The Basics of Implementation Science

Nederlands Implementatie Collectief
Week van de Implementatie 2023

Bethany Hipple Walters
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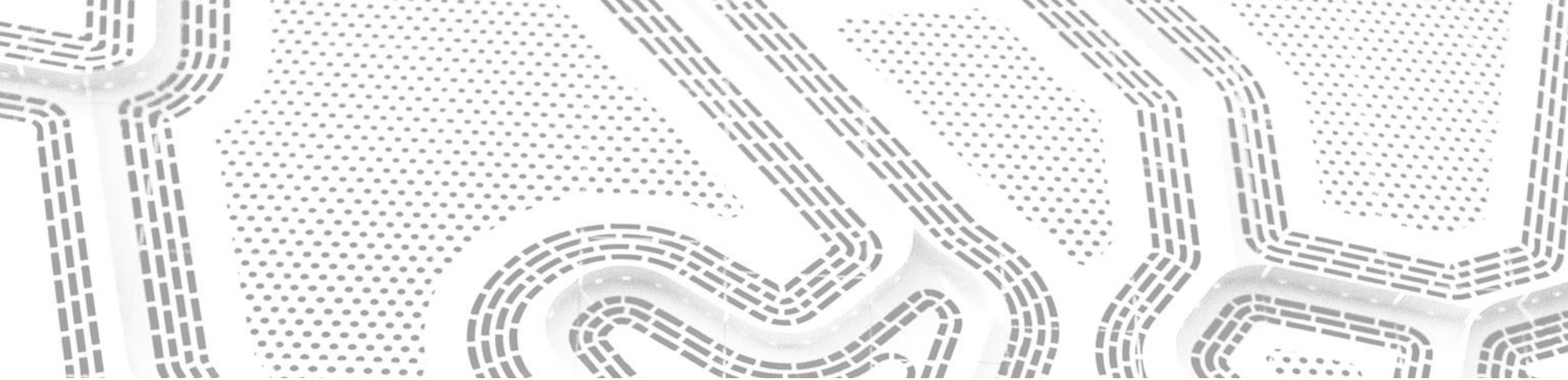

May we record this session?

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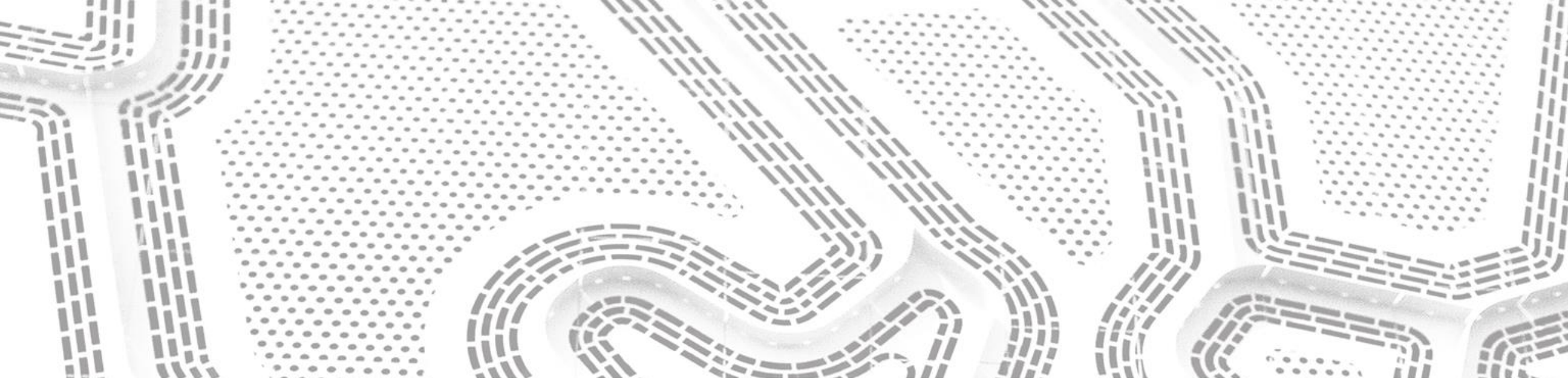

What do you hope to learn today?

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Agenda

- Introduction to Nederlands Implementatie Collectief
- Introduction to the speaker
- Implementing evidence-based practices
- Researching the implementation of evidence-based practices

Nederlands Implementatie Collectief

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Nederlands Implementatie Collectief/ Netherlands Implementation Collaborative

The Netherlands Implementation Collaborative (NIC) is a professional network for implementation scientists and implementation specialists in the Netherlands. By sharing knowledge about how professionals can effectively implement and evaluate evidence-based programs, policies, and guidelines, NIC hopes to improve the health, well-being, and welfare of people in the Netherlands.

NIC website

International – nederlandsimplementatiecollectief.nl

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Introduction to today's speaker

- Education
  - PhD from Erasmus University
  - MPH from Columbia University
  - BA from University of Massachusetts
- Career
  - Director of the Centre for Implementation at the Trimbos Institute
  - Project Director and Researcher at Massachusetts General Hospital – CEASE
  - Adjunct instructor at Webster University Leiden
- Research specializations
  - Implementation research
  - Practice-based health services research
  - Qualitative research
- Areas of research
  - Tobacco control in healthcare practices
  - Chronic disease programs in primary care
  - Mental healthcare systems reform

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Centre for Implementation at Trimbos

- Knowledge center for implementation and implementation research for programs, policies, and innovations related to mental health, alcohol (mis)use, drug (mis)use, and tobacco use
  - Research support
  - Training
    - Implementation strategies
    - Implementation science models and research methods
    - Research design
  - NIC partner

[Implementatie van onderzoek - Trimbos-instituut]

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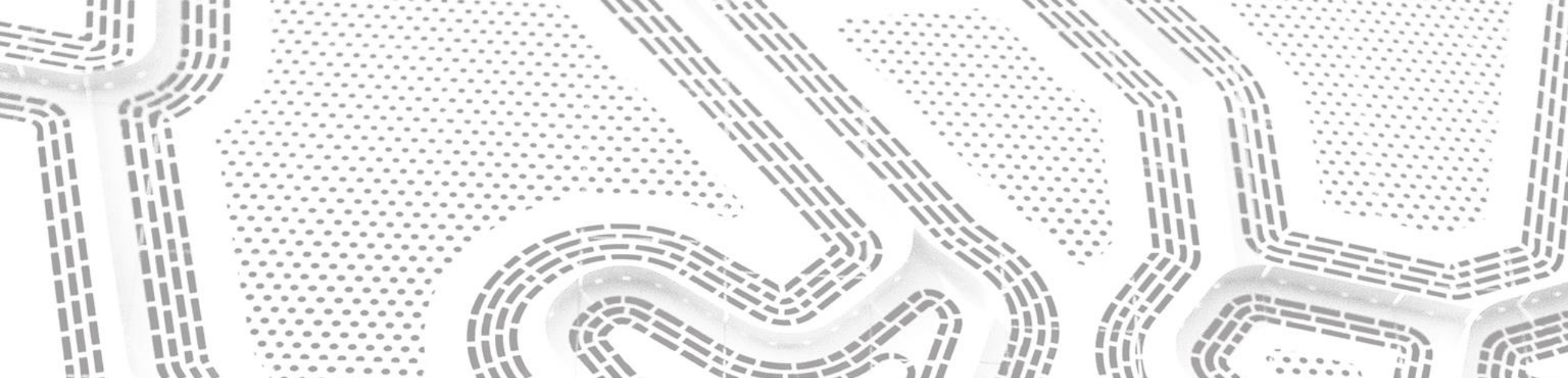

Key concepts in implementation science

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Key concepts

- Implementation science
- Implementation
- Evidence-based programs
- Researching implementation
  - Implementation science frameworks and models

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Implementation science

- Implementation science is “the scientific study of methods to promote the systematic uptake of research findings and other evidence-based practices into routine practice, and, hence, to improve the quality and effectiveness of health services”. (Eccles et at, 2006)
- Implementation science is
  - Multidisciplinary *and* interdisciplinary
  - Not one set of methods or techniques, but rather a way of exploring and analyzing implementation

References
Eccles, M.P., Mittman, B.S. Welcome to Implementation Science. *Implementation Science* 1, 1 (2006)

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Implementation

- Defined as “the process of putting to use or integrating evidence-based interventions” into a practice (Rabin et al, 2008)
  - Practices are often but not always or only health care delivery settings
- Hopefully done in a planned manner with feedback and insight from local stakeholders, tailored to meet the needs of the setting, with support and training provided, and evaluation conducted
  - Guided by an (evolving) implementation strategy

Reference
Rabin, B.A. et al. "A glossary for dissemination and implementation research in health." *Journal of Public Health Management and Practice* 14.2 (2008): 117-123.

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Evidence-based practices in health care

- Interventions shown, through research, to be effective
  - Efficacy and effectiveness studies
- Interventions can include
  - Internal or external programs
  - Clinical decision-making systems
  - Medications and therapies
  - E-health tools
  - Policies
  - Guidelines and practice standards

References

McKibbon, K A. “Evidence-based practice.” *Bulletin of the Medical Library Association* vol. 86,3 (1998): 396-401.

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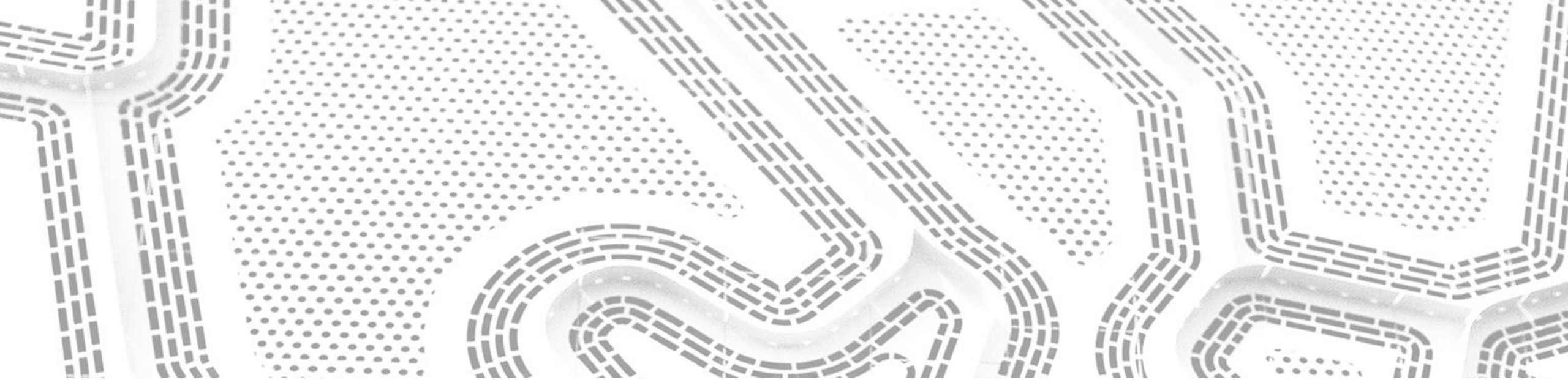

Implementation

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Implementing interventions

- Hopefully done in a planned manner with feedback and insight from local stakeholders, tailored to meet the needs of the setting, with support and training provided, and evaluation or research conducted
  - Implementation teams
    - Implementation specialists
    - Local stakeholders
    - Intervention experts
    - Evaluators or researchers

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Who guides implementation?

- Implementation specialists
  - *professionals who support organizations, leaders, and staff in their implementation of evidence-informed practices and policies. They identify, contextualize, and improve the use of evidenced-informed implementation strategies in a range of settings.*
  - *They also build implementation capacity among teams, organizations, and systems.*

Reference
Metz, A., Louison, L., Burke, K., Albers, B., & Ward, C. (2020). Implementation support practitioner profile: Guiding principles and core competencies for implementation practice. Chapel Hill, NC: National Implementation Research Network, University of North Carolina at Chapel Hill.

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Implementation strategies

- Implementation strategies are the *"methods or techniques used to enhance the adoption, implementation, and sustainability of a clinical program or practice"*
- Described in the implementation strategy document or plan
  - Step-by-step guide to making changes in practices

Reference
Proctor, E.K. et al. "Implementation Strategies: Recommendations for Specifying and Reporting." *Implementation Science : IS* 8 (2013): 139.

ZonMw has a great tool for developing an implementation plan!

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The implementation strategy document

- Developed with all stakeholders, but often spearheaded by the implementation specialist
- Informed by the intervention and the research question
- Strategy document often includes:
  - Description of the goal of the program and of implementation
  - Capacity building plan - tools and training needed for implementation
  - Information about the setting and context
  - Overview of key stakeholders and target population
  - Description of the plan for implementation support
  - Timeline
  - Budget

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Implementation support

- Use stand-alone tools, videos, and fact-sheets
  - Easy-to-share with little explanation
- Use Motivational Interviewing and messaging
  - During development, implementation, evaluation, and sustaining
- Build tailoring, evaluation, and sustainability into the program
  - Collect *all* the evaluation data that you may need for this project and for grant writing

Implementation guides

- One page sheet, completed by the project site, that lays out the framework of implementation
  - Goals
  - Training
  - Staff responsibilities
    - Primary and secondary
  - Timing
  - Additional resources
- Review and complete during training

An implementation guide shows how the intervention is actually done.

CEASE Implementation Guide

Three Easy Steps

What	When	Who	How
Step 1 **ASK** Does any member of your household use tobacco? Use: • iPad Intake Survey	Distribute iPad Intake Survey at front desk	Front office staff: _____ _____ _____ _____ _____ _____	• At every visit, give each parent the iPad to screen for tobacco use. ○ Parent answers survey and iPad prompts distribution of the Fax-to-Quit form and CEASE Action Sheet to parent. ○ Parent fills out Fax-to-Quit form and returns it to the front desk. ○ Parent brings CEASE Action Sheet to exam room.
Step 2 **ASSIST** in helping smokers quit and establishing a completely smoke-free home and car. Use: • CEASE Action Sheet • Prescriptions	During the exam	Physician, nurse, or health educator: _____ _____ _____ _____ _____ _____	• Use the responses on Step 1 of the CEASE Action Sheet to guide how you will assist in addressing tobacco use in Step 2. ○ Assist families with setting a smoke-free home and car rule and document these rules in the electronic medical record. ○ Complete the pre-printed prescriptions on the bottom of the CEASE Action Sheet and give them to those who use tobacco. ○ Assist tobacco users with setting a quit date and document the date in the electronic medical record.
Step 3 **REFER** those who smoke to the quitline and free text messaging program (SmokefreeTXT). Make a follow-up plan. Use: • Fax-to-Quit form • CEASE Action Sheet	At the front desk During the exam	Front office staff, physician or nurse: _____ _____ _____ _____	• Completed Fax-to-Quit forms should be faxed to the quitline. • Refer tobacco users to SmokefreeTXT as listed on the CEASE Action Sheet. • Arrange follow-up with tobacco users. • Document referrals in the electronic medical record.

Available at www.ceasetobacco.org

Preparing for implementation

National Implementation Research Network
https://nirn.fpg.unc.edu/module-3/topic-3/function-1

Understanding the context

- Collaborate with partners at the practices to understand the need for the intervention, how the intervention might need to be tailored, what capacity building is needed, who the key stakeholders and champions might be, and establish ways of working with the practices
- Use the RE-AIM Planning Tool or other tools to gather information on the context
- Desk research to gather information about the population served by the context

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Capacity building

- Training and support for relevant parties in both the intervention **and** in implementing the intervention
  - Tailored to the setting and needs
  - Multiple forms of training
    - Online, phone, in-person, email, training manuals
  - Support at many time points
    - Address barriers and changes
    - Motivational messaging
  - Different trainers for different aspects
  - Can be evaluated as independently or as part of a larger research plan

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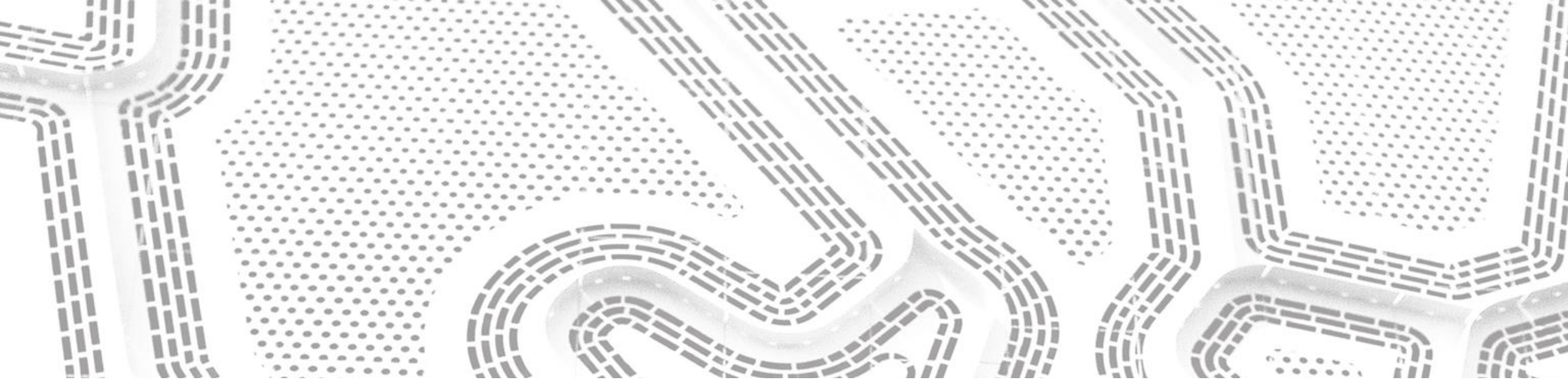

A recipe for implementation

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LEARN HOW AMERICAN SANDWICH BREAD

This classic sandwich bread is among the simplest and fastest yeast breads you can make. The milk and butter add richness, while the honey adds a touch of welcome sweetness. Simple steps and two risings deliver bread in 2 hours (plus cooling time). If you don't have a stand mixer, you can mix and knead the bread dough by hand; see pages 590–91.

1. WEIGH THE FLOUR: Measure out 3½ cups bread flour using a scale.
WHY? Because the ratio of flour to liquids is critical, weighing your flour is advisable because it is more accurate. We use bread flour rather than all-purpose flour because it is higher in protein; the higher the protein, the more gluten in the dough, which produces a taller, sturdier loaf.

2. MAKE SURE THE WATER AND MILK ARE 110 DEGREES: Before combining all the wet ingredients, make sure that the milk and water are the right temperature.
WHY? If the liquids are too hot (130 degrees or more), they will kill the yeast; if too cool the yeast won't activate and the bread won't rise. We use instant yeast because it can be added without needing to proof it ahead of time.

3. KNEAD THE DOUGH: Combine the dry ingredients in a stand mixer fitted with a dough hook, and then slowly add the milk mixture until the dough comes together. Increase the speed to medium and knead until the dough is smooth.
WHY? Kneading develops gluten, which is crucial to the texture of the bread. We prefer to use a stand mixer because it is easier.

4. LET THE DOUGH RISE: Turn the dough out onto a floured counter and knead it briefly to form a round, smooth ball. Place the dough in a greased bowl, cover with greased plastic wrap, and let it rise until doubled in size, about 40 minutes.
WHY? After kneading, the dough needs to rest, relax, and rise. During this stage the yeast causes the dough to rise and fosters flavor development.

5. SHAPE THE LOAF: Press the dough into a rectangle about 1 inch thick. With the long side facing you, roll the dough into a firm cylinder. Pinch the seam closed and place the dough seam side down in a greased loaf pan. Press the dough so it touches all four sides of the pan.
WHY? Rolling the dough into a cylinder builds structure and makes a nice, tall loaf.

6. LET THE LOAF RISE: Cover the loaf pan with plastic and let the dough rise until doubled in size, 20 to 30 minutes.
WHY? This second rise, called proofing, allows the dough to regain some airiness lost during shaping, and the gluten to relax. To test if the dough is properly proofed, press on it gently with your fingertip: it should leave an indentation that slowly fills in.

7. HEAT A BAKING STONE AND CREATE A STEAMY ENVIRONMENT: Place a baking stone on the lowest oven rack and put a loaf pan on the stone. Heat the oven to 350 degrees. Pour boiling water into the hot loaf pan.
WHY? A steamy oven prevents the crust from setting and allows the maximum rise when the bread enters the oven. A baking stone ensures a well-browned bottom crust.

8. BAKE THE LOAF AND CHECK FOR DONENESS: Place the loaf pan on the baking stone and bake until the bread is golden brown and registers 195 degrees, 40 to 50 minutes, rotating the pan halfway through baking.
WHY? The use of an instant-read thermometer is recommended, but you should also follow the visual cues, as temperature alone doesn't always signify a perfectly baked loaf.

AMERICA'S TEST KITCHEN

American Sandwich Bread

MAKES 1 LOAF **TOTAL TIME** 2 HOURS
(PLUS 2 HOURS COOLING TIME)

WHY THIS RECIPE WORKS: Many people who might enjoy making terrific sandwich bread at home don't even try it because they think it takes most of a day. We wanted a good, solid sandwich bread recipe that could be prepared in 2 hours, start to finish, including baking time. We found that sandwich bread improved markedly when kneaded with a stand mixer. This method helped us resist the temptation to add extra flour in an effort to tame the sticky bread dough, as more flour tends to make the dough denser and less flavorful; it also makes it rise less. We were also surprised to find that we preferred instant yeast to active dry yeast for our sandwich bread recipe. Not only did it greatly reduce rising times, but it also made for better-tasting bread. If you don't have a stand mixer, you can mix and knead the bread dough by hand; see pages 590–91. If you don't have a baking stone, bake the bread on an overturned and preheated rimmed baking sheet.

1 cup whole milk, heated to 110 degrees
⅓ cup warm water (110 degrees)
3 tablespoons honey
2 tablespoons unsalted butter, melted
3½ cups (19¼ ounces) bread flour
2¼ teaspoons instant or rapid-rise yeast
2 teaspoons salt

1. Whisk milk, water, honey, and butter together in 4-cup liquid measuring cup. Using stand mixer fitted with dough hook, combine flour, yeast, and salt on low speed. Slowly add milk mixture and let dough come together, about 2 minutes. Increase speed to medium and knead until dough is smooth and slightly tacky, about 10 minutes.

2. Transfer dough to lightly floured counter and knead by hand to form smooth, round ball, about 15 seconds. Place dough in large, lightly greased bowl, cover tightly with greased plastic wrap, and let rise until doubled in size, 40 to 50 minutes.

3. Grease 9 by 5-inch loaf pan. Transfer dough to lightly floured counter and press into rectangle about 1 inch thick and no longer than 9 inches, with long side facing you. Roll dough toward you into firm cylinder, keeping roll taut by tucking it under itself as you go. Pinch seam closed and place seam side down in prepared pan, pressing gently into corners. Cover with plastic and let rise until nearly doubled in size, 20 to 30 minutes.

Even beginning bakers can make our sandwich bread, which takes only 2 hours from start to finish.

4. One hour before baking, place baking stone on lowest rack and place empty loaf pan (or other heatproof pan) on stone. Heat oven to 350 degrees. Bring 2 cups water to boil. Working quickly, pour boiling water into hot pan and place pan with loaf on baking stone. Bake until loaf is golden brown and registers 195 degrees, 40 to 50 minutes, rotating pan halfway through baking.

5. Let bread cool in pan for 5 minutes, then transfer to wire rack and let cool to room temperature, about 2 hours, before serving.

VARIATIONS

Wheat Sandwich Bread

For extra wheat flavor, we add toasted wheat germ to the dough.

Toast ¼ cup wheat germ in dry skillet until fragrant, about 5 minutes. Reduce amount of bread flour to 2 cups and combine with 1¼ cups whole-wheat flour and toasted wheat germ.

Oatmeal-Raisin Sandwich Bread

Omit warm water from milk mixture. Bring ¾ cup water to boil in small saucepan. Stir in ¾ cup old-fashioned rolled oats or quick oats (do not use instant oats) and cook until

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An evidence-based 'program':
Tested before implemented in your local setting

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med baking sheet.

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utter together in 4-cup

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The protocol for the 'program':

- Background about the program
- Training in the program
- A description of the resources, tools, and time needed to do the program
- Program-specific instructions
- Acceptable variations

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3. KNEAD THE DOUGH: Combine the dry ingredients in a stand mixer fitted with a dough hook, and then slowly add the milk mixture until the dough comes together. Increase the speed to medium and knead until the dough is smooth. **WHY?** Kneading develops gluten, which is crucial to the texture of the bread. We prefer to use a stand mixer because it is easier.

4. LET THE DOUGH RI the dough out onto a floured counter and knead it briefly to form a round, smooth ball. Place the dough in a greased bowl, cover with greased plastic wrap, and let it rise until doubled in size, about 40 minutes. **WHY?** After kneading, the dough needs to rest, relax, and rise. During this stage the yeast causes the dough to rise and fosters flavor development.

5. SHAPE THE LOAF: Press the dough into a rectangle about 1 inch thick. With the long side facing you, roll the dough into a firm cylinder. Pinch the seam closed and place the dough seam side down in a greased loaf pan. Press the dough so it touches all four sides of the pan. **WHY?** Rolling the dough into a cylinder builds structure and makes a nice, tall loaf.

6. LET THE LOAF RISE: Cover the loaf pan with plastic and let the dough rise until doubled in size, 20 to 30 minutes. **WHY?** This second rise, called proofing, allows the dough to regain some airiness lost during shaping, and the gluten to relax. To test if the dough is properly proofed, press on it gently with your fingertip: it should leave an indentation that slowly fills in.

7. HEAT A BAKING STONE AND CREATE A STEAMY ENVIRONMENT: Place a baking stone on the lowest oven rack and put a loaf pan on the stone. Heat the oven to 350 degrees. Pour boiling water into the hot loaf pan. **WHY?** A steamy oven prevents the crust from setting and allows the maximum rise when the bread enters the oven. A baking stone ensures a well-browned bottom crust.

8. BAKE THE LOAF AND CHECK FOR DONENESS: Place the loaf pan on the baking stone and bake until the bread is golden brown and registers 195 degrees, 40 to 50 minutes, rotating the pan halfway through baking. **WHY?** The use of an instant-read thermometer is recommended, but you should also follow the visual cues, as temperature alone doesn't always signify a perfectly baked loaf.

The implementation strategy for the 'program':

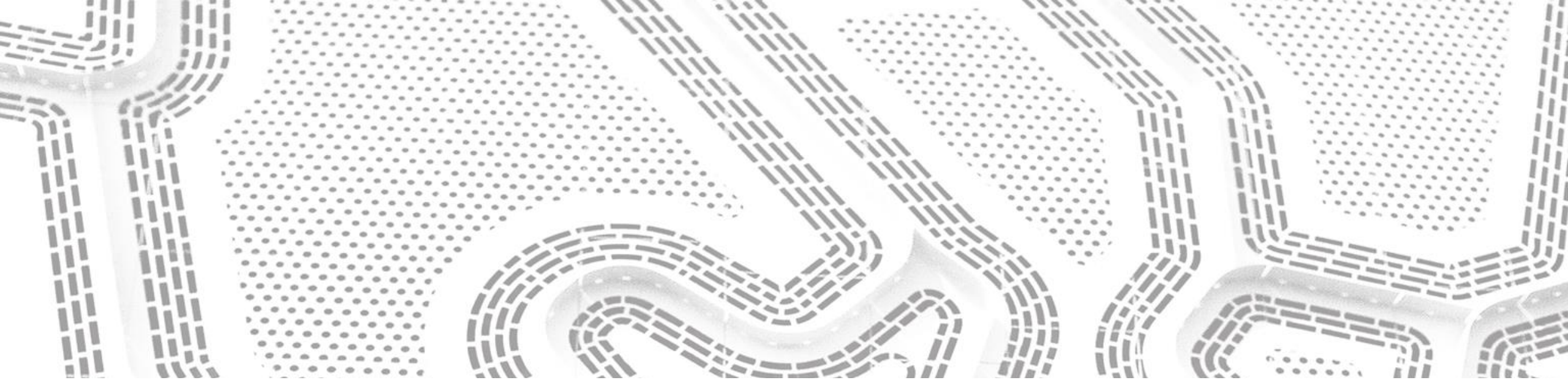
- Step-by-step guidance on how to make the 'program' work in your setting
- Advice on how to tailor to your setting
- Guidance on how to know if you've successfully implemented the program

tucking it under itself as you go. Pinch seam closed and place seam side down in prepared pan, pressing gently into corners. Cover with plastic and let rise until nearly doubled in size, 20 to 30 minutes.

bine with 1¼ cups whole-wheat flour and toasted wheat germ.

Oatmeal-Raisin Sandwich Bread

Omit warm water from milk mixture. Bring ¾ cup water to boil in small saucepan. Stir in ¾ cup old-fashioned rolled oats or quick oats (do not use instant oats) and cook until



Researching implementation

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Implementation science

- Implementation science studies explore and evaluate the implementation of evidence-based interventions into routine practice in real-world settings

- Implementation science studies are often
  - Pragmatic – real-word settings, real-world problems, and real-world solutions
  - Collaborative – conducted by multidisciplinary study teams
  - Guided – research is often guided by a model or framework
  - Extensive – aimed at comprehensively exploring implementation over time

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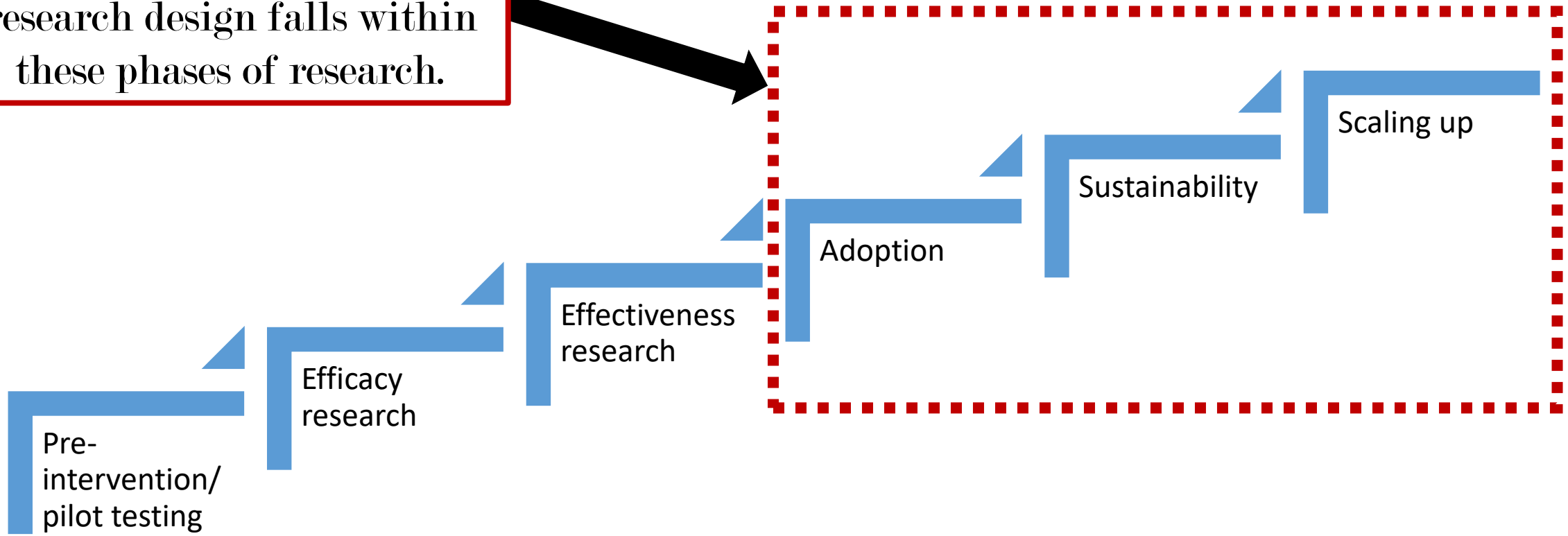
Most implementation research design falls within these phases of research.



Source: National Research Council and Institute of Medicine, 2009

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Implementation science studies

- Implementation science research can be part of hybrid effectiveness/implementation studies
- Pragmatic, real-world studies
  - With all the messiness of the real world
- Often longer studies
  - Research on sustaining an intervention often has data collection at 6, 12, and 18 months
- Implementation science studies can be intensive
  - Lots of data from multiple sources
  - Deep data

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Implementation science methods

- Multiple data collection methods can be used to explore implementation research questions
  - Mixed methods and qualitative methods are common
- Multiple populations can be studied
  - Patients
  - Providers
  - Managers and administrators
- Methods selected and used depend on the research question, implementation framework, and resources available

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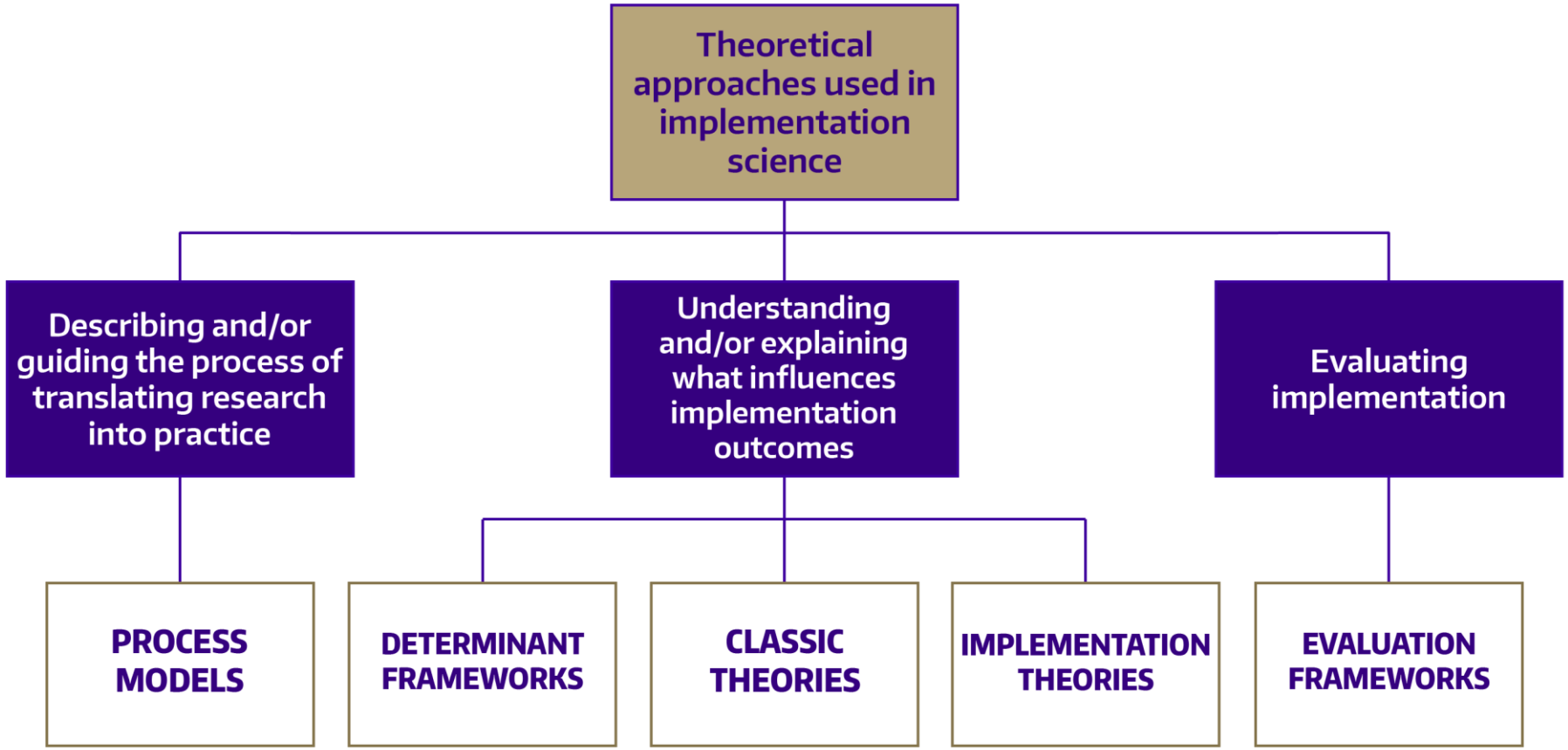
Theories in implementation science



Adapted from:
Nilsen P. Making sense of implementation theories, models and frameworks. *Implement Sci.* 2015;10(1):1-13.

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Select an implementation science framework

- When selecting a framework to guide your research, review and reflect on:
  - the structure of your study
  - the aim of your research project
  - *the purpose of the framework (describing/guiding the implementation process, analyzing what influences outcomes [barriers and facilitators], or evaluating the implementation effort)*
  - *the level(s) included within the framework (e.g., provider, organization, system)*
  - *the degree of inclusion and depth of analysis or operationalization of implementation concepts (process, determinants [barriers and facilitators], strategies, evaluation)*
  - *the framework's orientation, which includes the setting and type of intervention (i.e., EBP generally, a specific intervention, a guideline, a public health program being implemented) for which the framework was originally designed*

Reference
Moullin, J.C. et al "Ten recommendations for using implementation frameworks in research and practice." *Implementation Science Communications* 1 (2020): 1-12.

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Process models to research implementation

- Process models are used to gain in-depth understanding of the process of translating an evidence-based intervention into a practice setting
  - Data collected on:
    - All steps taken to implement the intervention
    - Changes or variations from how implementation was originally planned to happen
    - Who was involved in implementation when

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Practical, Robust Implementation and Sustainability Model (PRISM)

- PRISM explores "how the health care program or intervention interacts with the recipients to influence program adoption, implementation, maintenance, reach, and effectiveness"
- Constructs and perspectives include:
  - Intervention
    - Organizational perspective
    - Patient perspective
  - Implementation and sustainability infrastructure
  - Recipients
    - Organizational characteristics
    - Patient characteristics
  - External environment
  - RE-AIM evaluation tools and methods

Reference
Feldstein, A. C., & Glasgow, R. E. (2008). A practical, robust implementation and sustainability model (PRISM) for integrating research findings into practice. *The Joint Commission Journal on Quality and Patient Safety*, *34*(4), 228-243

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Influences on the design of PRISM

- Chronic Care Model
  - *supports the need to leverage support from the community, health system leadership, delivery system design, clinical information and clinician decision systems, and patient self-management to maximize outcomes*
- Model for Improvement
  - *focuses on evidence, context, and facilitation*
- RE-AIM framework
  - RE-AIM outcome measures and evaluation tools

Reference
Feldstein, A. C., & Glasgow, R. E. (2008). A practical, robust implementation and sustainability model (PRISM) for integrating research findings into practice. *The Joint Commission Journal on Quality and Patient Safety*, *34*(4), 228-243

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Use of PRISM

- Developing and tailoring programs, based on the organizational perspective and the patient perspective
- Supporting implementation of the program with and for the recipients while keeping external influencing factors in mind
- Evaluation, using the RE-AIM tools

- PRISM is often used as a framework for health information systems, technology programs, digital health data initiatives, monitoring systems, and data-informed decision-making

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Factors models to research implementation

- Determinant or factors-based approaches are used to gather data on factors that can influence the implementation of an intervention
  - Inside and outside of the practice
  - Related to the contents of the program
  - Target population
  - Structure of the practice
  - Characteristics of implementers
  - Tools used for implementation

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CFIR

"The CFIR provides a menu of constructs that can be used in a range of applications – as a practical guide for systematically assessing potential barriers and facilitators in preparation for implementing an innovation, to providing theory-based constructs for developing context-specific logic models or generalizable middle-range theories." CFIR website

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CFIR constructs

- Intervention Characteristics
- Outer Setting
- Inner Setting
- Characteristics of Individuals
- Process

Each construct has several sub-constructs.

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CFIR tools

- Evaluation design and data collection tools
  - Qualitative Data
    - Observation template
    - Interview guide
      - Can be tailored to your project
      - Can select the constructs most relevant to your desired outcome
  - Quantitative Data
    - No complete set
    - A few constructs have measures – see the CFIR website

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Evaluation models to research implementation

- Evaluation approaches are used to evaluate the outcomes of implementing the program
  - Reach
  - Short and long-term impact
  - Feasibility
  - Acceptability
  - Sustainability

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RE-AIM

"The goal of RE-AIM is to encourage program planners, evaluators, readers of journal articles, funders, and policy-makers to pay more attention to essential program elements including external validity that can improve the sustainable adoption and implementation of effective, generalizable, evidence-based interventions."
RE-AIM website

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RE-AIM tools

- RE-AIM Planning Tool
- Dissemination Planning Tool
- Checklist for Study or Intervention Planning
- Questions to Ask about RE-AIM Dimensions When Evaluating Health Promotion Programs and Policies

RE-AIM website

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RE-AIM

Reach the target population

Effectiveness or efficacy

Adoption by target staff, settings, or institutions

Implementation consistency, costs and adaptions made during delivery

Maintenance of intervention effects in individuals and settings over time

RE-AIM website

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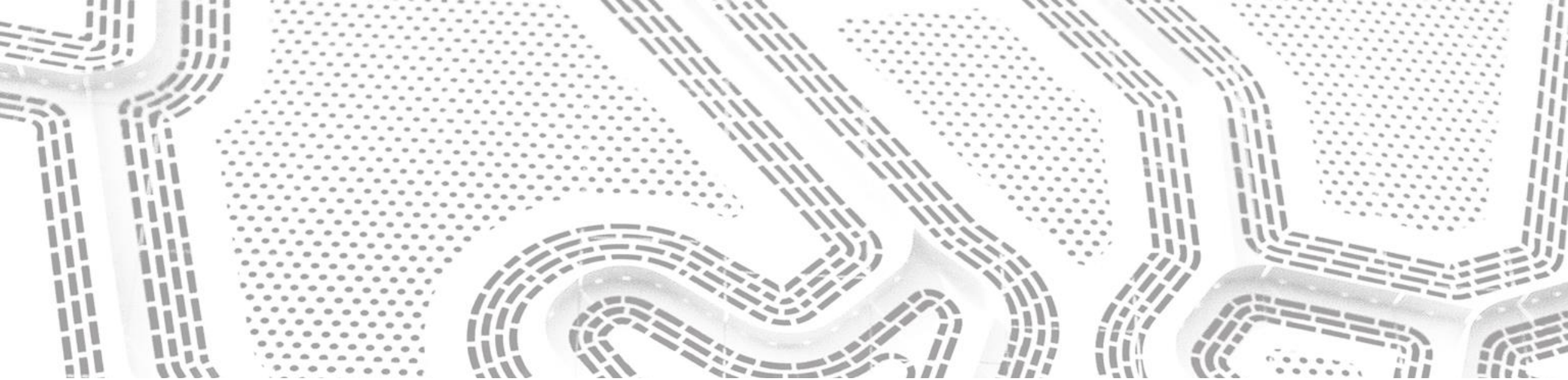

Implementation framework selection

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Compare frameworks head-to-head

http://www.dissemination-implementation.org/select.aspx

This interactive website was designed to help researchers and practitioners to select the D&I Model that best fits their research question or practice problem, adapt the model to the study or practice context, fully integrate the model into the research or practice process, and find existing measurement instruments for the model constructs.

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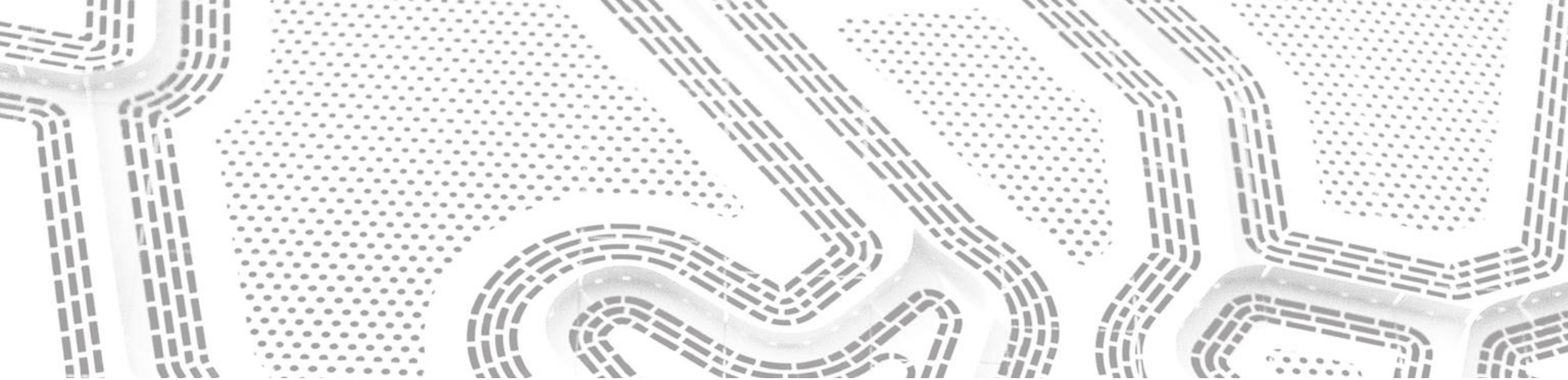

Questions? Comments? Ideas?

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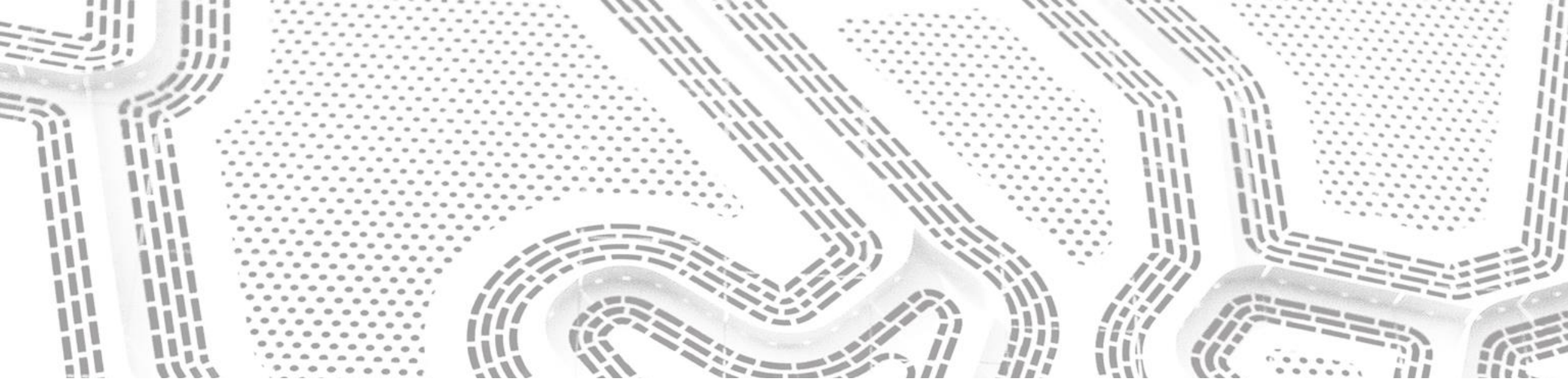

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