Introduction to Dissemination & Implementation Science
Overview

- What is Dissemination and Implementation (D&I) science and why is it important?
- Key terms, definitions, and methods
- Designing for Dissemination

- Please ask questions or bring discussion points throughout
Why are you pursuing PAPH research?

The latest research shows that we really should do something with all this research.
Where are you right now?

- Not familiar with D&I Science
- Exploring D&I Science
- Starting to apply D&I Science
- Confident in D&I Science expertise

Please share a bit about your D&I Science experience
The 17-year odyssey

Priorities for research funding

Peer review of grants

Publication priorities and peer review

Research synthesis

Guidelines for evidence-based practice

Evidence-based medicine movement

Academic appointments, promotion, and tenure criteria

Practice

Funding; population needs, demands; local practice circumstances; professional discretion; credibility and fit of the evidence.


Annu. Rev. Public Health. 30:151–74

Translation of the Diabetes Prevention Program (DPP)

Original efficacy study (n=92) - 2002

Effectiveness in YMCAs (n=92) - 2007

Group Lifestyle Balance (community) (n=42) - 2009

Online Social Network (n=220) - 2014

Veterans Health Administration (n=387) - 2017

National DPP (220 organizations n=14,747) - 2017

Efficacy → Effectiveness → Dissemination & Implementation

84.1 million U.S. adults have prediabetes

Ely. Diabetes Care 2017;40:1331-1341
Figure 1

Traditional translational pipeline from preintervention, efficacy, effectiveness, and dissemination and implementation studies.

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

What? Evidence-based interventions

How? Implementation strategies

Implementation Outcomes
- Fidelity
- Penetration
- Acceptability
- Sustainability
- Uptake
- Costs

Patient Outcomes
- Clinical/health status
- Health behaviors
- Satisfaction

The Core of Implementation Science

Improve public health

When defining implementation science, some very non-scientific language can be helpful...

- The intervention/practice/innovation is THE THING
- Effectiveness research looks at whether THE THING works
- Implementation research looks at how best to help people/places DO THE THING
- Implementation strategies are the stuff we do to try to help people/places DO THE THING
- Main implementation outcomes are HOW MUCH and HOW WELL they DO THE THING
Some key terms

- **Dissemination and implementation research** intends to bridge the gap between research, practice, and policy by **building a knowledge base** about how health information, effective interventions, and new clinical practices, guidelines, and policies are **communicated and integrated** for public health and health care service use in specific settings.

- **Dissemination research** is defined as the scientific study of the **targeted distribution** of information and intervention materials to a specific public health, clinical practice, or policy **audience**. The intent is to understand how best to communicate and integrate knowledge and the associated evidence-based interventions.

- **Implementation research** is defined as the scientific study of the use of **strategies to adopt and integrate evidence-based** health interventions into clinical and community settings to improve individual outcomes and benefit population health.

Implementation Science and Nutrition Education and Behavior: Opportunities for Integration

Taren Swindle PhD, Geoff M. Curran PhD

Table 1. Implementation Terms and Definitions

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adaptation</td>
<td>Process of changes to an innovation to increase suitability for a particular population or organization while keeping core components; may happen deliberately or passively.</td>
</tr>
<tr>
<td>Dissemination</td>
<td>Targeted spread of information/interventions to a targeted audience.</td>
</tr>
<tr>
<td>Context</td>
<td>Setting in which implementation takes place; features of inner and outer setting that may affect implementation including, but not limited to, culture, organizational structure, local policy, leadership, capacity, networks, and environmental (in) stability.</td>
</tr>
<tr>
<td>Hybrid designs</td>
<td>Research designs with dual focus on clinical effectiveness (i.e., health outcomes) and implementation outcomes.</td>
</tr>
<tr>
<td>Innovation</td>
<td>Process whereby a designated person (facilitator) uses a set of implementation strategies differentially between sites in response to varying contextual needs and barriers; akin to current use of the term technical assistance in nutrition education and behavior, which has a different meaning in implementation science.</td>
</tr>
<tr>
<td>Implementation strategy</td>
<td>Scientific study of implementation that focuses on the how and why of successes and failures of innovations in real-world settings; goal is generalizable knowledge.</td>
</tr>
<tr>
<td>Implementation research</td>
<td>Degree to which an individual or organization is prepared to implement change.</td>
</tr>
<tr>
<td>Readiness Scale-up</td>
<td>Broadening the delivery of an innovation through deliberate efforts to reach a wider but similar audience and context compared with that in which the innovation was tested originally.</td>
</tr>
<tr>
<td>Stakeholders</td>
<td>Individuals or organizations affected by an implementation effort; can include community members or patients targeted by the effort and/or frontline practitioners delivering the innovation.</td>
</tr>
<tr>
<td>Technical assistance</td>
<td>Use of local or centralized personnel (e.g., call-in help line) as needed to address issues with implementation; an implementation strategy.</td>
</tr>
</tbody>
</table>


Note: This table was adapted and expanded from Proctor et al. and Livet et al.
“We propose that the key goal of implementation science should be to study the
- development, spread and sustainability of
- broadly applicable and practical programs, treatments, guidelines, and policies
- that are contextually relevant and robust
- across diverse settings, delivery staff, and subgroups.”
Where does Public Health happen? How can D&I help?

Where do your research questions fall in the translational research continuum?


“Subway” schematic to guide researchers contemplating implementation studies of evidence-based interventions

Discuss in pairs, briefly...

- In what ways do you hope your work will impact public health?
- How will you measure these impacts?
- Anyone willing to share?
What is an implementation challenge in your work?
Multiple-levels of Context

- Policy
- Community
- Interpersonal
- Individual
Multiple-levels of Context

- Intervention
- Provider
- Organization
- Community/Policy
A refined compilation of implementation strategies: results from the Expert Recommendations for Implementing Change (ERIC) project

Psychology and Health
Vol. 26, No. 11, November 2011, 1479-1498

A refined taxonomy of behaviour change techniques to help people change their physical activity and healthy eating behaviours: The CALO-RE taxonomy

Susan Michie\(^{a}\ast\), Stefanie Ashford\(^{b}\), Falko F. Sniehotta\(^{c}\), Stephan U. Dombrowski\(^{d}\), Alex Bishop\(^{b}\) and David P. French\(^{b}\)
Implementation Science and Nutrition Education and Behavior: Opportunities for Integration

Taren Swindle PhD, Geoff M. Curran PhD, Susan L. Johnson PhD

Table 2. Clusters and Examples of Implementation Strategies Drawn From Expert Recommendations for Implementing Change Project

<table>
<thead>
<tr>
<th>Cluster of Strategies</th>
<th>Example Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engage consumers</td>
<td>Use mass media; prepare consumers to be active participants</td>
</tr>
<tr>
<td>Use evaluative and iterative strategies</td>
<td>Audit and feedback; develop a formal implementation blueprint</td>
</tr>
<tr>
<td>Change infrastructure</td>
<td>Create or change credentialing and/or licensure standards; change physical structure/equipment</td>
</tr>
<tr>
<td>Adapt and tailor to the context</td>
<td>Promote adaptability; tailor strategies</td>
</tr>
<tr>
<td>Develop stakeholder interrelationships</td>
<td>Identify and prepare champions; build a coalition</td>
</tr>
<tr>
<td>Use financial strategies</td>
<td>Develop disincentives; use new payment schemes</td>
</tr>
<tr>
<td>Support practitioners</td>
<td>Remind practitioners; revise professional roles</td>
</tr>
<tr>
<td>Provide interactive assistance</td>
<td>Provide local technical assistance; provide supervision</td>
</tr>
<tr>
<td>Train and educate stakeholders</td>
<td>Use train-the-trainer strategies; develop educational materials</td>
</tr>
</tbody>
</table>

Note: This table was adapted from Powell et al.66 and Waltz et al.67 of the Expert Recommendations for Implementing Change project. Definitions of the strategies can be found in the original sources.
## Implementation Science and Nutrition Education and Behavior: Opportunities for Integration

### Table 3. Example of Strategy Specification to Support Implementation of Motivational Interviewing (MI)

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Strategy Cluster</th>
<th>Definition</th>
<th><strong>Actors</strong></th>
<th>Action</th>
<th>Temporality</th>
<th>Dose</th>
<th>Justification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Make training dynamic</td>
<td>Train and educate stakeholders</td>
<td>Interactive opportunities to practice and reflect</td>
<td>Experienced MI trainers</td>
<td>1-time workshop</td>
<td>1–2 wk before start of MI intervention</td>
<td>6 h</td>
<td>Provide foundational skills in MI</td>
</tr>
<tr>
<td>Send reminders</td>
<td>Support practitioners</td>
<td>Automated by MI staff</td>
<td>Keep reminders of key training messages</td>
<td>Once per wk for 6 mo</td>
<td>Approximately 24 e-mails</td>
<td></td>
<td>Remind trainees by commonly used mode of communication</td>
</tr>
<tr>
<td>Provide audit and feedback</td>
<td>Use evaluative strategies</td>
<td>MI trainer watches recorded session of trainee and provides feedback</td>
<td>MI trainers</td>
<td>Twice within first 6 mo</td>
<td>1 h of feedback and coaching on each occasion (total of 2 h)</td>
<td></td>
<td>Providing tailored feedback in supportive environment to encourage further MI skill development</td>
</tr>
</tbody>
</table>

Outcomes for Implementation Research: Conceptual Distinctions, Measurement Challenges, and Research Agenda

Enola Proctor · Hiie Silmere · Rakesh Raghavan · Peter Hovmand · Greg Aarons · Alicia Bunker · Richard Griffey · Melissa Hensley

What? Evidence-based interventions

How? Implementation Strategies

Implementation

Outcomes
- Feasibility
- Fidelity
- Penetration
- Acceptability
- Sustainability
- Uptake
- Costs

Patient Outcomes
- Clinical/health status
- Health behaviors
- Satisfaction

Theories, Models, and Frameworks in D&I Science

- D&I Models Webtool: https://dissemination-implementation.org
- T-CaST: Theory, Model, and Framework Comparison & Selection Tool: https://impsci.tracs.unc.edu/tcast/


Where do your research questions fall in the translational research continuum?

Fig. 1

“Subway” schematic to guide researchers contemplating implementation studies of evidence-based interventions

Hybrid Studies

TABLE 2. Design Characteristics of Clinical Effectiveness and Implementation Trials (Ideal Types)

<table>
<thead>
<tr>
<th>Design Characteristic</th>
<th>Clinical Effectiveness Trial</th>
<th>Implementation Trial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test</td>
<td>“Clinical” intervention</td>
<td>Implementation intervention or strategy</td>
</tr>
<tr>
<td>Typical unit of randomization</td>
<td>Patient, clinical unit</td>
<td>Provider, clinical unit, or system</td>
</tr>
<tr>
<td>Typical unit of analysis</td>
<td>Patient</td>
<td>Provider, clinical unit, or system</td>
</tr>
<tr>
<td>Summative outcomes</td>
<td>Health outcomes; process/quality measures typically considered intermediate; costs</td>
<td>Adoption/uptake of the “clinical” intervention; process measures/quality measures typically considered outcomes</td>
</tr>
</tbody>
</table>

FIGURE 1. Research pipeline.

How can I incorporate D&I in my research agenda (and do I want to)?

**Decision 2:** Once the decision has been made to incorporate D&I Science in the project: Identify an implementation scientist to assist to support the study

- **Option 1:** work with implementation scientist from department or consultation within the institution
- **Option 2:** identify implementation researcher from another organization/institution
- **Scenario 3:** Interest in implementation science training
  - Identify implementation science mentor(s) and begin training

**Decision 3:** What is the emphasis of the study on implementation science?

- **Option 1:** Focus on implementation science will be low
  - Implementation scientist in a consultant, low % Co-I, or advisory board role may be appropriate
- **Option 2:** Focus on implementation science will be moderate to high
  - Implementation scientist in a higher % consultant/Co-I or MPI role may be appropriate

**Fig. 1** Flow of decisions once the decision has been made to incorporate D&I Science in the project

https://doi.org/10.1186/s43058-020-00107-4
Designing For Dissemination (D4D) Defined

- Set of processes that are considered and activities that are undertaken throughout the
  - Planning
  - Development
  - Evaluation
  - of an intervention to increase its D&I potential
- Understanding and consideration of the user context (receiver “pull”).
Designing for dissemination and sustainability (D4DS)

Table 1. D4DS: Recommendations and answerable questions

### Shifting ways of thinking: How to view the world from a D4DS perspective

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Explanation</th>
<th>Action or answerable question</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1:</strong> Begin with dissemination, sustainment, and equitable impact in mind</td>
<td>It is not enough to begin with anticipated health outcomes in mind—begin by asking, Who will influence the decision to adopt and sustain? How will this work ensure equitable impact?</td>
<td>To what extent do specific activities designed to enhance dissemination, sustainability, and equity yield improved health impacts?</td>
</tr>
<tr>
<td><strong>2:</strong> Prioritize the needs and perspectives of diverse stakeholders at every stage of the process</td>
<td>Involving stakeholders from multiple perspectives, including potential adopters, will help anticipate challenges; keeping stakeholders involved throughout the process should improve quality of adaptations.</td>
<td>To what extent does ongoing involvement—in different ways and at multiple points in time—produce greater impact than more modest or one-time stakeholder engagement?</td>
</tr>
<tr>
<td><strong>3:</strong> Appreciate the value of a rapid and iterative approach and the need for periodic adaptation</td>
<td>Anticipate and plan for the need to adapt programs or strategies in response to dynamic context over time.</td>
<td>In what ways do approaches that specifically include multiple assessment points for review of results to date and iterative adaptations yield enhanced impact?</td>
</tr>
</tbody>
</table>
### Shifting skills and approaches: What we need to do differently to realize the promise of D4DS

<table>
<thead>
<tr>
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<th>Explanation</th>
<th>Action or answerable question</th>
</tr>
</thead>
<tbody>
<tr>
<td>4: Incorporate team science and systems science principles and practices</td>
<td>D4DS is a collaborative enterprise and produces products that influence systems of care and health. Team and systems science best practices can help ensure that teams work well together and that they can produce better products.</td>
<td>To what extent do programs and products that incorporate team science and systems science methods produce greater impact?</td>
</tr>
<tr>
<td>5: Employ health communication techniques tailored to the intended audience</td>
<td>One size does not fit all, and framing how programs and products are discussed and promoted has a big impact on adoption.</td>
<td>Do products distributed to intended audiences using health communication and audience-targeted strategies produce greater adoption?</td>
</tr>
<tr>
<td>6: Evaluate adoption, equity, and sustainment at scale</td>
<td>Transparent reporting and rigorous evaluation of adoption, equity, and sustainment impacts and relationships among them using both randomized and nonrandomized designs are needed.</td>
<td>To what extent can the field be advanced by investigations that provide full reporting on all three of these impacts rather than on health impacts only?</td>
</tr>
</tbody>
</table>
### Shifting training and evaluation systems and infrastructure: What we need to build to support shifting views, skills, and approaches

<table>
<thead>
<tr>
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<th>Explanation</th>
<th>Action or answerable question</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>7:</strong> Establish and promote training programs that acculturate trainees to the D4DS perspective and teach D4DS skills</td>
<td>Training in key issues described in this article (e.g., communications training, systems science, user-centered design, in-depth training in stakeholder engagement) helps promote equity.</td>
<td>To what extent do training programs and activities that include key D4DS competencies produce better, more sustainable results than those that do not?</td>
</tr>
<tr>
<td><strong>8:</strong> Provide resources to assist programs and policies that inform D4DS and develop practice-based evidence</td>
<td>The above recommendations require support and funding. Infrastructure is needed to accommodate emerging D4DS lessons learned.</td>
<td>To what extent do programs and trainings that provide targeted resources and specific responsibilities for D4DS and continuous evaluation produce more sustainable and equitable impacts?</td>
</tr>
</tbody>
</table>

So many to thank!

- Ross Brownson, Debra Haire-Joshu, Stephanie Mazzucca, Enola Proctor, Cindy Schwarz, Allie Phad, Dianne Ward, many more…
- Washington University Network for D&I Research (WUNDIR)
What do you think?

Questions?
Examples?
Overview

The Thing
- Go NAPSACC
- Using theory to study Go NAPSACC implementation

Do the Thing:
- Test GNS KY with research questions and research design
- Measure outcomes

“Subway” schematic to guide researchers contemplating implementation studies of evidence-based interventions
What is Go NAPSACC?

Development of an Evidence-Based Program
Go NAPSACC

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

- Focuses on installing evidence-based practices within the child care setting
- Works through consultants whose jobs include supporting child care quality
- Designed for dissemination (D4DS)

- 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
Our History

**Creation Phase**
- Development
- Proven Effective

**Expansion Phase**
- Promotion
- Adoption

**Go NAPSACC**
- Evolution of Go NAPSACC
- Core Components

---

**Timeline**
- 2002: NAPSACC developed
- 2005-2006: NAPSACC proven effective
- 2008: NAPSACC promoted as a model program
- 2010: Adopted by over 30 states
- 2014: Provider Tools launched
- 2015-2016: Piloted with 5 states
- 2017: Consultant & State Tools launched
Creation Phase

Development

Not a curriculum, but a planning model

Proven Effective

- Over 1 dozen publications
Used D4DS Principles

1. Started thinking early about how this “thing” might function in practice
2. Developed as partnership between academic department and public health
3. Included multiple stakeholders (early childhood, child care, public health, and others) from the beginning
Expansion Phase

Promotion

- Center for Excellence in Training and Research Translation: effective, evidence-based program
- White House Report: model program to promote healthy habits in child care programs
- CHOICES Project: best evidence of impact on early childhood obesity risk

Adoption

- Adopted >30 states
- Adapted for international use
Used D4DS Principles

1. Started thinking early about how this “thing” might function in practice
2. Developed as partnership between academic department and public health
3. Included multiple stakeholders (early childhood, child care, public health, and others) from the beginning
4. Identified the system of child care – how it operates- in order to fit our “thing” into that universe
5. Used communication strategies that were tailored to this audience
**Evolution of Go NAPSACC**

**Objective:** From consultant driven model to a provider driven, consultant supported, online toolkit

**Core Philosophies:**
1. Evidence-based
2. User friendly

**Expansions:**
1. From 2 to 7 modules
2. From paper to online
Used D4DS Principles

1. Started thinking early about how this “thing” might function in practice
2. Developed as partnership between academic department and public health
3. Included multiple stakeholders (early childhood, child care, public health, and others) from the beginning
4. Identified the system of child care – how it operates- in order to fit our “thing” into that universe
5. Used communication strategies that were tailored to this audience
6. Incorporated team & system science into principles/practices
Go NAPSACC’s Core Components

5-STEP IMPROVEMENT PROCESS
Go NAPSACC’s Core Components
Evidence-Based BEST PRACTICES
Physical Activity Example

BEST PRACTICE SECTIONS

1. Time Provided
2. Indoor Play Environment
3. Teacher Practices
4. Education & Professional Development
5. Policy

EXAMPLES

“Preschool children are provided 120 minutes or more for indoor and outdoor physical activity each day.”

“A large variety of portable play equipment is available and in good condition for children to use indoors.”

“Teachers incorporate physical activity into classroom routines, transitions, and planned activities.”
Common Barriers to Implementation

- Variation in background/experience of Consultants
- Unable to convert child care programs to active users
- Lack of adherence to full 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

Considered Options for Next Steps

  - Identify theories and frameworks commonly used in dissemination and implementation research
  - 61 models identified
  - Purpose/use of theories?
  - How should we implement the innovation?
  - What will influence the success of implementation?
  - How do we evaluate implementation success?
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

*Damschroder et al. Fostering implementation of health services research findings into practice: a consolidated framework for advancing implementation science. Implement Sci. 2009; 4(1):50
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

Inner Setting
- Communication
- Culture
- Implementation climate
- Readiness

Individuals Involved
- Knowledge and beliefs
- Self-efficacy
Consolidated Framework for Implementation Research

**Inner Setting**
- Communication
- Culture
- Implementation climate
- Readiness

**Individuals Involved**
- Knowledge and beliefs
- Self-efficacy

**Culture**
- People can rely on others to do their jobs well.
- People show signs of stress and strain.
- People give effort toward doing a good job.

**Communication**
- Staff feel free to express concerns or ask questions.
- Directors listen to staff ideas and suggestions.
- Staff kept informed

**Readiness**
- Staff are ready for implementation
- An environment exists to accomplish things
- Director is prepared to improve center practices

**Implementation Climate**
- Supporting children’s PA is a high priority
- Staff recognized when do a good job
- Staff expected to use practices that support PA
Consolidated Framework for Implementation Research

Inner Setting
- Communication
- Culture
- Implementation climate
- Readiness

Individuals Involved
- Knowledge and beliefs
- Self-efficacy

Knowledge & Beliefs
- Staff believe following policies will benefit children
- Staff feel they know how to support adoption of PA practices

Self-Efficacy
- Director feels the center can adopt practices when staff are not receptive
- Staff feel personal control over adoption of new policies
- Staff feel promoting children’s PA is easy
How to Implement

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

Quality Implementation Framework (QIF)* developed by:
- Conducting a synthesis of implementation literature
- Defining critical steps for high-quality implementation
- Using a 4-phase process

Quality Implementation Framework

Assessment, Adaptation, Capacity Building
Creating Structure for Implementation
Applying Lessons Learned
Ongoing Implementation Support

Meyers et al. 2012. Four phases of the QIF
Quality Implementation Framework

Phase 1
- Identify staff for implementation team
- Assess needs, fit, and capacity/readiness
- Identify needed adaptations

Assessment, Adaptation
Capacity Building, Plan for Implementation
Applying Lessons Learned
Ongoing Implementation Support
Quality Implementation Framework

Phase 2

- Facilitate center capacity building (general and intervention specific)
- Develop a plan for Go NAPSACC implementation
Quality Implementation Framework

Phase 3

- Implement Go NAPSACC
- Use online tools work through two cycles of the 5-step improvement process
Quality Implementation Framework

Phase 4
- Participate in cross-center team meetings to share experiences and learn from other centers
Quality Implementation Framework

Phase 1
- Identify staff for implementation team
- Assess needs, fit, and capacity/readiness
- Identify needed adaptations

Phase 2
- Facilitate center capacity building (general and intervention specific)
- Develop a plan for Go NAPSACC implementation

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- Implement Go NAPSACC
- Use online tools work through two cycles of the 5-step improvement process

Phase 4
- Participate in cross-center team meetings to share experiences, learn from other centers

Assessment, Adaptation
Capacity Building, Plan for Implementation
Applying Lessons Learned
Ongoing Implementation Support
### Basic vs Enhanced Go NAPSACC

#### Basic Go NAPSACC

**Basic Implementation**
- **Go NAPSACC orientation**
- Use of Go NAPSACC online tools
  - Complete 2 cycles of the 5-step process
  - 12 monthly check-ins with TA provider

#### Enhanced Go NAPSACC

**Enhanced Implementation**

**Phase 1**
- Identify implementation team
- Conduct needs assessment
- Review results, prioritize capacity needs
- Identify necessary adaptations

**Phase 2**
- Tailored workshop
  - General- and intervention-specific capacity building
  - Go NAPSACC orientation*
  - Plan for Go NAPSACC implementation

**Phase 3**
- Use Go NAPSACC online tools*
  - Complete 3 cycles of the 5-step process*
  - 12 monthly check-ins with TA provider*

**Phase 4**
- 2-3 meetings between Implementation Teams within the region
Research Questions and Design
Key Research Questions

1. Does Enhanced Go NAPSACC increase centers’ implementation of evidence-based practice more than Basic Go NAPSACC?

2. Does Enhanced Go NAPSACC improve centers’ adoption of Go NAPSACC use of its 5-step improvement process?

3. How do contextual factors at child care centers (and community) impact Go NAPSACC implementation?

4. What is the incremental cost effectiveness of Enhanced Go NAPSACC compared to Basic Go NAPSACC?

5. Does Enhanced Go NAPSACC improve children’s diet and physical activity behaviors more than Basic Go NAPSACC?
Study Design

- Type 2 hybrid effectiveness-implementation trial with a cluster-randomized design.
- Participants:
  - 18 Child Care Aware Coaches (TA consultants)
  - 97 Child Care Centers, 1 director and 1 teacher from each
  - 485 Children, about 5 per center, 3-4 years old, at two timepoints
- Coaches randomized following baseline data collection
  - 1:1 in either Basic Go NAPSACC or Enhanced Go NAPSACC
- Implement Basic or Enhanced Go NAPSACC for 12 months

Clinical Trials Registration #: NCT03938103
How to Evaluate Implementation

How do we identify and evaluate important implementation outcomes?

RE-AIM

- Adoption
- Implementation fidelity
- Maintenance
Implementation Outcomes

- Centers’ implementation of evidence-based nutrition and physical activity practices (assessed via EPAO instrument)
- Centers’ successful completion of key steps of Go NAPSACC participation (assessed via website use)
  0. Registration
  1. Self-assessment
  2. Setting goals and creating action plans
  3. Completing action plans
  4. Completing trainings
  5. Repeating the self-assessment

Implementation Outcomes (cont.)

- Coaches’ (TA consultant) successful delivery of key components of implementation approach—either Basic or Enhanced (assessed via TA Activity log on website)
- Centers’ directors/teachers and coaches’ perspectives of the implementation context (assessed via survey)
- Cost of implementation from the perspective of Child Care Aware, the agency responsible for providing TA consultants to child care in KY
Health Outcomes

- Children’s diet quality for meals and snacks eaten at child care
  - Measured by direct observation (pre COVID)
  - Calculated Diet Quality Index (DQI)
- Children’s physical activity at child care
  - Accelerometry
  - MVPA/hour
- Children’s BMI
  - Height and weight
  - Weight status
Designed an effective innovation ("the thing") built on D4DS principles

Developed a Type 2 hybrid effectiveness-implementation trial based on identified barriers

Used CFIR to target inner setting and individuals; used the Quality Implementation Framework to implement.

Results (implementation and health) being collected; available next year.
Research Team & Funding

- **PI:** Dianne S. Ward
- **Co-Investigators:** Alice Ammerman (UNC), Derek Hales (UNC), Courtney Luecking (KY), Justin Trogden (UNC)
- **Consultants:** Geoff Curran (University of Arkansas), Christina Studts (UCO-Denver)
- **Project Managers:** Regan Burney (UNC), Reginia Lewis (KY)
- **Community Partners:** Child Care Aware of Kentucky, Kentucky Department for Public Health

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- **CDC, U48DP005017** – UNC Center for Health Promotion and Disease Prevention
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Thank You

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Activity
Example to work through together

- **Setting:** Senior living facilities
- **The thing:** Multi-level (environment and resident) evidence based PA Intervention
  - PA program for residents: video on ways to increase PA throughout the day
  - Enhanced PA environment to promote PA throughout the day
- **D&I considerations**
  - Designing for Dissemination (D4D)
    - What are key questions to ask?
    - What outcomes are important to key partners?
  - How to understand context?
  - How to build strategy?
  - How to evaluate outcomes?
Resources
NIH D&I Funding Opportunities

General D&I resources

- **Washington University in St. Louis - Toolkits**
  - Intro to D&I, Formulating Aims, Understanding Barriers & Facilitators for Successful Implementation, Identifying Research Outcomes, + more
  - [https://implementationresearch.wustl.edu/support-your-research/toolkits/](https://implementationresearch.wustl.edu/support-your-research/toolkits/)

- **National Cancer Institute - Implementation Science Resources**
  - [https://cancercontrol.cancer.gov/is](https://cancercontrol.cancer.gov/is)
  - [https://cancercontrol.cancer.gov/is/tools/research-tools](https://cancercontrol.cancer.gov/is/tools/research-tools)

- **University of Washington - Implementation Science Resource Hub**
  - [https://impsciuw.org/](https://impsciuw.org/)

- **Training Institute for Dissemination and Implementation Research in Cancer (TIDIRC): OpenAccess**
  - [https://cancercontrol.cancer.gov/is/training-education/training-in-cancer/TIDIRC-open-access](https://cancercontrol.cancer.gov/is/training-education/training-in-cancer/TIDIRC-open-access)

- **Advancing Health Equity Through Implementation Science: Bibliography and Resources**
  - [https://consortiumforcanceris.org/files/Health_Equity_and_Implementation_Science_Bibliography_508.pdf](https://consortiumforcanceris.org/files/Health_Equity_and_Implementation_Science_Bibliography_508.pdf)

- **Resources for Stakeholder & Community Engagement**
Theories, Models, and Frameworks Resources

Explore D&I Models

You can search for D&I Models by entering a keyword or by selecting from the categories below.

<table>
<thead>
<tr>
<th>Model</th>
<th>D &amp;/or I</th>
<th>Socio-Ecological Levels</th>
<th>Field of Origin</th>
<th>Times Cited</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Model for Evidence-Based Practice</td>
<td>D/I</td>
<td>Individual Organization Community</td>
<td>Nursing</td>
<td>44</td>
</tr>
<tr>
<td>ACE Star Model of Knowledge Transformation</td>
<td>D/I</td>
<td>Individual Organization Community</td>
<td>Nursing</td>
<td>1870</td>
</tr>
<tr>
<td>Active Implementation Framework</td>
<td>I-Only</td>
<td>Individual Organization Community</td>
<td>Education</td>
<td>39</td>
</tr>
<tr>
<td>Adaptation in dissemination and implementation science</td>
<td>I-Only</td>
<td>Individual Organization Community System</td>
<td>Health Disparities</td>
<td>14</td>
</tr>
<tr>
<td>Advancing health disparities research within the health care system</td>
<td>D/I</td>
<td>Organization Community System</td>
<td>Health Disparities</td>
<td>1680</td>
</tr>
</tbody>
</table>

A few key tips to help you navigate the webtool:

A tutorial is available for each section of the webtool under the Tutorial section of the website.

In this webtool, the term ‘Model’ is used to refer to both theories and frameworks that enhance the dissemination and implementation of evidence-based interventions.
Theories, Models, and Frameworks Resources

Theory, Model, and Framework Comparison and Selection Tool (T-CaST)

What is the purpose of this tool?

Implementation researchers can use this tool to assess the utilization of one or more theory, model, or framework (TMF) in a particular project. More specifically, the tool can be used for:

- Considering the characteristics of TMFs most important for the project
- Presenting characteristics to stakeholders to identify their priorities
- Evaluating the ways in which one or more TMF meets the needs of the project
- Comparing potential TMFs to select the best fit for the project
- Identifying ways in which multiple TMFs can complement one another to address all important criteria
- Communicating to various stakeholders reasons why a TMF was selected
- Increasing transparency related to TMF selection and use in reporting (manuscripts, grants, etc.)

https://impsci.tracs.unc.edu/tcast/
Study designs for D&I science

- Videos
  - https://www.youtube.com/watch?v=Vn1npEkuhqw
  - https://www.youtube.com/watch?v=dvscLyHrd-k
- PRECIS-2 (next slide)
PRECIS – PRagmatic Explanatory Continuum Indicator Summary

Tool to help trialists designing clinical trials consider where they would like their trial to be on the pragmatic/explanatory continuum

https://www.precis-2.org/
Loudon et al. The PRECIS-2 tool: designing trials that are fit for purpose BMJ 2015; 350 :h2147
Implementation Research Logic Model

Fig. 2

From: The Implementation Research Logic Model: a method for planning, executing, reporting, and synthesizing implementation projects

Implementation Research Logic Model (IRLM) Standard Form with Intervention. Notes. Domain names in the determinants section were drawn from the Consolidated Framework for Implementation Research. The format of the outcomes column is from Proctor et al. 2011

Figure 1. Implementation Research Logic Model for the Healthy Weight Clinic pediatric weight Management Intervention. Superscript letters denote linkages between the determinants, strategies, mechanism, and outcomes. Superscript numbers denote the relative strength of the determinant based on the coding system of Damrosch and Lowry to gauge the relative strength of the determinant on the following scale: −2 (strong negative impact), −1 (weak negative impact), 0 (neutral or mixed influence), 1 (weak positive impact), and 2 (strong positive impact). Bold indicates primary outcomes.

Journals

Implementation Science Communications
https://implementationsciencecomms.biomedcentral.com/

Implementation Science
https://implementationscience.biomedcentral.com/

https://journals.sagepub.com/home/irp
Textbooks

- Dissemination and Implementation Research in Health: Translating Science to Practice
- Evaluating Improvement and Implementation for Health
- Knowledge Translation in Health Care: Moving from Evidence to Practice
Practice-Based Research

Additional examples of using research to make for better practice
Predictors of Non-Compliance with a National Early Care and Education-Based Obesity Prevention Initiative: Go NAPSACC

Erik A. Willis, PhD, MPH\textsuperscript{,1,2}, Xiuya Chang\textsuperscript{3}, Falon Smith, PhD\textsuperscript{1}, Emily Clarke, BS, RD, LDN\textsuperscript{1}, and Dianne S. Ward, PhD\textsuperscript{1,2}

- Database review from June 2014 to November 2020

- Purpose:
  - Examine predictors of not completing the 5-step process
  - Develop a risk stratification score

- 3,883 ECE programs
  - 2,909 programs to examine predictors
  - 974 programs for risk score validation
Predictors of Not Completing the 5-Steps Process

- Family Childcare Home
- On-CACFP Programs
- Multiple Modules Started
- No Action Plan Created
- Unsuccessful with Past Modules

Risk Score: 91% Accuracy

Willis et al. Am J Health Promot. 2022
Go NAPSACC data can drive stakeholder discussions

- Where do providers struggle?
- What goals are completed most often?
  - What makes these goals attractive to programs?
- What goals are least completed/selected?
  - What supports might encourage completion of other best practices?
- Are there system level challenges
- Where do TAs struggle?
  - How are ECE trainers and technical assistants supported around obesity content?
- Data from Go NAPSACC could support advocating for additional funds
Finding Ways to Make System Change
Go NAPSACC in the Spectrum of Opportunities

Framework for State-Level Obesity Prevention Efforts Targeting ECE Settings

In 2018, the Centers for Disease Control and Prevention proposed a framework for integrating childhood obesity prevention efforts into early care and education settings via state systems work. This graphic presents how Go NAPSACC, an evidence-based change process, has been part of that integration across all nine suggested opportunities within the framework.

- **Statewide Recognition & Intervention Programs**
  - Many states have integrated Go NAPSACC into a recognition or other intervention program. Examples include breastfeeding friendly certifications using the Go NAPSACC Breastfeeding & Infant Feeding Self-Assessment, and broader recognitions requiring work in multiple modules.

- **Statewide Technical Assistance Networks**
  - Participating states commonly use Go NAPSACC as a tool in statewide technical assistance networks. Examples of TA networks include child care resource and referral, family child care networks, university extensions, SNAP-Ed, non-profits, and child care health consultants.

- **Pre-service & Professional Development Systems**
  - Go NAPSACC trainings are eligible for clock/contact hours in most participating states. Additionally, one state has integrated Go NAPSACC trainings into their Formal Child Development Associate credential courses.

- **Quality Rating & Improvement System (QRIS)**
  - Several states link Go NAPSACC to QRIS systems in some way, with 3 states formally requiring nutrition and/or physical activity self-assessments and/or action plans to attain higher levels on QRIS.

- **ECE Funding Streams**
  - Child Care Block Grant quality improvement funds have supported the cost of the Go NAPSACC license in some states. Additionally, some states require ECE provider participation in QRIS, which by ripple effect can require Go NAPSACC implementation.

- **Child Care Food Program (CACFP)**
  - Go NAPSACC compliments CACFP work. Some CACFP sponsoring organizations have trained staff as Go NAPSACC consultants, using the resources to help child care programs reach higher nutrition standards. Others combine training on CACFP and Go NAPSACC in TA opportunities.

- **Licensing & Administrative Regulations**
  - Go NAPSACC best practices are aligned to licensing and administrative regulations in multiple states, with 4 states actively promoting Go NAPSACC as a resource to help meet health and nutrition licensing standards.

- **Early Learning Standards**
  - Many states have early learning standard domains related to health and development. Go NAPSACC trainings and resources can help child care providers meet these early learning standards.

- **Statewide Access Initiatives (FARM2ECE)**
  - 15 states have used Go NAPSACC specifically in a Farm to ECE initiatives. The Go NAPSACC Farm to ECE self-assessment, resource library, and trainings help enhance and evaluate Farm to ECE work.

Using Go NAPSACC Aggregate Data

- Data were obtained from the Go NAPSACC web-based platform.
- Data were collected and maintained at UNC.
- State administrators and individual ECE programs self-reported through the online system.
- State administrators provided information on key Go NAPSACC implementation factors.

On average, states use 2 (range 1 to 4) technical assistance systems.
Additional Research on Role of Staff Training
Outdoor Play & Learning

Topics:
Outdoor Playtime
Outdoor Play Environment
Policy
Training Development and Dissemination

The goal of this project was to:

1. **develop** a library of trainings embedded within the Go NAPSACC website
2. **disseminate** those trainings widely throughout participating states
3. **assess** uptake in participating states over their first year of use

**Data sources**
- GNS database
- State level survey
  - 20 of 21 states reported on training dissemination

*Clarke et al. Nutr Educ Behav. (in press)*
State Level Dissemination: Barriers and Solutions

Having trainings approved for professional development credit (85% of states) was an important motivator for training completion.

Barriers to training approval:
1. Lack of technological capacity to integrate into state training registry
2. States prohibiting on-demand trainings
3. Length of trainings are too short

Strategies used to overcome barriers:
1. Partnering with Go NAPSACC to develop system linking trainings to state registries
2. Having consultants facilitate trainings
3. Bundle shorter trainings into packages for approval

Clarke et al. Nutr Educ Behav. (in press)
Go NAPSACC On-Demand Training Library

Evaluation results by participants
- > 93% trainings were easy to follow
- > 89% trainings were engaging
- > 93% able to apply what they learned

On-demand training were an effective strategy for engaging
- Family child care home
- Rural ECEs
- Urban ECEs

More intentional promotion may be needed to reach non-CACFP ECEs

Clarke et al. Nutr Educ Behav. (in press)