

PRIMARY CARE AND WIC COORDINATION TO PREVENT OBESITY FOR INFANTS: A RANDOMIZED CLINICAL TRIAL

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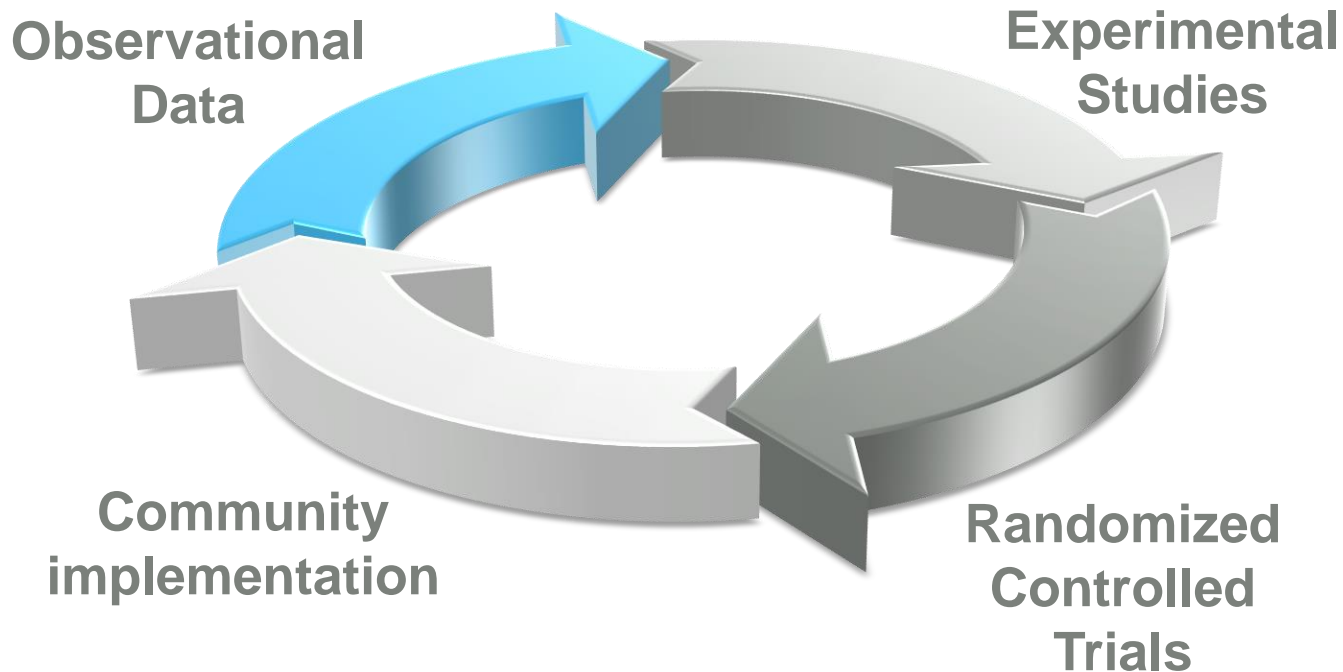
Jennifer Savage Williams has documented no financial relationships to disclose or conflicts of interests (COIs) to resolve.



The Center for Childhood Obesity Research

Conducts research that provides an evidence base needed to develop successful childhood obesity prevention programs

Develop partnerships with public health professionals and communities to design and implement sustainable interventions



**1 of 3 children in the U.S. are
overweight or obese before age 5**



Infants with rapid weight gain have...

- Higher BMI and fat mass in childhood¹
- Increased risk of obesity in adulthood²
- Higher blood pressure in childhood³ and adulthood⁴
- Reduced physical fitness in childhood⁵
- Increased metabolic risk factors at 17 y⁶

¹Sacco, J Clin Nutr, 2013; Koontz, Ped Obes, 2014; Taveras, Pediatrics, 2009; Stettler, ²Circulation, 2005;

³Belort 2007 J Pediatr; ⁴Ben Shlomo, Hypertension, 2008; ⁵Van Deutekom, Int J Obes, 2015;

⁶Ekelund, J Clin Endocrinol Metab, 2007



Responsive Parenting/Caregiving

Defined as a mother's/caregiver's prompt, contingent, & developmentally-appropriate interaction with child

Why target responsive parenting?

- ❑ Language development
- ❑ Attachment
- ❑ Emotional growth
- ❑ Social competence
- ❑ School readiness
- ❑ Self regulation
- ❑ Weight status?



Lamb, Easterbrook, *Infant social cognition: Empirical and theoretical considerations*, 1981;
Ainsworth, Bell, *Stimulation in early infancy*, 1969; Eshel et al. Bull World Health Organ. 2006

Structure-based parenting may influence child eating behavior

Control

Psychological Control:

- Pressure
- Intrusiveness
- Dominance



Vs.



Structure

Behavioral Control:

- Routines
- Guidance
- Limit setting

Structure in Feeding

- Provides access
- Rules & routines
- Child perspective
- Parent provides, child decides

Control in Feeding

- Restricts all access
- Hiding foods
- Parent perspective
- Takes food away



Poorer
self-regulatory
abilities

Overconsumption?



Greater
self-regulatory
abilities

**Consumption
in moderation?**

We often talk about what NOT to do...but, what guidance should be provided on what to do?



Do we need more than one manual?



The Intervention Nurses Start Infants Growing on Healthy Trajectories (INSIGHT) Study

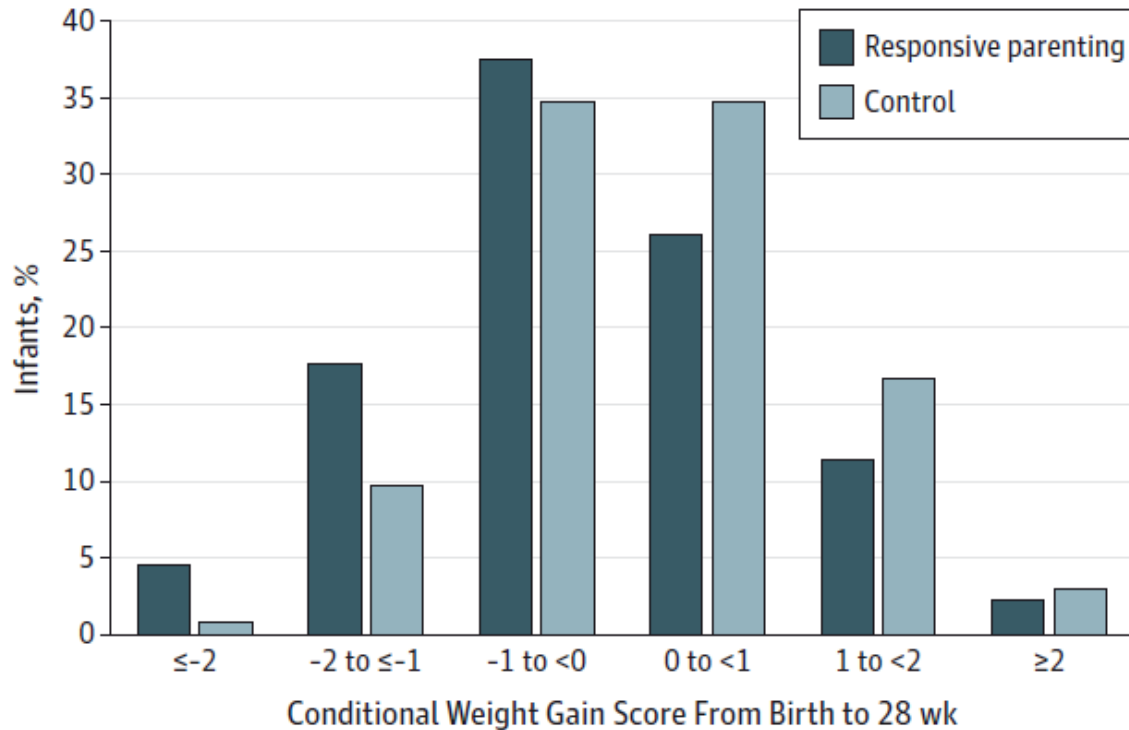


Primary Aim: To evaluate a responsive parenting (RP) intervention that is designed to prevent rapid infant weight gain and childhood obesity at age 3 years among first-born infants.

Funding: NIDDK R01DK088244

Study protocol: Paul et al. 2014 BMC Pediatrics

Rapid weight gain from birth to 28 weeks



Faster weight gain:

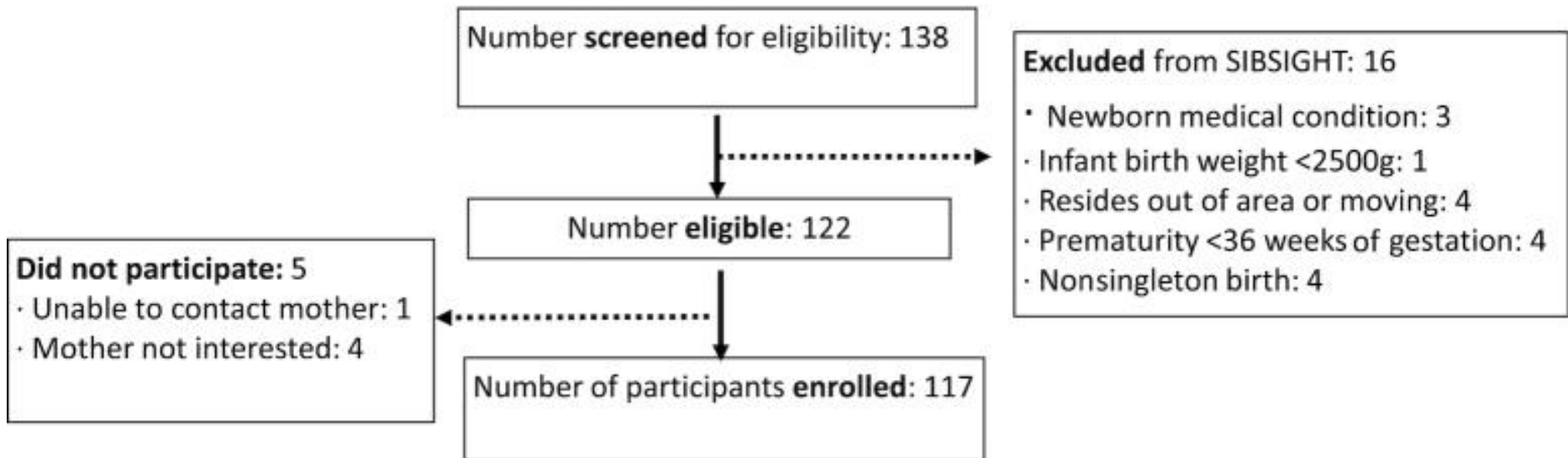
37% parenting

51% safety

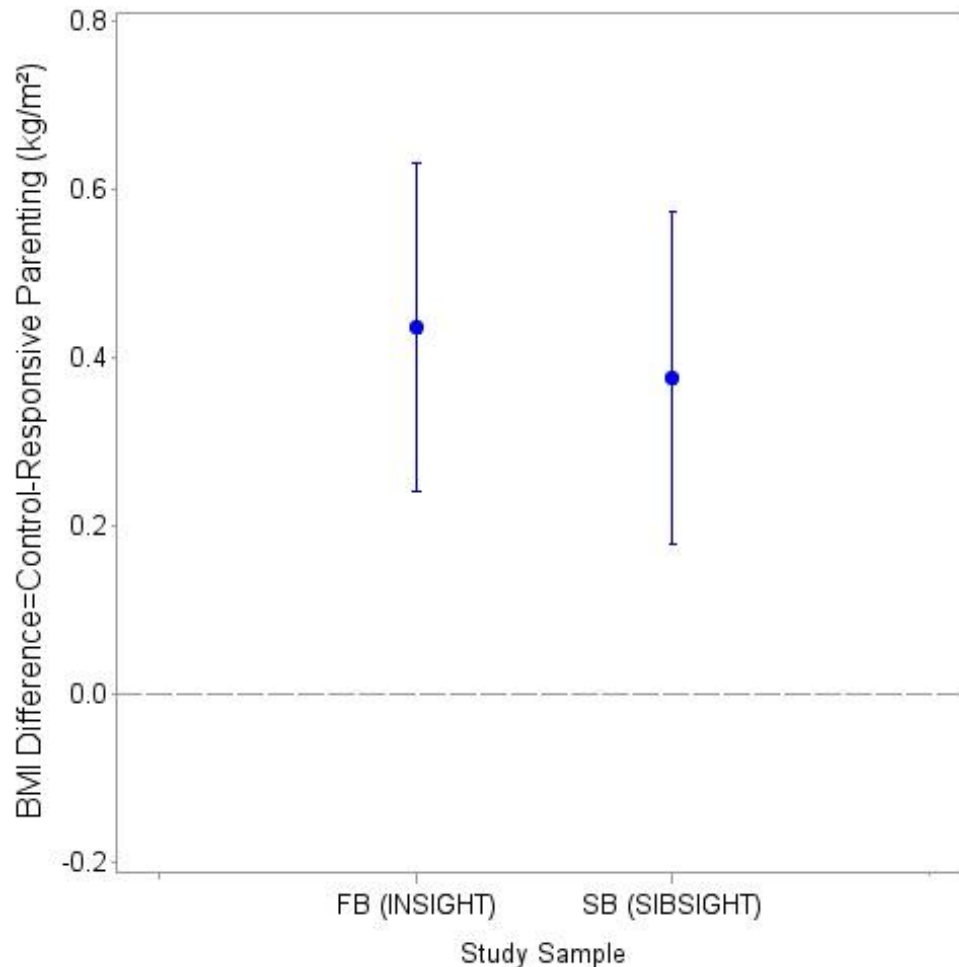
*CWG Mean = 0;

CWG score > 0 = faster weight gain, CWG score < 0 = slower weight gain

SIBSIGHT

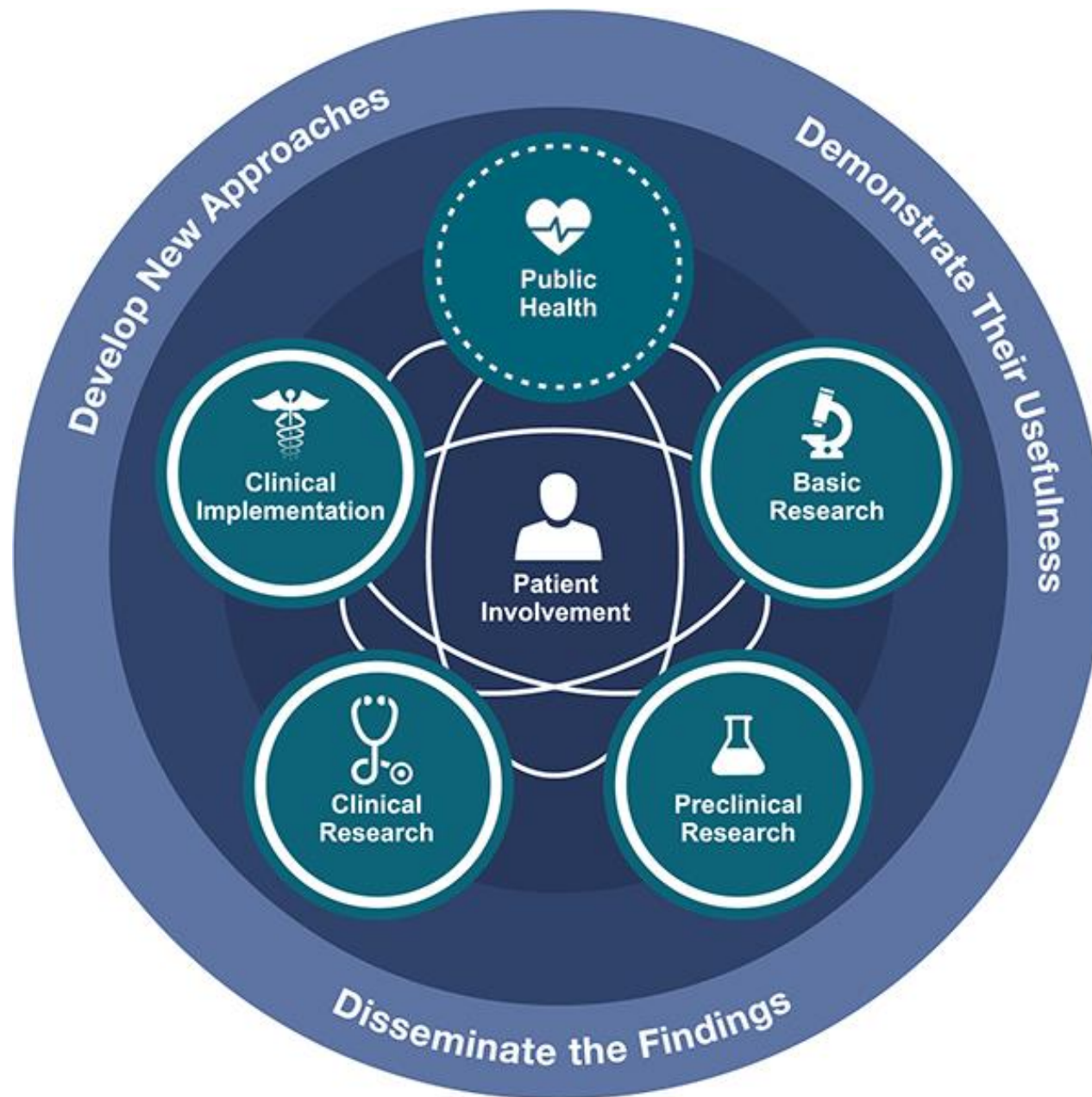


INSIGHT RP has protective effect on firstborn and secondborn sibling BMI



Firstborn children whose parents received the RP intervention with their first child had BMI that was 0.44 kg/m² (95% CI: -0.82 to -0.06) lower than controls, respectively.

Second-born children whose parents received the RP intervention with their first child had BMI that was 0.36 kg/m² (95% CI: -0.75 to 0.03) lower than controls, respectively.



CLINICAL-COMMUNITY INTEGRATION TO ACHIEVE HEALTHY PEOPLE & COMMUNITIES:

A FRAMEWORK TO OPTIMIZE THE PREVENTION AND TREATMENT OF OBESITY AND IMPROVE POPULATION HEALTH

People are more likely to engage in a healthcare system integrated with their community, where settings and resources reinforce healthy behaviors, provide patient-centered care, and undergo continuous evaluation and improvement. Stakeholders recognize their interdependency and act in a coordinated and collaborative fashion to improve health and achieve health equity. This drives behavior change and ultimately helps to prevent and treat obesity and improve population health.

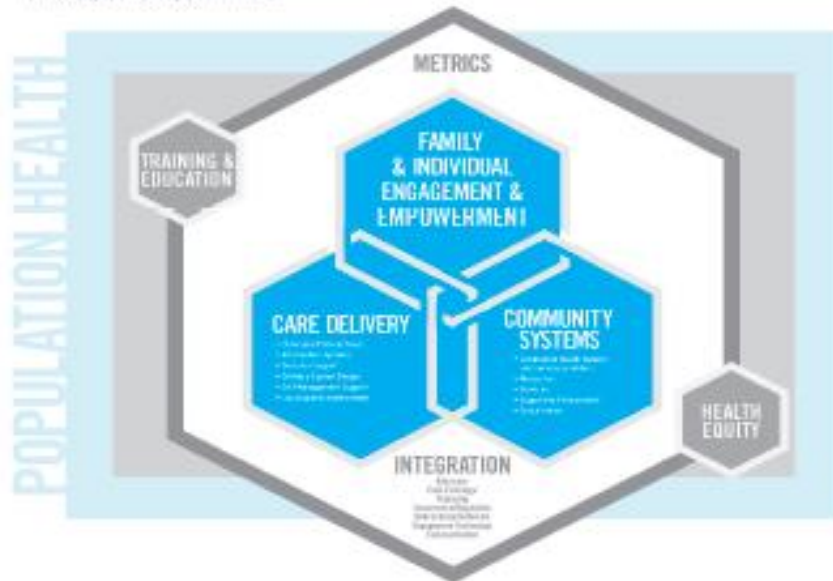


Figure 1 | An illustration of a framework that integrates clinical and community systems to prevent and manage obesity.

Care delivery- guidelines & recommendations, clinical decision support, best available evidence, workflow

Family & individual engagement- patient-reported risk assessment data, self-directed learning

Community systems- schools, WIC, etc.

Big data- integration and metrics

Dietz, W. H., B. Belay, D. Bradley, S. Kahan, N. D. Muth, E. Sanchez, and L. Solomon. 2017. *A model framework that integrates community and clinical systems for the prevention and management of obesity and other chronic diseases*. National Academy of Medicine, Washington, DC. <https://nam.edu/wp-content/uploads/2017/01/A-Model-Framework-That-Integrates-Community-and-Clinical-Systems-for-the-Prevention-and-Management-of-Obesity-and-Other-Chronic-Diseases.pdf>.



WEE Baby Care Study

Build and evaluate a model for delivering consistent personalized messages to coordinate care across multiple settings – WCV and WIC - to support mothers and their children's related health outcomes.

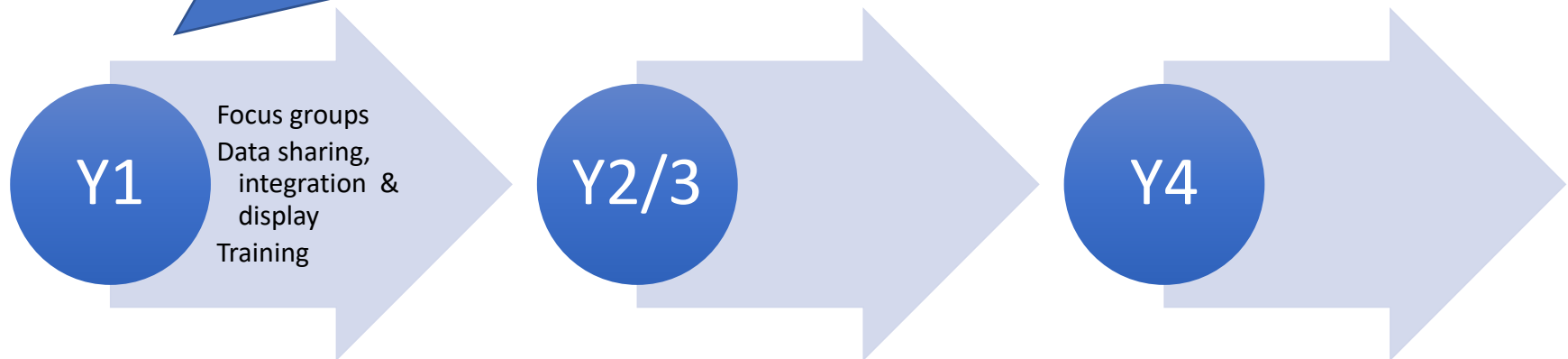


Developed by The MatColl Institute

Anticipated Opportunities for Coordination by Infant Age

	Newborn	1 mo.	2 mo.	3 mo.	4 mo.	5 mo.	6 mo.
Well Child Visits (WCV)	X	X	X		X		X
WIC Visits	X			X			X

Objective 1: Tailor curriculum to ensure cultural appropriateness, and evaluate delivery mode and use of health information technologies.



Funding Support: Maternal and Child Health Research HRSA 1 R40MC283170100;
Co-PI's: Savage, Bailey Davis

Conflicting Messaging: Parents Confused about Growth

“His doctor thinks that he’s at a proper weight and health, where his WIC nutritionist thinks that he’s overweight and in risk of getting like diabetes and stuff.”

-Mother of Infant receiving WIC and Pediatric Well Child Care

*“We might be talking about the weights on the charts so then they [mothers] might say, ‘well the doctor always has a different percent or different number’ than we have so then they would sometimes listen to the doctor instead of us. And sometimes I’ll get like a little offended, cause we might say they’re overweight but according to the doctor they’re okay.” – **WIC Nutritionist***

*“...I don’t know what that is, you know if we just have, if we’re using the same growth curves or not or what is, what is the scale, but I notice that too. We have parents coming in saying they’re underweight but they’re not, you know. Or they’ll have a four-month-old and they’ll say well they weigh too much for their height, and I’m like well they’re four months.” **-Pediatrician***

Conflicting Messaging: Parents Confused about Feeding

“My doctor had told me to start giving him cereal at night, where WIC was...stern against him having cereal until...he was 6 months. But...he was about 3 months when the doctor said go ahead...it’s not going to hurt him...”

-Mother of Infant receiving WIC and Pediatric Well Child Care

“Mom will not start solids before four months, so we’re following up with that, and she’ll say ‘well no we started that last month because he was, you know, taking too much formula and the doctor said it was fine.’” - WIC Nutritionist

“WIC is telling them to introduce solids is much earlier stage than what the American Academy of Pediatrics guidelines are. So, um, some of them are starting to get cereal and baby food at 3 ½ months or 4 months of age where the AAP is pushing more toward 6 months and they are telling me that this is what WIC has been giving us.” - Pediatrician

Coordinating Care: Strategy to Clarify Messages for Parents

“Sometimes you can explain the same thing the doctor said, but in a different way and the mom will just thank you, because you brought it to her level, and so it’s the same message, but explained in a different way.”

-WIC Nutritionist

“...if the WIC feels okay mom is doing a good job, I want to know the mom is doing a good job so I don’t have to again like you know like give her a positive reinforcement [and] I can concentrate more on like something else.” – Pediatrician

“I don’t think that would bother me at all because then they could learn from each other and hopefully... they can get on a system that works and collaborates with both and then they’d be on the same page.” – Mother of infant receiving WIC and Pediatric Well Child Care

Objective 1: Tailor curriculum to ensure cultural appropriateness, and evaluate delivery mode and use of health information technologies.

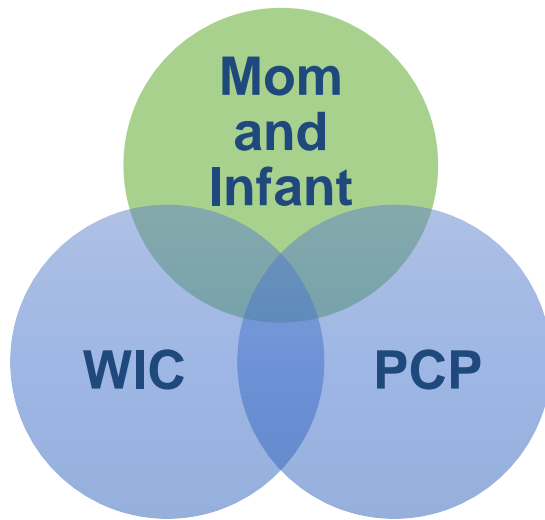


Objective 2: Establish the efficacy of providing coordinated, personalized care on responsive parenting across multiple settings to prevent overweight at 6 months of age.

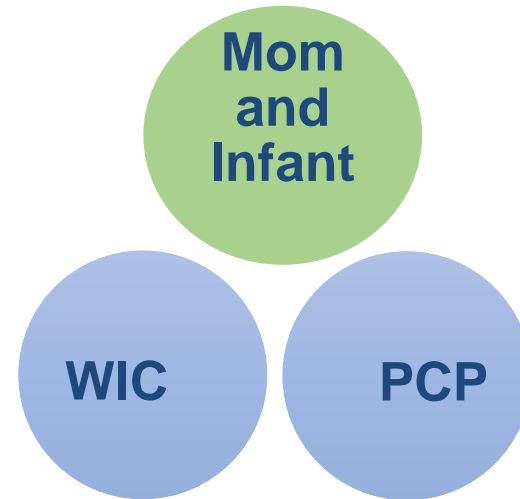
Funding Support: Maternal and Child Health Research HRSA 1 R40MC283170100;
Co-PI's: Savage, Bailey Davis

Community Systems

Integration of clinical care and community



Treatment (n=145):



Standard of Care Control(n=145)

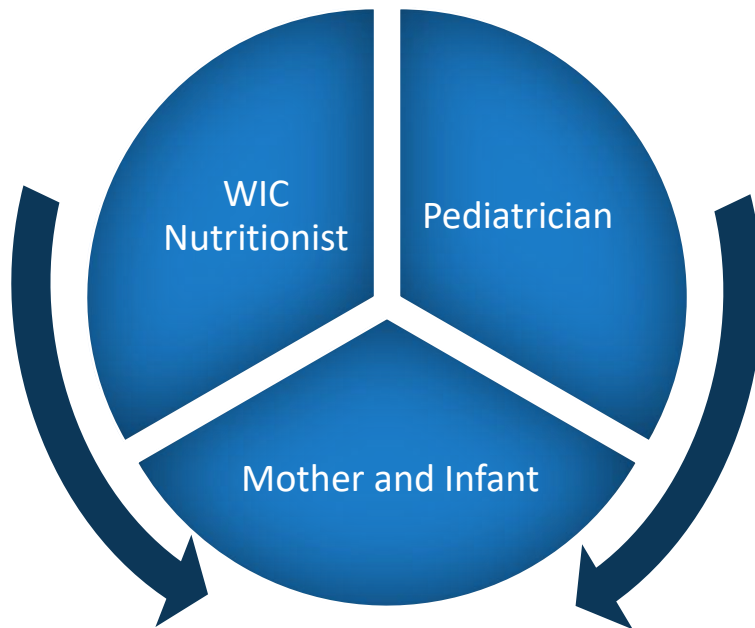
Participants were consented when baby was < 35 days old

Funding Support: Maternal and Child Health Research HRSA 1 R40MC283170100;

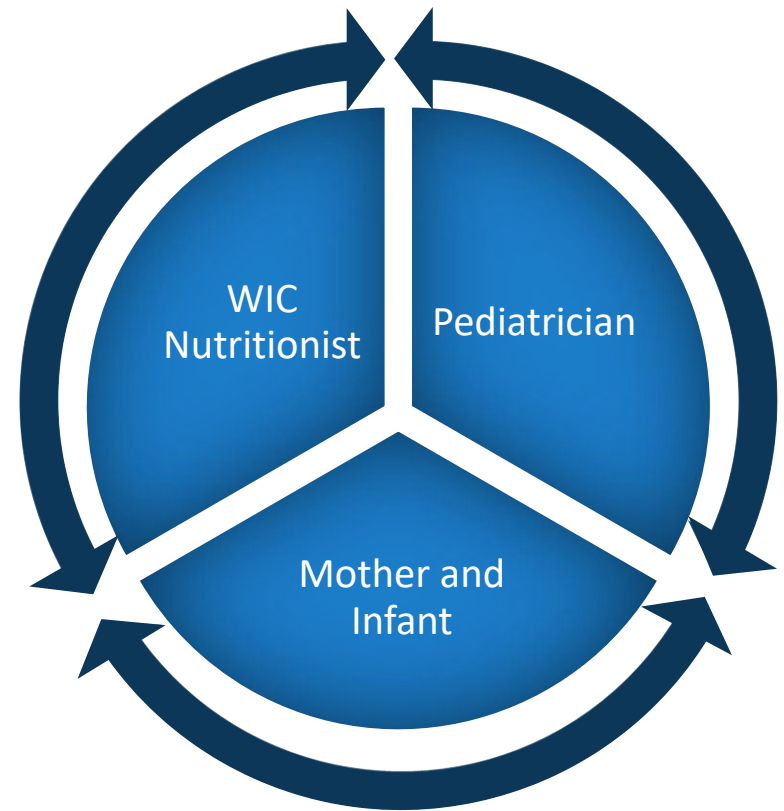
Co-PI's: Savage, Bailey Davis

Protocol: Savage et al., *BMC Pediatrics*, 2018

WEE Baby Care Study Design



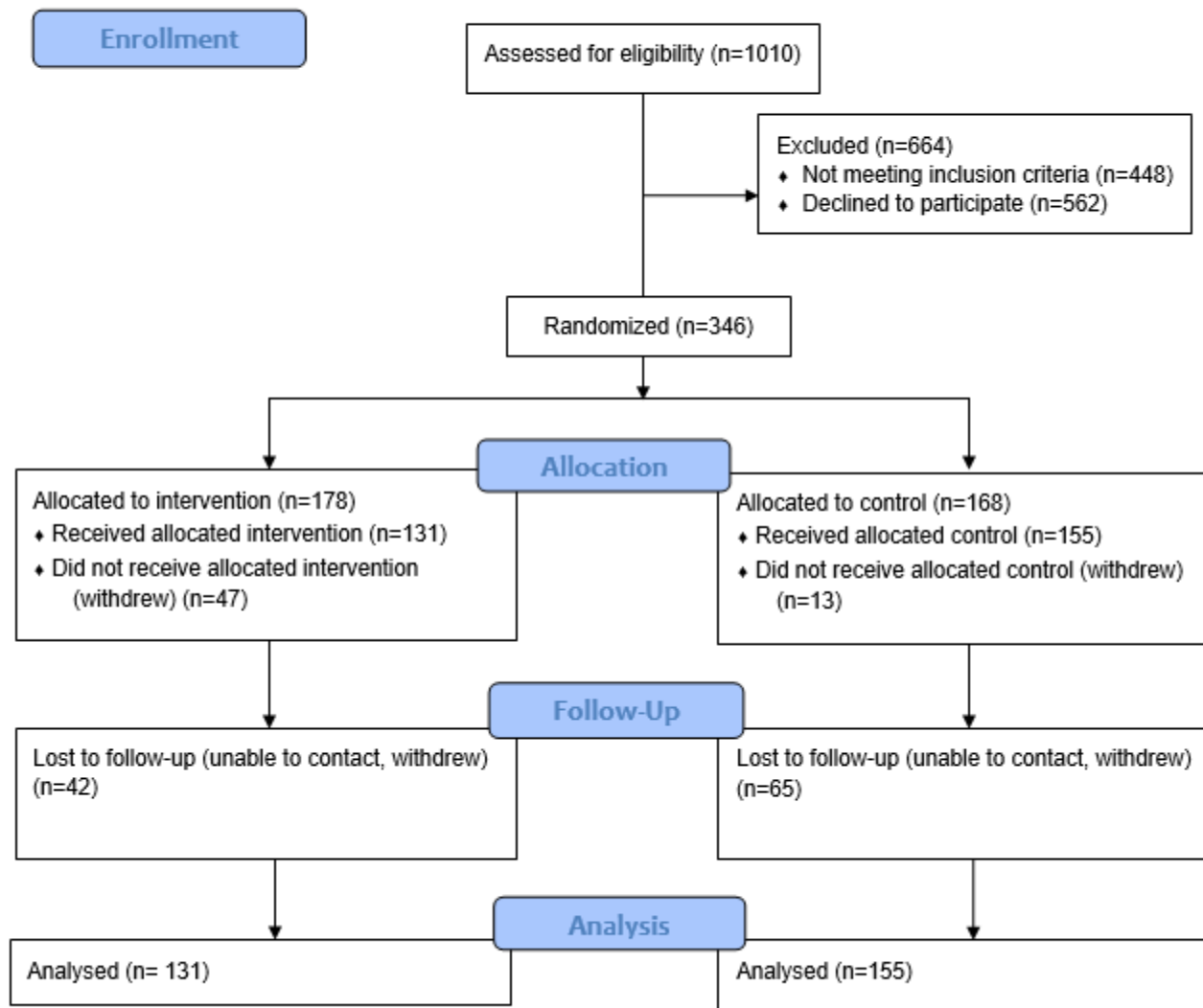
Control: Standard Care
N = 155



Intervention: Integrated Care
N = 131

- Participants were consented when baby was < 35 days old

CONSORT 2010 Flow Diagram



Participants had a median income of \$10,000 to \$24,999

	% of all participants
Race and Ethnicity	
Non-Hispanic White Caucasian	65%
Non-Hispanic African American	15%
Hispanic or Latino	25%
Marital Status	
Married	27%
Single or divorced	44%
Single but living with partner	27%
Education	
Some high school	11%
High school graduate	50%
Some technical school	30%
College graduate	8%
Employment	

Intervention components

1. Personalized messaging using
Early Healthy Living
screening tool



WEE Baby
Care Study

Digital Tools:

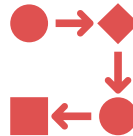
Patient-Reported Outcome Measure (PROM)



Involve Patients

Patient-Reported Outcome
Measures

Risk Calculators



Involve Clinicians

Progress Note
Synopsis Report
1-click Referral



Variables

Access
Leadership

PRE-APPOINTMENT Questionnaire

- click to complete online -

PROM: working definition

Eriksen J, Bygholm A, Bertelsen P. The purpose of patient-reported outcome (PRO) post its digitalization and integration into clinical practice: An interdisciplinary redefinition resembling PROs theoretical and practical evolvement. *Applied Sciences*. 2020 Jan;10(21):7507.

validated questionnaire

developed in collaboration between patients, clinicians, and other pertinent stakeholders

systematically applied

mediated digitally

completed directly by a qualified proxy

composed of disease-specific or preference-based measures


consisting of content pertaining to the patient's physical condition and well-being

providing objective and/or subjective outcomes, and individual and/or population data




5. How sleepy is your child when you put him/her to bed?


☐ Wide awake








☐ Awake but drowsy/sleepy





☐ Already asleep



2. Select beverages that your child drank in the past week.

<input type="checkbox"/>	Breastmilk	 
<input type="checkbox"/>	Formula	
<input type="checkbox"/>	Milk	
<input type="checkbox"/>	Water	
<input type="checkbox"/>	100% Juice	
<input type="checkbox"/>	Fruit punch, Fr Lemonade, Sor	

		Yes	No
12.	I sometimes nurse, give a bottle, or something to eat as a way to keep my child quiet or to calm my child when he/she is upset.	<input type="checkbox"/>	<input type="checkbox"/>
13.	I try to get my child to finish his/her bottle, snacks or meals.	<input type="checkbox"/>	<input type="checkbox"/>
14.	Do you usually use a cellphone, laptop or computer, or have the television on when you are feeding or playing with your child?	<input type="checkbox"/>	<input type="checkbox"/>
	 		
15.	Is the television usually on in the room where your child goes to sleep at night?	<input type="checkbox"/>	<input type="checkbox"/>

Coordinated Care Curriculum *centered on the patient*

- Patient Reported Data
- Food, Sleep, Activity, Responsive Parenting
- Every well child visit 0-24 mo.
- Clinical Decision Support to inform Preventive Counseling

EHL Data Collection



Parent Completes Early Healthy Living (EHL)

Immediate personalized feedback (pdf)
Educational materials, links



Parent Concerns

Parent sets an agenda by choosing topics to discuss with provider



EHR Integration

ExpressLane Well Visit Progress Note
Parent agenda featured, obesogenic responses in bold



Documentation check-boxes

BMI, Nutrition Counseling, Physical Activity Counseling (HEDIS)
Anticipatory Guidance Educational Materials (dropdownlist)

Intervention components



WEE Baby
Care Study

1. Personalized messaging using
Early Healthy Living
screening tool
2. Evidence-based responsive
parenting and nutrition
curriculum



Healthy Active Living for Families
Right From the Start

Healthy Active Living for Families



Start today: Help your child stay at a healthy weight for life.
Yes, it's true! The first years are the stage for healthy habits for the rest of your child's life. It's never too early to start.

We know how important the first years are for getting your child off to a healthy start. We also understand that being a parent is an important — and hard — job! So we talked to hundreds of parents to find out what works when it comes to raising a healthy active child.

Food & Feeding

Good eating habits begin early.



0 to 12 months



1 to 3 years



3 to 5 years

Physical Activity

Even small children need to get moving.



0 to 12 months



1 to 3 years



3 to 5 years

Tips for Parents

Being a parent is an important job!



0 to 12 months



1 to 3 years



3 to 5 years

EarlyInsight



for new parents

Early Insight: Helping parents raise healthy babies in the first 4 months



Main responsive parenting intervention themes:

- Recognition and appropriate response to infant hunger and fullness cues
- Alternatives to feeding in order to soothe infant
- Promoting adequate sleep, self-soothing, "settling"
- Developmentally appropriate introduction of solid foods and portion sizes



PennState

Coordinated Care Curriculum

Welcome to the WEE Baby Care Study!

Parents face many challenges when it comes to their newborn babies. We hope that these handouts will teach you to look, listen and respond to your baby.

This packet provides information about:

Feeding
Your Baby
Pages 1-18

Soothing
Your Baby
Pages 19-23

Your Baby's
Sleep
Pages 24-37

Playing with
Your Baby
Pages 38-46



WEE Baby
Care Study

Our goal is to help you be the best parent you can be so you can have a healthy & happy baby!



American Academy of Pediatrics
**Institute for Healthy
Childhood Weight**

Intervention components

1. Personalized messaging using **Early Healthy Living** screening tool
2. Evidence-based responsive **parenting and nutrition curriculum**
3. Electronic **Data Sharing and Coordination of Care** between Pediatricians and WIC Nutritionists



WEE Baby
Care Study

Data sharing between well-child visits and WIC

Bidirectional

Pediatricians ↔ WIC Nutritionists

- Name (child/parent)
- Child date of birth
- WIC participant
- Visit date
- Preventive Education
 - SmartSet discussion points
 - Nutrition Education Topic Codes
- 80-character, free-text comment

Unidirectional

Pediatricians → WIC Nutritionists

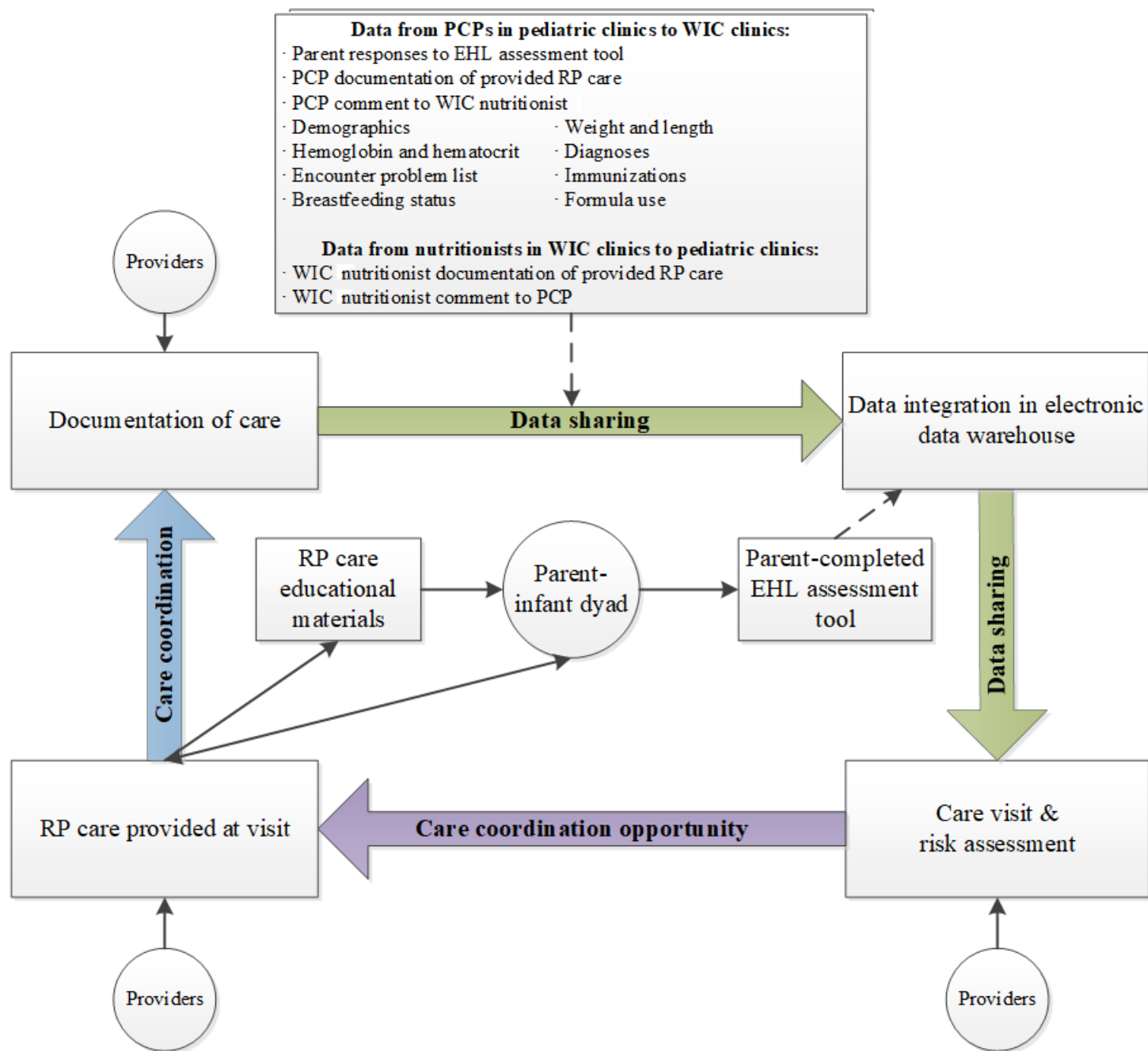
- Child's health insurance
- Hemoglobin/Hematocrit
- Length/Weight
- Brand and product name of formula
- Food allergies
- Special pediatric conditions
- Medical diagnoses (e.g., reflux, diabetes)
- Immunizations

Pediatrician view in EPIC

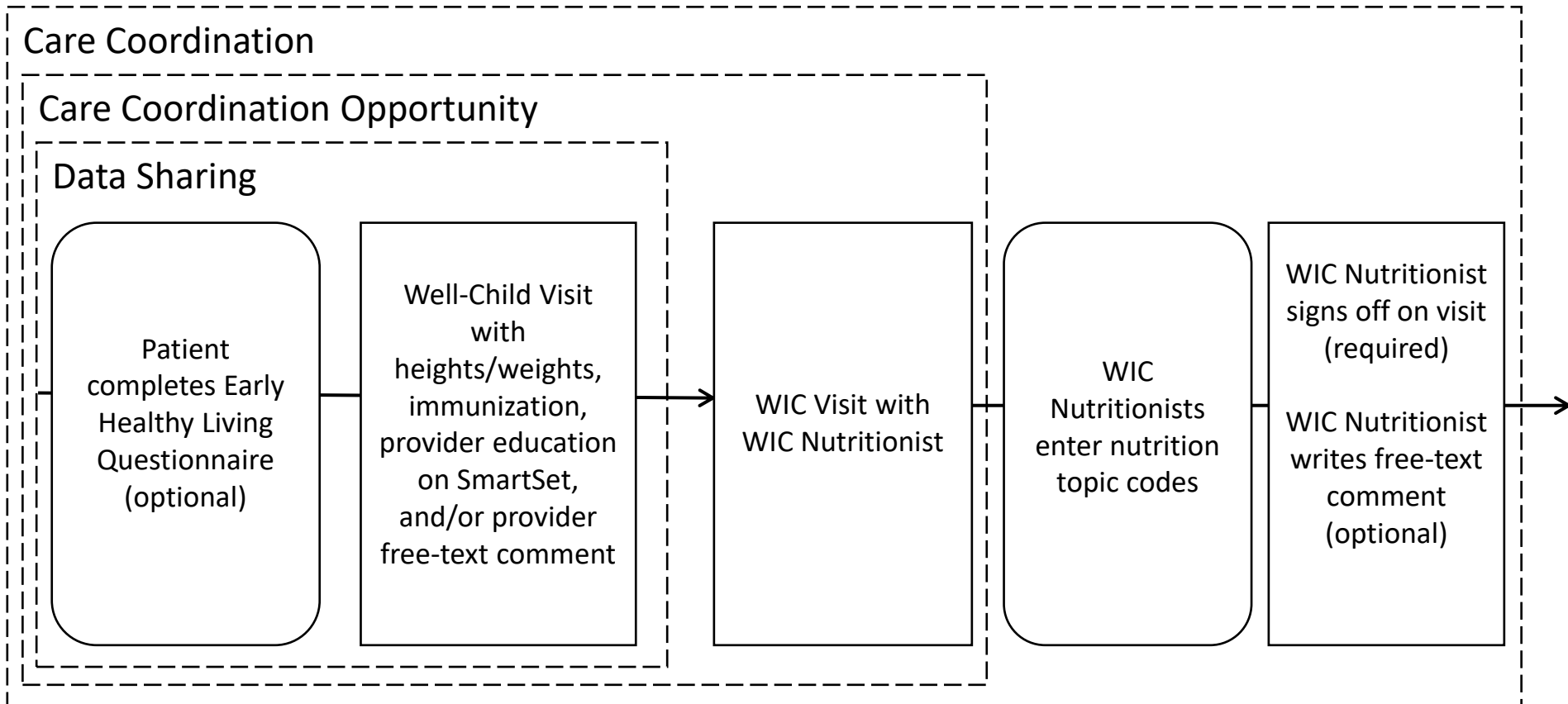
		Early Healthy Lifestyles Data (PATIENT REPORTED) Survey Date: Survey Source: Clinic	WIC Coordinated Data Date WIC nutritionist completed form:	Provider Review and Guidance
			WIC Nutritionist Comment: Mom adding fruits/veg to formula bottles; enc d/c & waiting to offer from spoon.	
Beverages		Select beverages that your child drank in the past week.		
	Breastmilk	N/A	Breastfeeding basics discussed: N/A Breastfeeding problems discussed: N/A	N/A
	Formula	True	Discussed formula preparation: Yes	Discussed formula preparation
	Milk	N/A		N/A
	Water	N/A		After 6 months, water can be provided at snack times or in between feedings.
	100% Juice	N/A	Discussed limiting juice intake: N/A	N/A
	Fruit Punch, fruit drink, iced tea, lemonade, soda	N/A	Discussed limiting high sugar foods and beverages: N/A	N/A
Bottle	When preparing a bottle, how many ounces did you put in the bottle at each feeding?	5-6 ounces	Discussed bottle feeding practices: Yes	Infants 4-6 months: offer 5-8 oz. 5-6 times per day.
			Discussed dental health/nursing bottle mouth: Yes	N/A

Sample WIC Nutritionists' View

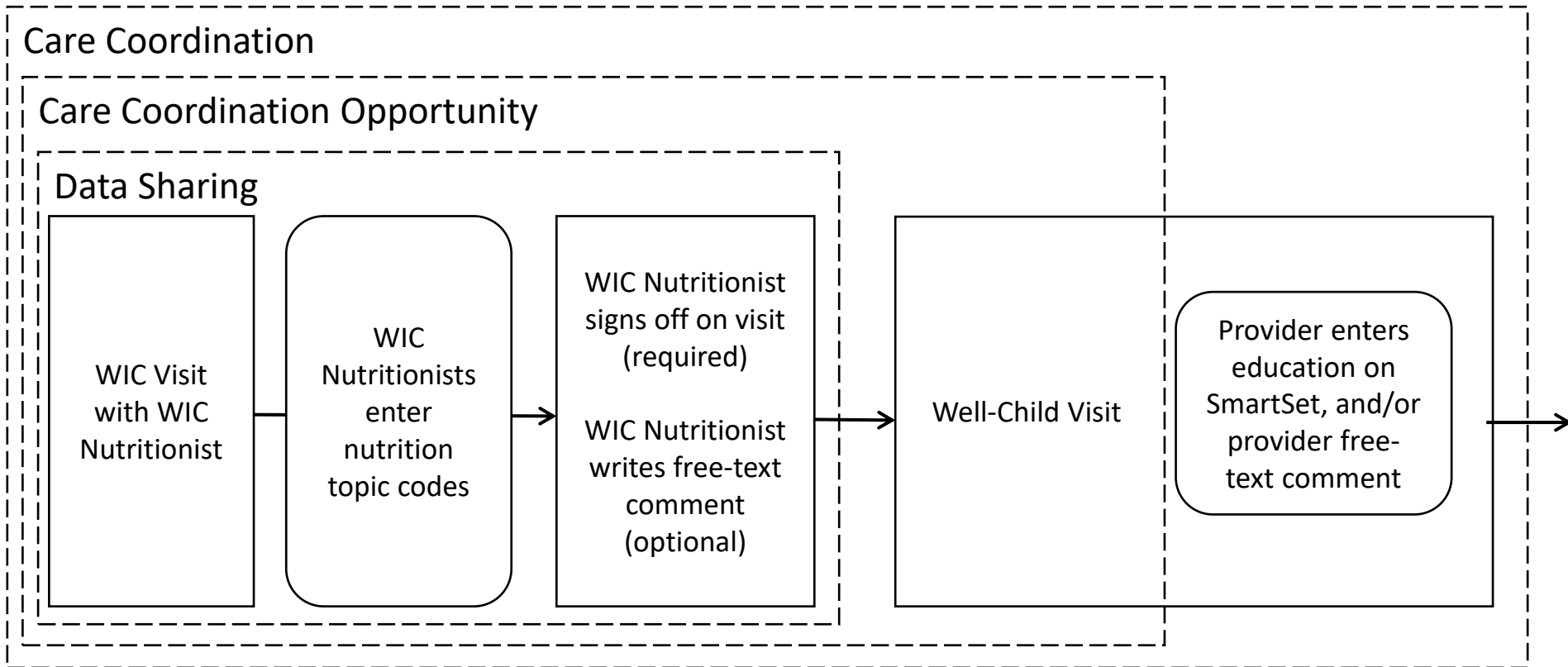
Immunizations <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="width: 45%;"> <p>DTP/DTAP: 2/28/2017</p> <p>Hep B: 8/20/2016</p> <p>MMR:</p> <p>Polio:</p> <p>Varicella:</p> </div> <div style="width: 45%;"> <p>Hepatitis A:</p> <p>HIB: 1/3/2017</p> <p>Pneumococcal: 2/28/2017</p> <p>Rotovirua: 2/28/2017</p> </div> </div>	
EHL Questionnaire <div style="margin-top: 10px;"> <p>Appointment Relationship</p> <p>What is your relationship to the child being seen for an appointment today: I live with the child and care for the child regularly</p> <p>Beverages</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>The child has had Breastmilk in the past week:</p> <p>The child has had Milk in the past week:</p> <p>The child has had 100% Juice in the past week: ■</p> </div> <div style="width: 45%;"> <p>The child has had Formula in the past week: ■</p> <p>The child has had Water in the past week:</p> <p>The child has had Fruit punch, fruit drink, iced tea, lemonade or soda in the past week:</p> </div> </div> <p>Provider Discussion Topics: Breastfeeding Basics Discussed. Discussed Formula Preparation. Discussed Water, Hydration Needs. Discussed Limiting Juice Intake.</p> <p>Bottle</p> <p>When preparing a bottle, how many ounces did you put in the bottle at each feeding: 5-6 oz.</p> <p>Provider Discussion Topics: Discussed Bottle Feeding Practices.</p> <p>Food to Soothe</p> <p>I sometimes nurse, give a bottle, or something to eat as a way to keep the child quiet or to calm them when they are upset: ■</p> <p>Provider Discussion Topics: Discussed Avoiding Using Food to Soothe.</p> <p>Hunger and Fullness</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>When it comes to eating, the child doesn't eat enough:</p> <p>When it comes to eating, the child is always hungry:</p> </div> <div style="width: 45%;"> <p>When it comes to eating, the child eats the right amount: ■</p> <p>When it comes to eating, the child eats too much:</p> </div> </div> <p>Provider Discussion Topics: Discussed Parent Concern: Doesn't Eat Enough. Discussed Parent Concern: Is Always Hungry.</p> <p>Repeated Exposure</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>When it comes to eating, the child spits out healthy food:</p> <p>Provider Discussion Topics:</p> </div> <div style="width: 45%;"> <p>When it comes to eating, the child is picky:</p> </div> </div> </div>	



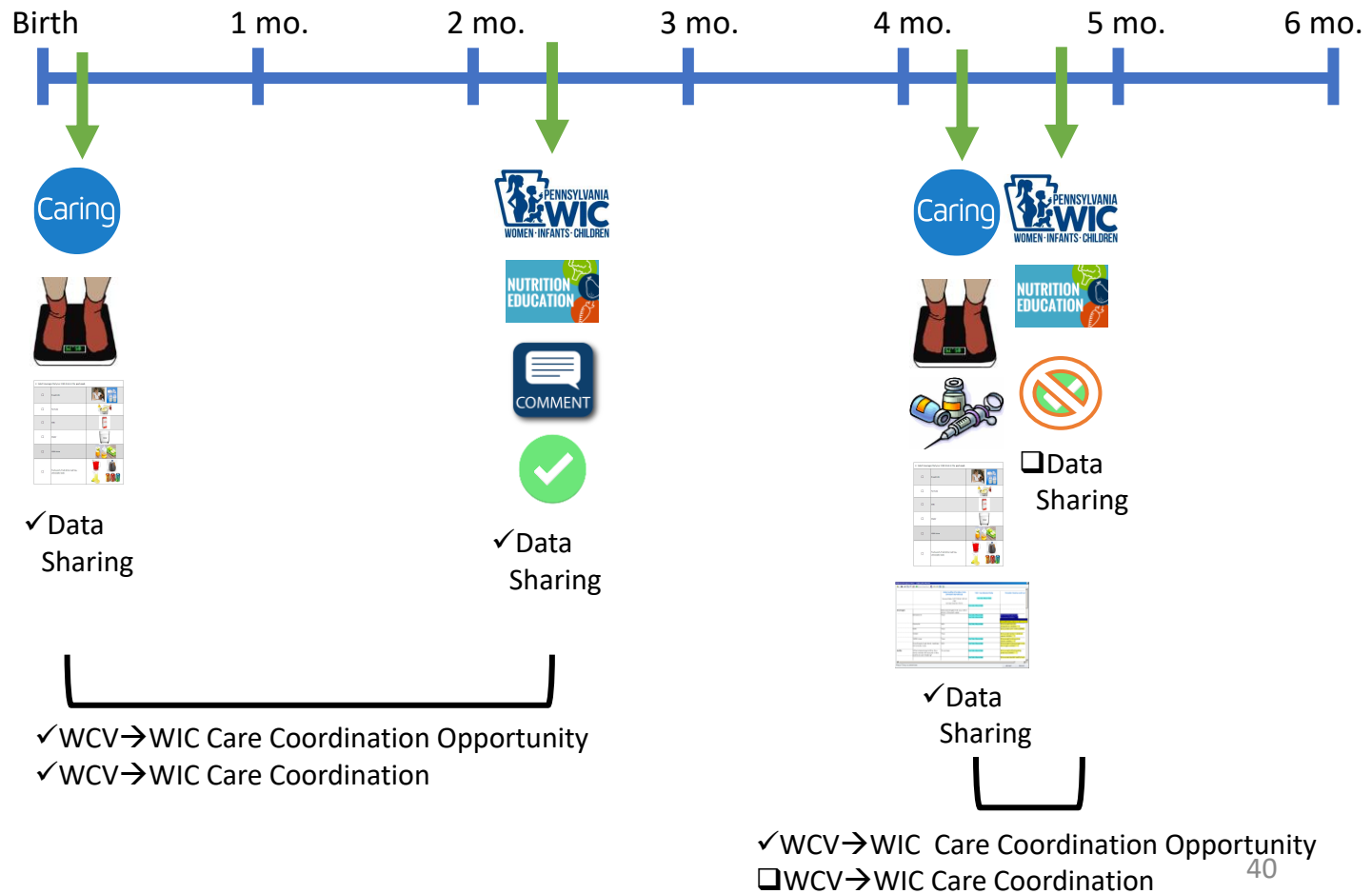
Pediatrics → WIC



WIC → Pediatrics



Model to Evaluate Care Coordination during 6 months of Data Sharing



Big Data Integration and Metrics

Preliminary Results

- Most (84%) mother-infant dyads attended the expected 4 WCVs
- About half (44%) of mother-infant dyads attended the expected 3 WIC visits
- About half (48%) of parents completed EHL 4 times in 6 months
- Parents completed EHL 53.2% at PCP
- PCPs documented 35.3% of visits, but documented education at least once for 60% of treatment infants
- WIC nutritionist documented at 100% of visits, utilizing free-text comment

Lessons Learned

- Engaging end-users in the development and design of the intervention does not guarantee adoption
 - WIC readily adopted study-specific education codes and free-text comment
 - Pediatricians documented study-specific counseling less than half of the time and did not use free-text feature
- Changes to the EHR and QuikWIC are ongoing at both system and local levels

WEE Baby Care Study

- Parent/infant dyads attended 3.5 WCVs and 2.3 WIC visits, 6 months
- Clinicians documented provided responsive parenting care at 35% WCVs and shared data with WIC after 100% of visits
- WIC visit followed WCV 50.3% of the time, so there were 1.8 WCV to WIC visit care coordination opportunities
 - WIC coordinated care by documenting responsive parenting care at 66.7% of opportunities
- WCV followed WIC visit 59% of the time, so there were 0.9 WIC to WCV care coordination opportunities
 - Clinicians coordinated care by documenting responsive parenting care at 44% of opportunities

Kling et al. *JMIR Pediatr Parent*. 2020; 3(2):e22121
Savage et al. *BMC Pediatr*. 2018;18(1):293.

Table 3. Frequency of study-team developed education topics discussed by WIC nutritionists for the RP intervention group by infant age (n = 131).

Study-team Developed Education Topics	Topics n (%)			
	Age range of infants in months at WIC nutritionist visits			
	Birth - 2 mths.	2 - 4 mths.	4 - 6 mths.	6+ mths.
Hunger and fullness	65 (46)	24 (30)	20 (23)	8 (15)
Nighttime feedings	9 (6)	6 (8)	7 (8)	11 (21)
Food to Soothe	44 (31)	27 (34)	30 (35)	18 (34)
Bottle feeding practices	35 (25)	28 (35)	23 (27)	19 (36)
Night waking	21 (15)	25 (32)	24 (28)	19 (36)
Bedtime routines	33 (23)	28 (35)	28 (33)	18 (34)
Self-soothe to sleep	34 (24)	27 (34)	25 (29)	20 (38)
Tummy time	12 (8)	23 (29)	41 (48)	25 (47)
TV in bedroom	2 (1)	9 (11)	11 (13)	13 (25)
Parent use of electronic device	0 (0)	3 (4)	3 (3)	2 (4)

Primary outcome findings



Thank you!

Contact: jsavage@psu.edu

For more information, see our website at:
www.hhd.psu.edu/ccor

