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What are your biggest questions about running a national quality improvement collaborative?

National Quality Improvement Collaboratives: Lessons Learned from Research and Operations

MICHAEL L. RINKE, MD, PHD & TAMMY M. BRADY, MD, PHD

Montefiore Einstein

Who we are:

Michael L. Rinke, MD, PhD, Professor of Pediatrics and Vice President and Chief Quality Officer for Montefiore Medical Center. Dr. Rinke's research focuses on the application of behavior change techniques and implementation science to improve the quality of care delivered to children in both the inpatient and ambulatory settings.

Tammy M. Brady, MD, PhD, Professor of Pediatrics Children's National: Pediatric nephrologist and hypertension specialist who focused on caring for individuals at increased cardiovascular disease risk through research and clinical innovation. In addition to her federally funded work in youth cardiovascular health promotion, she contributes to a global effort to reduce cardiovascular disease mortality through the international public health initiative Resolve to Save Lives.

Both have led 5+ National QI Collaboratives

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Disclosures

Drs. Rinke and Brady and this work were supported by AHRQ grants R01HS023608 & R01HS026239; NIH Grant UL1TR001073

Drs. Rinke and Brady have no other financial disclosures or conflicts of interest

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Disclosures (continued)

- Drs. Rinke and Brady are supported by, led by, in awe of, and owe everything to an amazing group of motivated, dedicated and energetic colleagues and patients who should all be up here presenting

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Agenda

1. Introduction
2. Quality Improvement Collaborative Phases
    1. Pre-Decision
    2. Pre-Collaborative
    3. Collaborative
    4. Post-Collaborative
3. Conclusion

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Objectives:

Identify	Participants will identify key phases for quality improvement collaboratives
Demonstrate	Participants will demonstrate familiarity with challenges running pediatric quality improvement collaborative research & projects

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What is a Quality Improvement Collaborative?

- Organized, multifaceted approach to QI with:
  1. Specific topic for improvement with large variation in practice,
  2. Clinical and QI experts sharing best practice knowledge,
  3. Multidisciplinary teams from multiple sites willing to improve care,
  4. Model for improvement with measurable targets for improvement, data feedback to teams and small tests of change, and
  5. A series of structured activities to advance improvement, exchange ideas and share experiences of participating teams

Schouten LM, et. al. Evidence for the impact of quality improvement collaboratives: systematic review. BMJ 2008.

Nadeem E, et. al. Understanding the components of quality improvement collaboratives: a systematic literature review. The Milbank quarterly 2013.

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What is the Impact of Quality Improvement Collaborative?

- QICs improve care by:
  1. Collective learning,
  2. Data feedback,
  3. Benchmarking and
  4. Open sharing of successes and failures

  to accelerate improvement by the entire group

QIC's sustainably reduce patient harm and improve quality of care

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Resources for Running a QIC: We are NOT the Experts

PRiMER

peer-reviewed reports in medical education research

professional development perspective

Six Steps to Begin a Quality Improvement Collaborative

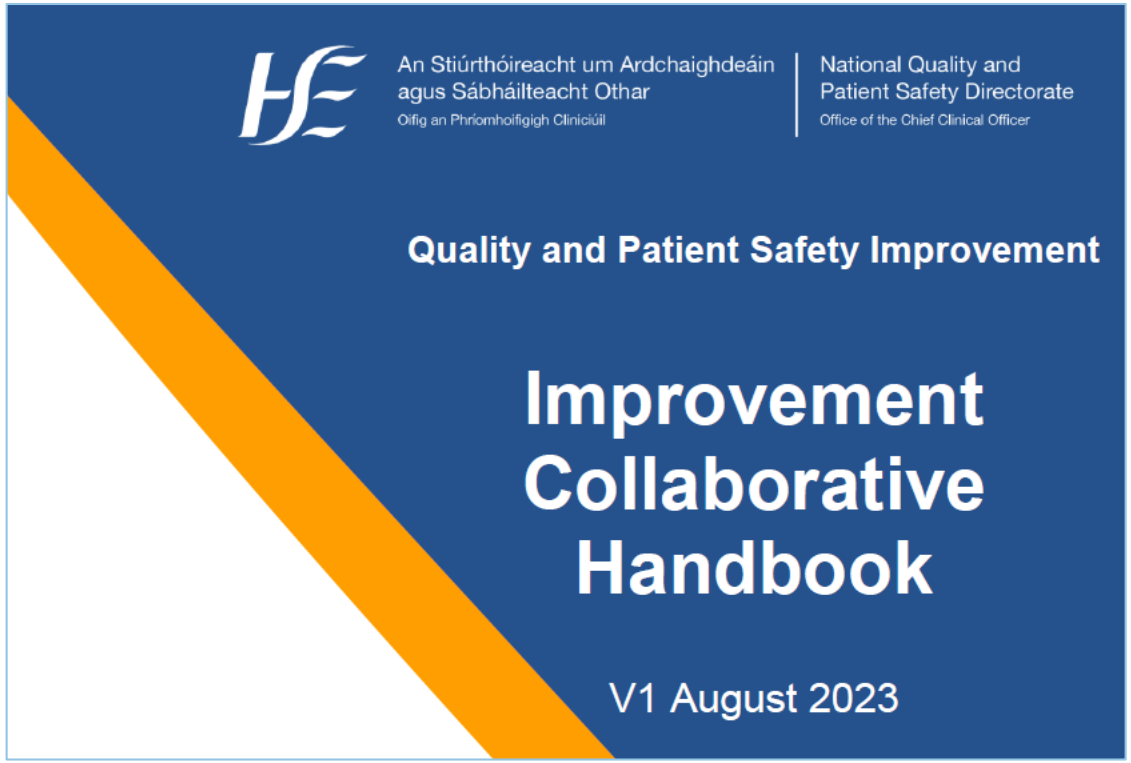
John Petrilli, MD | Karo G. Ohanian, MD | Randy Xun, MD | Dana Neutze, MD, PhD

PRiMER. 2025;9:46.

Published: 9/11/2025 | DOI: 10.22454/PRiMER.2025.397106

Abstract

Quality improvement collaboratives (QICs) are increasingly used in graduate medical education to enhance clinical outcomes and meet educational objectives. While they offer potential benefits, such as driving systemic change and developing best practices, multi-institutional QI efforts face unique challenges, and no consolidated guidance exists to help faculty navigate them. Drawing on literature and



An Stiúrthóireacht um Ardchaighdeáin agus Sábháilteacht Othar

Oifig an Phríomhoifigigh Cliniciúil

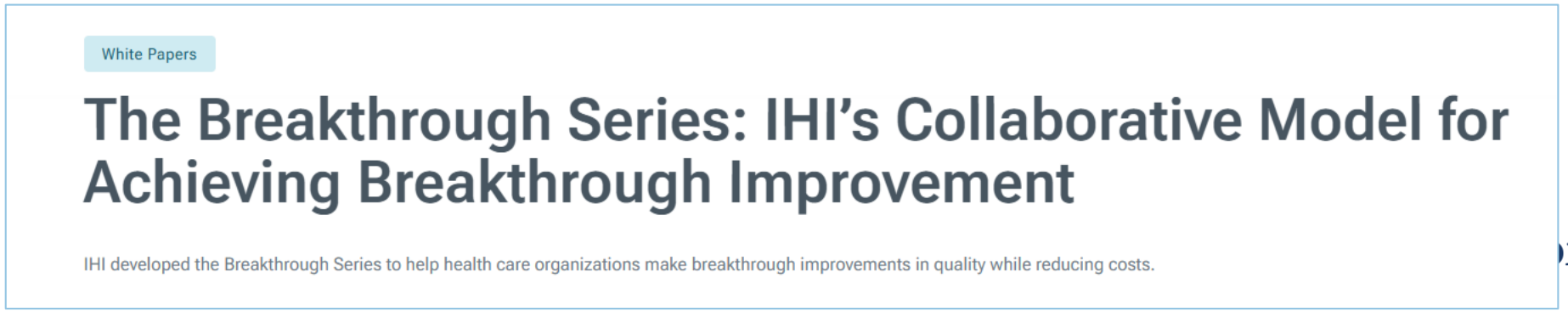
National Quality and Patient Safety Directorate

Office of the Chief Clinical Officer

Quality and Patient Safety Improvement

Improvement Collaborative Handbook

V1 August 2023



White Papers

The Breakthrough Series: IHI's Collaborative Model for Achieving Breakthrough Improvement

IHI developed the Breakthrough Series to help health care organizations make breakthrough improvements in quality while reducing costs.

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Two National QICs

Project RedDE!

Reducing **D**iagnostic **E**rrors

in Primary Care Pediatrics

To investigate whether a quality improvement collaborative can reduce three high-frequency/sub-acute diagnostic errors in primary care pediatrics

Boosting
Primary
Care
Awareness and
Treatment for
Childhood
Hypertension

To determine whether a quality improvement collaborative without and with subspecialist involvement can improve pediatric hypertension guideline compliance

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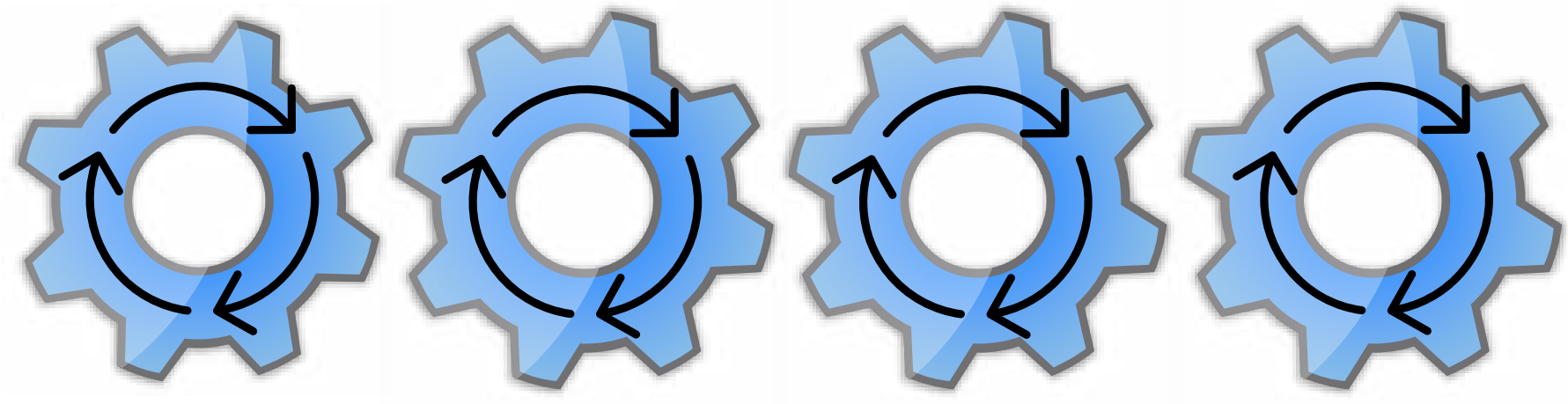
Phases of a Quality Improvement Collaborative



Pre-Decision	Pre-Collaborative	Collaborative	Post-Collaborative

What phase is most challenging?

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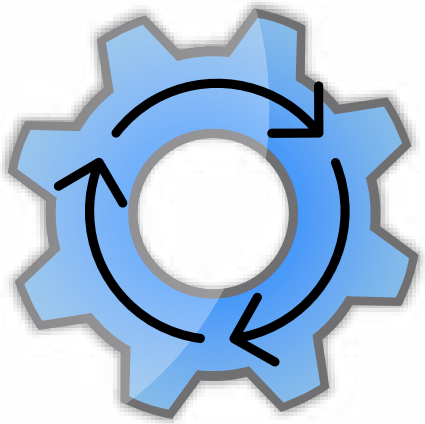

Pre-Decision

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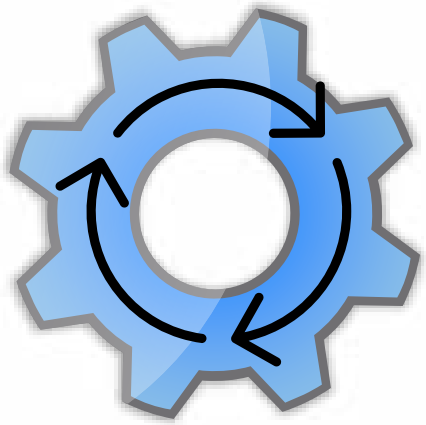
What are the most important considerations for the pre-decision period in a national quality improvement collaborative?



Pre-Decision

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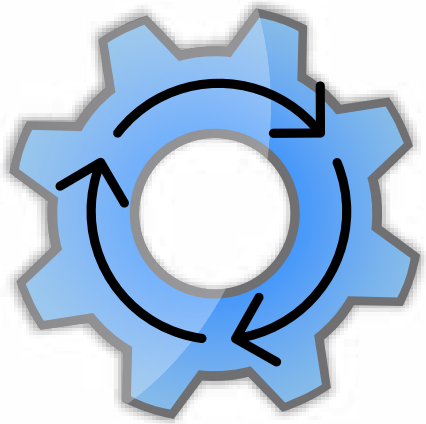

Pre-Decision

- Great Team
- Stakeholder interest
- Novel
- Funding

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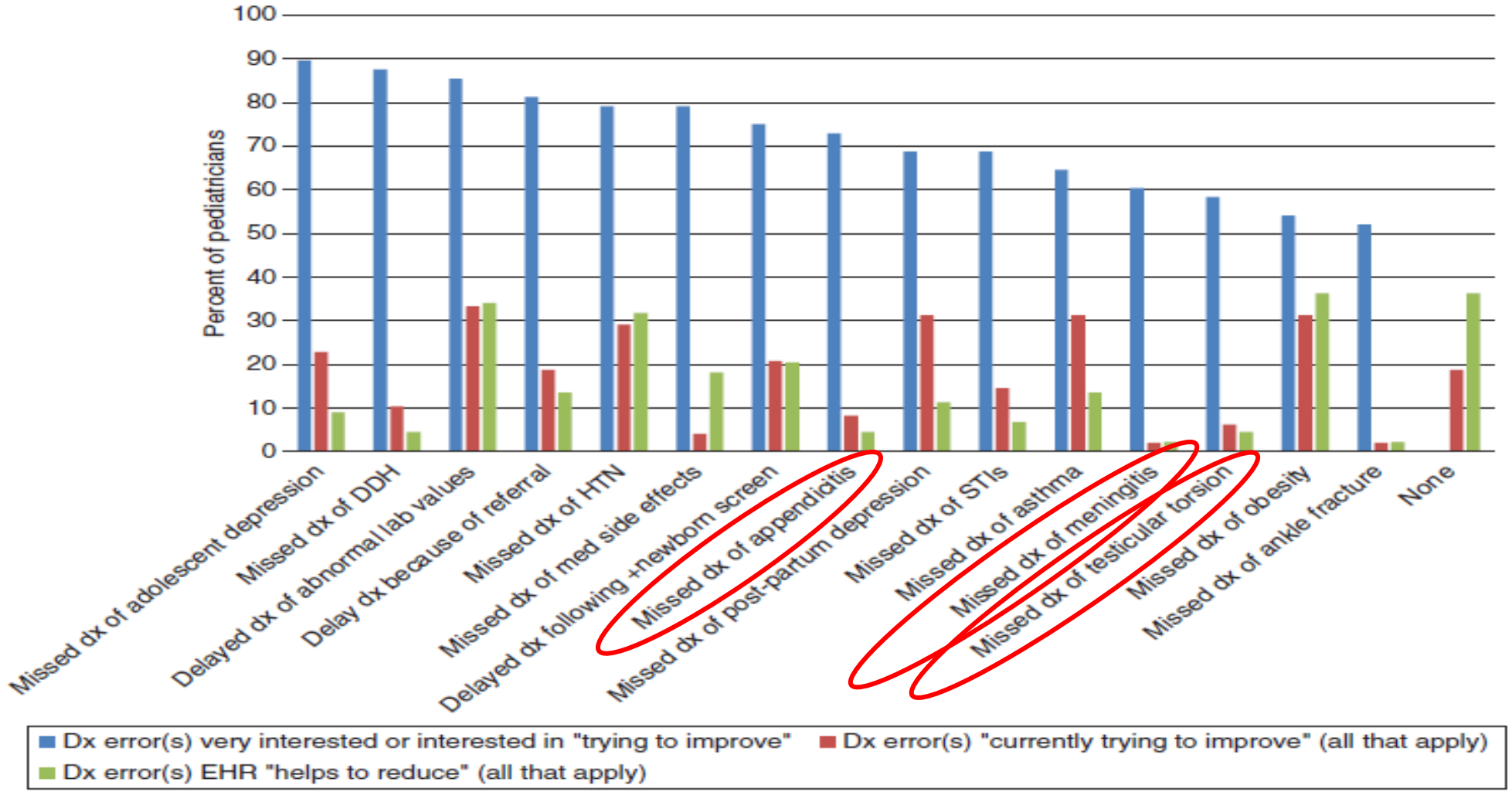
Pre-Decision to Run a QI Collaborative

- Mike, Tammy, David and Beth, who all share a love for boxed wine and the Northeast's Amtrak, are looking for a way to collaborate. (**LESSON 1: FIND A GREAT TEAM WHO YOU WANT TO WORK WITH, A LOT**)

1. How do they know what stakeholders/participants are interested in?
2. How do they identify a novel project and design?
3. How do they get funding?

Lesson 2: Involve your subjects in designing your QIC



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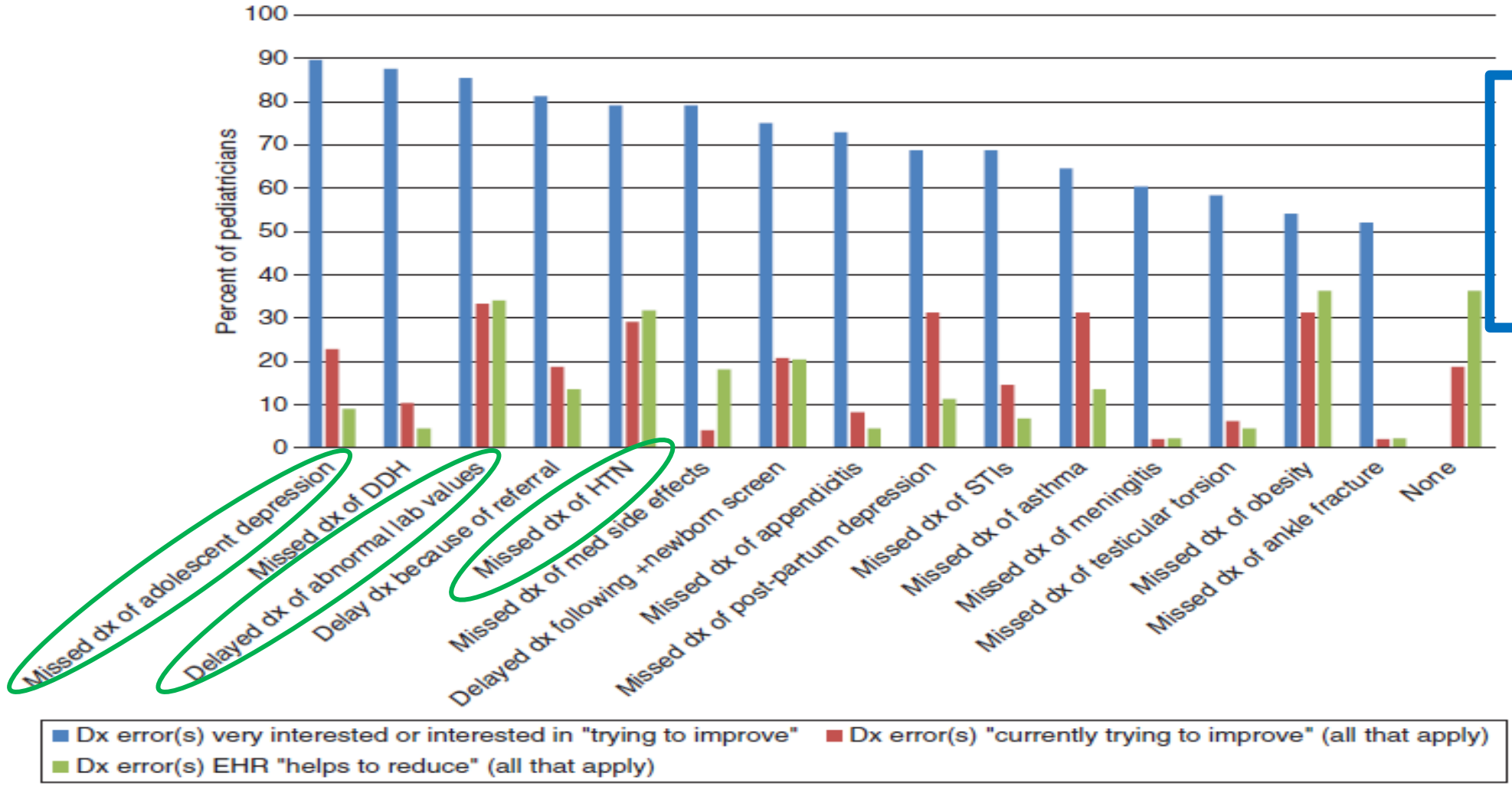
Rinke, Bundy et. al 2016

Lesson 2: Involve your subjects in designing your QIC



High Frequency, Sub-acute Errors

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Rinke, Bundy et. al 2016

Project RedDE!
Reducing Diagnostic Errors
in Primary Care Pediatrics

Objective:

- To investigate whether a quality improvement collaborative can reduce three high-frequency/sub-acute diagnostic errors in primary care pediatrics:
  1. Missed Diagnosis of Adolescent Depression
  2. Missed Diagnosis of Elevated Blood Pressure
  3. Delayed Diagnosis of 5 Specific Abnormal Laboratory Values

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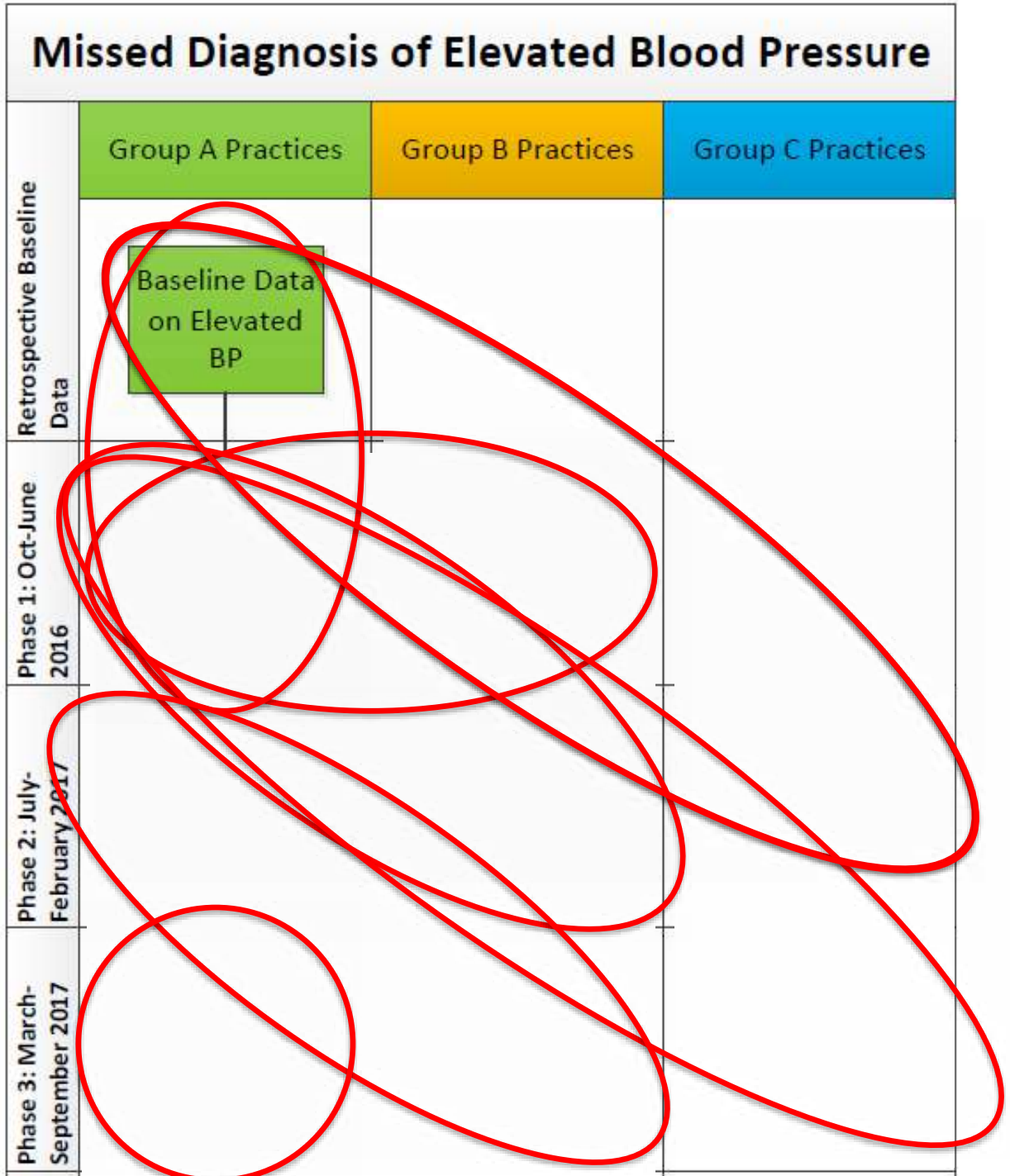
Methodology:

- 43 Primary Care Pediatric Practices recruited from around the country (34 Wave 1, 9 Wave 2)
- Participate in a randomized trial to investigate whether a quality improvement collaborative can reduce 3 diagnostic errors: Match pairs then randomized
- Each practice randomly assigned to collect retrospective baseline data on 1 error (6 months)
- Then intervene to reduce that error (9 months)
- They also collect control data on 2nd error



Lesson 3: Quasi-Experimental Designs are great when you don't have Clinical Equipoise and can create novelty

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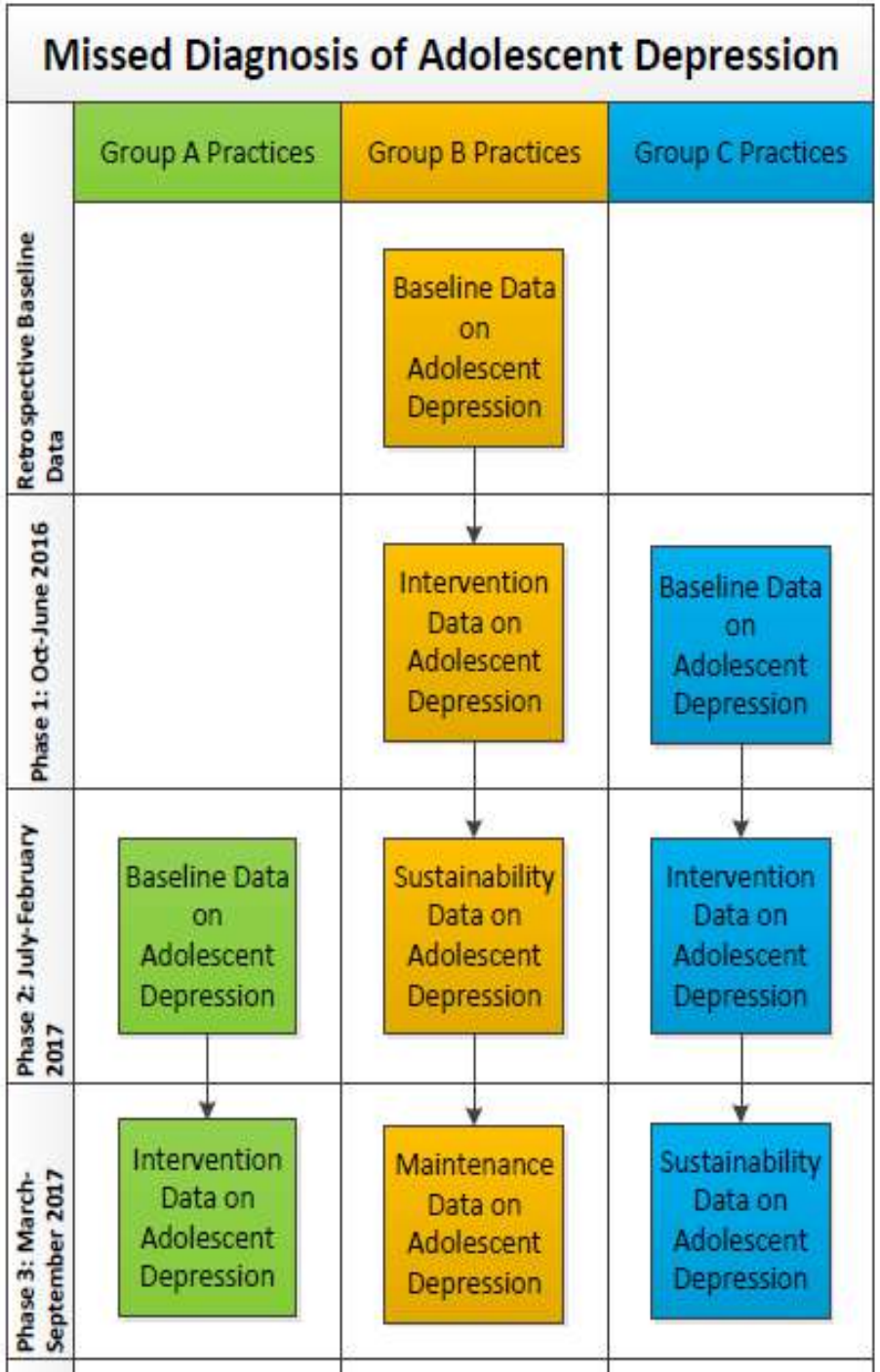

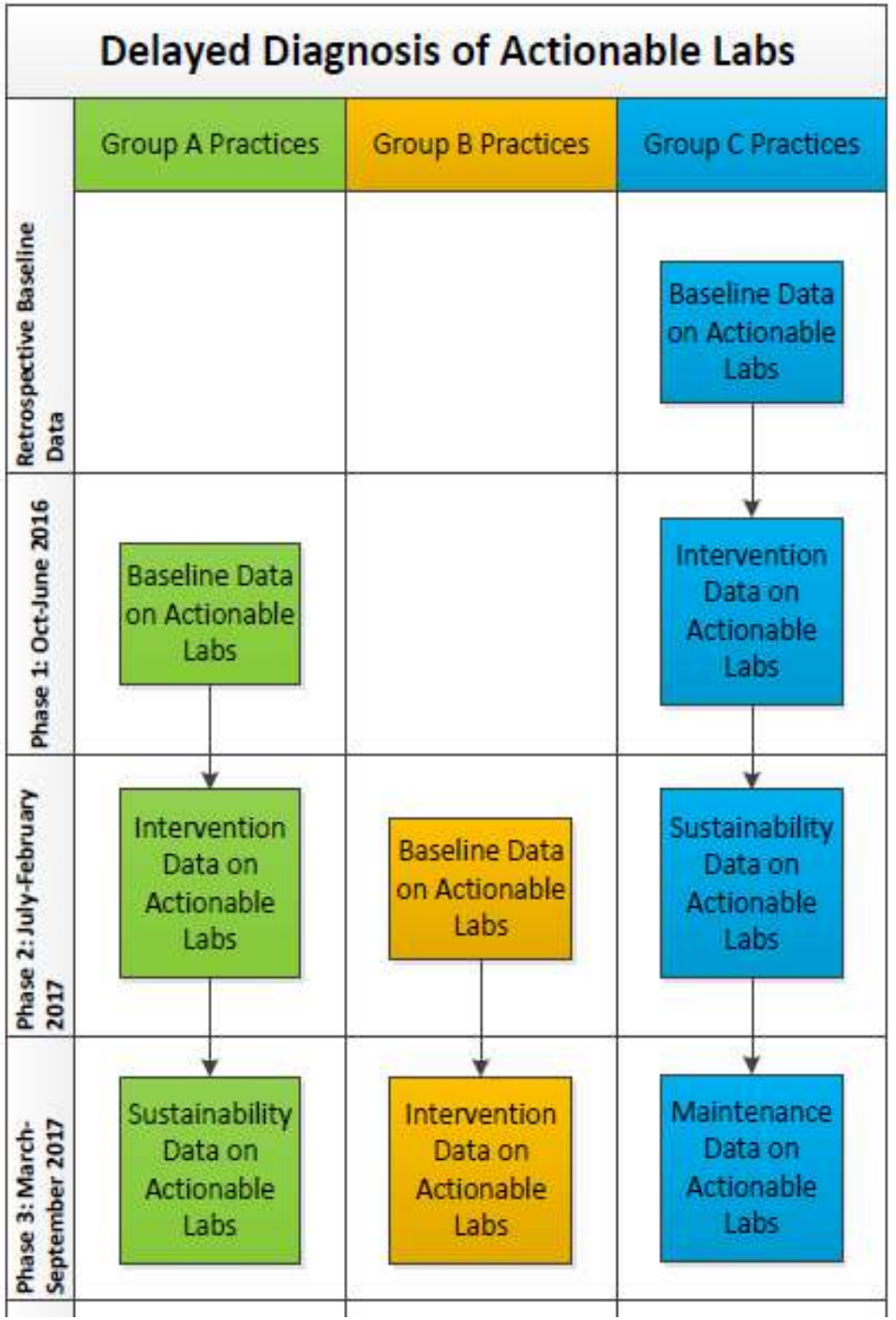

Lesson 3: Quasi-Experimental Designs are great when you don't have Clinical Equipoise and can create novelty

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Study Design

Lesson 3: Quasi-Experimental Designs are great when you don't have Clinical Equipoise and can create novelty

By the end of the project:

- All practices collected baseline/control data on all 3 errors
- All practices are actively intervening on all 3 errors
- 9 Wave 2 practices enrolled and randomized after Phase 1

Funding: The bricks are painted yellow not gold

- AHRQ Funded both Collaboratives
- Project REDDE crafted to respond to Diagnostic Error Interest
- BP-CATCH built on REDDE and had new guidelines that came out
- Long time-window from submission to collaborative
- Grants need specifics; QI is iterative and changes

Lesson 4: Funding, not needed, very hard, long time delays

BP-CATCH Objective:

To determine whether a quality improvement collaborative without and with subspecialist involvement can:

1. Improve pediatric hypertension guideline compliance
   - 2017 AAP Hypertension Guidelines

Boosting
Primary
Care
Awareness and
Treatment for
Childhood
Hypertension

FROM THE AMERICAN ACADEMY OF PEDIATRICS | CLINICAL PRACTICE GUIDELINE | SEPTEMBER 01 2017

Clinical Practice Guideline for Screening and Management of High Blood Pressure in Children and Adolescents

Joseph T. Flynn, MD ✉; David C. Kaelber, MD; Carissa M. Baker-Smith, MD; Douglas Blowey, MD; Aaron E. Carroll, MD; Stephen R. Daniels, MD; Sarah D. de Ferranti, MD; Janis M. Dionne, MD; Bonita Falkner, MD; Susan K. Flinn, MA; Samuel S. Gidding, MD; Celeste Goodwin; Michael G. Leu, MD; Makia E. Powers, MD; Corinna Rea, MD; Joshua Samuels, MD; Madeline Simasek, MD; Vidhu V. Thaker, MD; Elaine M. Urbina, MD;
SUBCOMMITTEE ON SCREENING AND MANAGEMENT OF HIGH BLOOD PRESSURE IN CHILDREN

Address correspondence to Joseph T Flynn. Email: joseph.flynn@seattlechildrens.org

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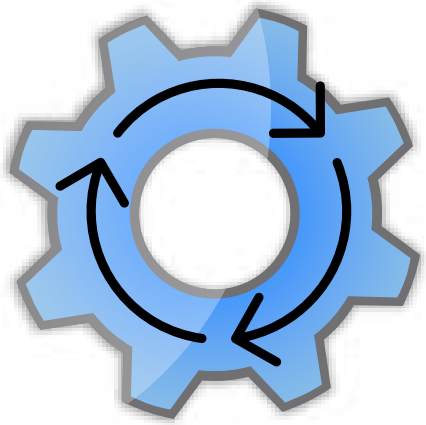
Questions on the pre-decision period in a national quality improvement collaborative?



Pre-Decision

- Great Team
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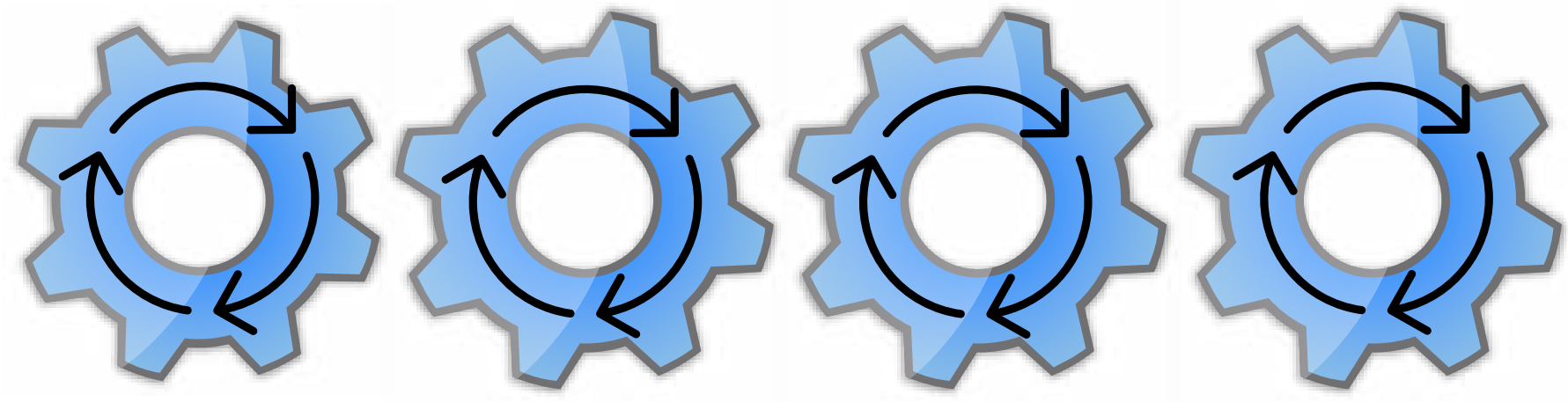
Phases of a Quality Improvement Collaborative



Pre-Decision	Pre-Collaborative	Collaborative	Post-Collaborative
• Great Team • Stakeholder interest • Novel • Funding			

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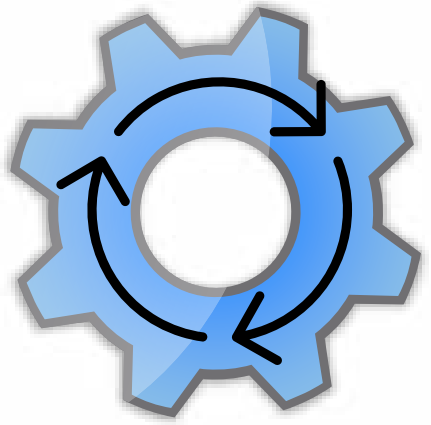

Pre-Collaborative

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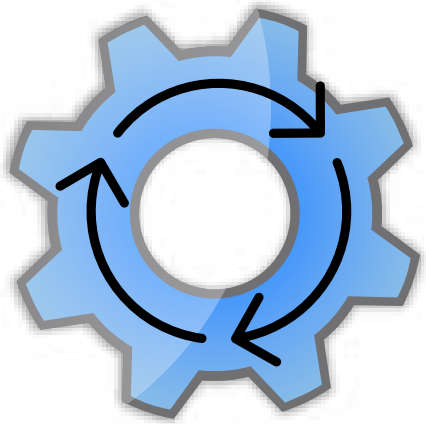
What are the most important considerations for the Pre-Collaborative period in a national quality improvement collaborative?



Pre-Collaborative

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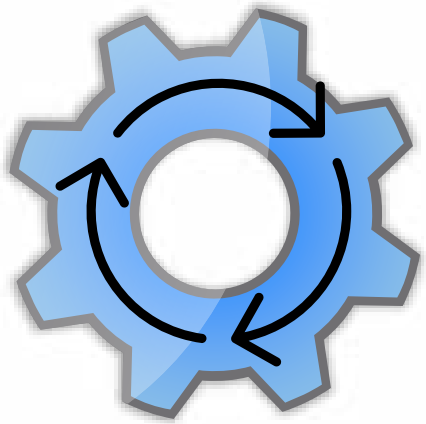

Pre-Collaborative

- Recruitment
- Measure Identification
- Change Package
- Meetings
- Publication Policy

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Pre-Collaborative: What to do before a QI Collaborative

- Mike, Tammy, David and Beth, celebrated getting an AHRQ R01.
- They then quickly despaired because it meant they had to build an “Emerald City,” and run a QIC. At least they were together. (**LESSON 1: FIND A GREAT TEAM WHO YOU WANT TO WORK WITH, A LOT**)

1. How do they recruit practices?
2. How do they pick measures?
3. How do they create a change package?
4. What meeting frequency, type, agendas?
5. Why important to think about publication policy now?

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Recruitment:

LESSON 5: Incentivize but don't force

- Home institutions: having a large and diverse team increases ability to recruit
- Email everyone
- Lots of informational webinars
  - This problem is important

<u>Aside</u>: Nurse says, "patient's blood pressure is high." What do you do say/do?

Recruitment:

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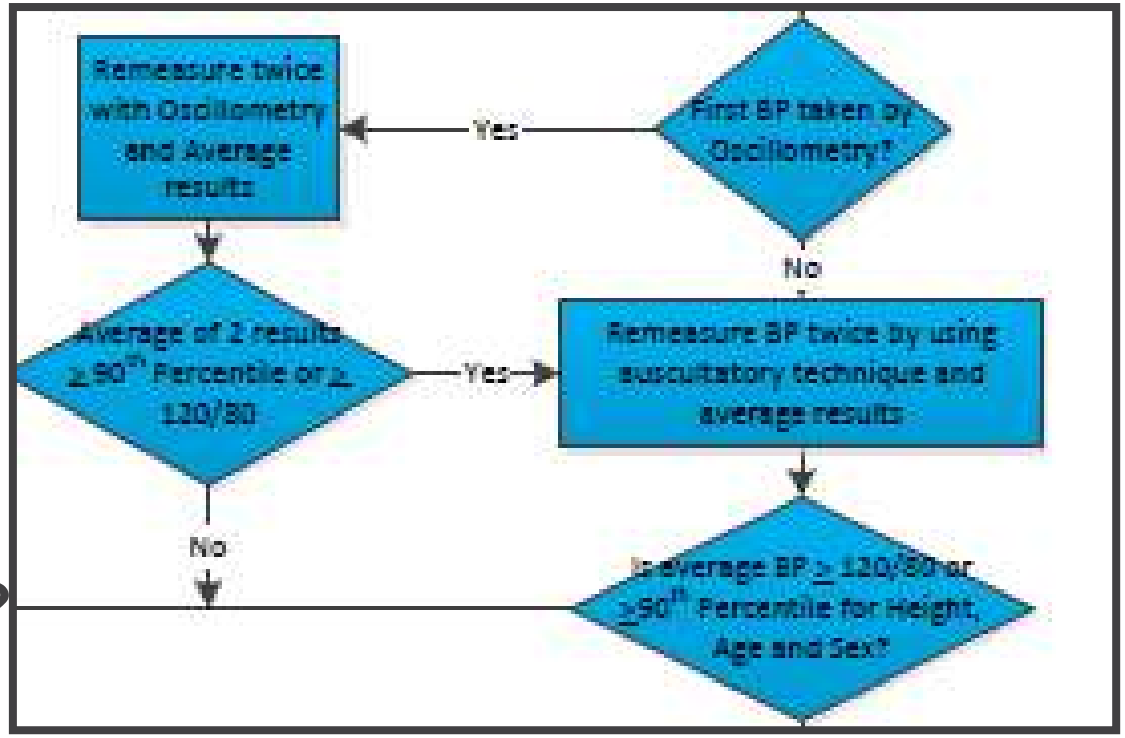

<u>Aside</u>: Nurse says, "patient's blood pressure is high." What do you say/do?

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Recruitment:

LESSON 5: Incentivize but don't force

- Home institutions: having a large and diverse team increases ability to recruit
- Email everyone
- Lots of informational webinars
  - This problem is important
  - Participating is easy and useful
  - All teach, all learn
- Incentives:
  - $900 per 9 months of data entry per site
  - MOC Part 2 & 4
- IRB based on home institution's requirements; help completing it from study coordinator

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LESSON 6: Pick only a few measures

2017 AAP Guidelines:

FROM THE AMERICAN ACADEMY OF PEDIATRICS | CLINICAL PRACTICE GUIDELINE | SEPTEMBER 01 2017

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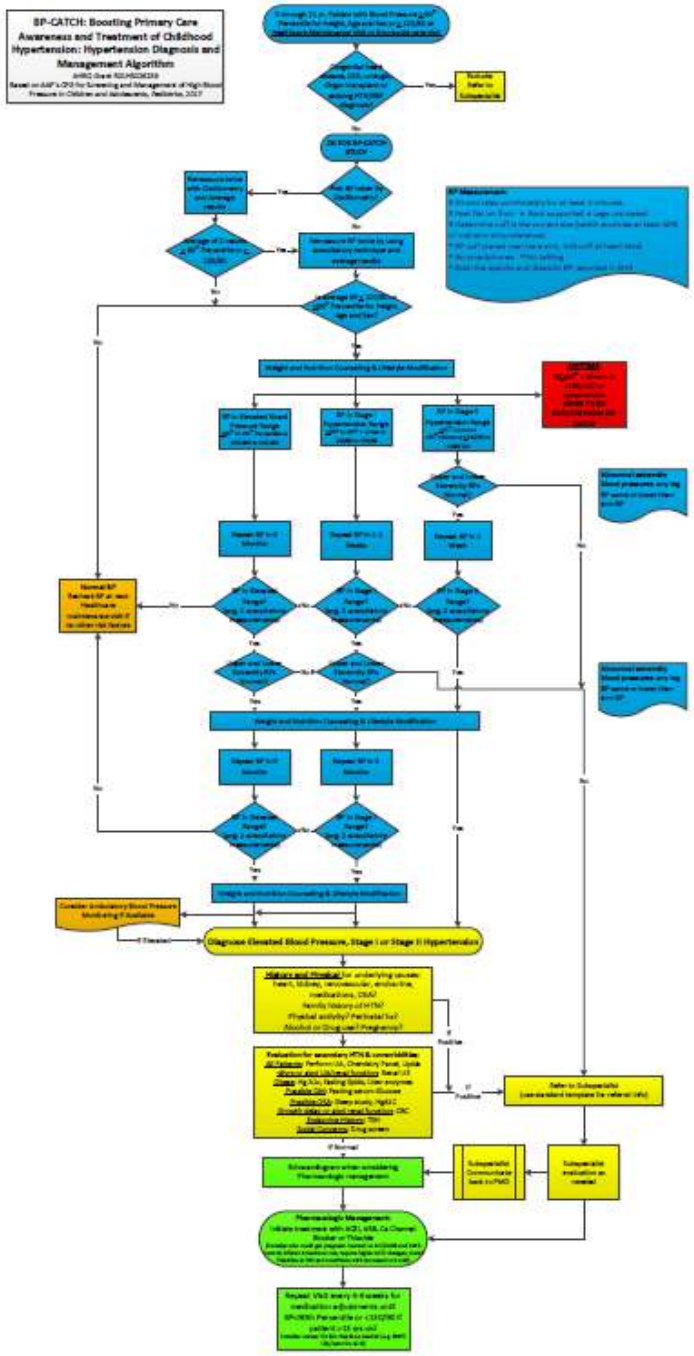

- 30 Key Action Steps
- 27 Additional Consensus Recommendations

- At least 30 specific actions needed to be taken to diagnose and treat most straightforward hypertension cases

LESSON 6: Pick only a few measures

Cohort	PRE-WORK -3-0 Months	PHASE 1 0-6 Months	PHASE 2 7-12 Month
1	Pre-QIC data collection	QIC to Improve Local Hypertension Processes + Registry & BP Measurement	
2	Pre-QIC data collection		

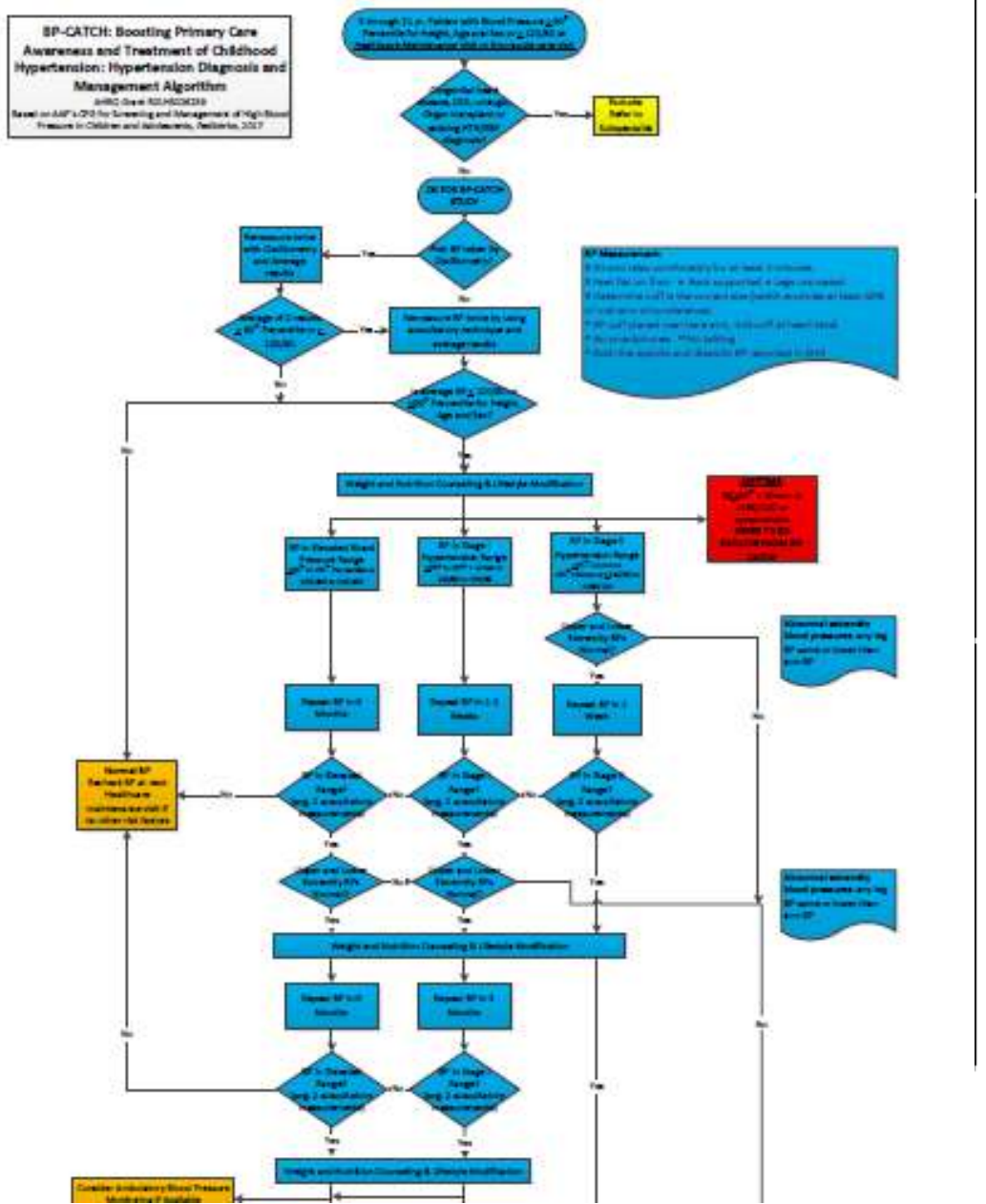

Figure 1: 28 month Collaborative Structure, Wir

LESSON 6: Pick only a few measures

Cohort	PRE-WORK -3-0 Months	PHASE 1 0-6 Months	PHASE 2 7-12 Months	PHASE 3 13-18 Months	PHASE 4 19-24 Months
1	Pre-QIC data collection	QIC to Improve Local Hypertension Processes + Registry & BP Measurement			
2	Pre-QIC data collection	Usual Care + Registry & BP Measurement			

Figure 1: 28 month Collaborative Structure, Winter 2018 through Spring 2021

LESSON 6: Pick only a few measures

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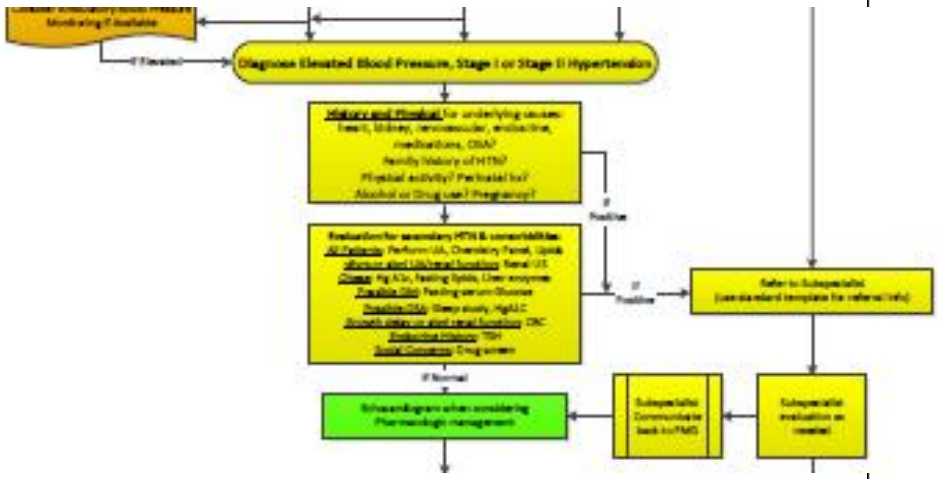
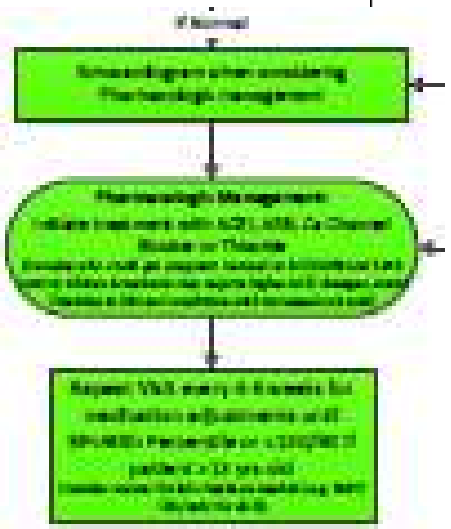
1	Pre-QIC data collection	QIC to Improve Local Hypertension Processes + Registry & BP Measurement	QIC with Subspecialist(s) to Improve Communication and Standardize Expectations		
2	Pre-QIC data collection	Usual Care + Registry & BP Measurement	QIC to Improve Local Hypertension Processes		

Figure 1: 28 month Collaborative Structure, Winter 2018 through Spring 2021

LESSON 6: Pick only a few measures

Cohort	PRE-WORK -3-0 Months	PHASE 1 0-6 Months	PHASE 2 7-12 Months	PHASE 3 13-18 Months	PHASE 4 19-24 Months
1	Pre-QIC data collection	QIC to Improve Local Hypertension Processes + Registry & BP Measurement	QIC with Subspecialist(s) to Improve Communication and Standardize Expectations	Hub and Spoke Co-Management QIC with Primary Care Hypertension Diagnosis and Management	
2	Pre-QIC data collection	Usual Care + Registry & BP Measurement	QIC to Improve Local Hypertension Processes	QIC with Subspecialist(s) to Improve Communication and Standardize Expectations	

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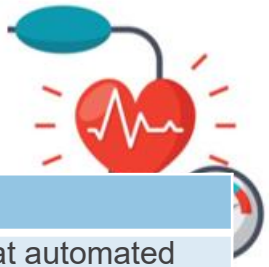
1	Pre-QIC data collection	QIC to Improve Local Hypertension Processes + Registry & BP Measurement	QIC with Subspecialist(s) to Improve Communication and Standardize Expectations	Hub and Spoke Co-Management QIC with Primary Care Hypertension Diagnosis and Management	Sustain Changes
2	Pre-QIC data collection	Usual Care + Registry & BP Measurement	QIC to Improve Local Hypertension Processes	QIC with Subspecialist(s) to Improve Communication and Standardize Expectations	Hub and Spoke Co-Management QIC with Primary Care Hypertension Diagnosis and Management

Figure 1: 28 month Collaborative Structure, Winter 2018 through Spring 2021

LESSON 6: Pick only a few measures



Boosting Primary Care Awareness and Treatment for Childhood Hypertension

Measure	Definition
BP Measurement Algorithm Followed	After documenting an elevated BP measurement, additional steps followed correctly: 2 repeat automated measurements obtained and averaged and if still high (or instead), 2 auscultatory measurements obtained and averaged
Recommended Counseling	A patient with elevated BP received nutritional, lifestyle and weight counseling
3 Extremity BP Performed	A patient received BP measurement on left and right arm and either lower extremity when required (at 1st visit with BP elevation noted when average BP was in stage 2 range or after 2nd visit with BP elevation noted when average BP was in elevated or stage 1 range)
PCP Follow-Up Recommended	A follow up appointment was recommended (at any time frame) with a PCP after elevated BP measurement
PCP Follow-Up Scheduled when BP in Stage 2 range	A follow up appointment was made in the correct time frame (within 1 week) with a PCP after a BP measurement in the Stage 2 hypertension range
PCP Follow-Up Scheduled when in Stage 1/EBP range	A follow up appointment was made in the correct time frame with a PCP after a BP measurement in the Stage 1 range (within 2 weeks for 1st visit; within 3 months for 2nd visit) or EBP range (within 6 months)
Diagnosis of Stage 2 Hypertension Documented	Stage 2 hypertension was documented after 2nd visit with BP in stage 2 range documented
Diagnosis of Stage 1 Hypertension Documented	Stage 1 hypertension was documented after 3rd visit with BP in stage 1 range documented
Diagnosis of EBP Documented	EBP was documented after any visit with BP in elevated range documented
Recommended Lab Tests Completed	A patient with diagnosis of elevated BP, Stage 1 or Stage 2 hypertension received the recommended lab tests for all patients when appropriate: lipid profile, urinalysis, chemistry panel

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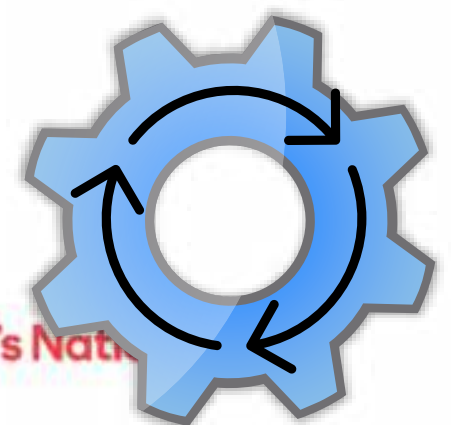
Change Package: Lesson 7: Change package is a living document and will evolve

- Have tools for each measure
- Starting point for improvement
- Have practices contribute to change package
- Steal Shamelessly
- Get feedback from patients
- Perfect is the enemy of the good



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What is in this Change Package?

This change package is comprised of 4 Chapters:

- Chapter 1 | Quick Reference
  - Section 1| BP-CATCH Hypertension Diagnosis and Management Algorithm
  - Section 2| Management on Basis of Office Blood Pressure
  - Section 3| BP Categories and Stages
  - Section 4| Hypertension ICD-10 codes
  - Section 5| Mini-RCA Form
  - Section 6| External Resource
- Chapter 2 | Blood Pressure Measurements and Follow-Up in the Primary Care Practice
  - Section 1| Measurement of Blood Pressure
  - Section 2| Screening of Blood Pressure
  - Section 3| Calculating Blood Pressure Percentile
  - Section 4| Recognizing Abnormal Blood Pressure Percentiles
  - Section 5| Discussing Elevated Blood Pressure with Families
  - Section 6| Document Actions When a Child has Sustained Elevated Blood Pressure Measurements
  - Section 7| Motivation Interviewing (MI): Weight and Nutritional Counseling and Lifestyle Modification
  - Section 8| Follow-up
- Chapter 3 | Hypertension Diagnosis, Work-Up & Subspecialist Communication
  - Section 1| Making the Diagnosis
  - Section 2| Discussion of Hypertension with Patient/Family
  - Section 3| Patient Evaluation
  - Section 4| Primary Care Provider and Subspecialist Communication
- Chapter 4 | Treatment and Management of Hypertension
  - Section 1| Pharmacological and non-pharmacological Treatment
  - Section 2| Treatment follow-up and monitoring
  - Section 3| Discussion of Hypertension Management with Patient/Family

Meetings: Lesson 8: Meetings are for improvement, recruitment and retention

- All-teach, all-learn
  - Monthly video conferences, every 8 months day long video conference
  - **PRACTICES DO THE TALKING**
- Mini-RCAs monthly on an error
  - Focus on Failures
- Monthly QI coach contact: meet practices where they are via email, zoom meeting, etc.
- Email listserves for reminders and questions
- All practices get the same intervention no matter where they are randomized

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Publication Policy: Why needed?

- Mike, Tammy, and David were told by a Department chair: “Our clinics make up a large proportion of your clinics. If we are not included as authors in your publications, we will pull our clinics and data from the QIC.”

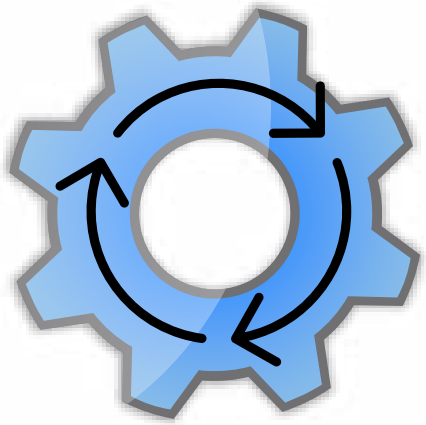
Publication Policy: Lesson 9: Clear guidelines for authorship and publications/presentations at the start

- Disseminated to all participants: describes who will be an author and how others can obtain authorship and publish data if interested

Table of Contents

Montefiore Einstein

Questions about the pre-collaborative period in a national quality improvement collaborative?



Pre-Collaborative

- Recruitment
- Measure Identification
- Change Package
- Meetings
- Publication Policy

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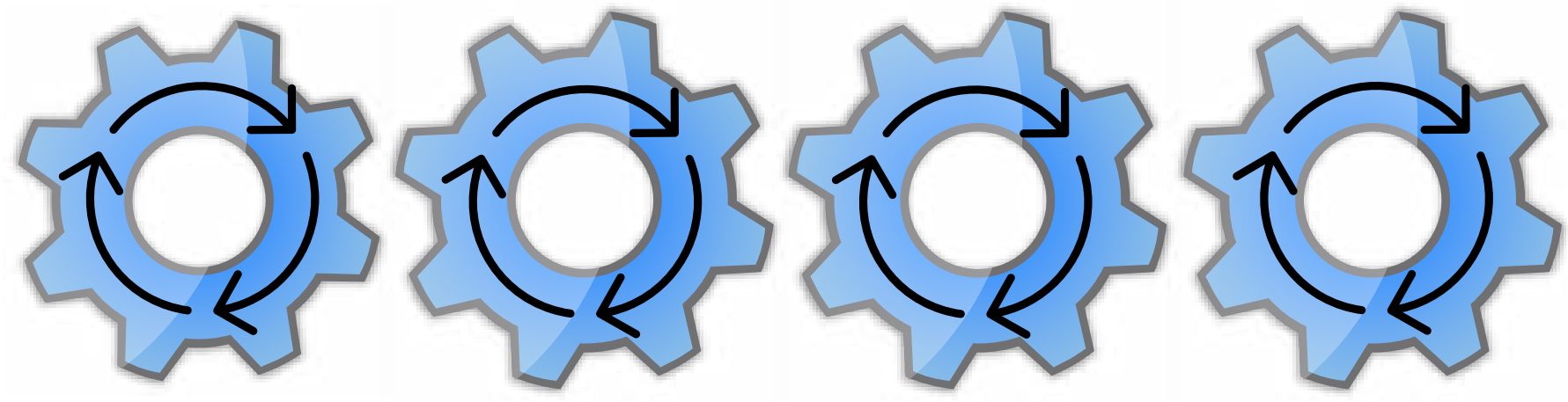
Phases of a Quality Improvement Collaborative



Pre-Decision	Pre-Collaborative	Collaborative	Post-Collaborative
• Great Team • Stakeholder interest • Novel • Funding	• Recruitment • Measure Identification • Change Package • Meetings • Publication Policy		

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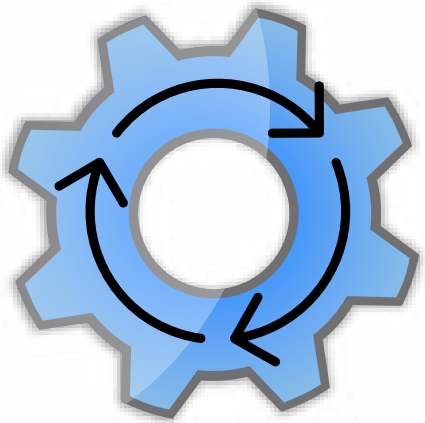
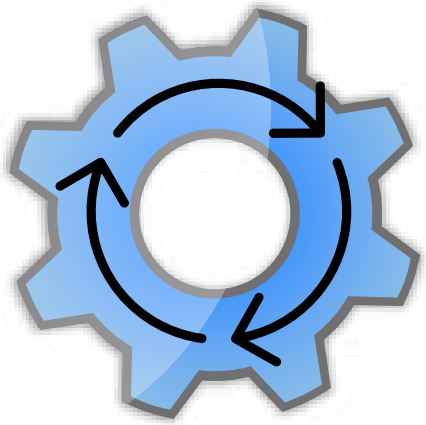


Collaborative

fiore Einstein

What are the most important considerations for the Collaborative period in a national quality improvement collaborative?



Collaborative

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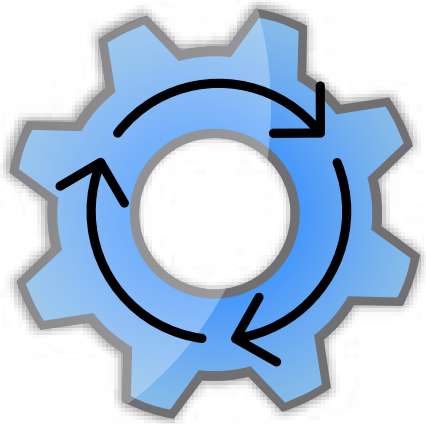

Collaborative

- Retention
- Data QA
- Mixed Methods
- Flexibility

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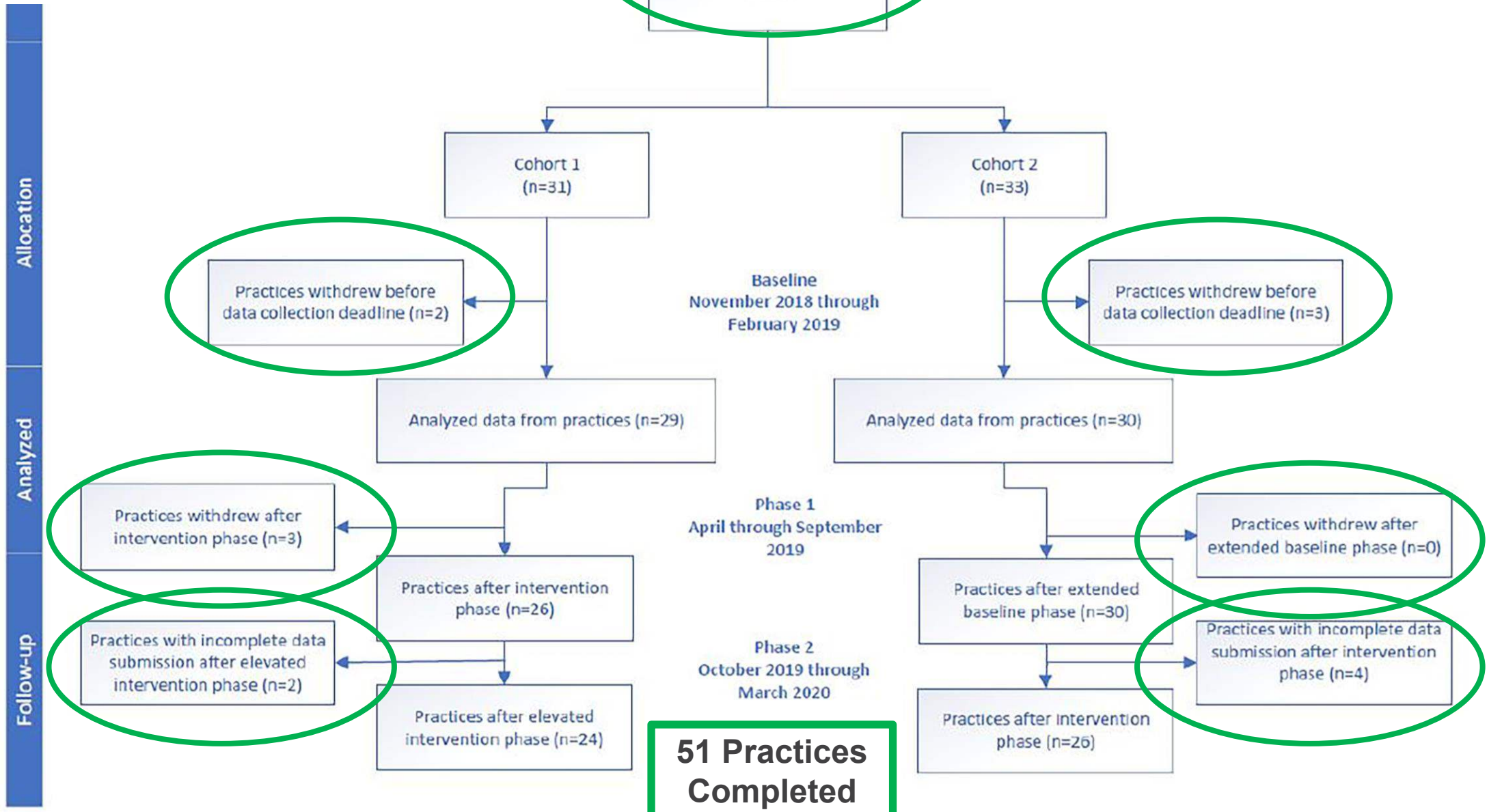
Collaborative: Actually running the QI Collaborative

- Mike, Tammy, David and Beth, joined by an amazing team of 12 people (**LESSON 1: FIND A GREAT TEAM WHO YOU WANT TO WORK WITH, A LOT**) started the BP-CATCH QIC with 64 practices

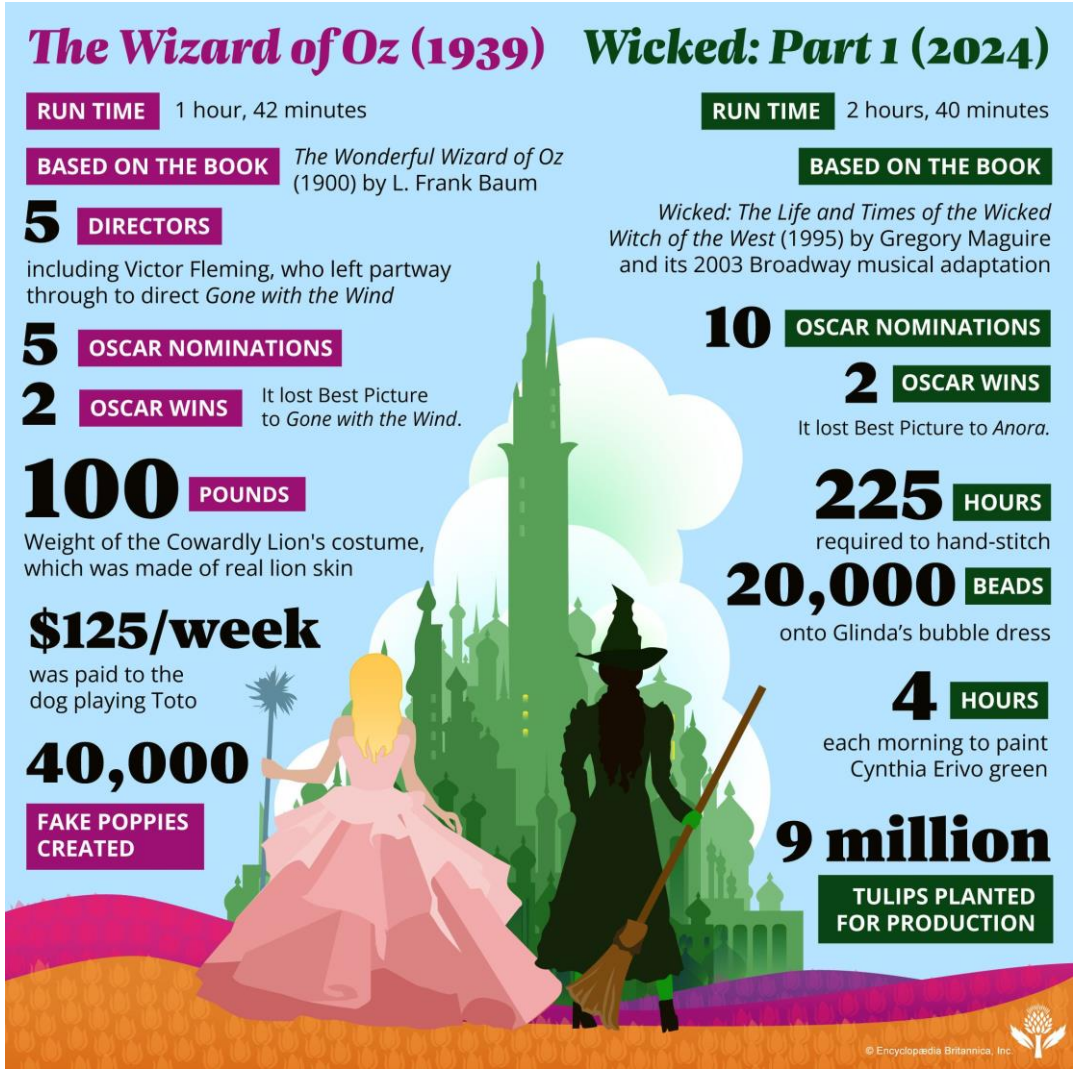
1. How do they retain these practices?
2. How do they ensure accurate and timely data submission?
3. How can mixed methods research be used to deepen understanding of their data?

Retention: Lesson 10: Personal touch, Over Recruit



Lesson 11: Data QA is critical during the QIC, not after

- Multiple and repeated data collection webinars
- Use of easy collection methods:
  - First 10 patients each month
  - Data collection forms
  - REDCAp Database
- Real-time identification of abnormal values
  - BP of 0
  - BP of 300/200
- Monthly feedback of data to teams
- Transparent data sharing across all practices



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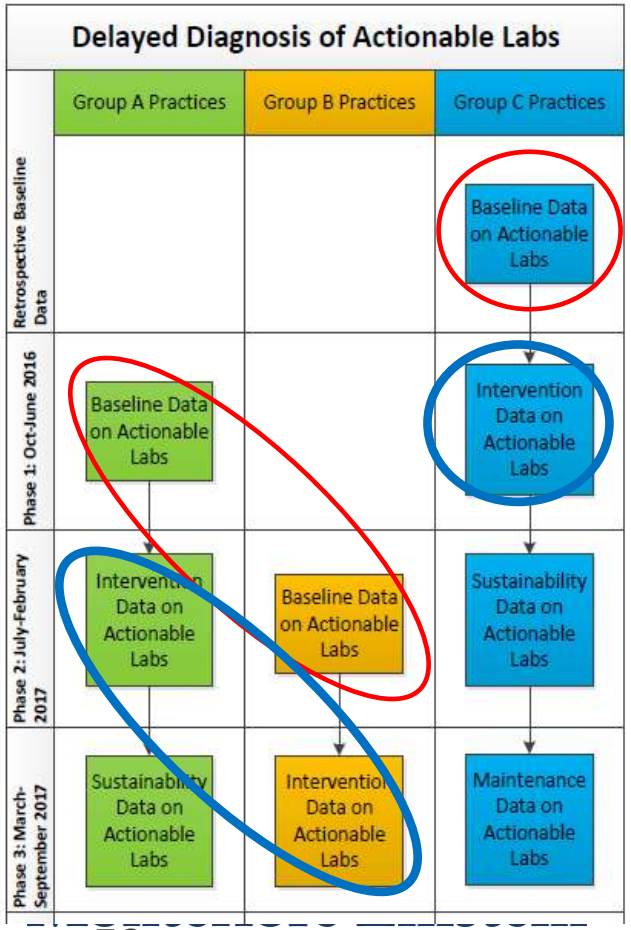
Lab-related Diagnostic Errors

Project RedDE!
Reducing Diagnostic Errors
in Primary Care Pediatrics

Outcome	Comparison	N	%	RD (95% CI)	P
Documentation of appropriate action for abnormal results	Intervention vs. Control	2663	93.9% vs. 92.9%	0.9% (-1.1%, 3.0%)	0.370



Lesson 12: Mixed methods approaches are crucial with quasi-experimental design

1. Fitted by generalized mixed-effects model with potential clustering effects of practices and months taken into account; 2. Percentages (%) and RD's (Risk Difference) are model-based estimates.
* Adjusted for age, sex, insurance, and wave

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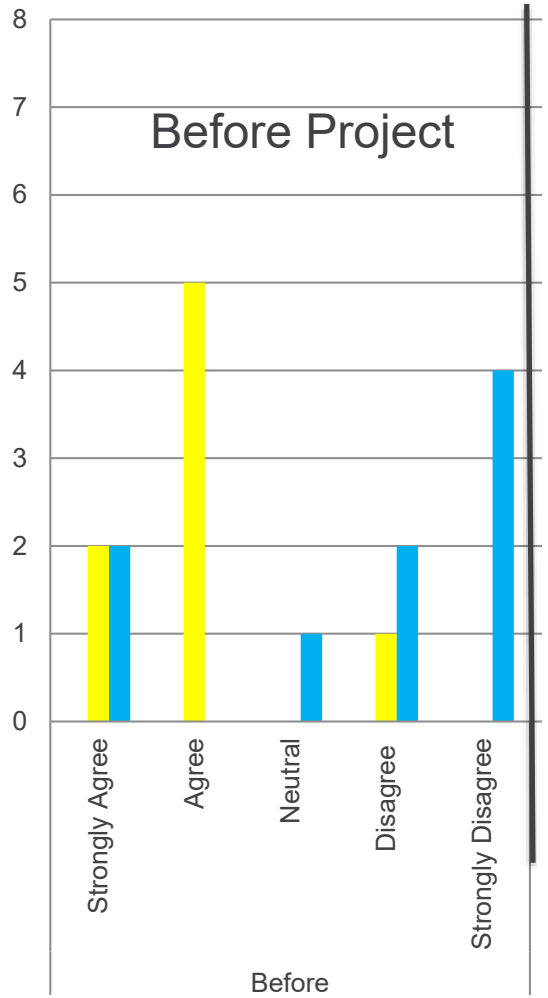
Hypotheses for Lab Error Findings:

1. Spillover Effects: Each collaborative group heard in orientation and learning sessions about the other errors
2. Hawthorne Effects: Collecting control data influenced their behavior

Spillover/Hawthorne:

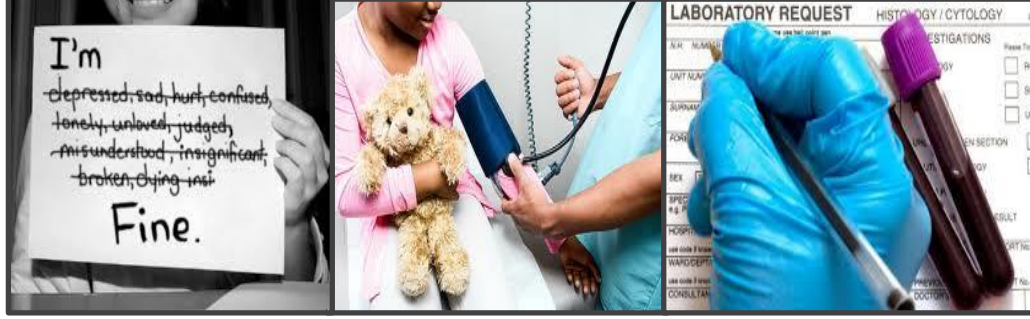
Our core clinical team...Documents follow up on lab results



Lesson 12: Mixed methods approaches are crucial with quasi-experimental design

IATRIC HOSPITAL FOR:
EINSTEIN
nstein College of Medicine
YESHIVA UNIVERSITY

Hypotheses:



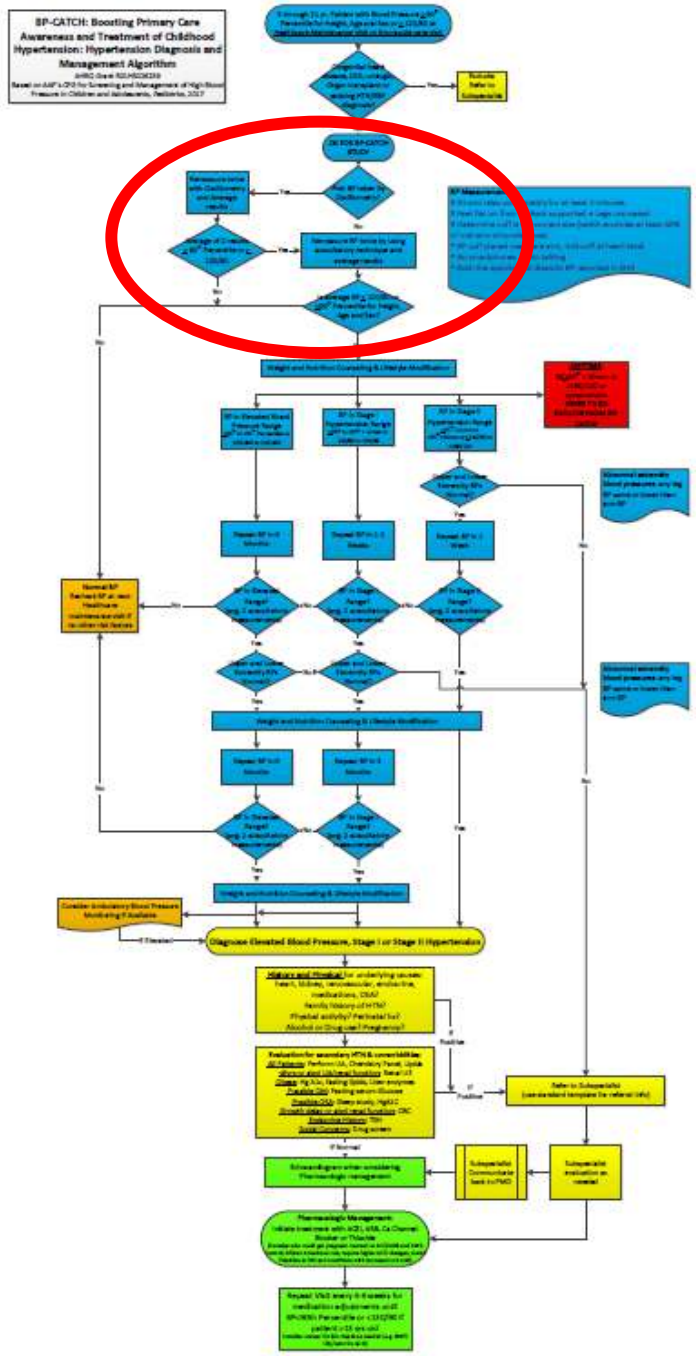
1. Spillover Effects: Each collaborative group heard in orientation and learning sessions about the other errors
2. Hawthorne Effects: Collecting control data influenced their behavior
3. Poor randomization: first group more likely to benefit from lab error reduction work
4. Quality Improvement Collaborative: not as useful a tool when performance already at or above 90%

Where in the process did the Error Occur?

N=171 Mini-RCAs on patients where all steps were not completed

- 54% Recognize abnormal blood pressure
- 53% Re-measure abnormal blood pressure

Lesson 12: Mixed methods approaches are crucial with quasi-experimental design



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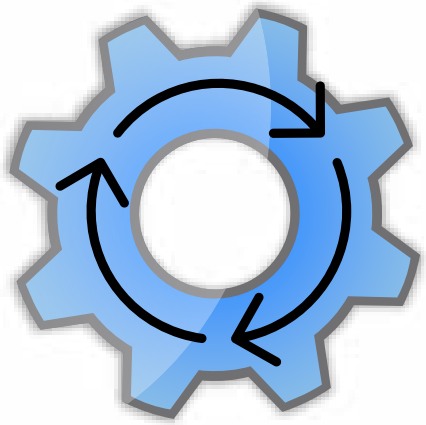

Collaborative

- Retention
- Data QA
- Mixed Methods
- **Flexibility**

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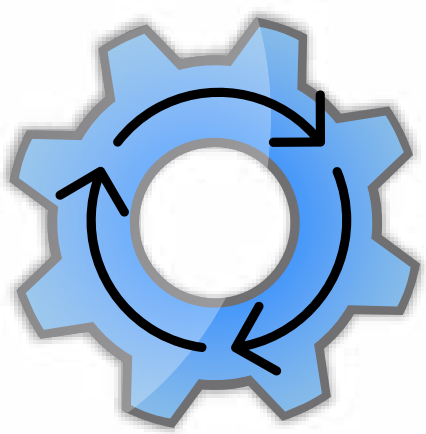
COVID-19



Collaborative

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BP-CATCH 2: What would you do if COVID-19 came during your QIC?

March 13, 2020

Cohort	PRE-WORK -3-0 Months	PHASE 1 0-6 Months	PHASE 2 7-12 Months	PHASE 3 13-18 Months
1	Pre-QIC data collection	QIC to Improve Local Hypertension Processes + Registry & BP Measurement	QIC with Subspecialist(s) to Improve Communication and Standardize Expectations	
2	Pre-QIC data collection	Usual Care + Registry & BP Measurement	QIC to Improve Local Hypertension Processes	

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Local News

New Rochelle Marks One Year Since First Case Of COVID-19 Was Confirmed

March 3, 2021 / 7:16 PM EST / CBS New York

Add CBS News on Google

Lesson 13: Be Adaptable and Flexible

Montefiore Einstein

BP-CATCH 2: What would you do if COVID-19 came during your QIC?

- Adult patients use Home BP Monitoring (HBPM) to track BP diagnoses and treatment effectivity
- **<u>Can we use HBPM to reduce Pediatric BP visits</u>**?

March 13, 2020

Cohort	PRE-WORK -3-0 Months	PHASE 1 0-6 Months	PHASE 2 7-12 Months	PHASE 3 13-18 Months
1	Pre-QIC data collection	QIC to Improve Local Hypertension Processes + Registry & BP Measurement	QIC with Subspecialist(s) to Improve Communication and Standardize Expectations	COVID-19
2	Pre-QIC data collection	Usual Care + Registry & BP Measurement	QIC to Improve Local Hypertension Processes	

Lesson 13: Be Adaptable and Flexible

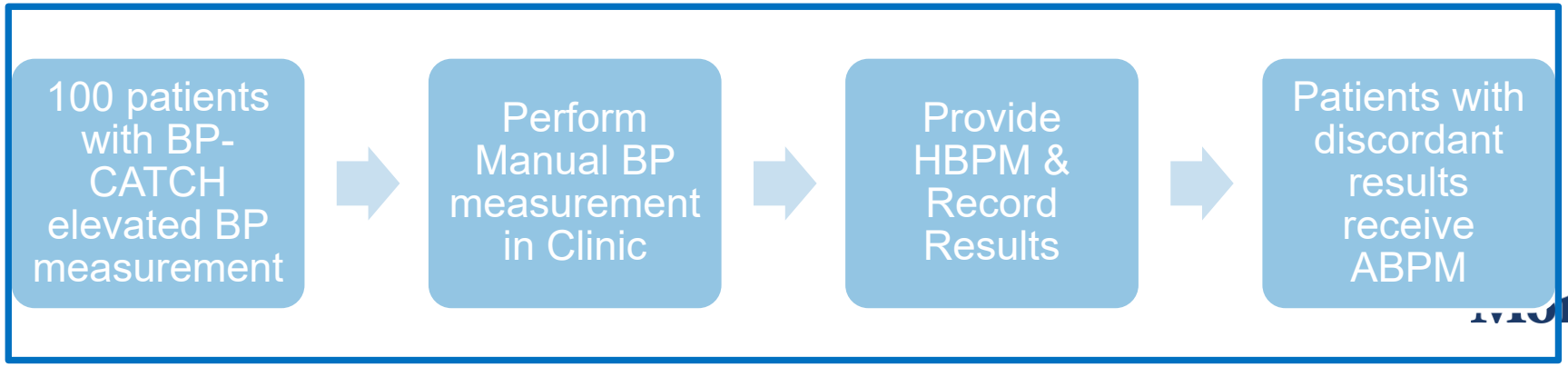
Montefiore Einstein

BP-CATCH 2: Pediatric Home Blood Pressure Monitoring

New Aims:

1. Investigate if 1) HBPM correlates with in-person manual BP measurement and/or 2) ABPM in pediatric primary care patients at higher risk for hypertension diagnosis but without diagnosed hypertension
2. Determine if HBPM is feasible for pediatric primary care patients at higher risk for hypertension diagnosis but without diagnosed hypertension

Lesson 13: Be Adaptable and Flexible



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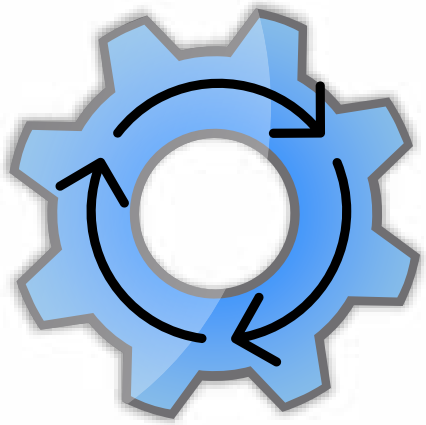
Questions about the Collaborative period in a national quality improvement collaborative?



Collaborative

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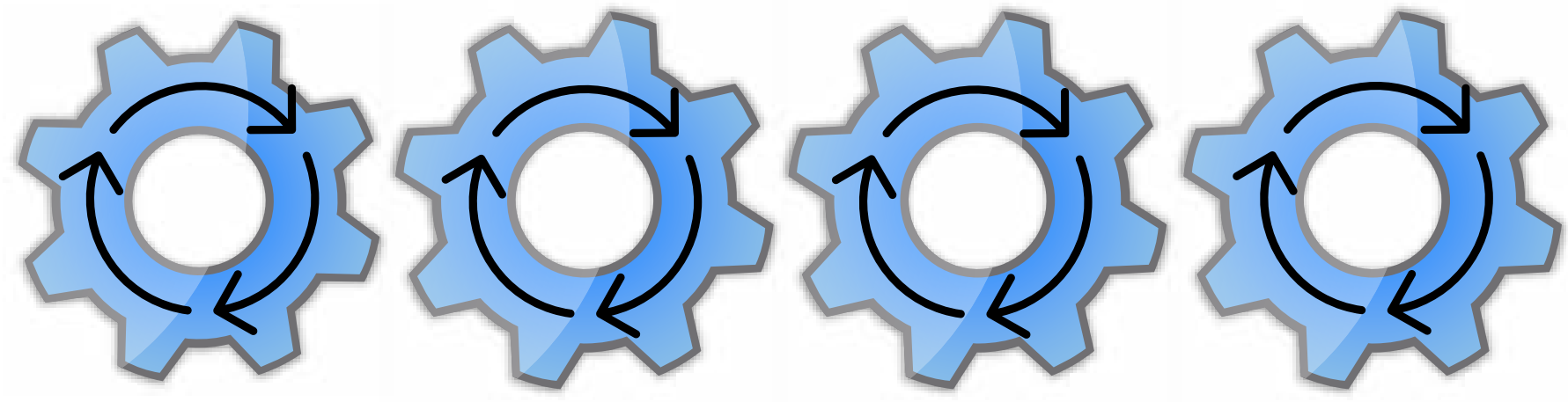
Phases of a Quality Improvement Collaborative



Pre-Decision	Pre-Collaborative	Collaborative	Post-Collaborative
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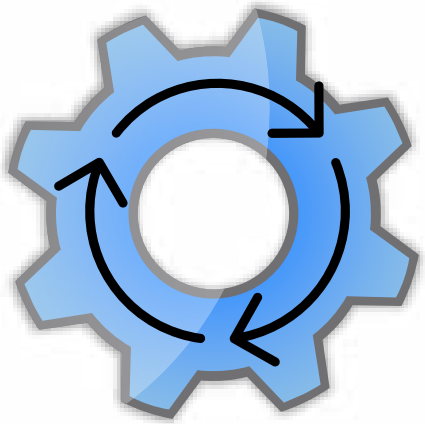

Post-Collaborative

https://forms.office.com/r/uuaFLWdGZh

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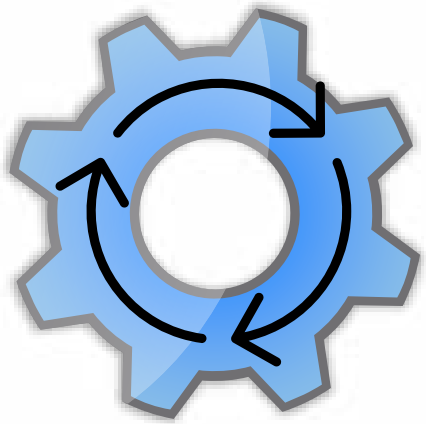
What are the most important considerations for the Post-Collaborative period in a national quality improvement collaborative?



Post-Collaborative

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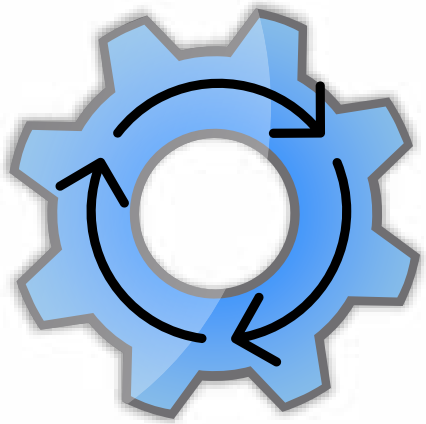
What are the most important considerations for the Post-Collaborative period in a national quality improvement collaborative?



Post-Collaborative

- Data Analysis
- Manuscripts
- Next steps

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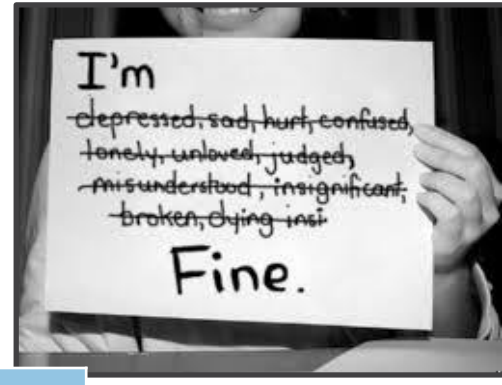
Depression-related Diagnostic Errors

Project RedDE!
Reducing Diagnostic Errors
in Primary Care Pediatrics



Outcome	Comparison	N	%	RD (95% CI)	P
Documentation of Diagnosis of Depression	Intervention vs. Control	7508	10.5% vs. 6.6%	3.9% (2.4%, 5.3%)	<0.0001

Note: 1. Fitted by generalized mixed-effects model with potential clustering effects of practices and months taken into account; 2. Percentages (%) and RD's (Risk Difference) are model-based estimates.

* Adjusted for age, sex, insurance, and wave

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Elevated BP-related Diagnostic Errors

Project RedDE!
Reducing Diagnostic Errors
in Primary Care Pediatrics

Outcome	Comparison	N	%	RD (95% CI)	P
Appropriate action taken and documented for EBP	Intervention vs. Control	3783	75.4% vs. 58.9%	16.5% (12.8%, 20.1%)	**<0.0001**

Note: 1. Fitted by generalized mixed-effects model with potential clustering effects of practices and months taken into account; 2. Percentages (%) and RD's (Risk Difference) are model-based estimates.
* Adjusted for age, sex, insurance, and wave

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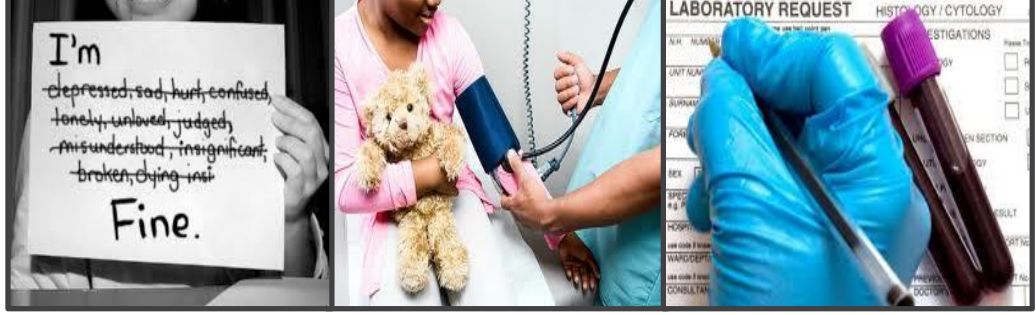
Anecdotally:

Project RedDE!
Reducing **D**iagnostic **E**rrors
in Primary Care Pediatrics

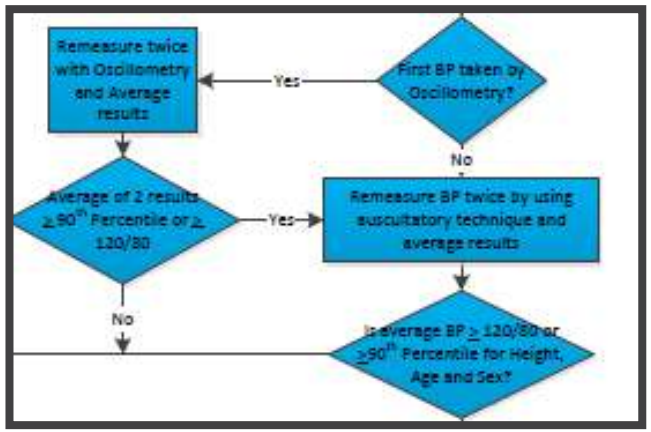


- "We never would have screened or even considered depression in a 12 year-old, and we found two 12-year-old patients last week with depression, one of whom was suicidal."
- "Before Project RedDE! we would have ignored his elevated blood pressure, just chalked it up to him being an upset 3 year-old. But when we followed it up, it was sustained and he had an UPJ obstruction."
- "I thought maybe I should look for an STI [one of Project RedDE's 5 lab groups], and sure enough she had Chlamydia. I never would have even considered it."

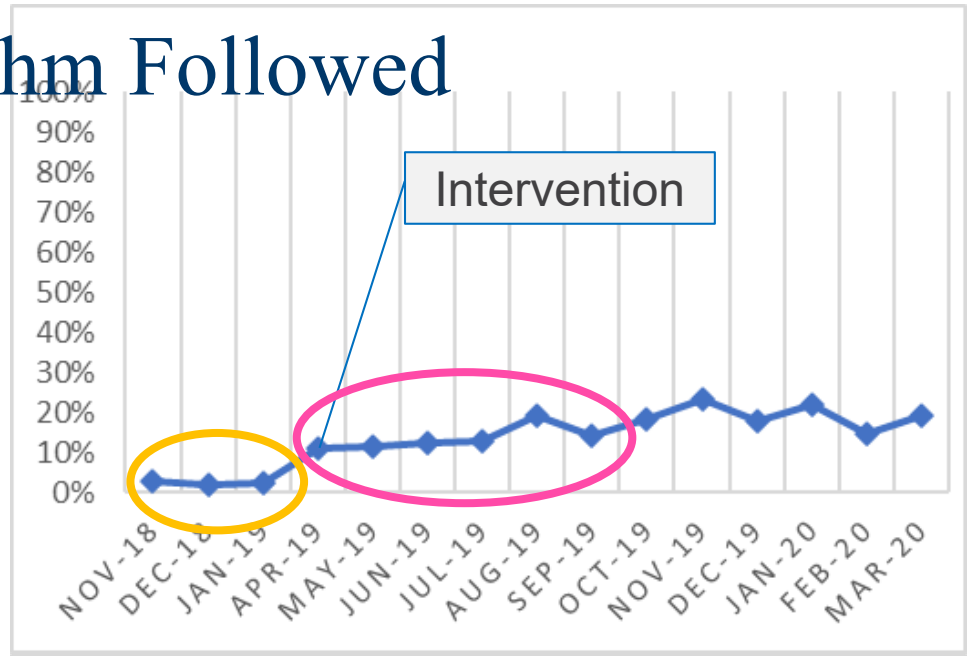
OUR BEST MEASURE:
12 Months Intervention:
BP Measurement Algorithm Followed

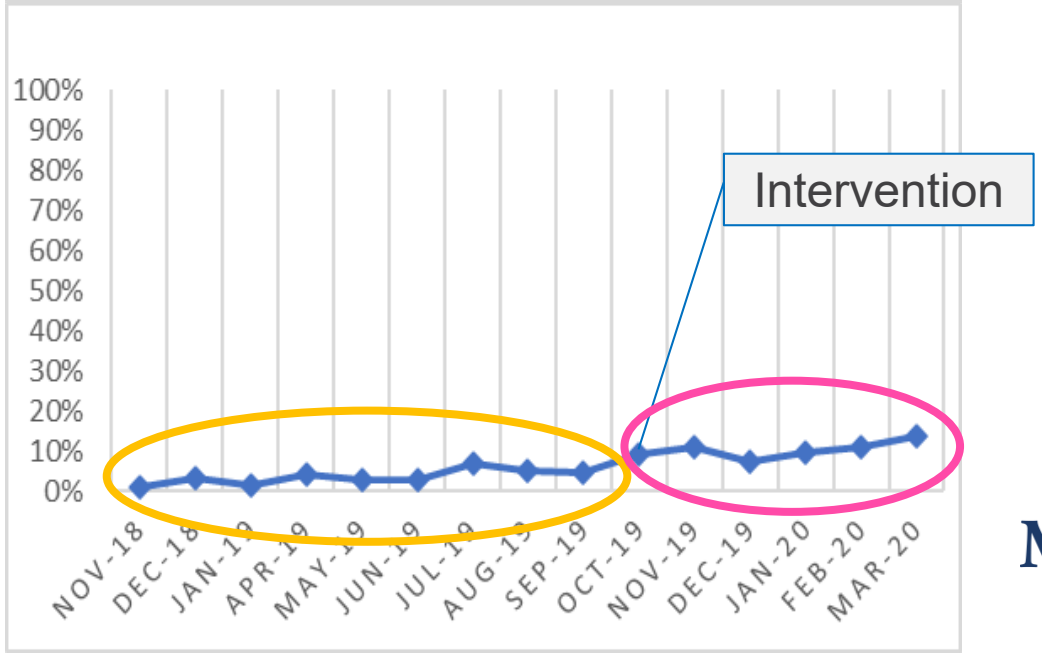
Boosting Primary Care Awareness and Treatment for Childhood Hypertension

Cohort 1:
N=4424



Cohort 2:
N=4679





Baseline 3%
Intervention 11.6%
RD 6.3
95% CI (4.5, 8)

LESSON 6: Pick only a few measures

Lesson 14: Statistical significance does not equal clinical significance

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	Baseline			Intervention			Elevated Intervention			Estimated Percent Improvement/RD in Regression Model: Intervention vs. Baseline		Elevated Intervention vs. Baseline		Elevated Intervention vs. Intervention-	
	Criteria Met	N	%	Criteria Met	N	%	Criteria Met	N	%	RD	95%CI	RD	95%CI	RD	95%CI
BP Algorithm followed	141	4738	3	402	3475	11.6	260	1368	19	**6.3**	**(4.5,8.0)**	**12.2**	**(9.2,15.1)**	**5.9**	**(3.5,8.4)**
Recommended counseling	2142	4118	52	1561	2778	56.2	571	1094	52.2	0.01	(-4.1, 4.2)	-0.27	(-7.1,6.5)	-0.33	(-4.6,4.0)
3 Extremity BP Performed	1	844	0.1	3	605	0.5	3	219	1.4	0.4	(-0.23, 1.0)	1.2	(-0.3,2.8)	0.9	(-0.8,2.5)
PCP Follow Up Recommended	373	3758	9.9	338	2505	13.5	183	1009	18.1	1.4	(-1.4, 4.1)	3.5	(-1.1,8.1)	2.2	(-1.0,5.3)
Stage 2 PCP Follow up Scheduled	5	110	4.5	4	69	5.8	3	20	15	-0.5	(-6.7, 5.8)	11.7	(-5.2,28.5)	12.2	(-4.7, 29.0)
Stage 1/EBP Follow up Scheduled	144	2809	5.1	160	1847	8.7	106	768	13.8	1.2	(-1.2, 3.7)	4.7	(0.5,8.9)	3.5	(0.4,6.5)
Diagnosis of Stage 2 HTN Documented**	2	28	7.1	3	11	27.3	2	3	66.7	N/A*	N/A*	59.5	(1.5,117.6)	39.4	(-24.3, 103.1)
Diag Stag Documente						19.5	5	24	20.8	N/A**	N/A**	26.3	(-3.6,56.2)	7.0	(-15.4, 29.5)
Diagnosis EBP Docun					177	22.6	12	59	20.3	N/A**	N/A**	7.5	(-10.8, 25.7)	-2.9	(-16.5, 10.8)
Recon Lab Tests Completed**					06	1	5	65	7.7	N/A**	N/A**	9.5	(1.1,17.8)	8.1	(11.9,15)

RD: Risk Difference

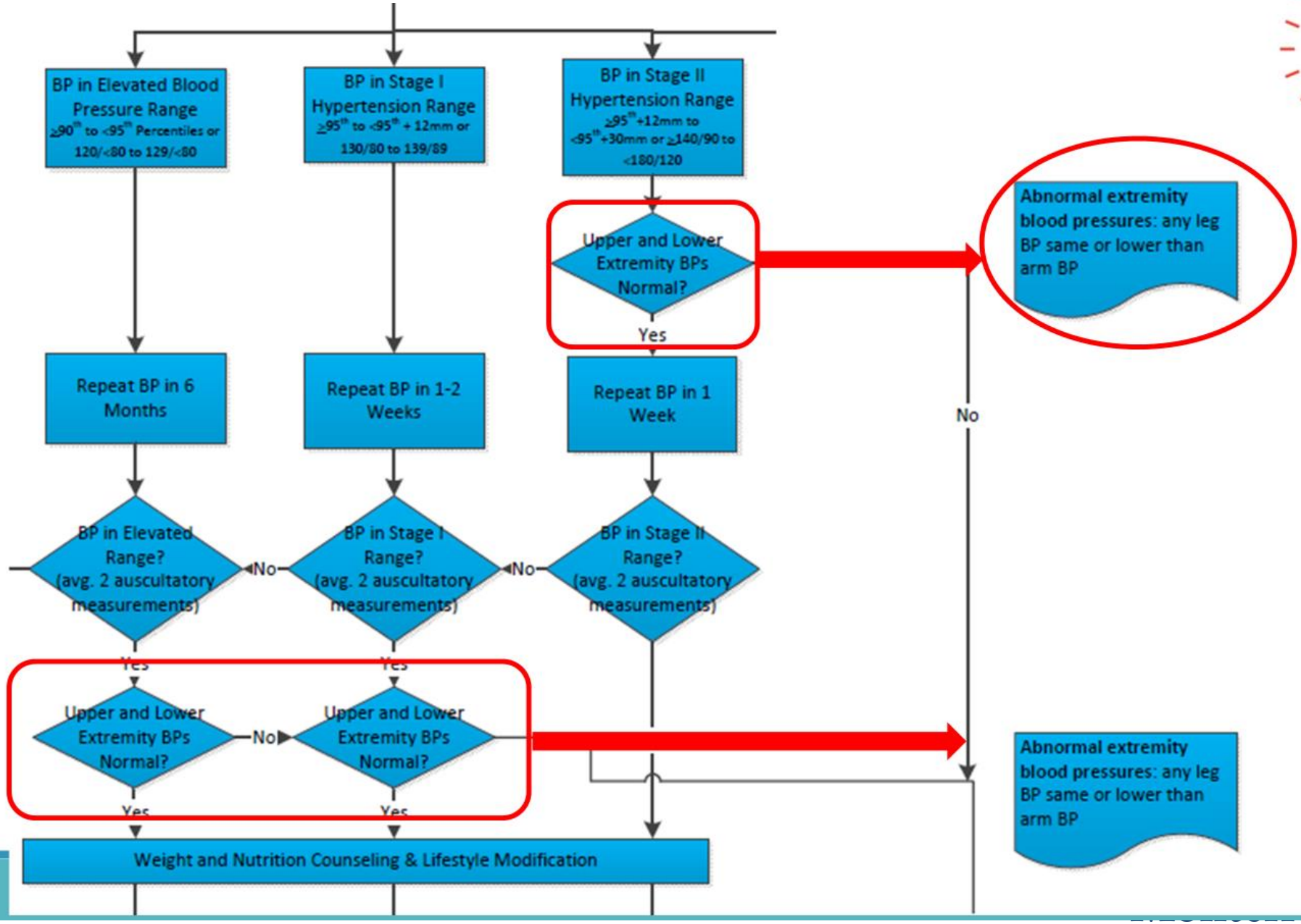
*Enough Data not available to compile data

Lesson 15: Guidelines need to keep reality of implementation in mind

LESSON 6: Pick only a few measures

Boosting Primary Care Awareness and Treatment for Childhood Hypertension

Boosting Primary Care Awareness and Treatment for Childhood Hypertension



	Baseline			Intervention			Elevated Intervention			Estimated Percent Improvement/RD in Regression Model: Intervention vs. Baseline		Elevated Intervention vs. Baseline		Elevated Intervention vs. Intervention-	
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Diagnosis of Stage 2 HTN Documented**	2	28	7.1	3	11	27.3	2	3	66.7	N/A*	N/A*	59.5	(1.5,117.6)	39.4	(-24.3, 103.1)
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RD: Risk Difference

*Enough Data not available to compile data

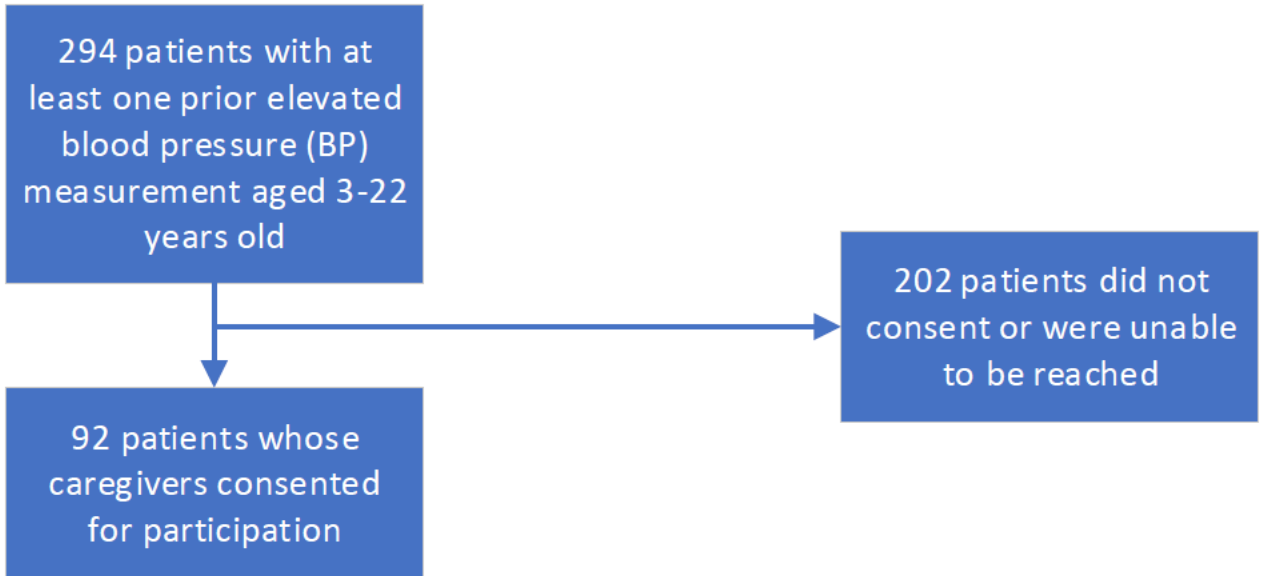
Boosting Primary Care Awareness and Treatment for Childhood Hypertension

Lesson 15: Guidelines need to keep reality of implementation in mind

LESSON 6: Pick only a few measures

BP-CATCH 2: Pediatric Home Blood Pressure Monitoring

- Winter 2020-2021; Urban pediatric clinics



BP-CATCH 2: Pediatric Home Blood Pressure Monitoring

72 patients presented to clinic for manual BP measurements (58 received 2 measurements; 14 received 1 measurement)

- Winter 2020-2021;
  Urban pediatric clinics
- 294 eligible patients
- 92 enrolled (31%)
- 72 showed up (78%)
- 26 HBPM data (36%)
- <10% success rate

Lesson 16: Research often begets more questions than answers

Manuscripts: Lesson 17: Lots to be Learned

Baseline Data

- Rinke ML, Singh H, Heo M, Adelman J, O'Donnell HC, Choi SJ, Norton A, Stein REK, Brady TM, Lehmann CU, Kairys SW, Rice-Conboy E, Thiessen K, Bundy DG. *Diagnostic errors in primary care pediatrics: Project RedDE*. Academic Pediatrics. 2018. 18:220-227. PMID: 28804050

Methodology

- Bundy DG, Singh H, Stein REK, Brady TM, Lehmann CU, Heo M, O'Donnell HC, Rice-Conboy E, Rinke ML. *The design and conduct of Project RedDE: A cluster-randomized trial to reduce diagnostic errors in pediatric primary care*. Clinical Trials. 2019. 16:154-164. PMID: 30720339

Primary Results for each Error

- Rinke ML, Singh H, Brady TM, Heo M, Kairys SW, Orringer K, Dadlez NM, Bundy DG. *Cluster randomized trial reducing missed elevated blood pressure in pediatric primary care: Project RedDE.* Pediatric Quality and Safety. 2019. 4:e187 [Epub]. PMID: 31745503
- Rinke ML, Bundy DG, Stein REK, O'Donnell HC, Heo M, Sangvai S, Lilienfeld H, Singh H. *Increasing recognition and diagnosis of adolescent depression: Project RedDE a cluster randomized trial.* Pediatric Quality and Safety. 2019. 4:e217 [Epub]. PMID: 31745520
- Rinke ML, Bundy DG, Lehmann CU, Heo M, Adelman JS, Norton A, Singh H. *Project RedDE: Cluster randomized trial to reduce missed or delayed abnormal laboratory value actions.* Pediatric Quality and Safety. 2019. 4:e218 [Epub]. PMID: 31745521.

Mini-RCAs

- Dadlez, NM, Adelman J, Bundy DG, Singh H, Applebaum JR, Rinke ML. *Contributing factors for pediatric ambulatory diagnostic process errors: Project RedDE.* Pediatric Quality and Safety. 2020. 5:e299 [Epub]. PMID: 32656467

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Boosting
Primary
Care
Awareness and
Treatment for
Childhood
Hypertension

Manuscripts: Lesson 17: Lots to be Learned

- Rea CJ, Brady T, Bundy DG, Heo M, Faro E, Giuliano K, Goilav B, Kelly P, Orringer K, Tarini B, Twombley K, Rinke ML. *Pediatrician adherence to guidelines for diagnosis and management of high blood pressure.* The Journal of Pediatrics. 2022. 242:12-17. PMID: 34774574

Baseline Data

- Heo M, Rea CJ, Brady TM, Bundy DG, Melikam S, Orringer K, Tarini BA, Giuliano K, Twombley K, Goilav B, Kelly P, Faith MS, Pietrobelli A, Rinke ML. Racial and ethnic disparities in pediatric counseling on nutrition, lifestyle, and weight: A secondary analysis of the BP-CATCH randomized clinical trial. JAMA Network Open, 2025. 8:e2456238 [Epub]. PMID 39878982

Equity Analysis

Lesson 18: Push your manuscripts until accepted

Primary Results

- Brady T, Goilav B, Tarini B, Heo M, Bundy DG, Rea CJ, Twombley K, Giuliano K, Orringer K, Kelly P, Rinke ML. *Pediatric home blood pressure monitoring: Feasibility and concordance with clinic-based manual blood pressure.* Hypertension. 2022 79:e129-e131. PMID: 35983760

BP-CATCH 2: HBPM

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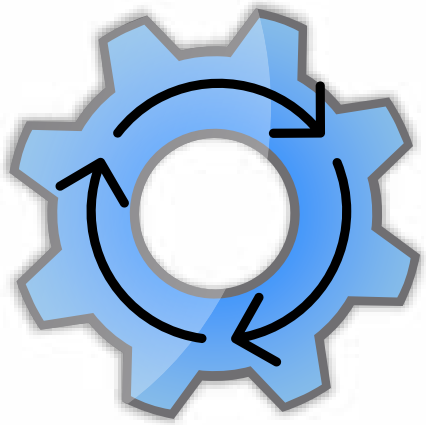
Next Steps:

- Say goodbye to practices
- Feedback final data analyses
- Memorialize change packages
- Think about through lines for next projects
- Present your work

Questions for the Post-Collaborative period in a national quality improvement collaborative?



Post-Collaborative

- Data Analysis
- Manuscripts
- Next steps

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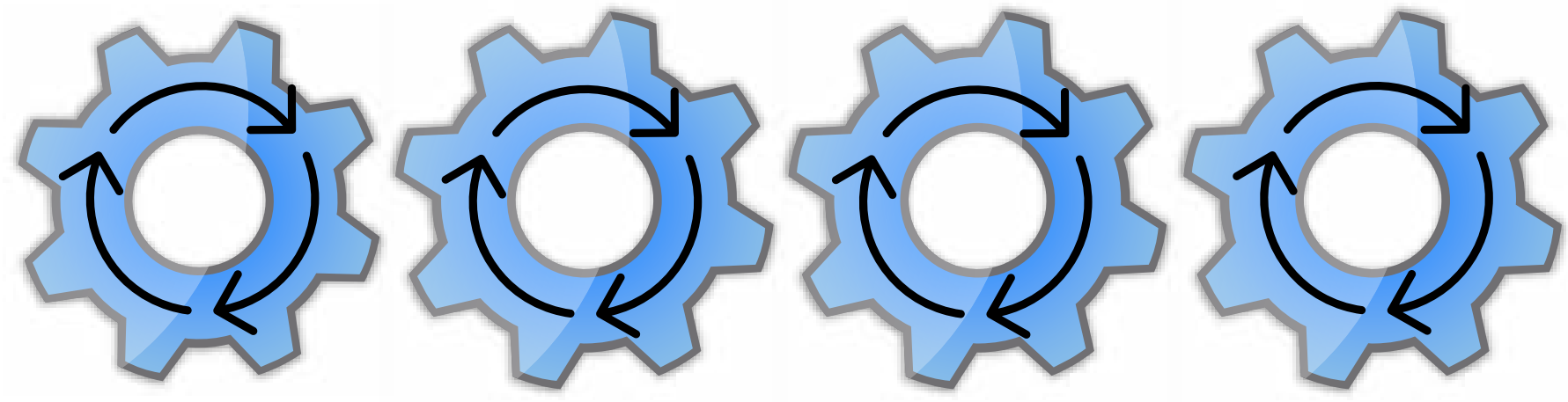
Agenda

1. Introduction
2. Quality Improvement Collaborative Phases
    1. Pre-Decision
    2. Pre-Collaborative
    3. Collaborative
    4. Post-Collaborative
3. **Conclusion**

INTERACTIVE

Phases of a Quality Improvement Collaborative



Pre-Decision	Pre-Collaborative	Collaborative	Post-Collaborative
• Great Team • Stakeholder interest • Novel • Funding	• Recruitment • Measure Identification • Change Package • Meetings • Publication Policy	• Retention • Data QA • Mixed Methods • Flexibility	• Data Analysis • Manuscripts • Next steps

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Lessons Learned:

- **Lesson 1: FIND A GREAT TEAM WHO YOU WANT TO WORK WITH, A LOT**
- Lesson 2: Involve your subjects in designing your research
- Lesson 3: Quasi- Experimental Designs are great when you don't have Clinical Equipoise and can create novelty
- Lesson 4: Funding, not needed, is very hard and has long time delays
- Lesson 5: Incentivize but don't force recruitment
- Lesson 6: Pick only a few measures
- Lesson 7: Change package is a living document
- Lesson 8: QIC meetings are for improvement, recruitment and retention
- Lesson 9: Clear guidelines for authorship and publications at the start of the QIC
- Lesson 10: Personal touch for retention and over recruit
- Lesson 11: Data QA is critical during the QIC, not after
- Lesson 12: Mixed methods approaches with quasi-experimental design
- Lesson 13: Be adaptable and flexible
- Lesson 14: Statistical significance does not equal clinical significance
- Lesson 15: Guidelines need to keep reality of implementation in mind
- Lesson 16: Research often begets more questions than answers
- Lesson 17: Lots to be learned from QICs
- Lesson 18: Push your manuscripts until accepted

Project RedDE!
Reducing Diagnostic Errors
in Primary Care Pediatrics

Boosting
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Which lesson(s) resonated the most with you?

How might these lesson(s) influence your future QI work?

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Thank you and Questions

Project RedDE!
Reducing Diagnostic Errors
in Primary Care Pediatrics

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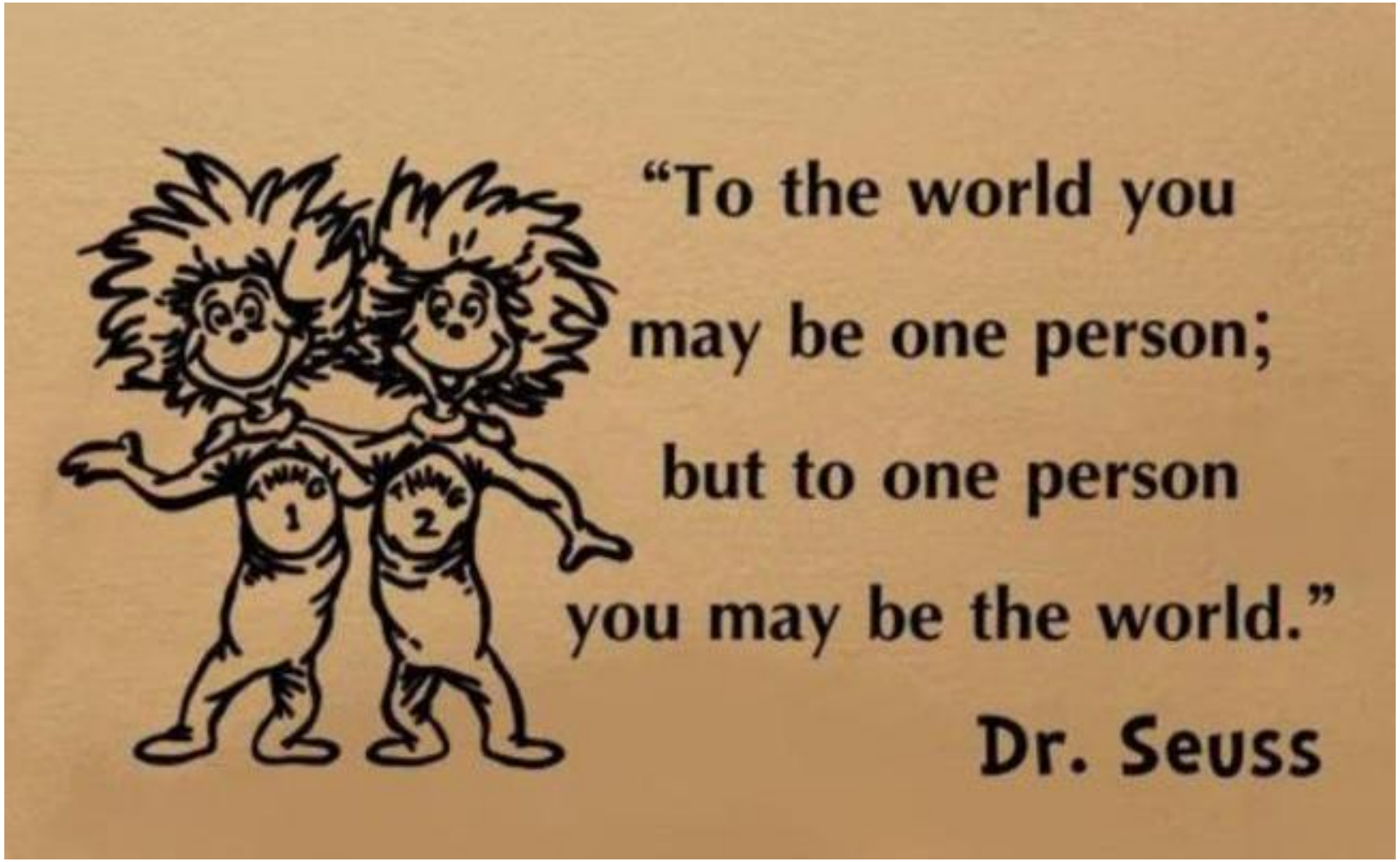

Please complete the evaluation

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