

Applying Research to Current Practices: A Roadmap to Accelerate the Route from Learning to Impact

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James M. Anderson Center for Health Systems Excellence

April 26, 2023



Disclosures

Inventor of technology to support Learning Health System Networks that has been licensed to Hive Networks by Cincinnati Children's

Relevant PCORI Awards

- ImproveCareNow Patient Powered Research Network
- PEDSnet: A pediatric national learning health system
- PCORnet LHS Communities: Developing Patient Powered Learning Health System Networks





Cincinnati
children'sTM
changing the outcome together

For Many Strokes, There's an Effective Treatment. Why Aren't Some Doctors Offering It?

“It was one of those findings that would change medicine, Dr. Christopher Lewandowski thought.

.....a large “Close to 700,000 patients have strokes (that) could prevent stroke (T.P.A.), could be helped by T.P.A.....up to 30 percent of stroke victims who arrive at hospitals on time and are perfect candidates ... do not receive it.”

“We felt that and are perfect candidates ... do not receive it.”

shed report, he said. He was wrong.

That groundbreaking clinical trial concluded 22 years ago”.....but.

Gina Kolata
New York Times
March 26, 2018



“It was, by all estimations, a successful research effort.

A randomized clinical trial (**2006**) across 11 sites in the US Department of VA, testing an organization of care called the Collaborative Chronic Care Model (CCM) for bipolar disorder vs. treatment as usual.

Significant impact - mood episodes, mental health QoL, social function, and satisfaction with care—all at no increased cost to the healthcare system. A two-year, four-site RCT in the Group Health Co-operative of Puget Sound showed similar outcomes at minimal cost.

Both studies published in same year in mainstream psychiatric journals read and respected by mental health researchers, clinicians, and administrators.

CCM for bipolar disorders endorsed by national clinical practice guidelines in USVA, in Canada, listed on US Substance Abuse and Mental Health Services Administration’s prestigious National Registry of Evidence-Based Programs and Practices.

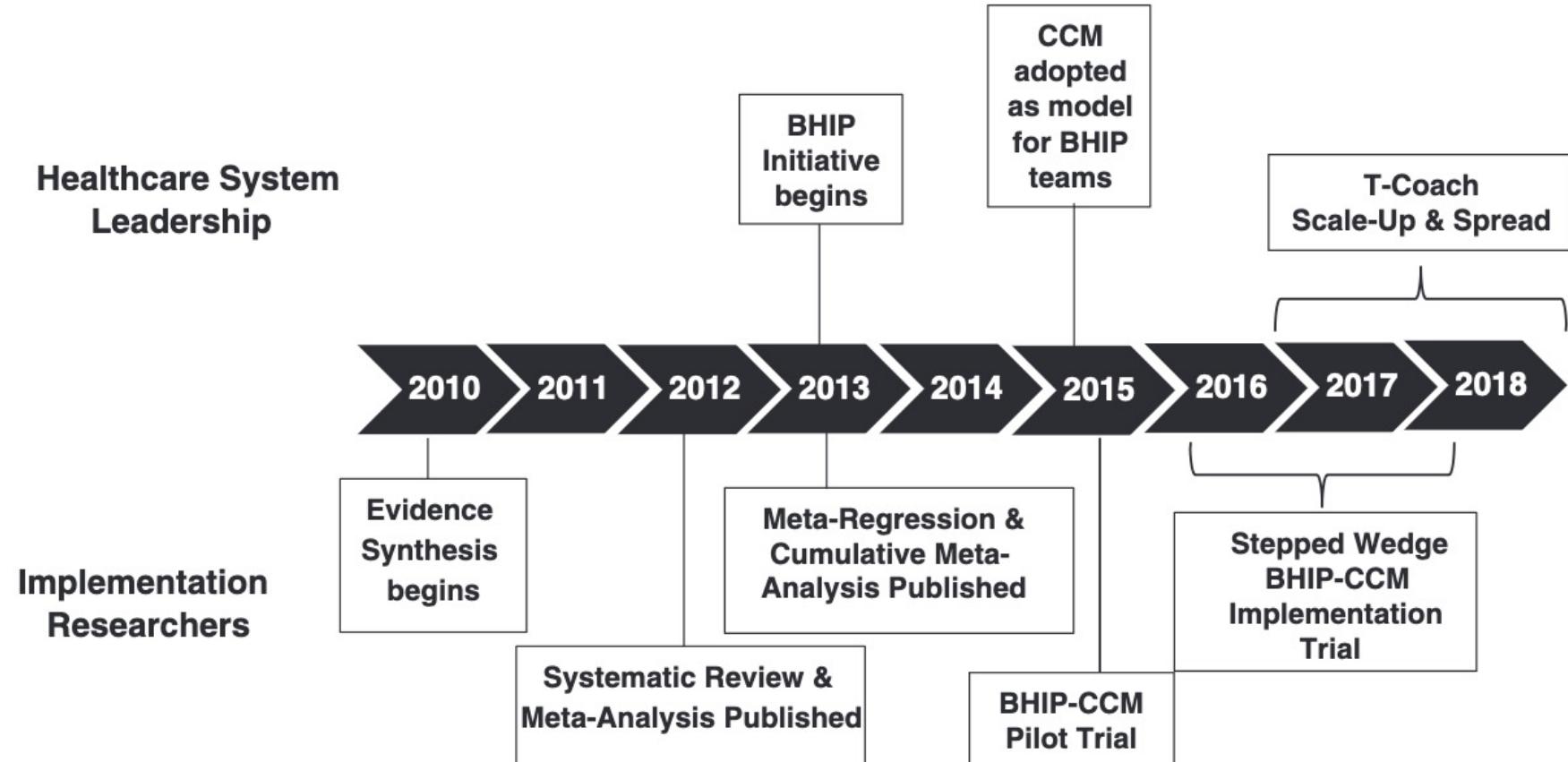
A worthwhile innovation in care? It was a no-brainer: improved outcome at little to no cost.

And yet, within a year of the end of the studies, none of the 15 sites had incorporated the CCM into their usual workflow.”

Bauer MS, Kirchner J. Psychiatry Research
doi.org/10.1016/j.psychres.2019.04.025



Spread in the VA (8 years beginning 2010)



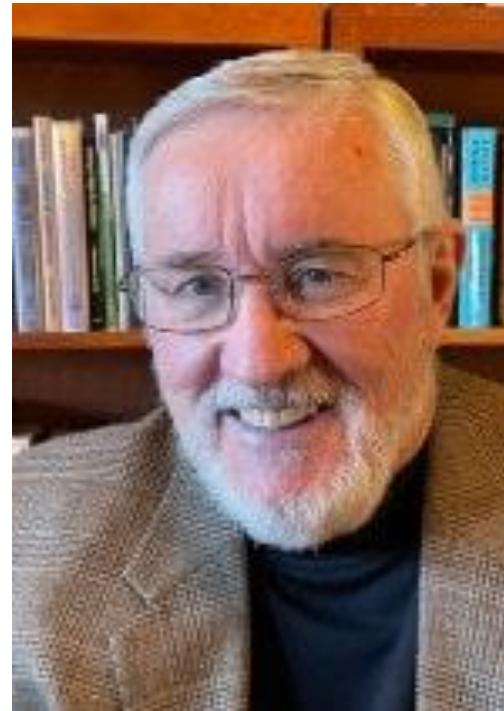
Bauer et al.
Medical Care. Volume 57, October 2019

**“Every system is perfectly designed to achieve
exactly the results it gets”**

Paul Batalden



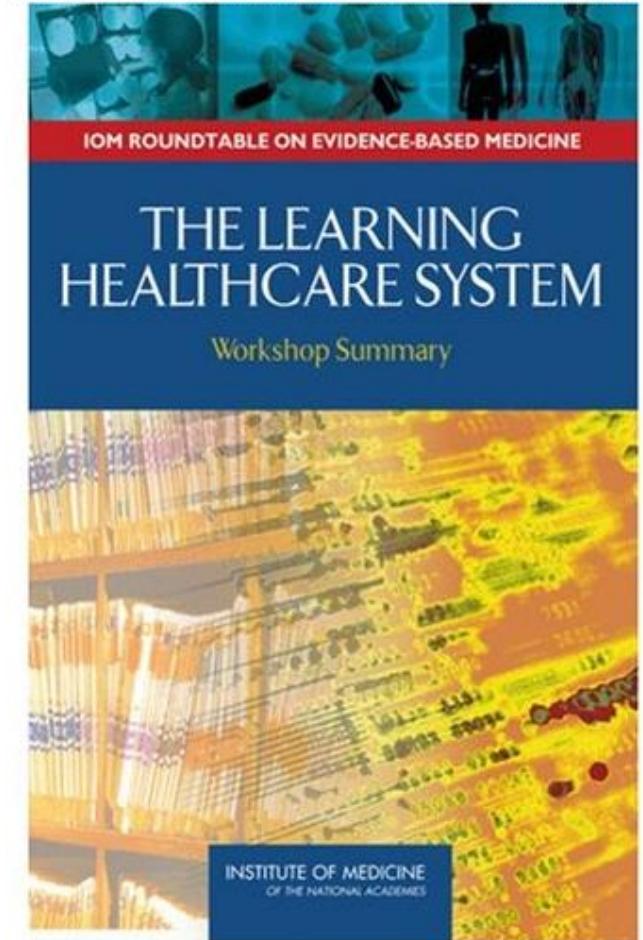
Paul Miles, MD American Board of Pediatrics



“What if your doctor could tell you what you could expect, based on the last thousand patients like you that she saw?”

A Learning Healthcare System

- One system for learning and doing (not separate systems for clinical care and research)
- Data generated at the point of care, aggregated to become knowledge, applied to clinical care
- Relentless iteration toward the best care and best health for individuals and populations



Another example.....

From: XXXX, (Rob)
Sent: Sunday, June 26, 2016 9:58 PM
To: Vinks, Alexander (Sander) <Sander.Vinks@cchmc.org>
Cc: XXXX, Jessica
Subject: pharmacokinetics/dynamics challenge

“ Our son was diagnosed with Crohn’s last year and was started on Remicade. His trough level has frequently been sub-therapeutic. Our sense is there are multiple possible reasons for this but I imagined you would say most of them are avoidable with the right pharmacologic approach. Have you had any experience with Remicade (infliximab) for therapeutic monitoring? ”

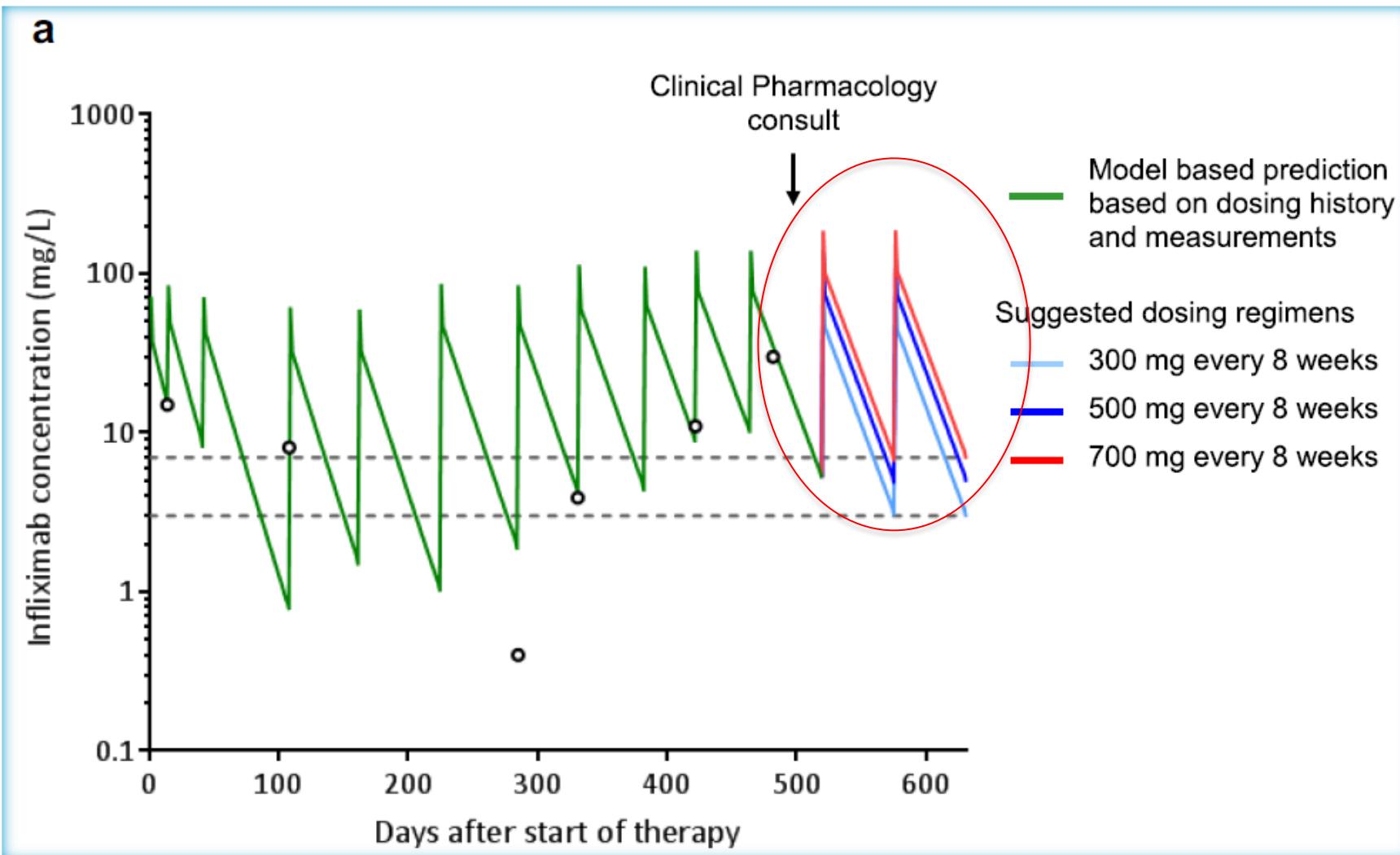
Seems like an area ripe for work given the cost of the drug and the risks of sub-therapeutic levels. We’d be curious about any thoughts you might have — that might help us and potentially the GI approach to Crohn’s. I’d be interested to meet if you think there are some opportunities to explore.”



Date	Remicade Dose	Interval (weeks)	Height (cm)	Weight (kg)	BMI	Alb.	CD64 (low, high)	ESR (<20, 20-40, >40)	Remicade Level (> 10, 5-10, < 5)	Ab's	Sx ¹
2/23/15			141.9	30.1	14.9	2.8		42	-		
3/5/15							1.26				
3/13/15	200	0	143	31.2	15.3	3.2		17	-		
3/27/15	200	2	143.5	33.8	16.4	3.8		8	15	<22	
4/24/15	200	6	144.5	37.4	17.9	3.3		8	-		
6/29/15	200	8	146	38.8	18.2	3.8	0.44	12	8.1	<22	
8/22/15	200	8	147.4	41	18.9	3.9		11	-		
10/24/15	300	8	148	42	19.2	3.7		26	-		
12/23/15	300	8	150	43.2	19.2	3.8		18	<0.4	<22	
2/7/16	400	6	151	43.8	19.2	3.8		27	3.9	<22	
3/30/16	400	6				3.9		24	-		
5/8/16	500	6	154.2	45.9	19.3	3.8	0.42	15	11	<22	
6/19/16	500	6	155	46.4	19.3	3.7		37	-		
7/7/16						3.9		27	30 (not trough)	<22	
8/15/16	500	8				3.5	0.64	27	2.9	<22	
9/9/16									25 (not trough)	<22	
9/25/16	500	6	157.5	47.0	19.0	3.8	0.61	15	7.9	<22	
11/6/16	500	6		47.6	18.6	3.9	0.60	14	8.4	<22	
12/18/16	500	6	158.6	47.9	19.0	3.8	0.67	20	8	<22	
2/6/17			160	46.3	18.1						
3/6/17	500	6				4.0	0.67	27	11	<22	
4/16/17	500	6				3.5	0.65	26	6.1	<22	
5/19/17			163.7	50.3	18.8						
5/28/17 ²	600	6				3.5	2.97 ³	22	6.3	<22	
7/9/17	600	6				3.7	3.30	26	9	<22	

Learning Health Systems as Facilitators of Precision Medicine

Ramsey LB, Mizuno T, Vinks AA, Margolis PA. Learning Health Systems as Facilitators of Precision Medicine. Clin Pharmacol Ther. 2017 Mar;101(3):359-67.



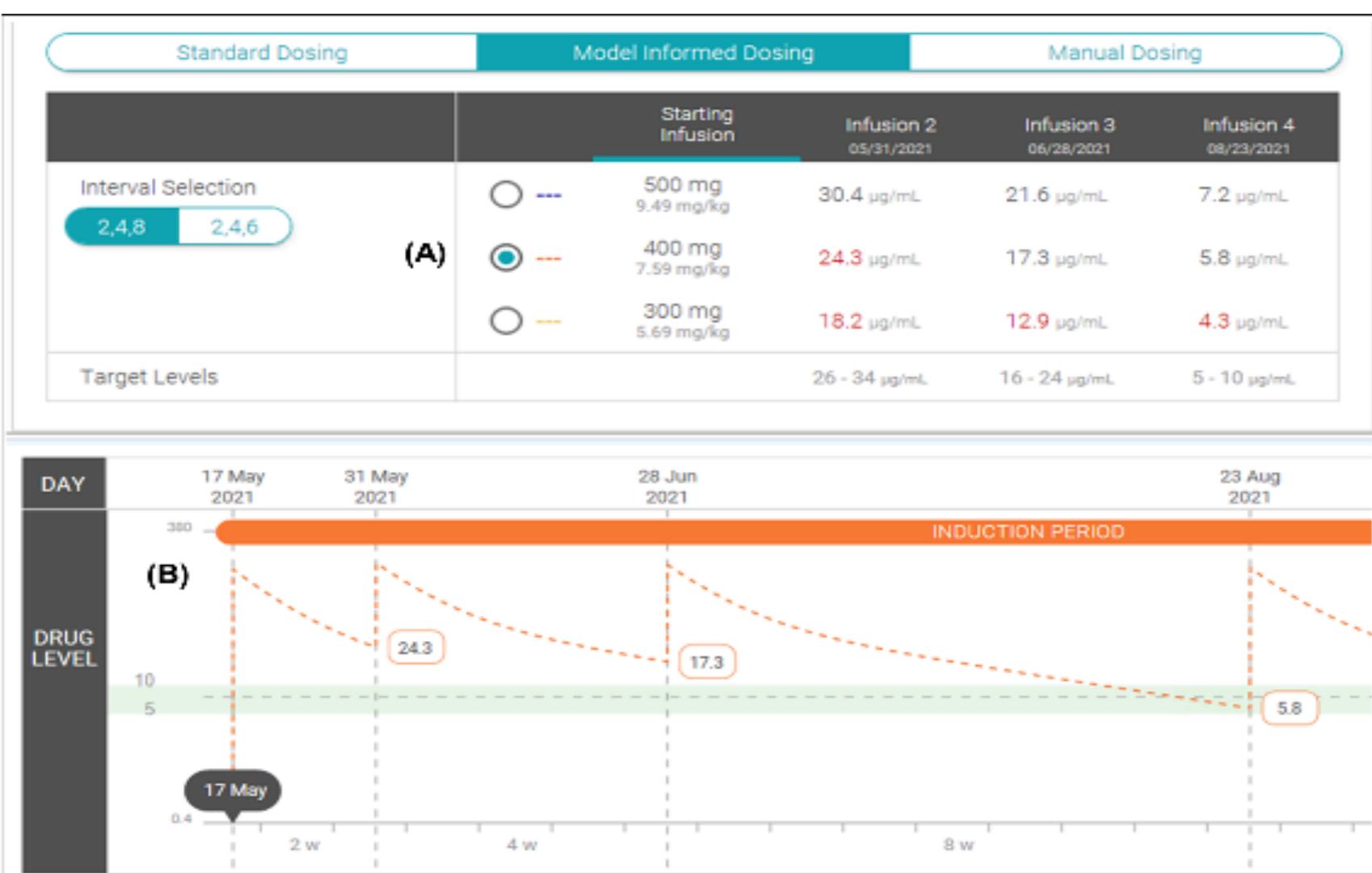


Figure 5. (A) Prior to treatment, the dashboard uses patient specific biomarkers of clearance and weight to display a table of dosing options to target the infusion3 (week6) trough concentration. (B) In the induction wizard, the dashboard will display the predicted concentration over time curve for the first four doses based on the selected regimen.



What if?

...we could create a vastly better chronic care system by harnessing inherent motivation and collective intelligence of patients and clinicians?

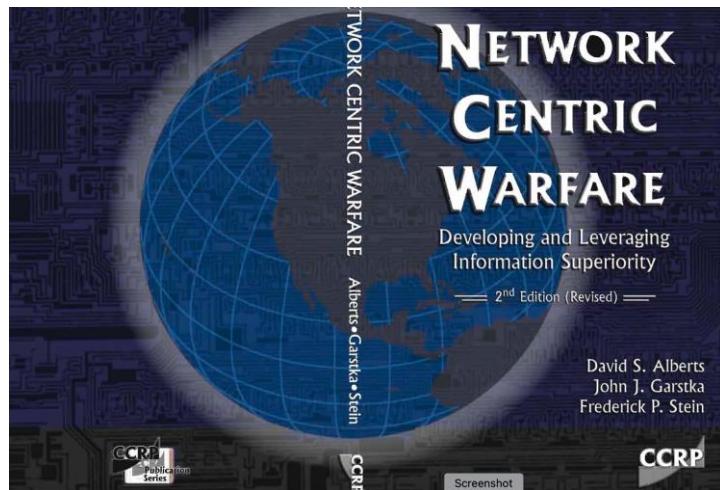
... this system allowed patients and physicians to share information, collaborate to solve problems, use their collective creativity and expertise to act in ways that improve health?



TRANSFORMATIVE
RESEARCH
AWARD

Theory Burst: Actor-Oriented Network Organizations

- **Actors** (hospitals, clinics, patients, clinicians, researchers) with a **shared purpose**, capabilities and **values to self-organize**
- Renewable and expandable **commons** where the actors accumulate and share resources
- **Protocols, processes, and infrastructure** that enable peer-to-peer collaboration



Strat. Mgmt. J., 33: 734–750 (2012)

THE ARCHITECTURE OF COLLABORATION

ØYSTEIN D. FJELDSTAD^{1*} CHARLES C. SNOW,^{2,3} RAYMOND E. MILES,⁴ and CHRISTOPHER LETTL⁵

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⁵ Institute for Entrepreneurship and Innovation, Vienna University of Economics and Business, Vienna, Austria

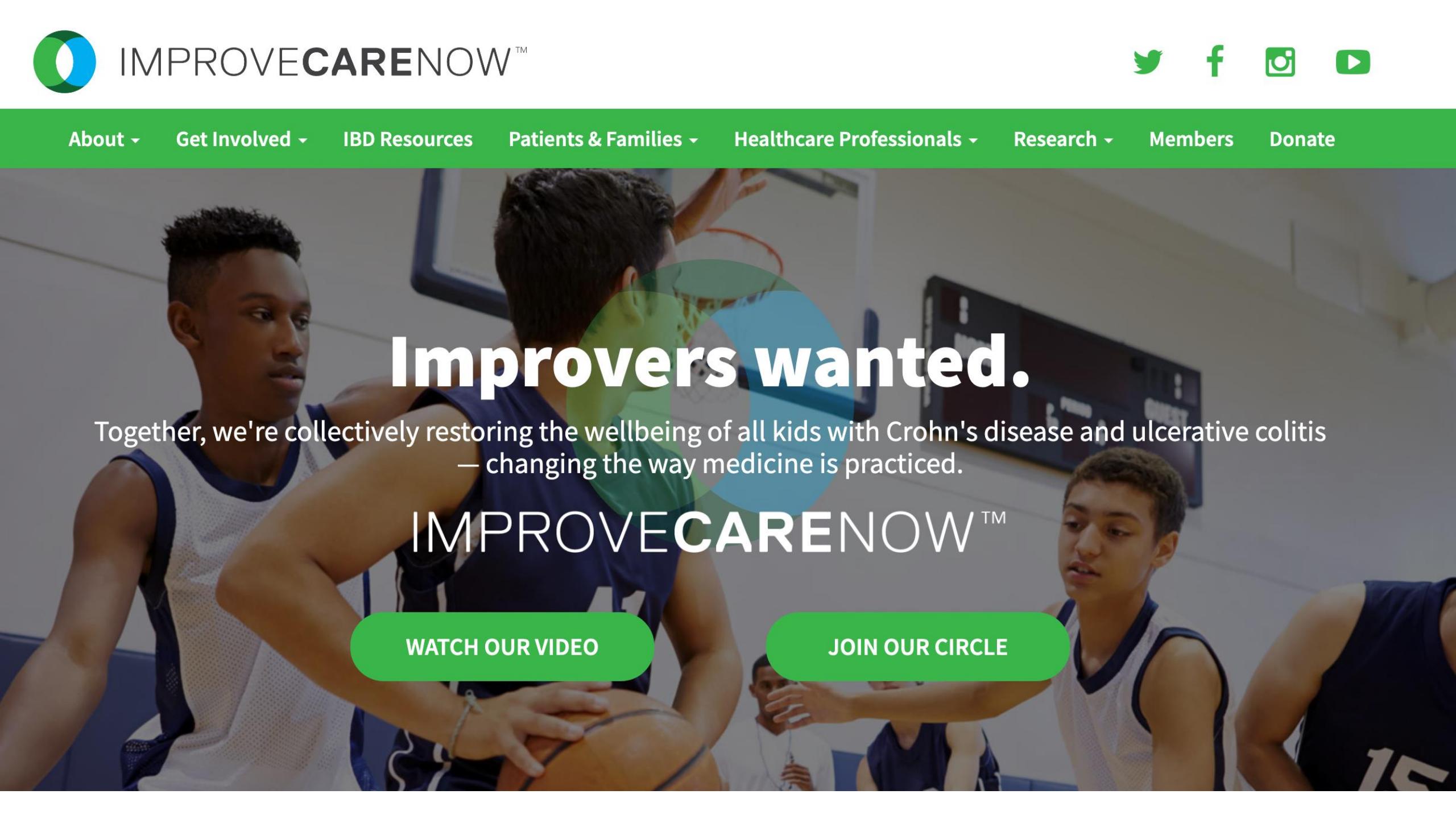


A Learning Healthcare System



Requirements:

1. “link personal and population **data** to researchers and practitioners”
2. “provide **real-time guidance** for superior care in treating and preventing illness”
3. “dramatically **enhance the knowledge base** on effectiveness of interventions”
4. “actions need to be taken by **every stakeholder**”
5. “there is no simple path forward” - must be able to change **large complex systems**

A black and white photograph of several young boys playing basketball in an indoor gymnasium. One boy in a white jersey is in the foreground, looking down at a basketball. Another boy in a dark jersey is behind him, also looking at the ball. A third boy in a white jersey is partially visible on the right. The background shows a basketball hoop and a scoreboard.

Improvers wanted.

Together, we're collectively restoring the wellbeing of all kids with Crohn's disease and ulcerative colitis – changing the way medicine is practiced.

IMPROVE**CARE**NOW™

[WATCH OUR VIDEO](#)[JOIN OUR CIRCLE](#)

ImproveCareNow Network Mission

Transform the health, care and costs for all children and adolescents with Crohn's disease and ulcerative colitis by building a sustainable collaborative chronic care network that enables patients, families, clinicians and researchers to work together in a Learning Health System to accelerate innovation, discovery and the application of new knowledge.





IMPROVE CARE NOW™

MODEL IBD CARE—A GUIDELINE FOR CONSISTENT RELIABLE CARE

Diagnostic and therapeutic interventions that are appropriate and recommended for a very large percentage of children and adolescents with Crohn's disease and ulcerative colitis.¹

TREATMENT WITH ADALIMUMAB:

7. Consider checking a drug trough level just prior to one of the first maintenance doses in weeks 6-12.
8. For patients treated with adalimumab, when disease is active it is recommended that the adalimumab trough level and antibody to adalimumab be measured.
9. The target trough level is generally > 7.5 µg/mL though higher trough levels may be necessary. Higher trough levels are associated with greater healing for perianal fistulizing disease.
10. If the measured trough is below the desired therapeutic range, consider increasing the dose and/or decreasing the interval between injections. If the measured trough is significantly above the desired therapeutic range, consider decreasing the dose and/or increasing the interval between injections if clinically appropriate.
11. In pediatrics, especially in the setting of more severe and/or extensive disease including perianal disease, higher doses and/or shorter intervals between injections are often utilized to optimize response and should be considered.



Link personal and population data to researchers and practitioners

“Data in once”



Screenshot of an Epic electronic medical record (EMR) interface for a patient named Crohnsjr, Richard. The interface shows the patient's demographic information (MRN: 0028007623, DOB: 01/21/1988), visit details (11/16/2011 visit with Colletti, Richard, MD for FOLLOW UP RETURN - test), and clinical notes for the IBD Registry.

IBD Registry

Background Information

Current diagnosis: Crohn's disease, ulcerative colitis, indeterminate colitis

Has the patient had a complete colectomy? (If correct information appears in the sidebar, it is okay to leave this response blank.) Yes No unknown

Does the patient currently have an ileostomy or colostomy? Yes No unknown

Current symptoms

Describe the IBD symptoms on the WORST day in the last 7 days:

General well-being: normal, fair, poor, unknown

Limitations in daily activities: no limitations, occasional, frequent, unknown

Abdominal pain: none, mild, moderate to severe, unknown

Stool characteristics

Describe the stools on the WORST day in the last 7 days:

Total number of stools: 3.0 not available/assessed

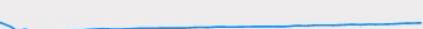
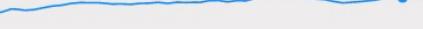
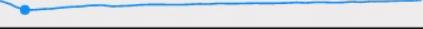
Most stools were: formed, partially formed, watery, unknown

Number of liquid/watery stools per day (if none): 1.0 not available/assessed

Did the patient report bloody stools? Yes No unknown

**Provide real-time guidance for superior
care in treating and preventing illness.**

Center Performance with Sparklines - Entire Network

Measure Category	Measure Sub-Category	Measure	Center Performance (Prior Month)	Network Target	Network Performance (Prior Month)	Gap to Target (Prior Month)	Center Performance Trend
Clinical Measures	Clinical Remission	% Pts Remission	82.3%	83%	82.5%	135	
		% Pts Sustained Clinical Remission	59.5%	60%	59.5%	74	
		% Pts Prednisone Free Remission	81.5%		81.7%		
		% Pts Prednisone Free Remission Crohn's Disease	82.8%		83.0%		
		% Pts Prednisone Free Remission Ulcerative Colitis	79.0%		79.2%		
		% Pts Remission Crohn's Disease	83.4%		83.6%		
		% Pts Remission Crohn's Disease sPCDAI	81.0%		81.0%		
		% Pts Remission Ulcerative Colitis	80.3%		80.5%		
		% Pts Remission Ulcerative Colitis PUCAI	75.1%		75.4%		
		% Pts Sustained Clinical Remission CD Patients	61.1%		61.2%		
		% Pts Sustained Clinical Remission UC Patients	56.4%		56.3%		
	Disease Classification	% Pts Inactive Disease Status	82.3%		82.5%		
		% Pts Mild Disease Status	13.8%		13.8%		
		% Pts Moderate or Severe Disease Status	3.9%		3.7%		
	Growth & Nutrition	% Pts Satisfactory Growth	94.8%		95.0%		
		% Pts Satisfactory Nutrition	91.2%		91.5%		
		% Pts at Risk of Growth Failure	4.0%		3.9%		
		% Pts In Growth Failure	1.2%		1.2%		

Select a Center

All

Drill to QI Chart

Drill to Center Compare Chart

All Other Charts

% Pts Remission - Entire Network



Indicator	2015-Jan	2015-Feb	2015-Mar	2015-Apr	2015-May	2015-Jun	2015-Jul	2015-Aug	2015-Sep	2015-Oct	2015-Nov	2015-Dec	2016-Jan	2016-Feb	2016-Mar	2016-Apr	2016-May	2016-Jun	2016-Jul	2016-Aug
Not Quiescent	2,139	2,209	2,276	2,342	2,307	2,300	2,313	2,345	2,432	2,450	2,405	2,434	2,496	2,550	2,598	2,598	2,583	2,555	2,582	2,670
Quiescent	7,465	7,630	7,726	7,864	8,043	8,249	8,489	8,700	8,866	9,115	9,332	9,511	9,667	9,791	10,032	10,180	10,322	10,553	10,706	10,919
Total	9,604	9,839	10,002	10,206	10,350	10,549	10,802	11,045	11,298	11,565	11,737	11,945	12,163	12,341	12,630	12,778	12,905	13,108	13,288	13,589

< >

Measure Category	Measure Sub-Category	Measure	Site	Network	Network Performance (per Month)	Site Performance Trend
Clinical Measures	Hospitalization	Intra-abdominal surgery			0.1%	
		Was there at least one day?			56.8%	
		Number of hospitalizations			0.7%	
		Hospitalizations 30			78.3%	
	Medication Usage	Off Prednisone			97.4%	
		Off Prednisone Cronotherapy			98.2%	
		Off Prednisone Ulcer			95.8%	
	Data Entry	Actual Visits Recorded			80.5%	
		Disease Classification			67.1%	
		Visits where TPMT is checked with thiopurine is started			43.8%	
		Visits Entered 30 Days				
	Internal	Height, Weight and Blood Pressure				
	Population	Registered Population				
		Visit Last 200 Days				
		Visit Past 13 Month				

Choose a Report X

Center Population

Population Management

Care Stratification Score (CSS)

All Centers Performance

All Measures per Center

All Centers per Measure

Patient Demographics

Select a Center

1/1/2015

11/1/2022

Select a Measure to Drill to QI Chart

All Other Charts

QI Reports: All Centers Performance

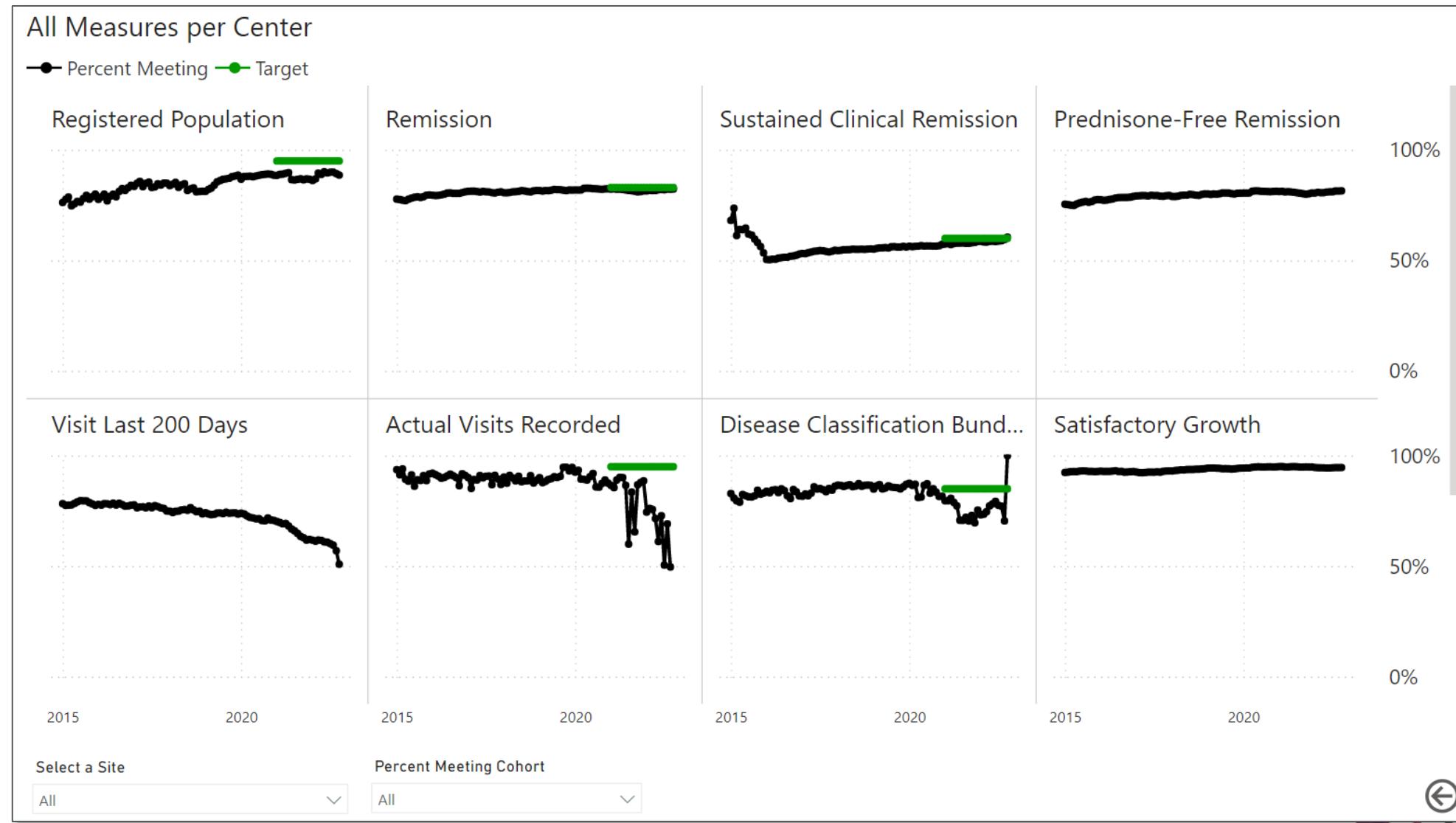
All Centers Performance

Center	Registered Population	Remission	Sustained Clinical Remission	Prednisone-Free Remission	Visit Last 200 Days	Disease Classification Bundle	Satisfactory Growth	Satisfactory Nutrition
American Family Childrens	99.3%	78.0%	56.3%	78.0%	65.9%		97.9%	94.9%
Arkansas Children's	100.0%	78.6%	61.5%	77.9%	50.8%		94.3%	89.1%
Arnold Palmer	87.8%	85.4%	63.9%	84.0%	51.3%		95.6%	91.9%
Atlanta Egleston/Emory	100.3%	86.7%	65.7%	85.5%	75.9%		97.3%	95.6%
Atlanta Scottish Rite	98.9%	80.4%	59.6%	79.9%	62.1%		97.3%	93.0%
Barbara Bush Children's	75.8%	83.6%	53.9%	82.9%	70.1%		97.7%	94.6%
Bon Secours St. Mary's	83.8%	81.8%	64.7%	81.8%	2.8%		92.3%	90.9%
Boston Children's	84.1%	86.1%	64.0%	84.0%	29.2%		94.2%	94.1%
Bronson Children's	71.9%	84.4%	62.1%	84.4%	67.5%		96.6%	86.1%
Cardinal Glennon	94.3%	77.5%	61.0%	74.6%	50.8%		95.7%	89.8%
Carilion Children's	99.1%	78.4%	50.0%	78.4%	57.4%		96.8%	93.3%
CCHMC	96.1%	83.8%	67.9%	83.6%	56.2%		96.8%	97.5%
Children's Alabama	109.7%	79.7%	54.8%	79.0%	26.9%		96.0%	89.8%
Children's Colorado	67.1%	82.9%	59.2%	80.6%	53.6%		98.7%	94.2%
Children's Dartmouth	96.4%	85.8%	59.4%	85.8%	77.5%		95.3%	90.8%
Children's Erlanger	78.4%	85.9%	58.7%	85.9%	69.8%		92.3%	88.5%
Children's Hospital LA	102.3%	91.9%	78.3%	89.2%	12.5%		95.2%	96.7%
Childrens Illinois Peoria	79.2%	84.2%	66.7%	81.6%	71.6%		100.0%	86.0%
Children's Mercy	122.4%	83.4%	70.8%	83.2%	69.3%		97.3%	92.7%
Children's Montefiore	88.0%	88.9%	75.0%	88.9%	32.9%		97.4%	80.0%
Children's National	83.1%	72.9%	55.7%	72.9%	36.5%		90.0%	83.5%
Children's New Orleans	93.7%	73.9%	30.4%	73.9%	90.5%		85.6%	86.1%
Children's Omaha	90.7%	93.0%	73.7%	90.2%	70.8%		96.3%	90.8%
Children's Richmond VCU	67.1%	77.0%	62.9%	75.7%	27.6%		94.6%	97.3%
Children's Vanderbilt	101.6%	77.1%	49.2%	76.0%	72.7%		92.3%	88.2%
CHOC	107.5%	79.6%	59.6%	77.7%	25.1%		90.4%	81.6%
CHOP	74.6%	82.7%	62.2%	82.7%	19.5%		95.0%	89.3%
Cook Children's	58.3%	84.6%	64.3%	73.1%	31.7%		100.0%	96.8%
Cottage Children's					0.0%			
Dayton Children's	99.6%	82.8%	51.4%	80.8%	88.6%		98.4%	85.0%
Dell	63.2%	91.2%	44.3%	90.4%	71.1%		90.7%	86.8%

Select a Site Percent Meeting Cohort Report Date Filter Year-Month

All All Show Current Month Only All

QI Reports: Center-Specific Measures



Pre-visit Care Planning

Select Lab

6MMPN	Serum
6TGN	Stool
Antibody/trough	TPMT
Inflammatory	

Labs

Lab Name	8/5/2021	8/25/2021	10/4/2021	12/30/2021	2/3/2022
Adalimumab Trough Level		22.43			
Albumin	2.70		3.00		
CRP	0.92	2.03	3.27	3.27	
Entyvio Trough Level					
ESR	35.00	52.00	76.00	59.00	
Fecal Calprotectin					
Hematocrit	34.60	32.10	33.10	32.00	

Result by Date

LabName ● Adalimumab Trou... ● Albumin ● CRP ● Entyvio Trough ... ● ESR ● Fecal Calpro... ● Hematocrit

Result Date	Adalimumab Trough Level	Albumin	CRP	Entyvio Trough Level	ESR	Fecal Calprotectin	Hematocrit
Sep 2021	22.43	2.70	0.92		34.60	35.00	34.60
Oct 2021		2.03	2.03	52.00	52.00	32.10	32.10
Dec 2021	76.00	3.00	3.27	76.00	59.00	33.10	33.10
Jan 2022		3.27	3.27		59.00	30.00	32.00
Mar 2022		3.10	3.10		63.00	33.80	31.80
May 2022		2.81	2.81			45.00	45.00
Jul 2022		3.00	3.00			31.80	31.80

PGA, SPCDAI, PUCAI

Date	PGA	PGA Score	SPCDAI	PUCAI
7/1/2022	Mild	1	20	
5/17/2022	Moderate	2	20	
3/11/2022	Moderate	2	50	
2/3/2022	Moderate	2	10	
12/30/2021	Mild	1	25	
10/4/2021	Moderate	2	30	
8/5/2021	Quiescent	0	0	
4/8/2021	Quiescent	0	0	
10/29/2020	Quiescent	0	0	
6/4/2020	Quiescent	0	0	
11/7/2019	Quiescent	0	0	

SPCDAI, PUCAI and PGA by Date

● SPCDAI ● PUCAI ● PGA

Date	SPCDAI	PUCAI	PGA
Jan 2019	30	2	2
Feb 2019	5	1	1
Mar 2019	30	30	30
Apr 2019	0	0	0
May 2019	10	1	1
Jun 2019	0	0	0
Jul 2019	0	0	0
Aug 2019	0	0	0
Sep 2019	0	0	0
Oct 2019	0	0	0
Nov 2019	0	0	0
Dec 2019	0	0	0
Jan 2020	0	0	0
Feb 2020	0	0	0
Mar 2020	0	0	0
Apr 2020	0	0	0
May 2020	0	0	0
Jun 2020	0	0	0
Jul 2020	0	0	0
Aug 2020	0	0	0
Sep 2020	0	0	0
Oct 2020	0	0	0
Nov 2020	0	0	0
Dec 2020	0	0	0
Jan 2021	0	0	0
Feb 2021	0	0	0
Mar 2021	0	0	0
Apr 2021	0	0	0
May 2021	0	0	0
Jun 2021	0	0	0
Jul 2021	0	0	0
Aug 2021	0	0	0
Sep 2021	0	0	0
Oct 2021	0	0	0
Nov 2021	0	0	0
Dec 2021	0	0	0
Jan 2022	0	0	0
Feb 2022	0	0	0
Mar 2022	0	0	0
Apr 2022	0	0	0
May 2022	0	0	0
Jun 2022	0	0	0
Jul 2022	0	0	0

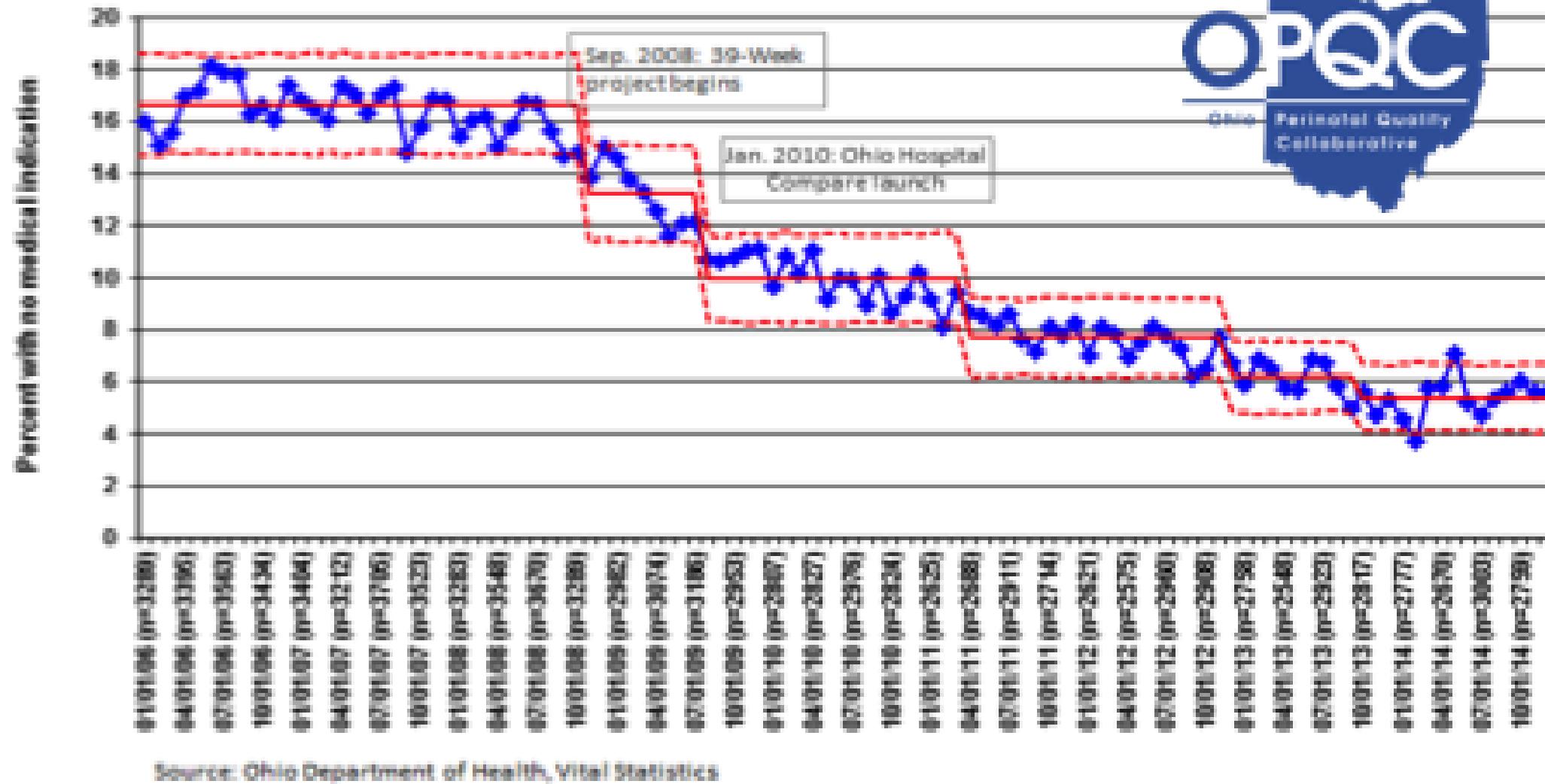
Improved Disease Activity Score

Ohio Perinatal Quality Collaborative: Elective Pre-term Delivery

Births induced at 37-38 weeks with no apparent medical indication for early delivery,

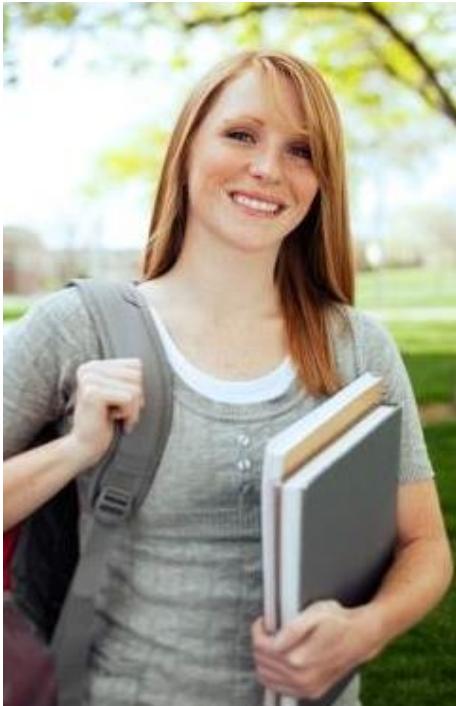
by month, 2006-2014

Aggregate of Ohio maternity hospitals



Actions need to be taken by every stakeholder

“Bianca Simmons”, age 20



- People want to cooperate and to make a difference
- Systems can be designed to allow this

Goals

- Keep symptoms at bay
- Be a leader in the IBD community



+

the ostomy toolkit



PEDIATRICS[®]

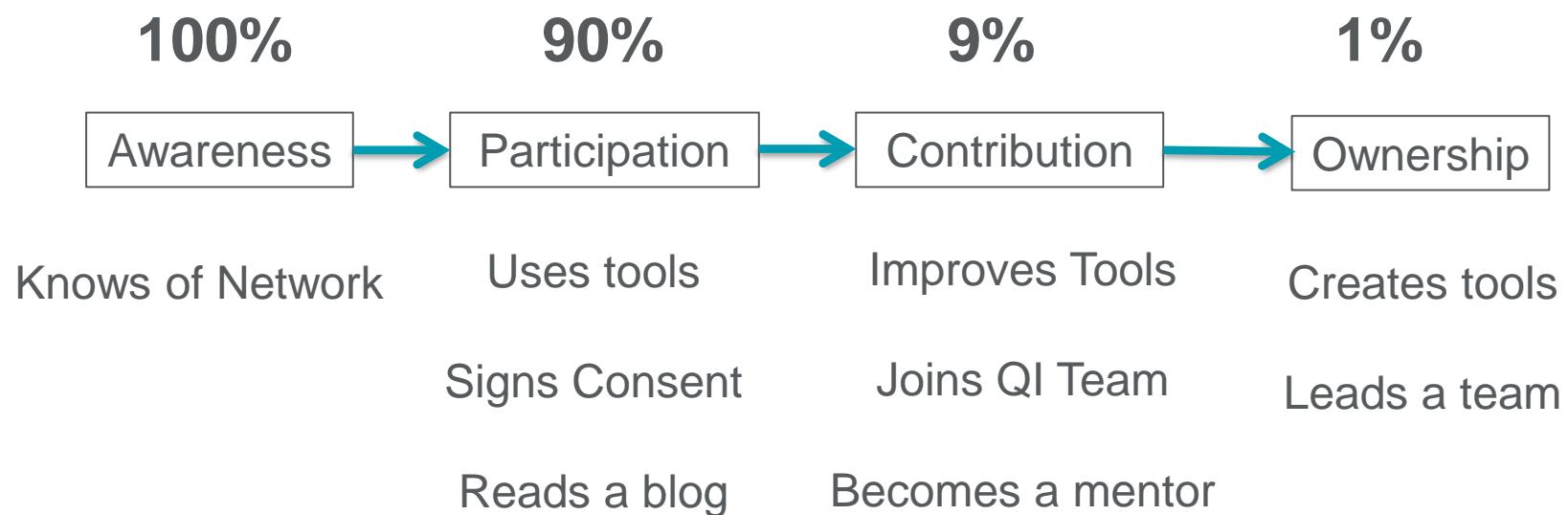
OFFICIAL JOURNAL OF THE AMERICAN ACADEMY OF PEDIATRICS

“A Guide to Gutsy Living”: Patient-Driven Development of a Pediatric Ostomy Toolkit

Jennie G. David, MS,^a Alexander Jofriet, BS,^b Michael Seid, PhD,^c Peter A. Margolis, MD, PhD,^c
for the ImproveCareNow Pediatric IBD Learning Health System



“actions need to be taken by every stakeholder”



An Educator





Cincinnati
Children'sTM
the outcome together

Tools

In the ImproveCareNow Network, there is a saying "to share seamlessly and steal shamelessly". It is understood that when clinicians, researchers, patients and families work collaboratively - sharing what has been learned and developed - improvements in care and health for kids living with IBD can be accelerated. The resources shared on our site demonstrate a commitment to share what has been learned and developed by parents and patients so that others living with IBD can enjoy the benefit of this collective wisdom and experience.

This information does not constitute medical advice and is not intended to be a substitute for professional medical advice, diagnosis, or treatment. The full [disclaimer](#) applies to the tools and documents posted on this page.



Co-Design of Resources

Learning Health Systems

[Open Access](#)

EXPERIENCE REPORT | [Open Access](#) |

Sustainable generation of patient-led resources in a learning health system

Jennie David , Catalina Berenblum Tobi, Samantha Kennedy, Alexander Jofriet, Madeleine Huwe, Rosa Kelekian, Melissa Neihart, Michelle Spotts, Michael Seid, Peter Margolis ... [See all authors](#)

First published: 12 February 2021 | <https://doi.org/10.1002/lrh2.10260>

Funding information: National Institute of Diabetes and Digestive and Kidney Diseases; Patient-Centered Outcomes Research Institute

<https://onlinelibrary.wiley.com/doi/full/10.1002/lrh2.10260>

**Dramatically enhance the knowledge base
on effectiveness of interventions**



HYPOPLASTIC LEFT HEART SYNDROME (“HALF A HEART”)



In 2008, the mortality rate during the 4 month period between the 1st and 2nd surgeries was 10-15%.

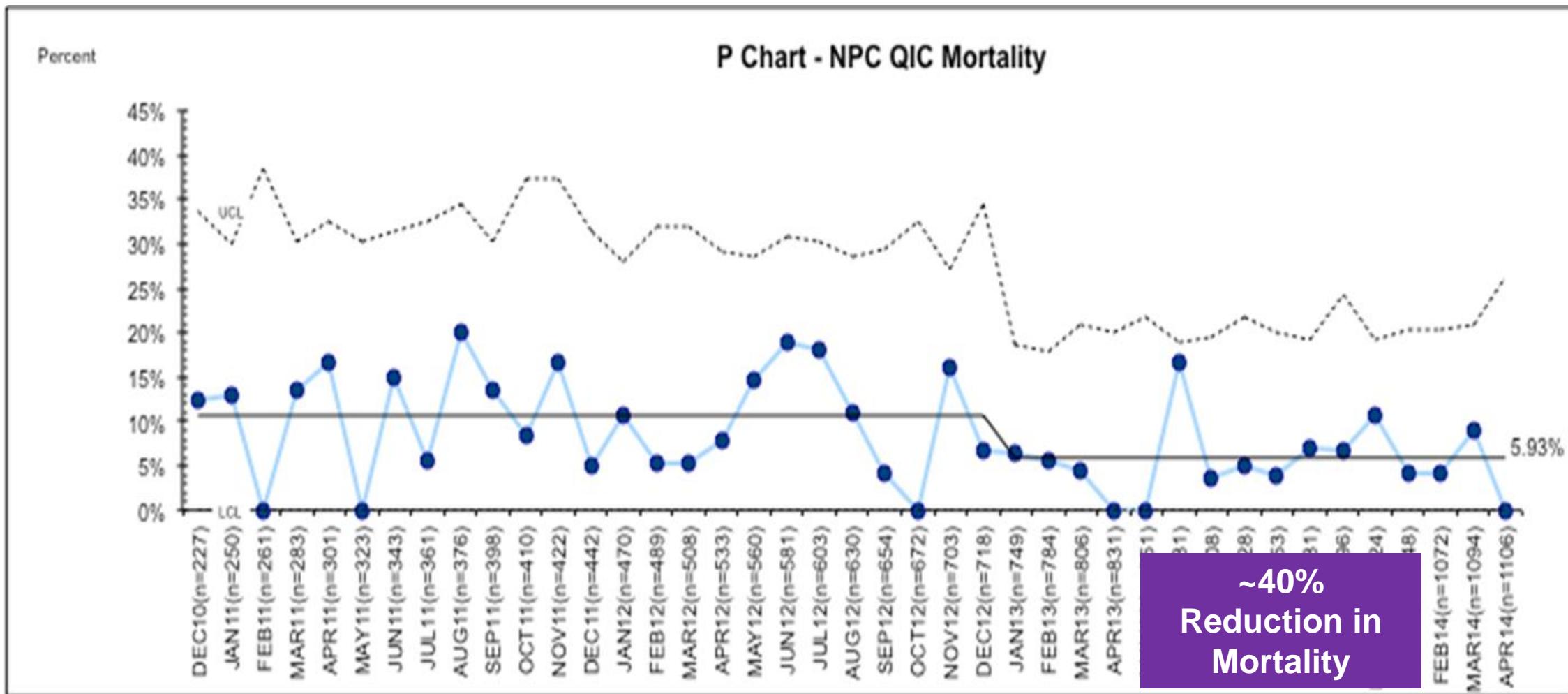
Underdeveloped
left ventricle

NATIONAL PEDIATRIC CARDIOLOGY QUALITY IMPROVEMENT COLLABORATIVE

Sisters
••• by Heart™



INTER-STAGE MORTALITY



Anderson et al. Circ Qual and Outcomes. 2015;8:428-436



Cincinnati
Children's™
changing the outcome together

OBSERVATIONAL RESEARCH

For infants in the NPC-QIC registry, digoxin use after 1st surgery was significantly associated with decreased mortality

Brown D, Mangeot C, Anderson J, Peterson L, King E, Lihn S, Neish S, Beekman R, Lannon C. *Digoxin use at discharge is associated with reduced interstage mortality after Stage I Palliation for single ventricle heart disease.*
American College of Cardiology Scientific Session & Expo,
March 14-16, 2015. San Diego, CA.



David Brown

OBSERVATIONAL RESEARCH

Digoxin and Inter-stage Mortality

Mortality	Without digoxin	With digoxin	P-value
NPC-QIC	10% (44/438)	1.7% (2/121)	0.003
PHN (SVR)	12.3% (28/228)	2.9% (3/102)	0.02



DIGOXIN USE IN NPC-QIC

Percent without an Arrhythmia Discharged on Digoxin

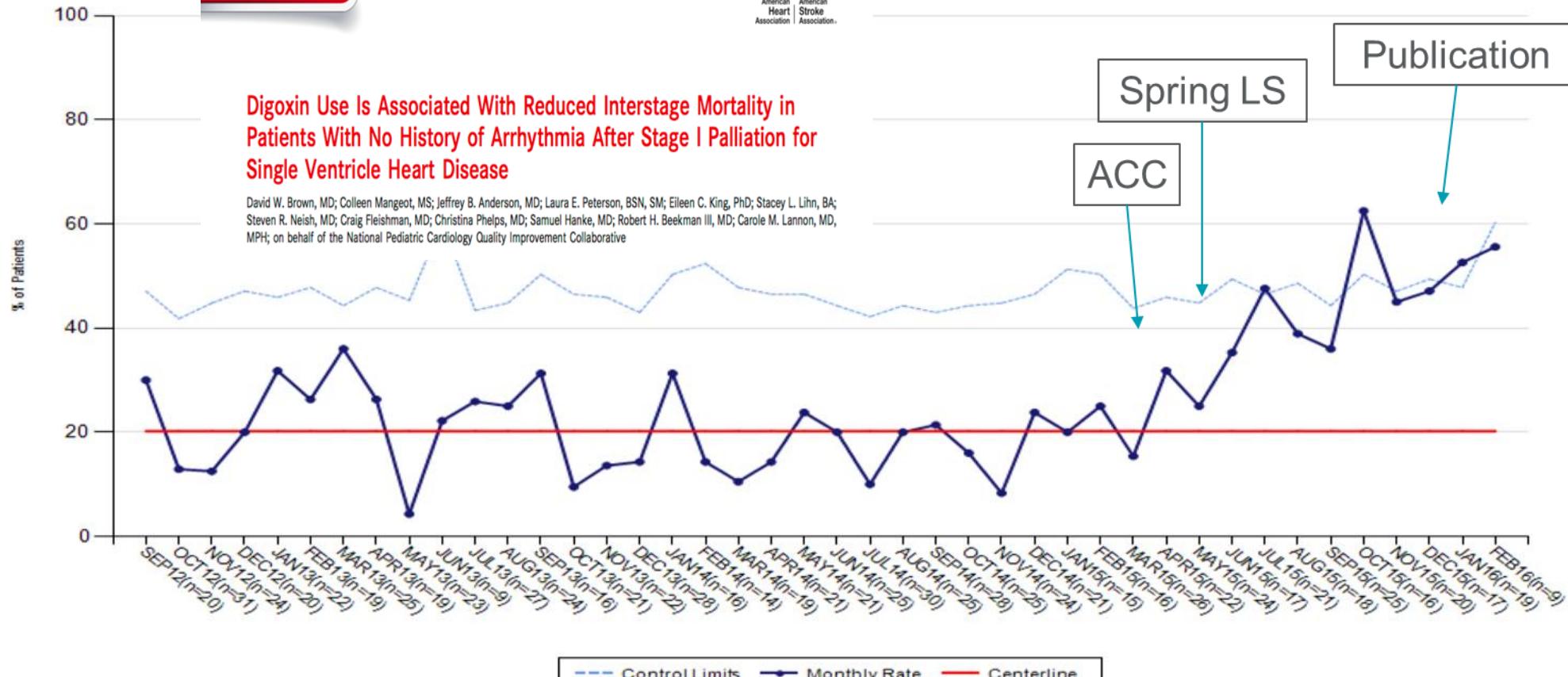
Patients without a history of arrhythmia at Stage 1 Palliation discharge who are discharged on digoxin.

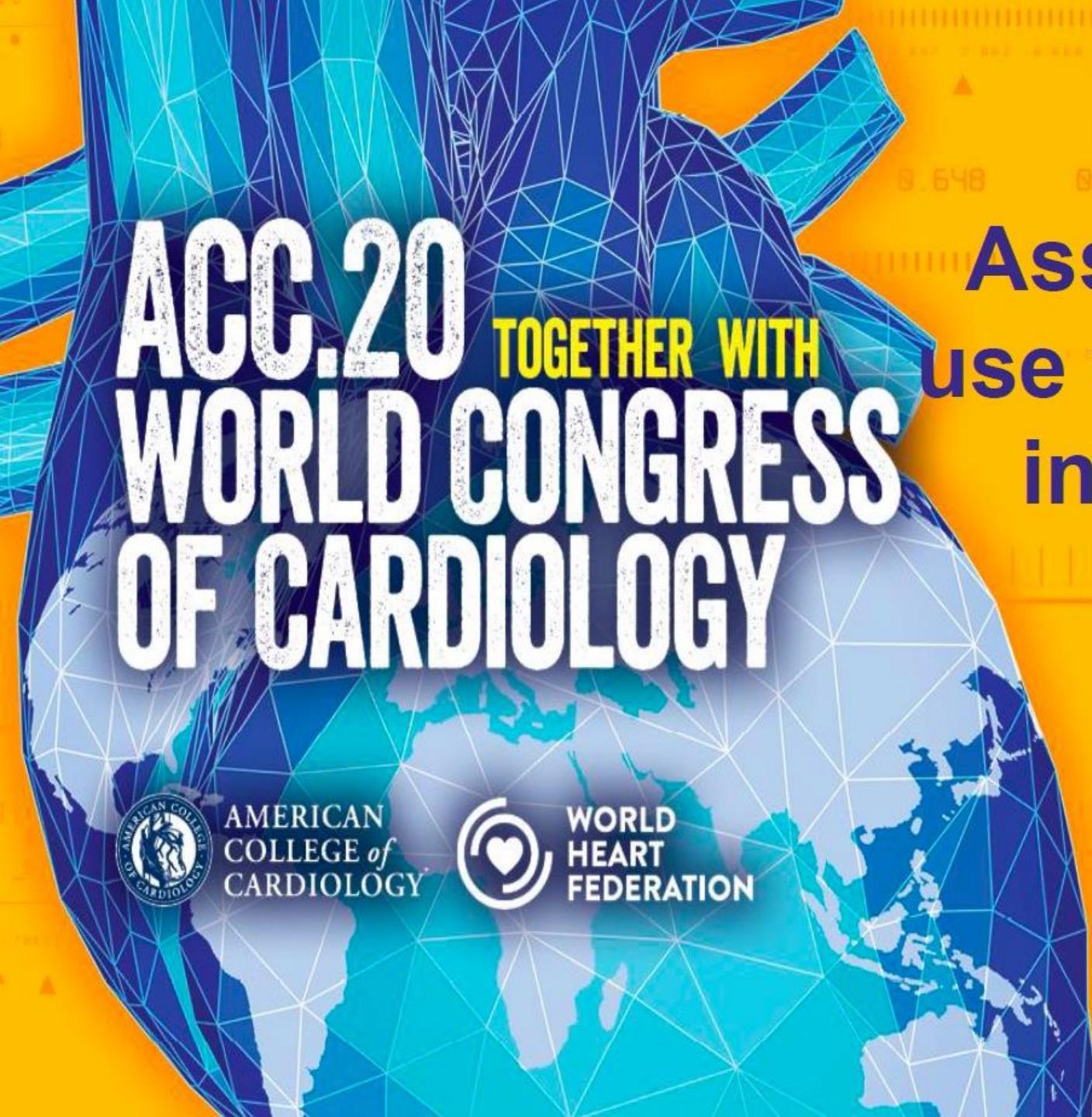
ORIGINAL RESEARCH



Digoxin Use Is Associated With Reduced Interstage Mortality in Patients With No History of Arrhythmia After Stage I Palliation for Single Ventricle Heart Disease

David W. Brown, MD; Colleen Mangeot, MS; Jeffrey B. Anderson, MD; Laura E. Peterson, BSN, SM; Eileen C. King, PhD; Stacey L. Lihn, BA; Steven R. Neish, MD; Craig Fleishman, MD; Christina Phelps, MD; Samuel Hanke, MD; Robert H. Beekman III, MD; Carole M. Lannon, MD, MPH; on behalf of the National Pediatric Cardiology Quality Improvement Collaborative





ACC.20 TOGETHER WITH WORLD CONGRESS OF CARDIOLOGY



AMERICAN
COLLEGE *of*
CARDIOLOGY



WORLD
HEART
FEDERATION

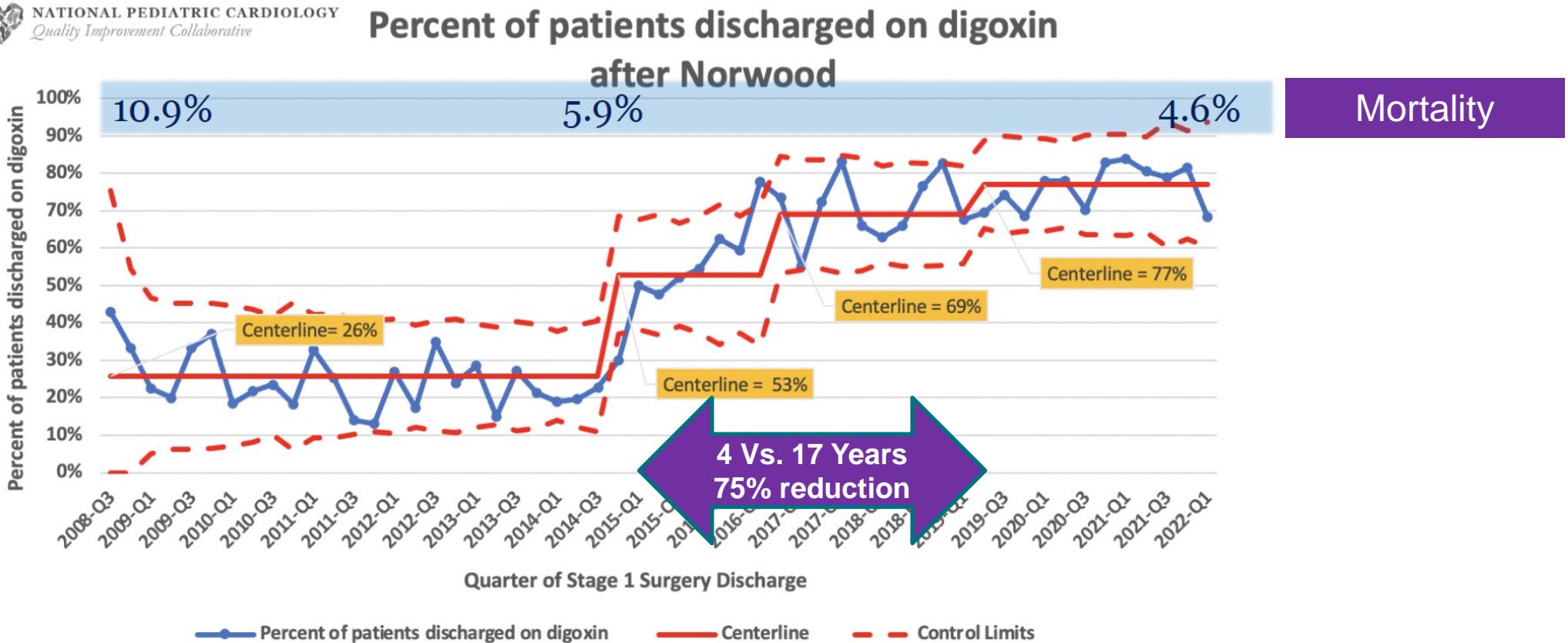
Association of digoxin use with transplant-free interstage survival: A risk-based analysis

Tyler N. Brown, MD

Pediatric Cardiology Clinical Fellow

Cincinnati Children's Hospital Medical Center

Tyler.brown@cchmc.org



Learning network presentation



Initial papers and confirmatory papers

In March 2016, a total of 164 healthcare professionals, parents, and patients ranked these 22 research topics, based on what they believed would result in the greatest improvement in health and well-being for pediatric IBD patients.

1	Do the effects of dual therapy differ for patients who start both treatments at the same time versus those who start biologics then step-up to dual therapy?
2	What are the characteristics (i.e. IBD phenotype and patient demographics, treatment course) of children who are unable to achieve remission within the first two years of being diagnosed?
3	What are the IBD and patient characteristics that should influence decision-making on the most effective treatments?
4	Compare the effectiveness of biologic agents (e.g., Infliximab, adalimumab) vs. enteral feeds to decrease inflammation
5	What is the comparative effectiveness of enteral therapy versus medications for treatment of IBD?

Background

- ▶ Anti-TNF is the most effective treatment for pediatric Crohn's disease
 - ▶ Don't work for every patient
 - ▶ Don't work forever
 - ▶ Real safety concerns
- ▶ Can combination therapy with a 2nd immune suppressant improve response rate and prolong duration of response?
 - ▶ With acceptable level of side effects

COMBINE Trial Specific Aim

Among anti-TNF naïve patients, is combining two drugs (an anti-TNF plus methotrexate) more effective than anti-TNF therapy alone in:

- 1. Inducing and maintaining long-term (2 year) steroid-free remission?*
- 2. Improving Patient Reported Outcomes?*

Pragmatic Trial in a Learning Health Network

- ▶ Internal validity: Randomized, double-blind, placebo-controlled trial
- ▶ External validity: Study participants were not just “like our patients”—they **were our patients**
- ▶ Primary outcome: reflects ways that we judge treatment success/failure for our patients

Largest pediatric IBD trial ever conducted (300 patients)

93% 1-year follow up

Most diverse population ever studied

CLINICAL - ALIMENTARY TRACT | ARTICLES IN PRESS

[Purchase](#)

SU

Comparative Effectiveness of Anti-TNF in Combination with Low Dose Methotrexate vs Anti-TNF Monotherapy in Pediatric Crohn's Disease: a Pragmatic Randomized Trial

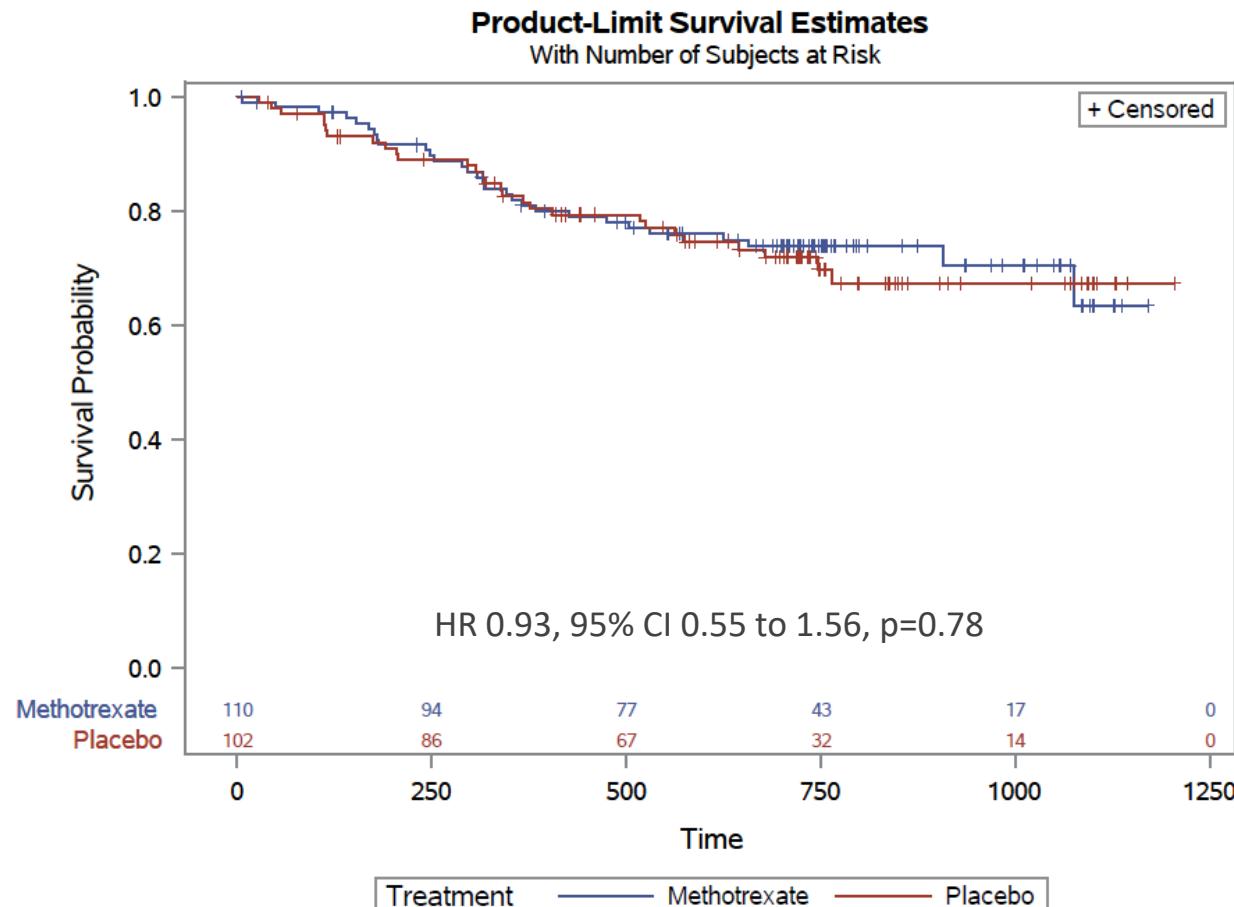
Michael D. Kappelman  • David A. Wohl • Hans H. Herfarth • ... Morris Weinberger • Shehzad A. Saeed * •

Athos Bousvaros * • Show all authors • Show footnotes

Published **March 31, 2023** • DOI: <https://doi.org/10.1053/j.gastro.2023.03.224>

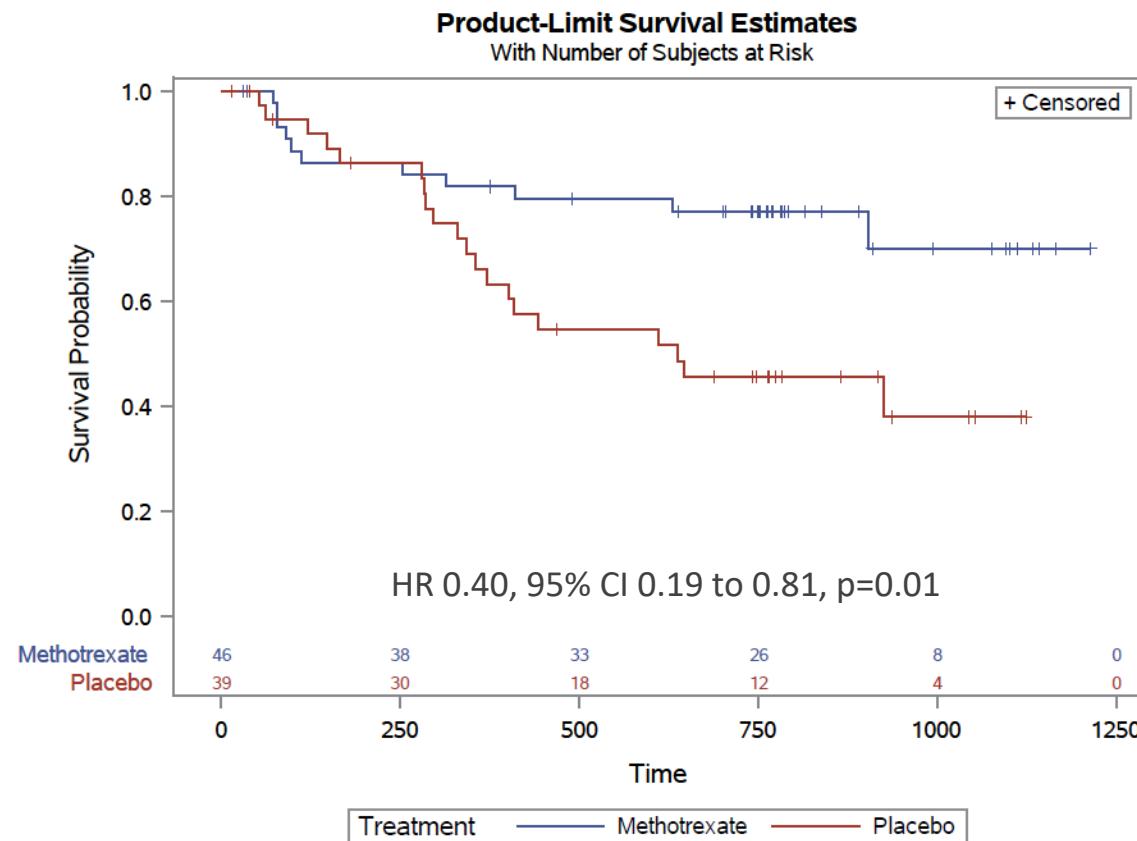
Results

Infliximab + methotrexate = infliximab monotherapy



Results

Adalimumab + methotrexate outperforms adalimumab alone



Reasonable safety profile

Table 4. Summary of Adverse Events (at Participant Level)

Event	All Patients (n=297)		Combination Therapy (Active) (n=156)		Monotherapy (Placebo) (n=141)	
	n	%	n	%	n	%
Adverse Event	214	70%	118	73%	96	67%
Serious Adverse Event	40	13%	18	11%	22	15%
Related Adverse Event						
Possibly Related	113	37%	68	42%	45	31%
Definitely Related	9	3%	6	4%	3	2%
Possibly or Definitely Related	115	38%	69	43%	46	32%

Potential ICN Recommendations

- ▶ Recommend monotherapy for infliximab and combination therapy strongly for all adalimumab?
- ▶ Recommend monotherapy for infliximab and combination therapy for adalimumab in conjunction with shared decision-making?
- ▶ Recommend monotherapy (with or without more frequent drug monitoring and more aggressive dosing) while awaiting further studies?

Co-designed Research and Implementation

Co-I's preparing for community- wide presentation on April 26, 2023

Medical
Student
Patient

Project
manager
Patient

QI
Implementation

I was seeing a patient today for presumed disease flare -on Remicade + MTX for 4 plus years and mother said-“Dr Saeed I wanted to talk about this new study that got published which showed that Remicade with MTX was not effective-do we want to stop the methotrexate?”

She read it thru our ICN social media channels....! April 20, 2023

QI
Implementation

Rana Ammoury

GI
Physicians

Network infrastructure fuels a portfolio of activities

► Technology Infrastructure

- ▶ Direct upload of 70% of data from EHR
- ▶ Real-time comparative performance data
- ▶ Community knowledge sharing hub

► Continuous Improvement Pathway

- ▶ Registry implementation and QI training
- ▶ Chronic care management to achieve clinical remission
- ▶ Advanced chronic care management to achieve sustained remission

► Innovation communities (“Trailblazers”)

- ▶ Therapeutic Drug Monitoring
- ▶ Auto-immune Liver Disease
- ▶ Adherence
- ▶ COVID Response
- ▶ Clinical Research Optimization
- ▶ Health Disparities
- ▶ Payment models
- ▶ Engagement Campaign

► Research

- ▶ 30 investigator-initiated projects
- ▶ Network-wide Federal, Foundation and Industry-sponsored observational and intervention research

Distinguishing Features of Learning Health Networks



HEALTHIER
TOGETHER

1. *Unrelenting focus on outcomes*
2. *Engaged community of people with culture and values to contribute and participate* (generosity, respect, curiosity)
3. *Shared platform/infrastructure of technology, policies, processes and incentives* so that people can find what is needed, when it's needed, to make decisions and act in ways that improve health
4. *Rapid learning system* – scientific methods and data to support rapid, real-world learning and evidence generation

Existing Networks

1. Hospital Safety (Solutions for Patient Safety)
2. IBD (ImproveCareNow)
3. Kidney Transplant (Improving Renal Outcomes Collaborative)
4. Ohio Perinatal Quality Collaborative
5. Asthma Learning Health System
6. Hypo-plastic left heart syndrome (National Pediatric Cardiology Quality Improvement Collaborative)
7. Fontan Outcomes Network
8. Community Health (All Children Thrive Cincinnati)
9. Congestive heart failure (ACTION)
10. Hospital cardiac care (PAC 3 and 4)
11. Cystic Fibrosis Learning Health Network
12. Autism Learning Health Network
13. Epilepsy Learning Health Network
14. Pancreatic Cancer (Canopy Cancer Collective)
15. Pediatric rheumatology collaborative improvement network (PR-COIN)
16. Sickle Cell Network
17. Bipolar Disorder (life span) - starting

Prospective Networks

- Adult kidney transplant
- Posterior urethral valves (pediatric)*
- Adult safety
- Cancer
 - Bone marrow transplant (life span)*
 - Oncology survivorship (life span)*
 - BRCA Breast Cancer
 - Multiple myeloma
 - Colon cancer
- Mental/behavioral health
 - Anxiety disorders
 - ADHD
 - Depression
- Cross-cutting networks
 - Equity
 - Adherence
 - Emotional health and resilience
- Public Health Preparedness
- Trach dependent children

BEFORE LEARNING HEALTH NETWORKS

Seventeen years from evidence to application in practice

Widespread disparities in practice

Inefficiencies slow study completion, which prevent approval for treatments, therapies, tests, and devices.

Physicians lack the data to tell their patients what to expect based on the last 1,000 patients like them.

Patients and families are not involved in deciding research priorities.

The old model cannot keep up with the explosion of new evidence and technology.

AFTER LEARNING HEALTH NETWORKS

Less than three years to design and diffuse new evidence

Reliable implementation of evidence and best practices across hundreds of hospitals that ordinarily compete

Organized clinical research communities used real-world data needed to achieve FDA approval of a life-saving device.

Large patient registries with real-time data shared transparently across hundreds of health care organizations.

Patient-designed educational tools and videos; patient-driven research priorities

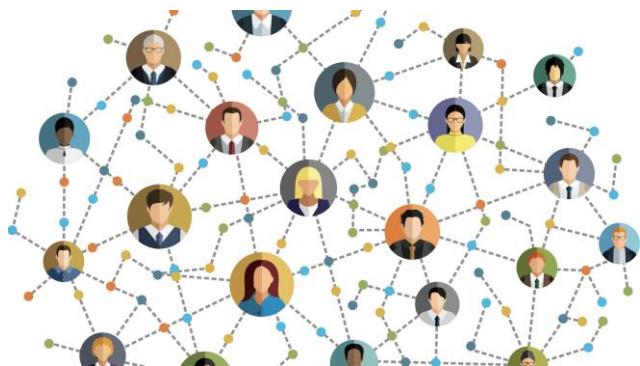
The new model is adaptive, dynamic, and fast.
Everyone can contribute.



Questions to consider

- How might network organizing be useful in achieving highly reliable care and accelerating evidence translation among Optum practice groups?
- How might networked communities and network data enable faster, more adaptative, more continuous creation and application of knowledge for decision-making and policies?
- What would collaboration with networked communities look like?

Communities of Practice

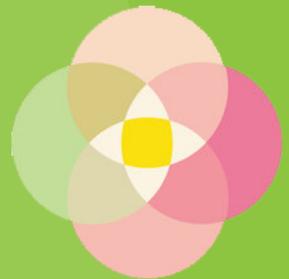


Values of Open Science



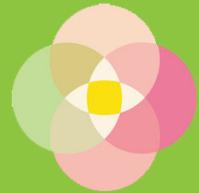
Transparency and Trust





HEALTHIER
TOGETHER

Connecting the science
of modern medicine
with the wisdom and
care of a community



HEALTHIER
TOGETHER

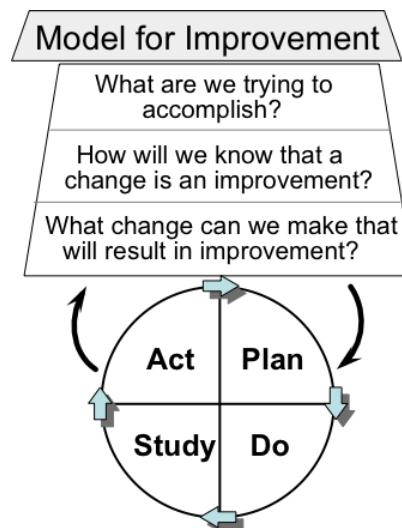
We Are Healthier Together

THANK YOU.

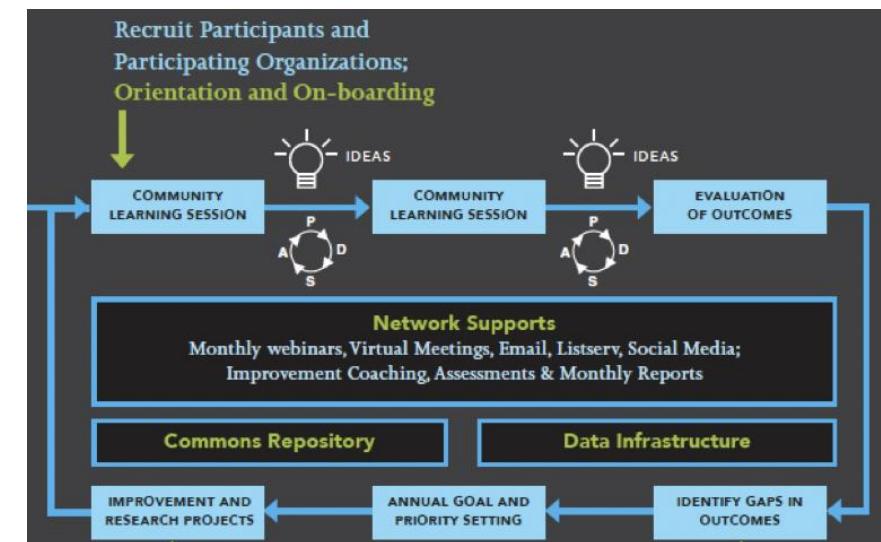


Extra Slides

Structure and Function of Network Components



- Data from every clinical encounter
 - Tools/techniques
-
- ←
- Reports:
 - Outcome/Process
 - Data quality
 - Pre-visit Planning
 - Population Management
 - QI Training/Coaching
 - Monthly Webinars
 - Semi-Annual Learning Sessions
 - Shared best practices



“Pathway to Mastery” supports IBD care centers through stages of improving patient outcomes

Goal to Exit

Know your population

Foundations

>75% Registered Patients

Get patients in remission

Achieving Remission

>83% Remission

Achieving Sustained Remission

Keep them in remission
>60% Sustained Remission

Innovate to address needs

Trailblazers

Project Specific Aims

Activation (Pre-IRB)
N= 5 centers

Multidisciplinary Pre-Visit Planning
N= 12 centers

Adherence
N= 12 centers

Engagement
N= 17 * Expanded 2020

Foundations
N=20 centers

Population Management
N= 28 centers

Autoimmune Liver Network for Kids (A-LiNK)
N= 9 Sept 2020

Belgium Onboarding
N=9 centers

Clinical Standardization/
Personalized Care
N=26

Research
N= 5 * Sept 2019-Sept 2020

Learning Labs Content Focus

COVID Response
N=6 June-August 2020

Engagement | Psychosocial Support | Nutrition

Biosimilars for Pediatric Patients with Inflammatory Bowel Disease: Pediatric Gastroenterology Clinical Practice Survey

Ross M Maltz ^{1 2}, Madeline G McClinchie ¹, Brendan M Boyle ^{1 2}, Megan McNicol ³,
Grant A Morris ⁴, Erin C Crawford ⁵, Jonathan Moses ⁶, Sandra C Kim ⁵

Affiliations + expand

PMID: 36827968 DOI: [10.1097/MPG.00000000000003750](https://doi.org/10.1097/MPG.00000000000003750)

Abstract

Background: Biosimilars are biological agents that have been demonstrated to have similar safety and efficacy profiles as the originator. The objective of this study was to evaluate the perspectives of pediatric gastroenterologists in the United States (U.S.) towards biosimilar use and to explore factors that impact their comfort level with prescribing infliximab biosimilars.

Methods: A cross-sectional survey was developed and distributed to pediatric gastroenterology physicians from the U.S. via a listserv (Pediatric GI Bulletin Board). Respondent's demographics were recorded. Using a six-point Likert scale, the survey assessed the respondent's perceptions towards biosimilars and initiating switches from the originator to biosimilar agent along with factors impacting provider's comfort level. Fischer's exact tests were used to detect statistically significant differences in responses for hypotheses of interest.

Results: 139 pediatric gastroenterologists completed the online survey (response rate 5.4%). Eighty-seven percent of respondents reported being comfortable prescribing infliximab biosimilars to anti-tumor necrosis factor naïve patients, and 69% reported being comfortable doing a one-time switch if the patient was in clinical remission. Factors that negatively impacted a respondent's comfort level included respondents not practicing at an ImproveCareNow (ICN) center and managing less than 50 patients with inflammatory bowel diseases (IBD).

Conclusions: Nearly 90% of pediatric gastroenterologists felt comfortable prescribing an infliximab biosimilar, and 70% felt comfortable with a one-time switch to the biosimilar if the patient was in clinical remission. Involvement in ICN a learning health system and caring for higher numbers of patients with IBD was associated with increased provider comfort with biosimilar use.

HEALTHIER TOGETHER NETWORK RESULTS:

Increased remission from 60% to 82% among children and youth with Crohn's disease and ulcerative colitis across 110 centers and 30,000 patients.

—ImproveCareNow Network

Across 140+ children's hospitals in the "Solutions for Patient Safety Network" (examples):

- Decreased serious safety events by 32%
- Decreased adverse drug events by 74%
- Decreased unplanned extubations by 42%

In 2020, these results and more saved 18,631 children from serious harm and saved \$380 million.

40% reduction in mortality from hypoplastic left heart syndrome (HLHS) and reduced growth failure from 30% to < 10% for 95% of all children with this condition in the U.S.

—National Pediatric Cardiology QI Collaborative

Decreased stroke rates by 50% in children with heart failure who require a cardiac assist device across 50 hospitals.

—ACTION Network

Used real-world data to achieve FDA approval for life-saving cardiac devices in children previously available only to adults.

—ACTION Network



HEALTHIER TOGETHER NETWORK RESULTS (CONT'D):

Decreased elective preterm birth 75% across birth hospitals in Ohio (**sustained reduction of > 65,000 elective preterm births over 10 years**)

—Ohio Perinatal Quality Collaborative

Reduced births before 32 weeks' gestation by **6.6%** *across Ohio*, including reductions in repeat early preterm births in women insured by Medicaid (**17% decrease**) and African American women (**20% decrease**)

—Ohio Perinatal Quality Collaborative

Reduced late-onset infections in infants born at 22 to 29 weeks gestation by **20%** among 24 NICUs in Ohio

—Ohio Perinatal Quality Collaborative

Reduced hospital length of stay for infants with Neonatal Opioid Withdrawal Syndrome by **2 days** across all of Ohio

—Ohio Perinatal Quality Collaborative



HEALTHIER TOGETHER NETWORK RESULTS (CONT'D):

43% improvement (from 46% to 66%) in the percentage of 11,000 Cincinnati Public School children proficient in 3rd grade reading reflecting hundreds of additional urban children reaching the target

—All Children Thrive Network

18% reduction in bed days (about 190 fewer days in the hospital/year) for children in the 3 poorest neighborhoods of Cincinnati with 8,800 children

—All Children Thrive Network

Reduced acute rejections in children with kidney transplants 44% across 12 pediatric nephrology centers

—Improving Renal Outcomes Collaborative

More than \$75 million in grant funding from NIH, AHRQ, CMS, PCORI, and other sponsors

More than 140 publications across leading journals, including *JAMA*, *British Medical Journal*, *Pediatrics*, *Neurology*, *American Journal of Transplantation*, *Mayo Clinic Proceedings*, *JAMA Pediatrics*, and many more

