2024 Learning Collaborative

Innovative Ways to Leverage Informatics for Quality Improvement

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Better Health Partnership

Session Objectives

- Learn how informatics and quality improvement strategies have been used to solve key problems in the healthcare sector.
- Explain informatics and quality improvement methods that can be generalized to solve problems in the healthcare sector.
- Understand new developments in the field of informatics, including Cosmos, and how they may be leveraged for regional health improvement.

Dynamic Defects in Chronic Condition Management System

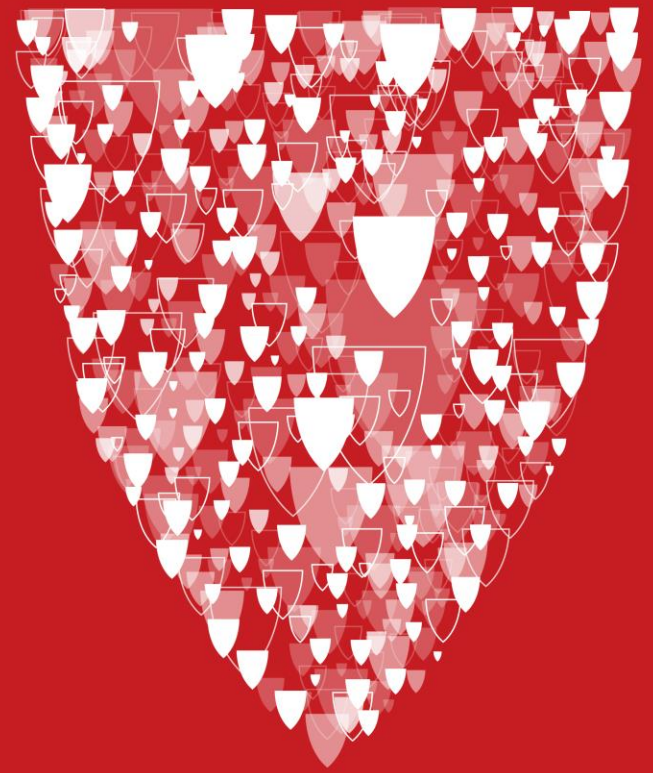
Tyler Barnett, MHSA

Director Value Improvement Analytics

10/25/2024

University Hospitals

Cleveland | Ohio



Objectives

- Specify the problem(s) in chronic condition management being addressed prior to solutioning
- Techniques / approaches taken to work through these problems
- Ongoing Lessons Learned

Problem Clouds

System Design Flaws & Fragmented Care Pathways

Scarce time, resources, and communication logistics

Information Overload / Burnout

75% QI Projects Fail

Quality Improvement Infrastructures largely lacking

Competing Priorities / Ideas

Condition	Count	Avg PMPY (All LOB)
COPD	42,710	$18,209 (1.5x w/ BH)
CHF	22,786	$31,386 (1.4x w/ BH)
CKD	54,136	$20,647 (1.5x w/ BH)
Diabetes	45,657	$18,505 (1.6 w/BH)
Hypertension	121,460	$14,449 (1.65 w/ BH)

https://www.cdc.gov/chronic-disease/data-research/facts-stats/index.html#:~:text=The%20impact%20of%20chronic%20diseases,chronic%20and%20mental%20health%20conditions.

Strategic Tactics

1. Partner Key Clinical, Operational SMEs, & Data Scientists
2. Define ‘Excellence’
3. Declare Idealized Measurements
4. Gather Data & Curate Datamarts
5. OODA Loop (Orient, Observe, Decide, Act)
6. Pilot Interventions
7. Assess Data
8. Scale

Defects In value:

1. % of undiagnosed patients
2. % of diagnosed patients without Wellness Visit in prior year
3. % of diagnosed patients with behavioral/mental health screening and follow up
4. % of patients on guideline directed medication therapy
5. % of patients with pharmacy consult

Fractal Management System

1. Declare Objectives & Key Results & Hardwire Next Action for each defect
2. Curate Enabling Infrastructure
3. Engage and Connect
4. Report Transparently & Ensure Shared Accountability

Lessons Learned

1. Maintain grounded in purpose when adding new team(s)
2. Data Distribution and QI visualizations are a requirement
3. Continuous measurement cycles are ideal
4. Human Factors are critical & require more attention
5. Simplify, communicate, and re-establish the management system
6. Pilot with intention to scale regardless of outcome
7. Coordinated Feedback Loops & Communication Plans are critical

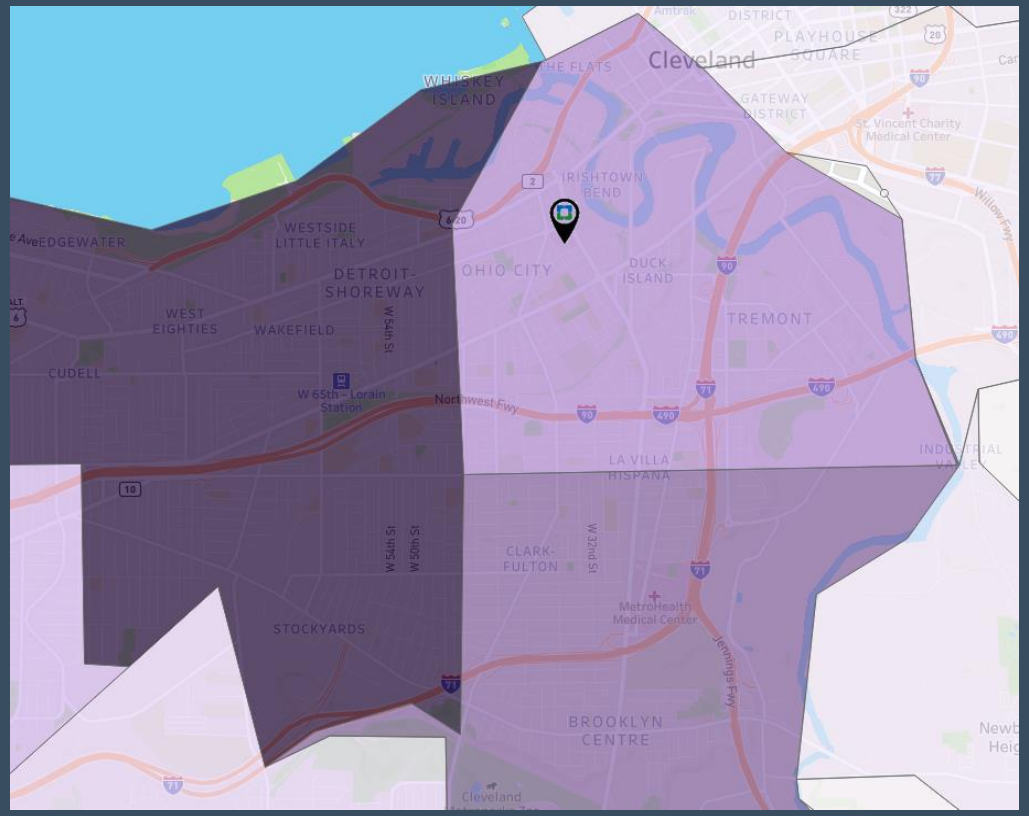
Geospatial Data for Localized Community Interventions

Alex Rennick

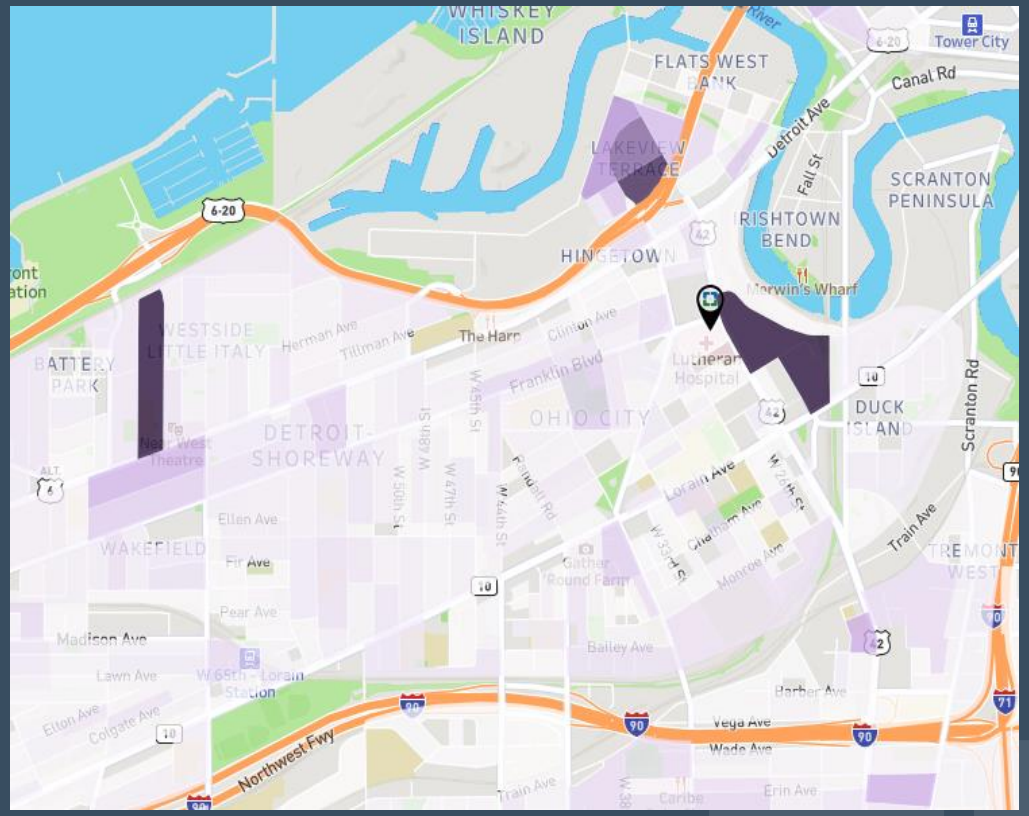
2024-10-25

Cleveland Clinic

Increasing granularity

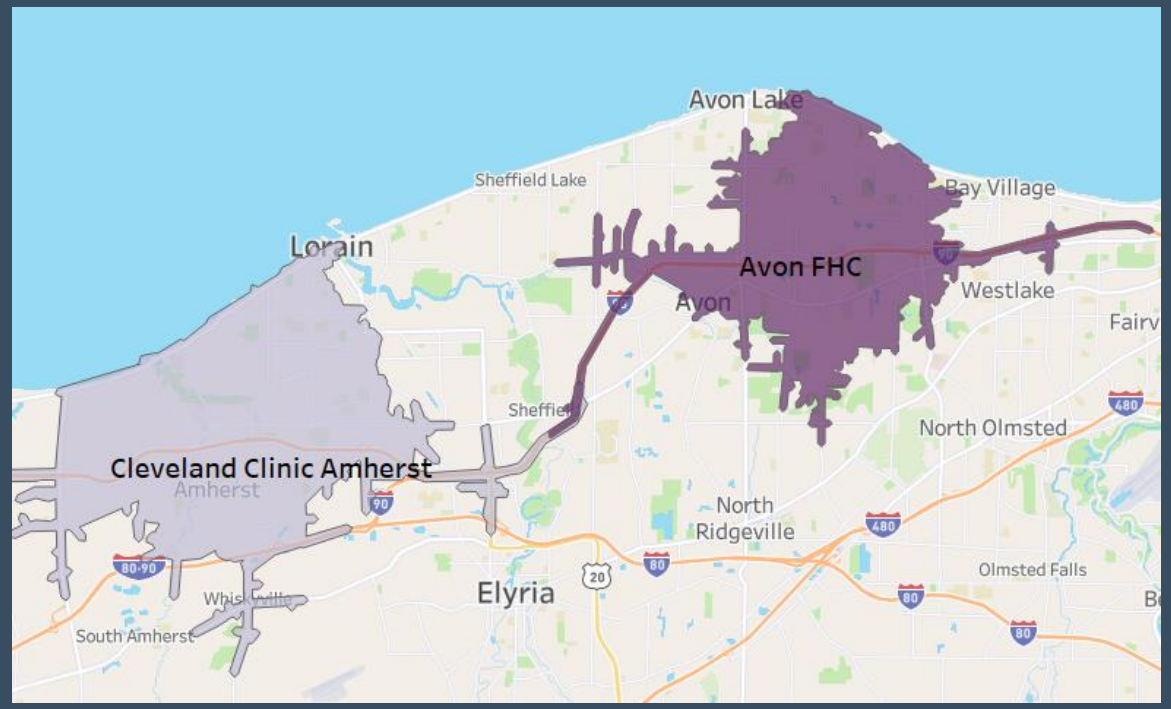


ED utilization by zip code

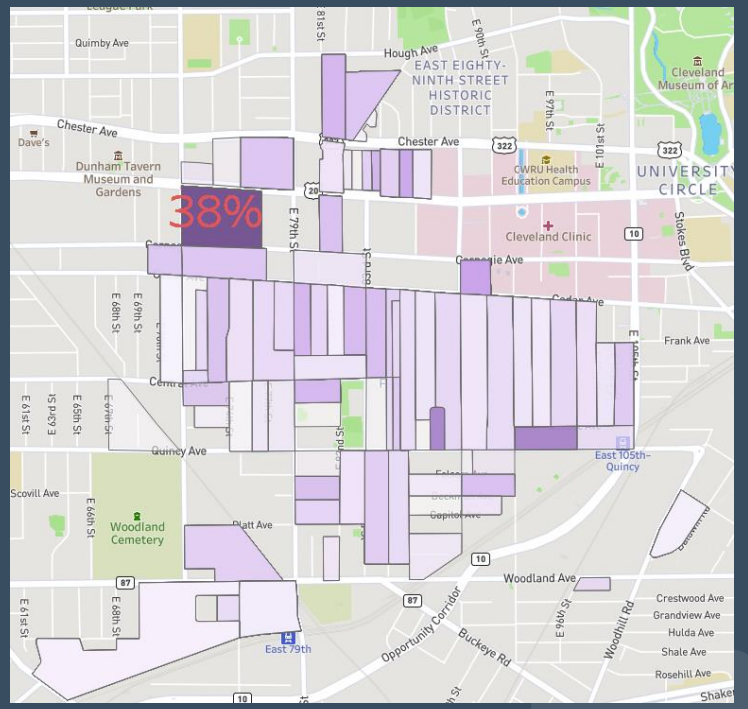


ED utilization by block

Increasing depth and accuracy

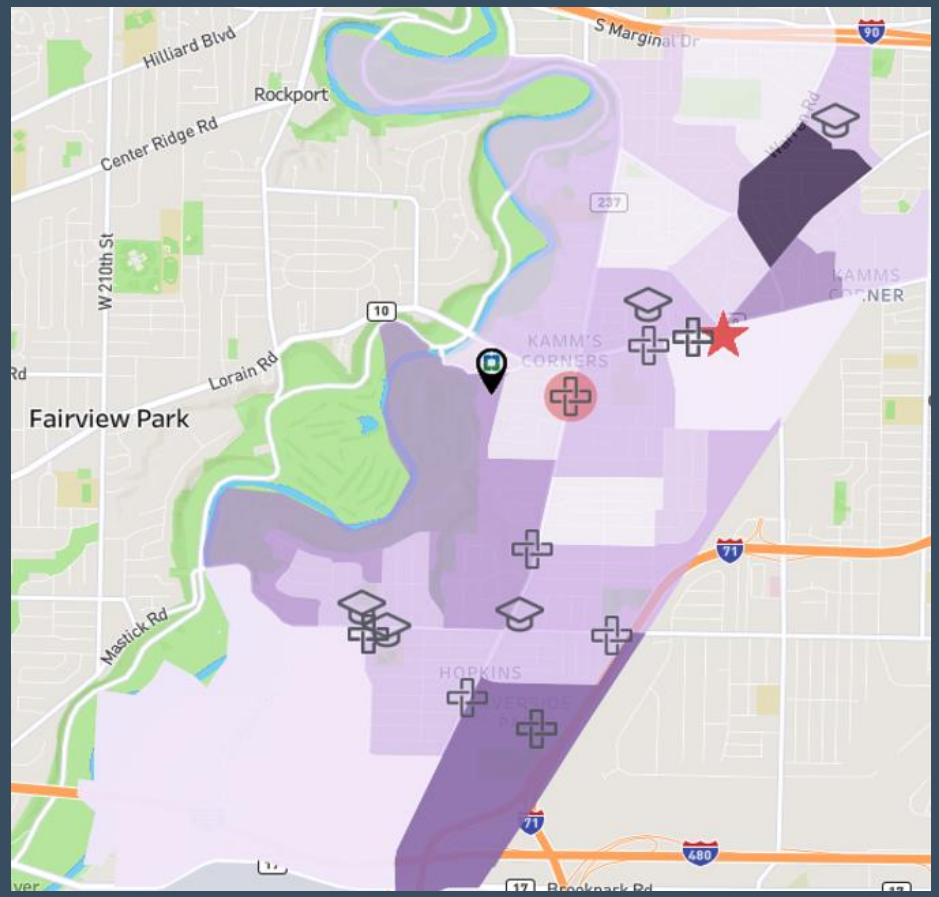


Ten-minute drive time to identify communities local to our facilities



Estimated percent of population by block seen by Cleveland Clinic

Using Public data



Estimated Food Stamps by Census Block

Cleveland Clinic

Every life deserves world class care.

Innovative Ways to Leverage Epic – Akron Children's Hospital

Joel Davidson
Better Health Partnership
Learning Collaborative
October 25, 2024

Akron Children's Hospital

Our Mission

To improve the health of children, teenagers and young adults through excellence in patient care, education, research, advocacy and community partnerships.

Our Vision

Akron Children's will be the most trusted, inclusive and accessible pediatric health system in the communities we serve.

Our Promises

1. To treat every child as we would our own.
2. To treat others as they would like to be treated.
3. To turn no child away.

High Quality Primary Care Pediatrics

Well Care Initiatives

- 6 visits by 15 months
- 3-21 year with well visit in last year

Care Standardization

- Standard well visit smartsets
- Age based templates
- Lead testing
- Measuring blood pressure
- Asthma Control Assessment

High Quality Well Care

American Academy of Pediatrics
DEDICATED TO THE HEALTH OF ALL CHILDREN®

Recommendations for Preventive Pediatric Health Care

Bright Futures/American Academy of Pediatrics

Bright Futures
prevention and health promotion for infants, children, adolescents, and their families™

Each child and family is unique; therefore, these Recommendations for Preventive Pediatric Health Care are designed for the care of children who are receiving nurturing parenting, have no manifestations of any important health problems, and are growing and developing in a satisfactory fashion. Developmental, psychosocial, and chronic disease issues for children and adolescents may require more frequent counseling and treatment visits separate from preventive care visits. Additional visits also may become necessary if circumstances suggest concerns.

These recommendations represent a consensus by the American Academy of Pediatrics (AAP) and Bright Futures. The AAP continues to emphasize the great importance of continuity of care in comprehensive health supervision and the need to avoid fragmentation of care.

Refer to the specific guidance by age as listed in the *Bright Futures Guidelines* (Hagan JF, Shaw JS, Duncan PM, eds. *Bright Futures: Guidelines for Health Supervision of Infants, Children, and Adolescents*. 4th ed. American Academy of Pediatrics; 2017).

The recommendations in this statement do not indicate an exclusive course of treatment or serve as a standard of medical care. Variations, taking into account individual circumstances, may be appropriate.

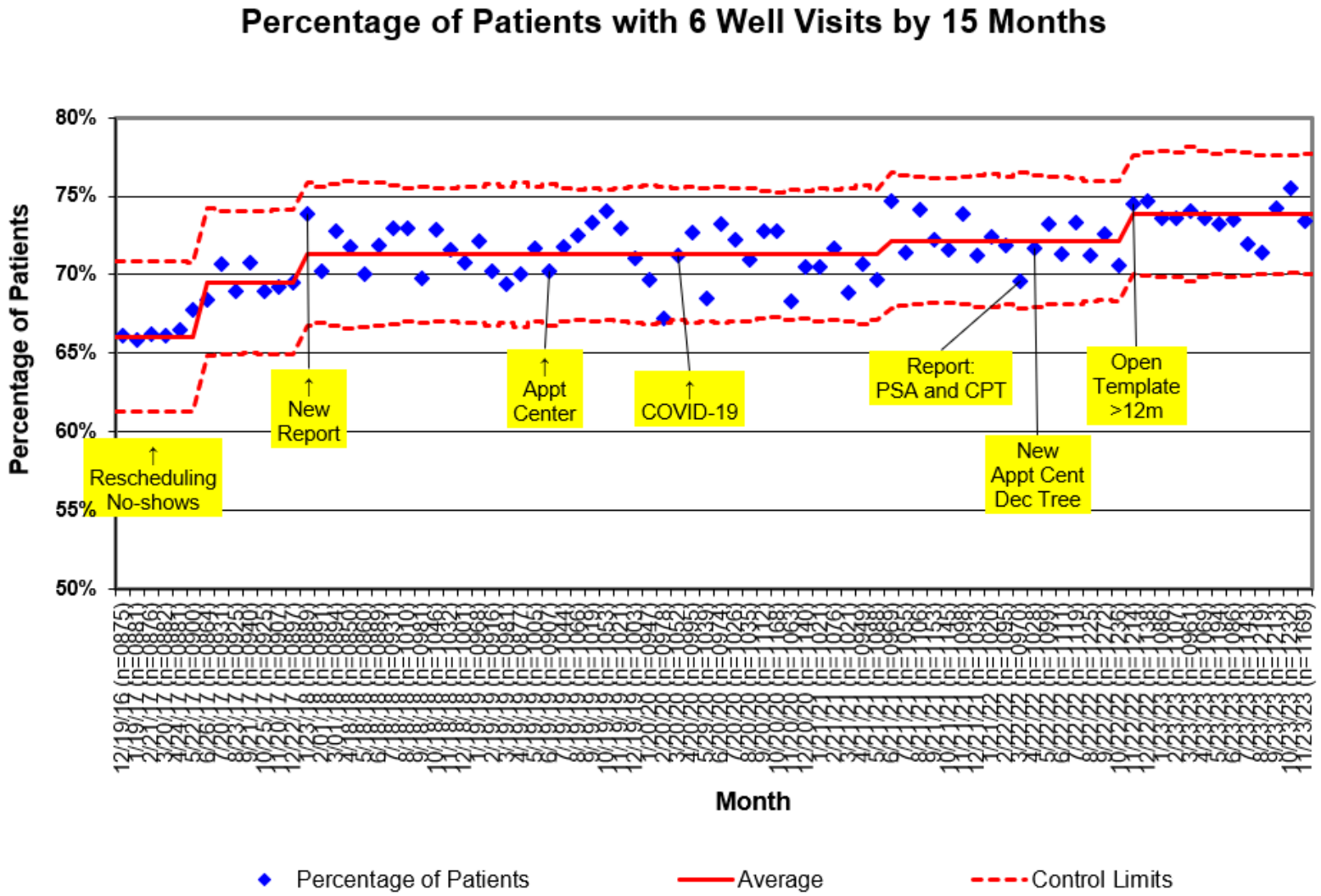
The Bright Futures/American Academy of Pediatrics Recommendations for Preventive Pediatric Health Care are updated annually.

	INFANCY								EARLY CHILDHOOD							MIDDLE CHILDHOOD							ADOLESCENCE										
AGE[1]	Prenatal[2]	Newborn[3]	3-5 d[4]	By 1 mo	2 mo	4 mo	6 mo	9 mo	12 mo	15 mo	18 mo	24 mo	30 mo	3 y	4 y	5 y	6 y	7 y	8 y	9 y	10 y	11 y	12 y	13 y	14 y	15 y	16 y	17 y	18 y	19 y	20 y	21 y
HISTORY Initial/Interval	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
MEASUREMENTS																																	
Length/Height and Weight		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Head Circumference		●	●	●	●	●	●	●	●	●	●	●																					
Weight for Length		●	●	●	●	●	●	●	●	●	●																						
Body Mass Index[5]												●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Blood Pressure[6]		★	★	★	★	★	★	★	★	★	★	★	★	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
SENSORY SCREENING																																	
Vision[7]		★	★	★	★	★	★	★	★	★	★	★	★	●	●	●	●	★	●	★	●	★	●	★	★	●	★	★	★	★	★	★	★
Hearing		●[8]	●[9] →			★	★	★	★	★	★	★	★	★	●	●	●	★	●	★	●	←		●[10]	→	←	●	→	←		●	→		
DEVELOPMENTAL/SOCIAL/BEHAVIORAL/MENTAL HEALTH																																	
Maternal Depression Screening[11]					●	●	●	●																									
Developmental Screening[12]								●			●		●																				
Autism Spectrum Disorder Screening[13]											●	●																					
Developmental Surveillance		●	●	●	●	●	●		●	●		●		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Behavioral/Social/Emotional Screening[14]		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Tobacco, Alcohol, or Drug Use Assessment[15]																						★	★	★	★	★	★	★	★	★	★	★	★
Depression and Suicide Risk Screening[16]																							●	●	●	●	●	●	●	●	●	●	●
PHYSICAL EXAMINATION[17]		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
PROCEDURES[18]																																	
Newborn Blood		●[19]	●[20] →																														
Newborn Bilirubin[21]		●																															
Critical Congenital Heart Defect[22]		●																															
Immunization[23]		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Anemia[24]						★			●	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★
Lead[25]							★	★	● or ★[26]		★	● or ★[26]		★	★	★	★																
Tuberculosis[27]				★			★		★			★		★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★
Dyslipidemia[28]												★			★		★		★	←	● →		★	★	★	★	★	←			●	→
Sexually Transmitted Infections[29]																							★	★	★	★	★	★	★	★	★	★	★
HIV[30]																							★	★	★	★	● →						
Hepatitis B Virus Infection[31]		★ →																															
Hepatitis C Virus Infection[32]																													● →				
Sudden Cardiac Arrest/Death[33]																						★ →											
Cervical Dysplasia[34]																																	●
ORAL HEALTH[35]							●[36]	●[36]	★		★	★	★	★	★	★	★																
Fluoride Varnish[37]							←				●				→																		
Fluoride Supplementation[38]							★	★	★		★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★					
ANTICIPATORY GUIDANCE	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

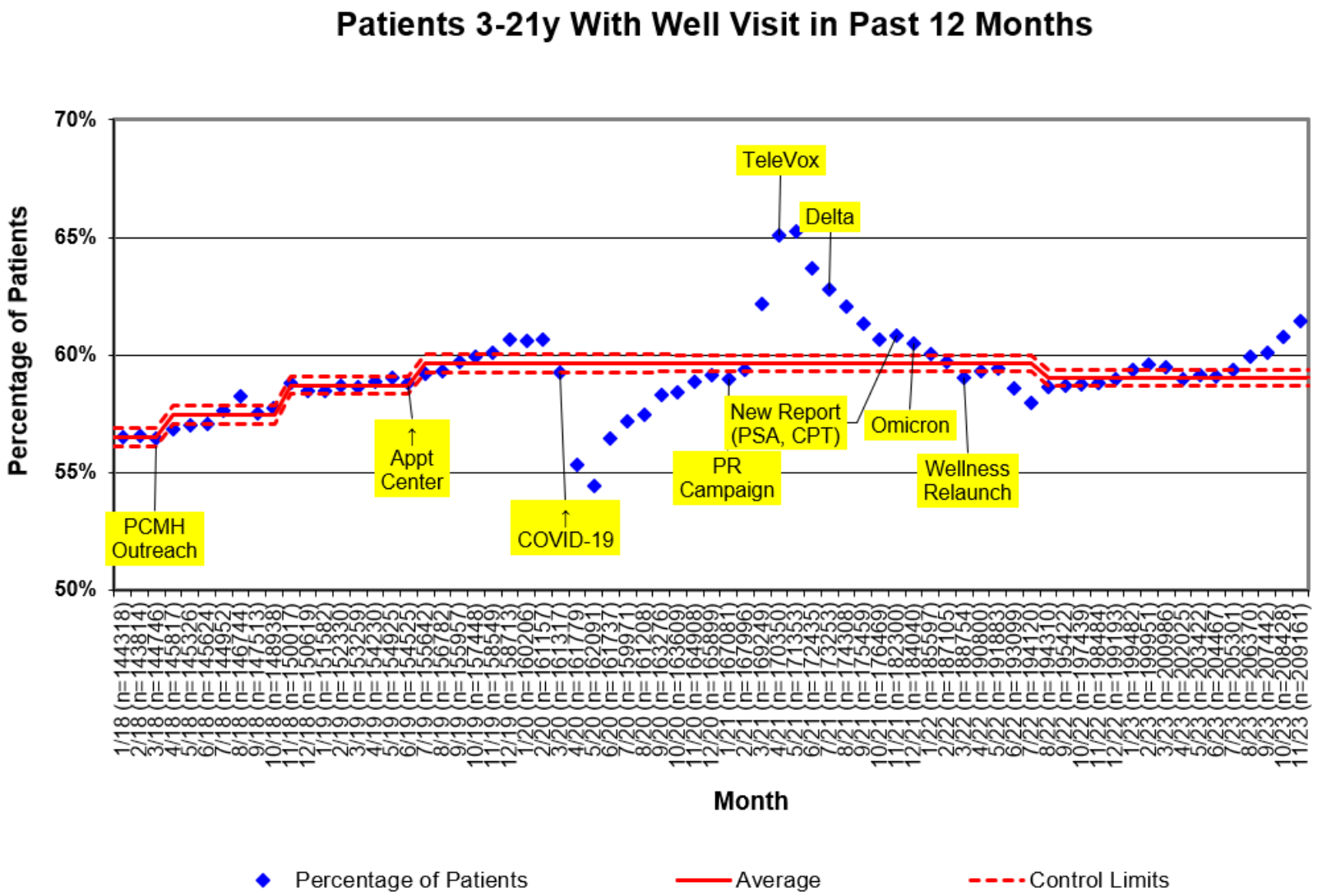
1. If a child comes under care for the first time at any point on the schedule, or if any items are not accomplished at the suggested age, the schedule should be brought up to date at the earliest possible time.
2. A prenatal visit is recommended for parents who are at high risk, for first-time parents, and for those who request a conference. The prenatal visit should include anticipatory guidance, pertinent medical history, and a discussion of benefits of breastfeeding and planned method of feeding, per "The Prenatal Visit" (https://doi.org/10.1542/peds.2018-1218).
3. Newborns should have an evaluation after birth, and breastfeeding should be encouraged (and instruction and support should be offered).
4. Newborns should have an evaluation within 3 to 5 days of birth and within 48 to 72 hours after discharge from the hospital to include evaluation for feeding and jaundice. Breastfeeding newborns should receive formal breastfeeding evaluation, and their mothers should receive encouragement and instruction, as recommended in "Policy Statement: Breastfeeding and the Use of Human Milk" (https://doi.org/10.1542/peds.2022-057988). Newborns discharged less than 48 hours after delivery must be examined within 48 hours of discharge, per "Hospital Stay for Healthy Term Newborn Infants" (https://doi.org/10.1542/peds.2015-0699).
5. Screen, per "Clinical Practice Guideline for the Evaluation and Treatment of Children and Adolescents with Obesity" (https://doi.org/10.1542/peds.2022-060640).
6. Screening should occur per "Clinical Practice Guideline for Screening and Management of High Blood Pressure in Children and Adolescents" (https://doi.org/10.1542/peds.2017-1904). Blood pressure measurement in infants and children with specific risk conditions should be performed at visits before age 3 years.
7. A visual acuity screen is recommended at ages 4 and 5 years, as well as in cooperative 3-year-olds. Instrument-based screening may be used to assess risk at ages 12 and 24 months, in addition to the well visits at 3 through 5 years of age. See "Visual System Assessment in Infants, Children, and Young Adults by Pediatricians" (https://doi.org/10.1542/peds.2015-3596) and "Procedures for the Evaluation of the Visual System by Pediatricians" (https://doi.org/10.1542/peds.2015-3597).
8. Confirm initial screen was completed, verify results, and follow up, as appropriate. Newborns should be screened, per "Year 2007 Position Statement: Principles and Guidelines for Early Hearing Detection and Intervention Programs" (https://doi.org/10.1542/peds.2007-2333).
9. Verify results as soon as possible, and follow up, as appropriate.
10. Screen with audiometry including 6,000 and 8,000 Hz high frequencies once between 11 and 14 years, once between 15 and 17 years, and once between 18 and 21 years. See "The Sensitivity of Adolescent Hearing Screens Significantly Improves by Adding High Frequencies" (https://www.sciencedirect.com/science/article/abs/pii/S105413391X16000483).
11. Screening should occur per "Incorporating Recognition and Management of Perinatal Depression Into Pediatric Practice" (https://doi.org/10.1542/peds.2018-3259).
12. Screening should occur per "Promoting Optimal Development: Identifying Infants and Young Children With Developmental Disorders Through Developmental Surveillance and Screening" (https://doi.org/10.1542/peds.2019-3449).
13. Screening should occur per "Identification, Evaluation, and Management of Children With Autism Spectrum Disorder" (https://doi.org/10.1542/peds.2019-3447).

Akron Children's Hospital

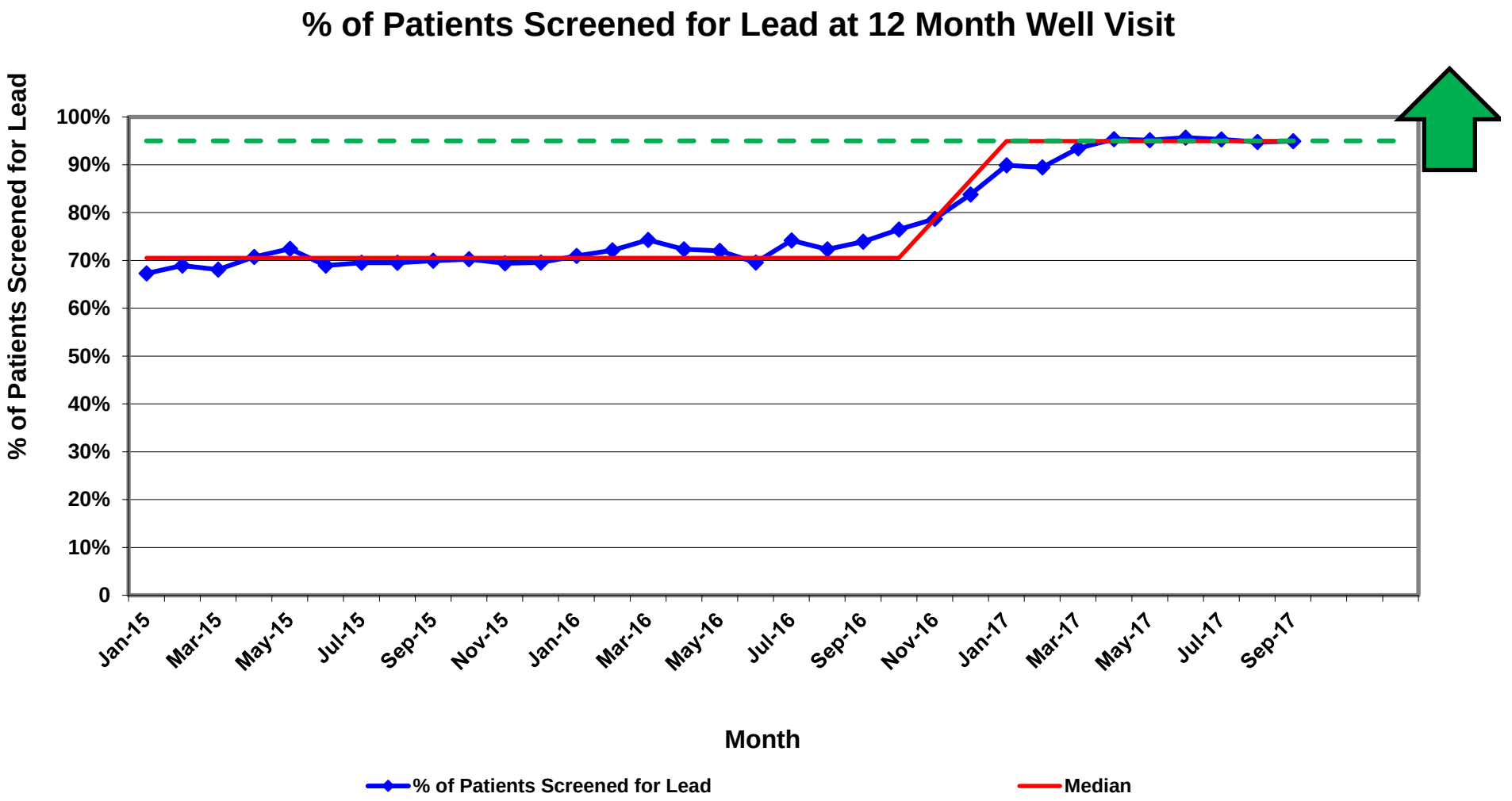
Focus on Well Care



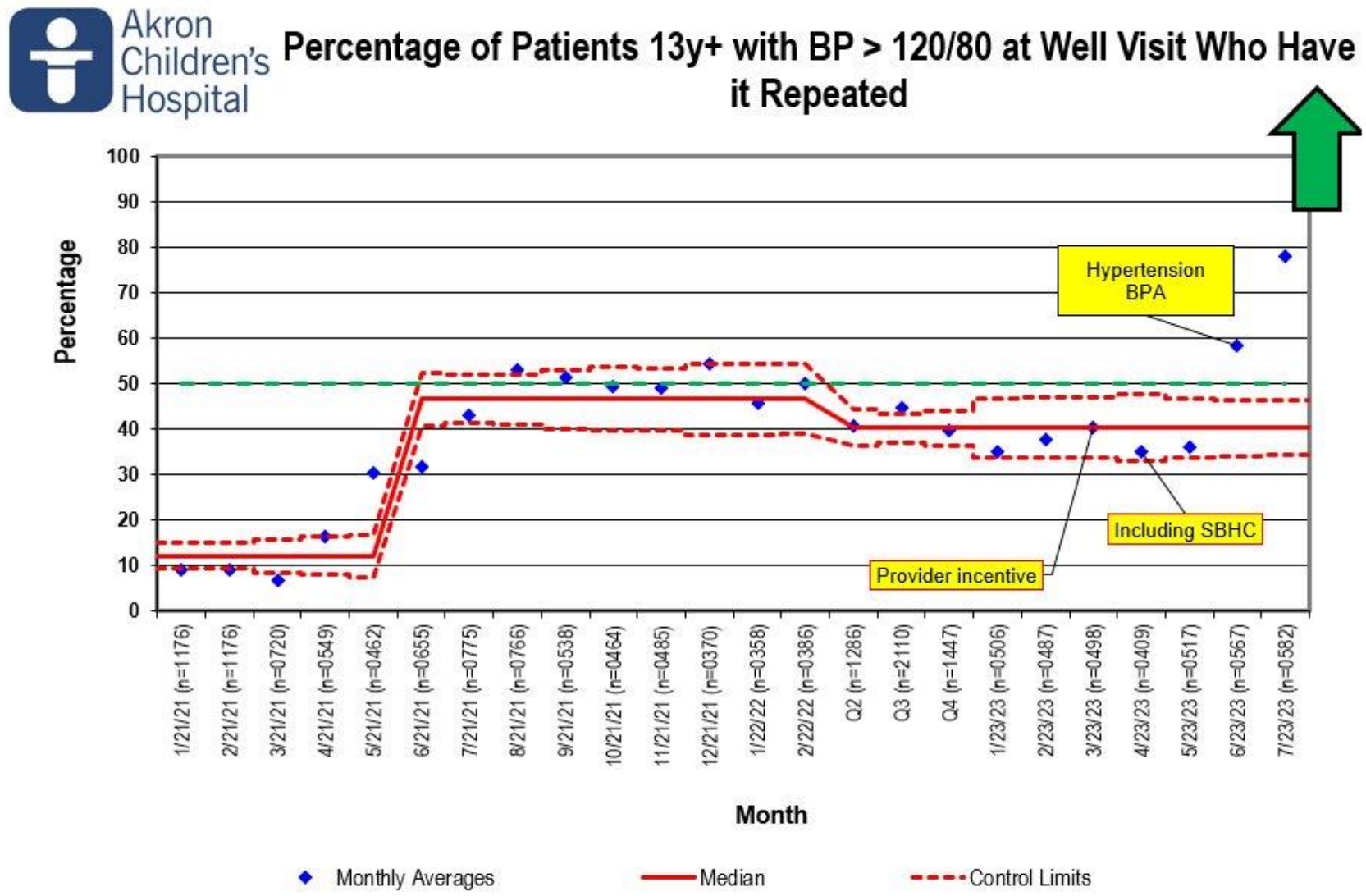
Focus on Well Care



Care Standardization - Lead



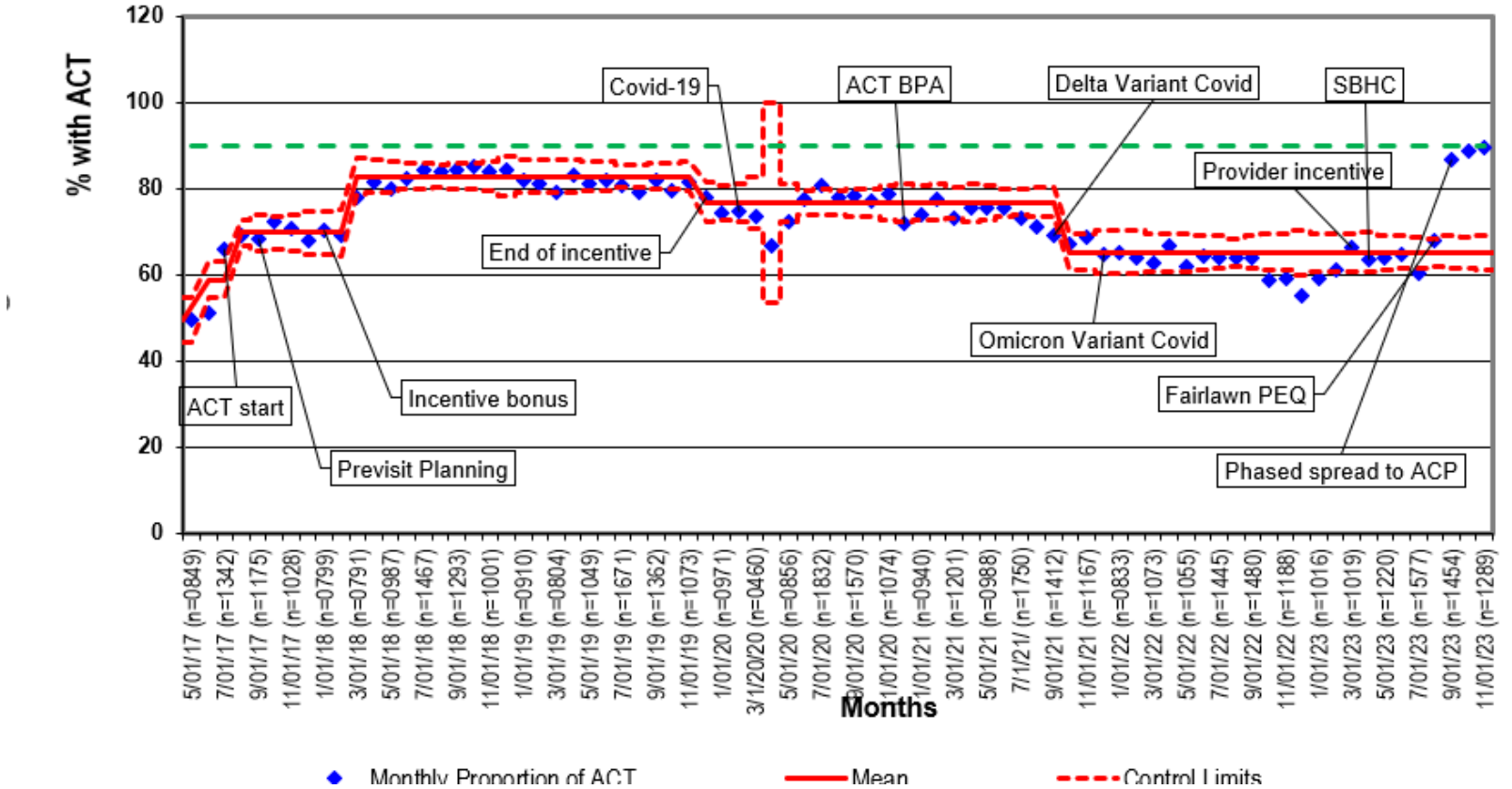
Care Standardization – Blood Pressure



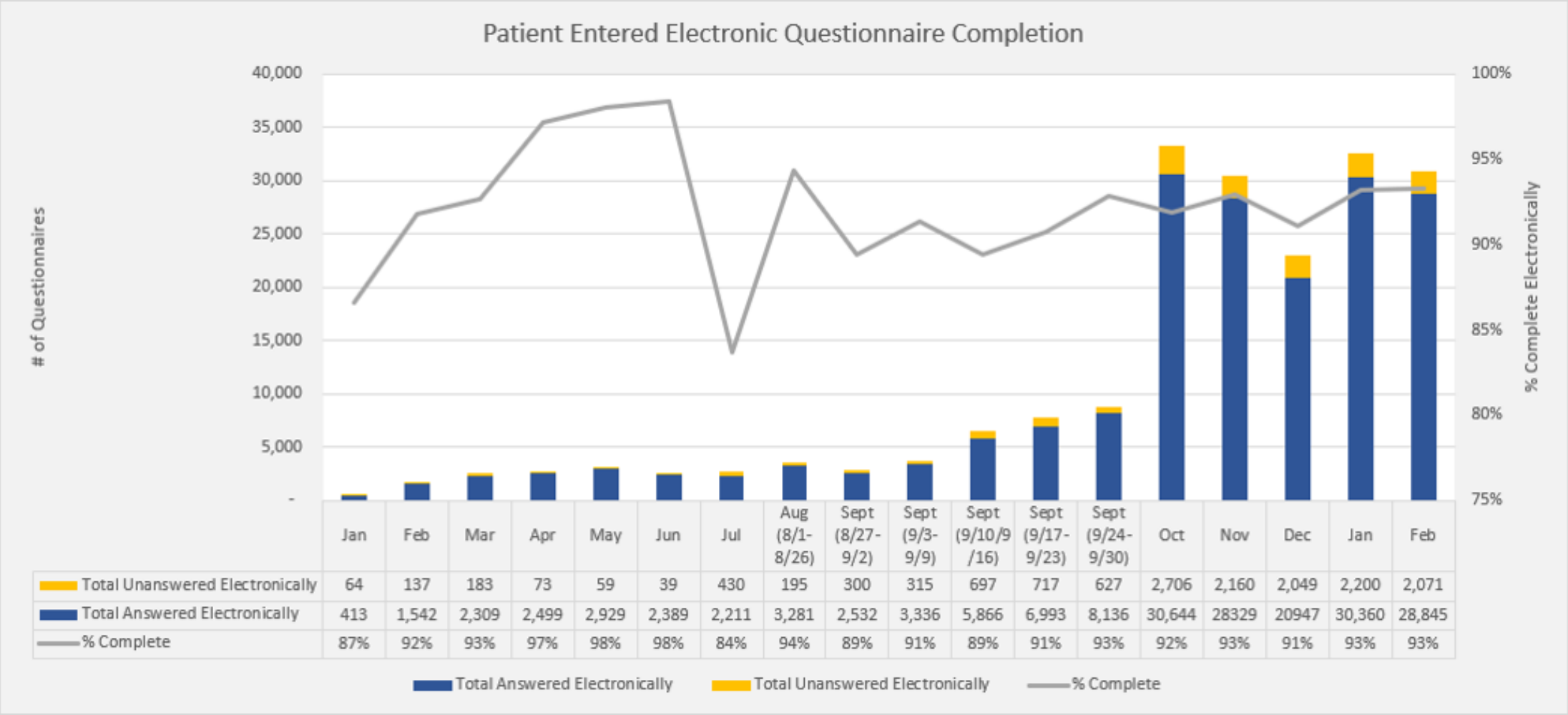
Care Standardization – Asthma Control

Akron Children's Hospital

% of Asthma Patients ≥4y with ACT or Rule of 2 at Well Visits



Transforming Patient Arrival



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug (8/1-8/26)	Sept (8/27-9/2)	Sept (9/3-9/9)	Sept (9/10/9/16)	Sept (9/17-9/23)	Sept (9/24-9/30)	Oct	Nov	Dec	Jan	Feb
Total Unanswered Electronically	64	137	183	73	59	39	430	195	300	315	697	717	627	2,706	2,160	2,049	2,200	2,071
Total Answered Electronically	413	1,542	2,309	2,499	2,929	2,389	2,211	3,281	2,532	3,336	5,866	6,993	8,136	30,644	28329	20947	30,360	28,845
% Complete	87%	92%	93%	97%	98%	98%	84%	94%	89%	91%	89%	91%	93%	92%	93%	91%	93%	93%

Akron Children's Hospital

Exploiting Health Information Technology to Improve Health – Immunizations Case Study

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

Board Certified in Clinical Informatics

Professor of Internal Medicine, Pediatrics, and Population and Quantitative Health Sciences
Case Western Reserve University
Northern Ohio CTSC Informatics Lead

Chief Health Informatics Officer and Vice-President of Health Informatics and Patient Engagement Technologies
Director of the Center for Health Informatics and Patient Engagement
Director of the Center for Clinical Informatics Research and Education
The MetroHealth System

Better Health Partnership Learning Collaborative
October 2024

MetroHealth

CASE WESTERN RESERVE UNIVERSITY
School of Medicine

MetroHealth and Epic

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, Payer Platform
- 2024 – Epic 2023 (Feb), Hyperdrive, Financial Assistance, Maternal Care Companion

Total EHR data

- 1.6 million patients
- 25 million visits
- 200 million labs/pathology
- 1 million imaging studies
- 25 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, and 2023)!!!
1st public health care system in the US with Epic to achieve HIMSS Enterprise Davies award (2015)!!!

The MOST cost effective intervention for health – IMMUNIZATIONS!!!!!!

- The “number needed to vaccine” (i.e. vaccines needed to be given to prevent one illness can range from a couple hundreds to <10).
- Most vaccines have a NET POSITIVE financial impact.
- Vaccines only work if they are injected!!!!

Strategic Approach to Improving Immunizations

1. *Clinical Decision Support* – build all ACIP (Advisory Committee on Immunization Practices) approved immunization rules into your EHR.
2. *Registry* – create a registry to determine your eligible patients due/overdue for immunizations.
3. *Alerts* – show immunization reminder to the care team (at the point of care) and to patients/parents through the patient portal.
4. *Reporting* – make it easy for everyone to see population level immunization rates.
5. *Outreach* – use multi-mode (texting, calling, personal health record reminders, letters, post-cards, email) to remind due/overdue patients/parents.
6. *Scheduling* – make immunization scheduling easy (self-scheduling).

Adolescent Immunizations Outcomes

ELSEVIER

JOURNAL OF ADOLESCENT HEALTH
www.jahonline.org

Original article

Direct Messaging to Parents/Guardians to Improve Adolescent Immunizations

David S. Bar-Shain, M.D. [a,b], Margaret M. Stager, M.D. [a], Anne P. Runkle [b], Janeen B. Leon, M.S. [a,b], and David C. Kaelber, M.D., Ph.D., M.P.H. [a,b,c,d,*]

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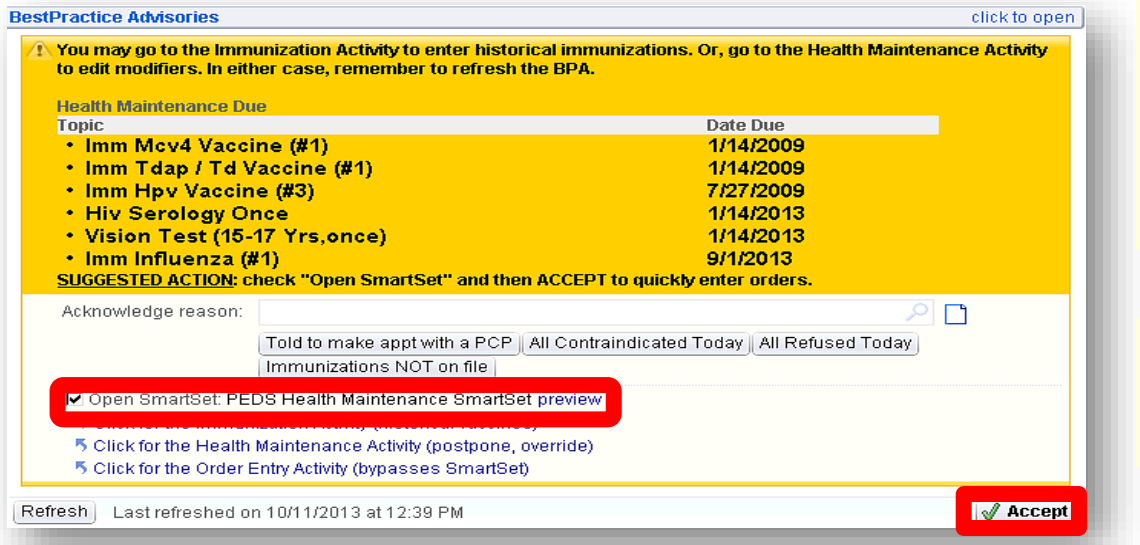
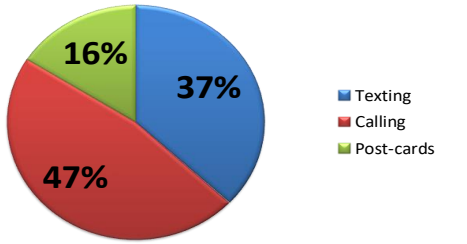
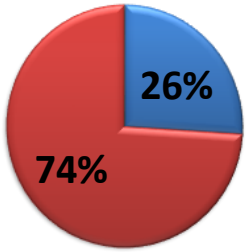






26% of adolescents messaged received at least one overdue immunization
(Need to message - 4 adolescents to immunize 1)
THOUSANDS OF MORE IMMUNIZATIONS GIVEN!!!!

~$200,000 in clinical revenue generated for ~$5,000 in messaging expenses.

DS Bar-Shain, MM Stager, AP Runkle, JB Leon, and DC Kaelber. *Direct Messaging to Parents/Guardians to Improve Adolescent Immunizations*. Journal of Adolescent Health. 2015 May;56(5 Suppl):S21-6.

MetroHealth

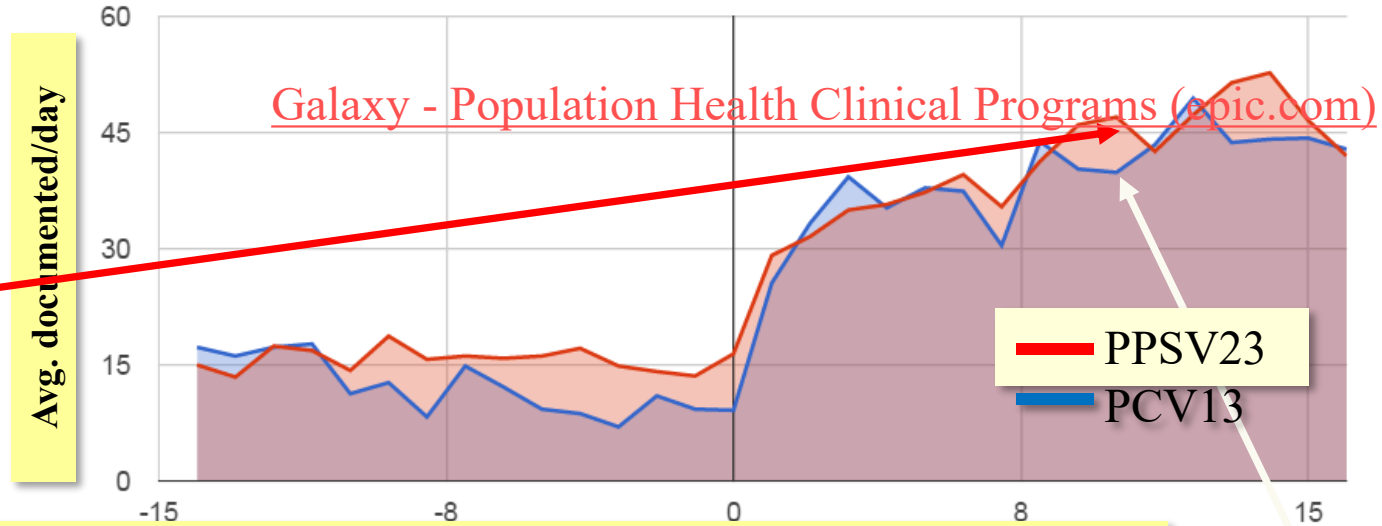
CASE WESTERN RESERVE UNIVERSITY
School of Medicine

Pneumonia Immunizations Outcomes

MetroHealth Process Outcomes:

Pre vs. Post Go Live

PPSV23 average increased 260%



Daily average by week of PCV13 and PPSV23

PCV13 average increased 325%

MetroHealth

Joint Commission recognized as best practice

Increasing Up-to-Date Pediatric and Adult Immunizations

Implementation Impact:	Operational Impact:	Timeline:	Improved
		2 weeks	**Metric:** Up-to-date immunizations

The MetroHealth System instituted a program to increase current pediatric immunizations using Epic tools. This program focuses on identifying patients who need immunizations based on the organization's criteria and alerting clinicians about those patients' needs using a BestPractice Advisory. MetroHealth's pediatric immunization program was recognized during a 2012 Joint Commission audit as a best practice immunization tracking and ordering system.

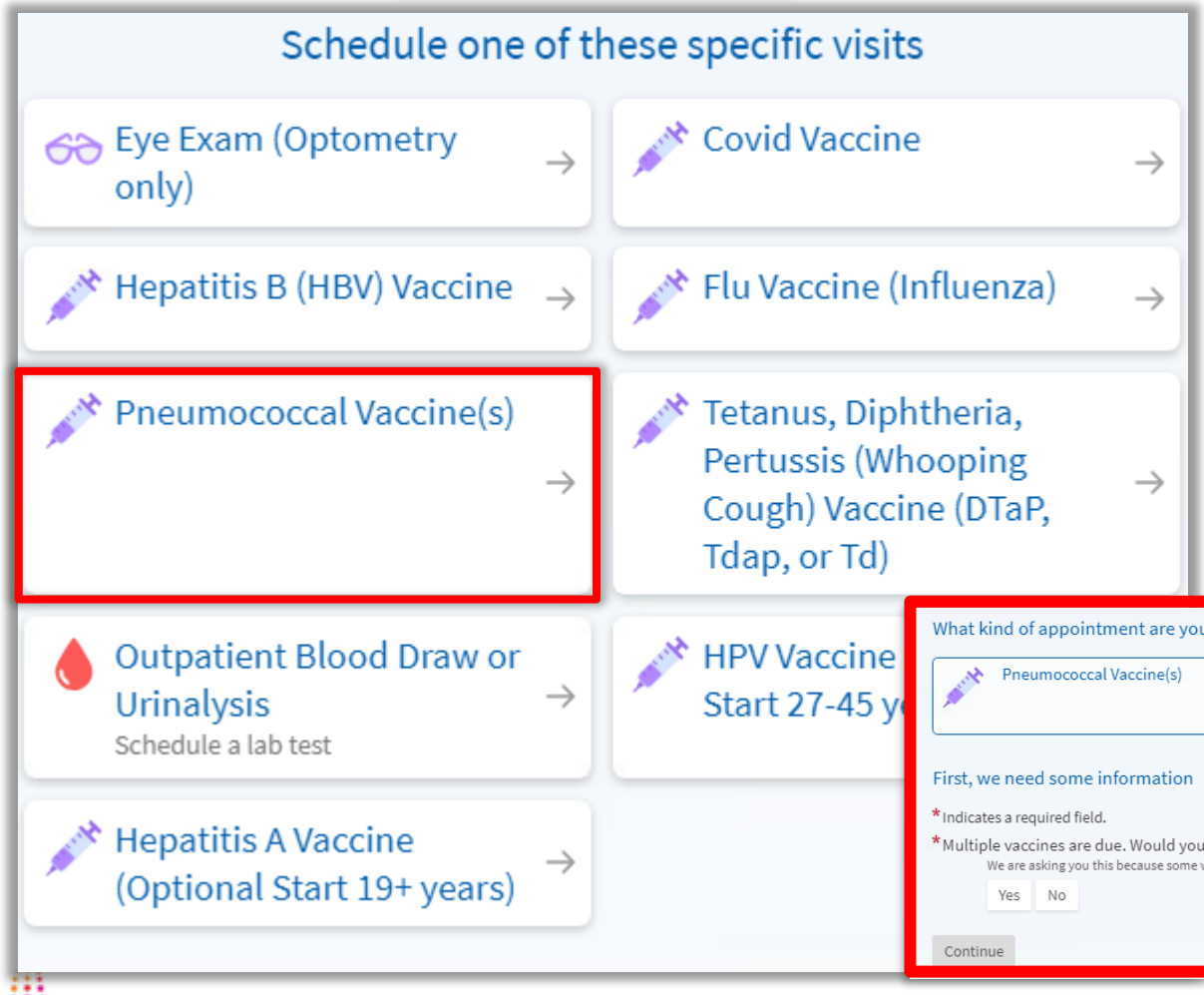
First Available: 1/4/2013

https://galaxy.epic.com/?#Browse/page=1!68!715!3290972&rank=2&queryid=127308871&docid=81214

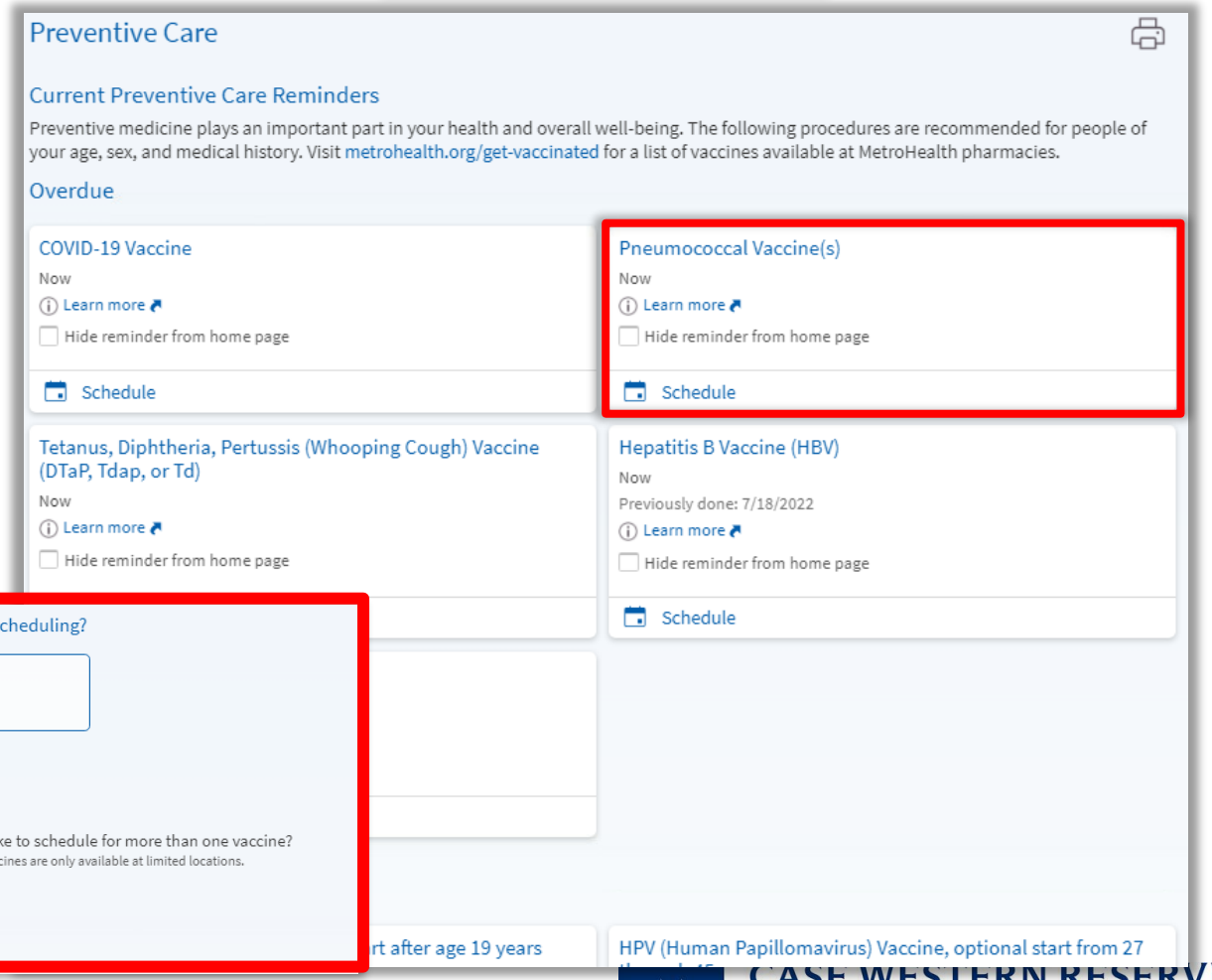
Immunization Self-Scheduling Workflow

MyChart
Two places to start scheduling

Schedule a Visit



Preventative Care



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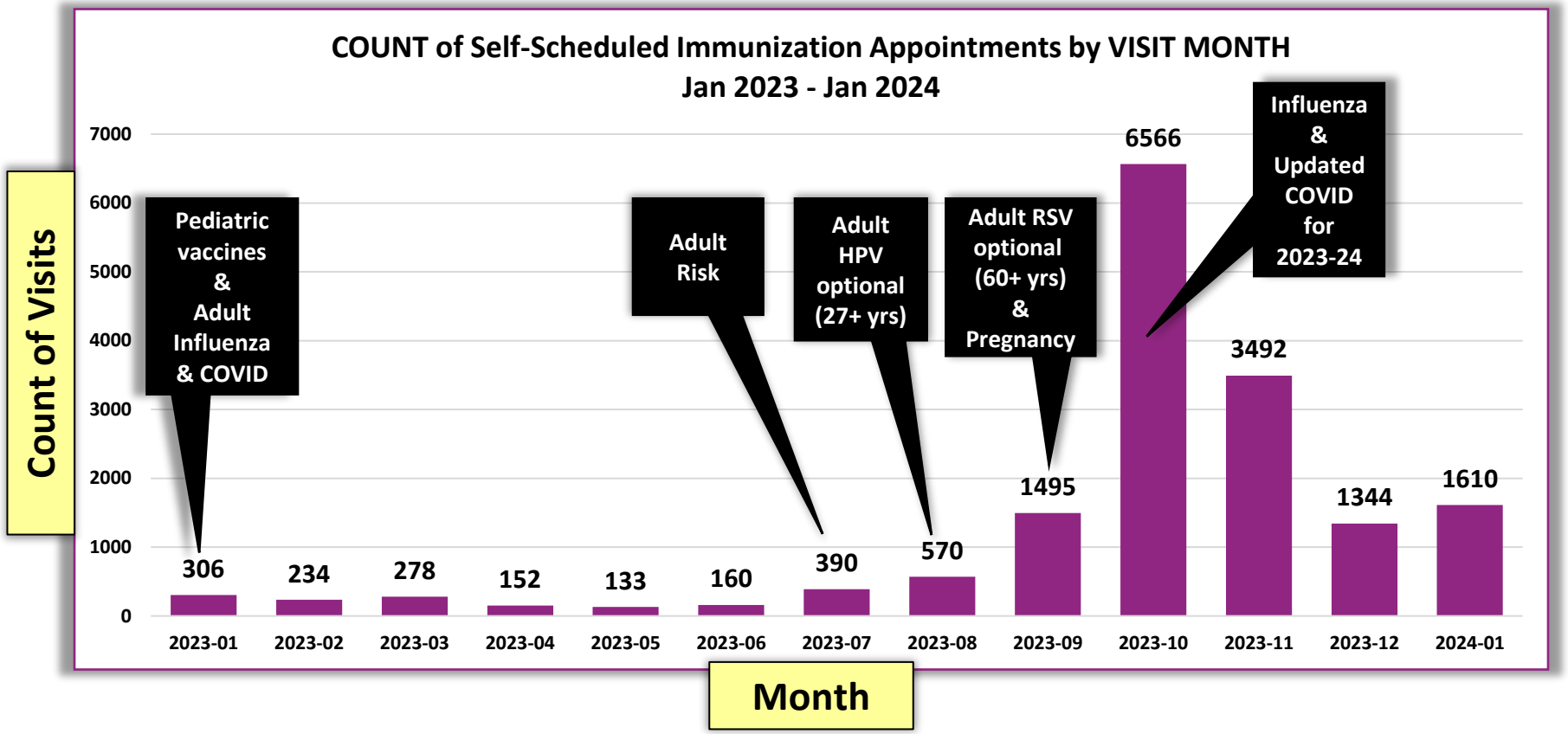
Immunization Self-Scheduling Outcomes

Appointments self-scheduled per month



In aggregate,
patients have used our functionality to self-schedule
17,073 immunization appointments.
(Jan 2023 – May 2024)

We saw a **spike** in self-scheduled appointments at the start of the **respiratory season** as adult patients sought their influenza, COVID, and RSV optional vaccines.

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2024 Learning Collaborative

Innovative Ways to Leverage Informatics for Quality Improvement

David Kaelber, MD, PhD, MPH
Chief Health Informatics Officer
The MetroHealth Systems

Tyler Barnett, MHSA
Director, Value Improvement Analytics
University Hospitals

Joel Davidson, MD
Locust Care Pediatric Care Group
Akron Children's Hospital
Co-Chair, BHP Children's Leadership Team

Alex Rennick,
Director Research Data Science & Analytics
Center for Community Health, Cleveland Clinic

Better Health Partnership

A New Approach To Measuring Healthcare Quality in Northeast Ohio Over a DECADE in the Making

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

Board Certified in Clinical Informatics

Professor of Internal Medicine, Pediatrics, and Population and Quantitative Health Sciences
Case Western Reserve University
Northern Ohio CTSC Informatics Lead

Chief Health Informatics Officer and Vice-President of Health Informatics and Patient Engagement Technologies
Director of the Center for Health Informatics and Patient Engagement
Director of the Center for Clinical Informatics Research and Education
The MetroHealth System

Better Health Partnership Learning Collaborative
October 2024

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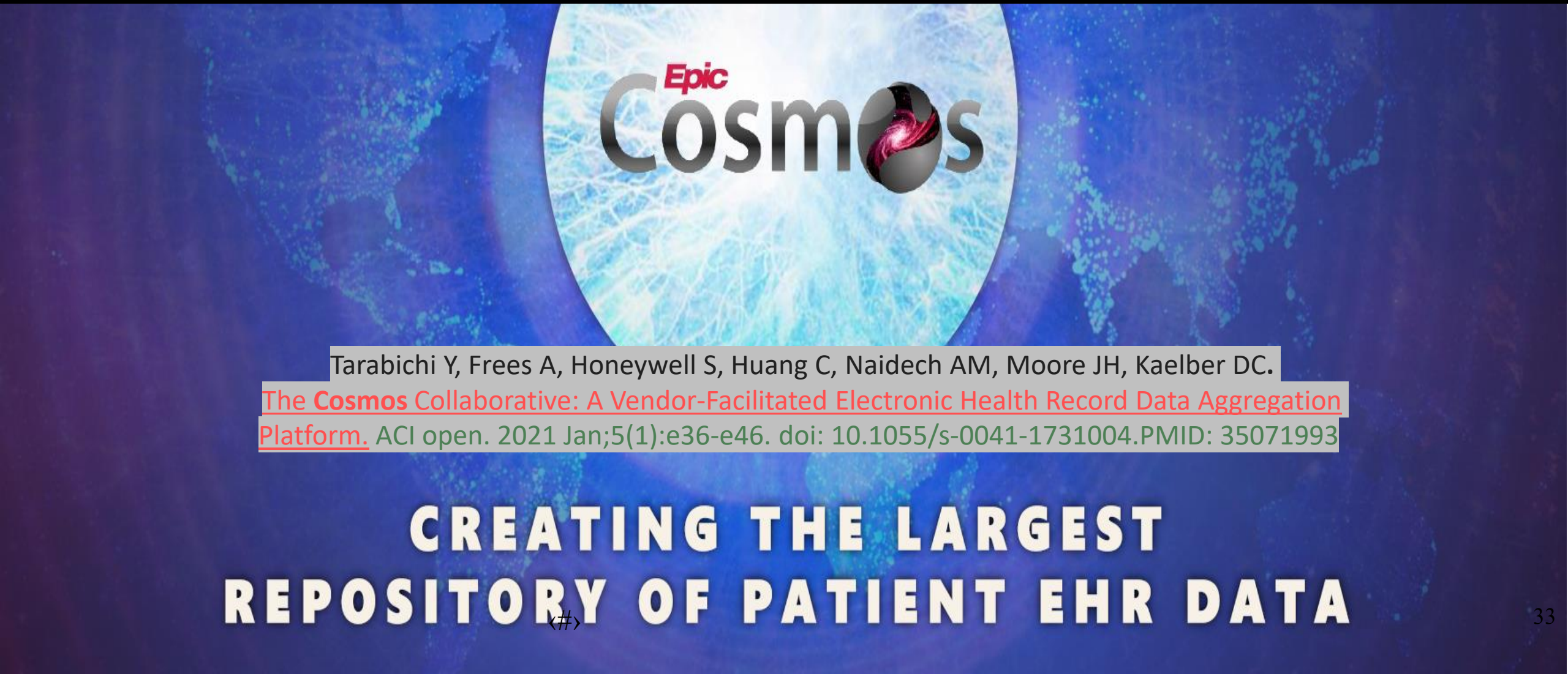
CREATING THE LARGEST, DE-DUPLICATED PLATFORM EVER TO ANALYZE QUAITY AND HEALTH TRENTS IN NORTHEAST OHIO!!!!!!!



Tarabichi Y, Frees A, Honeywell S, Huang C, Naidech AM, Moore JH, Kaelber DC. The **Cosmos** Collaborative: A Vendor-Facilitated Electronic Health Record Data Aggregation Platform. ACI open. 2021 Jan;5(1):e36-e46. doi: 10.1055/s-0041-1731004.PMID: 35071993

Creating the largest repository of

Participating Health Systems :

- Contribute Limited Data Set

- Get Access:
  - Improve Patient Care
  - Better understand health and disease
  - Can query down to the zip code level
  - Can bring in externally linked zip code/county data
  - Goes back to 2023 (and in many cases earlier)

Cleveland Clinic, MetroHealth, University Hospitals of Cleveland, and OCHIN (for FQHCs) and other regional healthcare systems.

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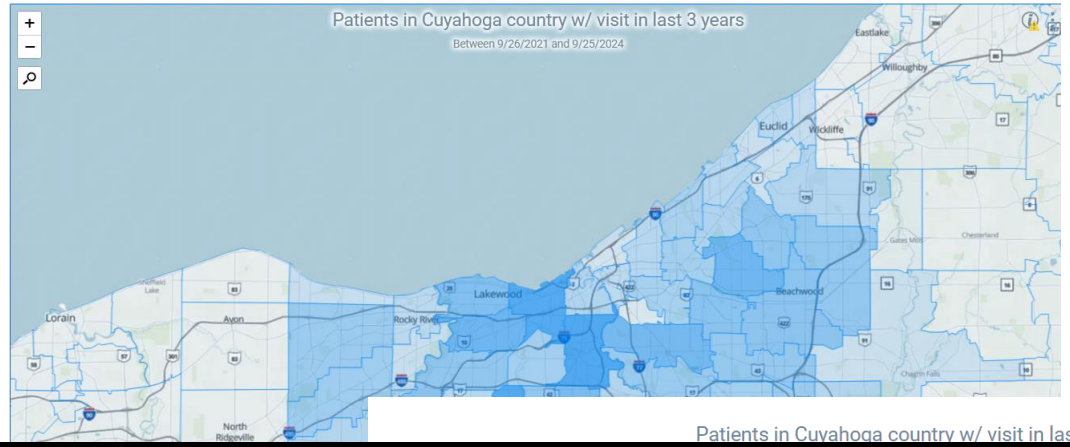
Cosmos and Cuyahoga County

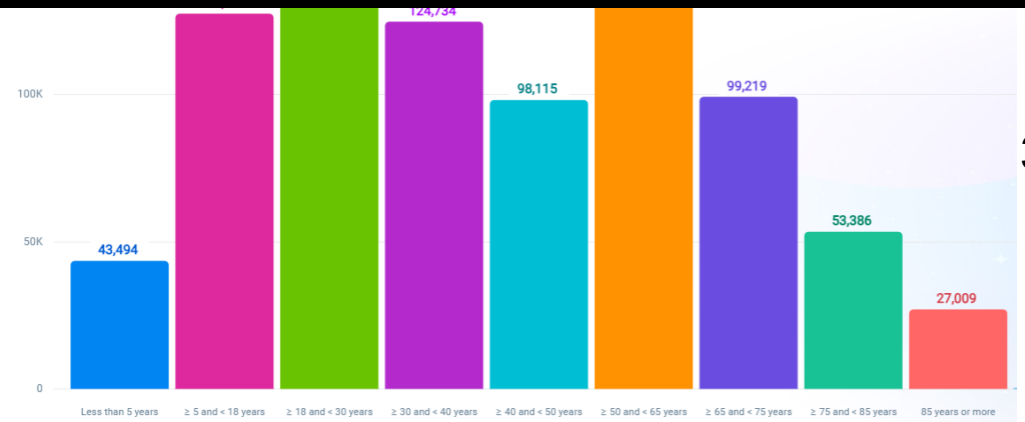


Patients in Cuyahoga country w/ visit in last 3 years by age

1. Self-service querying tool hosted the Epic corporation (over 50% of Epic customers)

2. 7 different “data models”:
   a. Admissions
   b. ED Encounters
   c. Encounters
   d. Organ Transplant Episodes

Cuyahoga Country: 866,782 patients in Cosmos and 1,229,182 patients in US Census = 71% of county population



Information

3. Can look at data by:
   a. Bar graphs/Line graphs
   b. Tree maps, Donut graphs, Pie charts
   c. Geomapping (down to zip code)
   d. Tables and Crosstabs

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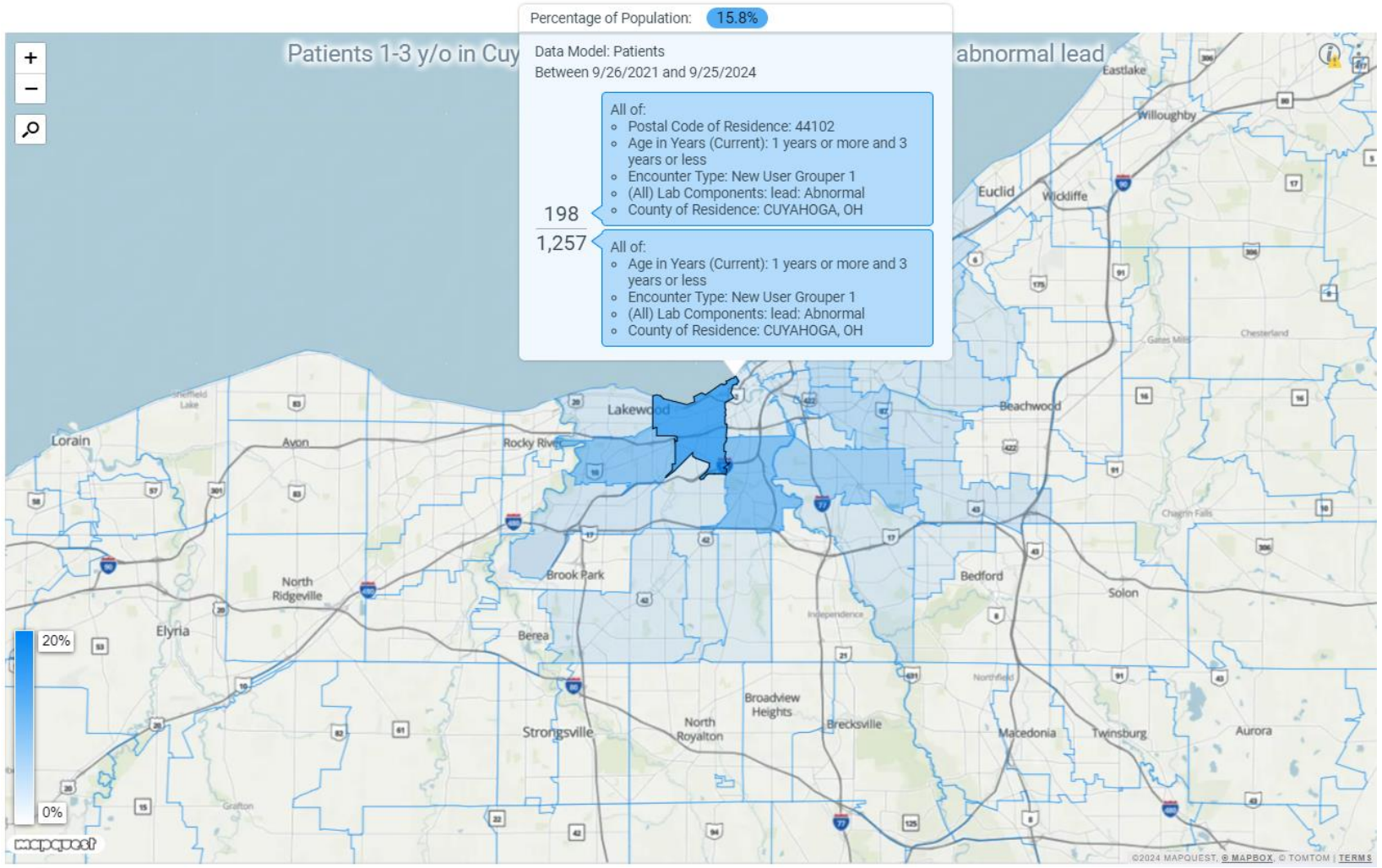
Cosmos SDOH related variables (collected and imputed)

Cuyahoga Country Lead Screening Example

Patients 1-3 y/o in Cuyahoga county with abnormal lead level



What will be the first Better Health Partnership activity to utilize Cosmos?

Will someone be presenting on using Cosmos at the NEXT Learning Collaborative?

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Thank You

Afternoon Feedback

Better Health Partnership