Report to Congress on the Centers for Disease Control and Prevention's Childhood Obesity Research Demonstration Project

Department of Health and Human Services
Centers for Disease Control and Prevention

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Executive Summary

Childhood obesity is a serious problem in the United States. Obesity currently affects 1 in 6 children and adolescents (ages 2-19). Children and adolescents with obesity are at higher risk of numerous health conditions including type 2 diabetes, high blood pressure and poor lipid profiles as well as stigmatization, and bullying. Obesity prevalence tends to be higher in children and adolescents from lower-income families. With fewer resources, lower-income children and adolescents may not attend child care or schools with comprehensive supports for healthy behaviors, and families may have a harder time getting their children the recommended health screenings and program referrals. CDC's Childhood Obesity Research Demonstration (CORD) project was an effort to implement effective interventions to reduce obesity among lower-income children (ages 2-12).

Funding for the initial demonstration, CORD 1.0 was authorized through Children's Health Insurance Program Reauthorization Act of 2009 (CHIPRA), and $25 million was appropriated through the Affordable Care Act (ACA) in 2010. CORD 1.0 grantees were funded from 2011-2015.

The Medicare Access and CHIP Reauthorization Act of 2015 (MACRA) appropriated an additional $10 million and extended the program for two years (CORD 2.0; grantees funded 2016-2018). This report covers activities from October 2011–December 2018.

CDC, with leadership from the Division of Nutrition, Physical Activity, and Obesity, and engagement with other federal partners, administers and provides scientific guidance and direction for the CORD program. This report to Congress describes the background, implementation, and selected findings from CORD 1.0 as requested by Congress in the original CHIPRA authorization:

REPORT TO CONGRESS.—Not later than 3 years after the date the Secretary implements the demonstration project under this subsection, the Secretary shall submit to Congress a report that describes the project, evaluates the effectiveness and cost effectiveness of the project, evaluates the beneficiary satisfaction under the project, and includes any such other information as the Secretary determines to be appropriate.

It also provides an overview of the CORD 2.0 planning and awardees. The key findings and lessons learned described in this report include:

- High-risk, underserved populations were reached in CORD 1.0 through community settings
- Implementation of the U.S. Preventive Services Task Force recommendation on obesity screening in children and adolescents and referral to intervention into the healthcare or community settings was feasible
- Beneficiaries (i.e., parents) were satisfied with the program
- Results showed promising improvement in health in both community and healthcare settings
- Dose mattered - children who had higher exposure to program components had better outcomes.
- Prevention interventions cost less than treatment related interventions
- Interventions were sustainable

In addition, this report includes appendices of all publications and tools developed through the CORD program through December 31, 2018.

Introduction

Childhood obesity is a serious problem in the United States, putting children and adolescents (ages 2-19) at risk for poor health. Obesity prevalence among children and adolescents is high, affecting 13.7 million children and adolescents [1]. For children and adolescents aged 2-19 years:

- Obesity prevalence was 13.9% among 2- to 5-year-olds, 18.4% among 6- to 11-year-olds, and 20.6% among 12- to 19-year-olds [1].
- Obesity was more common among certain populations
  - Hispanics (25.8%) and non-Hispanic Black or African American children and adolescents (22.0%) had a higher prevalence of obesity than non-Hispanic Whites (14.1%) [1]
  - Children and adolescents from the lowest (18.9%) and middle income (19.9%) families had a higher prevalence of obesity than those from the highest income group (10.9%). [2]

A collective approach at the community level and the health system level is needed to address our nation's high levels of childhood obesity. As childhood is a critical period in the development of healthy habits, focusing efforts on the youngest population provides the opportunity to improve a lifetime of health and well-being. Per the United States Preventive Services Task Force (USPSTF) recommendation [3], clinical settings are critical for implementing protocols for screening children's weight status and for providing the optimal clinical care for those children with obesity. However, prevention and treatment of obesity is complex and also requires community-based changes that improve access to healthy foods and safe places for physical activity in addition to access to evidence-based interventions.

In 2009, a trans-agency group led by Health and Human Services (HHS) developed the basic design and framework of the multi-sector approach for the childhood obesity demonstration project as part of the Social Security Act. This framework was incorporated in the Children's Health Insurance Program Reauthorization Act of 2009 (CHIPRA), authorizing the Childhood Obesity Research Demonstration Project (CORD). In 2010, Congress appropriated $25 million for CORD through the Affordable Care Act (ACA).

Congress provided additional appropriations for CORD in 2016 (CORD 2.0) and in 2018 (CORD 3.0). With each iteration of the research demonstration project, we continue to learn about how evidence-based interventions can be implemented in settings serving lower-income children and families, as well as what resources are needed to implement these interventions.

This report to Congress describes the background, implementation, and selected findings from CORD 1.0 as requested by Congress in the original CHIPRA authorization:

REPORT TO CONGRESS.—Not later than 3 years after the date the Secretary implements the demonstration project under this subsection, the Secretary shall submit to Congress a report that describes the project, evaluates the effectiveness and cost effectiveness of the project, evaluates the beneficiary satisfaction under the project, and includes any such other information as the Secretary determines to be appropriate.

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U.S. PREVENTIVE SERVICES TASK FORCE (USPSTF)

The USPSTF recommends that clinicians screen for obesity in children and adolescents 6 years and older and offer or refer them to comprehensive, intensive behavioral interventions to promote improvements in weight status.

The USPSTF defines comprehensive, intensive behavioral interventions as those that provide 26 contact hours or more of family-centered lifestyle counseling on nutrition, physical activity, behavior modification techniques, and skill building.

Section 1: Background and Findings from CORD 1.0

CDC used the initial framework from the HHS-led trans-agency workgroup to design CORD. After receiving the allotment of funds for the research demonstration project in 2010, CDC developed a Federal Steering Committee for CORD 1.0 with representatives from the Centers for Medicare & Medicaid Services (CMS), Health Resources and Services Administration (HRSA), Agency for Healthcare Research and Quality (AHRQ), National Institutes of Health (NIH), and the Administration for Children and Families (ACF). This Committee met quarterly to receive updates on the progress of the demonstration project and to provide guidance on strategies to help improve the project's implementation as related to each agency's mission.

CDC designed CORD 1.0 to best support healthy growth among underserved and high-risk children (described below) aged 2-12 years who were eligible for services under Medicaid or the Children's Health Insurance Program (CHIP) [4, 5]. For this high-risk population, CORD 1.0 tested the best ways to: 1) implement the USPSTF recommendation for screening and providing referrals, as needed, to family-based weight management programs; and 2) drive improvements in access to healthy foods and opportunities for physical activity for children at the broader community level by working with early care and education (ECE, formerly called child care), schools, and other key settings used by families.

In January 2011, CDC published a funding opportunity announcement (FOA) that was open to applicants representing diverse entities, including public and private organizations, universities and research institutions, community-based organizations, or state and local governments. The FOA sought applications for interventions designed to prevent and control obesity among children 2–12 years of age who are eligible for Medicaid or CHIP or who live in low-income areas where ≥50% of students are eligible for the USDA National School Lunch Program. To ensure selected grantees could implement these requirements, the applicant proposals had to include the following:

- Multi-Setting, Multi-Level Interventions: Grantees were required to incorporate multiple settings, including the home, school, ECE, healthcare, and community settings, in their interventions. Their interventions also had to be multi-level and cover various levels of the socioecological model (SEM), which is a framework that recognizes the interwoven relationship between individuals and their environment.
- Obesity Chronic Care Model: Grantees were required to use the Obesity Chronic Care Model (OCCM) in their interventions. The goal of the OCCM is to integrate primary healthcare with public health approaches to prevent and manage obesity. The OCCM focuses on patient self-management, as well as changes to the healthcare delivery system including changes to clinic information systems, use of decision supports, and improving communication between providers and patients. This model also emphasizes the importance of factors outside the healthcare setting that affect children's weight. Finally, the OCCM encourages links between providers and community resources to improve the dietary and physical activity behaviors of children and families.
- Community Health Workers (CHW): Grantees were required to use CHWs as a link between the healthcare and public health sectors as a way to address childhood obesity. CHWs are trained and, in some cases, certified, lay health workers who can be integrated into multidisciplinary healthcare teams. For CORD CHWs were envisioned as the bridge between families, the community, and the healthcare system for childhood obesity prevention and control. Their role was to help link children and families to resources in the community, such as places to get affordable, healthy food and participate in low-cost physical activity opportunities.

Three community grantees and one evaluation center were awarded the competitive CORD 1.0 funding for four years (2011-2015) with 12-month no-cost or low-cost extensions (2016):

Below is a summary of the interventions grantees conducted to meet these requirements.

- The University of Texas Health Science Center at Houston (TX-CORD) [6] – Texas CORD
  - Projects were in Austin and Houston, Texas
  - Target population: low-income, racial/ethnic minority children
  - Community settings: ECE/Head Start centers, elementary schools
  - Clinical settings: referrals, as needed, were made to either a clinical-based weight management programs, Next Steps, or the combination of the evidence based Mind Exercise Nutrition Do it Program (MEND program) a multicomponent healthy lifestyle intervention coupled with physical activity sessions derived from the Coordinated Approach to Child Health school program (CATCH program) delivered at a local YMCA.

- CHWs: CHWs had a critical role providing outreach, recruitment, and delivery of intervention components (e.g., MEND sessions included didactic healthy lifestyle lessons and hands on activities to engage families) and counseling

- San Diego State University (CA-CORD) [7] – Our Choice/ Nuestra Opcion
  - Projects were in Brawley, Calexico, and El Centro, California
  - Target population: rural communities with high poverty and childhood obesity rates
  - Community settings: ECEs, schools, and municipal recreation agencies and facilities
  - Clinical settings: federally qualified health centers (FQHCs) used an evidence-informed Family Wellness Program (FWP), administered by CHWs
  - CHWs: CHWs were trained to deliver FWP
- Massachusetts State Department of Public Health (MA-CORD) [8, 9] – Mass in Motion Kids
  - Projects were in Fitchburg and New Bedford, Massachusetts Target population: lower-income underserved children in communities with high poverty and childhood obesity rates
  - Community settings: the Special Supplemental Nutrition Program that serves Women Infants and Children (WIC), ECEs, schools (elementary and middle), and community-wide programs
  - Clinical settings: FQHCs implemented a multi-disciplinary weight management program (Healthy Weight Clinic)
  - CHWs: CHWs were integrated into the primary care and healthy weight clinic teams (e.g., served as wellness navigators and provided counseling)

One grantee was funded as an evaluation center:

- The University of Houston, (CORD-EC) was funded as the independent evaluation center [10, 11]. They developed a set of common core measures used by grantees and aggregated core measures across the CORD sites to conduct a process and outcome evaluation.

Overview of Reach and Select Findings across the CORD 1.0 sites				
	Settings			
	Community 1		**Healthcare**	
	Early Care and Education (ECE)2	**Schools 2**	**USPSTF guideline implementation testing**	
			Screening and assessment of obesity, nutrition, and physical activity status of 2-12 year olds	*Family-centered weight management programs for children with BMI ≥ 85% 4*
Intervention Sites	58	74	17	17
Children Reached	5,174	41,566	21,000+	1,164
Providers/Staff Reached	390	383	115	
Costs per child 3	$26-$96	$1.26-$38	$164-$181	$2,107-$2,220
Interventions Used	*NAPSACC, SPARK, CATCH EC*	*CATCH, SPARK, Planet Health, Eat Well Keep Moving*	*Clinical Decision Supports, Motivational Interviewing, Next Steps*	*MEND program, Healthy Weight Clinic, Family Wellness Program*
Outcomes	ECEs reached in CORD reported significant improvements in nutrition and physical activity environments; significant decline in child BMI found in TX-CORD grantee interventions	Schools reached in CORD reported significant improvements in nutrition and physical activity supports; decline in obesity prevalence in MA-CORD grantee	Clinics enhanced screening, counseling and care of all children especially those with overweight and obesity	Decline in child BMI observed in MA-CORD grantee interventions

Key:

1. CORD sites (Texas (TX), Massachusetts (MA) and California (CA)) also carried out interventions in other community settings such as WIC clinics, afterschool programs, community-based organizations, and restaurants.
2. Interventions had previously been shown in other populations or research sites to improve child behavior and the nutrition and physical activity environments of the different intervention settings:

   NAPSACC = Nutrition and Physical Activity Self-Assessment for Child Care

   SPARK = Sports, Play, and Active Recreation for Kids

   CATCH® = Coordinated Approach to Child Health school program

   CATCH EC® = CATCH Early Childhood

   PLANET HEALTH

   MEND® = Mind Exercise Nutrition Do it Program
3. Cost data was provided by individual CORD grantee projects and calculated using programmatic data and contained in their Final Annual Progress Report
4. CORD interventions included children at or above the 85th percentile for age and gender to participate in the family centered weight management programs.

Findings:

The findings from the CORD 1.0 sites suggest that multi-setting interventions can be implemented in primary care and community intervention sites serving lower-income children at risk for overweight and obesity and for children who already are overweight or have obesity. Although risk behaviors and Body Mass Index (BMI) changes varied across intervention sites and settings, promising findings from some sites suggest that interventions, when fully implemented, could result in declines in BMI and reach the segments of the US population who need them the most.

High-risk, underserved populations were reached in CORD 1.0 through community settings

- Most families (86%) participating in the TX-CORD ECE program had an annual income of<$25,000/year and were on Medicaid. Most were Hispanic/Latino [6].
- The prevalence of obesity was higher in the CORD population in both the ECE and school settings than the national average:
  - National prevalence of obesity for 2- to 5-year-old children was 13.9%. [1] Baseline data for 2-5 year old children who participated in each CORD project are described below: CA CORD [7] had a prevalence of 14.4%; TX-CORD had a prevalence of 19% [6] and MA-CORD had a prevalence of 17% among 2-5 year olds in the MA intervention communities who participated in the WIC program [9].
  - National prevalence for overall childhood obesity for 6- to 11-year-old children is 18.4% [1]. For TX-CORD, it was 35.2% among 5th grade children at baseline [6]. For MA-CORD, it was 28.1% among 4th graders in the intervention communities at baseline [9].
- Across sites, risk behaviors for obesity were reported: For example:
  - Baseline data from the MA-CORD site found that approximately 15-40% of children consumed no vegetables the previous day, 25-75% drank a sugar-sweetened beverage on the previous day and up to 87% had insufficient physical activity [9].
  - Baseline data from the TX-CORD site also found that parents reported children were consuming 1.2-1.5 servings of sugar sweetened beverages per day, and that > 60% of children had a television in their bedroom [6].
- A high proportion of children participating in weight management programs already had severe obesity.
  - Of the 1,156 children enrolled in family-based weight management programs in the CORD 1.0 sites, 30% were overweight (BMI in the 85-95th percentile), 41.5% had obesity (BMI of >95th percentile but not severe obesity), and 28.5% had severe obesity (BMI 120% of the 95th percentile) (unpublished data CORD Evaluation Center)

Implementation of the USPSTF recommendation into the healthcare setting was feasible

- Screening of childhood obesity was improved in healthcare settings in the CORD sites through the use of electronic health records with clinical decision supports.
- Family-based weight management programs were acceptable to families; parental satisfaction was reported in two sites (additional information below).

Results showed promising improvement in health in both community and healthcare settings

In community-based setting such as ECEs and schools, findings included:

- Decreased BMI z-score (a measure of weight that accounts for age, sex, and height), participants compared to usual Head Start health programs (TX-CORD) [12];
- When compared to a controlled community, a statistically significant decrease in obesity prevalence of 2.68% was found among 7th graders who participated in CORD in one Massachusetts community; a similar but non-significant decrease of 2.24% was found for 7th graders in the second community (p=0.099) (MA-CORD) [13];
- Statistically significant positive changes in ECE nutrition and physical activity environments in ECEs participating in CORD [14]; and
- Statistically significant decrease in consumption of sugar sweetened beverages (SSBs) and increase in consumption of water (MA-CORD) [13] in 4th and 7th graders.

In healthcare setting improvements and referrals to family-based community pediatric weight management programs, findings included:

- Statistically significant improvements in provider practice (TX-CORD) [15];
- Decline in BMI z scores of children who participated in a fully implemented FQHC family- based healthy weight program (MA-CORD) [16]; and

- Higher BMI reductions at three months for those 6- to 8-year-olds who participated in the MEND/CATCH program (compared to Next Steps program)—however, these improvements were not sustained at 12 months (TX-CORD) [17].

Parents' satisfaction with the program included:

- Unpublished data from the MA-CORD grantee found statistically significant improvements in parent satisfaction with obesity-related care (MA-CORD).
- Published data from the CA-CORD grantee found that parents reported high levels of satisfaction with the Family Wellness Program and the CHWs who administered the program (CA-CORD) [18].

Dose mattered

Community-based prevention in ECEs and schools:

- TX-CORD researchers used an implementation index score, based on factors such as teacher surveys and activity checklist, to classify schools into three levels of CATCH implementation: high, moderate, or low. Children in high implementing schools had significantly lower BMI z scores at follow-up for both 2nd and 5th grade students than low implementers. [19].

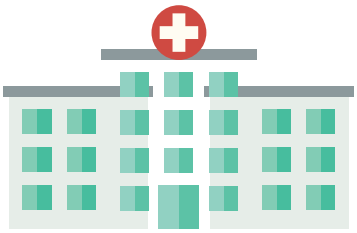
Community-based weight management programs supported by referrals from the healthcare setting:

- Children with better outcomes had higher attendance in the family-based weight management programs (TX-CORD) [17].

Prevention interventions cost less than treatment interventions.

Although a formal cost effectiveness analysis was not completed because risk behaviors and BMI changes varied across intervention sites, data from the CORD sites' final reports documented the costs of interventions that were then calculated across settings. The cost analysis showed ECE interventions ranged from $26-$96 per child; the school interventions ranged from $1.26-$38 per child (unpublished data). In both of these settings, the costs generally included staff training expenses and intervention materials. Such interventions were designed to lead to sustainable environmental policy changes (e.g. increased physical activity and improved ECE nutrition environments) that improve healthy eating, increase physical activity, and reduce screen time with a minimal investment.

Implementing interventions in the clinical setting had higher costs. The costs for enhancing screening and referral systems for children with obesity ranged from $164-$181 per child screened in the CORD sites (unpublished data). Costs of implementing interventions included enhancing Electronic Health Records (EHRs) to aid providers in obesity prevention and care, providing advanced training to healthcare staff, integrating a community healthcare worker to assist families, and developing materials to link families to community resources. The intensive family-based weight management programs cost approximately $2,200 per child.



Interventions were sustainable

Several interventions or components of interventions were sustained beyond the funding and completion of the project.

ECE:

- The CATCH Early Childhood (EC) coordination kit is now publically available to help coordinate the CATCH EC intervention in ECEs and provide continued support for ECEs using the CATCH program.
- The CA-CORD site was able to use the Supplemental Nutrition Assistance Program Education (SNAP-ED) funding to sustain its ECE initiatives. SNAP-Ed is a U.S. Department of Agriculture program that teaches people using or eligible for SNAP about good nutrition and how to make their food dollars stretch further. SNAP-Ed participants also learn to be physically active.

Healthcare:

- Enhancements to aid healthcare providers in obesity prevention and care were embedded into EHRs in all CORD sites.
- The TX-CORD site created supplementary materials to accompany existing American Academy of Pediatrics (AAP) provider materials called Next Steps: A Practitioner's Guide of Themed Follow-up Visits to Help Patients Achieve a Healthy Weight. The Next Steps guide is designed for clinicians to help children and adolescents with weight management issues and provides brief counseling materials to support family/child healthy lifestyle improvements. The CORD supplementary materials are now available to providers across the country in both English and Spanish (HealthyChildren.org).
- In the CA-CORD site, the grant-funded CHW placed as a patient navigator position in the FQHC was sustained. The MA-CORD project was also able to retain a CHW in the FQHC.

In summary, CORD 1.0 advanced the science of childhood obesity prevention and treatment by contributing 36 scientific

publications to the childhood obesity literature and developing three products to help sustain and spread improvements beyond the funding period. Please see appendix A and B for full details.

Section II: CORD 2.0—Focus on weight management programs for children in the clinical setting

- Building on research findings from CORD 1.0, CDC developed CORD 2.0 (Funding Period 2016–2018 via Medicare Access and CHIP Reauthorization Act of 2015) with a specific focus on pediatric weight management programs (for children offered in the clinical setting). Due to the short funding timeframe, CORD 2.0 specifically focused on building evidence on the ability of pediatric weight management program interventions to improve nutrition and physical activity behaviors of children aged 6 to 12 in lower-income families who are struggling with overweight and obesity.
- CORD 2.0 grantees were asked to work with state and community partners—such as state Medicaid offices—to understand appropriate billable services and state initiatives such as waivers, to help make the programs available to lower-income families, and to identify payment models that balance care and costs.

- CORD 2.0 grantees were asked to provide needed information on how pediatric weight management interventions can be effectively carried out for children from lower-income families, including information on optimal screening, referral, enrollment, and retention.
- Grantees were asked to assess pediatric weight management programs costs as well as identify program strengths and weaknesses from the perspective of providers, attendees, and other stakeholders, including state Medicaid offices. This information was used to determine how similar programs may be developed in a sustainable way and disseminated across primary care practices in the state.
- Grantees were asked to include information in their evaluations to determine if family-centered pediatric weight management interventions for the children affected the primary parent attendee.

Two grantees were awarded competitive funding for CORD 2.0 for the project period of June 2016– September 2018 with one year no-cost extension to complete all aspects of their research.

- **Arizona State University**
  The Arizona-CORD (AZ-CORD) is adapting and implementing an existing parenting program called the Family Check-Up (FCU) to address overweight and obesity in young people. The FCU model is a strengths-based, family-centered intervention that promotes family management and addresses child and adolescent adjustment problems. The AZ-CORD team is working with three primary care clinics and stakeholders across the state to implement and test Family Checkup 4 Health (FCU4Health).
- **Massachusetts Department of Health**
  Massachusetts CORD 2.0 (MA-CORD 2.0) is building on experiences in CORD 1.0 to optimize and test the clinical care of lower-income children with a BMI ≥ 85th percentile for age and gender.

CORD 2.0 grantees have engaged with their community advisory boards to help shape their projects and are actively carrying out their research objectives. To date, three papers have been published on this body of research (see appendix C for a complete listing).

As CORD 2.0 concludes, findings will be available on the DNPAO website at https://www.cdc.gov/obesity/strategies/healthcare/cord2.html. Additionally, as CORD 3.0 begins, which builds on CORD 1.0 and CORD 2.0 by adapting, testing, and packaging effective programs to reduce childhood obesity among children from lower-income families, information on the awardees and their projects will be available at https://www.cdc.gov/obesity/strategies/healthcare/cord3.html.

References

1. Hales, C.M., et al., *Trends in Obesity and Severe Obesity Prevalence in US Youth and Adults by Sex and Age, 2007-2008 to 2015-2016*. Jama, 2018. **319**(16): p. 1723-1725.
2. Ogden, C.L., et al., *Prevalence of Obesity Among Youths by Household Income and Education Level of Head of Household - United States 2011-2014*. MMWR Morb Mortal Wkly Rep, 2018. **67**(6): p. 186-189.
3. Grossman, D.C., et al., *Screening for Obesity in Children and Adolescents: US Preventive Services Task Force Recommendation Statement*. Jama, 2017. **317**(23): p. 2417-2426.
4. Blanck, H.M. and J.L. Collins, *The Childhood Obesity Research Demonstration project: linking public health initiatives and primary care interventions community-wide to prevent and reduce childhood obesity*. Child Obes, 2015. **11**(1): p. 1-3.
5. Dooyema, C.A., et al., *The childhood obesity research demonstration project: a comprehensive community approach to reduce childhood obesity*. Child Obes, 2013. **9**(5): p. 454-9.
6. Hoelscher, D.M., et al., I*ncorporating primary and secondary prevention approaches to address childhood obesity prevention and treatment in a low-income, ethnically diverse population: study design and demographic data from the Texas Childhood Obesity Research Demonstration (TX CORD) study*. Child Obes, 2015. **11**(1): p. 71-91.
7. Ayala, G.X., et al., *Our Choice/Nuestra Opcion: the Imperial County, California, Childhood Obesity Research Demonstration study (CA-CORD)*. Child Obes, 2015. **11**(1): p. 37-47.
8. Taveras, E.M., et al., *Design of the Massachusetts Childhood Obesity Research Demonstration (MA-CORD) study*. Child Obes, 2015. **11**(1): p. 11-22.
9. Davison, K.K., et al., *Evaluation overview for the Massachusetts Childhood Obesity Research Demonstration (MA-CORD) project*. Child Obes, 2015. **11**(1): p. 23-36.
10. Foltz, J.L., et al., *Childhood Obesity Research Demonstration (CORD): the cross-site overview and opportunities for interventions addressing obesity community-wide*. Child Obes, 2015. **11**(1): p. 4-10.
11. O'Connor, D.P., et al., *Childhood Obesity Research Demonstration project: cross-site evaluation methods*. Child Obes, 2015. **11**(1): p. 92-103.
12. Sharma, S.V., et al., *Impact of the Coordinated Approach to Child Health Early Childhood Program for Obesity Prevention among Preschool Children: The Texas Childhood Obesity Research Demonstration Study*. Child Obes, 2019. **15**(1): p. 1-13.
13. Franckle, R.L., et al., *Student obesity prevalence and behavioral outcomes for the massachusetts childhood obesity research demonstration project*. Obesity (Silver Spring), 2017. **25**(7): p. 1175-1182.
14. O'Connor, D., *Affordable Care Act Childhood Obesity research Demonstration Project (CORD) - Component B: Evaluation Center Final Report* 2016.
15. Barlow, S.E., et al., *Improvement in Primary Care Provider Self-Efficacy and Use of Patient-Centered Counseling To Address Child Overweight and Obesity after Practice-Based Changes: Texas Childhood Obesity Research Demonstration Study.* Child Obes, 2018. **14**(8): p. 518-527.
16. Taveras, E.M., et al., *Clinical effectiveness of the massachusetts childhood obesity research demonstration initiative among low-income children*. Obesity (Silver Spring), 2017. **25**(7): p. 1159-1166.
17. Butte, N.F., et al., *Efficacy of a Community- Versus Primary Care-Centered Program for Childhood Obesity: TX CORD RCT.* Obesity (Silver Spring), 2017. **25**(9): p. 1584-1593.
18. Schmied, E.A., et al., *A Qualitative Examination of Parent Engagement in a Family-Based Childhood Obesity Program. Health Promot Pract, 2018*. **19**(6): p. 905-914.
19. Hoelscher DM, B.N., *Final Progress Report for Texas Childhood Obesity Research Demonstration (CORD): Systems Approach to Obesity Prevention in Underserved Children in Texas Cooperative Agreement #U01 DP003367-04 – CORD* 2016.

APPENDIX A

CORD 1.0 Publications as of December 31, 2018

1) **Title:** Development and Use of an Index for Measuring Implementation of a Weight Management Program in Children in Primary Care Clinics in Texas
Authors: Salahuddin M, Barlow SE, Pont SJ, Butte NF, Hoelscher DM
Journal: BMC Family Practice
Released: December 2018
Link to abstract: https://www.ncbi.nlm.nih.gov/pubmed/30518321

2) **Title:** Behavior Modification of Diet and Parent Feeding Practices in a Community- Vs Primary Care-Centered Intervention for Childhood Obesity
Authors: Wilson TA, Liu Y, Adolph AL, Sacher PM, Barlow SE, Pont S, Sharma S, Byrd-Williams C, Hoelscher DM,Butte NF
Journal: J Nutr Educ Behav
Released: November 2018
Link to abstract: https://www.ncbi.nlm.nih.gov/pubmed/?term=Behavior+modification+of+diet+and+parent+feeding+practices+in+a+community-+vs+primary+care-centered

3) **Title:** Improvement in Primary Care Provider Self-Efficacy and Use of Patient-Centered Counseling to Address Child Overweight and Obesity After Practice-Based Changes: Texas Childhood Obesity Research Demonstration Study
Authors: Barlow SE, Salahuddin M, Butte NF, Hoelscher DM, Pont SJ
Journal: Childhood Obesity
Released: October 2018
Link to abstract: https://www.ncbi.nlm.nih.gov/pubmed/30153036

4) **Title:** Racial/Ethnic Differences in the Effectiveness of a Multisector Childhood Obesity Prevention Intervention
Authors: Nelson CC, Colchamiro R, Perkins M, Taveras EM, Leung-Strle P, Kwass J, Woo Baidal JA
Journal: Am J Public Health
Released: September 2018
Link to abstract: https://www.ncbi.nlm.nih.gov/pubmed/30024810

5) **Title:** Process Evaluation of an Early Care and Education Intervention: The California Childhood Obesity Research Demonstration Study (CA-CORD)
Authors: Lin SF, Binggeli-Vallarta A, Cervantes G, Angulo J, Moody JS, McKenzie TL, Horton LA, Ayala GX
Journal: Health Promot Pract.
Released: July 2018
Link to abstract: https://www.ncbi.nlm.nih.gov/pubmed/30051727

6) **Title:** Associations Between Parent-Perceived Neighborhood Safety and Encouragement and Child Outdoor Physical Activity Among Low-Income Children
Authors: Nicksic NE, Salahuddin M, Butte NF, Hoelscher DM
Journal: J Phys Act Health
Released: May 1, 2018
Link to abstract: https://www.ncbi.nlm.nih.gov/pubmed/29485931

7) **Title:** Health Marketing for the Massachusetts Childhood Obesity Research Demonstration Study: A Case Study
Authors: Criss S, Blaine RE, Palamé M, Perkins M, Davison K, Kwass JA, Taveras EM; MA-CORD Study Team
Journal: Health Promot Pract.
Released: March 2018
Link to abstract: https://www.ncbi.nlm.nih.gov/pubmed/29566576

8) **Title:** Qualitative Examination of Parent Engagement in a Family-Based Childhood Obesity Program
Authors: Schmied EA, Chuang E, Madanat H, Moody J, Ibarra L, Ortiz K, Macias K, Ayala GX
Journal: Health Promotion Practice
Released: February 2018
Link to abstract: https://www.ncbi.nlm.nih.gov/pubmed/29448812

9) **Title:** Predictors of Severe Obesity in Low-Income, Predominantly Hispanic/Latino Children: The Texas Childhood Obesity Research Demonstration Study
Authors: Salahuddin M, Pérez A, Ranjit N, Kelder SH, Barlow SE, Pont SJ, Butte NF, Hoelscher DM
Journal: Preventing Chronic Disease
Released: December 2017
Link to abstract: https://www.ncbi.nlm.nih.gov/pubmed/29283881

10) **Title:** Strategies to Recruit a Diverse Low-Income Population to Child Weight Management Programs From Primary Care Practices
Authors: Barlow SE, Butte NF, Hoelscher DM, Salahuddin M, Pont SJ
Journal: Preventing Chronic Disease
Released: December 2017
Link to abstract: https://www.ncbi.nlm.nih.gov/pubmed/29267156

11) **Title:** Best Practices and Barriers to Obesity Prevention in Head Start: Differences Between Director and Teacher Perceptions Authors: Byrd-Williams C, Dooley EE, Sharma SV, Chuang RJ, Butte N, Hoelscher DM
Journal: Preventing Chronic Disease
Released: December 2017
Link to abstract: https://www.ncbi.nlm.nih.gov/pubmed/29267155

12) **Title:** Implementation of Multisetting Interventions to Address Childhood Obesity in Diverse, Lower-Income Communities: CDC's Childhood Obesity Research Demonstration Projects
Authors: Dooyema CA, Belay B, Blanck HM
Journal: Preventing Chronic Disease
Released: December 2017
Link to abstract: https://www.ncbi.nlm.nih.gov/pubmed/29267154

13) **Title:** Efficacy of a Community- Versus Primary Care-Centered Program for Childhood Obesity: TX CORD RCT
Authors: Butte NF, Hoelscher DM, Barlow SE, Pont S, Durand C, Vandewater EA, Liu Y, Adolph AL, Perez A, Wilson TA, Gonzalez A, Puyau MR, Sharma SV, Byrd-Williams C, Oluyomi A, Huang T, Finkelstein EA, Sacher PM, Kelder SH
Journal: Obesity (Silver Spring)
Released: July 2017
Link to abstract: https://www.ncbi.nlm.nih.gov/pubmed/28703504

14) **Title:** Clinical Effectiveness of the Massachusetts Childhood Obesity Research Demonstration Initiative Among Low Income Children
Authors: Taveras EM, Perkins M, Anand S, Woo Baidal JA, Nelson CC, Kamdar N, Kwass JA, Gortmaker SL, Barrett JL, Davison KK, Land T
Journal: Obesity (Silver Spring)
Released: June 28, 2017
Link to abstract: https://www.ncbi.nlm.nih.gov/pubmed/28653504

15) **Title:** Childhood Obesity Prevention in the Women, Infants, and Children Program: Outcomes of the MA-CORD Study
Authors: Woo Baidal JA, Nelson CC, Perkins M, Colchamiro R, Leung-Strle P, Kwass JA, Gortmaker SL, Davison KK, Taveras EM
Journal: Obesity (Silver Spring)
Released: June 28, 2017
Link to abstract: https://www.ncbi.nlm.nih.gov/pubmed/28653498

16) **Title:** Student Obesity Prevalence and Behavioral Outcomes for the Massachusetts Childhood Obesity Research Demonstration Project
Authors: Franckle RL, Falbe J, Gortmaker S, Barrett JL, Giles C, Ganter C, Blaine RE, Buszkiewicz J, Taveras EM, Kwass JA, Land T, Davison KK
Journal: Obesity (Silver Spring)
Released: June 28, 2017
Link to abstract: https://www.ncbi.nlm.nih.gov/pubmed/28653502

17) **Title:** Using School Staff Members to Implement a Childhood Obesity Prevention Intervention in Low-Income School Districts: the Massachusetts Childhood Obesity Research Demonstration (MA-CORD Project), 2012-2014
Authors: Blaine RE, Franckle RL, Ganter C, Falbe J, Giles C, Criss S, Kwass JA, Land T, Gortmaker SL, Chuang E, Davison KK; MA-CORD Project Group
Journal: Preventing Chronic Disease
Released: January 12, 2017
Link to abstract: https://www.ncbi.nlm.nih.gov/pubmed/28084989

18) **Title:** Factors Affecting Implementation of the California Childhood Obesity Research Demonstration (CA-CORD) Project, 2013
Authors: Chuang E, Brunner J, Moody J, Ibarra L, Hoyt H, McKenzie TL, Binggeli-Vallarta A, Cervantes G, Finlayson TL, Ayala GX
Journal: Preventing Chronic Disease
Released: October 20, 2016
Link to abstract: https://www.ncbi.nlm.nih.gov/pubmed/27763831

19) **Title:** Lessons Learned by Community Stakeholders in the Massachusetts Childhood Obesity Research Demonstration (MA-CORD) Project, 2013–2014
Authors: Ganter C, Aftosmes-Tobio A, Chuang E, Kwass J, Land T, Davison KK, et al.
Journal: Preventing Chronic Disease
Released: January 26, 2017
Link to abstract: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5268744/

20) **Title:** Community Stakeholders' Perceptions of Major Factors Influencing Childhood Obesity, the Feasibility of Programs Addressing Childhood Obesity, and Persisting Gaps
Authors: Ganter C, Aftosmes-Tobio A, Chuang E, Blaine RE, Land T, Davison KK
Journal: Journal of Community Health
Released: April 2016
Link to abstract: https://www.ncbi.nlm.nih.gov/pubmed/26433725

21) **Title:** A Cascade of Champions: A Qualitative Study About the MA-CORD Media Competition Implementation
Authors: Criss S, Tran A, Ganter C, Aftosmes-Tobio A, Gortmaker S, Viswanath K, Kwass JA, Davison KK
Journal: Int J Environ Res Public Health
Released: April 5, 2016
Link to abstract: https://www.ncbi.nlm.nih.gov/pubmed/27058550

22) **Title:** Media Competition Implementation for the Massachusetts Childhood Obesity Research Demonstration Study (MA-CORD): Adoption and Reach
Authors: Criss S, Cheung L, Giles C, Gortmaker S, Viswanath K, Kwass JA, Davison K
Journal: International Journal of Environmental Research and Public Health
Released: April 5, 2016
Link to abstract: https://www.ncbi.nlm.nih.gov/pubmed/27058549

23) **Title:** Rationale, Design, and Methods for Process Evaluation in the Childhood Obesity Research Demonstration Project
Authors: Joseph S, Stevens AM, Ledoux T, O'Connor TM, O'Connor DP, Thompson D
Journal: Journal of Nutrition Education and Behavior
Released: December 2015
Link to abstract: https://www.ncbi.nlm.nih.gov/pubmed/26298514

24) **Title:** Development of the Policy Indicator Checklist: A Tool to Identify and Measure Policies for Calorie-Dense Foods and Sugar-Sweetened Beverages Across Multiple Settings
Authors: Lee RE, Hallett AM, Parker N, Kudia O, Kao D, Modelska M, Rifai H, O'Connor DP
Journal: American Journal of Public Health
Released: May 2015
Link to abstract: https://www.ncbi.nlm.nih.gov/pubmed/25790397

25) **Title:** Insufficient Sleep Among Elementary and Middle School Students is Linked with Elevated Soda Consumption and Other Unhealthy Dietary Behaviors
Authors: Franckle RL, Falbe J, Gortmaker S, Ganter C, Taveras EM, Land T, Davison KK
Journal: Preventative Medicine
Released: May 2015
Link to abstract: https://www.ncbi.nlm.nih.gov/pubmed/25712328

26) **Title:** Childhood Obesity Research Demonstration (CORD): the Cross-Site Overview and Opportunities for Interventions Addressing Obesity Community-Wide
Authors: Foltz JL, Belay B, Dooyema CA, Williams N, Blanck HM
Journal: Child Obesity
Released: February 2015
Link to abstract: https://www.ncbi.nlm.nih.gov/pubmed/25679059

27) **Title:** Childhood Obesity Research Demonstration **Project:** Cross-Site Evaluation Methods
Authors: O'Connor DP, Lee RE, Mehta P, Thompson D, Bhargava A, Carlson C, Kao D, Layne CS, Ledoux T, O'Connor T, Rifai H, Gulley L, Hallett AM, Kudia O, Joseph S, Modelska M, Ortega D, Parker N, Stevens A; EC-CORD (BETTER Policies) Team
Journal: Child Obesity
Released: February 2015
Link to abstract: https://www.ncbi.nlm.nih.gov/pubmed/25679060

28) **Title:** Design of the Massachusetts Childhood Obesity Research Demonstration (MA-CORD) Study
Authors: Taveras EM, Blaine RE, Davison KK, Gortmaker S, Anand S, Falbe J, Kwass JA, Perkins M, Giles C, Criss S, Colchamiro R, Baidal JW, Land T, Smith L, MA-CORD Study Group
Journal: Child Obesity
Released: February 2015
Link to abstract: https://www.ncbi.nlm.nih.gov/pubmed/25469676

29) **Title:** Evaluation Overview for the Massachusetts Childhood Obesity Research Demonstration (MA-CORD) Project
Authors: Davison KK, Falbe J, Taveras EM, Gortmaker S, Kulldorff M, Perkins M, Blaine RE, Franckle RL, Ganter C, Baidal JW, Kwass JA, Buszkiewicz J, Smith L, Land T; MA-CORD Study Group
Journal: Child Obesity
Released: February 2015
Link to abstract: http://www.ncbi.nlm.nih.gov/pubmed/25575095

30) **Title:** Evaluation Protocol to Assess an Integrated Framework for the Implementation of the Childhood Obesity Research Demonstration Project at the California (CA-CORD) and Massachusetts (MA-CORD) Sites
Authors: Chuang E, Ayala GX, Schmied E, Ganter C, Gittelsohn J, Davison KK
Journal: Child Obesity
Released: February 2015
Link to abstract: https://www.ncbi.nlm.nih.gov/pubmed/25423618

31) **Title:** Incorporating Primary and Secondary Prevention Approaches to Address Childhood Obesity Prevention and Treatment in a Low-Income, Ethnically Diverse Population: Study Design and Demographic Data from the Texas Childhood Obesity Research Demonstration (TX CORD) Study
Authors: Hoelscher DM, Butte NF, Barlow S, Vandewater EA, Sharma SV, Huang T, Finkelstein E, Pont S, Sacher P, Byrd-Williams C, Oluyomi AO, Durand C, Li L, Kelder SH
Journal: Child Obesity
Released: February 2015
Link to abstract: https://www.ncbi.nlm.nih.gov/pubmed/25555188

32) **Title:** Our Choice/Nuestra Opción: the Imperial County, California, Childhood Obesity Research Demonstration Study (CA-CORD)
Authors: Ayala GX, Ibarra L, Binggeli-Vallarta A, Moody J, McKenzie TL, Angulo J, Hoyt H, Chuang E, Ganiats TG, Gahagan S, Ji M, Zive M, Schmied E, Arredondo EM, Elder JP
Journal: Child Obesity
Released: February 2015
Link to abstract: https://www.ncbi.nlm.nih.gov/pubmed/25584664

33) **Title:** The Childhood Obesity Research Demonstration **Project:** A Team Approach for Supporting a Multisite, Multisector Intervention
Authors: Williams N, Dooyema CA, Foltz JL, Belay B, Blanck HM
Journal: Child Obesity
Released: February 2015
Link to abstract: https://www.ncbi.nlm.nih.gov/pubmed/25325835

34) **Title:** The Childhood Obesity Research Demonstration **Project:** Linking Public Health Initiatives and Primary Care Interventions Community-wide to Prevent and Reduce Childhood Obesity
Authors: Blanck HM, Collins JL
Journal: Child Obesity
Released: February 2015
Link to abstract: https://www.ncbi.nlm.nih.gov/pubmed/25679058

35) **Title:** The Utility of Geographical Information Systems (GIS) in Systems-Oriented Obesity Intervention **Projects:** The Selection of Comparable Study Sites for a Quasi-Experimental Intervention Design--TX CORD
Authors: Oluyomi AO, Byars A, Byrd-Williams C, Sharma SV, Durand C, Hoelscher DM, Butte NF, Kelder SH
Journal: Child Obesity
Released: February 2015
Link to abstract: https://www.ncbi.nlm.nih.gov/pubmed/25587670

36) **Title:** The Childhood Obesity Research Demonstration **Project:** A Comprehensive Community Approach to Reduce Childhood Obesity
Authors: Dooyema CA, Belay B, Foltz JL, Williams N, Blanck HM
Journal: Child Obesity
Released: October 2013
Link to abstract: https://www.ncbi.nlm.nih.gov/pubmed/24094146

APPENDIX B

CORD 1.0 Grantee Tools and Products

CORD sites developed several products to help sustain and spread improvements beyond the funding period.

1) CATCH EC coordination kit: Publically available to facilitate successes across all ECE centers. https://catch.org/units/early-childhood-coordination-kit

2) Supplemental materials have been added to Next Steps: A Practitioner's Guide of Themed Follow-up Visits to Help Patients Achieve a Healthy Weight resource, developed by the American Academy of Pediatrics to better assist providers in implementing the USPSTF guidelines for screening, assessment, and weight management programs. These are available in both English and Spanish available at https://shop.aap.org/next-steps-a-practitioners-guide-for-themed-follow-up-visits-for-their-patients-to-achieve-a-heal/

3) The Healthy Weight Clinic Guide: How to Develop, Implement and Maintain a Community-Based Pediatric Healthy Weight Clinic available at: https://www.nichq.org/resource/healthy-weight-clinic-guide

APPENDIX C

CORD 2.0 Publications as of December 31, 2018

1) **Title:** Rationale and Design of the Clinic and Community Approaches to Healthy Weight Randomized Trial
Authors: Fiechtner L, Perkins M, Biggs V, Langhans N, Sharifi M, O'Connor G, Price S, Locascio J, Kuhlthau K, Kwass JA, Nelson C, Land T, Longjohn M, Lawson V, Hohman K, Taveras EM
Journal: Contemporary Clinical Trials
Released: April 2018
Link: https://www.ncbi.nlm.nih.gov/pubmed/29330083

2) **Title:** An Individually Tailored Family-Centered Intervention for Pediatric Obesity in Primary Care: Study Protocol of a Randomized Type II Hybrid Effectiveness–Implementation Trial (Raising Healthy Children Study)
Authors: Smith JD, Berkel C, Jordan N, Atkins DC, Narayanan SS, Gallo C, Grimm KJ, Dishion TJ, Mauricio AM, Rudo-Stern J, Meachum MK, Winslow E, Bruening MM
Journal: Implementation Science
Released: January 2018
Link: https://www.ncbi.nlm.nih.gov/pubmed/?term=An+individually+tailored+family-centered

3) **Title:** The Family Check-Up 4 Health (FCU4Health): Applying Implementation Science Frameworks to the Process of Adapting an Evidence-Based Parenting Program for Prevention of Pediatric Obesity and Excess Weight Gain in Primary Care Front
Authors: Smith JD, Berkel C, Rudo-Stern J, Montaño Z, St. George SM, Prado G, Mauricio AM, Chiapa A, Bruening MM, Dishion TJ
Journal: Front Public Health
Released: October 2018
Link: https://www.ncbi.nlm.nih.gov/pubmed/30374436