

Childhood Obesity
Research Demonstration
(CORD) Project

Activities in the Healthcare Setting for Secondary Prevention of Childhood Obesity



Welcome!

The webinar will begin at 1:00 PM (CDT)

The archive of today's webinar and a PDF of the presentation slides will be posted to the msdcenter.org website

Hosted by



Our Speakers



Carrie Dooyema,
MSN, MPH, RN

Behavioral Scientist, ECE Team, Division of Nutrition, Physical Activity and Obesity
Centers for Disease Control and Prevention, CDC



Sarah Barlow,
MD, MPH

Professor, Pediatrics, Department of Clinical Science,
UT Southwestern Medical Center



Deanna Hoelscher,
PhD, RDN, LD, CNS, FISBNPA

Director, Michael & Susan Dell Center for Healthy Living
John P. McGovern Professor in Health Promotion



Nancy Butte
PhD

Professor, Pediatrics-Nutrition
Baylor College of Medicine

Helping Our Nation's Children Grow Up Strong & Healthy

CDC's Childhood Obesity Research Demonstration (CORD) 1.0 Projects

**Carrie Dooyema, MPH, MSN, RN
Behavioral Scientist and Evaluator
Obesity Prevention and Control**

**Division of Nutrition, Physical
Activity, and Obesity (DNPAO)**

**CORD Team: H. Blanck, B. Belay,
A. Goodman, M. Harrison, S.
Garner**

Fall 2017



National Center for Chronic Disease Prevention and Health Promotion
Division of Nutrition, Physical Activity, and Obesity



DNPAO Strategic Priorities: Supporting All Americans Across the Lifespan



Getting a Healthy Start

- Breastfeeding
- Early Child Nutrition

Growing Up Strong & Healthy

- Early Care and Education (ECE) and Schools (DPH)
- Childhood Obesity Management ★

Maintaining Good Nutrition

- Healthy Food Environment
- Vitamin & Mineral Malnutrition

Keeping Active

- Activity-Friendly Communities
- Increasing Physical Activity

Childhood Obesity: Status and Impact

Scope and Cost



- ❑ **14.5% of low-income children** (2014) aged 2-4 who are enrolled in WIC have obesity
- ❑ **17.5% of children** aged 6-11 years have obesity (2011-2014)
 - **5.6% of children** aged 6-11 years have **severe obesity**
- ❑ Obesity tracks from childhood to adulthood impacting both **physical and mental health**
- ❑ Nearly **1 in 4 young adults** are unfit or too heavy to serve in our military
- ❑ Adult obesity costs an estimated **\$147-\$190 billion per year** in medical costs.

Childhood Obesity Recommendations

**Addressing
childhood
obesity requires
a network of
care between
healthcare
systems, public
health,
families, and
the community**

- The NAM (IOM) recommends taking action in **multiple settings** where children learn, live & play
- 2010 American Academy of Pediatrics Practice Guidelines (2+)
- In 2010 and 2017, the U.S. Preventive Services Task Force recommended that **providers screen children** aged **6 years+** for obesity, and provide or refer to **intensive lifestyle modification** programs (Grade B)

Building the Foundation: CORD 1.0

Authorization

- Children's Health Insurance Program Reauthorization Act of 2009
- Required a multisectoral approach

Focus: Reduce Obesity by –

- Parental-child behavioral management -
- Increasing children's physical activity, fruits, vegetables, and healthier beverages
 - Ensuring adequate sleep
 - Decreasing screen time and consumption of sugary drinks and energy-dense foods

Target Audience

- **Low-income children aged 2-12 years in key settings (ECE, schools, community, healthcare)**

Grantees:

- The University of Texas Health Science Center at Houston
- San Diego State University
- Massachusetts State Department of Public Health
- The University of Houston served as the evaluation center for the project



Inputs

CORD Research

Outputs

Health care

Early care and Education

School

Community

Home, Family, Children

Community Health Workers

Systems Change • Creating Healthy Places

Intervention Communities



Education • Social Support

Recommendations to create healthy communities for low-income children

Using best strategies for obesity promotion from prior research.

Applying strategies in multiple levels and settings to evaluate a model of primary care and public health.

Sharing with policy makers, stakeholders and other communities

CORD 1.0 Prevention and Treatment Model

Collective Approach

- Community Coalitions
- Clinical-Community Linkages
- Key organizations implement evidence based best practices (ECE, school, healthcare)

Interventions in healthcare centers

- Important setting to prevent child obesity
- Improving screening, counseling and referral

QI & Sustainability

- CORD researchers:
 - Used clinical decision supports to aid in the provision of optimal care
 - Provided training & technical assistance providers
 - Provided a referral venue for children and families with obesity





22 publications, 3 toolkits

For more information, contact: Hblanck@cdc.gov

For more information on CORD 1.0 visit our website at:

<https://www.cdc.gov/obesity/strategies/healthcare/cord1.html>

For more information on CORD 2.0 visit our website at:

<https://www.cdc.gov/obesity/strategies/healthcare/cord2.html>

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.



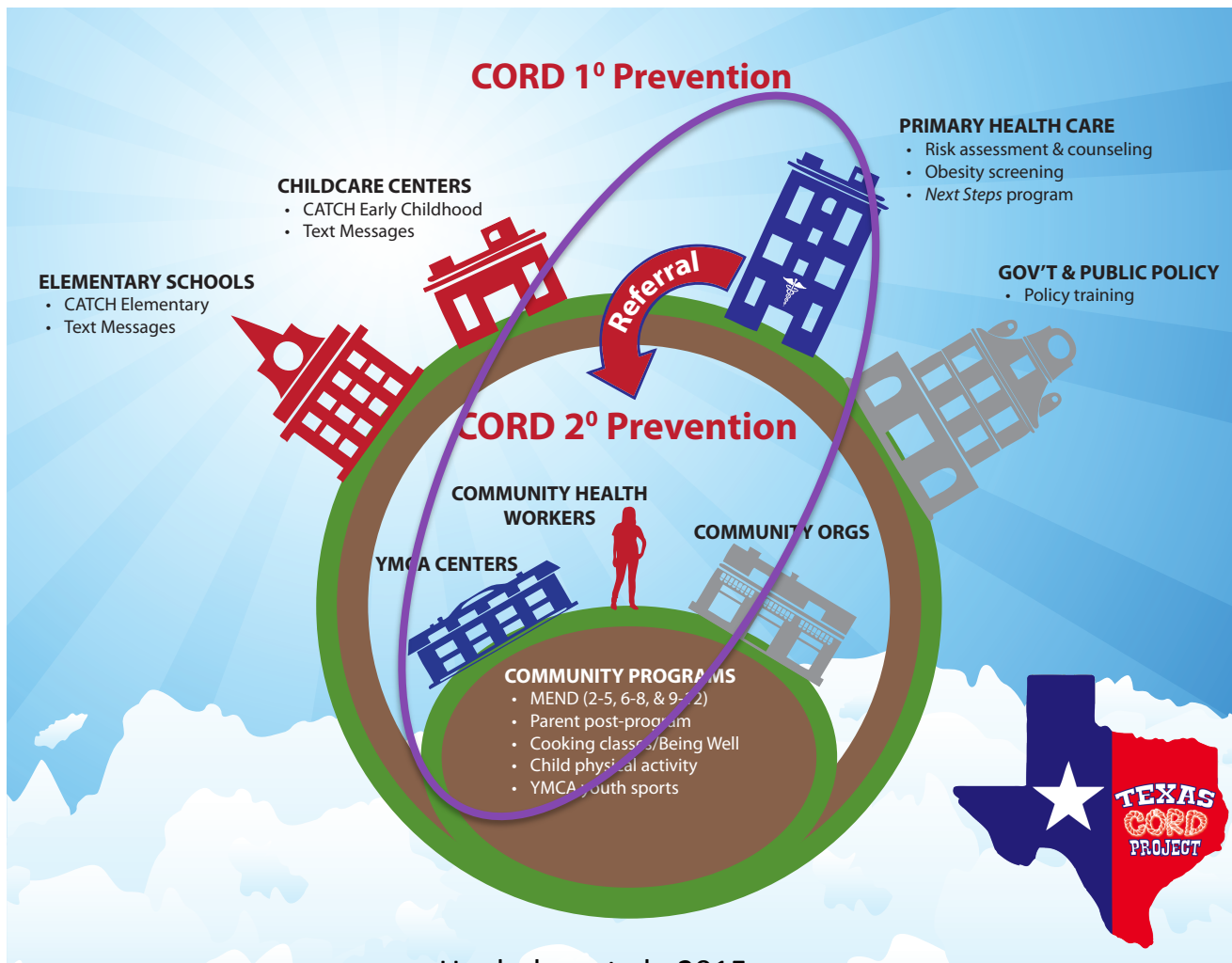
The Texas CORD Project: Recruitment strategies and outcome for weight management comparison study 11/15/2017

Sarah E Barlow, MD, MPH
UT Southwestern, Dallas TX

Nancy F Butte, PhD
Deanna Hoelscher, PhD
Meliha Salahuddin, PhD
Stephen Pont, MD, MS

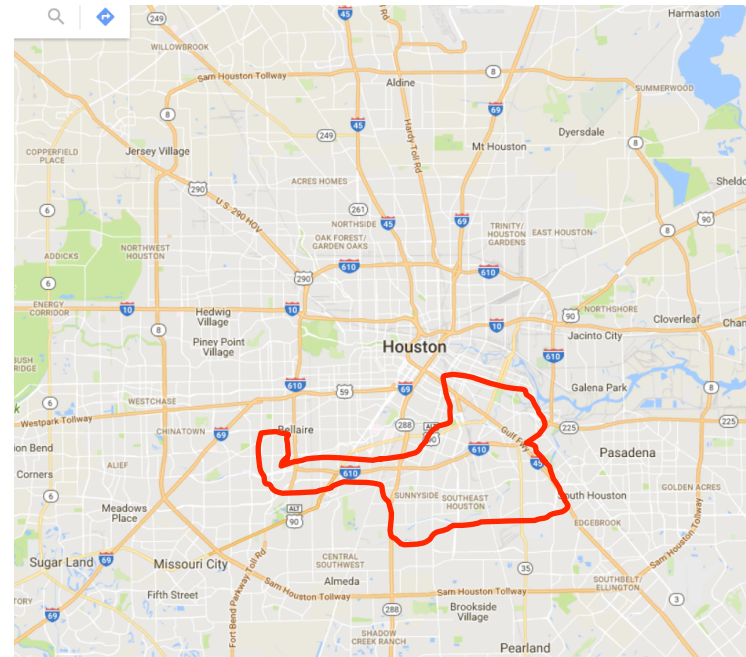


TX CORD Study Design



Hoelscher et al., 2015

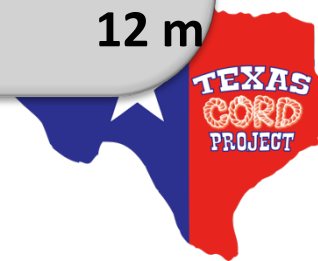
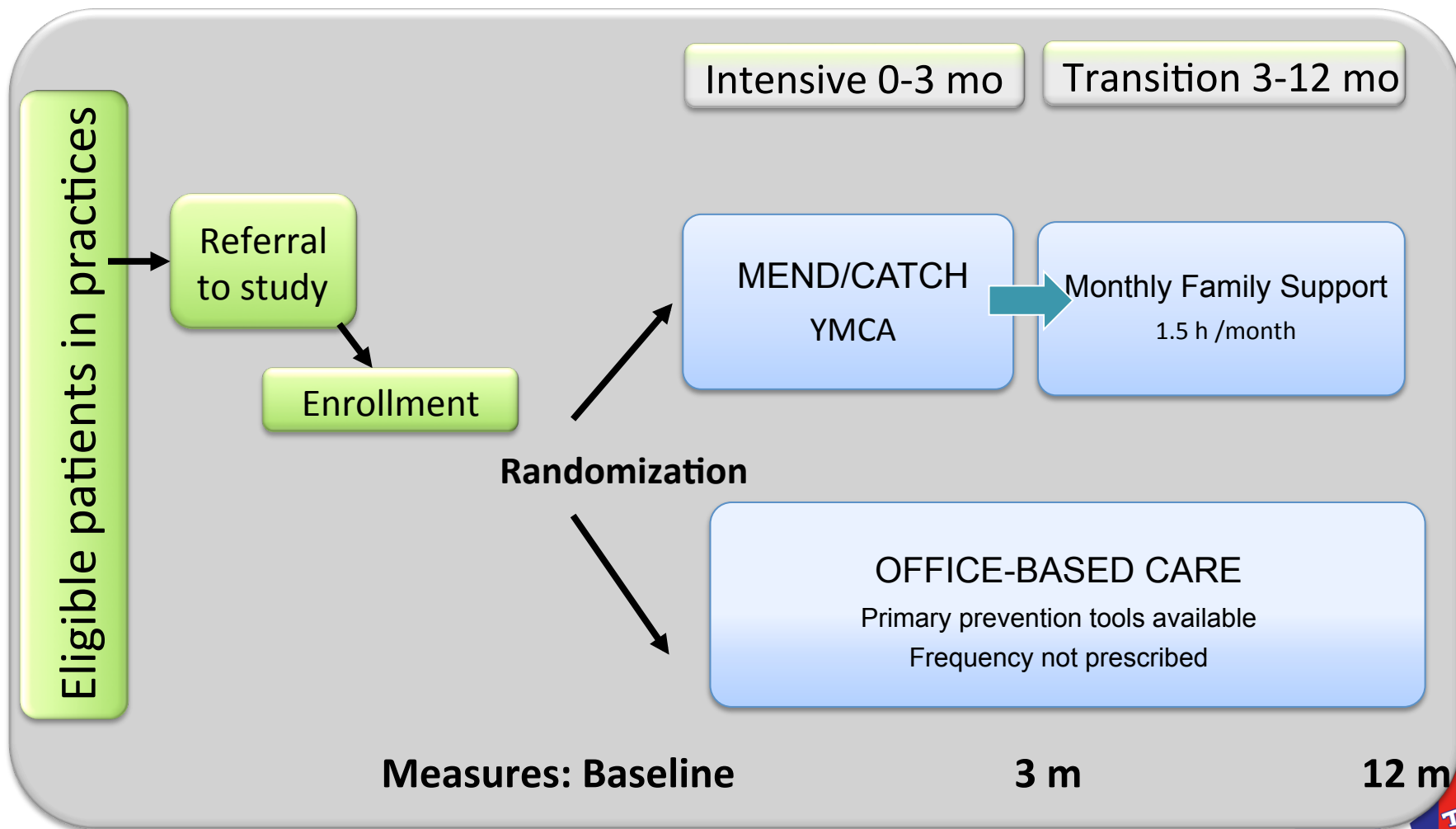
Office Selection



1. Catchments selected for household income, education, race and ethnicity
Oluyomi et al., 2015
2. Healthcare offices selected for high Medicaid/CHIP eligible patients

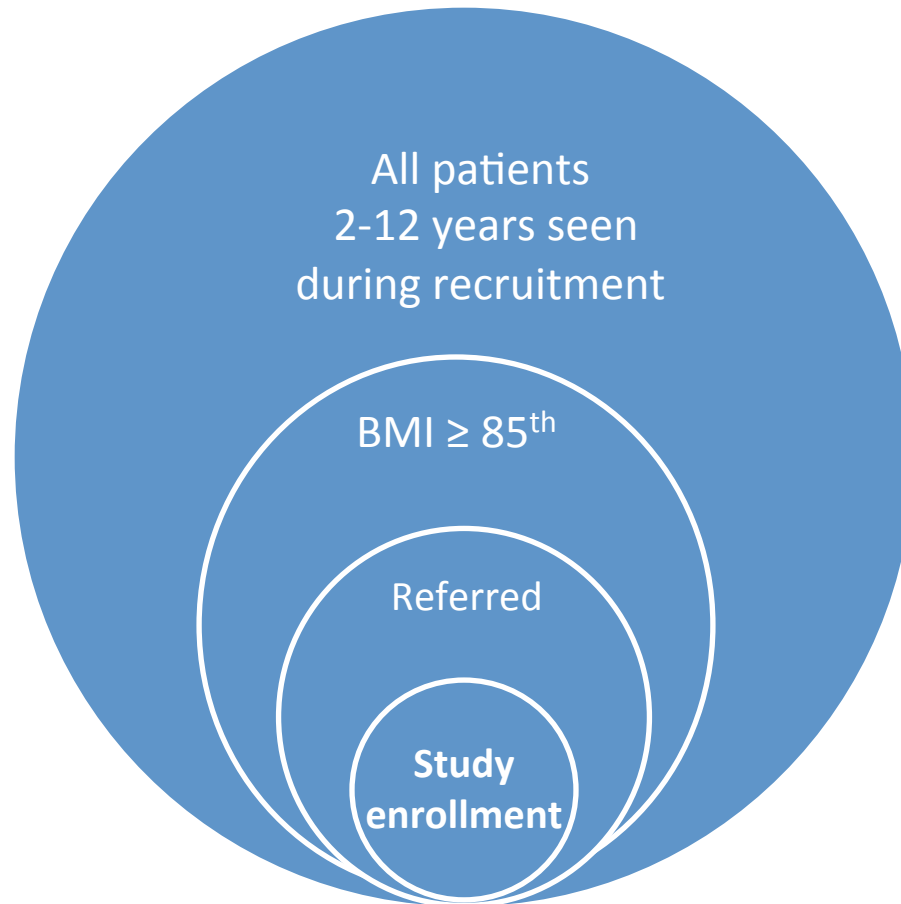


Recruitment and enrollment are pre-requisites of RCT: who did (and who did not) enroll?



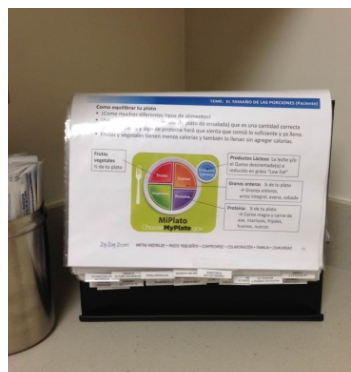
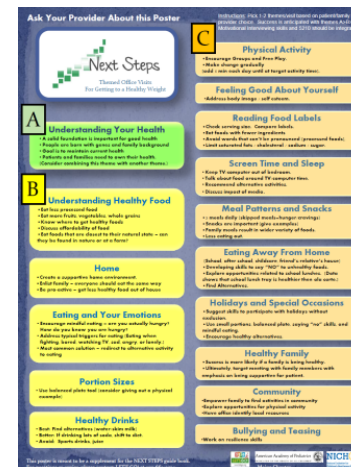
Recruitment theoretical structure

Eligibility was limited to patients in TX CORD Offices



Practice-based support to encourage obesity care and study enrollment

- Site: Primary healthcare clinics
- Training: Physicians and support staff (in-person and online)
- Components
 - Electronic health record (EHR) Best Practice Alert for Obesity/Overweight
 - EHR Obesity Smart Set
 - EHR referral link to study within Smart Set
 - Next Steps Guide & office materials for clinicians (Spanish & English)
 - Next Steps Booklet for families (Spanish & English)



EHR changes adapted with permission: American Recovery and Reinvestment Act (Award #R18 AE000026) Taveras PI



Practices in catchment areas:

Houston: 5 practices from one large hospital network

- 3 were structured as medical homes for low income patients, 2 had both commercial and public insurance
- Common EHR
- EHR alert and EHR referral implemented

Austin: 7 practices from 3 parent organizations

- Either FQHC or safety net clinics
- 3 different administrations, 3 different EHRs
- No EHR alert or EHR referral



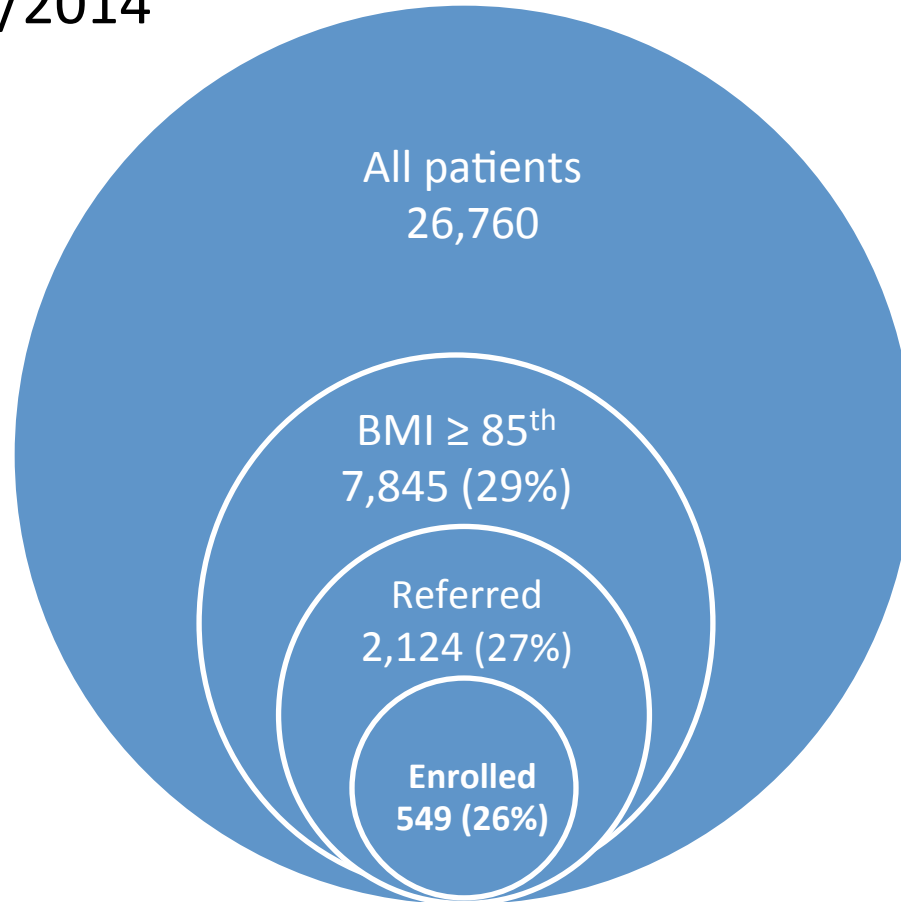
Patients from TX CORD practices 2-12 y seen between 9/2012 and 1/2014



	2-5 years n = 13155	6-8 years n = 6737	9-12 years n = 6868
Age years mean	3.58	7.24	10.8
Gender n (%)			
female	49.8	48.7	48.9
male	50.2	51.3	51.1
Race-ethnicity n (%)			
Hispanic	60.3	60.8	64.0
Black non-Hispanic	20.7	20.7	22.2
White non-Hispanic/Other	19.0	18.4	13.8
Insurance type n (%)			
Medicaid	66.9	61.3	54.2
CHIP	6.8	13.1	13.8
Commercial	25.1	22.9	25.2
Other	1.1	2.8	6.8
BMI percentile mean	55.0	65.8	70.3
BMI category n (%)			
<5th	7.8	3.3	2.7
5th - <85th	68.4	60.2	51.4
85th - <95th	12.6	15.1	18.7
95th - <99th	6.6	14.6	21.4
≥99th	4.7	6.7	5.8

Recruitment

12 Offices: unique patients 2-12 years of age seen between 9/2012 and 1/2014



“Referred” families

- heard about study AND
- agreed to receive more information

Enrolled: 7% of patients with BMI ≥ 85th

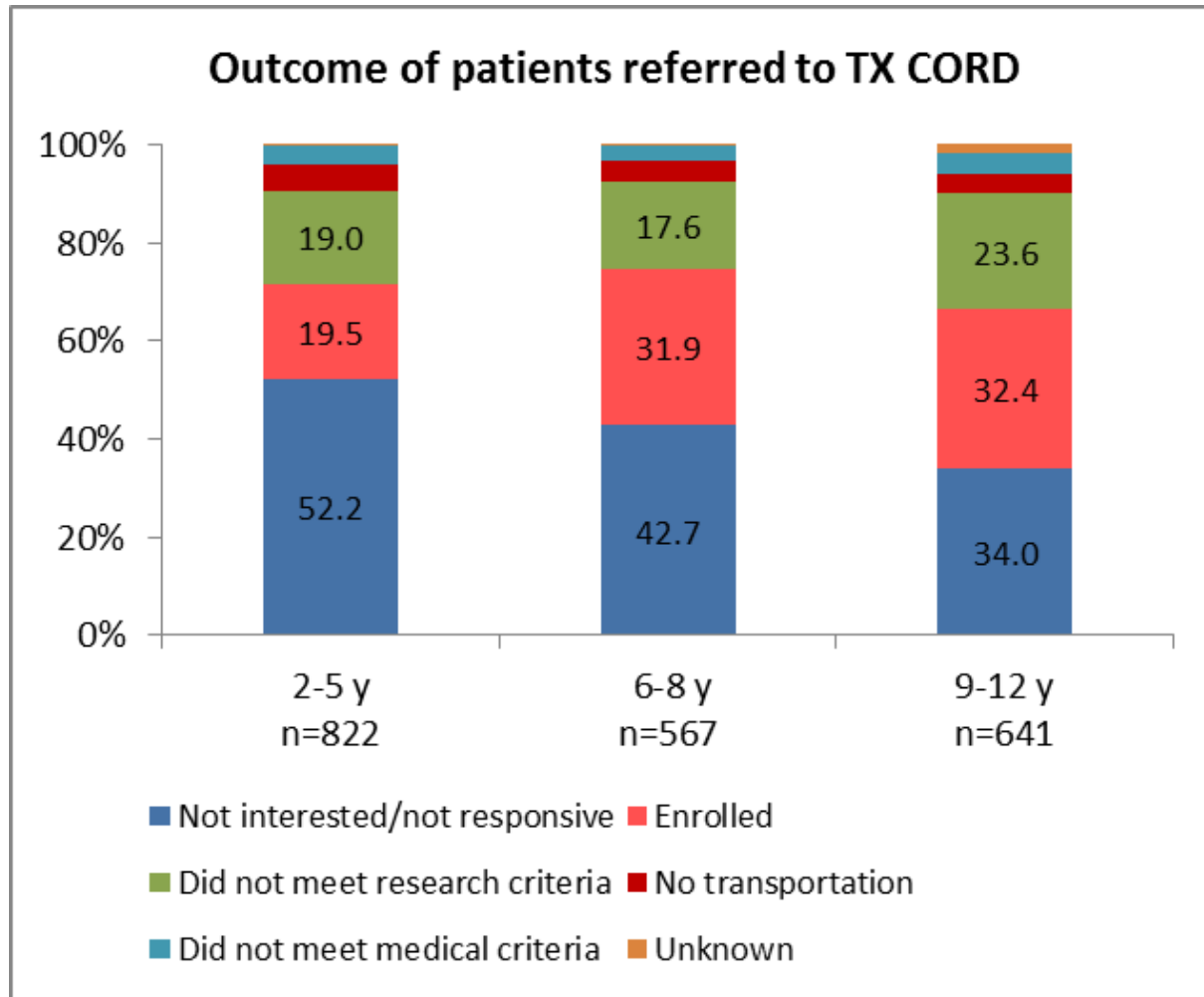


Office patients with BMI \geq 85th %ile vs. referred patients vs. enrolled patients



	2-5 years			6-8 years			9-12 years			
	Office \geq 85 n = 2856	Referred n = 822	Enrolled n = 160	Office \geq 85 n = 2160	Referred n = 567	Enrolled n = 181	Office \geq 85 n = 2829	Referred n = 641	Enrolled n = 208	
Age groups differed		28.7%	19.5%		26.3%	31.9%		22.7%	32.4%	
Age years mean	3.88	3.89	4.29	7.36	7.23	7.52	10.87	10.35	10.46	
High Hispanic	Race-ethnicity %									
	Hispanic	68.9	N/A	88.1	66.3	N/A	84.5	69.4	N/A	86.1
	Non-Hispanic black	16.5		10.0	18.2		14.9	19.5		12.0
	Non-Hispanic white/ other	14.6		1.9	15.5		0.6	11.1		1.9
High Medicaid/CHIP	Insurance %									
	Medicaid	72.0		82.2	66.2		73.0	57.1		58.2
	CHIP	7.5	N/A	8.2	14.0	N/A	15.1	16.1	N/A	20.9
	Commercial	19.2		8.2	17.1		10.7	18.8		11.0
	Other	1.3		1.3	2.7		1.3	8.0		9.9
Percent with high BMI Referral > Office \geq 85 Referral Enrolled	BMI category n (%)									
	85 th -95 th	52.8	25.6	23.1	41.5	19.4	19.3	40.7	16.8	13.9
	95 th -99 th	27.6	34.2	30.6	40.1	44.2	44.2	46.7	57.4	62.0
	\geq 99 th	19.6	40.2	46.3	18.5	36.4	36.5	12.6	25.9	24.1

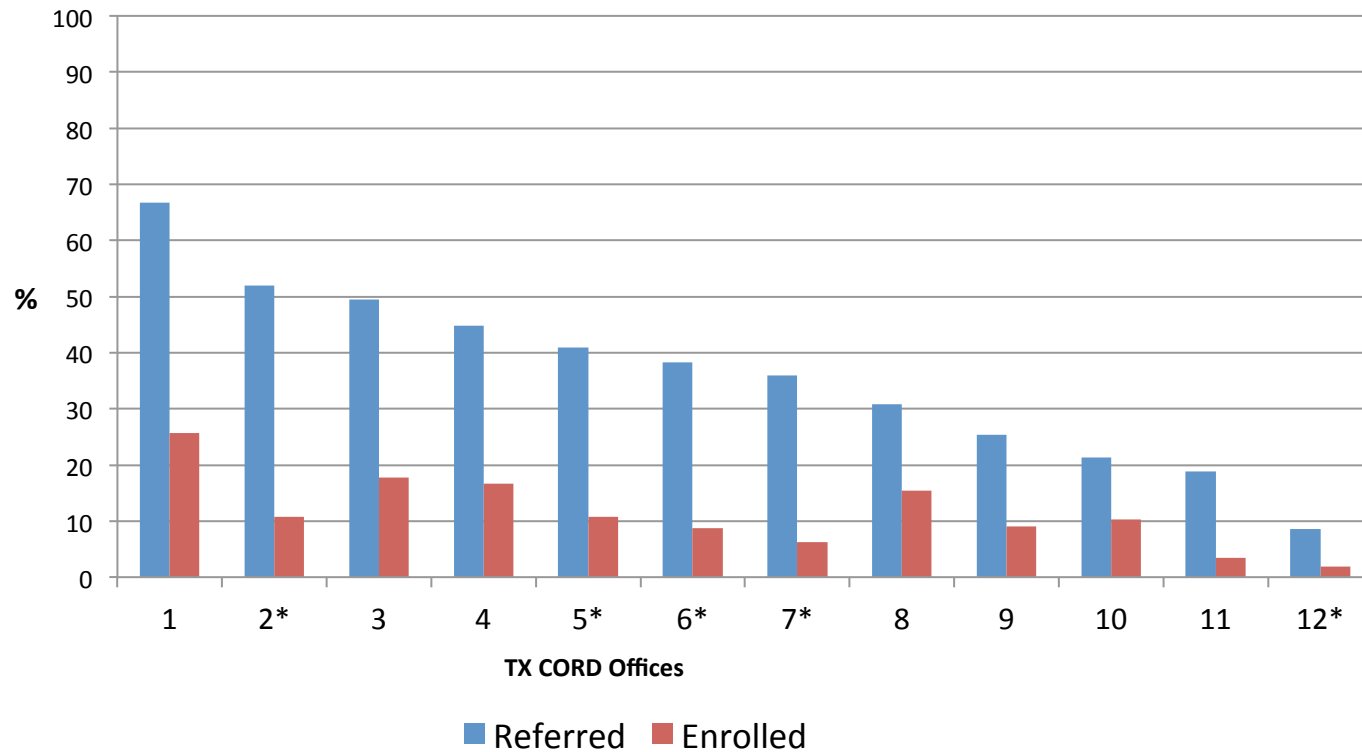
Once referred, 6-12 y had higher enrollment rate than 2-5 y



Large variation in rates of referral and enrollment by practice

Among patients 2-12 y with BMI \geq 85th percentile

- referral rates were between 9% and 69%
- enrollment rates were between 2% and 26%



* EHR alert and referral link



Recruitment Summary

1. Practice population was racially-ethnically diverse and low income
2. Overall referral rate was about 30%, and enrollment was about 25% of referred (7% of patients with BMI \geq 85th percentile)
 - Families of younger children were less interested in programs
 - Severe obesity was associated with referral, but once patient was referred, degree of obesity was not associated with enrollment
3. Variation in referral and enrollment by practice was large
 - Austin practices, which had no alert and no EHR referral link, overall had higher referral and enrollment



Future directions

Effective programs must be adopted to have an impact on the obesity epidemic, and so we need to study patient engagement

1. Understand barriers to referral and enrollment at family level
 - Improve engagement of families of 2-5 year old children

2. Understand barriers to referral at practice level
 - Explore reasons for variation
 - Practice structure/environment?
 - Staff motivation?



TX CORD Secondary Intervention



Efficacy of a Community- versus Primary Care-Centered Program for Childhood Obesity: TX CORD RCT

Nancy F Butte, Deanna M Hoelscher, Sarah E Barlow, Stephen Pont, Casey Durand, Elizabeth A Vandewater, Yan Liu, Anne L Adolph, Adriana Perez, Theresa A Wilson, Alejandra Gonzalez, Maurice R Puyau, Shreela V Sharma, Courtney Byrd-Williams, Abiodun Oluyomi, Terry Huang, Eric A Finkelstein, Paul M Sacher, Steven H Kelder

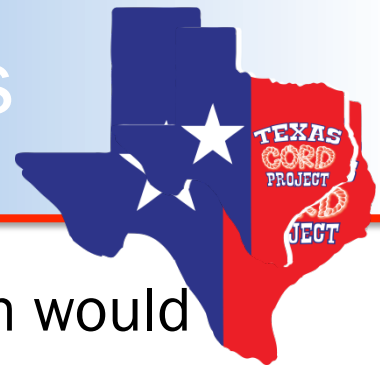
Obesity 2017; 25:1584-1593.

TX CORD Study Aims



- To evaluate a **primary prevention obesity program** in low-income, ethnically diverse catchment areas in Austin and Houston, TX
- To evaluate a **12-month family-based secondary prevention program** within a community primary prevention program

Secondary Prevention Program: Aims



- Hypothesis: 12-month community-centered program would significantly reduce BMI compared to the primary care-centered program in low-income, ethnically diverse overweight and obese children, aged 2-12 years.
- *To determine the comparative efficacy of 12-mo community-centered program (intervention) against primary care-centered program (comparison)*
 - Primary outcome: %BMI_{p95}
 - Secondary outcomes: body composition, blood pressure, psychosocial status at 3 and 12 mo post-baseline

Study Design

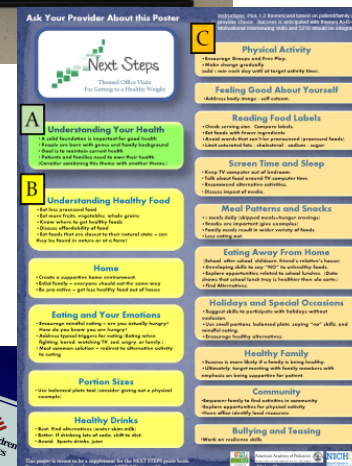
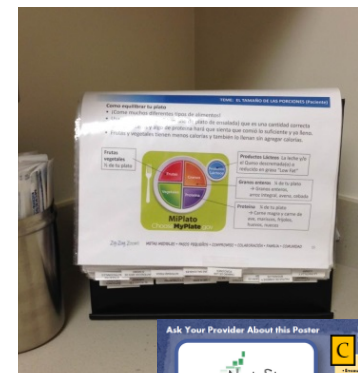


- Overweight & obese children (total n=576), aged 2-12 years, were randomly assigned to either the 12-mo **intervention** or **comparison** group, stratified by age subgroups (2-5, 6-8, and 9-12 y).
- RCT conducted within the primary prevention catchment areas in Austin and Houston
- Family allocation into 5 cohorts in 2012-2015

Primary Care-centered Program (comparison)



- Site: Primary healthcare clinics
- Components
 - EHR Best Practice Obesity/Overweight Alert
 - EHR Obesity Smart Set
 - Next Steps Guide & office materials for clinicians (Spanish & English)
 - Next Steps Booklet for families (Spanish & English)
- Self-paced

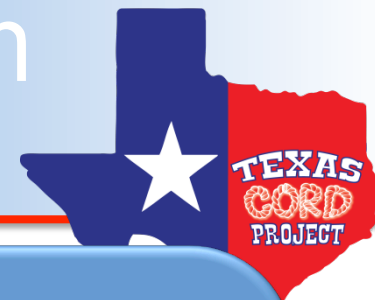


Community-centered Program (intervention)



- Site: YMCA
- Training: theory leaders, community health workers (CHW), exercise leaders
- Components
 - Preschool Child
 - MEND 2-5
 - School-aged Child
 - MEND 6-8 and 9-12
 - CATCH Exercise Sessions & YMCA Sports Teams
 - MEND World Online/Print Materials
 - Family support: MEND refresher, Be Well Book, Cooking classes, Text msg

Community-centered Program (intervention)



Timeline

Intensive 0-3 mo

Transition 3-12 mo

MEND 2-5

MEND
1.5 h session 1X/wk

Family Support
1.5 h 1X/mo
Be Well Book, Cooking
Classes, Text msg

MEND 6-8, 9-12

MEND/CATCH
2 h session 2X/wk

YMCA Youth Sports
1 h 2X/wk
Family Support
1.5 h 1X/mo
MEND World, Be Well Book
Cooking Classes, Text msg

MEND



Mind

Social learning theory and behavior modification:

- Goals and rewards
- Role modelling
- Stimulus control
- Positive parenting
- Self-esteem & confidence

Exercise

Active play – Kids only

- Fun!
- Land & water based
- Multi-skills – balance, agility and coordination
- Group play
- Non-competitive
- Improve self-esteem

Nutrition

Customized healthy eating

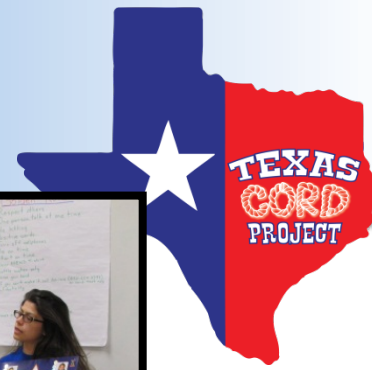
- No forbidden foods – NOT a diet
- Nutrition targets
- Educating & empowering families
- Supermarket tour- reading food labels
- Portion sizes
- Fussy eating

Do It!

Putting learning into action

- Empowering families to make sustainable lifestyle changes
- Encouraging and motivating families to do it for themselves
- Creating agents of social change in communities – kids, parents and leaders

MEND: Mind & Nutrition



CATCH Exercise Sessions



Family Support Sessions



Outcome Measures



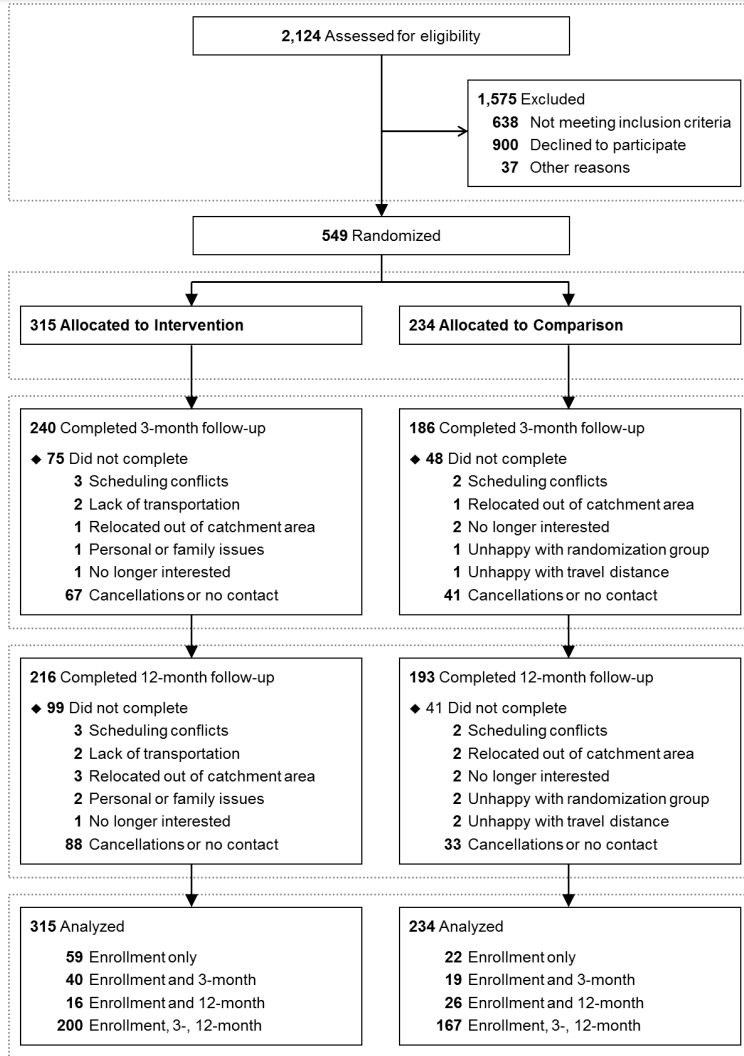
- Primary Outcome
 - %BMI_{p95}
- Secondary Outcomes
 - Fat mass (bioelectrical impedance analysis, Tanita)
 - Blood pressure
 - Fitness: Step Test
 - Physical activity: ActiGraph, SPAN physical activity
 - Diet: Block FFQ, SPAN nutrition
 - Psychosocial outlook: PedsQOL, Strengths & Difficulties Questionnaire

Data Analysis



- Multi-level mixed-effects linear regression by age group (Stata 13.1)
 - Group, time, group X time
 - Covariates: age, gender, race/ethnicity, maternal BMI, community, income, education
- Intent-to-Treat Analysis using multiple imputation
 - Sensitivity analysis
 - Maximum likelihood estimation
 - Complete cases
- Secondary Analysis
 - Program compliance

Consort Diagram



Baseline
26% enrolled

3-month
76% and 79% measured

12-month
68% and 82% measured

Baseline Demographics



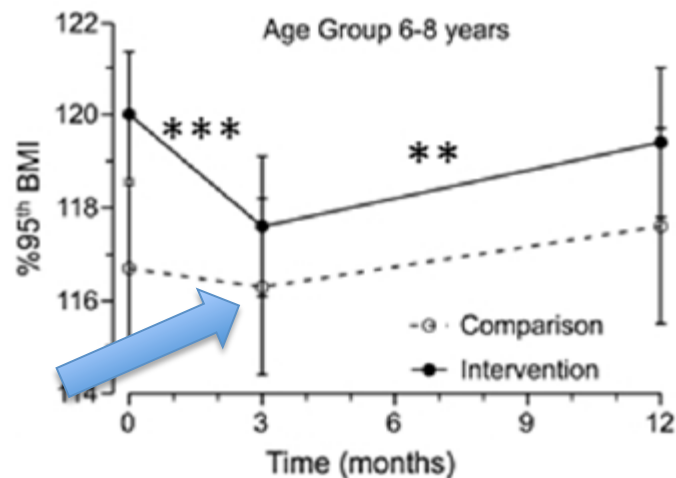
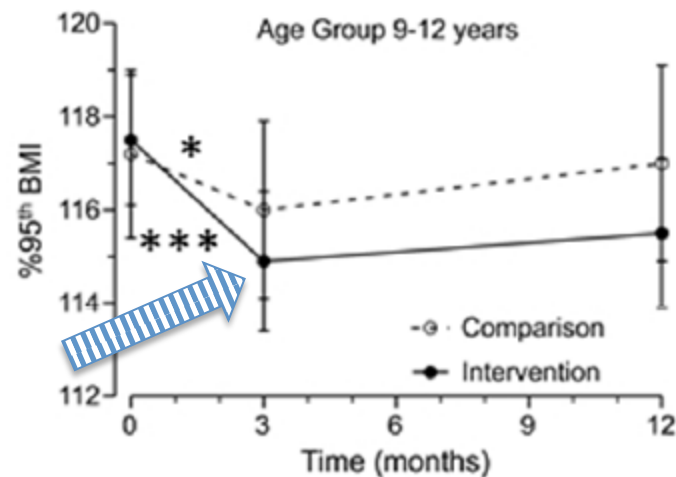
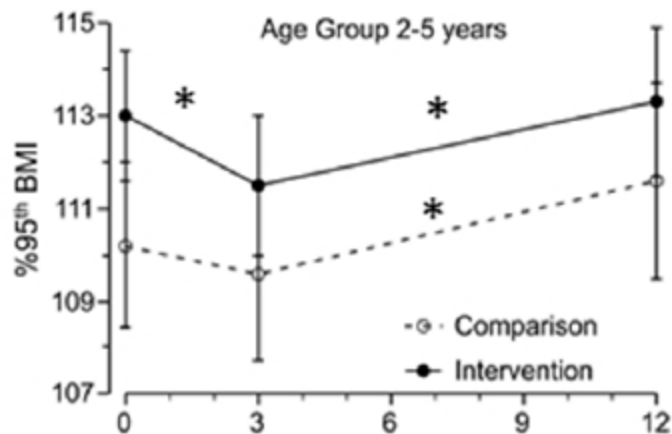
	Ages 2-5 y		Ages 6-8 y		Ages 9-12 y	
	Comparison (n=60)	Intervention (n=100)	Comparison (n=68)	Intervention (n=113)	Comparison (n=106)	Intervention (n=102)
Sex						
Male (%)	55	51	43	49	45	55
Race/Ethnicity						
Hispanic/Latino (%)	95	84	93	80	89	83
Black (%)	5	13	7	19	9	15
Other (%)	0	3	0	1	2	2
Annual household						
\$ 25,000 or less (%)	78	85	79	77	80	80
\$ 25,001 or more (%)	22	15	21	23	20	20
Education						
Grade 12 /GED or less (%)	75	79	75	65	73	76
College 1-3 y or more (%)	25	21	25	35	27	24

Baseline Characteristics



	Ages 2-5 y		Ages 6-8 y		Ages 9-12 y	
	Comparison (n=60)	Intervention (n=100)	Comparison (n=68)	Intervention (n=113)	Comparison (n=106)	Intervention (n=102)
Anthropometry & Body Composition	Mean (SD)					
Weight (kg)	22.3 (5.1)	24.2 (6.1)	39.3 (9.8)	40.2 (10.5)	59.4 (14.3)	56.4 (14.7)
BMI (kg/m ²)	20.0 (2.5)	20.5 (2.8)	23.4 (3.8)	23.8 (4.2)	27.3 (4.3)	26.8 (4.0)
Percent BMIp95(%)	110.2 (13.7)	113.0 (15.2)	116.8 (18.3)	120.0 (21.4)	117.2 (17.3)	117.5 (16.5)
Percent fat mass (%)	31.0 (4.9)	31.7 (6.5)	35.4 (6.0)	35.5 (6.8)	37.6 (6.1)	37.2 (7.1)
Cardiovascular Health						
Systolic blood pressure (mmHg)	95.1 (10.5)	96.4 (9.5)	104.4 (10.1)	101.8 (8.5)	106.9 (9.1)	106.2 (10.8)
Diastolic blood pressure (mmHg)	62.3 (7.2)	58.8 (7.7)	62.3 (9.4)	61.4 (9.0)	63.2 (9.3)	64.0 (10.1)
Child Psychosocial Status						
PedsQL total score	89.3 (9.0)	86.0 (13.2)	77.2 (16.2)	76.3 (15.2)	75.0 (15.4)	75.0 (17.0)
SDQ Total Difficulties score	11.5 (5.0)	10.7 (5.6)	11.1 (6.2)	10.7 (5.6)	10.3 (6.0)	11.0 (5.6)

Primary Outcome: %BMI_{p95}



Time effect

- * $p < 0.05$
- ** $p < 0.01$
- *** $p < 0.001$

Intervention Dosage

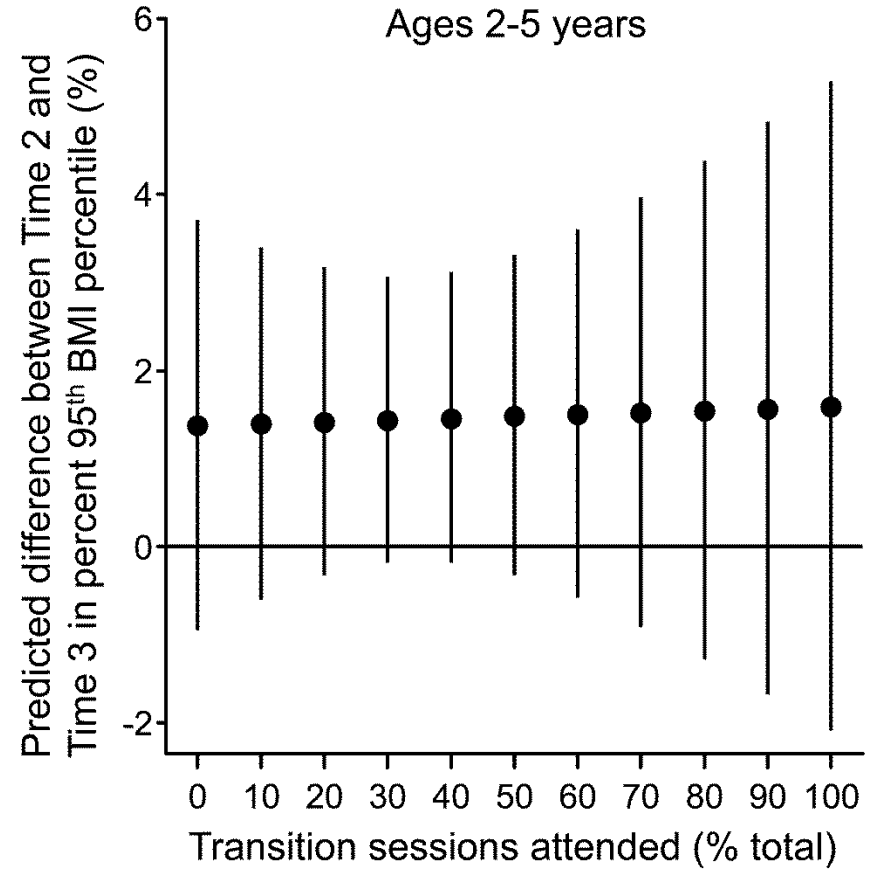
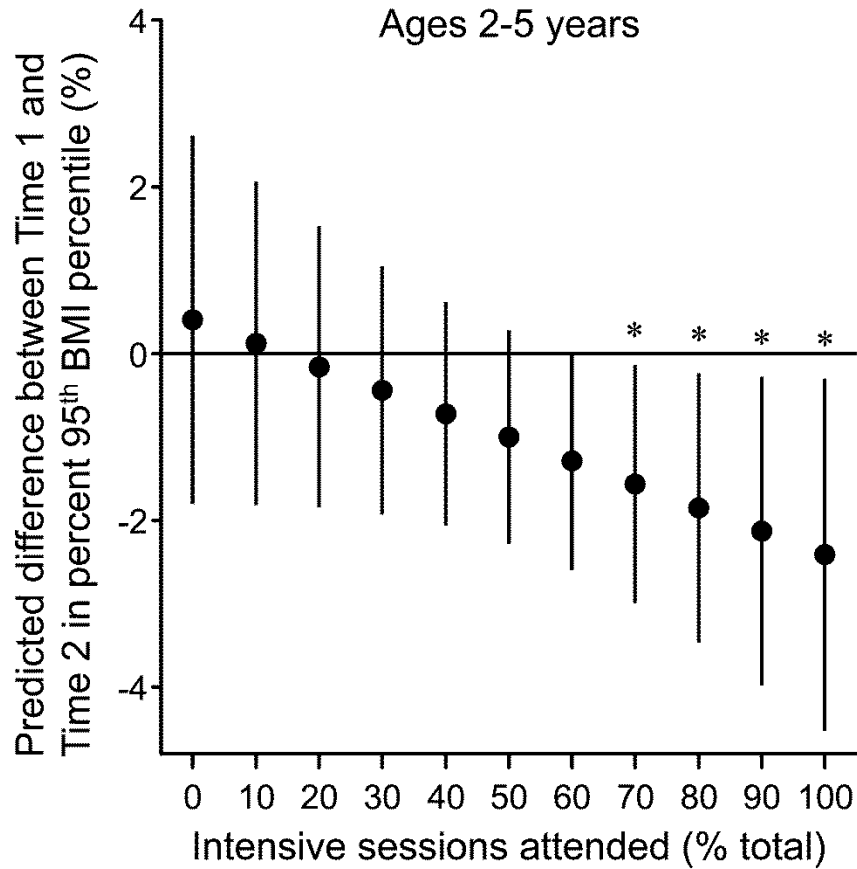


	Comparison*			Intervention**		
	2-5 y	6-8 y	9-12 y	2-5 y	6-8 y	9-12 y
Dosage (#sessions)	0.2 ± 0.4	0.2 ± 0.4	0.2 ± 0.4	4 ± 3	10 ± 6	8 ± 5
Dosage (%)	8 ± 21	11 ± 21	9 ± 21	46 ± 34	58 ± 33	47 ± 30

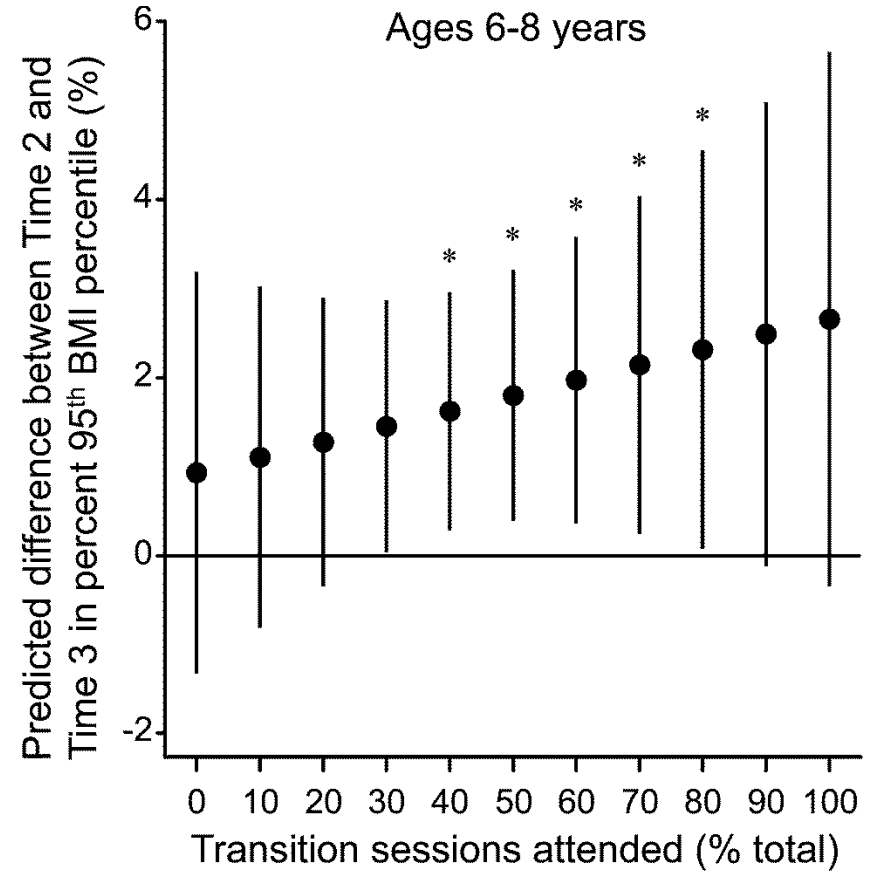
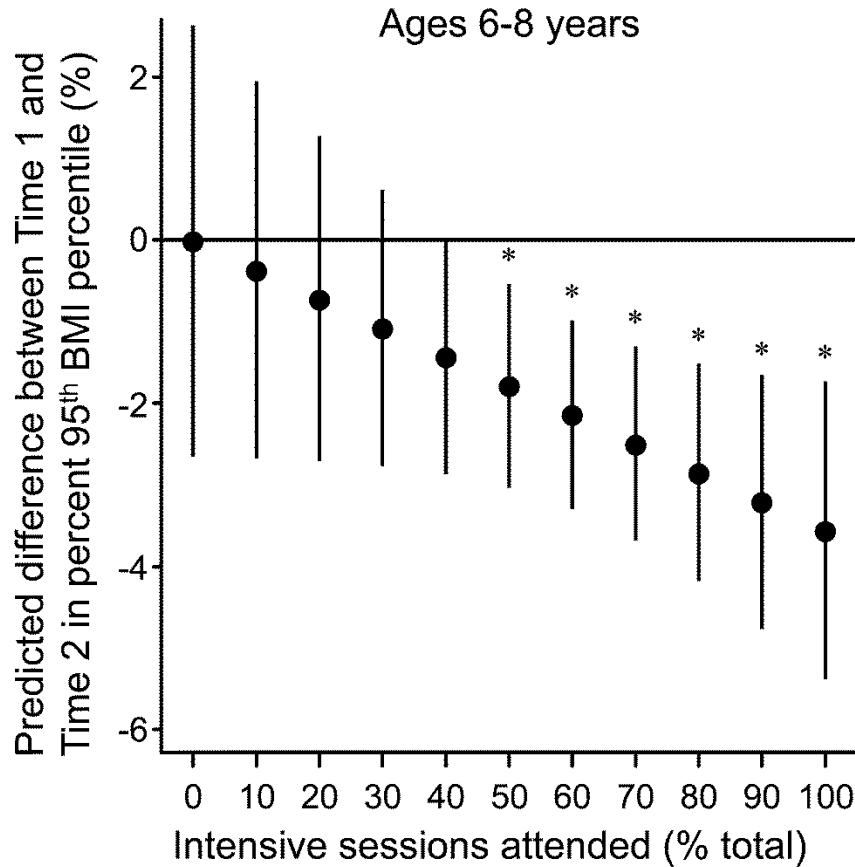
*Maximum sessions offered in NEXT STEPS = 2

**Maximum sessions offered in MEND/CATCH 2-5 y = 9
MEND/CATCH 6-8, 9-12 y = 18

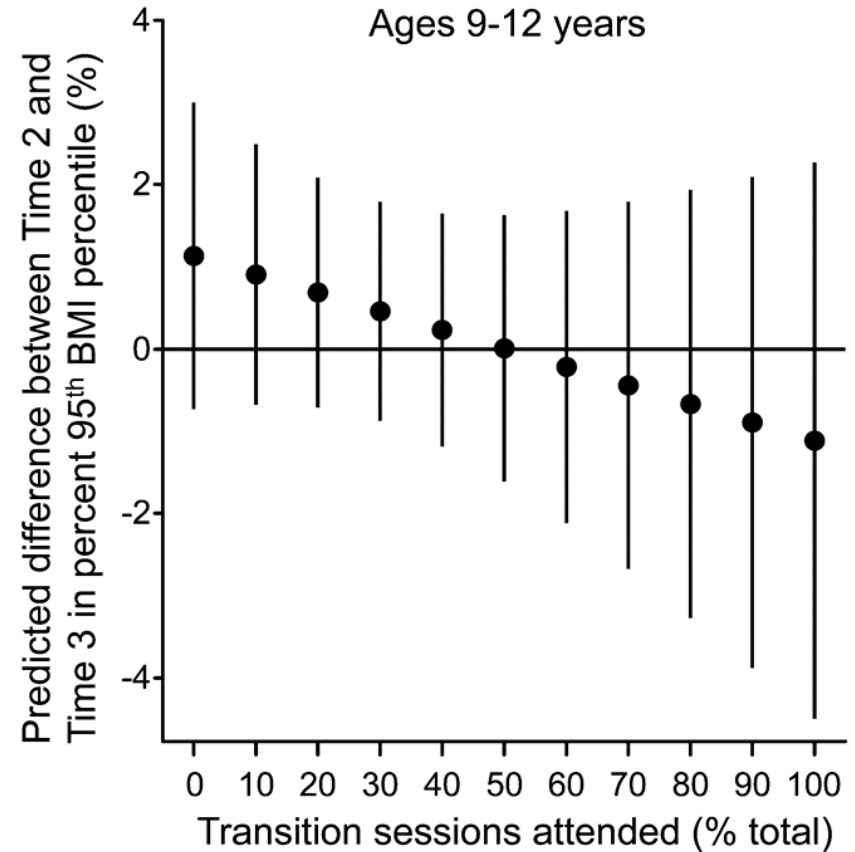
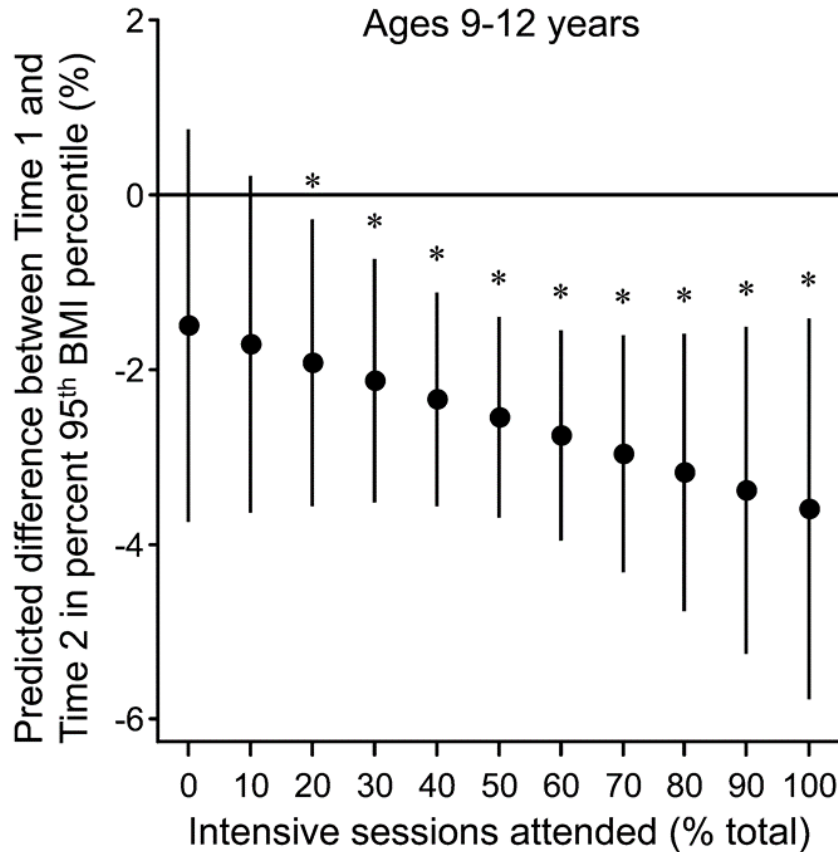
%BMI_{p95} Change as Function of Intervention Compliance: 2-5 year olds



%BMI_{p95} Change as Function of Intervention Compliance: 6-8 year olds



%BMI_{p95} Change as Function of Intervention Compliance: 9-12 year olds

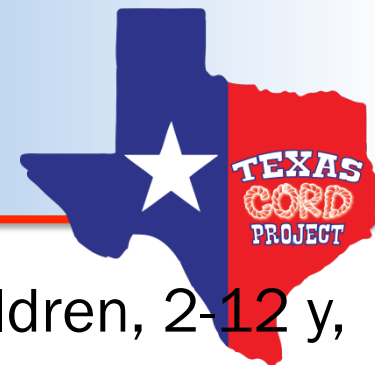


Secondary Outcomes - 3 months



- For ages 2-5 y:
 - ↓ Strength & Difficulties (comparison & intervention)
- For ages 6-8 y:
 - ↓ SBP (comparison)
 - ↑ PedsQOL (comparison & intervention)
 - ↓ Strengths & Difficulties (comparison & intervention)
- For ages 9-12 y:
 - ↑ PedsQOL (comparison & intervention)
 - ↓ Strengths & Difficulties (comparison & intervention)
 - ↓ SBP, DBP (comparison < intervention)

Summary



- A total of 549 families with overweight or obese children, 2-12 y, randomized into MEND/CATCH or NEXT STEPS
 - Low income families, predominately Hispanic and Black
 - 78% retention at 3 months, 75% at 12 months
- For age group 2-5, MEND did not differentially affect %BMI_{p95}
- For age group 6-8, MEND/CATCH resulted in greater (p=0.05) improvement in %BMI_{p95} relative to NEXT STEPS at 3 months,
- For age group 9-12, MEND/CATCH did not significantly affect %BMI_{p95} (p=0.07)
 - Intervention compliance was inversely correlated to change in %BMI_{p95} during Intensive phase
 - Secondary effects observed for blood pressure, psychosocial status in both programs

Conclusion



- Efficacy of MEND/CATCH6-12 demonstrated for improvement in $\%BMI_{p95}$ at 3 months but not 12 months relative to Next Steps
- Efficacy affected by intervention compliance, emphasizing need for implementation science research on sustaining family engagement in low-income populations to achieve long-term improvement in child weight status

Rationale for BMI measure



BMI percentile and z score function poorly in severe obesity

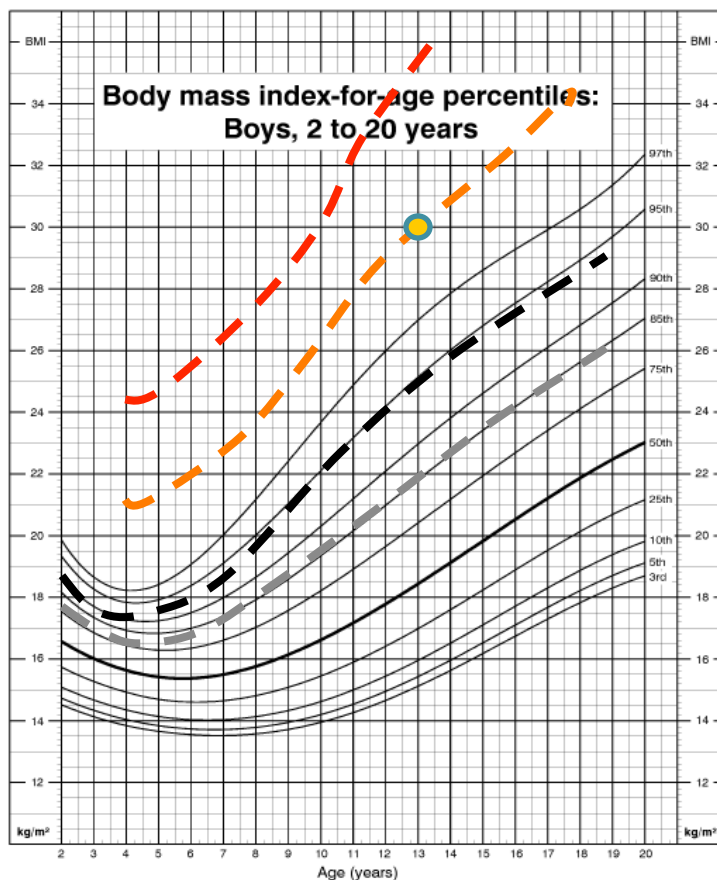
Example: 17 yo girl with 29 lb weight gain

BMI 1 kg/m ²	BMI 2 kg/m	%ile 1	%ile 2	z score 1	z score 2
50	55	99.6	99.6	2.61	2.62
35	40	98.1	99	2.08	2.31
32	37	96.9	98.5	1.87	2.17

Percent BMI_{95th percentile} (%BMI_{p95})



CDC Growth Charts: United States



- Class 3 obesity $\geq 140\%$ of obesity cutpoint
- Class 2 obesity = 120% - 139% of obesity cutpoint
- Obesity cutpoint = 95th percentile
- Overweight cutpoint = 85th percentile

ex: $30 \text{ kg/m}^2 \div 25 \text{ kg/m}^2 * 100 = 120\%$

BMI 1	BMI 2	%ile 1	%ile 2	z score 1	z score 2	% BMI _{p95 1}	% BMI _{p95 2}
50	55	99.6	99.6	2.61	2.62	167	183
35	40	98.1	99	2.08	2.31	117	133
32	36.6	96.9	98.5	1.87	2.17	107	122

SOURCE: Developed by the National Center for Health Statistics in collaboration with the National Center for Chronic Disease Prevention and Health Promotion (2000).



Childhood Obesity
Research Demonstration
(CORD) Project

Activities in the Healthcare Setting for Secondary Prevention of Childhood Obesity

Thank You!

The archive of today's webinar and a PDF of the presentation slides will be posted to the msdcenter.org website

Hosted by

