

Development of a Dissemination and Implementation Framework for an Early Childhood Obesity Prevention Program

EMILY BERGLING DRPH(C), CHARLOTTE FAREWELL PHD, JINI PUMA PHD

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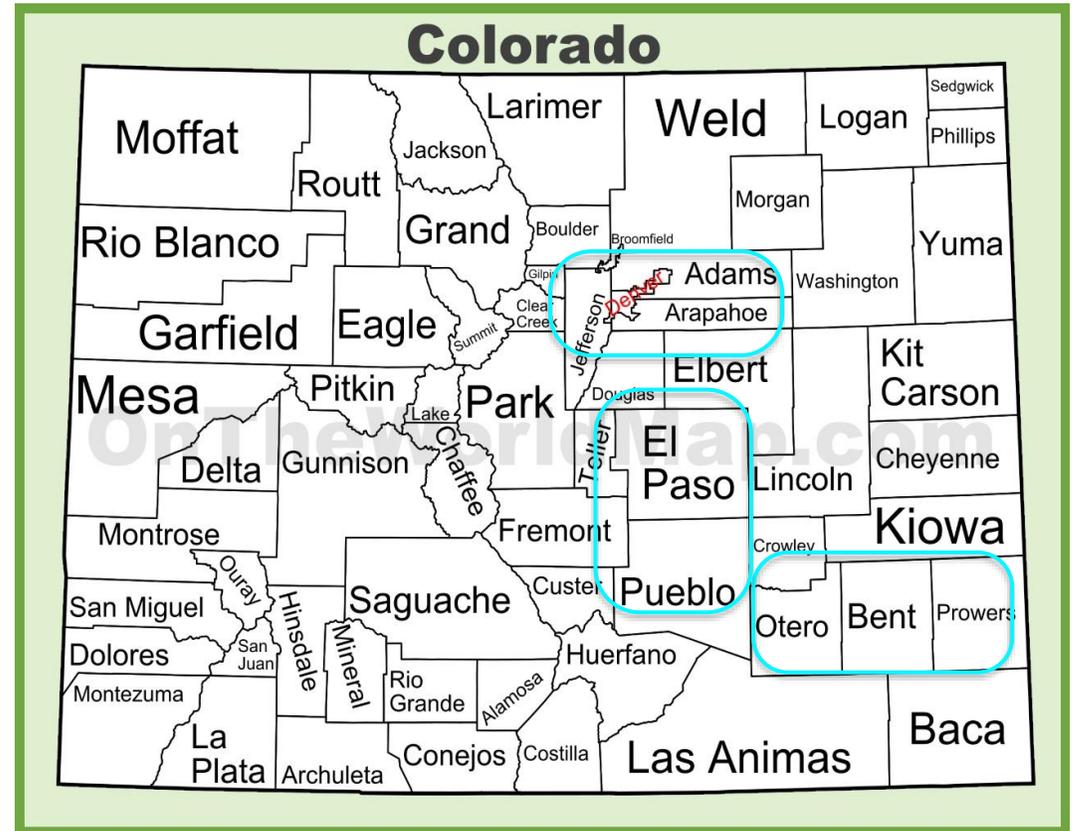
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Early Childhood Obesity-Prevention Programs

- Childhood obesity is a major public health issue
 - Prevalence has more than doubled in the past thirty years with low-income and ethnic minority children being disproportionately affected
- Early childhood is a critical time of development related to later health outcomes and a majority of U.S. children are placed in some form of non-parental care during these years
- Interventions implemented in Early Childhood Education settings provide the opportunity to impact health behaviors early in life
 - Promising environment to implement nutrition-related and physical activity health initiatives through their provision of meals and promotion of physical activity during outdoor play time
- Based on a 2020 Cochrane review there is inconsistent and weak evidence for obesity-prevention programs in ECE-settings intended to improve implementation of policies, practices, programs, staff knowledge and attitudes, and child outcomes

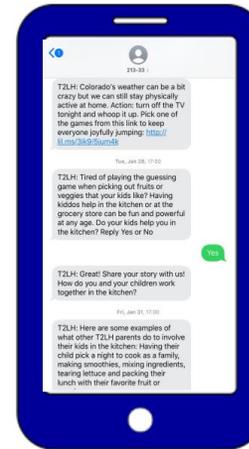


COWP was developed in 2012 using community-based participatory research (CBPR) principles and is a multi-level, multi-strategy early childhood obesity prevention program implemented in early childhood education centers.

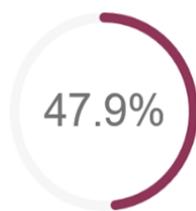
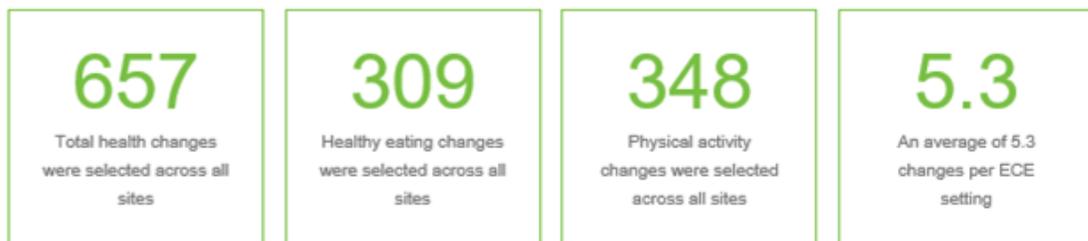


5 Components of COWP

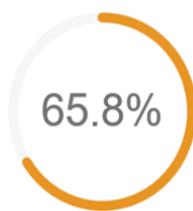
1. Child Nutrition Education
2. Child Physical Activity
3. Parent Wellness Activities (Workshop Series, Family Fun workshops, Text2LiveHealthy)
4. Workplace Wellness Activities
5. Policy, System, and Environment (PSE) strategic planning process



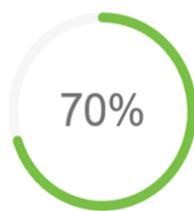
- Increased Health-Promoting PSE Changes in ECE Settings
- Increased Fruit & Vegetable Consumption and Physical Activity Levels for Participating Children, Parents and Staff



Of PSE changes were fully implemented after 6 months



Of PSE changes were fully implemented after 1 year



Of PSE changes were fully implemented after 2 years

Obesity Prevention in Context: Insights for Planning, Measurement, and Engagement From Across the Social Ecological Model

Assess, Identify, Make it Happen (AIM) for Preschools: A Tool to Decrease Early Childhood Obesity

Charlotte V. Farewell, MPH¹
 Jini E. Puma, PhD¹
 Jamie Powers, MPH¹
 Elaine S. Belansky, PhD¹

Early childhood obesity is at epidemic proportions and is a major risk factor for the development of chronic diseases in adulthood. Since the majority of preschoolers are placed in center-based care, best practice policy, system, and environment (PSE) changes in early child care settings plays an important role in defining early development of obesogenic behaviors. However, implementation of best practice PSE changes is often a challenge in low resource settings due to staff turnover, time constraints, cultural beliefs, and lack of health-related knowledge. Assess, Identify, Make it Happen for Preschools (AIM-P) is a strategic planning process that was used with wellness teams in early child care centers to implement PSE changes that support adoption of health behaviors. AIM-P uses key change-making strategies based on intervention mapping including assets and needs assessments, prioritization of changes based on importance and feasibility, development of action

INTRODUCTION

Childhood overweight and obesity is at epidemic proportions worldwide. Notably, more than half of obese preschool children will be obese at age 25 years (Kuhl, Clifford, & Stark, 2012). Early childhood obesity is, therefore, a major risk factor for the development of chronic diseases in adulthood. Previous studies have determined that a variety of behavioral factors contribute to excessive caloric intake and inadequate amounts of physical activity, thus resulting in overweight and obese conditions in early childhood (Brown et al., 2009; Duffey & Popkin, 2007). Given the early onset of nutrition- and physical activity-related behaviors linked to obesity, intervening within the first 5 years of life is imperative (Kuhl et al., 2012).

Examining early childhood obesity through a socio-ecological lens highlights the influence of policies,

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Impact of a nutrition education programme on preschool children's willingness to consume fruits and vegetables

Emily M Melnick* , Karen Thomas, Charlotte Farewell, Jennie Quinlan, Deanna LaFlamme, Diane Brogden, Sharon Scarbro and Jini E Puma
 Rocky Mountain Prevention Research Center, Colorado School of Public Health, University of Colorado Anschutz Medical Campus, Aurora, CO 80045, USA

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Abstract

Objective: To evaluate the impact of a preschool-based nutrition education programme consisting of twelve 'hands on' nutrition education lessons delivered during the school year on young children's willingness to consume fruits and vegetables.

Design: Quasi-experimental, pre-post design including the collection of plate waste evaluation data at the start and end of the 2015–2016 school year within two groups: (1) randomly selected classrooms receiving the intervention and (2) within conveniently sampled preschool classrooms not receiving the intervention serving as a comparison group.

Setting: Centre-based preschool programmes serving low-income families in the Denver metro area.

Participants: Three- to five-year-old children in preschool classrooms participating in the intervention during the 2015–2016 school year (*n* 308) and children enrolled in comparison classrooms (*n* 215).

Results: Repeated-measures logit models assessed whether increases in the odds of consuming small samples of fruits and vegetables between Time 1 (pre-intervention) and Time 2 (post-intervention) were different for children within the intervention group compared with the comparison group. Analyses showed that the change over time in consumption of the three vegetable samples varied by intervention status with greater change occurring among children within the intervention group (edamame: *P* = 0.001; cauliflower: *P* ≤ 0.0001 and red pepper: *P* ≤ 0.0001). Unlike vegetables, the change over time in consumption of the two fruit samples was not different between children within the intervention and comparison groups.

Conclusions: An experiential-learning nutrition education programme can positively influence eating behaviours of low-income preschoolers in a centre-based setting by increasing willingness to consume vegetables.

Keywords
 Early childhood
 Child obesity
 Programme evaluation
 Fruits
 Vegetables

COWP to Date

- Since the development of my COWP intervention, we have received 20 grants and contracts, totaling more than \$11 million dollars to implement the COWP program in various early childcare settings throughout Colorado.
- The COWP program has reached over 50,000 children, parents and teachers in approximately 150 low-income early childcare education settings in 14 counties in Colorado.
- In May 2019, COWP was accepted as an evidence-based intervention, based into the SNAP-Ed toolkit, which makes the program more broadly available to the 140 SNAP-Ed implementing agencies in all 50 states and two territories.

Dissemination and Implementation (D&I) Science

Implementation science looks the way evidence-based programs are applied in the real-world setting.

- Seeks to understand the barriers and facilitators that influence successful implementation of effective interventions.
- Studying implementation helps to ensure programs are generalizable, representative, and comprehensive in order to increase public health impact.

Dissemination is the process of spreading knowledge and information to these settings.

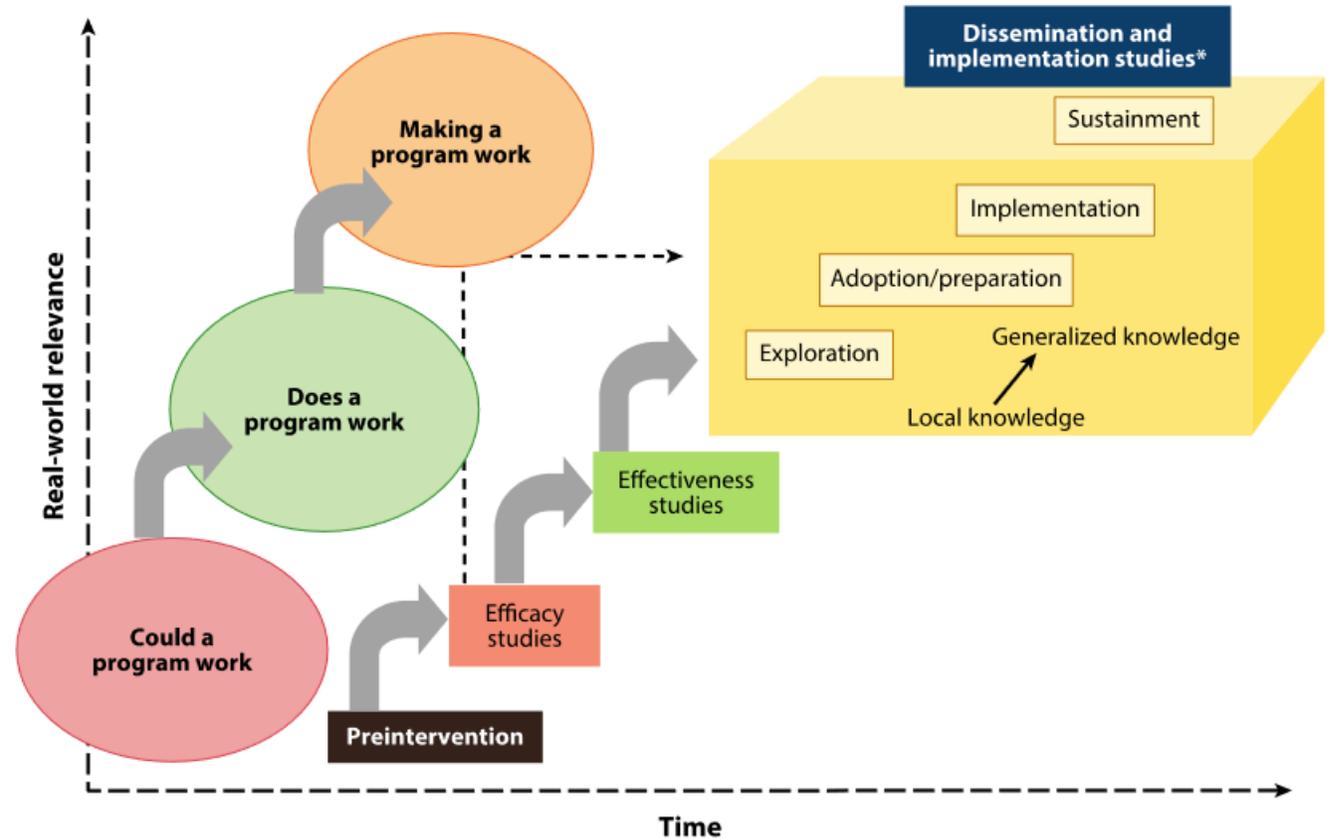
- Need to explore more creative dissemination efforts, beyond journal publications and meeting presentations, to increase the number of evidence-based programs that are implemented in real-world practices.

D&I science occupies a distinct phase along the research continuum, focusing on the adoption, adaptation, delivery and sustainment of evidence-based practices that have been or will be implemented into practice

It takes an average of 17 years for evidence-based programs to be put into practice, creating significant delays in access to interventions

D&I addresses this disconnect between evidence-based research and practical application in community settings

Traditional translational pipeline from pre-intervention, efficacy, effectiveness, and dissemination and implementation studies



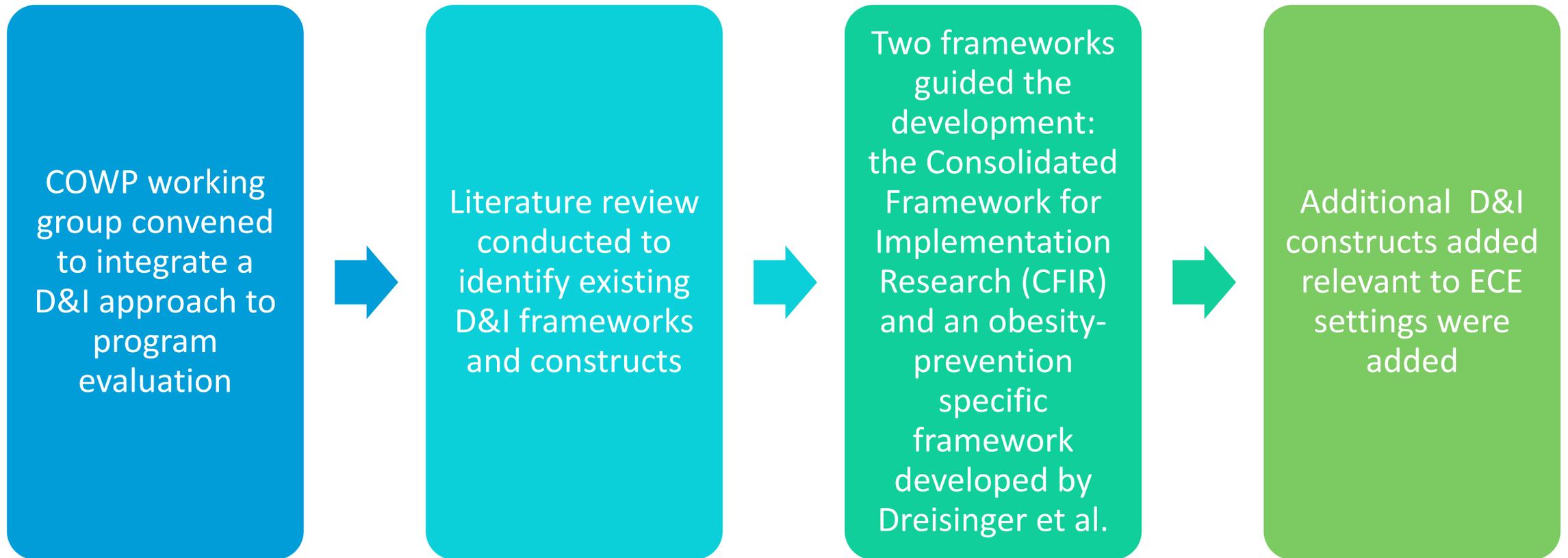
*These dissemination and implementation stages include systematic monitoring, evaluation, and adaptation as required.

Brown et al., *Ann Rev Public Health*, 2017

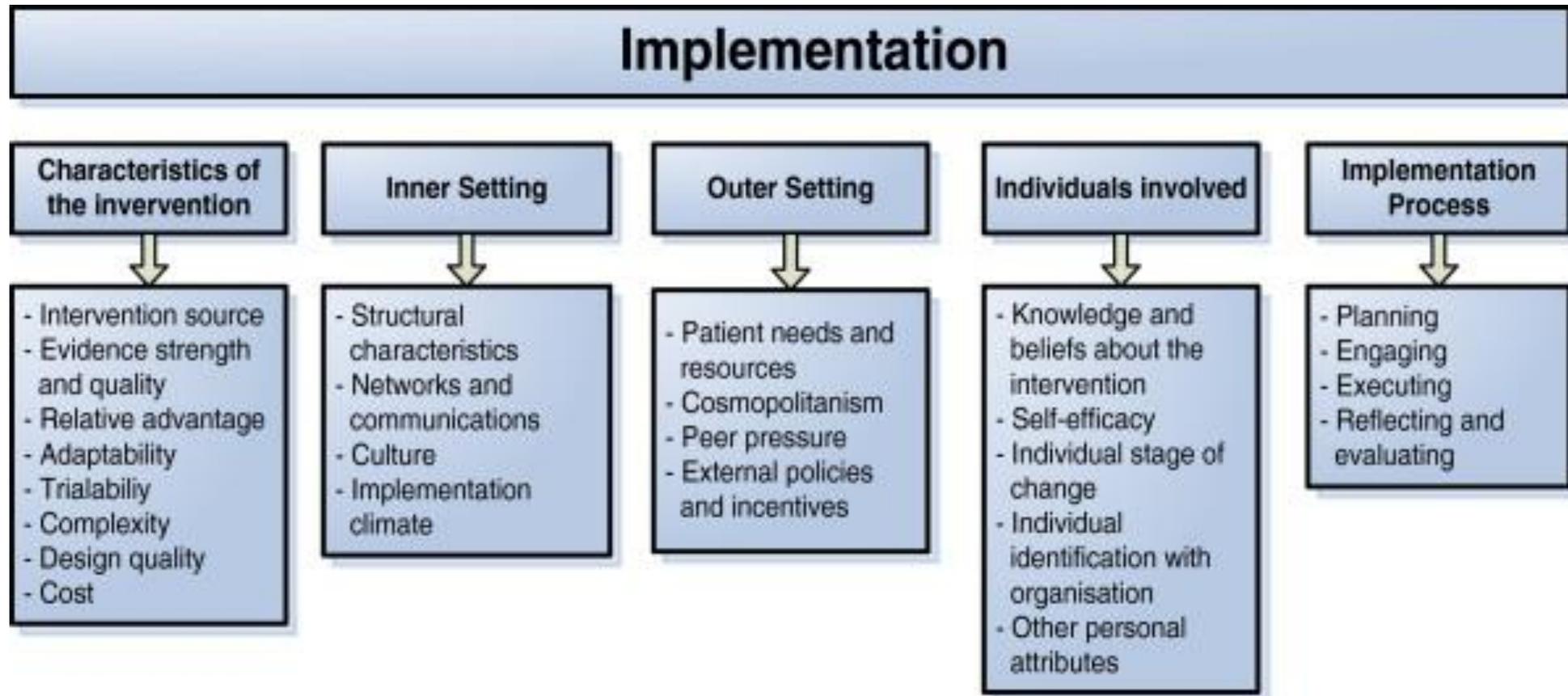
Existing Gap

- Current evaluation approaches to early childhood education (ECE) health promotion programs have a limited focus on outcome measures
- The complexity of implementing multi-component ECE programs calls for more comprehensive evaluation
- Adopting a dissemination & implementation (D&I) science approach to evaluation can account for additional factors that influence implementation and program success
- Although a plethora of D&I frameworks exist to help guide health promotion work, including for school-based programs, a gap still exists related to D&I frameworks for health promotion work in ECE settings and linking D&I factors to outcomes
- To fill this gap and inform implementation and evaluation efforts, a D&I framework was developed and applied to the Culture of Wellness in Preschools (COWP) program

COWP D&I Framework Developmental Process



D& I Framework: Consolidated Framework for Implementation Research (CFIR)



D& I Framework: Dreisinger et al.

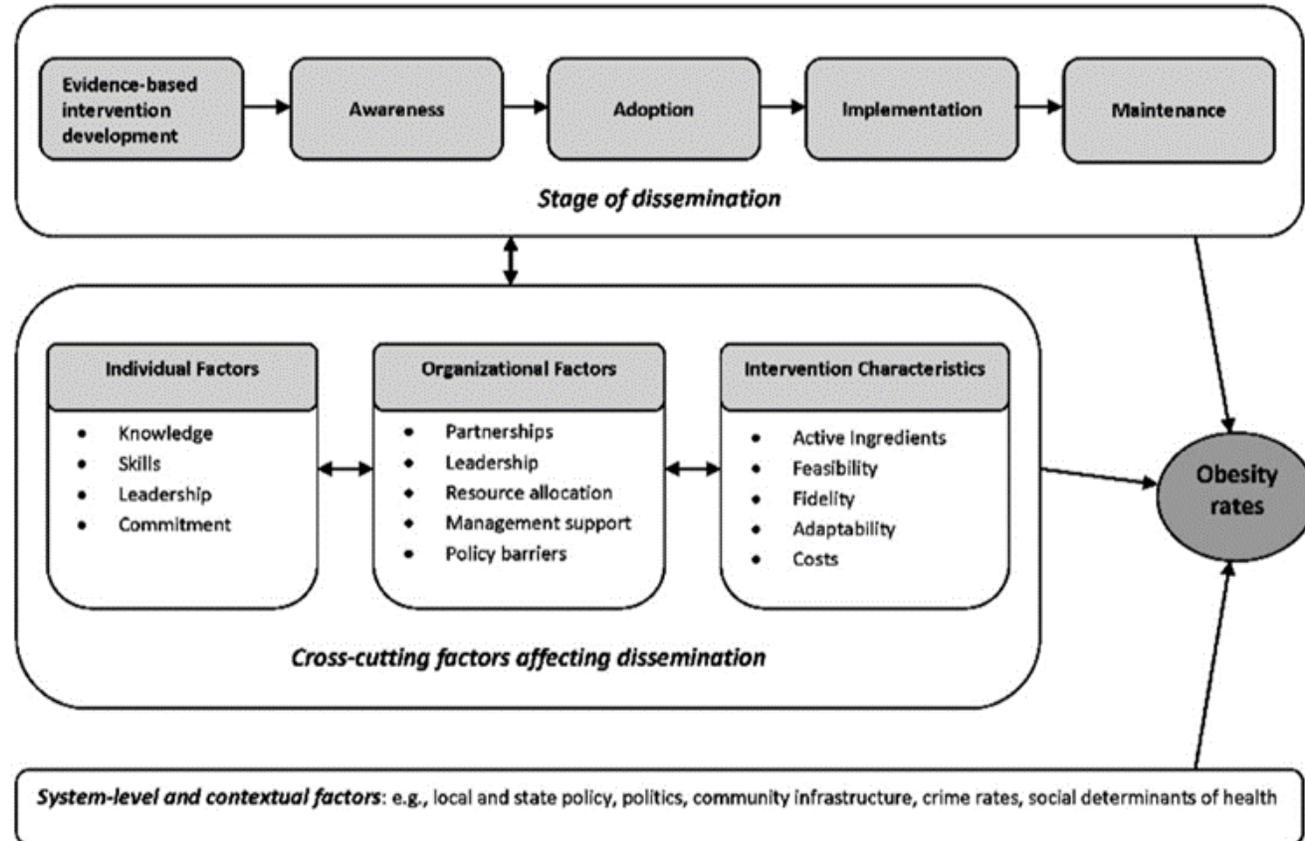


Fig. 2. Factors affecting dissemination of evidence-based interventions to prevent obesity.



Dissemination and Implementation Framework

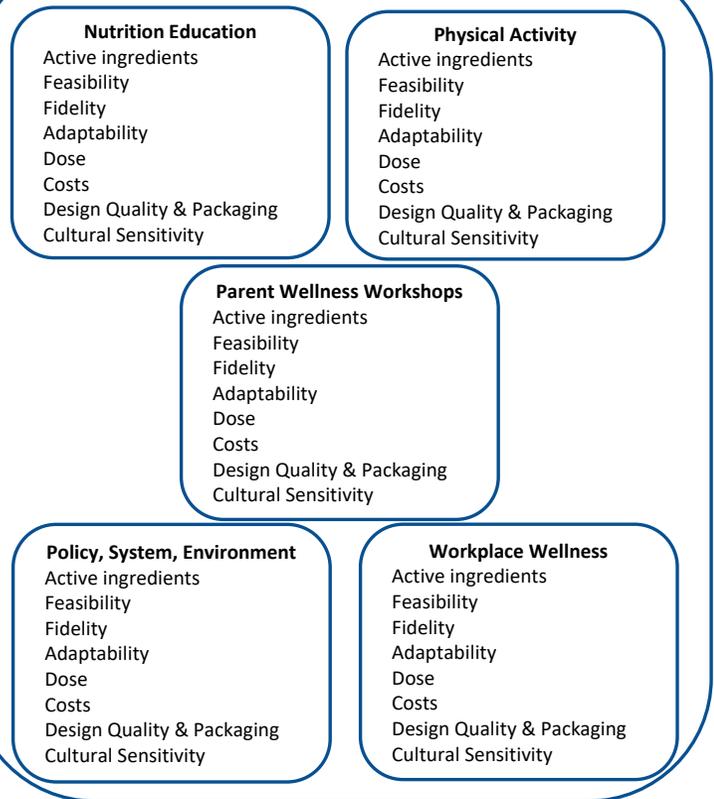
Process: Planning, Engaging, Executing, Reflecting & Evaluating

Stages of dissemination

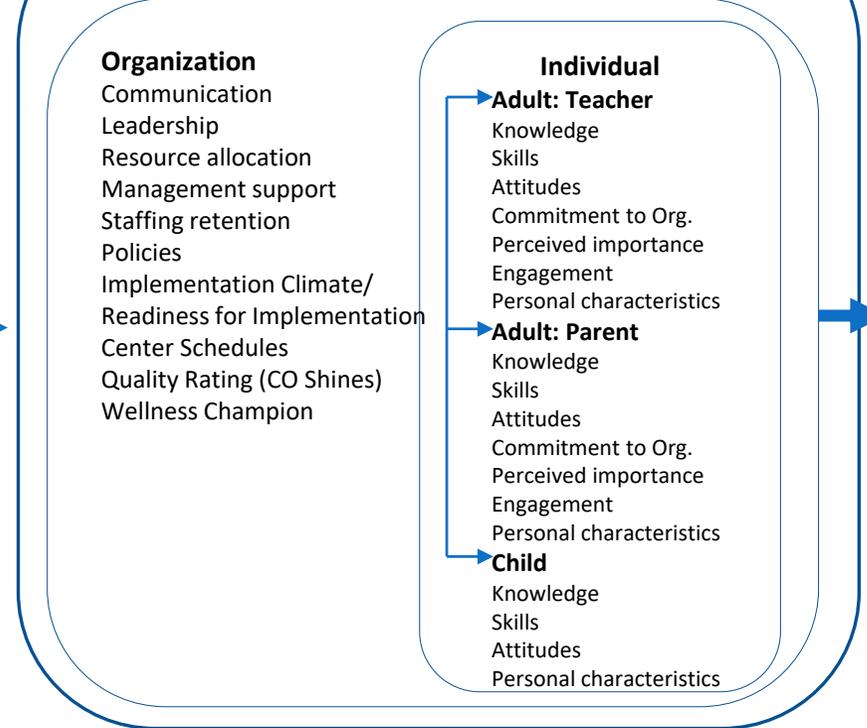


Cross-cutting factors affecting dissemination

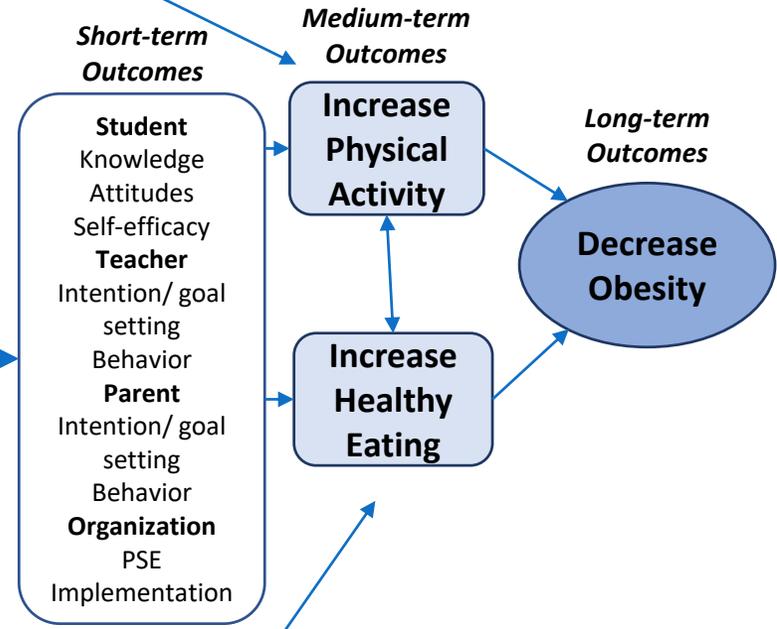
Intervention Factors



Structural and Participant Factors



System-level and contextual factors



Framework Constructs: Process

Constructs were drawn from the CFIR, intended to represent the active change process that is required for successful implementation of a program

- **Planning:** background research, development of the program curriculum and materials
- **Engaging:** working with ECE center directors and teachers, as well as parents and caregivers to inform programming
- **Executing:** implementation of this planned program into ECE centers across Colorado
- **Reflecting:** ongoing process that includes examining current practices and exploring goodness-of-fit of the program at each center and making adaptations, if necessary
- **Evaluating:** assessment of the intended outcomes and impacts of the program through multiple routes of data collection
 - Cyclical process; the pairing of *reflecting* and *evaluating* leads to a cycle of continuous quality improvement and can initiate the entire process from the beginning if refinements or adaptations are made to programming



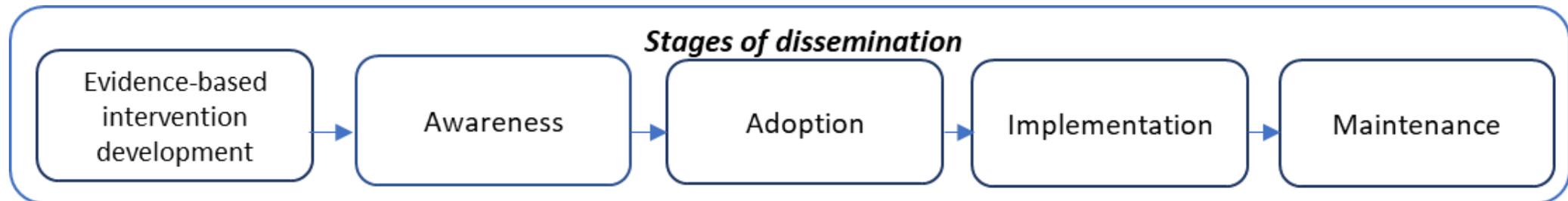
Process: Planning, Engaging, Executing, Reflecting & Evaluating

Framework Constructs: Stages of Dissemination

Based on the Dreisinger et al. framework and are founded on the Diffusion of Innovations Theory

Each of these stages are considered relevant to the expansion of COWP, not only by geographic location, but also within centers and the ECE network

Each stage, beginning with intervention development based on specific context to maintenance, are key to ensuring the continual success and spread of COWP



Framework Constructs: System-level

Based on their expertise and extensive background working in ECE settings, the working group developed a list of system-level and contextual factors that may have largest impact on the implementation and dissemination of COWP

- **Community Characteristics:** e.g. community infrastructure, geographic location, income
- **Social Determinants of Health:** conditions in the places where people live, learn, work, and play
- **ECE System:** The organizational structure, functioning, and expectations of ECE centers
- **Stages in the Food System:** growing, harvesting, packing, processing, transforming, marketing, consuming and disposing of food at both the local and national level
- **Funding Sources:** The entity, amount, stipulations, and frequency of funding provided to ECE centers
- **Complementary Initiatives:** e.g. other health promotion programs currently being implemented with the target population
- **Current Political Environment:** The aggregate mood or opinions of a population about current political issues that affect the target population

System-level and contextual factors

Community Characteristics

Social Determinants
of Health

ECE System

Food System

Funding Sources

Complementary Initiatives

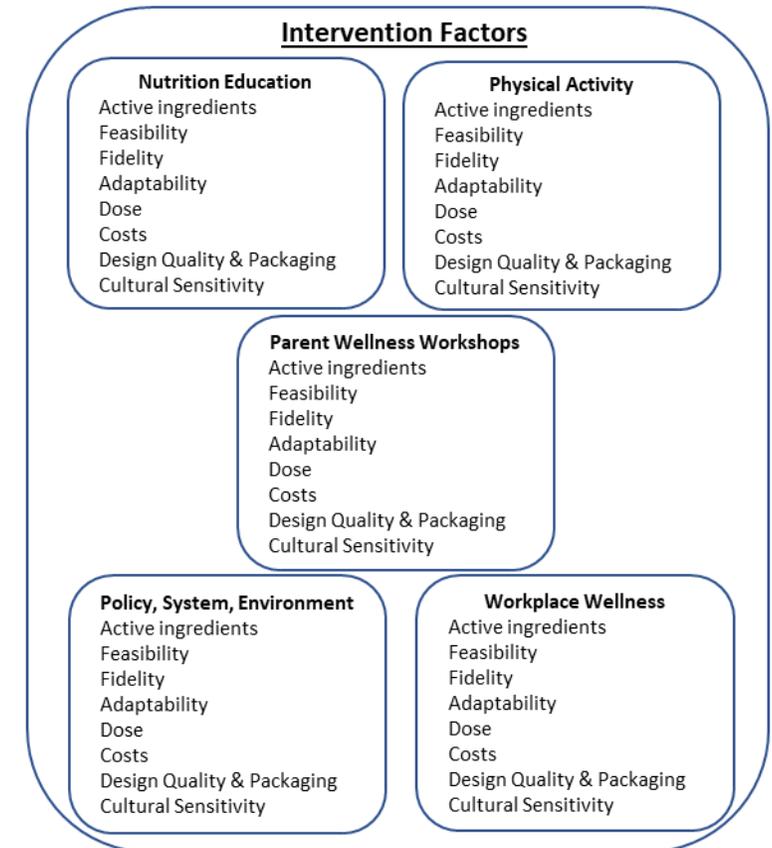
Political Environment

Framework Constructs: Intervention-level

5 main components: nutrition education, physical activity, parent wellness workshops, workplace wellness, and a policy, system, and environment (PSE) strategic planning process

Due to the inherent differences between each of these components, they were separated within the framework with each including their own intervention factors

- **CFIR:** Feasibility, Adaptability, Costs, Design Quality & Packaging
- **Additional constructs identified by the COWP team:** Active Ingredients, Fidelity, Dose, Accountability, Cultural sensitivity



Framework Constructs: Organizational-level

Existing structures and characteristics related to the organization affect the implementation of a program, especially in the ECE setting

- **CFIR:** Communication, Leadership Engagement, Resources Allocation, Implementation Climate, Readiness for Implementation, and Wellness Champion
- **Additional constructs identified by the COWP team:** Management Support, Staffing Retention, Policies, Center Schedules, Quality Rating, Staff Buy-in, and Family Engagement

Organization

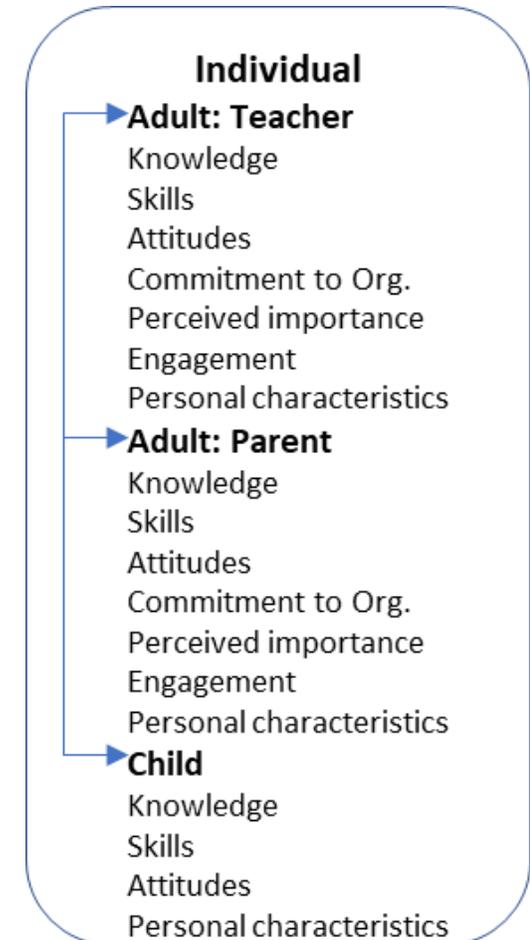
Communication
Leadership
Resource allocation
Management support
Staffing retention
Policies
Implementation Climate/
Readiness for Implementation
Center Schedules
Quality Rating (CO Shines)
Wellness Champion

Framework Constructs: Individual-level

COWP targets not only preschool students, but teachers and parents with their programming

Individual factors were separated by these three groups

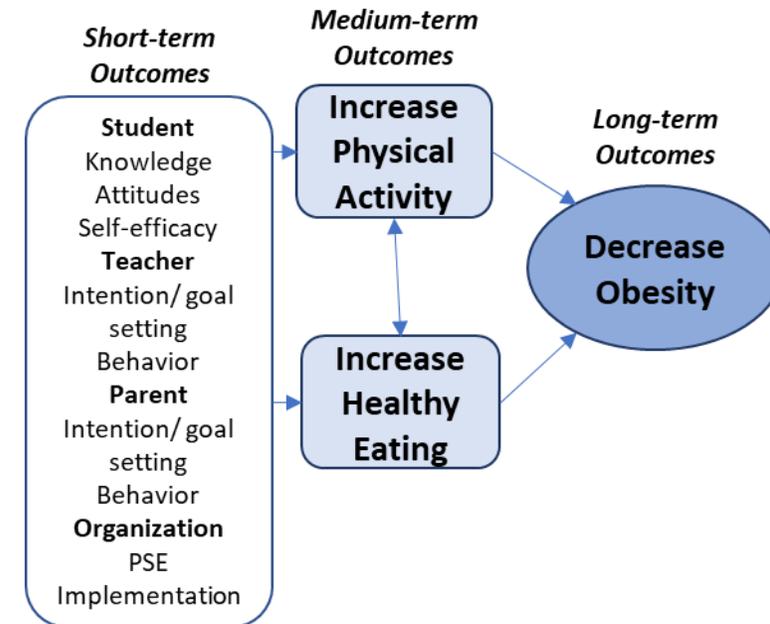
- **CFIR:** Knowledge, Skills, Personal Characteristics (other traits or attributes such as motivation, competence, learning style, and values), and Commitment to Organization (for teachers and parents only)
- **Additional constructs identified by the COWP team:** Attitudes, Engagement, and Perceived Importance (for teachers and parents only)



Framework Constructs: Outcomes

Based on the COWP logic model and aligns with the stages of change from the Transtheoretical Model

- **Short-term outcomes (*preparation*):** focused on the child, parent and teacher as these individuals can model and promote health behaviors to influence subsequent child behavior change. These include intention and goal-setting, as well as short-term or immediate behavior change
 - At the organizational level, the implementation of PSE changes identified through the PSE strategic planning process
- **Medium (*action*):** focused on the child who is intended to be impacted by the intervention. Medium-term outcomes include an increase in physical activity and healthy eating of the child.
- **Long-term (*maintenance*):** focused on the child who is intended to display long-term behavior change. Long-term outcomes include decreased obesity and related chronic disease.



Application

- After finalizing the framework, current evaluation data was mapped onto constructs within the D&I framework to identify data collection gaps
- Gaps informed new data collection and the decision to use mixed methods
 - Qualitative interviews with center directors (n=20)
 - Quantitative D&I-focused survey distributed to teachers (n=398)
- Goal of identifying of important constructs to that can be used to adapt current programming and inform development of new programming

Application: Qualitative

Qualitative interviews with center directors (N=20)

- **Intervention-level factors:** feasibility and adaptability
 - Program changes/modifications:
 - Continue to develop/adapt materials that are simple and easy to use
 - Provide options within lessons for teachers to pick and choose components given varying time restrictions
 - Training and fidelity monitoring to ensure changes do not impact COWP as an evidence-based intervention
- **Organizational-level factors:** staff and leadership engagement
 - Program changes:
 - Prioritize relationship building and buy-in efforts with school leadership *and* with individual teachers
 - Initial contact with school - focus on teacher trainings and emphasizing how intervention benefits them
- **Individual-level factors:** attitudes, skills and knowledge
 - Program changes
 - Assessment of teacher attitude, skills, and knowledge during trainings
 - Provide targeted support and resources to increase teachers' self-efficacy related to COWP

Application: Quantitative

- Quantitative D&I-focused survey distributed to teachers (N=398)
 - In the process of running mixed-level models and path analyses to explore associations with D&I constructs and program outcomes
 - RQ: What intervention, structural and participant factors are associated with pre-/post-change in fruit & vegetable consumption and physical activity over time?
 - Mixed-level models, with D&I predictors, testing interaction effects
 - Model 1: DV = change in SOPLAY over time, IVs = intervention implementation, interaction effects with structural & participant characteristics, interaction effects
 - Model 2: DV = change in plate waste over time, IVs = intervention implementation, interaction effects with structural & participant characteristics, interaction effects
 - SEM – path analysis
 - Intervention implementation -> structural & participant -> SOPLAY & plate waste

Implications

- The COWP D&I framework fills the need for a comprehensive D&I framework for multi-component ECE obesity-prevention programs
- Initial step in adopting a D&I focused approach to program evaluation and quality improvement
 - Using framework to guide future research and evaluation efforts
- The process and approach used can serve as road map of how to incorporate a D&I based approach into the evaluation of similar health promotion programs
 - COWP has been accepted into the SNAP-Ed toolkit as evidence-based interventions, this increases the opportunity for widespread dissemination
 - Contribute more broadly to other SNAP-Ed implementing agencies by providing a road map of how to incorporate a D&I based approach into evaluation efforts of existing SNAP-Ed health promotion programs

Questions and Discussion

Emily Bergling: Emily.bergling@cuanschutz.edu

Jini Puma: jini.puma@cuanschutz.edu

**Rocky Mountain
Prevention Research Center**

colorado school of public health

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