Next Steps in Childhood Obesity Work

Dianne S. Ward, Director
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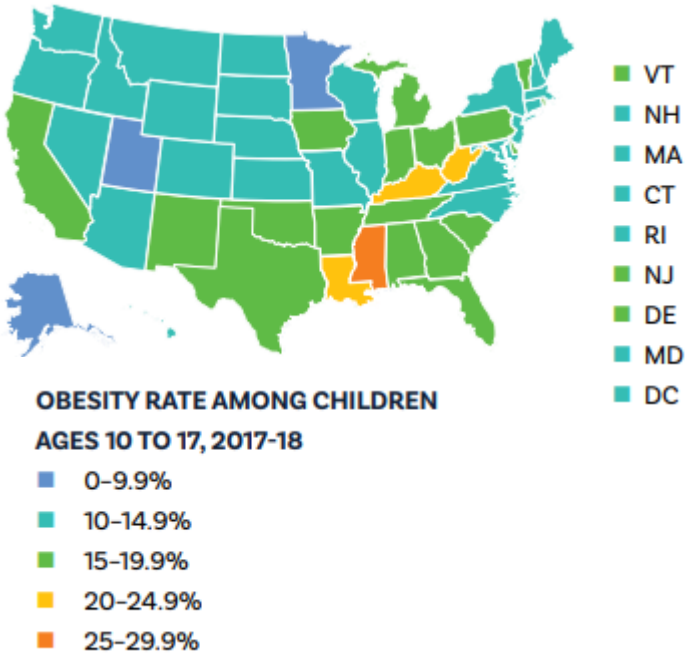
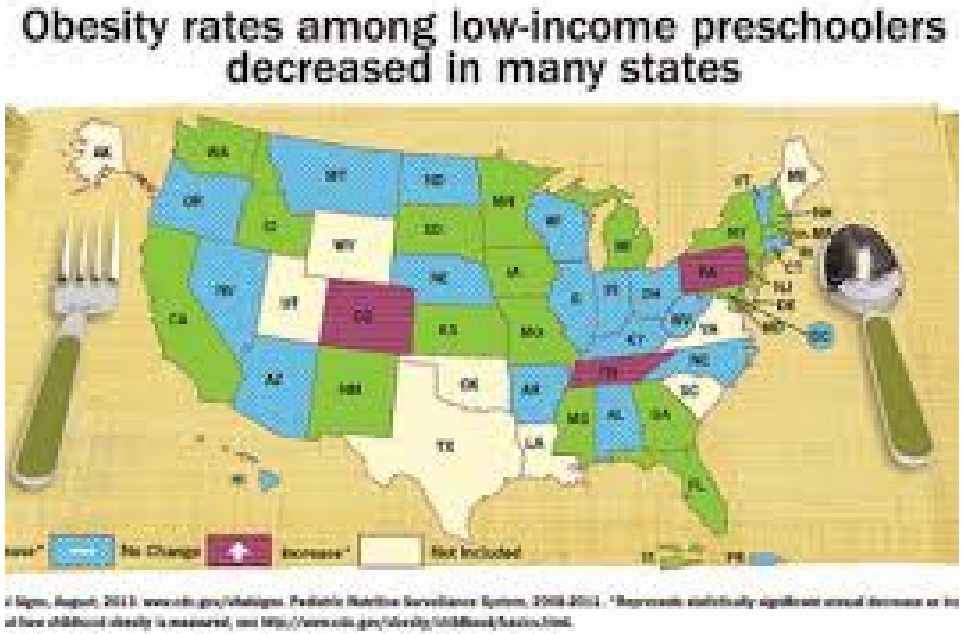
Some things are working



October, 2019 : Robert Wood Johnson Foundation



Changes in Obesity/Overweight Among Children in WIC

Table 2. Overweight and Obesity Among US Children in the Special Supplemental Nutrition Program for Women, Infants, and Children

	Prevalence, % (95% CI)[a]				2016 vs 2010	
	2010	2012	2014	2016	Adjusted Prevalence Ratio (95% CI)	Adjusted Prevalence Difference (95% CI)[b]
Overweight or Obesity (BMI at or above the 85th percentile for age and sex on the CDC growth charts)						
Overall[c]	32.5 (32.5-32.6)	31.2 (31.1-31.2)	30.2 (30.1-30.2)	29.1 (29.1-29.2)	0.90 (0.90-0.90)	−3.2 (−3.3 to −3.2)
Age, y[c,d]						
2	30.2 (30.2-30.3)	28.6 (28.5-28.7)	27.5 (27.5-27.6)	27.1 (27.0-27.2)	0.90 (0.90-0.90)	−3.0 (−3.1 to −2.9)
3	33.4 (33.3-33.4)	32.0 (31.9-32.1)	31.1 (31.1-31.2)	29.7 (29.7-29.8)	0.90 (0.89-0.90)	−3.5 (−3.6 to −3.4)
4	35.2 (35.1-35.3)	33.9 (33.8-34.0)	33.2 (33.1-33.3)	31.7 (31.5-31.8)	0.91 (0.90-0.91)	−3.3 (−3.5 to −3.2)
Sex[c,d]						
Male	33.5 (33.4-33.6)	31.8 (31.8-31.9)	30.9 (30.8-31.0)	29.6 (29.5-29.6)	0.89 (0.88-0.89)	−3.8 (−3.9 to −3.7)
Female	31.5 (31.5-31.6)	30.5 (30.4-30.5)	29.5 (29.4-29.6)	28.6 (28.6-28.7)	0.92 (0.91-0.92)	−2.7 (−2.8 to −2.6)
Race/ethnicity[c,d]						
Non-Hispanic white	28.8 (28.7-28.9)	27.8 (27.7-27.9)	27.7 (27.6-27.8)	27.4 (27.3-27.5)	0.95 (0.95-0.96)	−1.4 (−1.5 to −1.3)
Non-Hispanic black	27.3 (27.2-27.4)	26.3 (26.2-26.4)	25.9 (25.8-26.0)	25.0 (24.9-25.1)	0.92 (0.91-0.92)	−2.2 (−2.4 to −2.1)
Hispanic	37.2 (37.1-37.3)	35.5 (35.4-35.6)	34.0 (33.9-34.1)	32.6 (32.5-32.6)	0.88 (0.87-0.88)	−4.6 (−4.7 to −4.5)
American Indian/Alaska Native	40.3 (39.8-40.8)	37.5 (37.0-37.9)	36.2 (35.7-36.7)	36.7 (36.2-37.2)	0.91 (0.90-0.93)	−3.6 (−4.2 to −2.9)
Asian/Pacific Islander	26.6 (26.4-26.9)	25.2 (25.0-25.5)	24.2 (24.0-24.4)	22.4 (22.1-22.6)	0.84 (0.83-0.85)	−4.2 (−4.5 to −3.9)
Obesity (BMI at or above the 95th percentile for age and sex on the CDC growth charts)						
Overall[c]	15.9 (15.9-16.0)	15.2 (15.1-15.2)	14.5 (14.5-14.6)	13.9 (13.9-13.9)	0.88 (0.88-0.89)	−1.9 (−1.9 to −1.8)
Age, y[c,d]						
2	14.1 (14.0-14.1)	13.2 (13.1-13.3)	12.5 (12.4-12.5)	12.3 (12.2-12.3)	0.88 (0.87-0.88)	−1.7 (−1.8 to −1.6)
3	16.6 (16.6-16.7)	15.9 (15.8-15.9)	15.4 (15.3-15.4)	14.5 (14.5-14.6)	0.88 (0.87-0.88)	−2.0 (−2.1 to −1.9)
4	17.9 (17.8-18.0)	17.2 (17.1-17.3)	16.8 (16.7-16.9)	15.8 (15.7-15.9)	0.89 (0.88-0.90)	−2.0 (−2.1 to −1.9)
Sex[c,d]						
Male	16.8 (16.7-16.9)	15.9 (15.8-15.9)	15.2 (15.1-15.2)	14.4 (14.3-14.5)	0.87 (0.86-0.87)	−2.2 (−2.3 to −2.2)
Female	15.0 (14.9-15.1)	14.4 (14.4-14.5)	13.9 (13.8-14.0)	13.4 (13.3-13.4)	0.90 (0.90-0.91)	−1.5 (−1.6 to −1.4)
Race/ethnicity[c,d]						
Non-Hispanic white	12.8 (12.7-12.9)	12.4 (12.3-12.4)	12.2 (12.2-12.3)	12.1 (12.0-12.2)	0.95 (0.94-0.95)	−0.7 (−0.8 to −0.6)
Non-Hispanic black	12.7 (12.6-12.8)	12.1 (12.0-12.2)	11.9 (11.8-11.9)	11.4 (11.3-11.5)	0.90 (0.89-0.91)	−1.2 (−1.3 to −1.1)
Hispanic	19.3 (19.2-19.3)	18.3 (18.2-18.3)	17.3 (17.3-17.4)	16.4 (16.4-16.5)	0.86 (0.85-0.86)	−2.8 (−2.9 to −2.7)
American Indian/Alaska Native	20.9 (20.5-21.3)	18.9 (18.5-19.2)	18.0 (17.6-18.3)	18.5 (18.1-18.9)	0.88 (0.86-0.91)	−2.4 (−3.0 to −1.9)
Asian/Pacific Islander	12.5 (12.3-12.6)	11.7 (11.5-11.9)	11.1 (10.9-11.3)	10.0 (9.9-10.2)	0.81 (0.79-0.82)	−2.4 (−2.6 to −2.2)

The national obesity rate among 2- to 4-year-olds who participate in WIC declined significantly, from 15.9% in 2010 to 13.9% in 2016. This marked the second consecutive survey period(jamanetwork.com) in which obesity rates declined in this age group, and the decline was statistically significant across all racial and ethnic groups surveyed.

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Refocus on Behavior

Healthy Eating and Regular Physical Activity

Broaden Obesity to CV Health

ELSEVIER

The Journal of Pediatrics
Volume 209, June 2019, Pages 240-251.e1

Workshop/Symposium Summary

Promoting Cardiovascular Health in Early Childhood and Transitions in Childhood through Adolescence: A Workshop Report

Stephen R. Daniels MD, PhD [1], Charlotte A. Pratt PhD, RD [2], Emily B. Hollister PhD [3], Darwin Labarthe MD, PhD, MPH [4], Deborah A. Cohen MD, MPH [5], Jenelle R. Walker PhD, MS [6], Bettina M. Beech Dr PH, MPH [7], P. Babu Balagopal PhD [8], Dean W. Beebe PhD [9], Matthew W. Gillman MD, SM [10], Jaclyn M. Goodrich PhD [11], Cashell Jaquish PhD, NHLBI [12], Brian Kit MD, MPH, NHLBI [12], Alison L. Miller PhD [13], David Olds PhD [14], Emily Oken MD, MPH [15], Kumaravel Rajakumar MD, MS [16], Nancy E. Sherwood PhD [17] ... Martin E. Young PhD [25]

Behavioral Priority Areas

1. Smoking:
   Low rates of smoking:10.8% (YRBSS); new threat – e-cigarettes

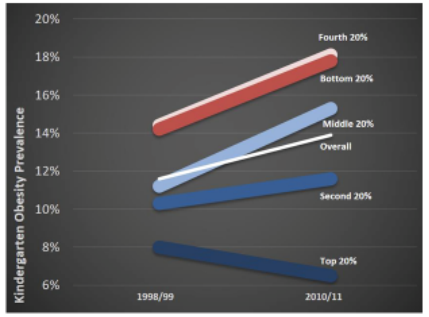
2. Healthy Diet:
   <1.0 % US children have idea diet score; 91%-poor; consistent finding

3. Physical Activity:
   ~ 20% children meet PA guidelines

4. BMI: Obesity rates: 17% overall
   For non-Hispanic whites, 17.5 percent of males and 14.7 percent of females.
   For non-Hispanic blacks, 22.6 percent of males and 24.8 percent of females.
   For Mexican Americans, 28.9 percent of males and 18.6 percent of females.

BMI Related to Both Diet and Physical Activity

Rise in Childhood Obesity



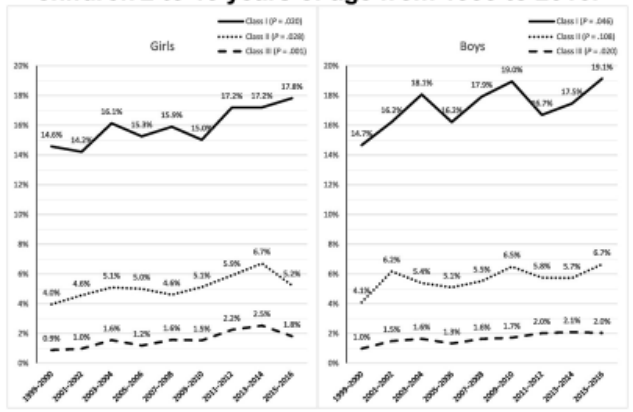
Association of family economic quintile and obesity prevalence in kindergarten

Skinner et al., 2014

Children's Healthy Weight Research

UNC RESEARCH

Prevalence of obesity and severe obesity among US children 2 to 19 years of age from 1999 to 2016.



Asheley Cockrell Skinner et al. Pediatrics 2018;141:e20173459

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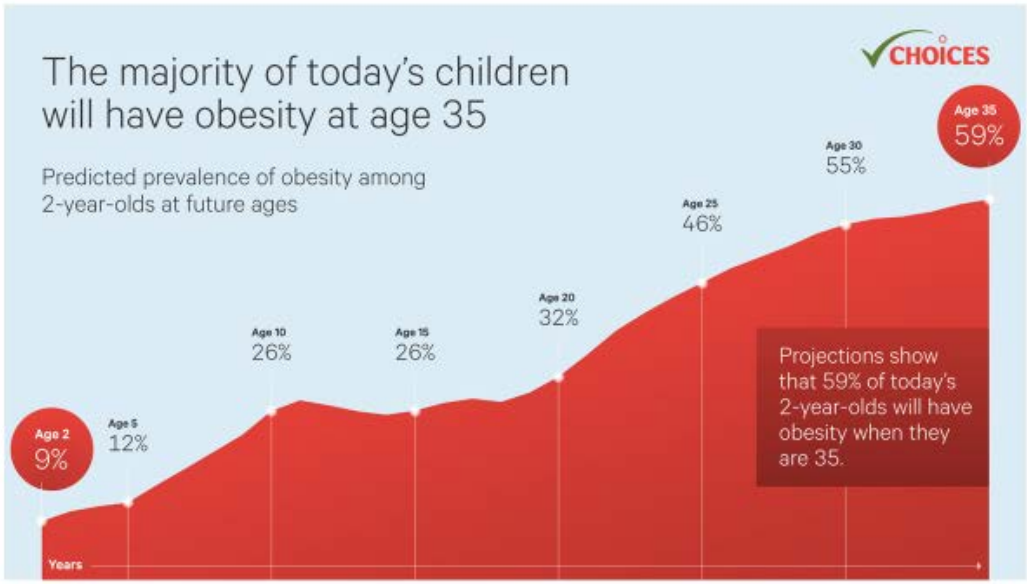
PEDIATRICS



Summary of Report Card Indicators and Grades

Indicator	Grade
Overall Physical Activity Levels	D-
Sedentary Behaviors	D-
Active Transportation	F
Organized Sport Participation	C-
Active Play	INC
Health-related Fitness	D
Family and Peers	INC
School	D+
Community and Built Environment	B-
Government Strategies and Investments	INC

An Average Day's Food

27% of 2-year-old children eat **no fruit***

*NOT including 100% fruit juice.

81% of 2-year-old children eat **desserts**

32% of 2-year-old children eat **no vegetables**

38% of 2-year-old children drink **sugary beverages**

From FITS study

D-

Overall Physical Activity

PRIMARY INDICATOR: The proportion of U.S. children and youth attaining 60 or more minutes of moderate-to-vigorous physical activity on at least 5 days per week.

The current physical activity guidelines in the U.S.[2] and globally[1] call for children and youth to participate in at least 60 minutes of moderate-to-vigorous physical activity daily. The grade of D- indicates that the majority of U.S. children and youth do not meet physical activity recommendations.

Age Group	Prevalence of Activity*
6-11 YEARS	42.5%
12-15 YEARS	7.5%
16-19 YEARS	5.1%

*based on accelerometry data from the 2005-06 National Health and Nutrition Examination Survey (NHANES)

National Physical Activity Plan, 2016

Excess Weight and Additional Kcals

Table. Excess weight of U.S. children from 7 to 18 years of age, and the corresponding additional calories consumed. Note that there is substantial variability around these estimates due to heterogeneity and sampling variability in NHANES.

Age	Boys, Weight Change from 1976-80 to 2003-06		Girls, Weight Change from 1976-80 to 2003-06	
	Excess Weight	Excess Intake	Excess Weight	Excess Intake
7 years	3.7 lbs	85 kcal/day	6.6 lbs	139 kcal/day
8 years	11.0 lbs	238 kcal/day	7.0 lbs	142 kcal/day
9 years	6.6 lbs	135 kcal/day	10.3 lbs	198 kcal/day
10 years	13.0 lbs	251 kcal/day	18.9 lbs	343 kcal/day
11 years	17.6 lbs	320 kcal/day	17.6 lbs	301 kcal/day
12 years	15.0 lbs	255 kcal/day	13.6 lbs	220 kcal/day
13 years	17.4 lbs	276 kcal/day	12.3 lbs	186 kcal/day
14 years	15.0 lbs	220 kcal/day	9.2 lbs	130 kcal/day
15 years	21.8 lbs	295 kcal/day	9.5 lbs	124 kcal/day
16 years	20.2 lbs	251 kcal/day	10.3 lbs	125 kcal/day
17 years	14.1 lbs	158 kcal/day	14.3 lbs	159 kcal/day
18 years	6.4 lbs	64 kcal/day	20.7 lbs	209 kcal/day
Average	**13.5 lbs**	**212 kcal/day**	**12.5 lbs**	**190 kcal/day**

Healthy Eating Research Brief, 2016

Feeding Infants and Toddlers Study, 2016

FITS 2016 Highlights

Areas for improvement

Nearly 1 in 5 (18%) infants 6-12 months **fall short on dietary iron**.

More than 1/4 of children 6 to 48 months **don't eat a single serving of vegetables** on a given day.

3/4 (75%) of 1-3 year olds consume **too much sodium**.

Almost all (90%) 2-3 year olds **consume sweet foods or sweetened beverages** on a given day.

About 20% of 1-3 year olds **don't drink cow's milk** on a given day.

Successes

More **mothers breastfeed, and for a longer duration** compared to FITS 2002.

More than 1/2 (59%) of 2-3 year olds eat **whole grains** on a given day.

Fewer infants are **drink 100% fruit juice** since FITS 2008, with the same likelihood of **eating fruit**.

About 25% of little one's daily calories come from **snacking occasions**.

Intervention Targets & Settings

TARGETS

- Child
- Teachers or caregivers
- Parents and/or other family members
- Policies and environment
  - Administrators: center directors, principals, park directors
  - Staff: teachers, aides, cooks, leaders
- Public policies

SETTINGS

- Early care and education (formal & informal)
- School (public & private)
- Afterschool

Ages and Stages of CVH Development

Conception & Gestation

- Infant (birth – 12 mo)
- Toddler (13 mo-36 mo)
- Preschool (3y -5y)
- K-Grade 2 (5y-8y)
- Grades 3-5 (8y-11y)
- Middle school/Junior High: 11y-14y
- High school: 14y-18 y

Early Years: birth to age 5

- 61 % (12.5 million) of children < 5 are in some kind of regular child care arrangement
- 1.5 million in family child care home (FCCH)
- Quality infant/toddler care is limited and expensive but may be the best place to focus our efforts
- However, a large number of children in non-licensed care (relative, neighbor, faith-based)
- Adverse childhood experience (ACE) has serious negative consequences; may need trauma-informed care

ECE Intervention Targets

Spectrum of Opportunities

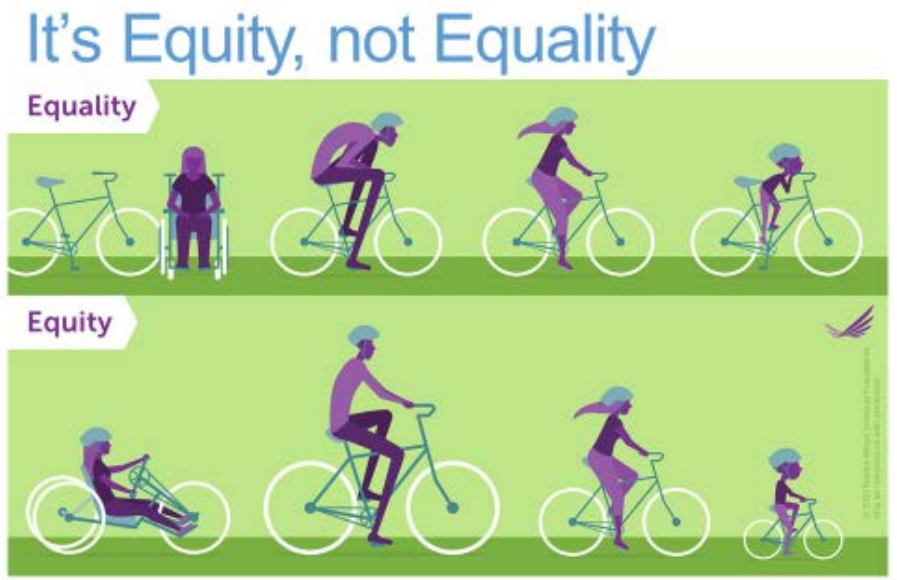
- Policies (licensing, quality rating systems)
- Standards (early learning; Head Start)
- Federal food assistance (CACFP)
- Pre-service & professional development
- State TA networks (e.g, Child Care Aware: Healthy CC Alabama)
- Statewide intervention/access initiatives

What is Needed?

ECE-Based Intervention Research for CVH

Improve Interventions

- Develop multi-level interventions (e.g., individual, interpersonal, & organizational)
- Consider newer approaches (e.g., social marketing; consumer informatics)
- Measure intervention fidelity (i.e., did the intervention fail or the implementation?)
- Be aware of potential for stigma (espec outcomes)
- Remember the equity lens and do not i



Robert Wood Johnson Wood Foundation, #PromoteHealthEquity

Design for Implementation

- "Start with the end in mind"[1]; interventions must consider how knowledge translation will occur
- Must engage community partners PRIOR to developing or implementing interventions and THROUGHOUT process
- Policy and environmental studies needed
- Evaluate cost-effectiveness
- Implementation and dissemination research

[1] Klesges L. et al. Beginning with the application in mind: designing and planning health behavior. Annals Beh Med, 2005

Unpack Black Box of Intervention

What works for whom and under what condition?

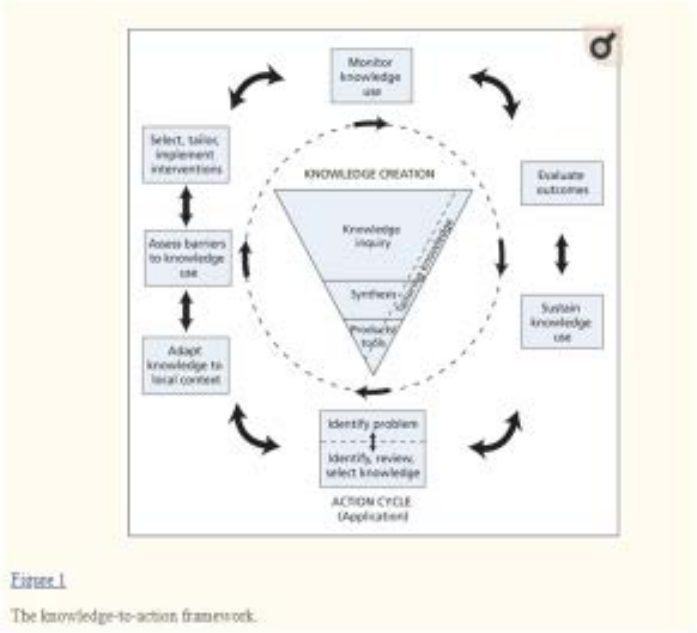


Figure 1

The knowledge-to-action framework

Straus et al. Defining knowledge translation. Canadian Medical Ass J, 2009.

Salter & Kothari. Using realist evaluation to open the black box of knowledge translation: a state-of-the-art review. Implement Sci. 2014.

Use a Systems Approach

- Develop multi-setting interventions (e.g., school & home; ECE & clinical)
- ECE organizational interventions that leverage systems (e.g., licensing, QIRS)
- Whole of (ECE) school research
  - *Must have integration of education and health*
  - *Fit into institutional priorities (e.g., educational outcomes)*
  - *Create expectation and demand for healthy environments where kids live and "work" (i.e., school)*
  - *Exposure to healthy food/eating environments with regular PA opportunities*
  - *Consider both quality and quantity of foods and physical activity*

Improved Research Design

- Studies that test intervention components (effect size) for MOST-based trials (fractional factorial); may need diff. funding mechanism
- Test for the intervention's "active ingredient" ("special sauce")
- Use alternative designs, such a SMART or SMART with adaptive randomization, when response heterogeneity is expected
- Rigorous analytical approaches that include repeated measures for longer follow-ups, control for confounding, and test effect modification and heterogeneity
- Use cluster-randomized trials, individually randomized group trials, stepped wedge designs, or regression discontinuity designs (*from Vulnerable Population workshop)*

Improved Research Designs

- Increase power through larger enrollments and longer intervention periods
- Require measurement and reporting of process evaluation data
- Rigorous analytical approaches that include repeated measures for longer follow-ups, control for confounding, and test effect modification and heterogeneity
- Power where possible to test for subgroup analysis (including boys vs. girls, race/ethnicity, age)
- Need rigorous, comprehensive systematic reviews that assess several outcomes, report strength of evidence, & risk profile of participants

Coming soon…

- Federal and state elections which could signal renewed interest in ECE (e.g., universal pre-K)2020 US Dietary Guidelines to include infants
- Increased use of funding from the Child Care Block Grant to addressing improvements in ECE environments (see model in Nebraska)
- Models of collaborations among child care and public health groups to address children's healthy weight (e.g., work in DPH in NC; Better Together project in 3 states (MS, AZ, AK)
- Need to define "physical activity quality" (not just quantity)
- Address staff health as important to child and family health
- Role of social-emotional health for children, families & providers

Stay with it. Kids need us.

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RESEARCH

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