IMPLEMENTATION SCIENCE INTRODUCTION

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OBJECTIVES FOR THIS SESSION

Describe the language of Implementation Science (IS).

Identify key elements of IS designs. Describe 3 applications of IS in the nutrition education and behavior field.

IMPLEMENTATION SCIENCE DEFINED

"Implementation Science is the scientific study of methods to promote the systematic uptake of research findings and other evidence-based practice into routine practice, and, hence, to improve the quality and effectiveness..."

-Eccles & Mittman, Implementation Science, 2006

IS "IS" REALLY SOMETHING NEW?

Familiar Concepts

- Formative Research
 - Contextual Assessment
 - Stakeholder Engagement
- Theory-Driven Intervention
- Process Evaluations

New(er) Concepts

- Linking implementation outcomes to health outcomes
- Focus on testing manipulations to implementation process
- Comparing implementation approaches on fidelity, costs, sustainability, etc.

Swindle, T., Curran, G. M., & Johnson, S. L. (2019).

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KEY IMPLEMENTATION SCIENCE TERMS







WHAT WILLYOU "DO" TO GET PEOPLE TO USE THE "THING"? - G. CURRAN

IN THIS PICTURE...



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KEY IMPLEMENTATION SCIENCE OUTCOMES



Proctor, E., Silmere, H., Raghavan, R., Hovmand, P., Aarons, G., Bunger, A., ... & Hensley, M. (2011).



WHICH IMPLEMENTATION STRATEGY (OR STRATEGIES) WILL PROMOTE ADOPTION, FIDELITY, AND SUSTAINABILITY OF THE INNOVATION GIVEN FEATURES OF THE CONTEXT?

THEORIES, MODELS, AND FRAMEWORKS



OPPORTUNITIES IN IS FOR NUTRITION EDUCATION & BEHAVIOR

Apply Implementation Science			
	Integrate Implementation Scien	ice Approaches in Research	
- Choose implementation strategies based on context.	- Measure implementation outcomes <i>and</i> delivery of implementation strategies.	Contribute to Implementation Science Knowledge	
		- Conduct comparative effectiveness implementation trials.	
L		- Test implementation theories.	

Swindle, T., Curran, G. M., & Johnson, S. L. (2019).

ILLUSTRATION OF IMPLEMENTATION SCIENCE TODAY



Do model-suggested strategies outperform a standard implementation for improving implementation and child outcomes?



Do stakeholder-selected strategies outperform a standard implementation for improving implementation and child outcomes?



What determinants influence implementation outcomes at three levels: client, provider, and organization ?



Applying Implementation Science Theories, Models, and Frameworks to Study Go NAPSACC in Kentucky

Amber Vaughn July 29, 2019

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- The content is solely the responsibility of the authors and does not necessarily represent the official views of any funders.





PURPOSE

Support improvements to child care environments that foster healthy eating, physical activity, and overall development in children

The Cost-Effectiveness of Interventions for Reducing Obesity among Young Children through Healthy Eating, Physical Activity, and Screen Time



 To date, the NAP SACC program shows the best evidence for impact on early childhood obesity risk among interventions specifically targeted to children under 5

- Original NAPSACC = delivered to child care programs in person by NAPSACC Consultant using paper-based tools
- Go NAPSACC = translated tools into interactive online format, streamlined support required from NAPSACC Consultant



PURPOSE

Support improvements to child care environments that foster healthy eating, physical activity, and overall development in children



PURPOSE

Support improvements to child care environments that foster healthy eating, physical activity, and overall development in children



Common Barriers to Implementation

- Variation in background/experience of Go NAPSACC Consultants
- Unable to convert child care programs to active users
- Lack of adherence to 5-step improvement process
- Lack of director motivation
- Lack of engagement of child care staff
- Turnover in program management
- Lack of opportunities for peer learning to share ideas
- Lack of funding



Theories, Models, and Frameworks

Summative Articles

- Tabak et al. (2012) Bridging Research and Practice: Models for Dissemination and Implementation Research. Am J Prev Med.
 - Identify theories and frameworks commonly used in dissemination and implementation research
 - 61 models identified
- Nilsen (2015) Making Sense of Implementation Theories, Models and Frameworks. Implem Sci.
 - Purpose/use of theories:
 - How should we implement the innovation?
 - What will influence the success of implementation?
 - How do we evaluate implementation success?



How to Implement

How do we improve Go NAPSACC implementation to address common barriers?

Quality Implementation Framework (QIF)

- Synthesis of implementation literature
- Critical steps for high-quality implementation
- Four phases



Quality Implementation Framework





Quality Implementation Framework

Local technical assistance





STRATEGIES

*Powell BJ et al. (2015) A refined compilation of implementation strategies: results from the Expert Recommendations for Implementing Change (ERIC) project. *Implem Sci.*

What Influences Implementation

What contextual factors may be barriers or facilitators to Go NAPSACC implementation?

Consolidated Framework for Implementation Research (CFIR)

- Outer setting
- Inner setting
- Individuals involved
- Innovation characteristics
- Implementation process



Consolidated Framework for Implementation Research



EXAMPLES:

Communication: adequacy of efforts using formal or informal methods for two-way communication between admin, staff, and families

Knowledge and beliefs: Staff are knowledgeable about how to support healthy eating and physical activity; they believe these efforts are worthwhile



How to Evaluate Implementation

How do we identify and evaluate important implementation outcomes? RE-AIM

- Adoption
 - Number
 - Representativeness
- Implementation fidelity

- Efficacy
- Maintenance



Research Design

Study Design

- Type 3 hybrid effectiveness-implementation trial with a clusterrandomized design.
- Participants:
 - 18 Child Care Aware Coaches
 - 97 Child Care Centers, 1 director and 1 teacher from each
 - 485 Children, about 5 per center, 3-4 years old, at two timepoints
- Randomize coaches following baseline data collection
 - Basic Go NAPSACC or Enhanced Go NAPSACC
- Implement Basic or Enhanced Go NAPSACC for 12 months



Outcomes

Implementation Outcomes

- Centers' implementation of evidence-based nutrition and physical activity practices (assessed via EPAO)
- Centers' successful completion of key steps of Go NAPSACC participation (assessed via website use)
 - Registration
 - Self-assessment
 - Setting goals and creating action plans
 - Completing action plans
 - Completing trainings
 - Repeating the self-assessment



Implementation Outcomes (cont.)

- Coaches' successful delivery of key components of their assigned implementation approach, Basic or Enhanced (assessed via TA Activity log on website)
- Centers' and coaches' perspectives of the implementation context (assessed via survey)
- Cost of implementation from the perspective of Child Care Aware



Health Outcomes

- Children's diet quality for meals and snacks eaten at child care
- Children's physical activity at child care
- Children's BMI



Project Team

- PI = Dianne S. Ward, EdD
- Co-Investigators = Alice Ammerman, Geoffrey Curran, Derek Hales, Byron Powell, Christina Studts, Justin Trogden, Amber Vaughn
- Project Managers = Regan Burney, Julie Jacobs
- Community Partners = Child Care Aware of Kentucky, Kentucky Department for Public Health



SELECTING IMPLEMENTATION STRATEGIES WITH STAKEHOLDER INPUT

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Financial Interests

Dr. Taren Swindle and UAMS have a financial interest in the technology (WISE) discussed in this presentation/publication. These financial interests have been reviewed and approved in accordance with the UAMS conflict of interest policies.

OVERVIEW



THETHING

TOGETHER, WE INSPIRE SMART EATING



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THE "THING"

Evidence Based Practice	Behaviors	References and Guidelines
Engaging mascot	Uses mascot during activity.Leads chant with mascot.	Borzekowski & Robinson, 2001; Boyland, Harrold, Kirkham, &Halford, 2012; Kraak &Story, 2015;Keller et al., 2012; Roberto, Baik, Harris, & Brownell, 2010;Weber, Story, & Harnack, 2006
Multiple, hands- on exposures	 Completes lesson in prescribed group size. Involves children in lesson. 	Anzman-Frasca, Savage, & Marini, 2012; Knai, Pomerleau, Lock, & McKee, 2006; Office of Head Start, n.d.; Schindler, Wardle, Cooke, & Gibson, 2003; Wardle & Herrera, 2003
Role Modeling	 Eats food with the children. Makes positive comments about the target food. 	Gibson & Kreichauf, 2012; Greenhalgh, Dowey, & Horne, 2009; Hendy & Raudenbush, 2000; Neelon & Briley, 2011; Office of Head Start, n.d.
Positive feeding practices	 Cues hunger and satiety. Encourages food exploration. Supports without pressure. 	Birch, McPheee, & Shoba, 1987; Galloway, Fiorito, Francis, & Birch, 2006; Johnson & Birch, 1994; Mustonen, Rantanen, & Tuorila, 2009; Neelon & Briley, 2011; Office of Head Start, n.d.; Reverdy, Chesnel, Schlich, Köster, & Lange, 2008

WISE RESULTS

 Sustained improvements in educator knowledge

 Outperformed standard for improving child diet (FFQ)

Improvements supported by biomarker measure



Whiteside-Mansell L., Swindle, T., In Press; Whiteside-Mansell L., Swindle, T., 2018; Whiteside-Mansell L., Swindle, T., 2017

THE THEORY

I-PARIHS



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THE IMPLEMENTATION THEORY FRAMEWORK





RESEARCH QUESTION AND DESIGN

THE RESEARCH QUESTIONS

Will stakeholder-selected strategies outperform a basic implementation approach on implementation and child outcomes?

- What barriers and facilitators do stakeholders prioritize?
- What strategies do stakeholders see as most feasible and important to address prioritized barriers and facilitators?

THE RESEARCH DESIGN

Cluster, Randomized Hybrid III Trial

- Evidence-Based Quality Improvement Panels
- Concept Mapping
- Liberating Structures



EVIDENCE-BASED QUALITY IMPROVEMENT



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THE BARRIERS & FACILITATORS PRIORITIZED

Context	Innovation	Recipients
 Leadership Support Capacity & climate for change 	 Time Perception of fit & advantage 	 Classroom Skills Beliefs

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CONCEPT MAPPING

Date of Concept Mapping Ratings: Hands on Support

Importance

Powell, B. J., Beidas, R. S., Lewis, C. C., Aarons, G. A., McMillen, J. C., Proctor, E. K., & Mandell, D. S., 2017

IMPLEMENTATION STRATEGIES

MULTIFACETED PACKAGE

THE STRATEGIES SELECTED

- I. Obtain formal commitments.
- 2. Develop an implementation blueprint.
- 3. Remind implementers.
- 4. Identify and prepare champions.
- 5. Facilitation
- 6. Develop educational materials.
- 7. Alter incentive structures.

Powell, B. J., Waltz, T. J., Chinman, M. J., Damschroder, L. J., Smith, J. L., Matthieu, M. M., ... & Kirchner, J. E. (2015); Waltz, T. J., Powell, B. J., Matthieu, M. M., Damschroder, L. J., Chinman, M. J., Smith, J. L., ... & Kirchner, J. E. (2015).

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THE MULTI-FACETED IMPLEMENTATION STRATEGY

THE STRATEGIES SPECIFIED: EXAMPLES

Strategy	Actor	Action	Temporality	Dose	Justification
Identify & prepare champions	Volunteer or designated at each enhanced site	Provide 3 hour training in how to advocate, educate, and navigate for WISE	Within 2 months of teacher training	One-time training with facilitator contacts	Provide local contact to increase capacity for change.
Incentives	Classroom teacher pairs will receive incentives (i.e., classroom supplies) from WISE staff	Provide tailored incentives reflective of use of 4 key practices.	Educators can earn new incentives each quarter	Varies by teacher (0 – 8 incentives may be earned)	Increase likelihood educators will try WISE practices & create first-hand experience with advantages; leverage social norms.

Proctor, E. K., Powell, B. J., & McMillen, J. C. (2013). Implementation strategies: recommendations for specifying and reporting. Implementation Science, 8(1), 139.

OUTCOMES

IMPLEMENTATION AND HEALTH

THE IMPLEMENTATION OUTCOMES

Construct	Measures
Reach	Number of Lessons delivered
Effectiveness	Child Food Frequency; Child BMI; Child RRS scan
Adoption	Food purchase records; Organizational Readiness for Implementing Change ^I
Implementation	WISE fidelity, Acceptability, Feasibility ²
Maintenance	Fidelity in following school year

I. Shea, C. M., Jacobs, S. R., Esserman, D. A., Bruce, K., & Weiner, B. J. (2014).

2. Weiner, B. J., Lewis, C. C., Stanick, C., Powell, B. J., Dorsey, C. N., Clary, A. S., ... & Halko, H. (2017).

RESULTS

PRELIMINARY!

QUALITATIVE FEEDBACK

"When we had our teacher meeting, I had them watch the videos. And they got some stuff from the videos. I liked the videos y'all sent. I got to learn more stuff and then pass it on to them ."

–WISE Champion

"She came back and gave the other classes a reward. We did all this and you still gave us a bad report? Nah. Something is wrong with this picture."

- Assistant Teacher

"I was very pleased with how they would come out to the center and talk with me to see if there was anything I needed. They went to the classrooms to check on the teachers to see how things were going... I just couldn't believe how they just tagged on to usI just don't think there was anything lacking that we didn't get here that we needed or I needed."

– Center director

PRELIMINARY QUANTITATIVE RESULTS

\$215 per classroom to deliver enhanced support for one year

- Significant treatment effects for:
 - Fidelity to Role Modeling
 - Fidelity to Engaging Mascot
- Marginal treatment effects for:
 - Fidelity to Hands-On Exposure

THANK YOU!

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Disseminating and Implementing a Lifestyle-based Healthy Weight Program for Mothers in a National Organization

Rachel Tabak, PhD, RD Washington University in St. Louis

July 29, 2019

Disclosures

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- The content is solely the responsibility of the authors and does not necessarily represent the official views of the funding agencies.

Overview

The Things (i.e., innovation or evidence-based intervention)

Partnership with Parents as Teachers

- In 2016-2017, PAT served:
 - > 190,000 families
 - > 227,000 children

History of our 20 year partnership with PAT

Healthy Eating & Active Living Taught at Home (HEALTH)

- Embedded lifestyle intervention
- Within curriculum for Parents as Teachers
- Simplified content dietary behaviors most likely to impact weight
- Mothers (n=179) of preschool children with overweight or obesity

Maternal Weight Change over 24 Months in HEALTH Effectiveness Trial by Randomization Assignment

Haire-Joshu et al, Am J Prev Med 2018;54(3):341

HEALTH Dissemination & Implementation

- Research design: Cluster randomized
- > 28 sites (532 moms) nationwide
 - Randomized: HEALTH or Usual care
- Effectiveness on weight and behaviors (e.g., soda intake)
- Mother, sites, parent educators
 - Implementation outcomes (RE-AIM)
 - Context (CFIR)

HEALTH Healthy Eating, Active Living Taught at Home

The Implementation theory frameworks

The Implementation theory frameworks: RE-AIM (Reach, Effectiveness, Implementation, Adoption, Maintenance)

https://www.frontiersin.org/articles/10.3389/fpubh.2019.00064/full

The Implementation theory frameworks: Consolidated Framework For Implementation Research (CFIR)

https://implementationscience.biomedcentral.com/articles/10.1186/1748-5908-4-50

Understanding implementation context

- 10 site leaders and 6 parent educators in 8 states
- Semi-structured interviews and a survey
- Positive perspectives of LIFE-Moms
 - Recommended materials be highly visual, low literacy, Spanish
 - Flexibility to tailor to family's needs and context
 - Prefer virtual training to avoid travel
Implementation strategy

HEALTH Training Curriculum

- Develop and distribute HEALTH educational materials
- Make parent educator training dynamic
- Provide ongoing consultation



HEALTH Healthy Eating, Active Living Taught at Home

Implementation outcomes

RE-AIM Outcome	Definition	Level
<u>R</u> each/ Representativeness	Absolute number, proportion, and representativeness of individuals who participate in HEALTH	• PAT site
<u>E</u> ffectiveness	Impact of HEALTH on weight and important lifestyle behaviors (e.g., diet and activity)	 Individual participant
<u>A</u> doption	Intention, initial decision, or action to try or employ HEALTH; "uptake"	• PAT site
<i>Appropriateness</i> ^a	Perceived fit, relevance, and compatibility of HEALTH for PAT and parent educators; and perceived fit of HEALTH to address weight	Parent educator
Feasibility ^a	Extent to which HEALTH can be successfully used or carried out within a given agency or setting	Parent educator
<u>Implementation</u>		
Acceptability ^a	Perception among implementation stakeholders that HEALTH is agreeable, palatable, or satisfactory	Individual participantParent educatorPAT site
Fidelity	Degree to which HEALTH was implemented as prescribed in the original protocol or as it was intended by the program developers	Parent educator
<i>Adaptation^a</i>	Planned or purposeful changes and unintentional deviations to the design or delivery of HEALTH	Parent educator
<u>Maintenance/</u> Sustainability	Extent to which HEALTH is maintained or institutionalized within PAT's ongoing, stable operations	PAT sitePAT National Center
^a Includes qualitative measures		

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PUBLIC HEALTH

PREVENTION RESEARCH CENTER in St. Louis Promoting Healthy Communities





Center for Obesity Prevention and Policy Research



Resources for D&I research

Textbooks



Implementation Science at a Glance



A Guide for Cancer Control Practitioners

U.S. Department of Health & Human Services | National Institutes of



https://cancercontrol.cancer.gov/IS/tools/practice.html

D&I Resources

Washington University in St. Louis - DIRC toolkits

- Intro to D&I, Aims, Barriers & Facilitators, Implementation Outcomes, Designs, Implementation Organizational Measures, Implementation Strategies, Guidelines, Checklist for writing IR proposals
- https://sites.wustl.edu/wudandi/di-toolkits/

Veteran Affairs' Quality Enhancement Research Initiative

- http://www.queri.research.va.gov/implementation/quality_improvement/default.cfm
- National Cancer Institute's Implementation Science Team
 - http://cancercontrol.cancer.gov/is/
- Canadian Knowledge Translation Clearinghouse website
 - http://ktcanada.net/
- Grid-Enabled Measures developed by the National Cancer Institute
 - https://www.gem-beta.org/public/MeasureList.aspx?cat=2
- > Training Institute on Dissemination and Implementation Research (TIDIRH), National Institutes of Health
 - https://obssr.od.nih.gov/training/training-supported-by-the-obssr/training-tidirh/
- ACCORDS University of Colorado
 - http://www.ucdenver.edu/academics/colleges/medicalschool/programs/ACCORDS/sharedresources/DandI/Pages/Resources.aspx

NIH Funding Opportunities

Dissemination and Implementation Research in Health

- ▶ <u>R01</u> PAR-19-274
- ▶ <u>R21</u> PAR-19-275
- ▶ <u>R03</u> PAR-19-276
- Standing study section