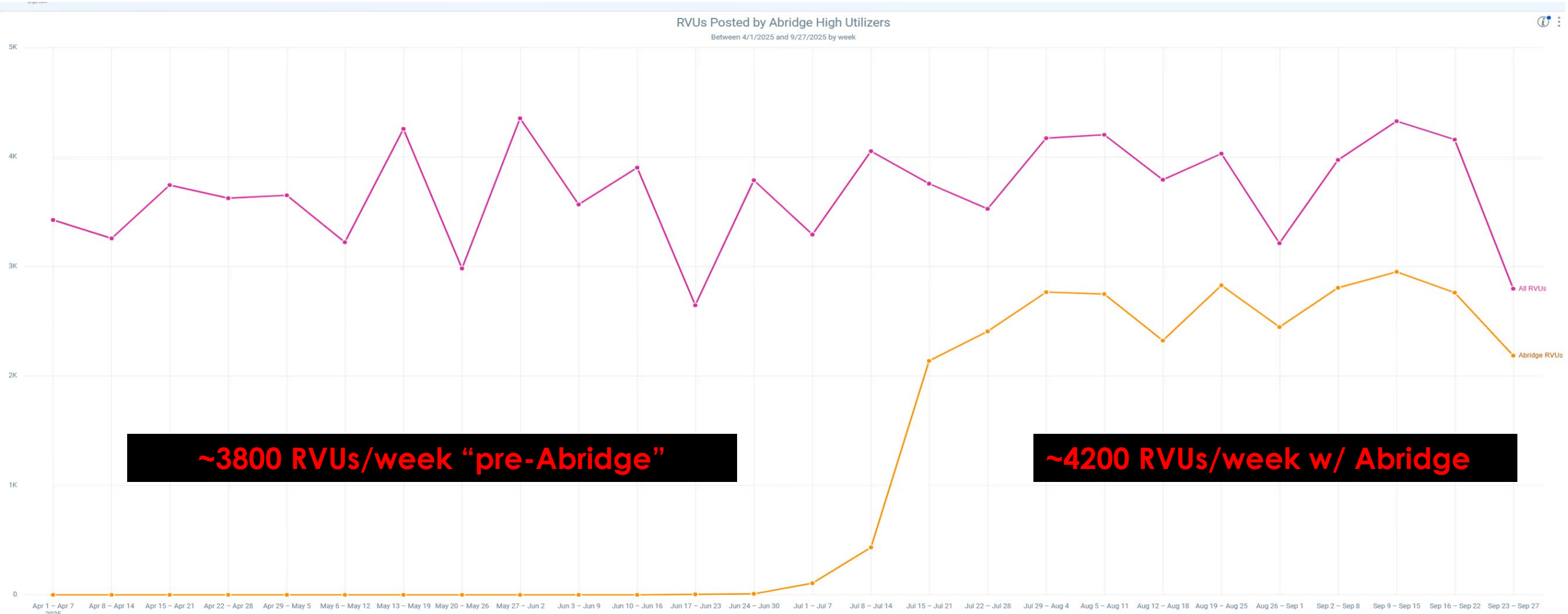
RVU Impact

(presumably from “RVU drift/per encounter” as well as willingness to “squeeze in encounters”)



~3800 RVUs/week “pre-Abridge”

~4200 RVUs/week w/ Abridge

~400 increase in RVUs shown in high utilizers (preliminary result)*; for a typical provider with 8 half-day clinical sessions per week with typical RVUs, a 2% increase in RVUs will pay for ambient listening license

Note – not sure of aggregate RVU to $ conversion factor for MetroHealth, but for Medicare ~$32 per RVU proposed for 2026

*-UPMC showed a 7% increase in RVUs

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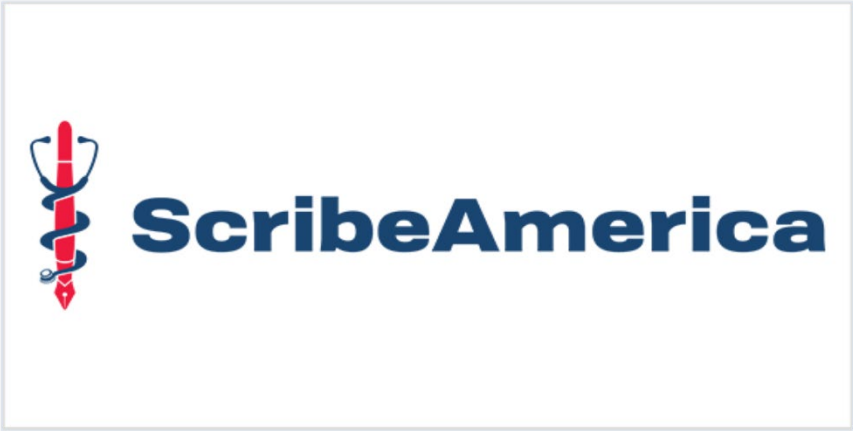
Scribe (virtual and physical) and mModal User Impact



All virtual and most physical scribe users (13/15 overall scribe users) in the pilot indicated that ambient listening was an effective scribe substitute

25/34 mModal users in the pilot indicate that they would "not need" mModal if they continue to use ambient listening

MetroHealth current has ~50 virtual and physical scribe users and spent $862K on scribes in 2024.

Scribes cost ~$200 per provider per day; Ambient listening costs ~$200 per provider per MONTH.

MetroHealth current has ~400 mModal users and spent ~$200K on mModal per year.

mModal costs ~$35 per provider per month.

Epic HCC Gap Closure Rates with Abridge

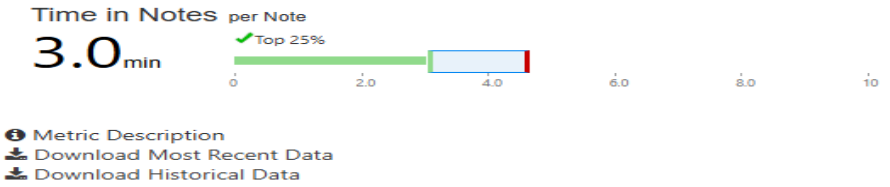
Abridge Pilot - Score Gap Analysis

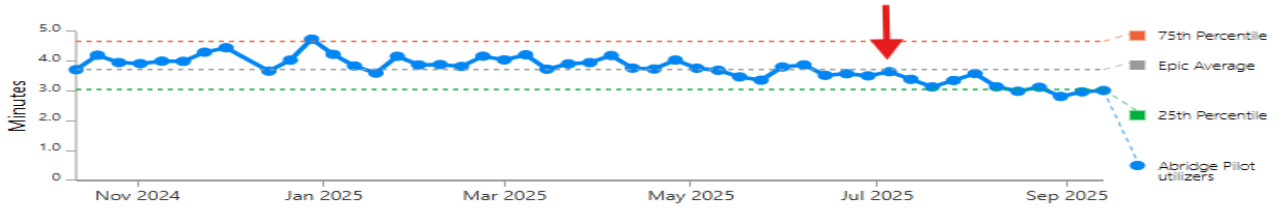
All Time

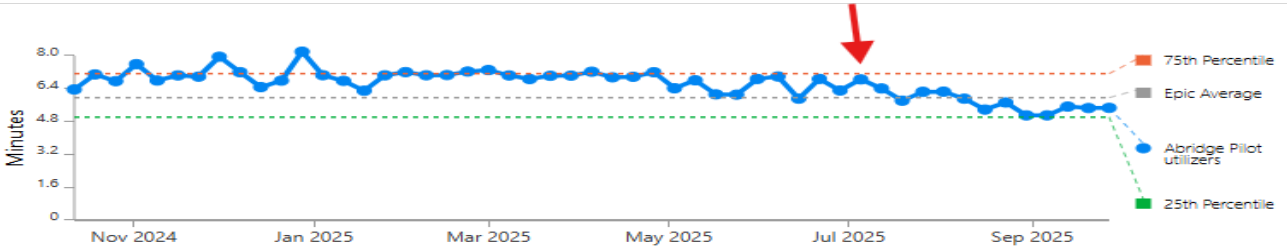
# of encounters	# of encounters with Abridge	0	1	2	3
	Measures				
1	Avg CMS HCC Score Gap	0.279808	0.2147403	-	-
	Patient Volume	5,481	4,395	-	-
2	Avg CMS HCC Score Gap	0.2833307	0.2343808	0.1953627	-
	Patient Volume	511	449	317	-

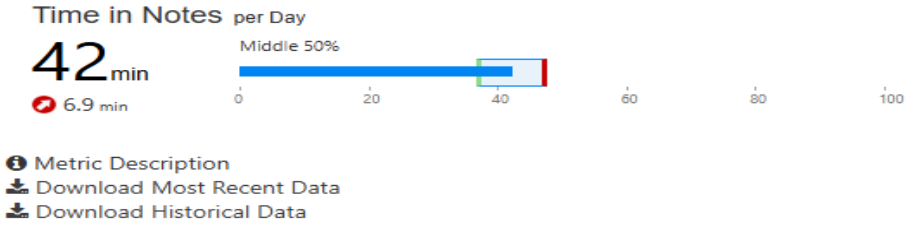
For each patient with an HCC gap, the HCC gap per encounter is LESS after the encounter if the encounter occurred with Abridge then without Abridge, presumably because the provider has "more time" and "less cognitive load" and so is more likely to address any HCC gaps as part of the encounter.

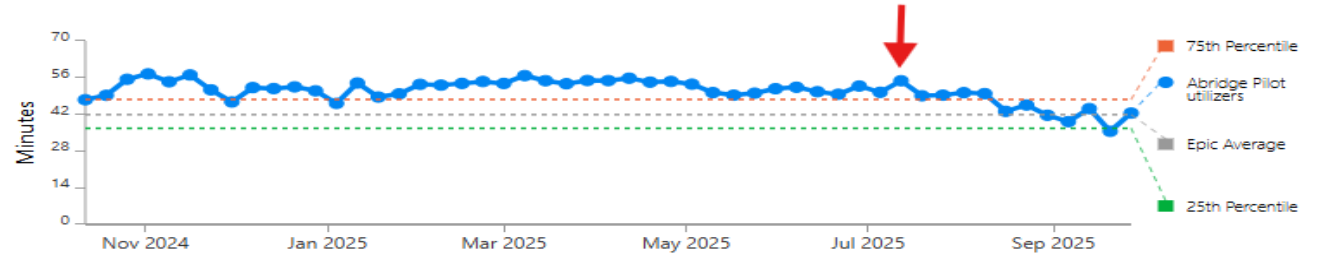
“Time in Notes”and "Pajama Time" for Abridge Users (Epic

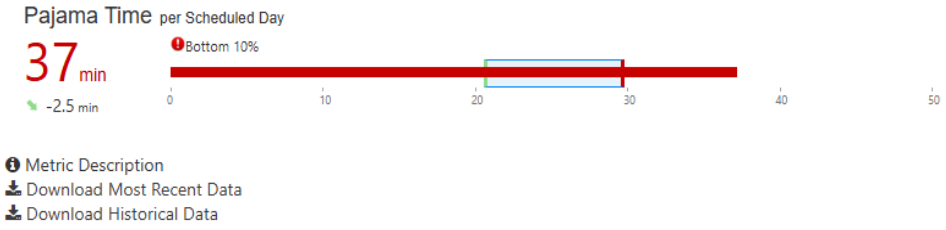


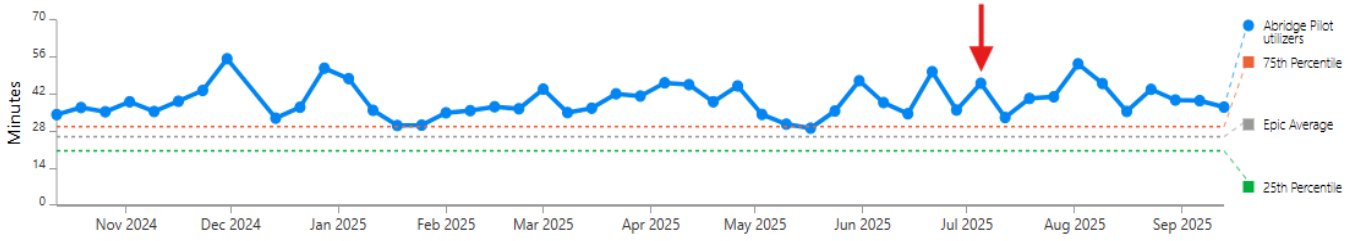












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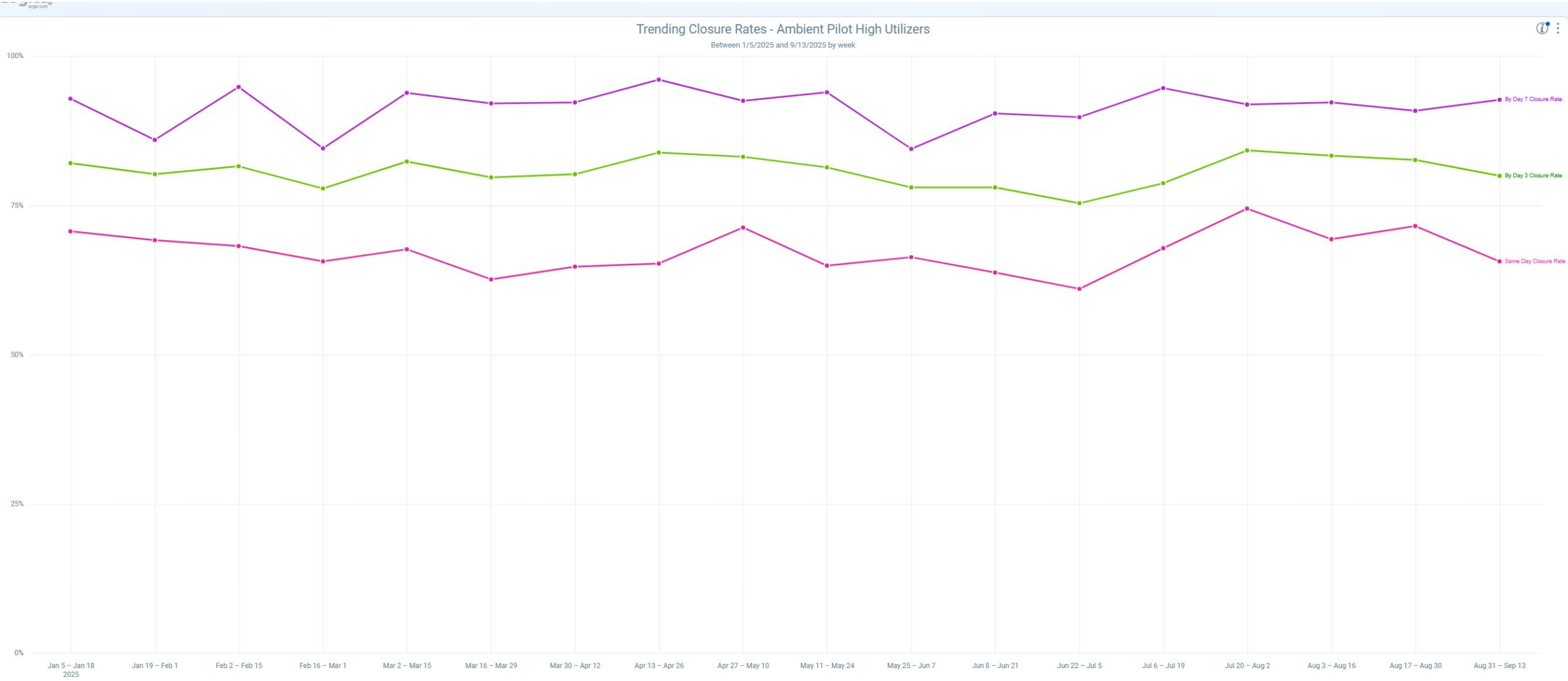
Epic Encounter Chart Closure Rates



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Patient Experience

MH Patient Experience - Ambient Pilot

This component displays surveys collected after 1/1/2025

Patient Experience Surveys	Apr	May	Jun	Jul	Aug	Sep	YTD
Explains	76.9%	76.8%	79.1%	75.2%	78.3%	77.1%	76.9%
Provider Listens Carefully	85.1%	82.2%	84.3%	80.4%	85.5%	85.7%	83.5%
Shows Respect	91.2%	88.9%	91.5%	88.8%	88.6%	91.6%	89.9%
Composite	84.2%	82.6%	84.9%	81.3%	84.0%	84.7%	83.3%

Abridge users appear to have a SLIGHT increase in “Explains”, "Shows Respect" and “Provider Listens” patient experience scores

Patient Experience Survey

The ambient listening tool improved my visit today compared to other visits when it was not used.

I felt comfortable knowing that the ambient listening tool was being used to document my conversation with my provider today.

Strongly agree	40%	12
Agree	40%	12
Neutral	17%	5
I have not had healthcare visits when this technology was not used	3%	1

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Post-Pilot Survey Results

SURVEY RESULTS ANALYSIS

74 RESPONSES, 15 WITH SCRIBES

Cognitive Load (Nasa TLX)

Mental Demand

74.3% Lower

- Avg 4/20 post-launch, compared to 14/20 pre-launch

Temporal Demand

66.7% Lower

- Avg 5/20 post-launch, compared to 15/20 pre-launch

Effort

65% Lower

- Avg 6/20 post-launch, compared to 16/20 pre-launch

Burnout (Mini Z)

Burnout

Decrease of 32.1%

- 11/74 clinicians feel burnout, compared to 54/74 pre-launch

Other

Undivided Attention

Decrease by 27.6%

Perceived WoW

Avg: 2.25 hrs/wk

- Avg 2.25 hrs/wk post-launch, compared to 5.74 hrs/wk pre-launch

Perceived Patient Access

Increase by 20.3%

Most Recent Clinician Feedback

"When I started using Abridge, **writing the notes became a breeze**. The AI-generated **notes are very detailed, organized, and accurate**. I only have to proofread them and make any necessary minor changes. It would take me 30 minutes at the end of the day to do this, instead of the 3-4 hours it took before. **I can give my undivided attention to the patients.** As for my family life, I stopped taking 30-40 notes home for the weekend. I finish the majority of them by Friday at 6 PM. I noticed that **my mind is free when I am home** with my spouse and my children. I am a better husband and a happier father. I wish we had this a long time ago. I hope that MetroHealth will soon contract for AI transcription for all its providers. **It is definitely a game-changer.**

"Abridge has been very beneficial and effective in note taking. Truly **makes stress of documentation way less**. Thorough and easy to follow. Does not necessarily decrease work burden but **decreases note burden and burn out. Would not want to lose this!"**

"I do feel that it is better (or at least much less frustrating) than the human scribes we getcurrently in the majority of cases."
"Notes are **more accurate**, since it catches details that patient is providing during the interview even if you have to finish a note several days later"

"Abridge has **literally removed a significant amount of stress from my day-to-day work**. Additionally, the stress is also removed from family time, allowing for **optimal work/life balance**"

"The improvement in cognitive burden is SUBSTANTIAL. Even when I wasn't initially saving time, I was DEFINITELY more cognitively available. Now I am leaving the office two hours earlier than usual."

"This has been life changing. **My notes are more thorough and address everything** I talk about but forget by the time I get to writing my notes. I am actually **able to have a conversation with my patients** without having to type and look at my computer the entire time"

Conclusions

1. Happy Providers - Ambient listening is easy to use, popular among most pilot users and has high utilization, particularly in primary care, dermatology and orthopedics. In some departments including the ED this technology received mixed review due to challenges with specialty workflow.

2. RVUs - In high Abridge utilizers (top 20%), increased RVUs, but could be confounders of other interventions @ MetroHealth during the pilot period

3. Scribe/Dictation Users - Many scribe and dictation users feel that ambient documentation could replace these other documentation aids.

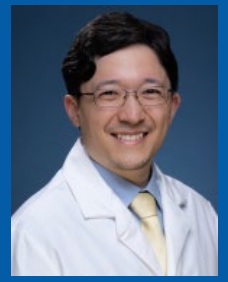
4. HCCs - In Abridge utilizers with high patient volumes, trend towards reduced HCC gap

5. Efficiency - Decreased provider pajama time and time in notes per appointment (objective and subjective). There was not a significant increase in chart closure rates.

6. Burnout/Cognitive Burden - Decreased provider burnout and cognitive burden

7. Happy Patients - Improvement in “Explains”, "Shows Respect" and “Provider Listens Carefully" patient experience metric. Limited data shows patients respond well to use of the technology and felt that patient facing material was helpful.

PHRI CCIRE Speed Rounds



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Assistant Professor, Family Medicine

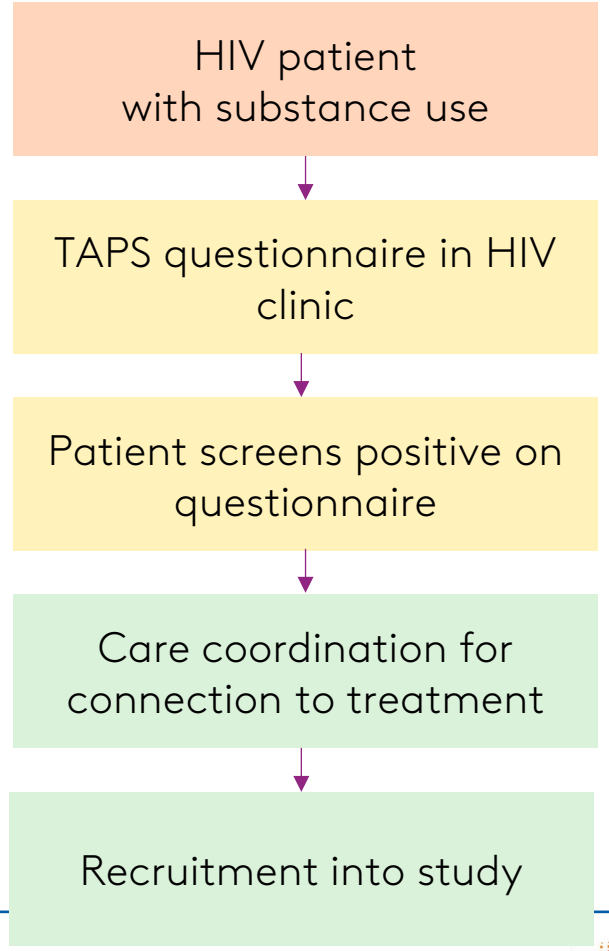
Center for Clinical Informatics Research and Education

National Institute on Drug Abuse Center of Excellence

NIDA COE at MetroHealth

Synergy between clinical management and research data

- PI: Ann Avery MH/CWRU
- One project of many
- HIV patients with substance use
- Clinical substance use screening in HIV clinic
- Connection with resources
- Recruitment into study for positive responses
- ~500 questionnaire responses per month
- ~25 eligible patients per month



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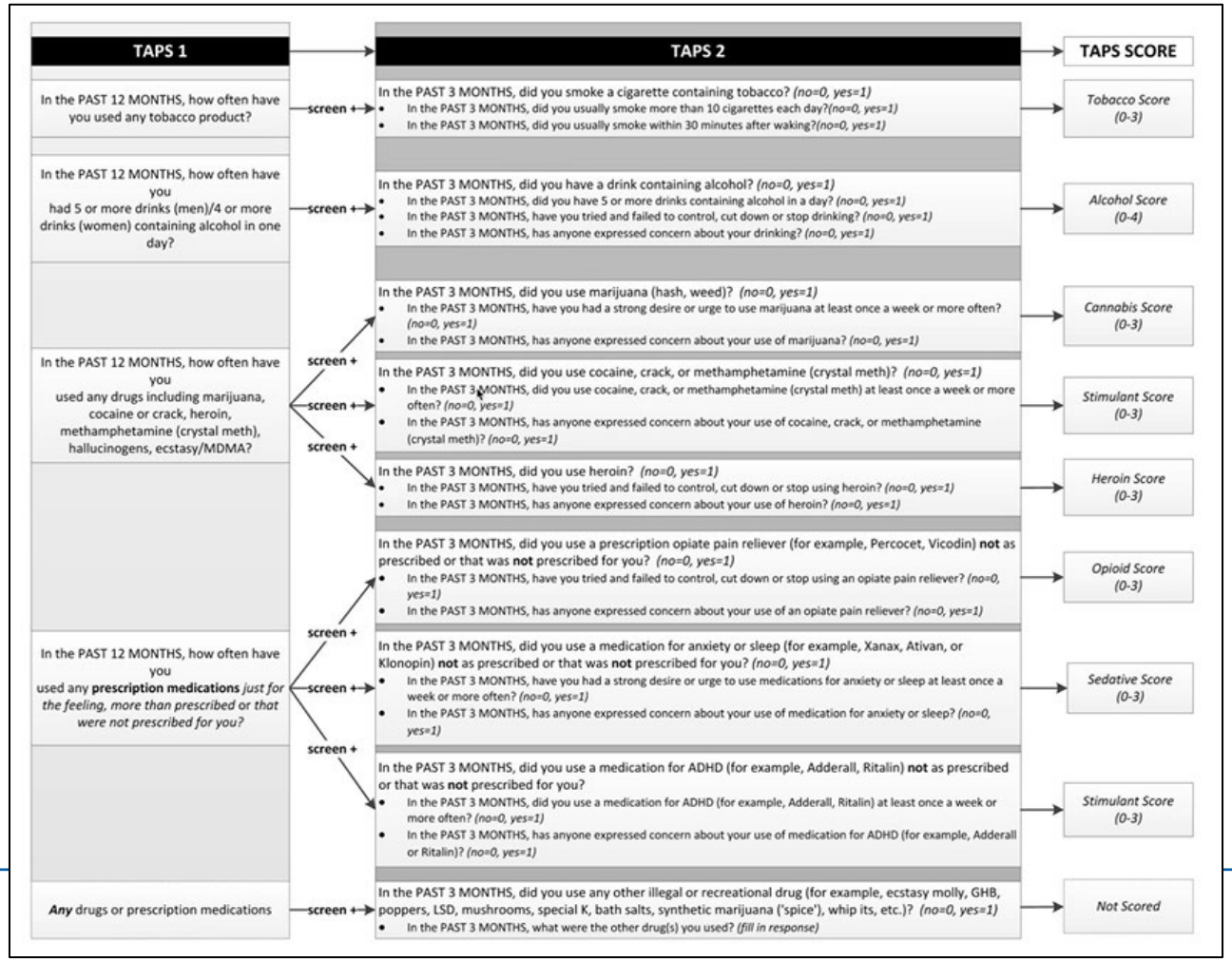
TAPS Substance Use Screening Questionnaire

Tobacco, Alcohol, Prescription Medication, and Other Substance Use Tool



TAPS 1		TAPS 2	TAPS SCORE
In the PAST 12 MONTHS, how often have you used any tobacco product?	screen +	In the PAST 3 MONTHS, did you smoke a cigarette containing tobacco? *(no=0, yes=1)* • In the PAST 3 MONTHS, did you usually smoke more than 10 cigarettes each day?*(no=0, yes=1)* • In the PAST 3 MONTHS, did you usually smoke within 30 minutes after waking?*(no=0, yes=1)*	*Tobacco Score (0-3)*
In the PAST 12 MONTHS, how often have you had 5 or more drinks (men)/4 or more drinks (women) containing alcohol in one day?	screen +	In the PAST 3 MONTHS, did you have a drink containing alcohol? *(no=0, yes=1)* • In the PAST 3 MONTHS, did you have 5 or more drinks containing alcohol in a day? *(no=0, yes=1)* • In the PAST 3 MONTHS, have you tried and failed to control, cut down or stop drinking? *(no=0, yes=1)* • In the PAST 3 MONTHS, has anyone expressed concern about your drinking? *(no=0, yes=1)*	*Alcohol Score (0-4)*
In the PAST 12 MONTHS, how often have you used any drugs including marijuana, cocaine or crack, heroin, methamphetamine (crystal meth), hallucinogens, ecstasy/MDMA?	screen +	In the PAST 3 MONTHS, did you use marijuana (hash, weed)? *(no=0, yes=1)* • In the PAST 3 MONTHS, have you had a strong desire or urge to use marijuana at least once a week or more often? *(no=0, yes=1)* • In the PAST 3 MONTHS, has anyone expressed concern about your use of marijuana? *(no=0, yes=1)*	*Cannabis Score (0-3)*
	screen +	In the PAST 3 MONTHS, did you use cocaine, crack, or methamphetamine (crystal meth)? *(no=0, yes=1)* • In the PAST 3 MONTHS, did you use cocaine, crack, or methamphetamine (crystal meth) at least once a week or more often? *(no=0, yes=1)* • In the PAST 3 MONTHS, has anyone expressed concern about your use of cocaine, crack, or methamphetamine (crystal meth)? *(no=0, yes=1)*	*Stimulant Score (0-3)*
	screen +	In the PAST 3 MONTHS, did you use heroin? *(no=0, yes=1)* • In the PAST 3 MONTHS, have you tried and failed to control, cut down or stop using heroin? *(no=0, yes=1)* • In the PAST 3 MONTHS, has anyone expressed concern about your use of heroin? *(no=0, yes=1)*	*Heroin Score (0-3)*
In the PAST 12 MONTHS, how often have you used any **prescription medications** *just for the feeling, more than prescribed or that were not prescribed for you?*	screen +	In the PAST 3 MONTHS, did you use a prescription opiate pain reliever (for example, Percocet, Vicodin) **not** as prescribed or that was **not** prescribed for you? *(no=0, yes=1)* • In the PAST 3 MONTHS, have you tried and failed to control, cut down or stop using an opiate pain reliever? *(no=0, yes=1)* • In the PAST 3 MONTHS, has anyone expressed concern about your use of an opiate pain reliever? *(no=0, yes=1)*	*Opioid Score (0-3)*
	screen +	In the PAST 3 MONTHS, did you use a medication for anxiety or sleep (for example, Xanax, Ativan, or Klonopin) **not** as prescribed or that was **not** prescribed for you? *(no=0, yes=1)* • In the PAST 3 MONTHS, have you had a strong desire or urge to use medications for anxiety or sleep at least once a week or more often? *(no=0, yes=1)* • In the PAST 3 MONTHS, has anyone expressed concern about your use of medication for anxiety or sleep? *(no=0, yes=1)*	*Sedative Score (0-3)*
	screen +	In the PAST 3 MONTHS, did you use a medication for ADHD (for example, Adderall, Ritalin) **not** as prescribed or that was **not** prescribed for you? • In the PAST 3 MONTHS, did you use a medication for ADHD (for example, Adderall, Ritalin) at least once a week or more often? *(no=0, yes=1)* • In the PAST 3 MONTHS, has anyone expressed concern about your use of medication for ADHD (for example, Adderall or Ritalin)? *(no=0, yes=1)*	*Stimulant Score (0-3)*
Any drugs or prescription medications	screen +	In the PAST 3 MONTHS, did you use any other illegal or recreational drug (for example, ecstasy molly, GHB, poppers, LSD, mushrooms, special K, bath salts, synthetic marijuana ('spice'), whip its, etc.)? *(no=0, yes=1)* • In the PAST 3 MONTHS, what were the other drug(s) you used? *(fill in response)*	*Not Scored*

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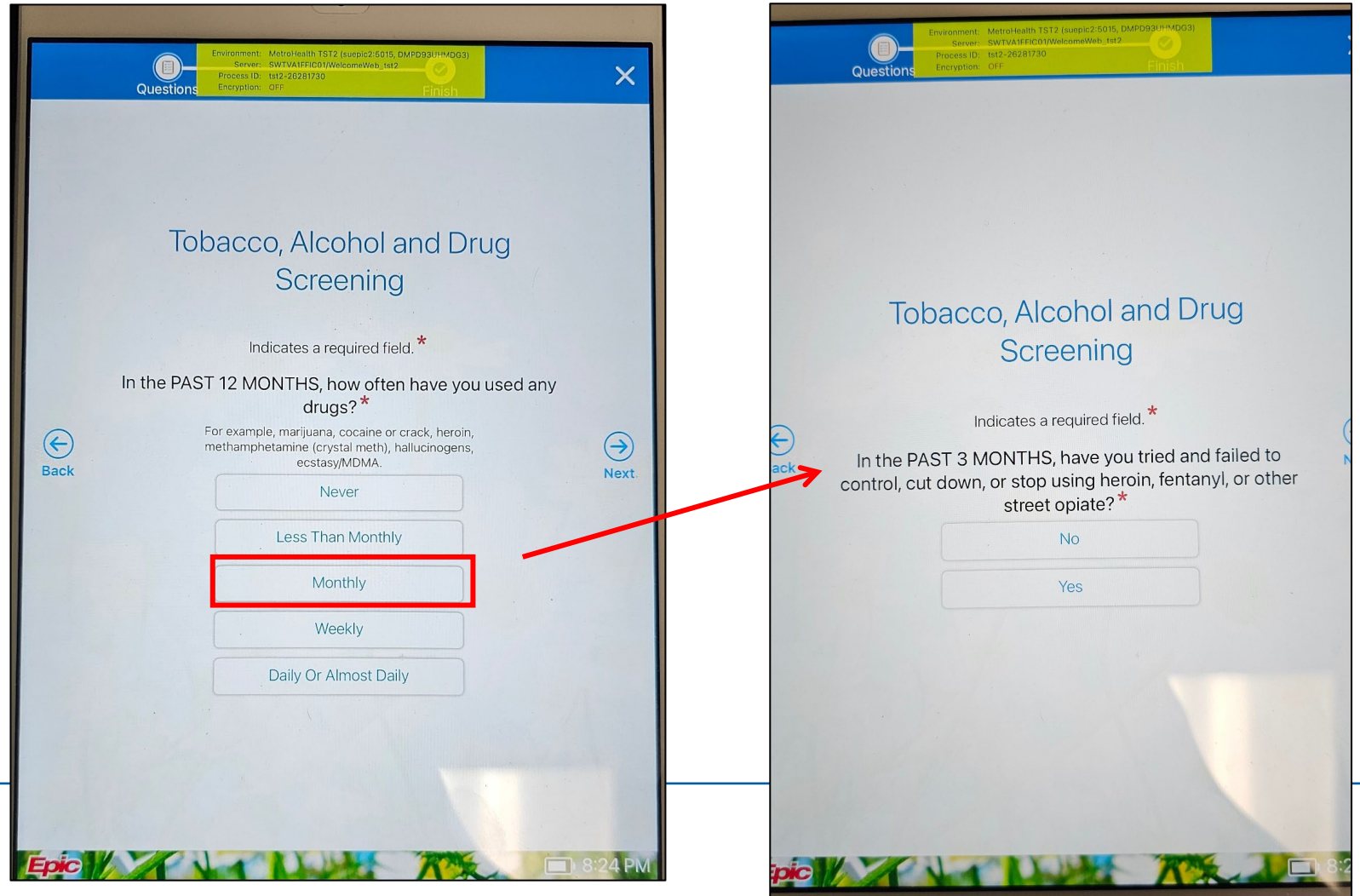
Presenting the Questionnaire to Patients

Creating an optimized version of a standard screening for iPad and Kiosk



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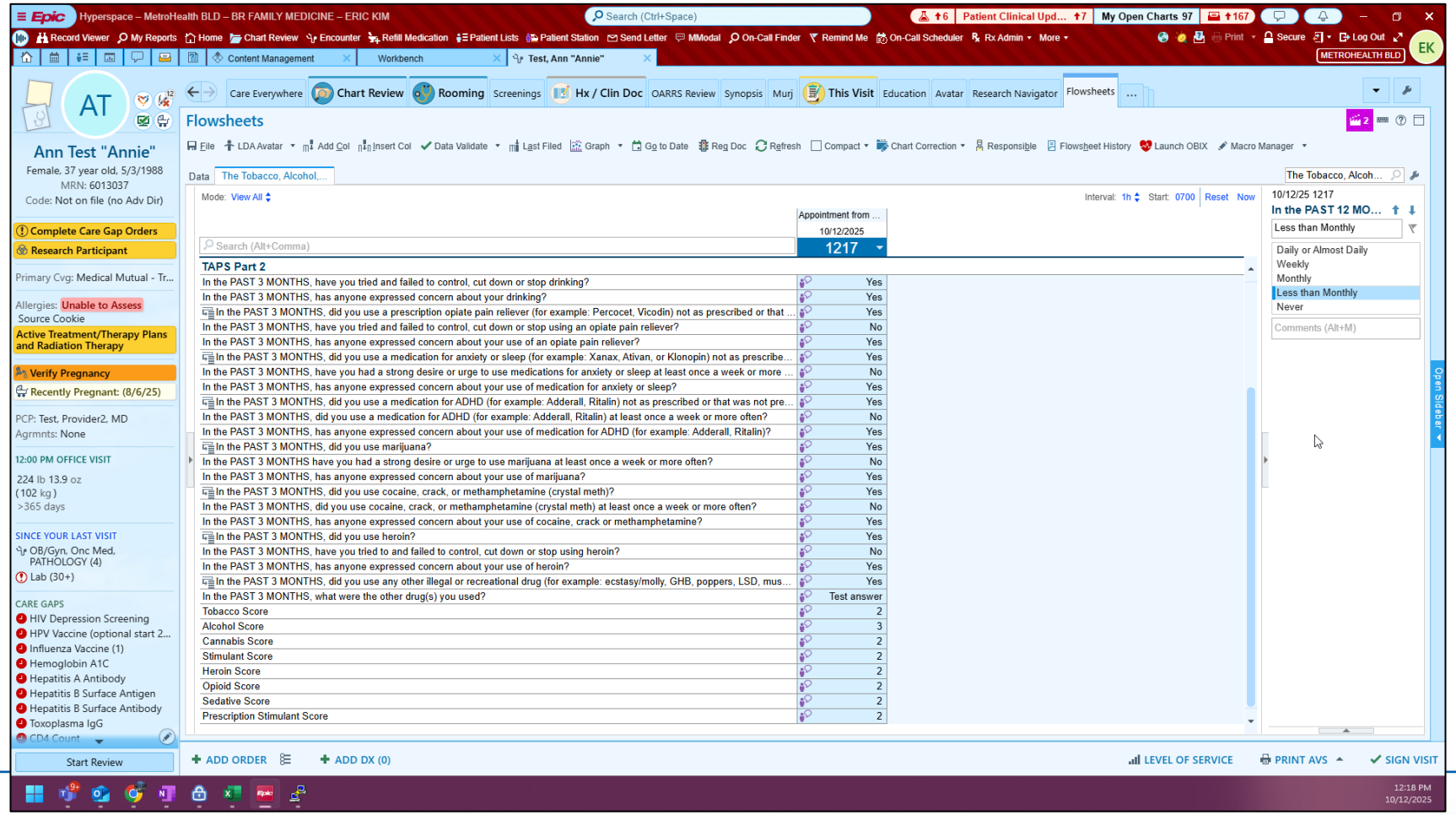
Storing and Recalling Results

Filling questionnaire responses to flowsheets for easy access and retrieval



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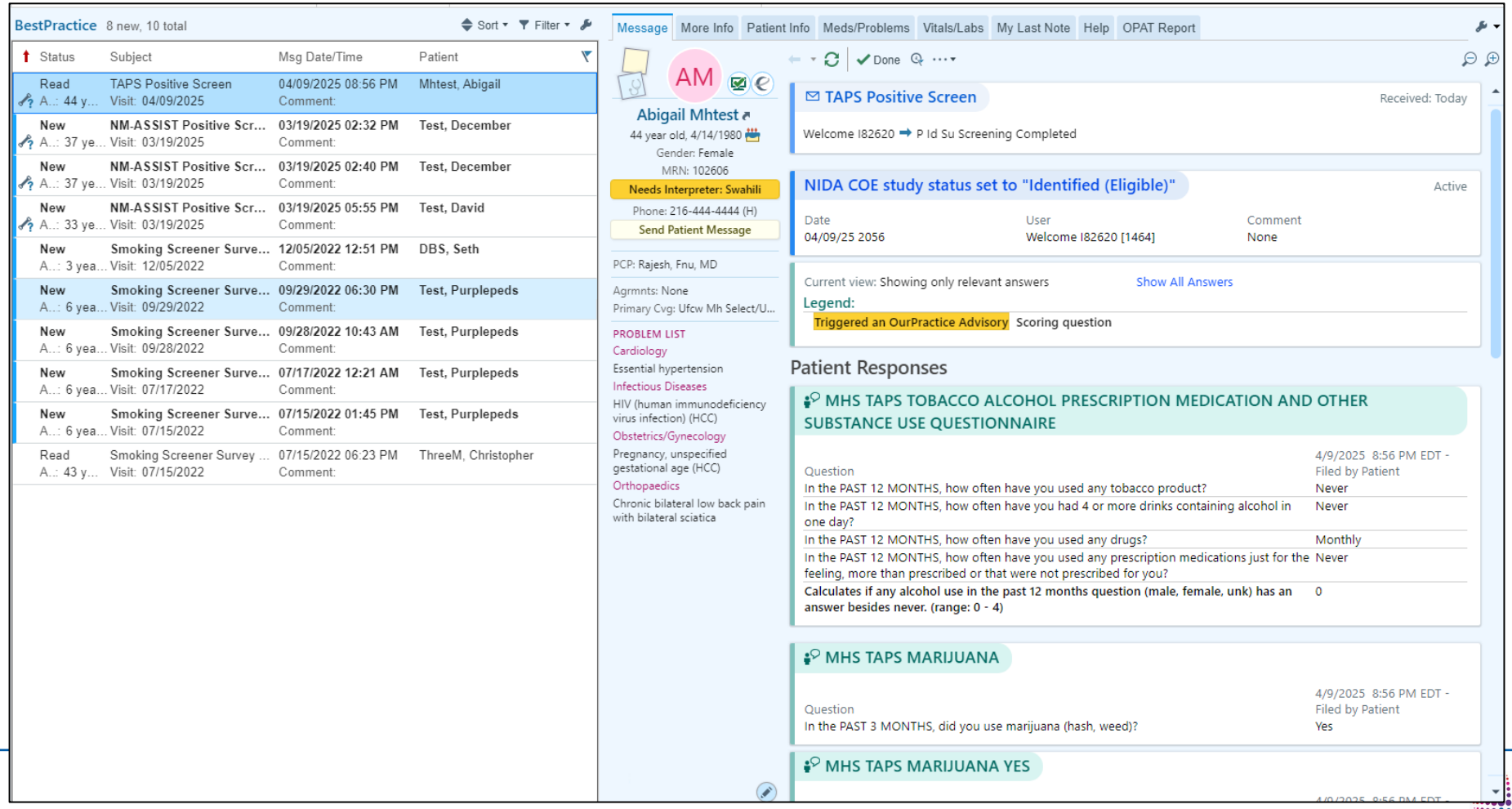
Questionnaire Initiated Recruitment

Questionnaires notify study staff of eligible patients and communicate information



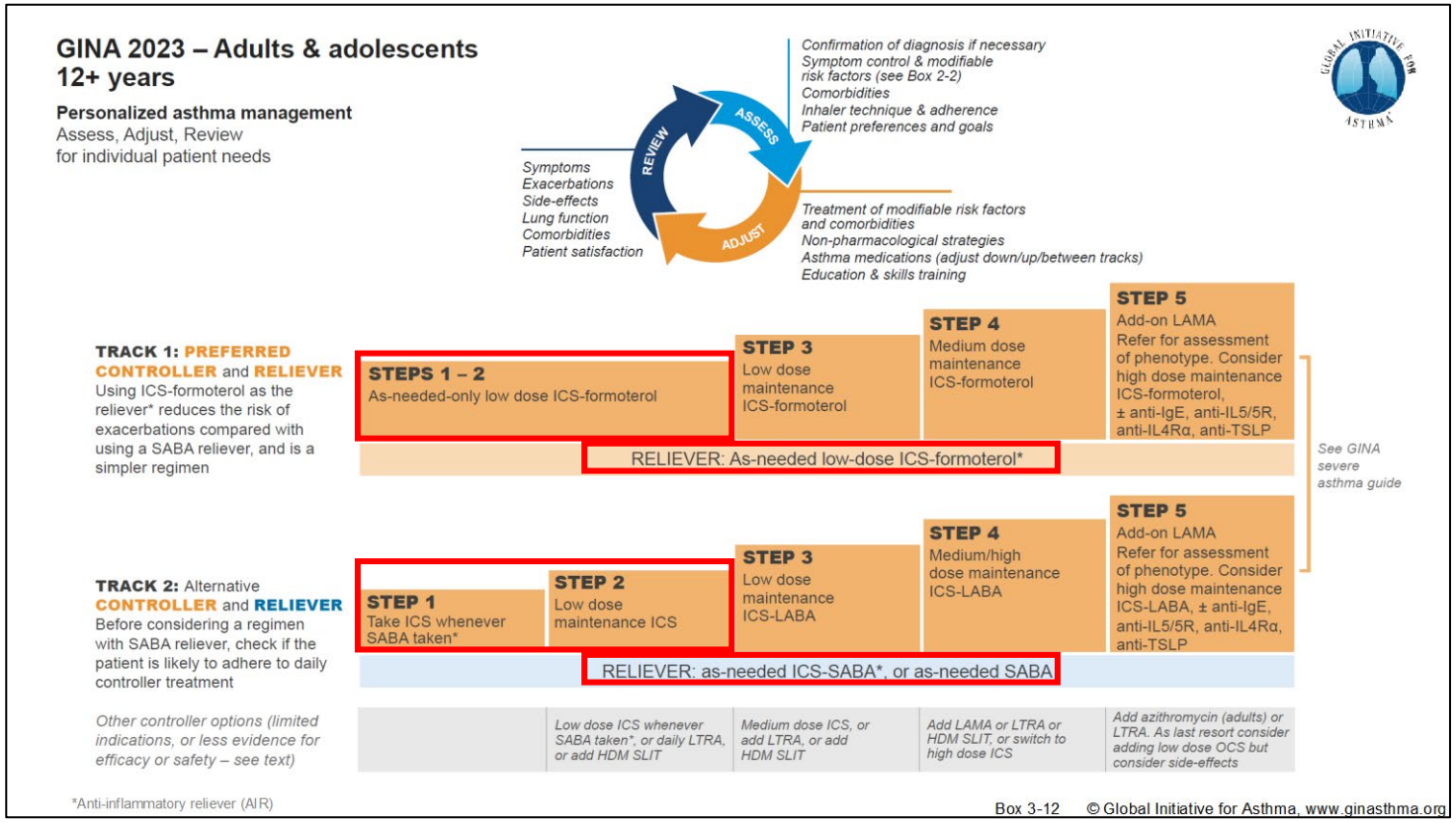
MetroHealth

PARTICS Implementation Project

Encouraging Adoption of New Practice

Patient Activated Reliever Triggered Inhaled Corticosteroids

- PIs: Elliot Israel MGH, David Kaelber MH/CWRU
- Supported by the PREPARE trial, our patients were a part of this trial!
- Less than 1% of Family Medicine asthma patients on indicated therapy
- ~25 provider interventions per month
- ~15 patient self referrals per month



Israel et al. A randomized, open-label, pragmatic study to assess reliever-triggered inhaled corticosteroid in African American/Black and Hispanic/Latinx adults with asthma: Design and methods of the PREPARE trial. Contemp Clin Trials. 2021 Feb;101:106246. doi: 10.1016/j.cct.2020.106246. Epub 2020 Dec 11. PMID: 33316456; PMCID: PMC8130188.

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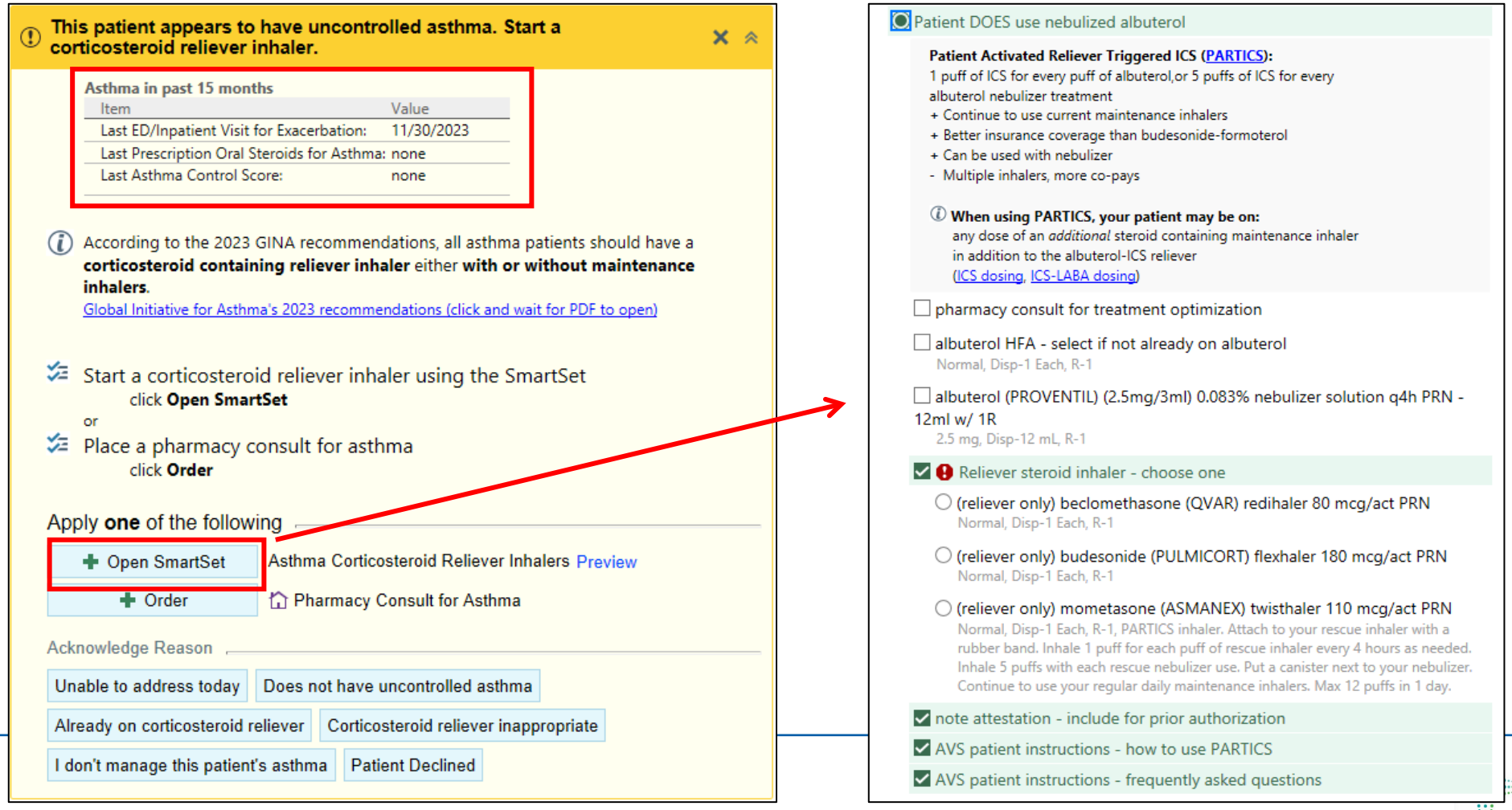
Provider Just-In-Time Support

Clinical decision support based on asthma registry standardized metrics



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Patient Education Materials

After visit summary materials to help patients understand the intervention

PARTICS Asthma Inhalers
Frequently Asked Questions

What is PARTICS -- Adding an extra inhaler that you were just prescribed to use every time you use your quick relief medication like Albuterol.

Why use PARTICS? -- Using this combination can

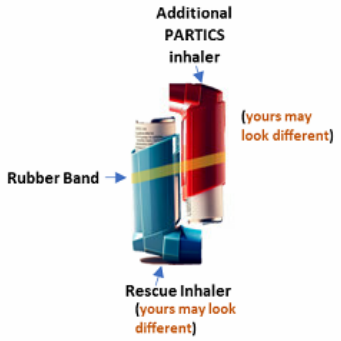
- Reduce severe asthma attacks, emergency room visits, and being hospitalized for asthma.
- Improve your ability to do regular activities, like work, school and taking care of family.

How do I do PARTICS? -- Each time you use your reliever medication, you also use the additional PARTICS inhaler.

- If you use a reliever inhaler, like Albuterol, take a puff of your reliever inhaler then take a puff of the additional PARTICS inhaled corticosteroid, puff for puff.
- If you also use a nebulizer: Take 5 puffs of the PARTICS inhaler after you finish your nebulizer treatment.

How do I make PARTICS easy to do? -- To remember to use 2 inhalers, you can put a rubber band around the additional PARTICS inhaler and your rescue inhaler to keep them together and carry with you. See the picture below.

Attach your additional PARTICS inhaler you were prescribed today to your rescue inhaler with a rubber band to carry with you.



When you need to use your rescue inhaler to relieve asthma symptoms:

#1 Turn the inhalers around to make them easy to puff.

#2 Put the rescue inhaler to your mouth, take as many puffs as you feel you need.

#3 Then place the additional PARTICS inhaler in your mouth and take the same number of puffs as you took of the rescue Inhaler.

If you have a nebulizer:

Place an additional PARTICS inhaler next to or on top of your nebulizer.

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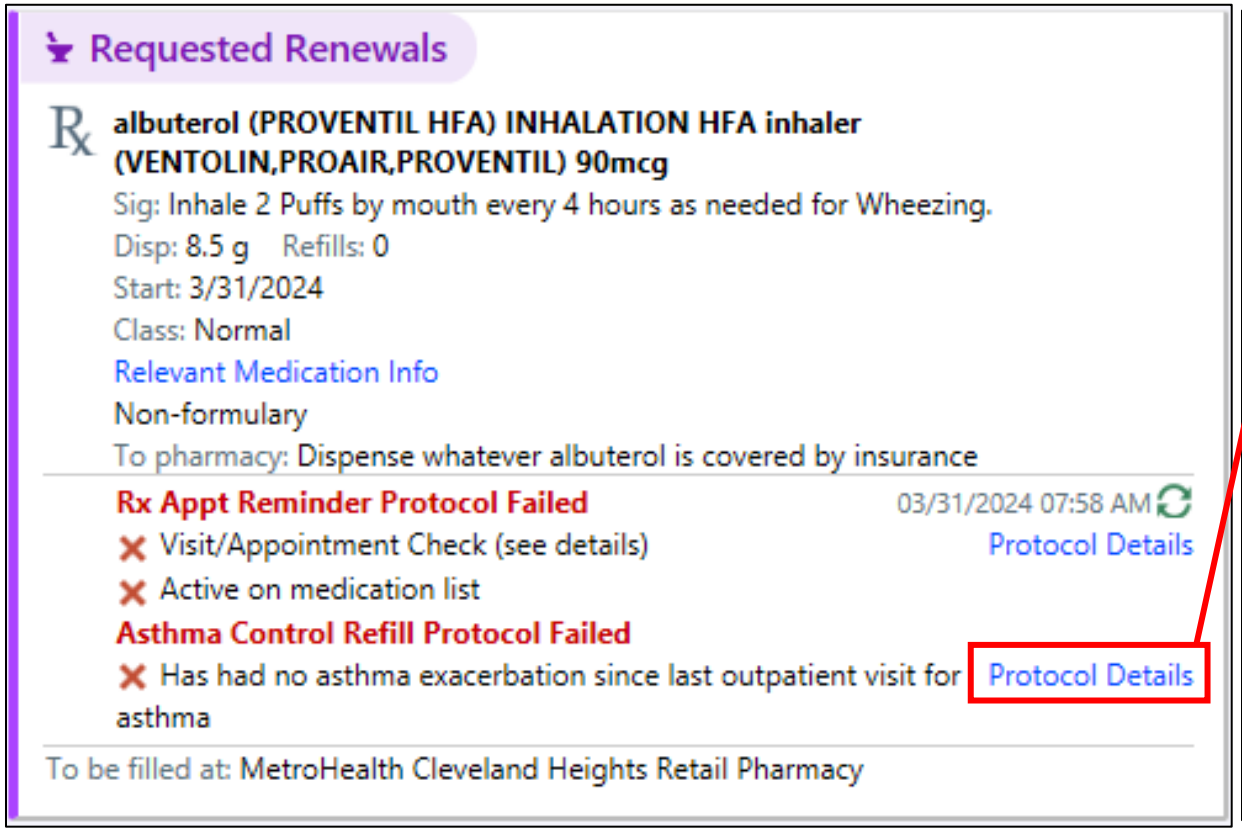
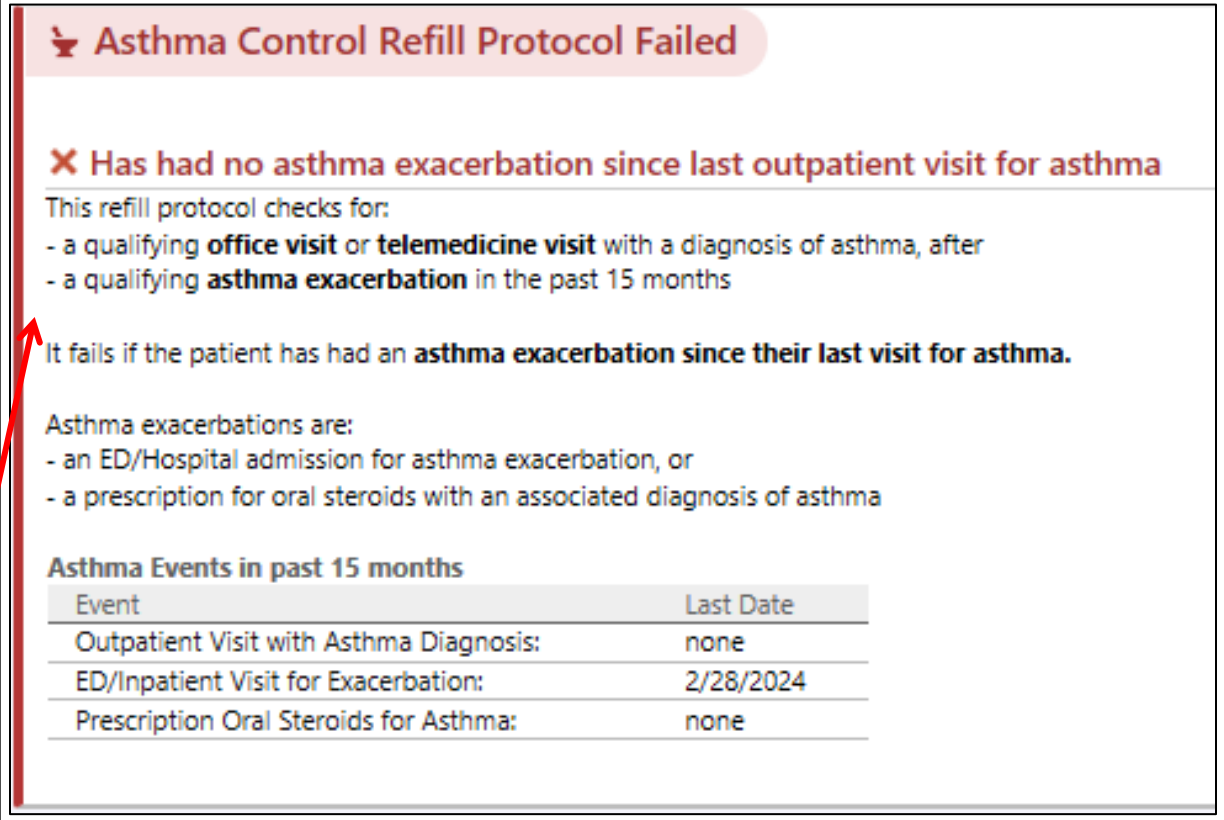
Provider Intervention Outside of Visits

A refill protocol for asthma medication that prompts the provider to act





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Clinical Pharmacy Partnership

Patient self-referral based on objective evidence of uncontrolled asthma

Patient with Uncontrolled Asthma

↓

MyChart message sent

↓

Patient agrees to referral via questionnaire

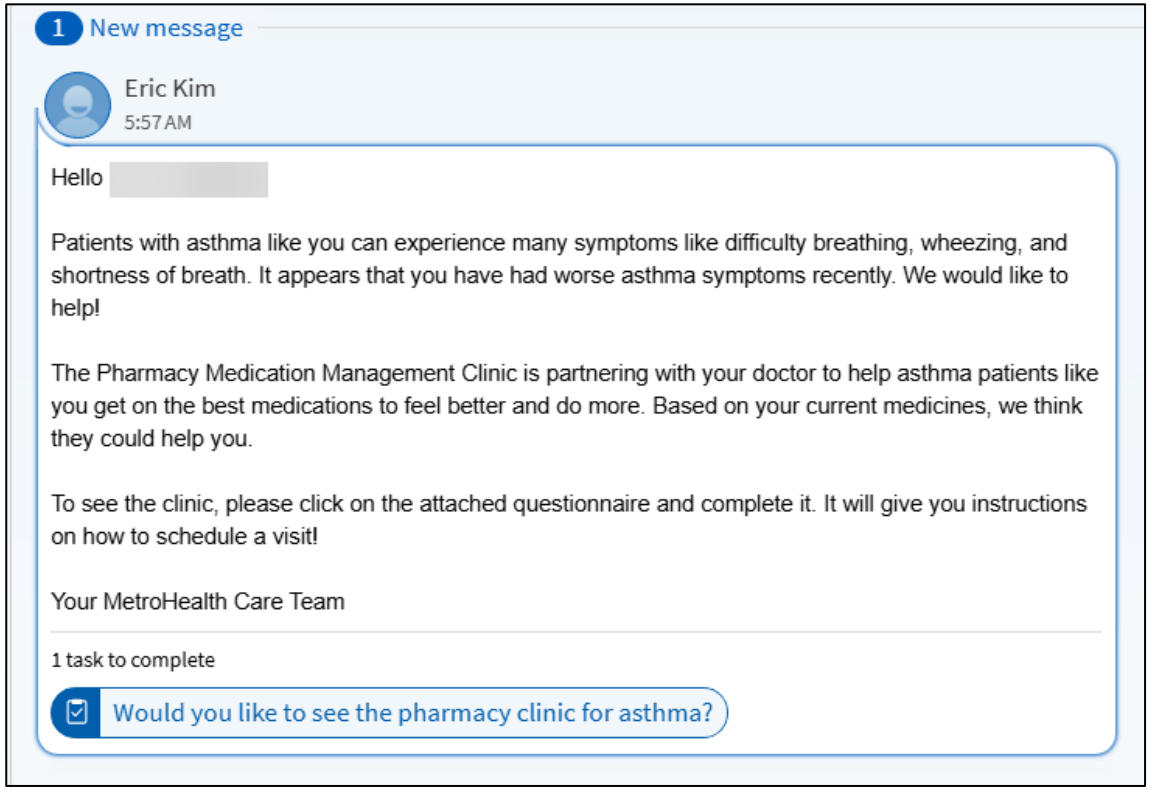
↓

CON 367 placed automatically

↓

Patient schedules by MyChart scheduling ticket

MyChart Message



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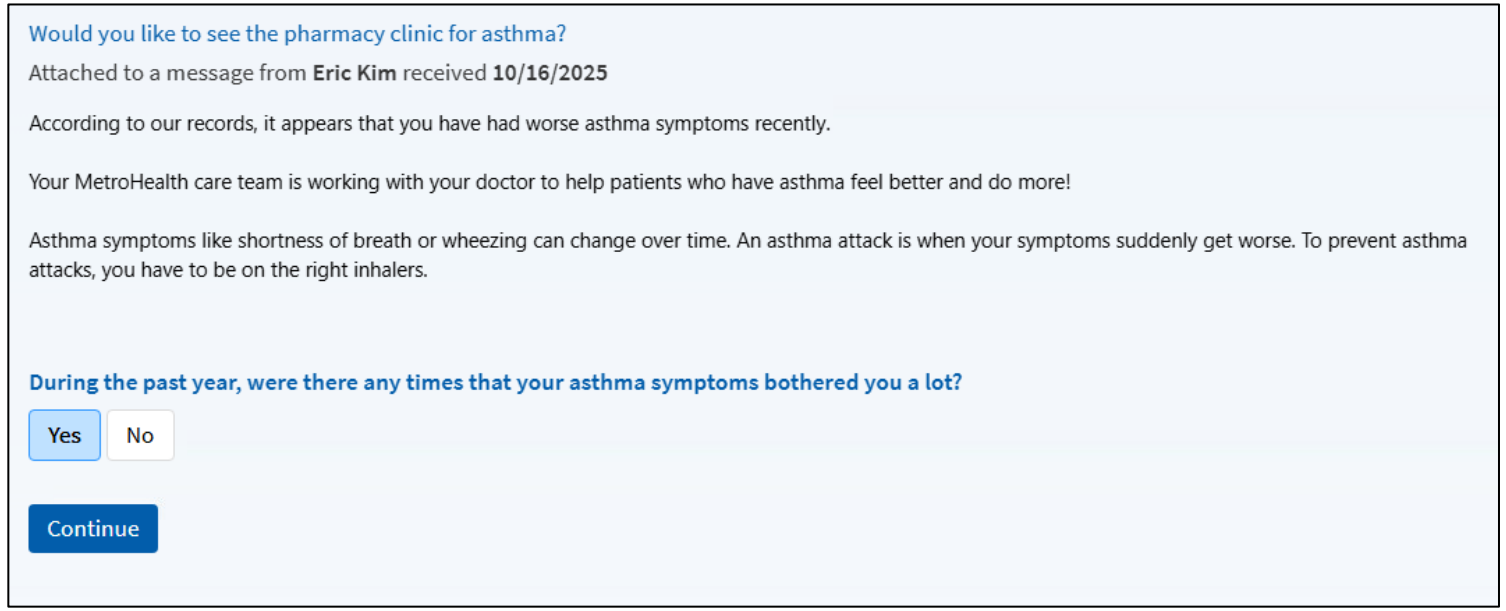
Patient Self-Triage

A patient-entered questionnaire in MyChart that triggers a referral.



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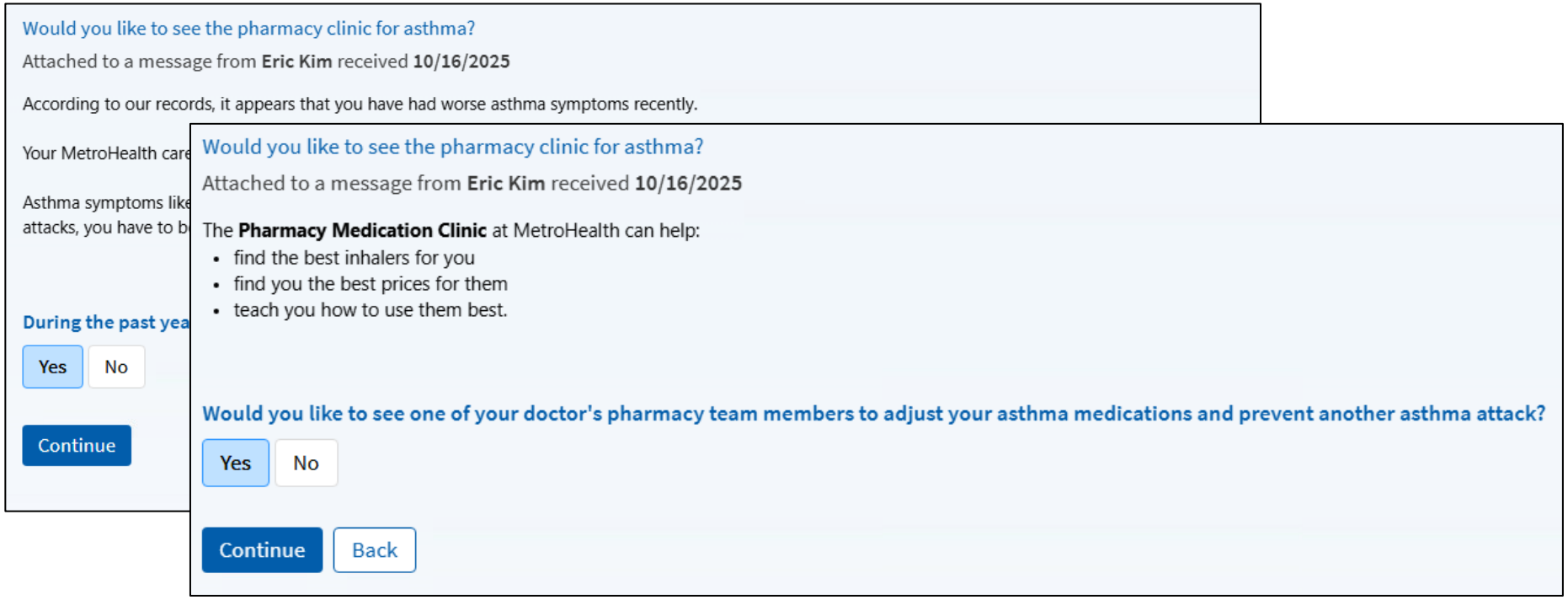

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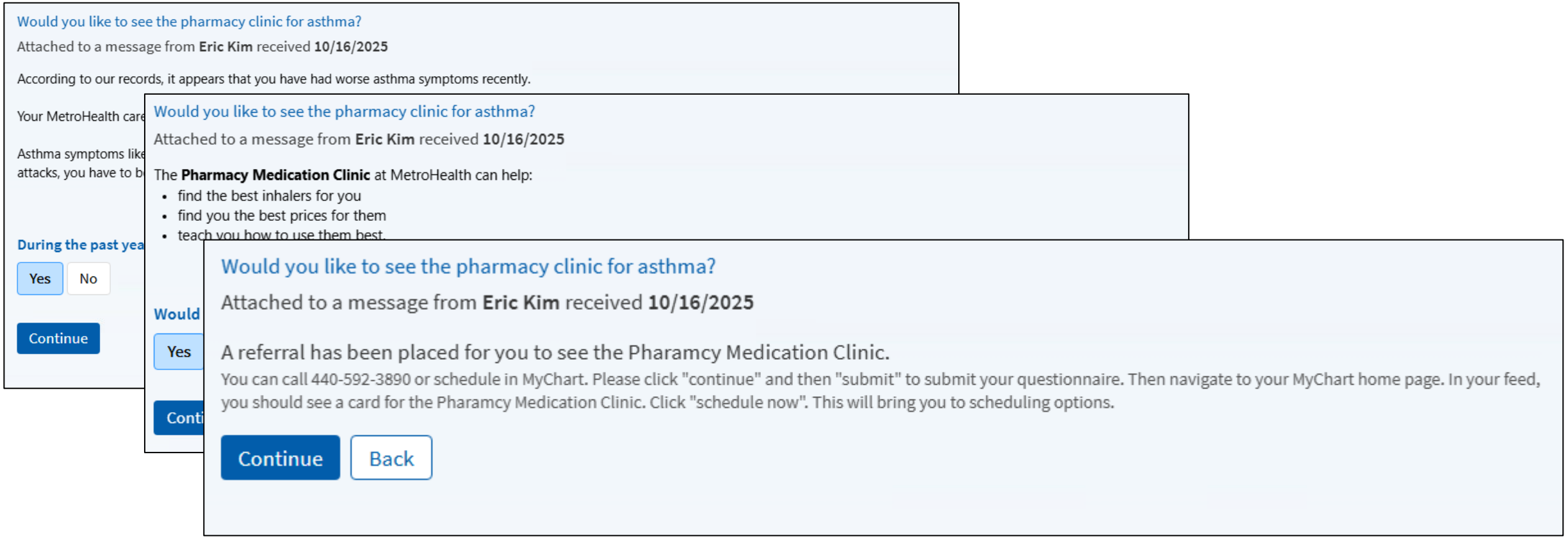

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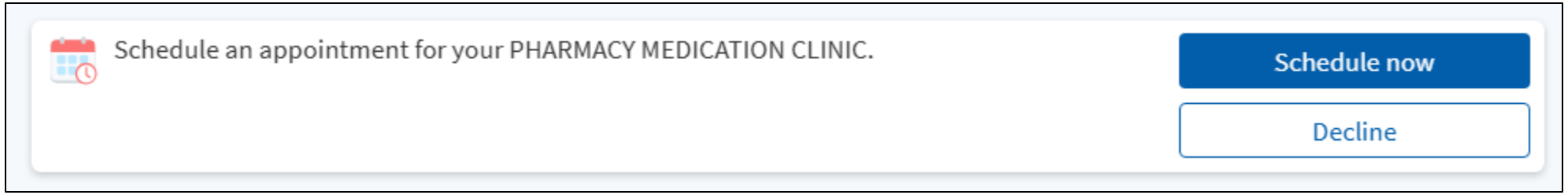
Patient Self-Scheduling

Patients who have completed the questionnaire can self-schedule in MyChart



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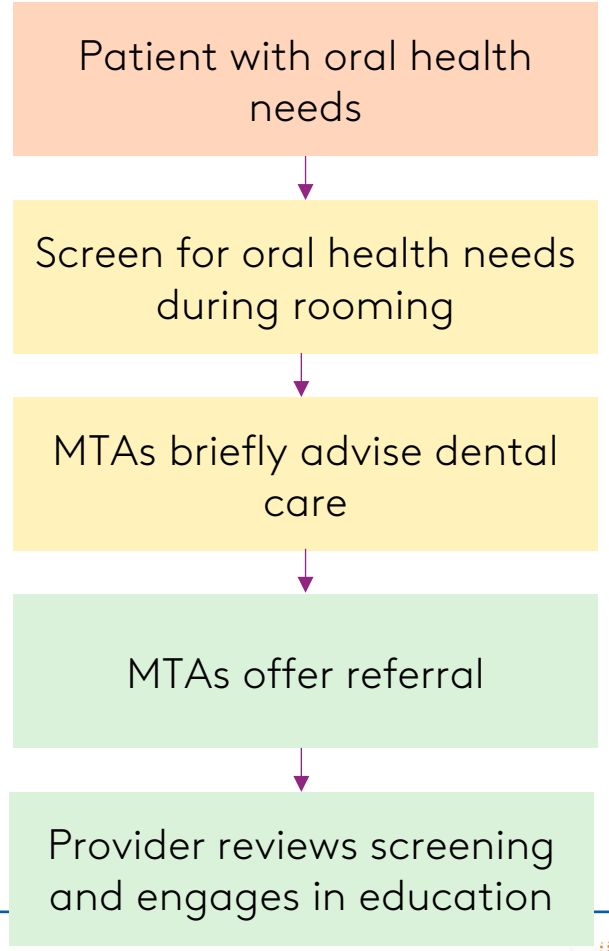
Oral Health Intervention in Primary Care

Dental Health Is Primary Care

A team-based approach to encouraging dental care in older adults

- PIs: Suchitra Nelson CWRU, David Kaelber MH/CWRU
- Previous successful study among pediatric patients
- Encourage dental care among the elderly by integrating with primary care
- Ask, Advise, Assess, Assist, Arrange
- 9 MH practices engaged
- 40 MH providers trained
- ~30 provider patient interventions per month



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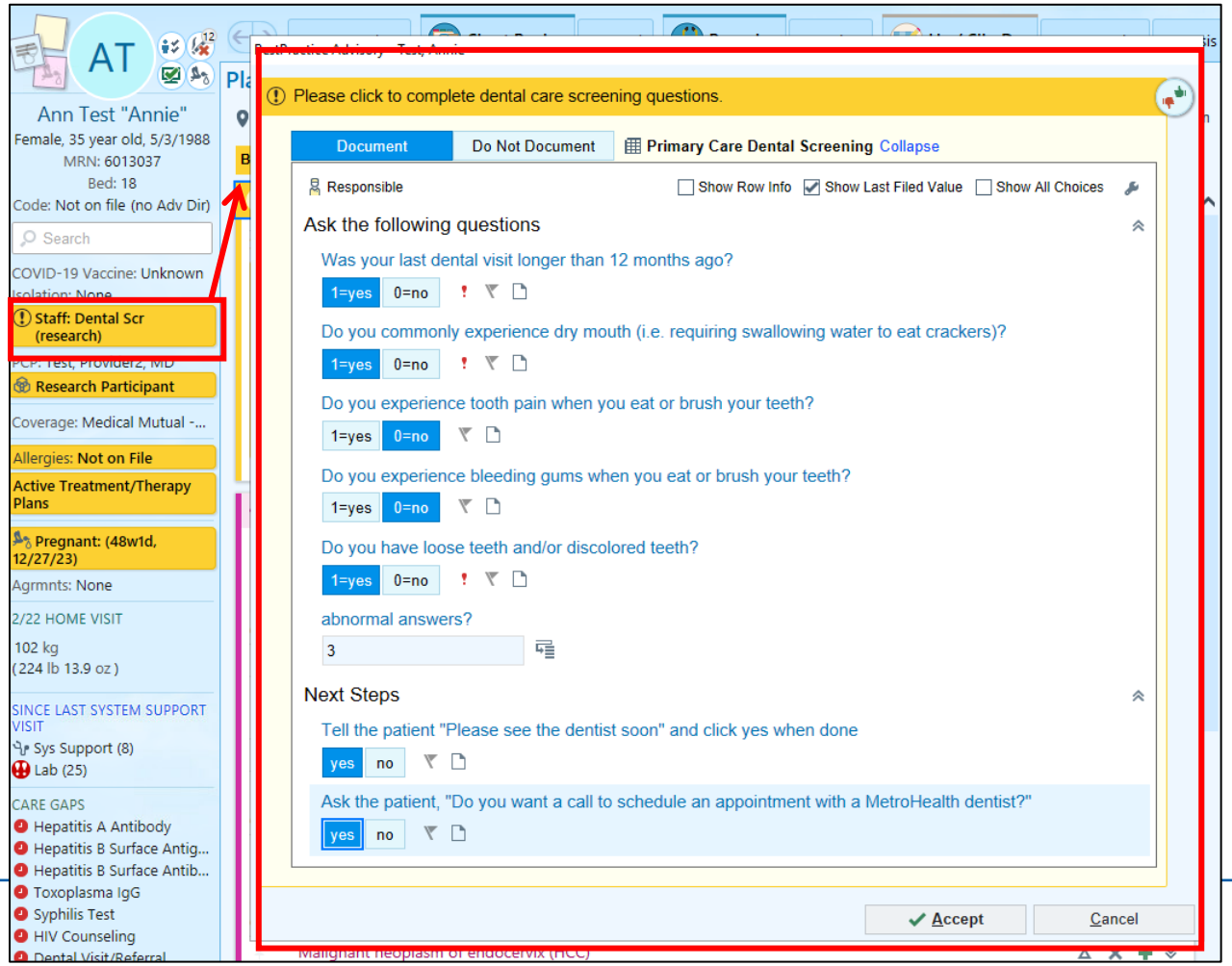
Primary Care Screening for Oral Health

Involving medical staff in the system of care



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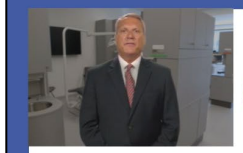
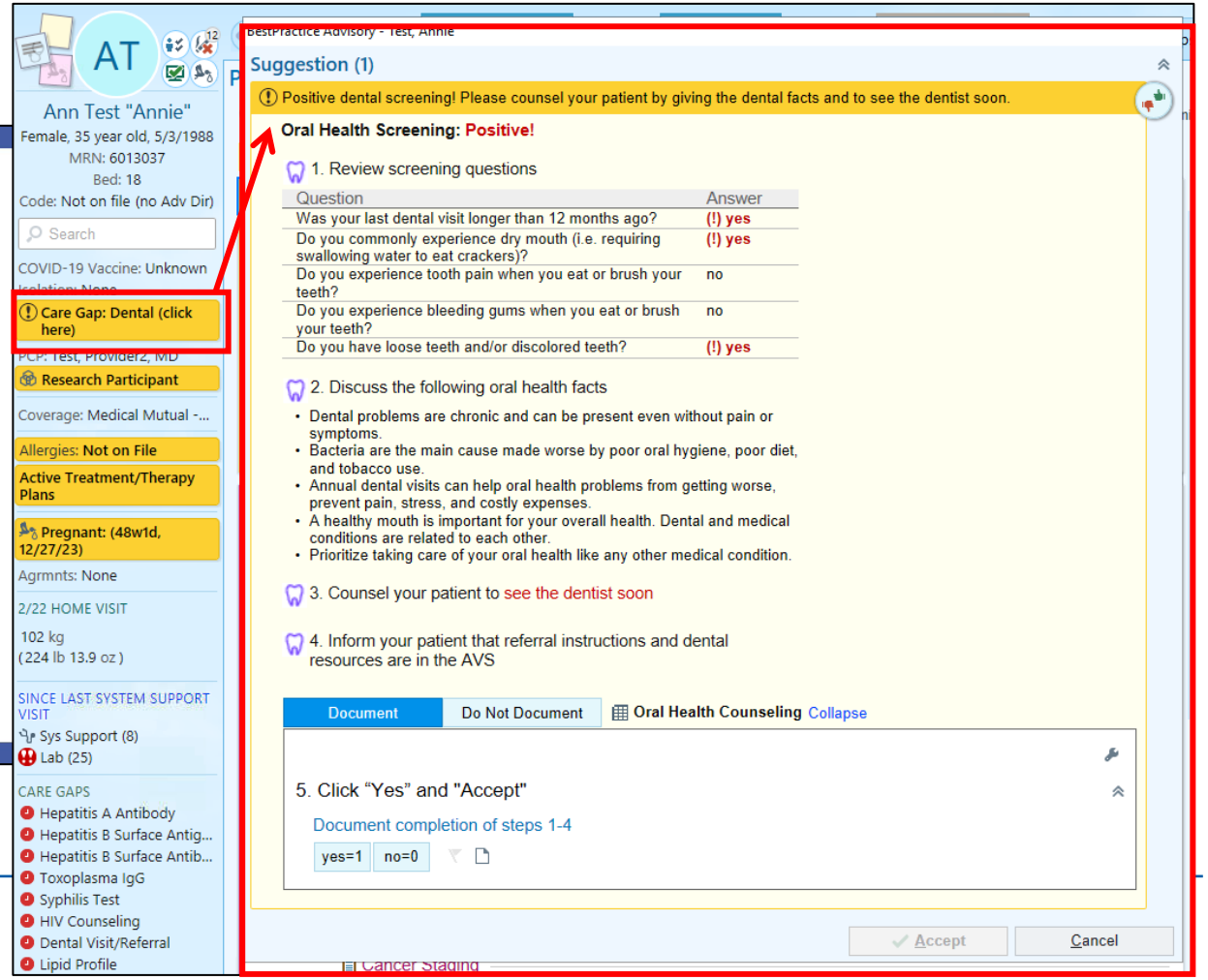
Supporting Provider Intervention

CME/MOC certified provider education with a clinical script



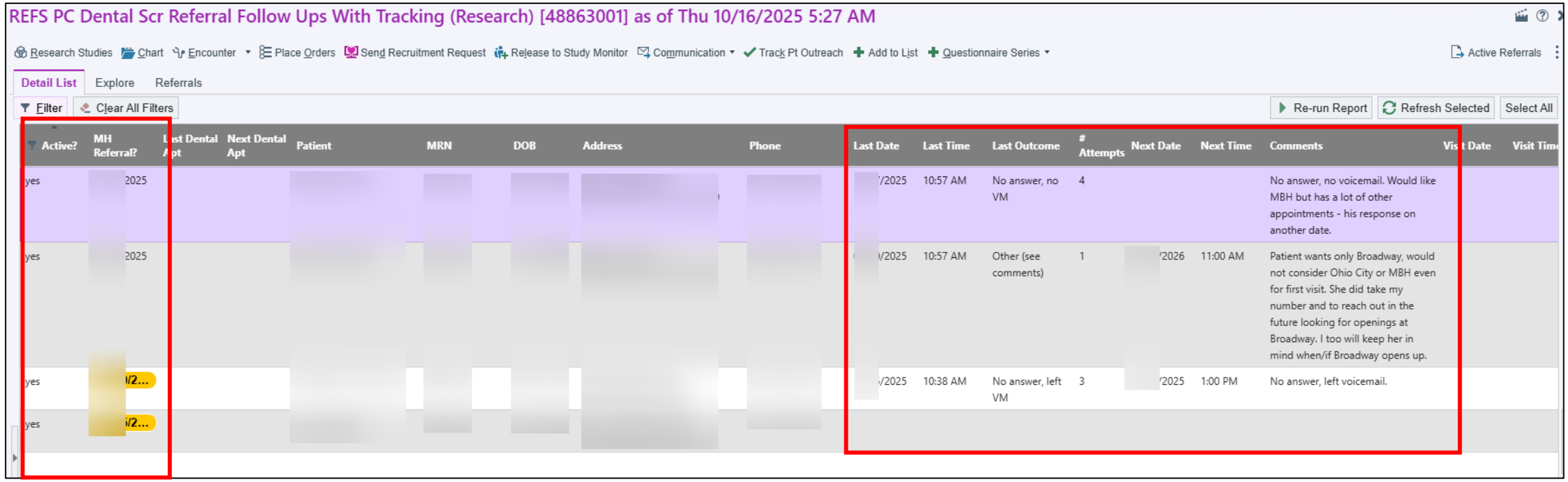
Goals for Provider Training

- **Understand Oral Health Problems in Older Adults**
- **Understand Barriers to Care for Older Adults**
- **Learn Strategies to Improve Oral Health in Older Adults Including:**
  - ✓Oral Hygiene
  - ✓Importance of Fluoride
  - ✓Nutrition for Oral Health



Referral Management

Systems of support to organize referral, outreach, and follow up



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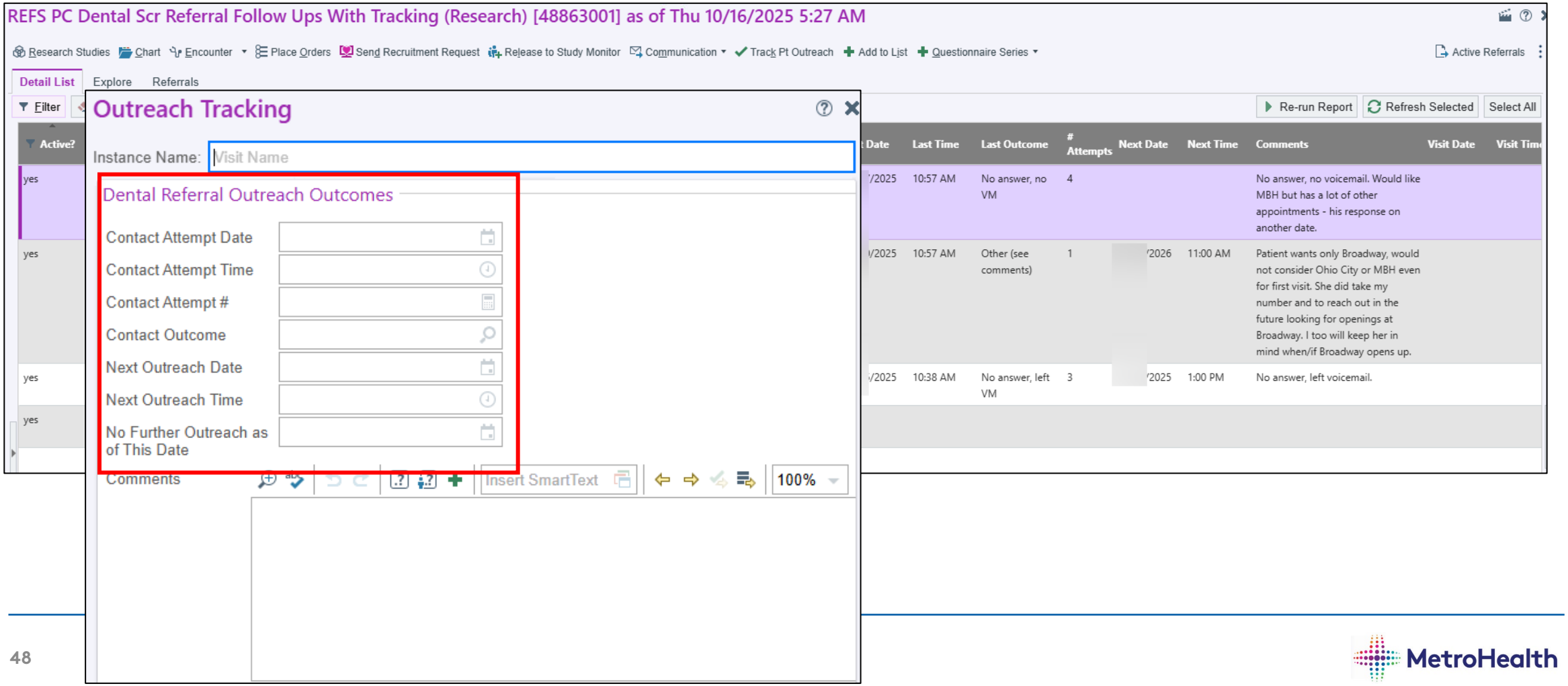

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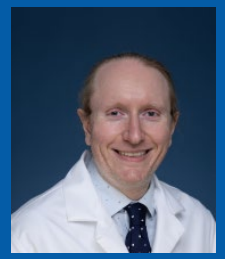
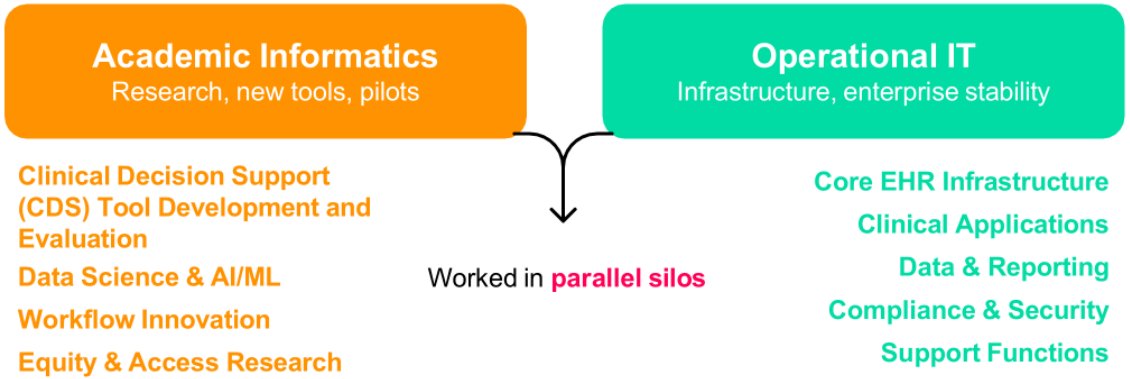
PHRI CCIRE Speed Rounds



Nicholas Riley, MD, PhD, FAMIA
Assistant Professor, Family Medicine
Center for Clinical Informatics Research and Education
Director of Informatics, Ambulatory Care,
The MetroHealth System

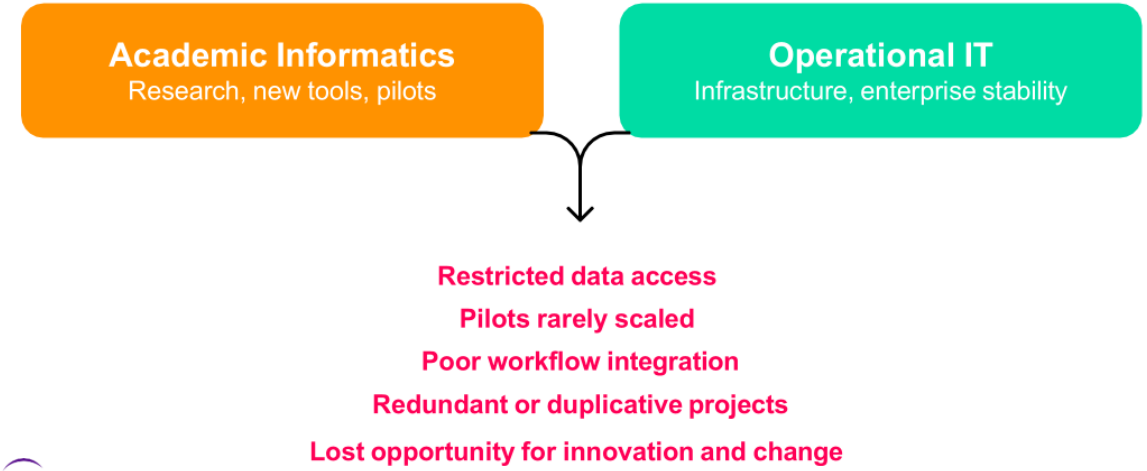
From last week's PHRI seminar…

The Divide



NYU Grossman School of Medicine

Consequences



NYU Grossman School of Medicine

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What I do best

Build bridges to solve complex health care problems

in ways that **work** for patients, families and clinicians

ABC Quit

ABC Quit

Leveraging technological innovation to reduce pediatric secondhand smoke exposure

PI: Jonathan Winickoff, MD, MPH, pediatric tobacco use researcher at MGH

Investigators at Metro

- David Kaelber
- Janeen Leon
- Nicholas Riley

Population: 868 dyads of parents and children under 12 receiving care at Metro

ABC Quit

Questionnaire at child's appointment (portal, kiosk or tablet)

Low portal/kiosk engagement
Tablet operational challenges

+ Lab-triggered recruitment
+ MyChart & text outreach
+ Improved tablet workflows
+ In-person iPad recruitment

Pharmacy can't reach patients
Quit line vendor change

Self-service cessation support

Ohio Quit Line

Quit texting (SmokefreeTXT)

Pharmacy NRT & counseling

[+clinician-facing iEHR]

+ Pharmacy MyChart workflow
+ Undelivered NRT workflow
+ Quit line interim workflow

+ More outreach/"rescue" workflows

Phone enrollment

+ In-person iPad follow-up

Control

1 year quit measure +

add-on cotinine if possible

Intervention

Add-on serum cotinines +

biocounseling phone visits

+ varenicline

No in-house lead
+ anemia screening
Phone visit no-shows
+ evening scheduling

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ABC Quit

Build using Epic modules (live starting 12/12/2022)

- EpicCare Ambulatory
  - Clinical workspace configuration
  - Clinical documentation
  - In Basket
  - Orders & Order Transmittal
- OurPractice Advisories (clinical decision support)
- MyChart/Welcome questionnaires (patient portal/kiosk/tablet)
- Cogito (reporting)
  - Clarity (data warehouse)
  - Radar (dashboards)
  - Reporting Workbench (patient outreach/operational reporting)
  - SlicerDicer (self-service reporting)
- Canto (tablet-based in-person recruitment workflow)
- Interconnect (web services, SMART on FHIR app development)
- Research
- Secure Chat (coordination during in-person recruitment)
- Chronicles (custom code running in Epic)

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ABC Quit

Started from a working system (eCEASE) at the Children's Hospital of Philadelphia

Required both technical (e.g. SMART on FHIR) and operational adaptations to MetroHealth

Informatics fellows collaborated — Drs. Kim at Case/Metro and Saleh at CHOP

Choose2Quit

Choose2Quit

Adult primary care rooming staff-initiated eReferral versus navigation for tobacco cessation

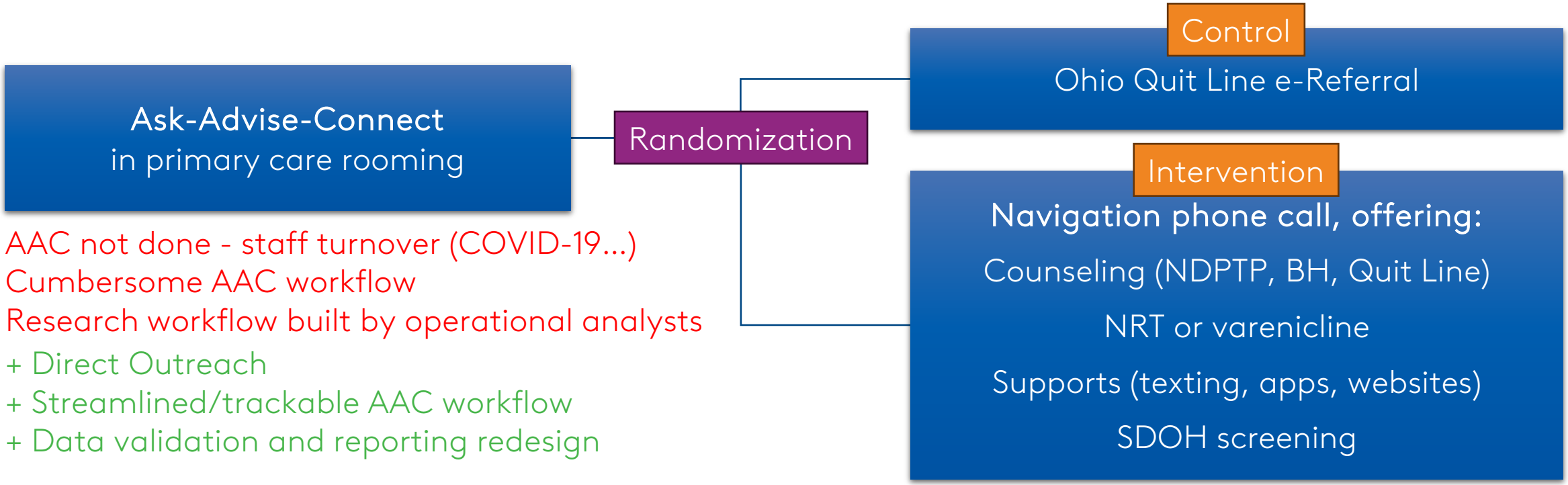
PI: Susan Flocke, PhD, preventive services researcher at Oregon Health and Science University

Investigators at Metro

- David Kaelber
- Nicholas Riley
- Eileen Seeholzer

Population: 2231 adult primary care patients during/after in-person visits at 11 Metro clinics

Choose2Quit



AAC not done - staff turnover (COVID-19…)
Cumbersome AAC workflow
Research workflow built by operational analysts
+ Direct Outreach
+ Streamlined/trackable AAC workflow
+ Data validation and reporting redesign

Ad hoc scheduling/counseling workflows
Missing Quit Line data
+ Creative EHR data extraction

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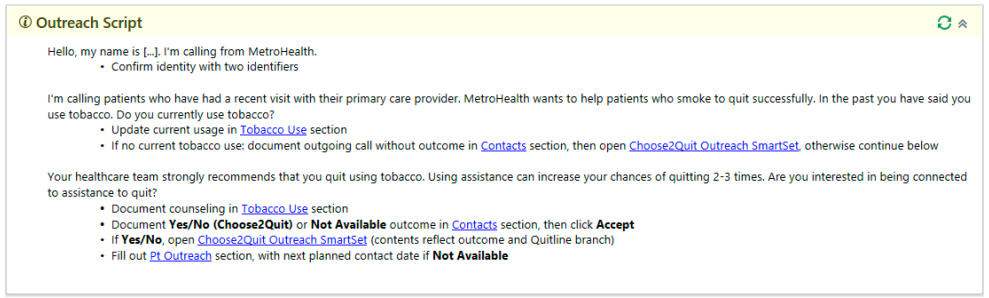
Choose2Quit

Direct Outreach (live 8–11/2023)

"Rescue" workflow for missed/unavailable AAC

91% contact rate

Informing current study (TEAM-UP)



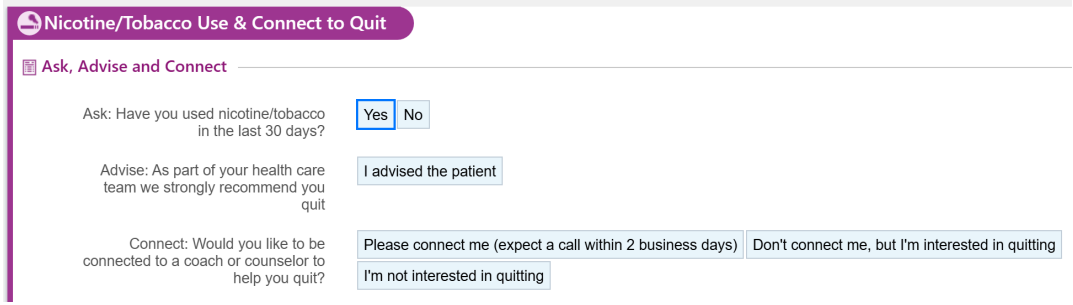
- SmartSets
- MyChart patient messaging
- Cogito (reporting)
  - Clarity (data warehouse)
  - Datalink (batch processing)
  - Reporting Workbench (patient outreach)
- Chronicles (custom code running in Epic)

Streamlined AAC/vaping history (live 5/18/2024)

Reduced friction and double documentation

Operational reporting facilitated increase in AAC completion

Vaping history characterization informed ENDS R21



- OurPractice Advisories
  - Custom actions placing quit line and navigation orders
  - Custom actions manipulating history data
- Cogito (reporting)
  - Reporting Workbench (including custom action for vaping history migration)
- Chronicles (custom code running in Epic)

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PHRI CCIRE Speed Rounds

Proposals in Progress

Opportunities for feedback and partnership

Ashley Hughes, PhD

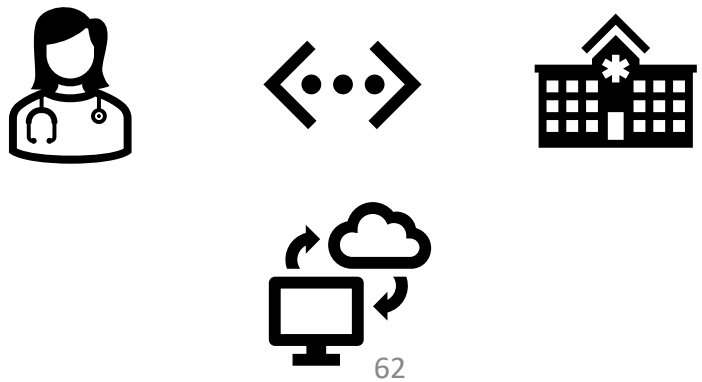
Associate Professor, Internal Medicine

Center for Clinical Informatics Research and Education

Lung cancer screening

- Target: Bristol Myers Squibb Foundation
- Co-lead with CWRU
- Stakeholders: FQHCs, MetroHealth*, CCF, University Hospitals

- **Overall objective**: Improve lung cancer screenings for patients served at FQHCs



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CASE WESTERN RESERVE UNIVERSITY
School of Medicine

Lung cancer screening

- **Obj. 1: Develop a community-informed referral process for lung cancer screening and smoking cessation**
  - Establish an EMR-integrated shared decision-making tool.
  - CoDevelop referral pathway(s) for lung cancer screening and smoking cessation.
- **Obj. 2: Implement strategies for lung cancer screening and smoking cessation referral pathways through training and education.**
- **Obj. 3: Evaluate the agile implementation of the multi-touch referral system for smoking cessation/lung cancer screening bundle.**

Breast cancer screening

- **Background**
  - Breast cancer is among the leading causes of cancer-related deaths.
  - Breast cancer screening can detect up to 85% of breast cancers and reduce mortality from breast cancer by up to 40%.
  - Disparities are present in both mortality rates due to breast cancer and screening rates.
  - Epic Cheers campaigns provide a viable approach to improving outstanding health services, like cancer screenings.
- **Overall objective**: Improve guideline concordant breast cancer screenings in MHS population.

Breast cancer screening

- **Aim 1**: Identify patient factors for APO success in breast cancer screening campaigns.
- **Aim 2:** Understand unmet needs of non-responders to breast cancer screening APO messaging.
- **Aim 3**: Tailor breast cancer screening outreach to improve guideline concordant breast cancer screening for underserved patient populations.
- Target: American Cancer Society
- Stakeholders: MetroHealth- Cancer Center, primary care, population health, radiology

PHRI CCIRE Speed Rounds

David Kaelber, MD, PhD, MPH, FAAP, FACP, FACMI, FAMIA

Professor of Internal Medicine, Pediatrics, and Population and Quantitative Health Sciences

Center for Clinical Informatics Research and Education

Chief Health Informatics Office and Vice-President of Health Informatics and Patient Engagement Technologies

The MetroHealth System

Machine Learning Interpretability Methods – Low value in isolated $$$ biomarkers

ELSEVIER

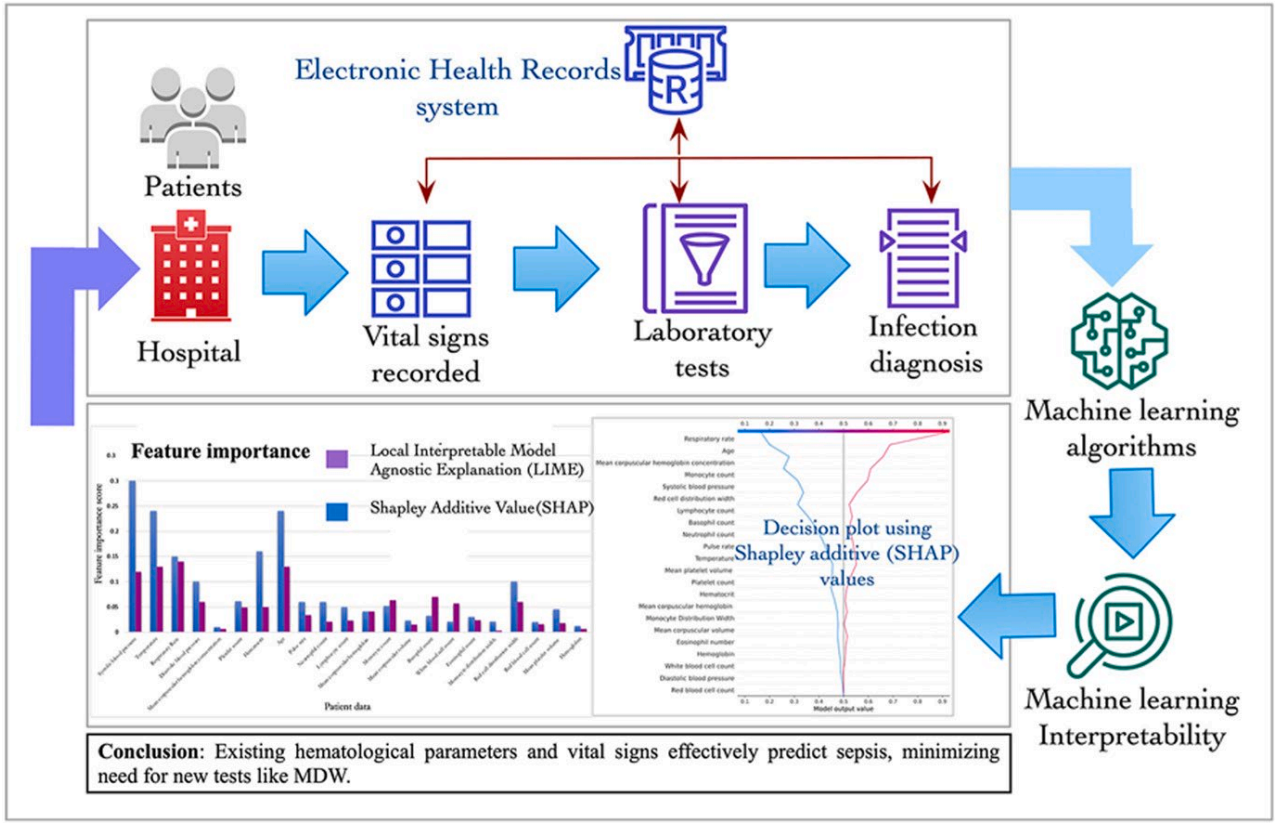
Computers in Biology and Medicine
Volume 183, December 2024, 109251

Machine learning interpretability methods to characterize the importance of hematologic biomarkers in prognosticating patients with suspected infection

Dipak P. Upadhyaya [a], Yasir Tarabichi [a b], Katrina Prantzalos [a], Salman Ayub [b], David C. Kaelber [a b], Satya S. Sahoo [a]

Show more

- Big data collaboration with CWRU PhD and PhD candidate.
- Demonstrating novel ML frameworks with a focus on interpretability methods



Prevail – Multicenter COPD phenotyping and prospective QI study

Primary Health Care Research & Development

cambridge.org/phc

Development

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Practical strategies for achieving system change in the US: lessons and insights from the CONQUEST quality improvement programme

Alexander Evans[1], Jill VanWyk[2], Margee Kerr[1,3], Amy Couper[1,3], Wilson D. Pace[4,5], Yasir Tarabichi[6], Rachel Pullen[1], Michael Pollack[7], M. Bradley Drummond[8], Jill Ohar[9], Catherine Meldrum[10], MeiLan K. Han[11], Alan Kaplan[12,13], Tonya Winders[14], Juan Wisnivesky[15], Barry Make[16], Alex Federman[17], Victoria Carter[3], Katie Lang[1,3], Douglas Mapel[18], Nicola A. Hanania[19], Daiana Stolz[20], Fernando J. Martinez[21] and David Price[1,3,22]

[1]Observational and Pragmatic Research Institute Pte Ltd, Singapore, Singapore; [2]Department of Family Medicine,

- Early results demonstrating care opportunities primarily in diagnostic spirometry and med optimization in our own population

Pragmatic and Observational Research Dovepress

Open Access Full Text Article ORIGINAL RESEARCH

Preserved Ratio Impaired Spirometry in US Primary Care Patients Diagnosed with Chronic Obstructive Pulmonary Disease

Alexander Evans[1], Yasir Tarabichi[2], Wilson D Pace[3,4], Barry Make[5], Nicholas Bushell[6], Victoria Carter[7], Ku-Lang Chang[8], Chester Fox[9], MeiLan K Han[10], Alan Kaplan[11,12], Janwillem WH Kocks[13–15], Chantal Le Lievre[6], Alexander Roussos[6], Neil Skolnik[10,16], Joan B Soriano[17], Barbara P Yawn[10], David Price[1,6,7,18]

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Chronic Obstructive Pulmonary Diseases: Journal of the COPD Foundation®

COPD FOUNDATION

Original Research

Pragmatic Evaluation of an Improvement Program for People Living With Modifiable High-Risk COPD Versus Usual Care: Protocol for the Cluster Randomized PREVAIL Trial

Katherine Hickman, MBBS[1,2,3] Yasir Tarabichi, MD, MSCR[4] Andrew P. Dickens, MSc, PhD[5] Rachel Pullen, MBChB[5] Margee Kerr, PhD[5,6] Amy Couper, BSc[5,6] Alexander Evans, MSc[6] James Gatenby, MD[6] Luis Alves, MD[7,8] Cono Ariti, MSc[5] Mona Bafadhel, MBChB, MRCP, PhD[9] Victoria Carter, BSc[6] James Chalmers, MBChB, PhD[10] Rongchang Chen, MD[11] Graham Devereux, MBChB, PhD, FRCP[12] M. Bradley Drummond, MD, MHS[13] J. Martin Gibson, MD, FRCP[14,15,16] David M. G. Halpin, MD, DPhil[17] MeiLan K. Han, MD, MS[18] Nicola A. Hanania, MD, MS[19] John R. Hurst, PhD[20] Alan Kaplan, MD[5,21,22] Konstantinos Kostikas, MD, PhD, FERS[5,23] Barry Make, MD[24] Douglas Mapel, MD, MPH[25] Jonathan Marshall, BSc, PhD[26] Fernando Martinez, MD, MS[27] Catherine Meldrum, PhD, RN[28] Marije van Melle, PhD[5,29] Marc Miravitlles, MD[30] Tamsin Morris, BSc[31] Hana Mullerova, PhD[26] Ruth Murray, PhD[6] Shigeo Muro, MD, PhD[32] Clementine Nordon, MD, PhD[26] Jill Ohar, MD[33] Wilson Pace, MD, FAAFP[34,35] Michael Pollack, MSc[36] Jennifer K. Quint, FRCP[37] Anita Sharma, FRACGP, MBBS[38] Dave Singh, MD[39] Mukesh Singh, MBBS[40,41,42] Frank Trudo, MD, MBA[36] Dennis Williams, PharmD[43,44] Tom Wilkinson, MA Cantab, MBBS, PhD, FRCP, FERS[45,46,47] Tonya Winders, MBA[48] David Price, MA, MBBC, FRCGP[5,6,49]

Continuing to lead in responsible AI-driven CDS evaluation and implementation

American Journal of Emergency Medicine 97 (2025) 147–151

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American Journal of Emergency Medicine

journal homepage: www.elsevier.com/locate/ajem

External validation of a widely available, localizable sepsis early detection model in the emergency department setting

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ABSTRACT

Study objective: Several algorithms have been developed to assist clinicians in predicting the onset of sepsis. One of the most widely used is the Epic Sepsis Model. The first release of the model (V1) was a logistic regression that suffered from variable results in external validation. The second release (V2) leverages a gradient boosted tree model that can be localized to an individual hospital system. While widely available, V2 has yet to be independently externally validated.

Methods: We conducted a retrospective study comparing the performance of both models in the emergency department setting. Model discrimination was measured via AUC-ROC for both V1 and V2 at the encounter level, before sepsis-3 criteria were met and before there was evidence of clinical recognition of sepsis (identified by antibiotic, culture, or lactate orders).

Results: 35,076 encounters were included. 648 (1.8 %) met sepsis-3 criteria. AUC-ROC scores were 0.77 for V1 and 0.90 for V2. When only considering scores before evidence of clinical recognition of sepsis, there is a drop in AUC-ROC to 0.70 for V1 and to 0.85 for V2. At a scoring threshold targeting a 60 % sensitivity, V1 and V2 predictions were earlier than the first clinical recognition of sepsis in only 33.0 and 33.5 % of cases respectively.

Conclusion: While V2 achieves superior AUC-ROC's to V1 both before and after clinical recognition of sepsis, both models tended to alert for sepsis after evidence of clinical recognition.

MetroHealth Selects Pieces Technologies as AI Platform to Improve Clinical Workflows and Enhance Patient Care

Cleveland, OH, April 30, 2025

The MetroHealth System ("MetroHealth") and Pieces Technologies, Inc. ("Pieces") announced a strategic partnership that will provide care teams across the enterprise with AI-powered tools to assist with clinical workflows, returning valuable time to clinicians and enhancing patient care. MetroHealth will deploy Pieces' AI platform, which seamlessly integrates into the health system's existing electronic health record (EHR), across inpatient and outpatient settings.

"Pieces' AI-powered solutions will help MetroHealth enhance patient care and improve access by reducing inefficiencies and eliminating time-consuming administrative tasks, allowing our talented caregivers to work at the top of their licenses and provide more personalized care to more patients," said R. Douglas Bruce, MD, MBA Interim Executive Vice President and Chief Operating Officer for MetroHealth.

Pieces awarded $2m SBIR contract to improve cancer care with AI

Pieces will deploy its new conversational AI at MetroHealth, a public health system based in Cleveland, Ohio, which can interact directly with cancer patients and leverage the advanced human oversight platform

Vidya Sagar Maddela October 30, 2024

CDC Cosmos Partnership

Pauline Terebuh, MD MPH

Assistant Professor
Case Western Reserve University School of Medicine

Disclosure(s): No financial relationships to disclose

Poster(s):

(P-711) Testing for SARS-CoV-2, Respiratory Syncytial Virus and Human Metapneumovirus among patients hospitalized with acute respiratory tract infection — United States, 2022–2025

Monday, October 20, 2025 12:15 PM - 1:30 PM US ET

CDC paid MetroHealth/CWRU folks ~$300K for a one-year IPA (Inter-organization Partnership Agreement) for us to use Cosmos to answer questions for the CDC

Organization that would like to use Epic Cosmos (for example the CDC) can only do so by partnering with a healthcare system submitting data to Cosmos (for example MetroHealth).

MetroHealth has the potential for a HUGE “first-moved” advantage in this space!

MITRE Research Partnership (www.mitre.org)

MITRE is 65+ year old not-for-profit organization that acts in the public interest by delivering objective, cost-effective solutions to many of the world's biggest challenges.

MITRE operate FFRDCs—federally funded research and development centers—and provide technical expertise, stability, and continuity to government agency sponsors.

MITRE powers advances in national defense, aviation safety, GPS, financial systems, healthcare, cybersecurity, and more—advances that make your life better.

MITRE was looking for a healthcare partner with healthcare data for their research, MetroHealth is stepping up!

Current MITRE projects include:

1. **LLM for patient oncology trial matching**
2. **Dula use and value**
3. **Chronic kidney disease**

The MetroHealth/MITRE partnership facilitated MetroHealth standing up a PHI/HIPAA compliant Microsoft Azure LLM "playground"!!!!!

CASE WESTERN RESERVE UNIVERSITY
Clinical and Translational Science Collaborative

REGISTER NOW!

EPIC COSMOS DATATHON

Join the CTSC of Northern Ohio for the second multi-institutional Epic Cosmos Datathon. Over the course of the day, teams will harness their skills, tackle challenges, and transform concepts into tangible results. The event culminates in a dynamic presentation session, where each group shares their findings and insights with everyone.

OCTOBER 18, 2025 | 8:00AM - 5:00PM

MidTown Collaboration Center
1974 E. 66th St., Cleveland, OH

case.edu/medicine/ctsc

CCIRE Research Informatics Resources

David Kaelber
CHIO

Yasir Tarabichi
Director Clinical Research Informatics/ CHAIO

Janeen Leon
Associate Director Research Informatics

The MetroHealth CTSC Research Informatics team is housed in CCIRE.

MetroHealth Research Informatics is the lead informatics site in the Northern Ohio CTSC!

Use us EARLY (@ grant writing) and use of OFTEN for ANY non-standard technology requests (i.e anything other then items such as computer/printer issues; login/password issues); And we can help escalate quickly IF we are engaged!

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REDCap Update

REDCap is a HIPAA compliant database.

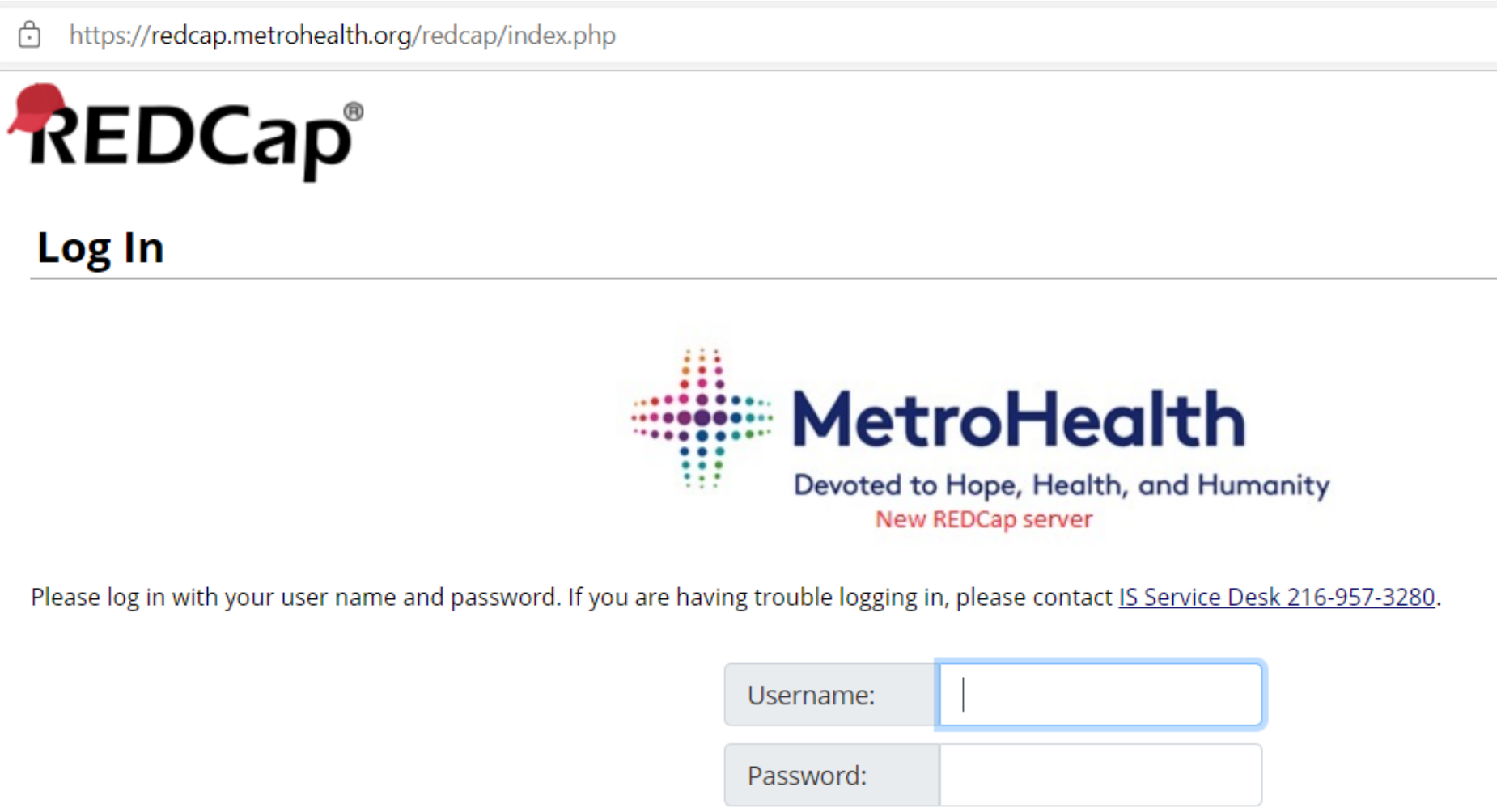
Hundreds of users.

Hundreds of studies.

Can be used for surveys.

Has a mobile app.

Can be used for texting patients.



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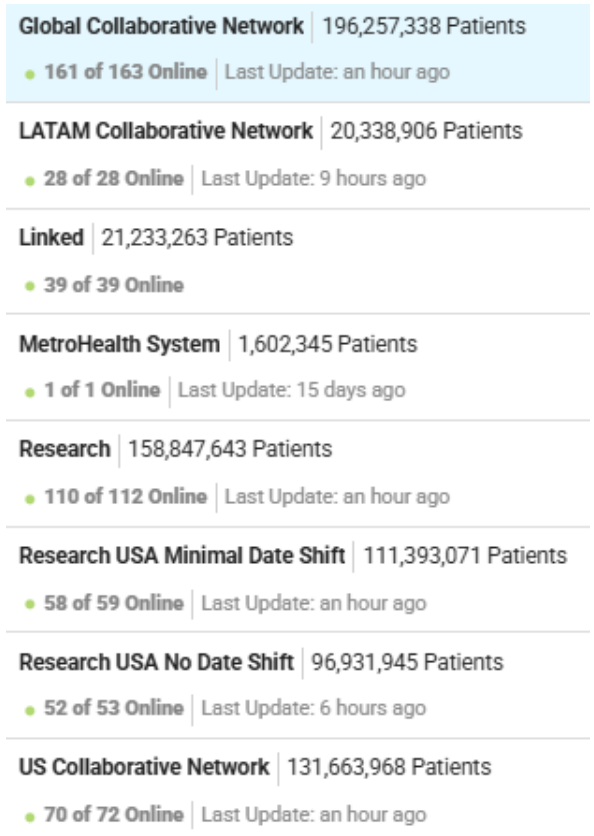
TriNetX Update (>130 million patients AND "line level" data access)



Increased data, new analytic tools, "line level" data requests, amazing research opportunities

Email me for your account TODAY! (MetroHealth is #1 user in the WORLD!)

1. H Jeong, JK Shaia, **DC Kaelber**, KE Talcott, RP Singh. *Associations between obstructive sleep apnoea and the development and severity of retinal vein occlusion.* Eye (Lond). 2025 Jul 16. doi: 10.1038/s41433-025-03900-4. Online ahead of print. PMID: 40670632.

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Cosmos Update (>300 million patients and SDoH data now too!)

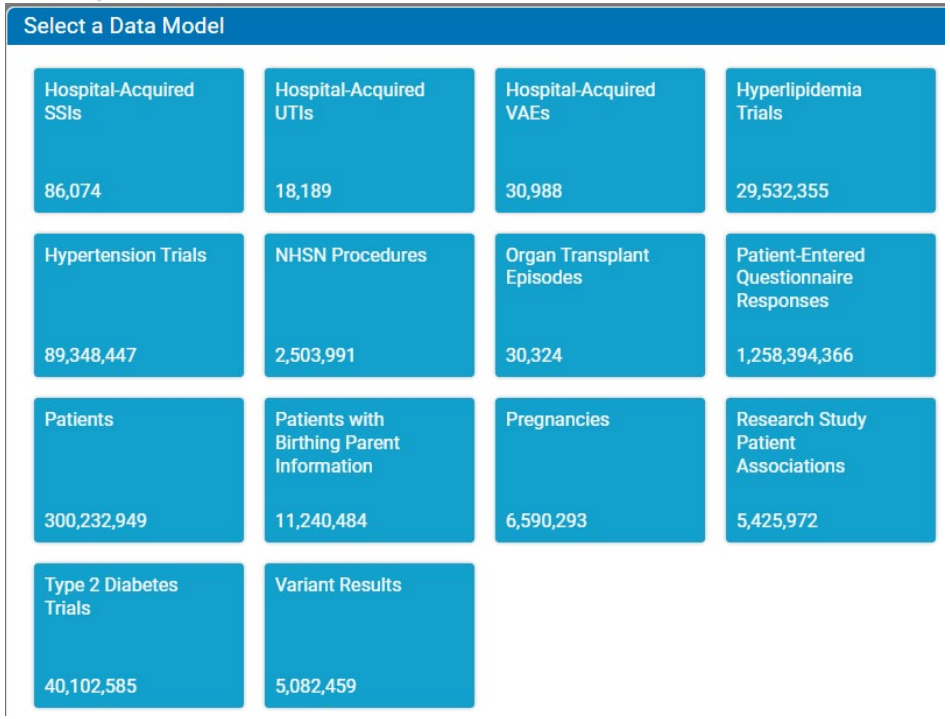
Cosmos Statistics

73 Billion Lab Results

16 Billion Procedures

12 Billion Medications

3 Billion Immunizations



22 different data models (including 11+ million patients with birthing parent information)

Epic SDoH wheel and Social Vulnerability Index now included!

"Line level" data "sandbox" available too!

LLM "sandbox with data available for early adopters in 2/2016!!!!!!

(MetroHealth is the larger publisher using Cosmos except for Epic – 8 of 133 publications)

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Wrap-up/Questions/Discussion

The MetroHealth System/CCIRE has:

1. Epic EHR with more breadth, depth, and longevity of data (especially among a diverse population) then almost any other healthcare system.
2. Epic EHR with implemented functionality and usability that places it in the top 1% of all healthcare systems in the world.
3. "Dream team" of clinical informaticists **(and PhD Informaticist).**
4. Unique deidentified population health tools (Epic Cosmos, Epic's Slicer-Dicer, and TriNetX) and imbedded geo-coding and SDoH metrics.
5. Nationally recognized informatics expertise in informatics data sciences (big data) and informatics implementation sciences.

Let us work even closer together to GROW RESEARCH and MAKE AMAZING RESEARCH DISCOVERIES!

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