

# Innovative Research Methods to Achieve Precision Home Visiting

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# Objectives

- Quick overview of precision home visiting
- What are precision home visiting research questions?
- How do we play matchmaker pairing precision home visiting research questions with study designs?

# What is precision home visiting?

## Simplified definition:

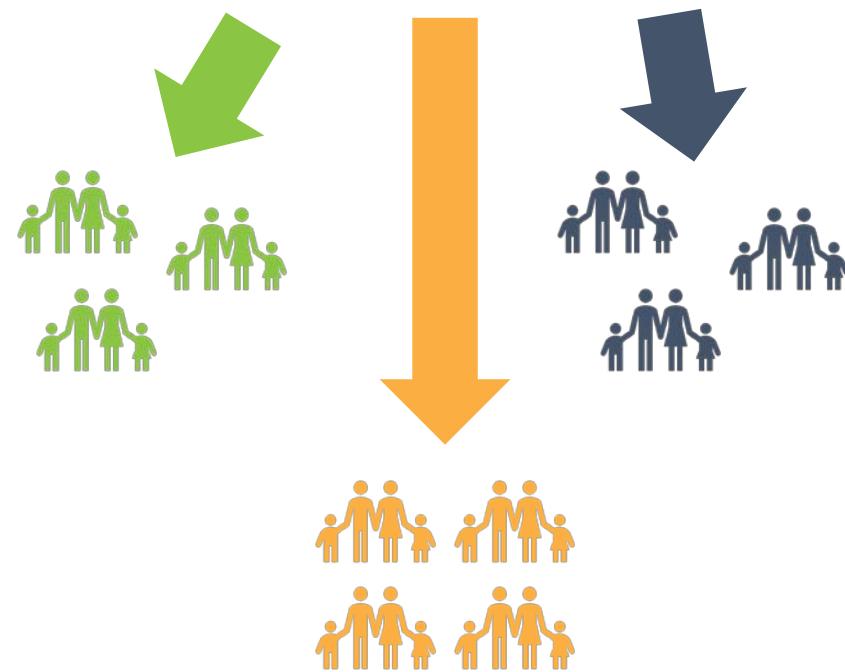
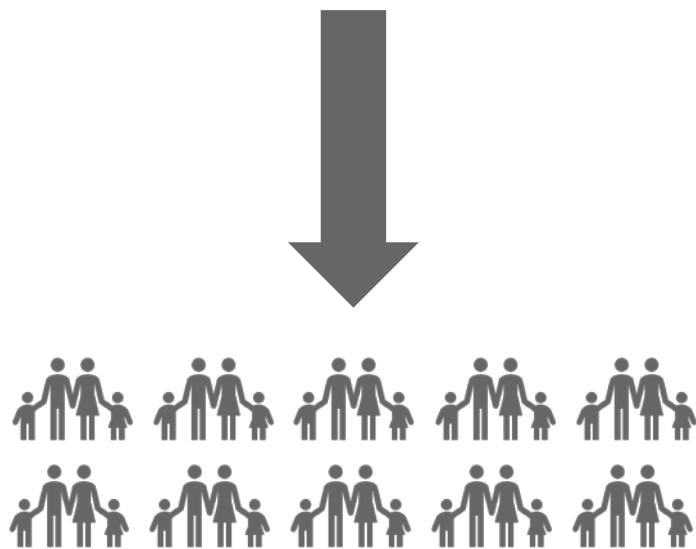


- Differentiates what works and for whom
- Focuses on active ingredients
- Examines meaningful subgroups
- Tests how we get from active ingredients to outcomes

# What is precision home visiting practice?

Services for the  
“average family”

What works for  
whom?



# Precision home visiting and interventions

Precision home visiting research aims to address key questions about interventions:

- **What ingredients are 'active' for particular families to achieve select outcomes?**
- **What works best?**
- **For whom does it work?**
- **Under what conditions do things work?**
- **What are the pathways between the active ingredients and the outcome (direct, indirect)?**

# HARC workshops: Quick overview

- Precision and Coherence
- Partnerships
- Rapid Cycle Evaluation

# Precision Home Visiting Research

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# Four hallmarks of precision home visiting guidelines

## Focus on active ingredients

Focus on what providers should *do* in working with families and one another.

## Form broad-based partnerships

Shorten the cycle from idea to scale-up by assuring feasibility and relevance.

## Define & measure explicitly

Measure ingredients, mediators and moderators of theories of change.

## Test efficiently

Shorten the cycle by using efficient designs and analytic methods.

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# Reflections on PHV

What do these hallmarks  
mean for the models?



# Active ingredients

- The elements of an intervention empirically proven to be responsible for driving changes in parent knowledge, attitudes, and behaviors.
- No active ingredient = no change in outcome



# Precision home visiting research continuum



## Theorized

### Active Ingredients

- Theoretically justified
- Supported by past research, not explicitly tested
- Informed by stakeholders

## Evidence Informed

### Active Ingredients

- Empirically established associations with outcomes
- Causal links not yet established

## Evidence-based

### Active Ingredients

- Empirically tested by design
- Impacts of the active ingredient isolated

# Active ingredients

- Focus on **active ingredients** to support scale-up of effective practices:
  - Conduct research to identify the elements of programs that work best for certain families in certain contexts
  - Highlight ingredients that can be adopted across relevant models to hasten the scale-up of what works

# Explicit definitions

- **Explicit definition and measurement of:**
  - Ingredients
  - Outcomes
  - Possible mediators and moderators of impacts

# Reflections on PHV: Explicit Definitions

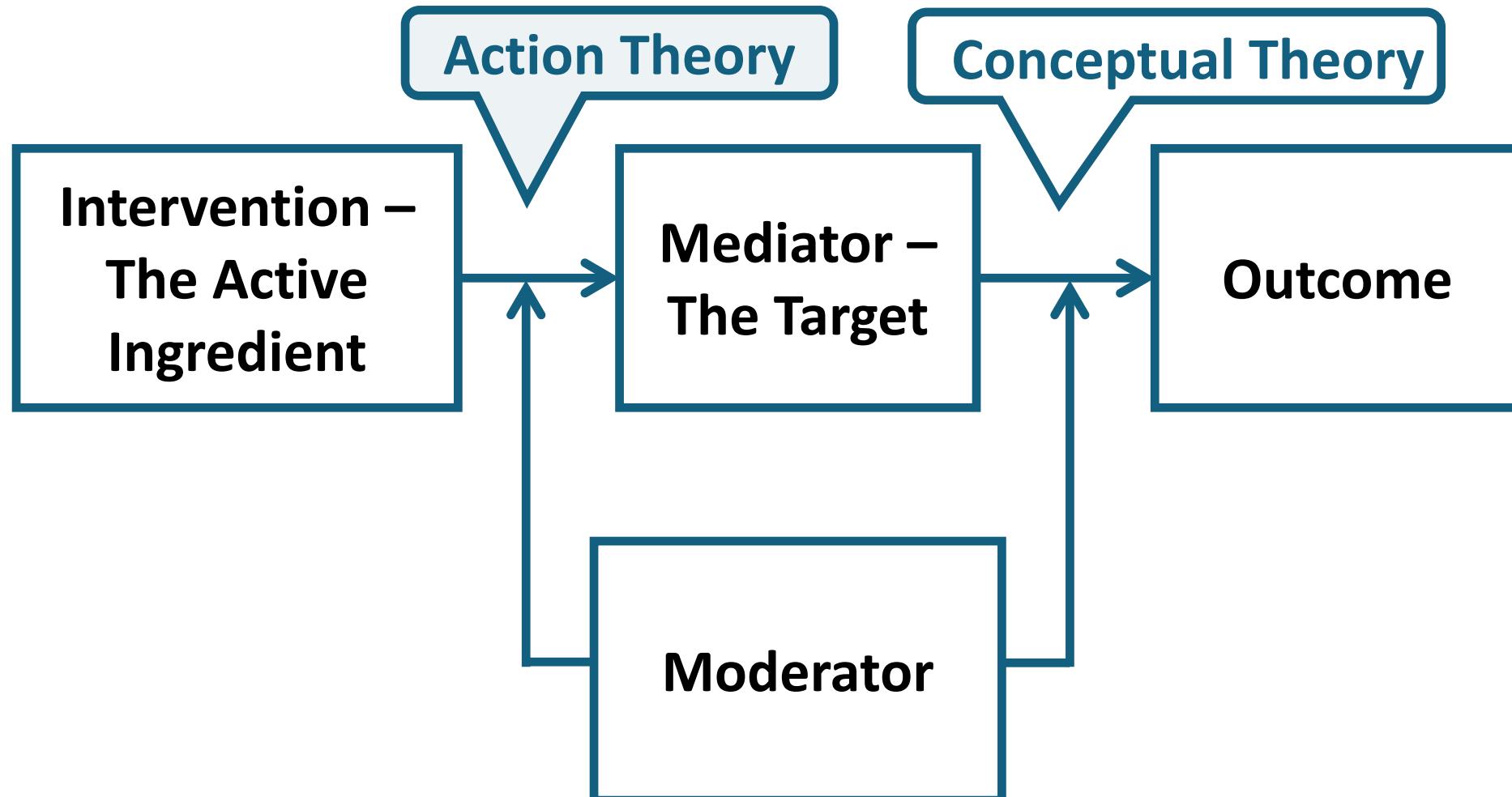
# What does this mean for the models



**SAGE NOTE** It is usually regarded as incorrect to talk of pre-arranged events occurring or happening; the wedding took place (not occurred or happened) in the afternoon.

**currence** (ə'kərəns) n. 1 something that occurs; happening; event. 2 the act or an instance of occurring.

# The basic research framework is simple



# Efficiency in testing ingredients

- Use of **efficient research designs:**
  - Rapid-cycle techniques (e.g., ideographic clinical trials or CQI)
  - Stepped-wedge designs
  - Adaptive trials
  - Bayesian analysis
- Acceleration in identifying what works for whom

# Reflections on PHV: Efficiency in Design

What does this mean for  
the models



# Designs: Advantages and disadvantages

*Stepped wedge Designs*  
*Rapid cycle Designs*  
*Adaptive Designs*



# Precision Home Visiting Research Questions

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# Precision home visiting research questions

- Ask about active ingredients
  - What drives outcomes? What changes the mediator?
  - For whom do they work? Are they universal active ingredients or only work for certain subpopulations?
  - Under what conditions do some active ingredients work or not?
- Ask about efficiency and effectiveness to achieve outcomes

# Example research questions

- Can you achieve similar impacts on parental sensitivity with two sessions instead of four?
- Which of three parent supports works best for improving child outcomes: Texting parents to remind them about visits only, texting parents ideas of activities to do with child or providing worksheets with tips to parents at the home visit?

# Example research questions

- Is a home walk-through necessary as compared to a home safety worksheet to achieve parental changes in behavior related to child safety? Are all of the lessons in the first month of services necessary or would you get similar impacts focusing on a subset of topics?
- What aspects of home visiting are necessary to mimic to obtain the same impacts if the program offers a telehealth model?

# Example research questions

- How can I better match the home visiting programs in my state with family needs?
- In what order should different lessons go in my model depending on family readiness
- What strategies for addressing expressive language should I use based on individual child strengths and needs?

# Example research questions

- Which aspects of the model are driving outcomes and which may not be (and could be eliminated)?
- What near term outcome can I focus on in order to achieve my long term outcome of child maltreatment prevention?

# Matchmaking: Questions & Designs

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# Example research questions

- **Can you achieve similar impacts on parental sensitivity with two sessions instead of four?**
- Which of three parent supports works best for improving child outcomes: Texting parents to remind them about visits only, texting parents ideas of activities to do with child or providing worksheets with tips to parents at the home visit?

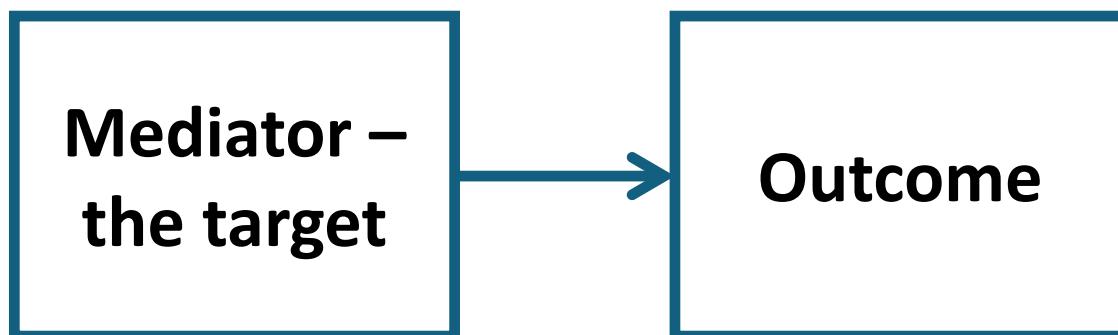
# Reflections on PHV: PHV Questions

What kind's of questions  
are the models asking?



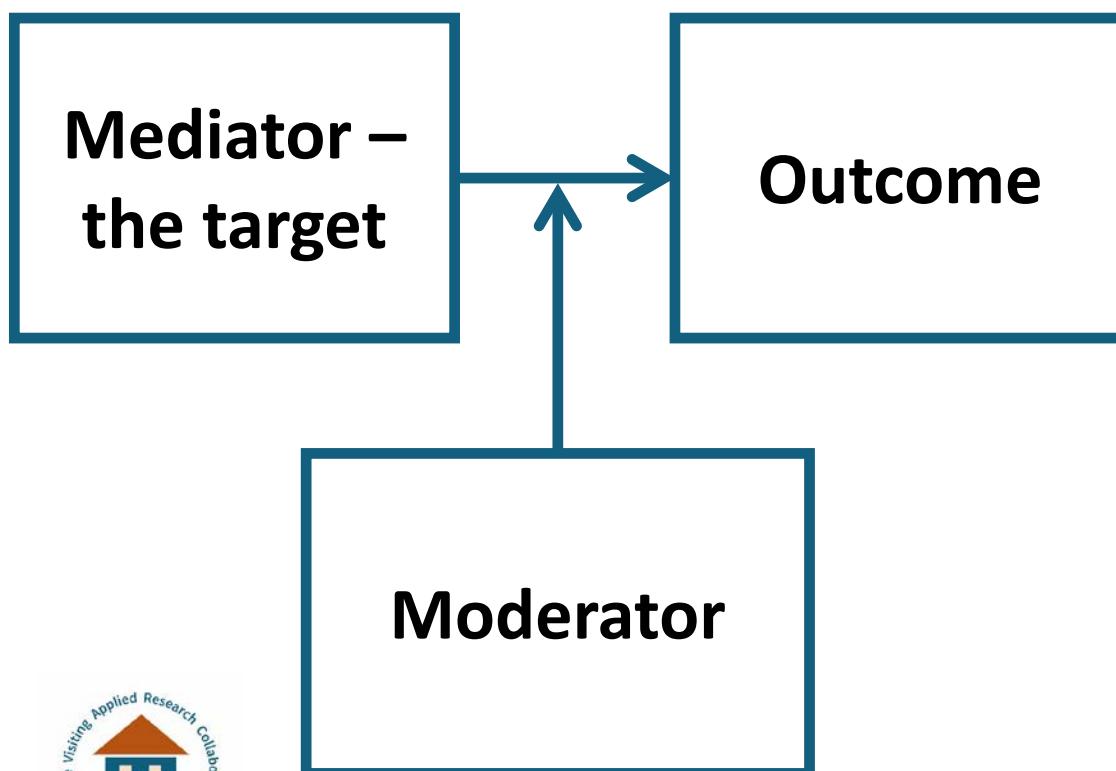
# Can you achieve similar impacts on parental sensitivity with two sessions instead of four?

What is our conceptual theory?

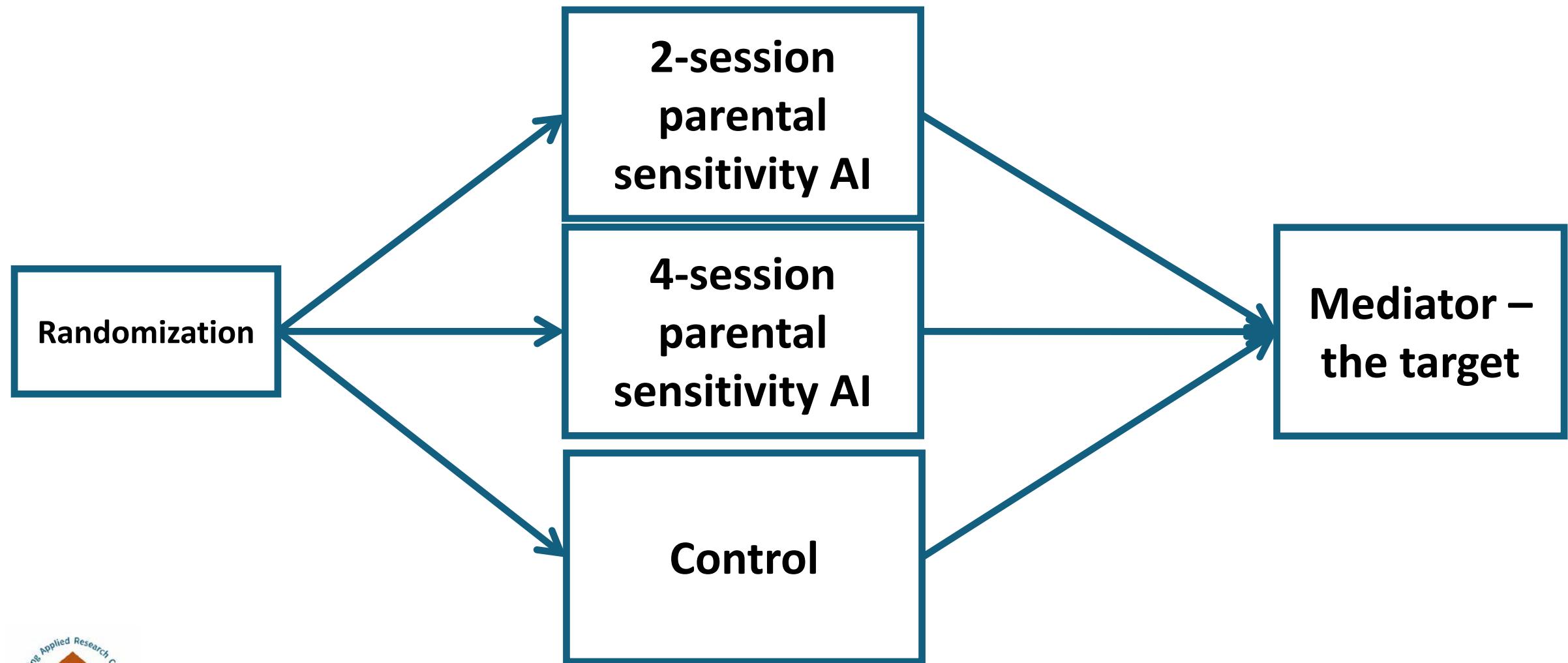


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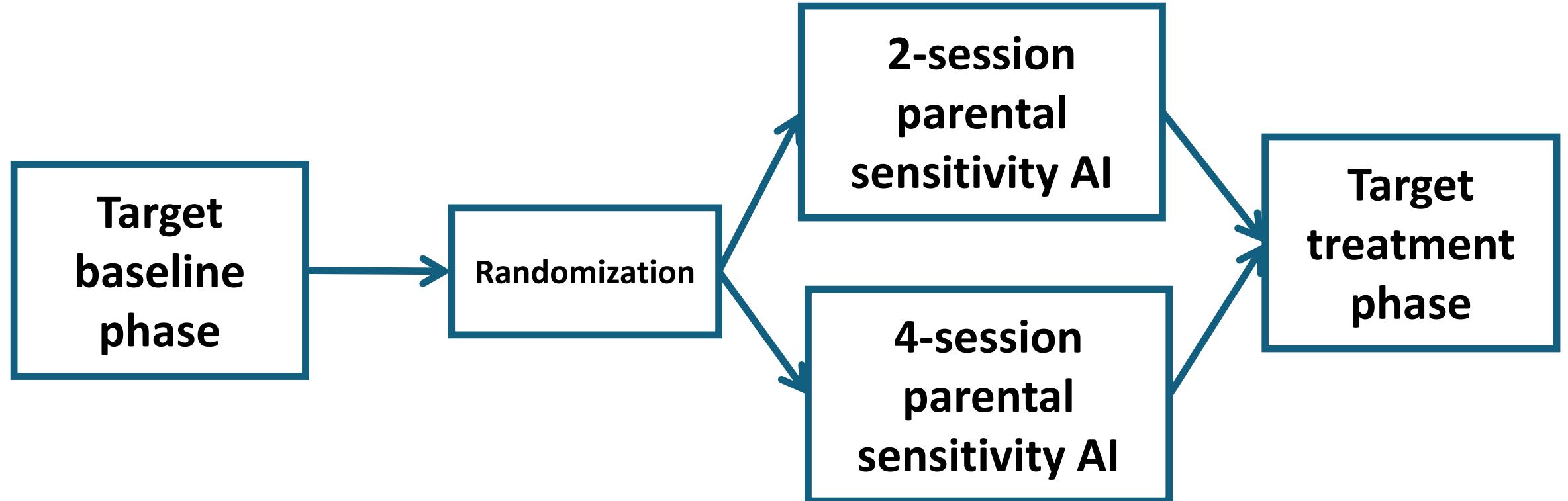
What is our conceptual theory?



# Traditional RCT design



# Example of an ideographic controlled trial

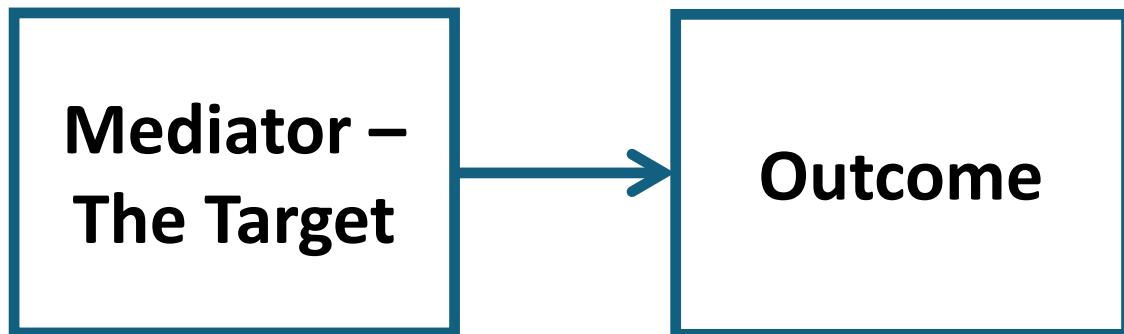


# Example research questions

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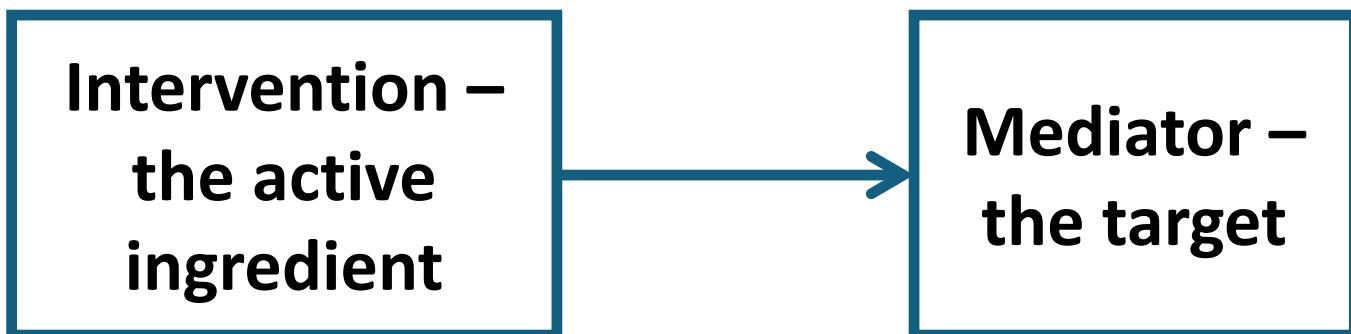


## 7 Way TO BOOST BABY BRAIN DEVELOPMENT



**Which of three parent supports works best for improving child outcomes: Texting parents to remind them about visits only, texting parents ideas of activities to do with child or providing worksheets with tips to parents at the home visit?**

What is our action theory?



# Full factorial design



	Texting reminder	Texting content	Worksheet	Reminder x content	Reminder x worksheet	Content x worksheet	All three
1	ON	OFF	OFF	OFF	OFF	OFF	OFF
2	OFF	ON	OFF	OFF	OFF	OFF	OFF
3	OFF	OFF	ON	OFF	OFF	OFF	OFF
4	ON	ON	OFF	ON	OFF	OFF	OFF
5	ON	OFF	ON	OFF	OFF	ON	OFF
6	OFF	ON	ON	OFF	ON	OFF	OFF
7	ON	ON	ON	OFF	OFF	OFF	ON
8	OFF	OFF	OFF	OFF	OFF	OFF	OFF

# Fractional factorial design



	Texting reminder	Texting content	Worksheet
1	ON	OFF	OFF
2	OFF	ON	OFF
3	ON	ON	OFF
4	OFF	OFF	ON
5	ON	OFF	ON
6	OFF	ON	ON
7	ON	ON	ON
8	OFF	OFF	OFF

# Fractional factorial design



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6	OFF	ON	ON
7	ON	ON	ON
8	OFF	OFF	OFF

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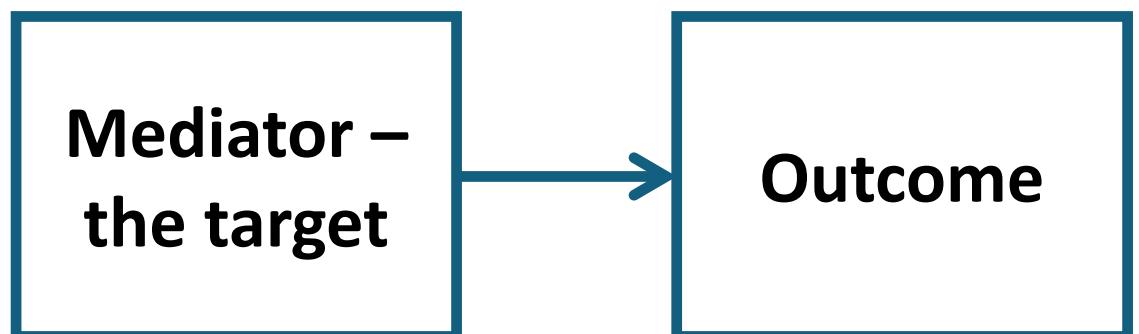
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# Example research questions

- Is a home walk-through necessary as compared to a home safety worksheet to achieve parental changes in behavior related to child safety? Are all of the lessons in the first month of services necessary or would you get similar impacts focusing on a subset of topics?
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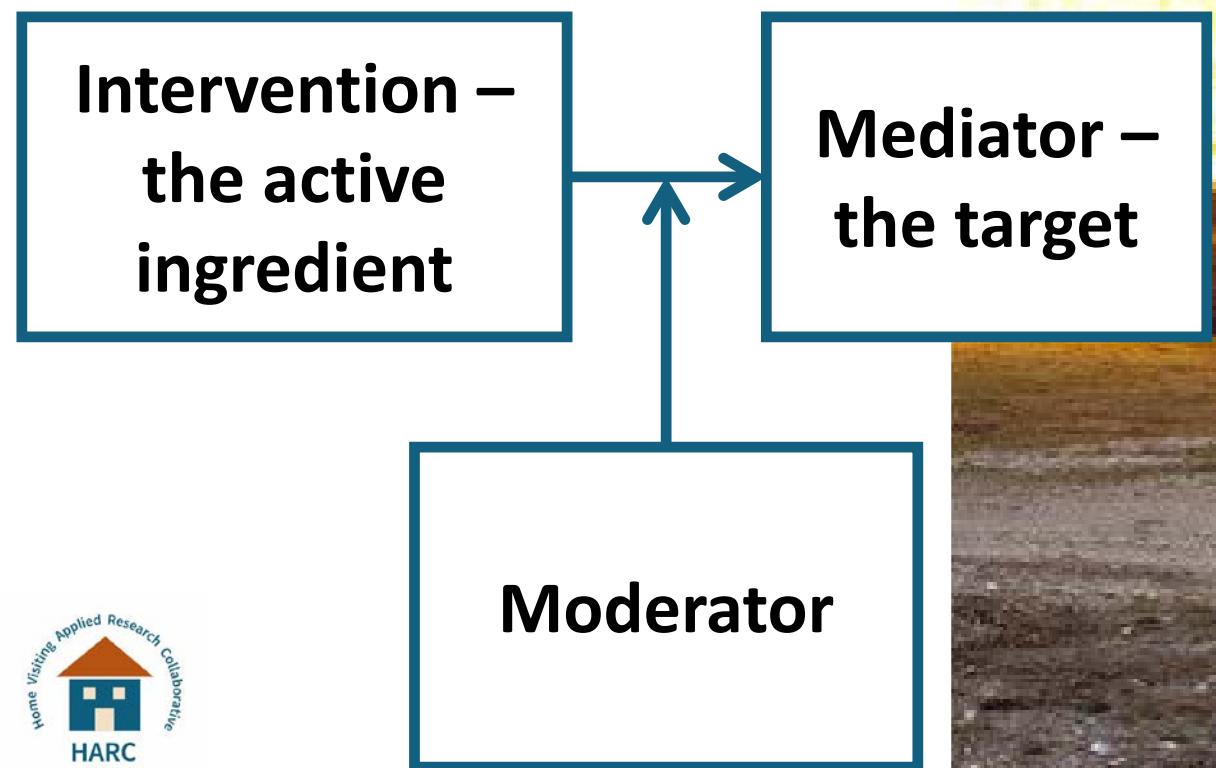
**Is a home walk-through necessary as compared to a home safety worksheet to achieve parental changes in behavior related to child safety?**

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**Is a home walk-through necessary as compared to a home safety worksheet to achieve parental changes in behavior related to child safety?**

What is our action theory?



Is a home walk-through necessary as compared to a home safety worksheet to achieve parental changes in behavior related to child safety?

We could do a stepped wedge blocked randomized controlled trial!



# What is a stepped wedge blocked randomized controlled trial?



Continuous cohort like phased starting of new participants in blocks (sites)



Everyone gets the intervention eventually (or at least every site)



Has most of the power and robustness associated with an RCT



Is still not a replacement for an RCT;  
cannot answer all questions

# Example stepped wedge or other wait list designs

Counties	T1	T2	T3	T4	T5	T6	T7	T8	T9
1	T	T	T	T	T	T	T	T	T
2	C	T	T	T	T	T	T	T	T
3	C	C	T	T	T	T	T	T	T
4	C	C	C	T	T	T	T	T	T
5	C	C	C	C	T	T	T	T	T
6	C	C	C	C	C	T	T	T	T
7	C	C	C	C	C	C	T	T	T
8	C	C	C	C	C	C	C	T	T
9	C	C	C	C	C	C	C	C	T

# Example stepped wedge assignment

Cohort	T1	T2	T3	T4	T5	T6	T7	T8	T9
1	T-A T-B								
2	C	T-A T-B							
3	C	C	T-A T-B						
4	C	C	C	T-A T-B	T-A T-B	T-A T-B	T-A T-B	T-A T-B	T-A T-B
5	C	C	C	C	T-A T-B	T-A T-B	T-A T-B	T-A T-B	T-A T-B
6	C	C	C	C	C	T-A T-B	T-A T-B	T-A T-B	T-A T-B
7	C	C	C	C	C	C	T-A T-B	T-A T-B	T-A T-B
8	C	C	C	C	C	C	C	T-A T-B	T-A T-B
9	C	C	C	C	C	C	C	C	T-A T-B

# Quick overview: Other design ideas

# How can I better match the home visiting programs in my state with family needs?

- Question focused on community level factors
- Must define family needs, which evolve quickly
- Traditional methods are too slow to adapt service allocation or model type to local evolving needs



# The Power of Modeling

Adaptive Bayesian trial

Predictive analytics to target social services based on the strengths and risks

# Adaptive Bayesian trial to inform targeted social service implementation

- Multi-arm study—each arm is a different strategy to address a common outcome
- Adapts intake allocation based on probability of success on the common outcome
- Intake adaptation variable is a baseline characteristics or risk factor

# Predictive analytics for the targeting of social services by risk

- Smart algorithms use known information about the effectiveness of service models and strategies for specific baseline characteristics to model need based on the evolving need or risk of a population
- Can nuance the results by community
- Works with BIG DATA!
- Services allocated to where they *will be* needed, not where they *were* needed

# Reflections on PHV: The Future

# The Model's perspective on forward thinking methods



# Reflections on PHV: Critical & Emerging Issues

Addressing the changing  
needs of home visiting  
through PHV





# NEXT STEPS

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