Multilevel, Adaptive, Implementation Strategies (MAISYs)

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Outline

- Implementers Have to Make Many Decisions @ Many Levels
- Multilevel Adaptive Implementation Strategies
  What? Why? Who?
- Using Randomization to Construct an Optimized MAISY

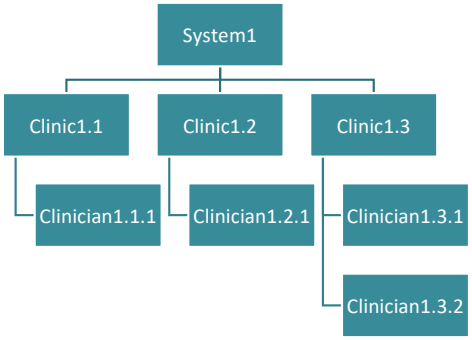
I rarely get through the third part.

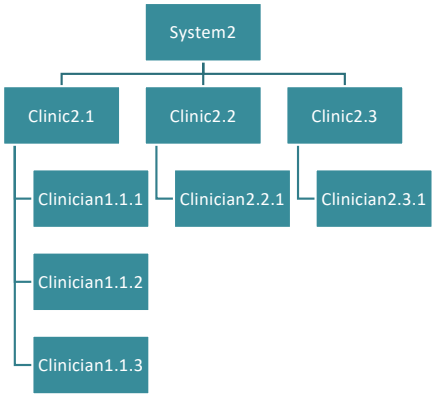
Multiple **Decision** Levels

@System Level

@Clinic Level

@Clinician Level





Determinants to Implementation at Multiple Levels

Evidence-based practices fail to be implemented or sustained due to barriers at multiple levels. For example,

@System Level	Ineffective communication, monitoring practices, policies
@Clinic Level	Lack of support, workflow processes
@Clinician Level	Lack of skills

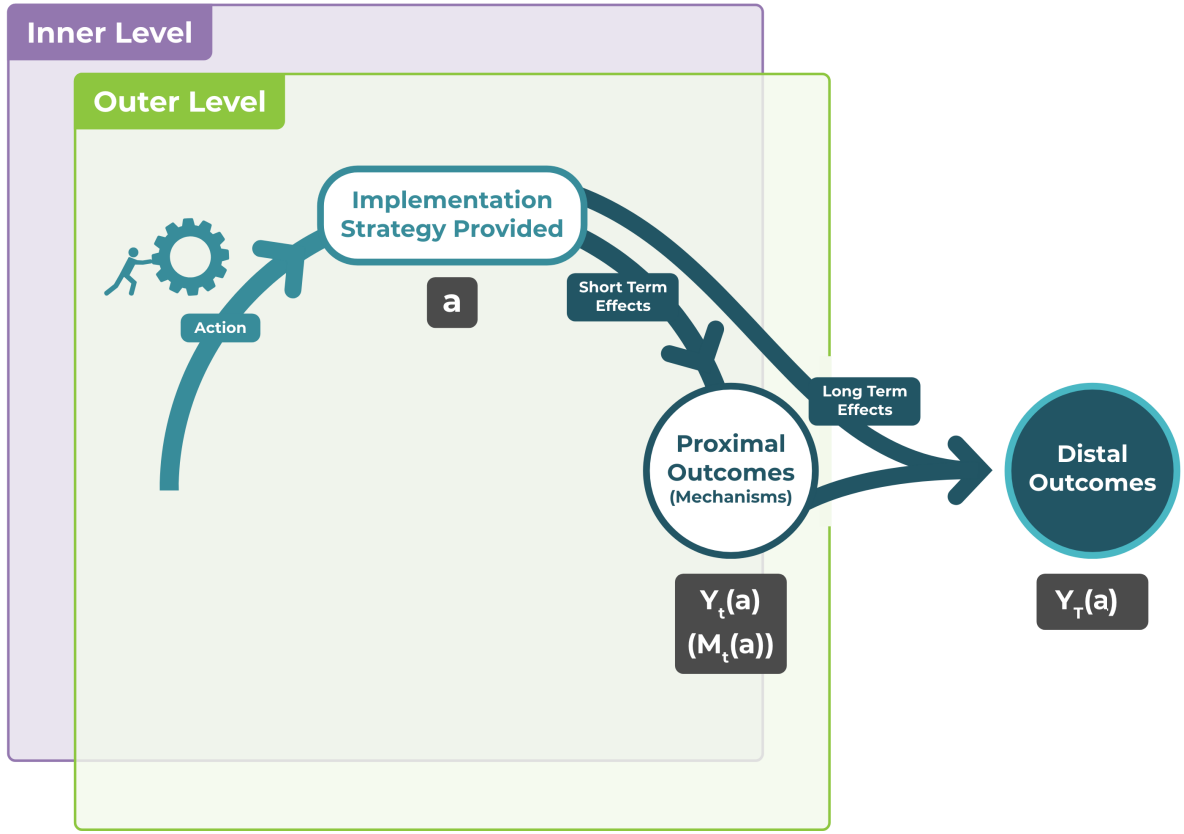
Implementation Strategies at Multiple Levels

A growing cadre of implementation strategies can help mitigate these challenges. For example,

@System Level	**Audit & Feedback$_{S}$**	Ineffective monitoring practices
@Clinic Level	**Facilitation$_{CC}$**	Lack of support
@Clinician Level	**Coaching$_{CN}$**	Lack of skills

Quick Review: What is an Implementation Strategy?

- Implementer
- Levels
- Targets
- Action
- Outcomes
- Rationale



Proctor, Powell, McMillen (2013), *Impl Sci*

From the Perspective of the Implementer

What works for one target may not work for another target	Between-target Heterogeneity
What works in the short-run may not work in the longer-run, or vice-versa	Within-target Heterogeneity

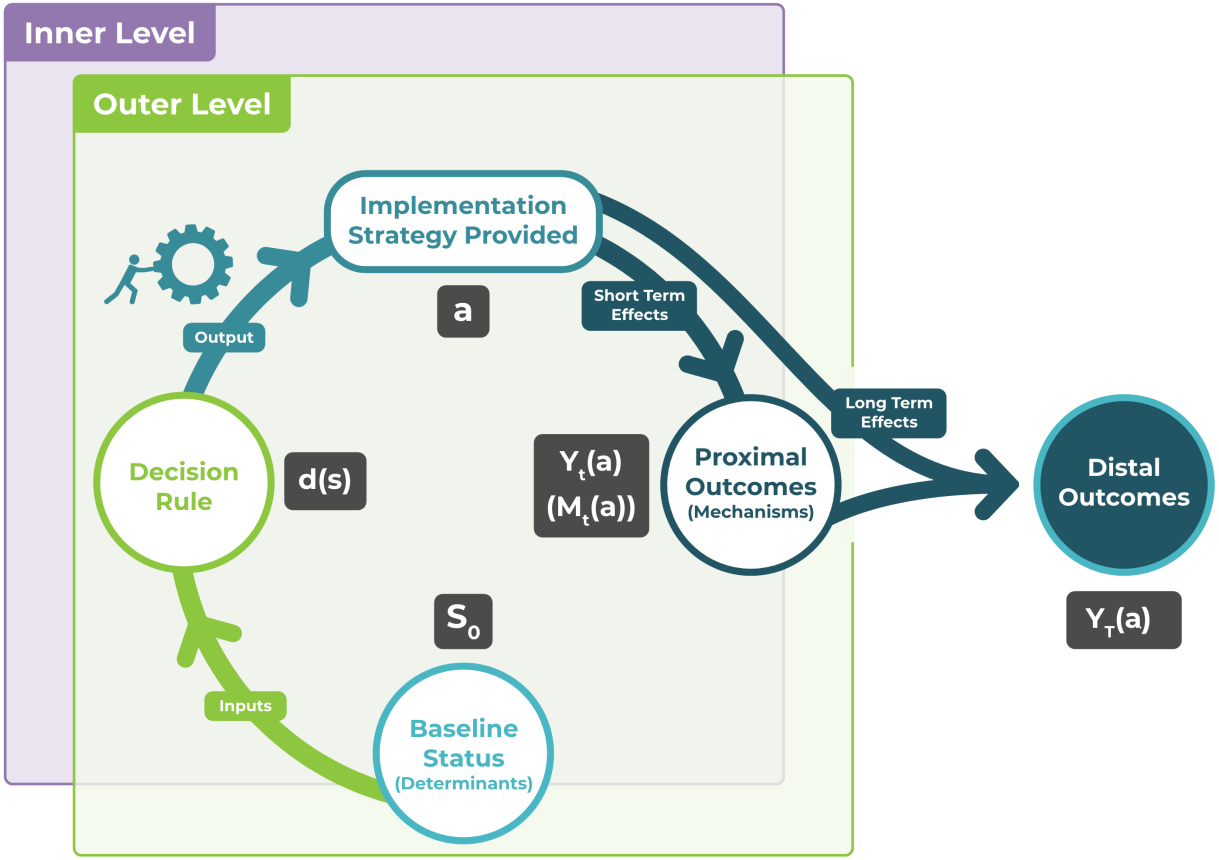
From the Perspective of the Implementer

I took the idea for a slide like this from Byron Powell.

From the Perspective of the Implementer

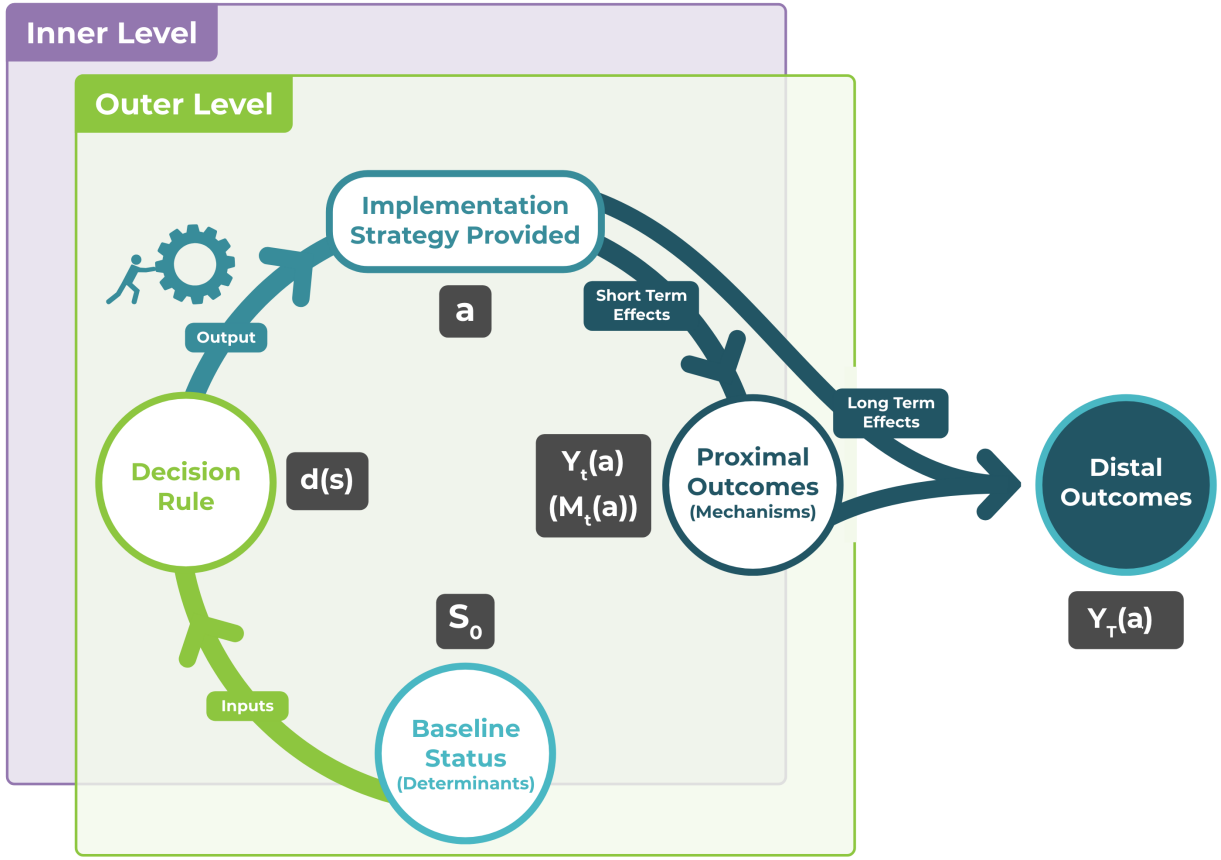
But a Decision is Not Just Any Action

What if we do this, instead?



This strategy has these extra components

- Implementer
- Levels
- Targets
- Action Options
- Baseline Status
- Decision Rule
- Outcomes
- Rationale



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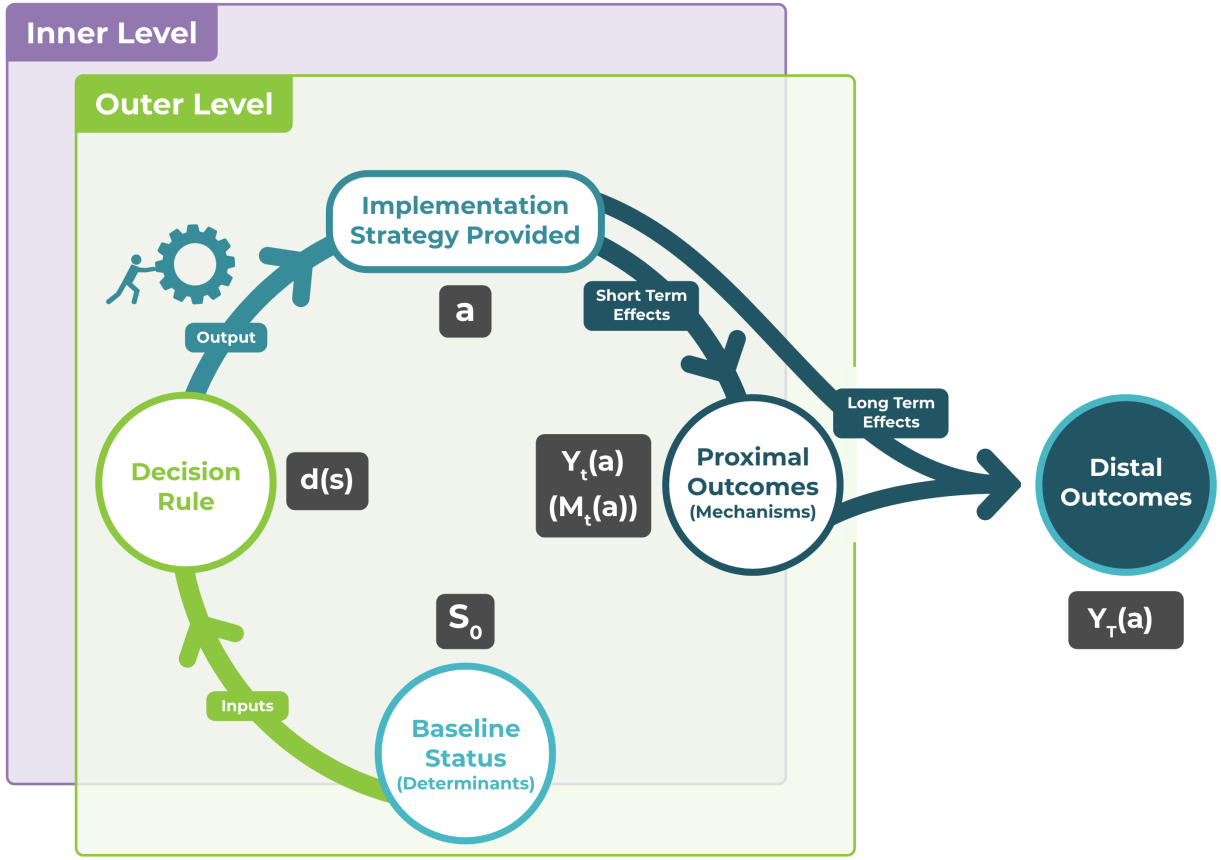
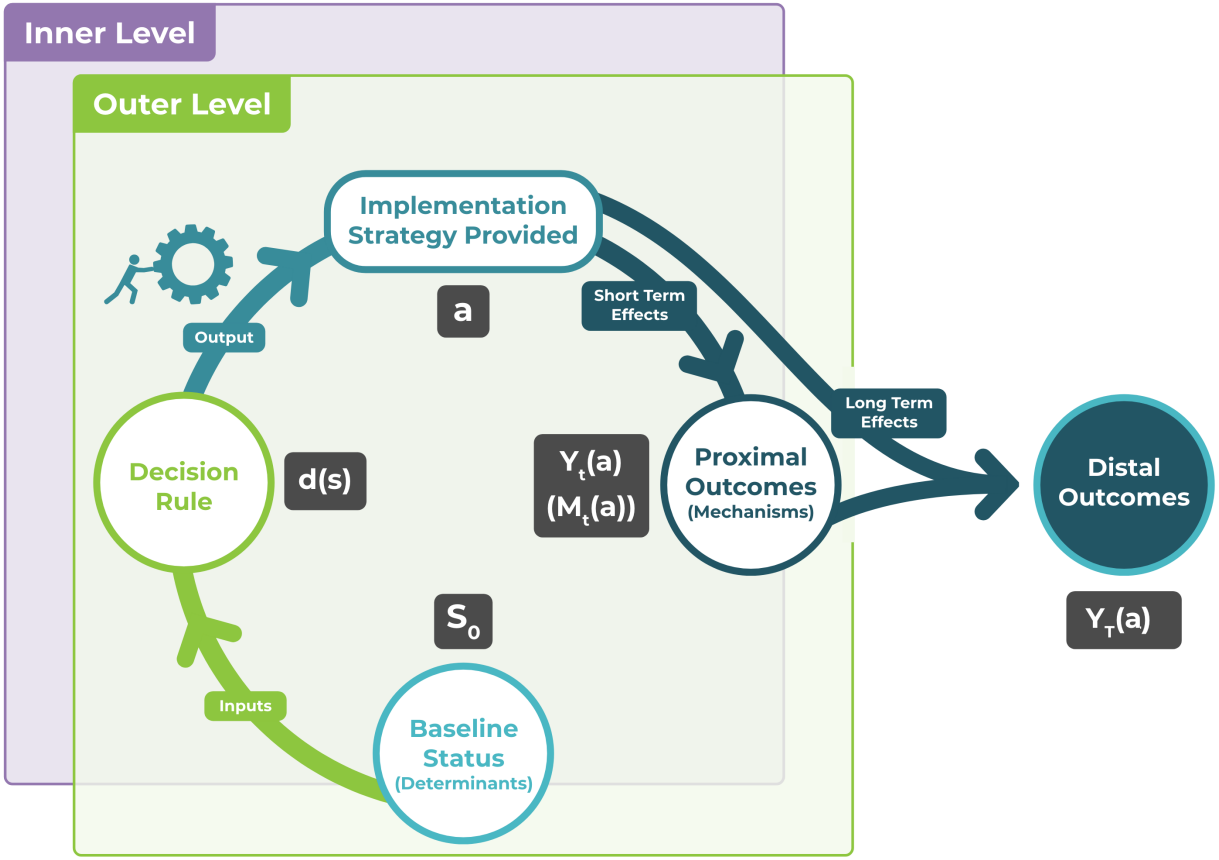


The “determinant” here is the measure (the variable), which takes on different values.

Between-target Heterogeneity @ Baseline ✓

Within-target Heterogeneity ✗



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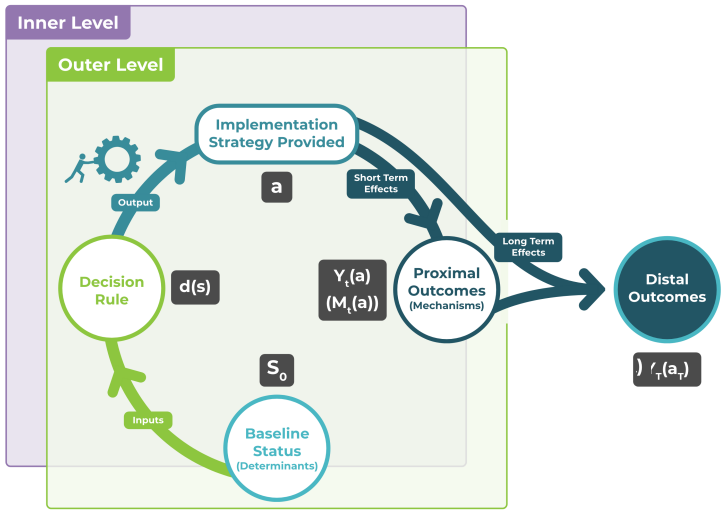
One that guides how best to adjust strategies given **both baseline and ongoing needs** of targets at the multiple levels of implementation.

Outline

- Many Decisions at Many Levels



- Let's Close this Loop using a Multilevel Adaptive Implementation Strategy

- Using Randomization to Construct an Optimized MAISY

Multilevel Adaptive Implementation Strategy (MAISY)

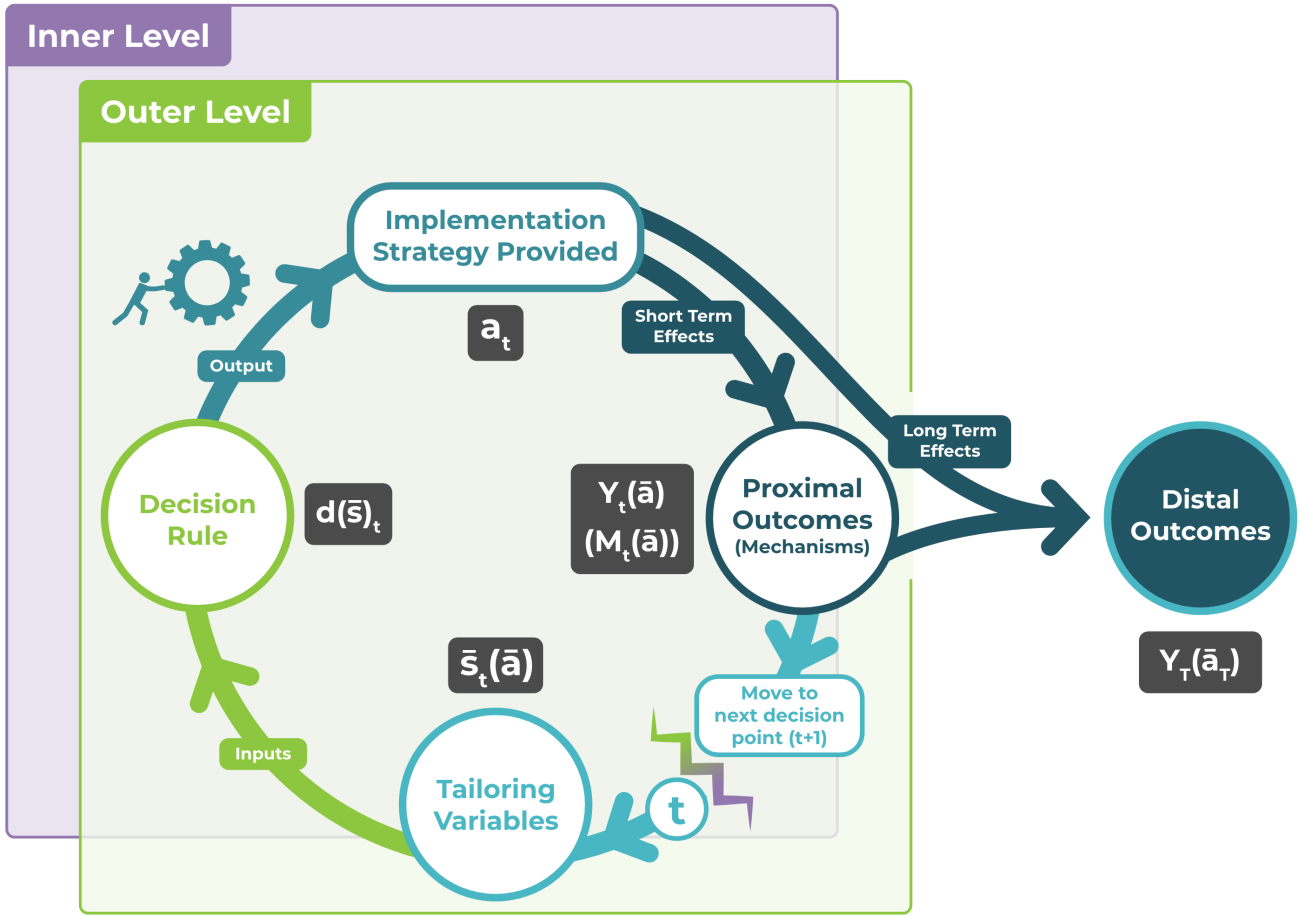
A MAISY is a sequence of decision rules used to guide how best to adapt the provision of implementation strategies

(i) at critical decision points,

(ii) across multiple levels,

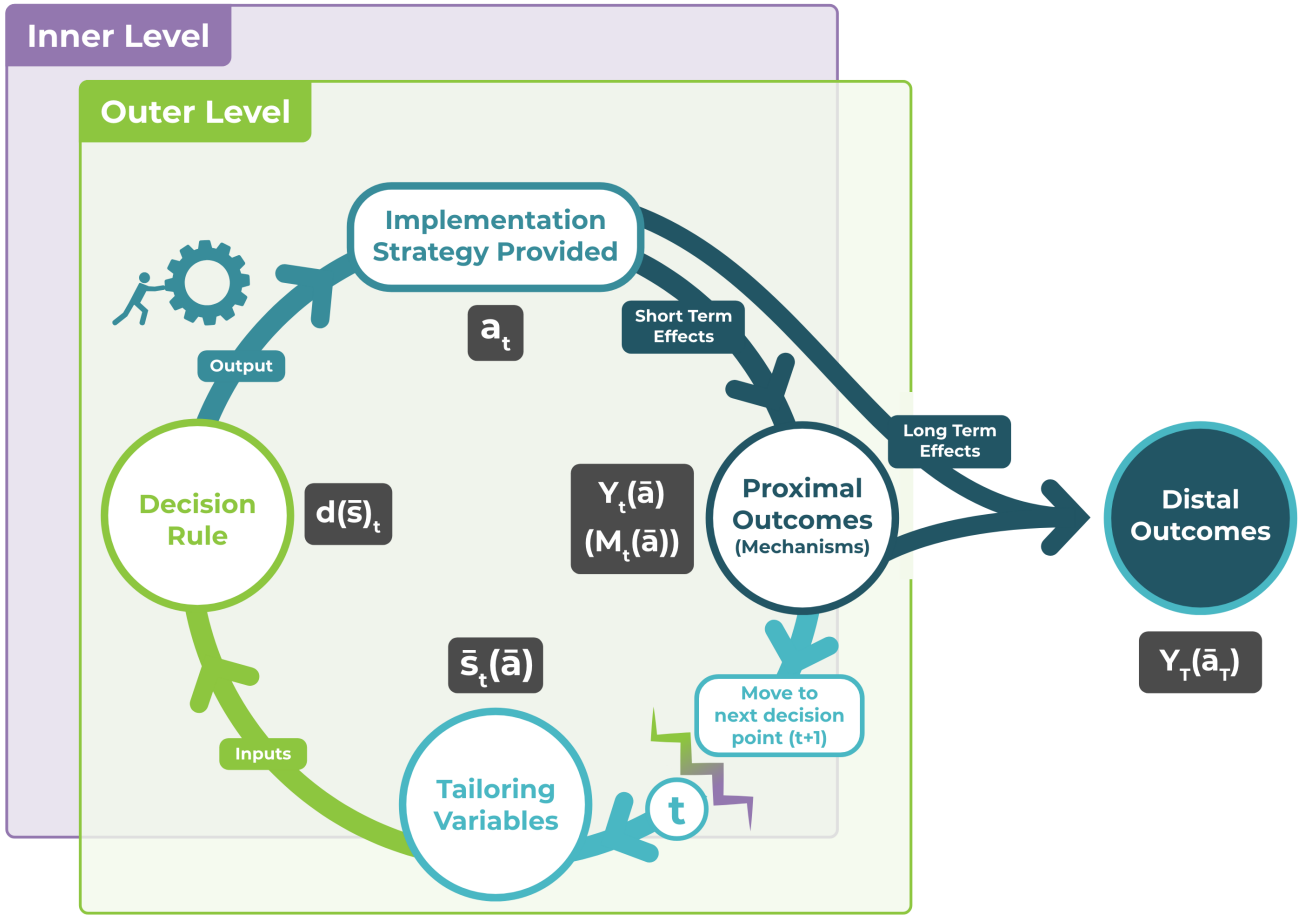
(iii) based on **both baseline and ongoing/changing status** of the targets in an organization.

Multilevel Adaptive Implementation Strategy (MAISY)



Multilevel Adaptive Implementation Strategy (MAISY)

- Implementer
- Decision Levels
- Targets
- Decision Points
- Action Options
- Tailoring Vars
- Decision Rules
- Outcomes
- Rationale

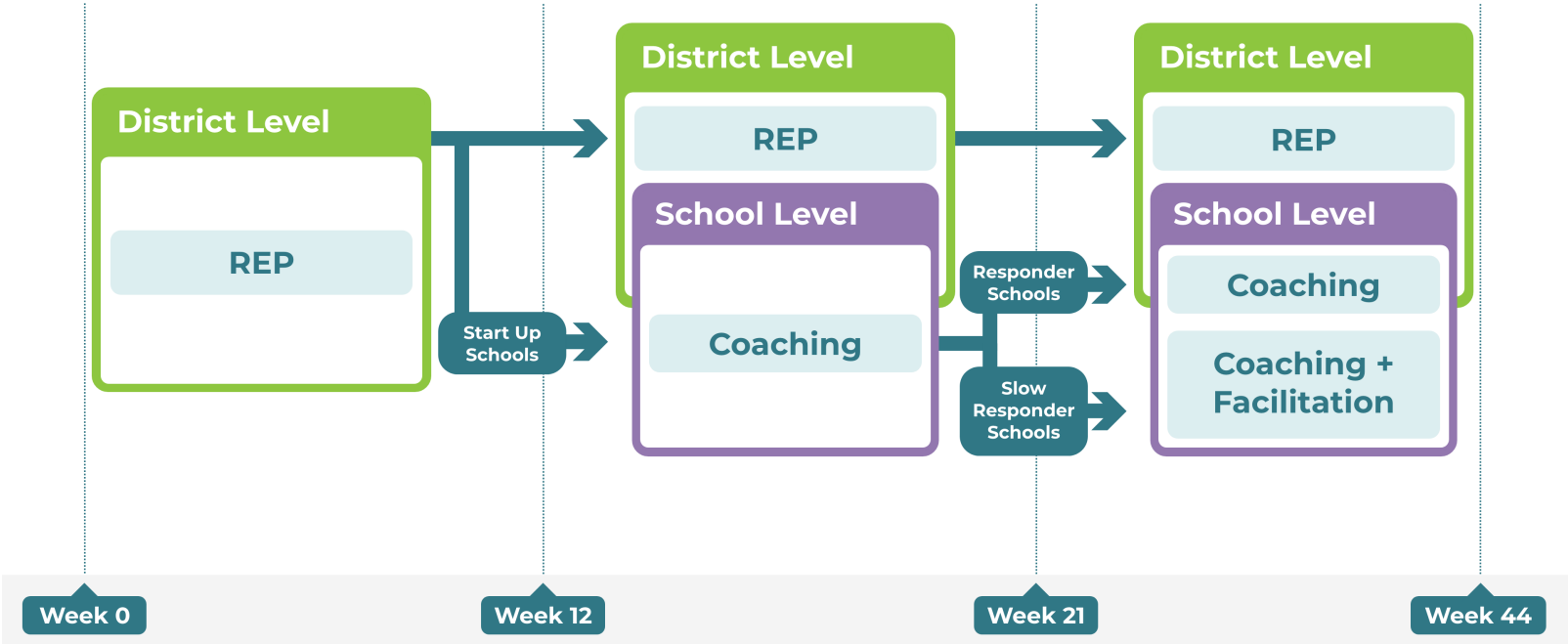


MAISY Example #1

Adaptive School-based Implementation of CBT (ASIC)

EBP: Cognitive Behavioral Therapy in Michigan Schools

Developer: Amy Kilbourne



Start-up School:

A school with school professionals who do not have training in CBT *or* have never provided CBT to any of their students.

MAISY Example #1

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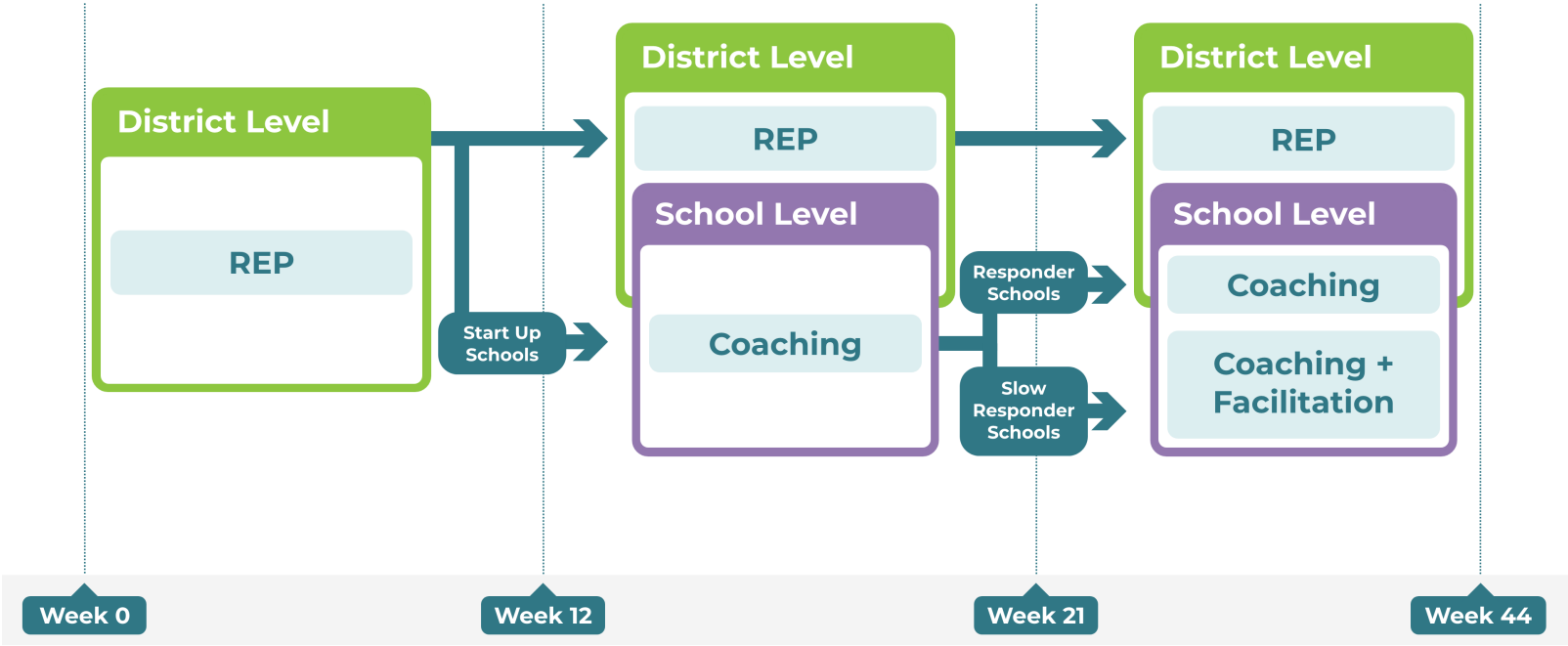


Slow-responding School:

(i) Any SP reports not providing 3+ CBT components to >10 students

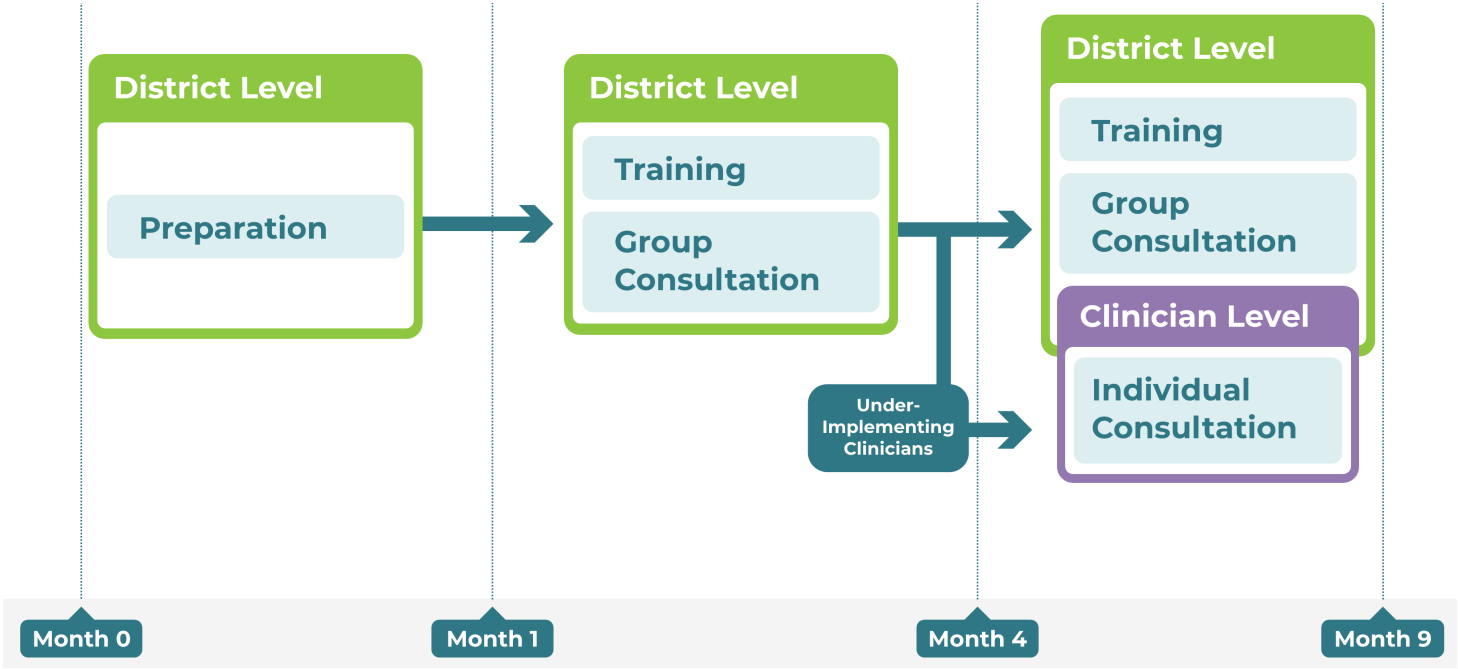
OR (ii) SPs report >2 barriers to CBT delivery (on average)

MAISY Example #2

Feedback & Outcomes for Clinically Useful Student Svcs (FOCUSS)

EBP: Measurement-based Care in Connecticut Schools

Developer: Elizabeth Connors



Under-implementing Clinician:
Collected 1+ outcome measure on <40% of students served in first 4 months

Why MAISYs?

Timing is important	Speed of adoption varies; not all targets are ready to take on more
Strategic sequencing	Lay a strong foundation for subsequent strategies, if needed
Health equity	MAISYs are consistent with “vertical health equity” principles

Why MAISYs?

Engagement is critical	In short-run, not just about fidelity or quant. of implementation
Often, more is not better	Kitchen sink strategies can lead to suboptimal implementation
Resource/Cost efficiency	Step-up for targets that need it; step-down for targets doing well

MAISYs are Guides for Implementers

- Implementation practitioners
- Community service providers
- Policy makers
- Clinical leaders
- ~~Researchers~~

MAISYs are Guides for Implementers, **not Researchers**

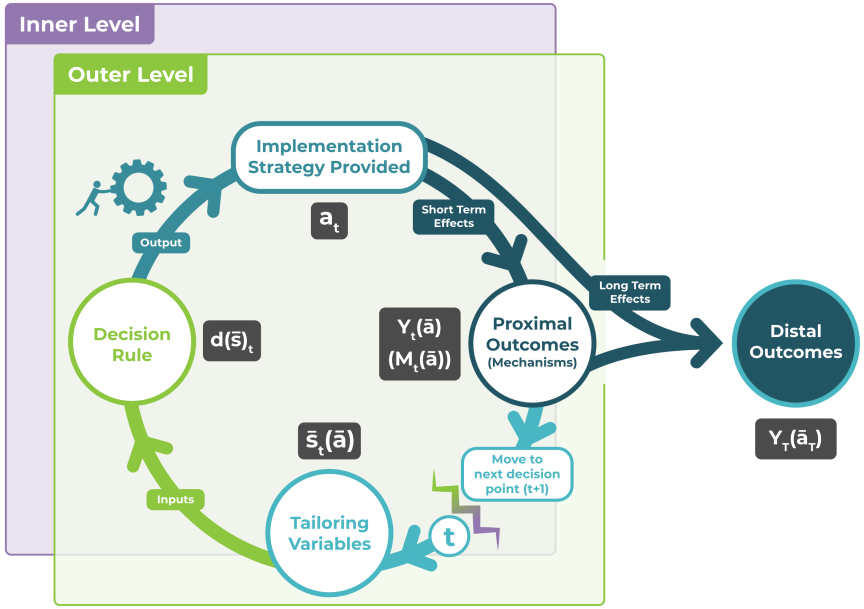
- Implementation practitioners
- Community service providers
- Policy makers
- Clinical leaders
- ~~Researchers~~ unless the Researcher happens to be in the role of the Implementer for purposes of the study, but let's hope the clinics and practitioners perceive it this way

A MAISY is not a Research Method

- Not an experimental design
  - There are no researchers in a MAISY
  - There are no randomizations
- Not an approach to conducting pilot studies
- Not an approach to data analysis
- Not an adaptive trial design

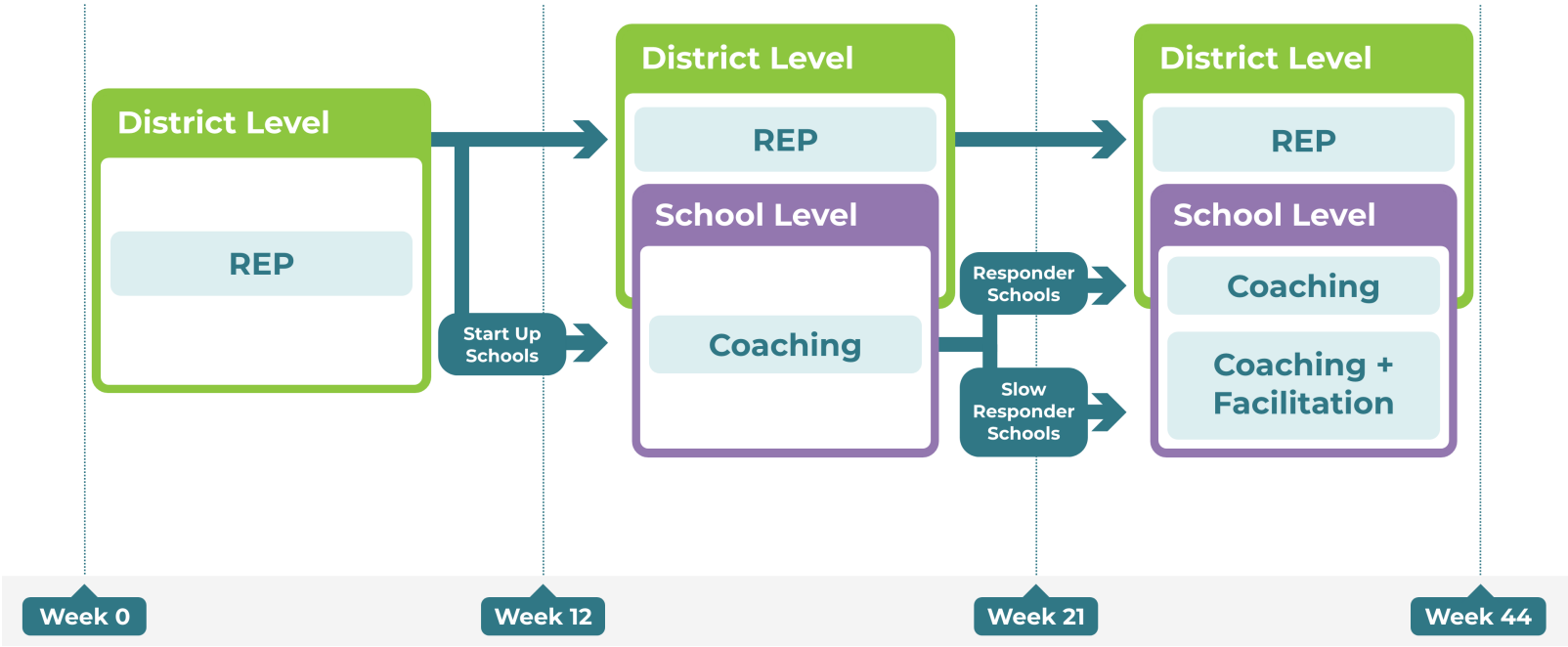
Jargon Buster Slide (~~Babel~~)

- Special case of what Byron Powell calls a “multifaceted multilevel implementation strategy”
- Special type of “adaptive implementation strategy”
- Certainly, MAISYs falls within the realm of “precision implementation strategies”



Recall MAISY Example 1

Adaptive School-based Implementation of CBT (ASIC)



Other Considerations

- Pre-specified (pre-planned)
- Mechanisms can be tailoring variables!!
- The tailoring variables are part of the MAISY
- Caution against conflating MAISYs and “adaptation”

Outline

- Implementers Have Many Decisions to Make
- Multilevel Adaptive Implementation Strategies
  What? Why? Who?
- Developing an Optimized MAISY

This is all about asking Optimization Questions
I am going to show you 13 of these.

Outline

- Implementers Have Many Decisions to Make
- Multilevel Adaptive Implementation Strategies
  What? Why? Who?
- Developing an Optimized MAISY

So put your researcher hats back on!

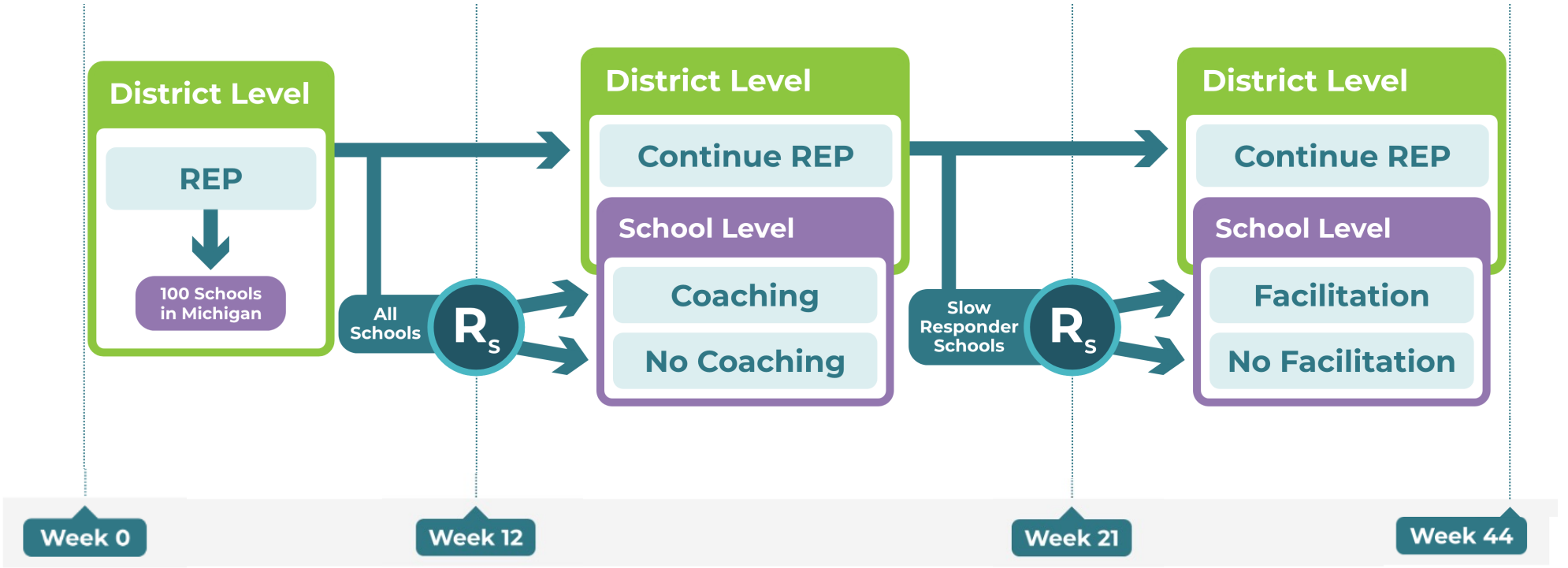
Optimization Questions: Basic, but important

	Type	In the context of ASIC
1	First stage strategies	What is the effectiveness of Coaching?
2	Later stage strategies	What is the effect of Facilitation among schools that are slower responders?
3	Interaction	Do Coaching and Facilitation interact to produce beneficial outcomes?
4	Adaptive versus not adaptive	What is the effect of the MAISY shown earlier vs only Coaching (not adaptive)?

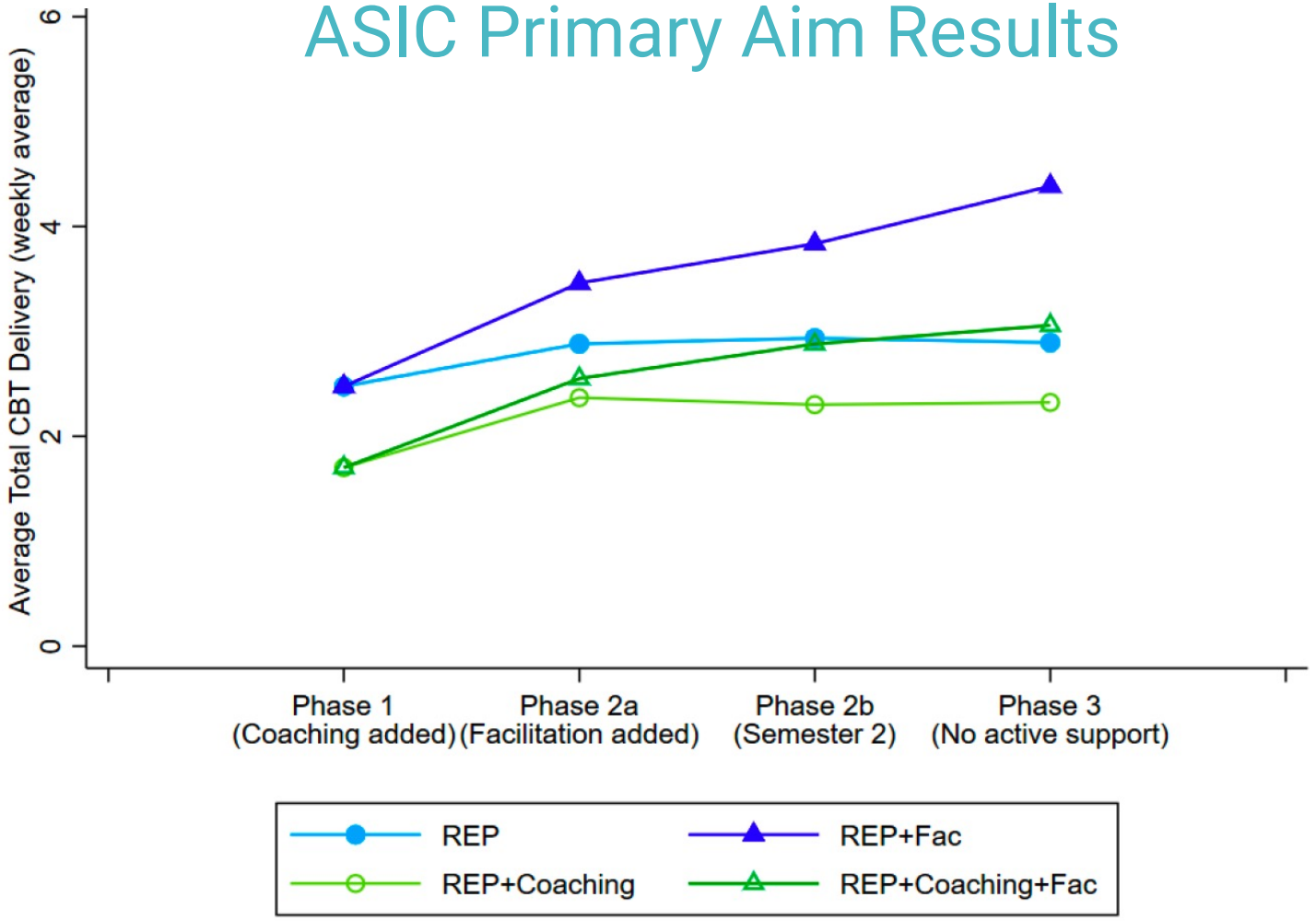
Sequential Multiple Assignment Randomized Trial

The ASIC SMART

PI: Amy Kilbourne



ASIC Primary Aim Results



Smith, Almirall, Choi, …Kilbourne (2022), *Impl Sci*

Optimization Questions: All about tailoring

	Type	In the context of ASIC
5	Better way to define non-response?	Should we use a more lenient definition (a lower cut-off) for “Responding School”?
6	Other baseline tailoring variables?	Perhaps only start-up schools require Coaching?
7	Other ongoing tailoring variables?	Perhaps Facilitation should only be offered to sub-optimally responding schools that did not engage in Coaching?

Optimization Questions: More about tailoring

	Type	In the context of ASIC
8	Other multilevel tailoring variables?	Perhaps Facilitation should only be offered to sub-optimally responding schools within the lowest resourced school districts?
9	Is the putative mechanism aide in decision making?	Is Facilitation necessary in sub-optimally responding schools delivering higher-quality CBT as a result of Coaching?

Optimization Questions: Some novel ones

	Type	In the context of ASIC
10	Sleeper effects of prior stage strategies?	Is it possible that first-stage strategies have no effect in the short-run, but have beneficial effects in the long-run when followed by a particular second-stage strategy?
11	Prescriptive effects?	Did we learn something from Coaching that can help decide whether to do Facilitation?

Sequential Multiple Assignment Randomized Trial

The ASIC SMART

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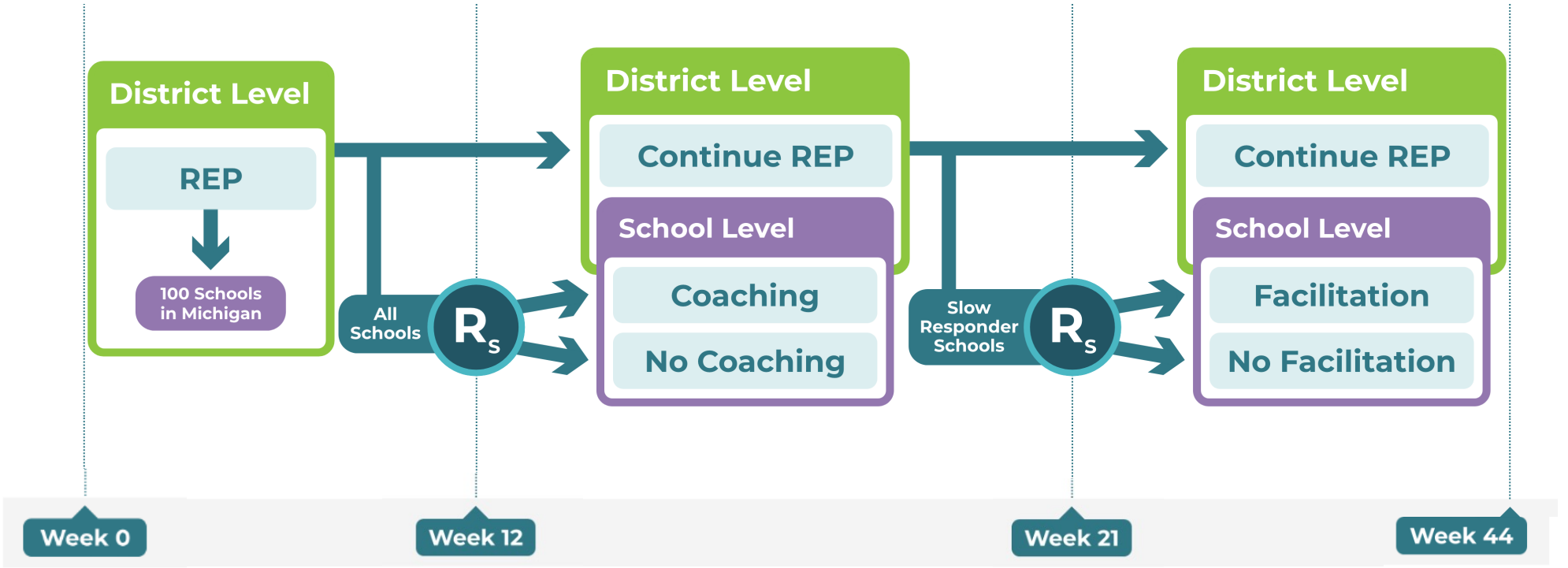

MAISY Example 2

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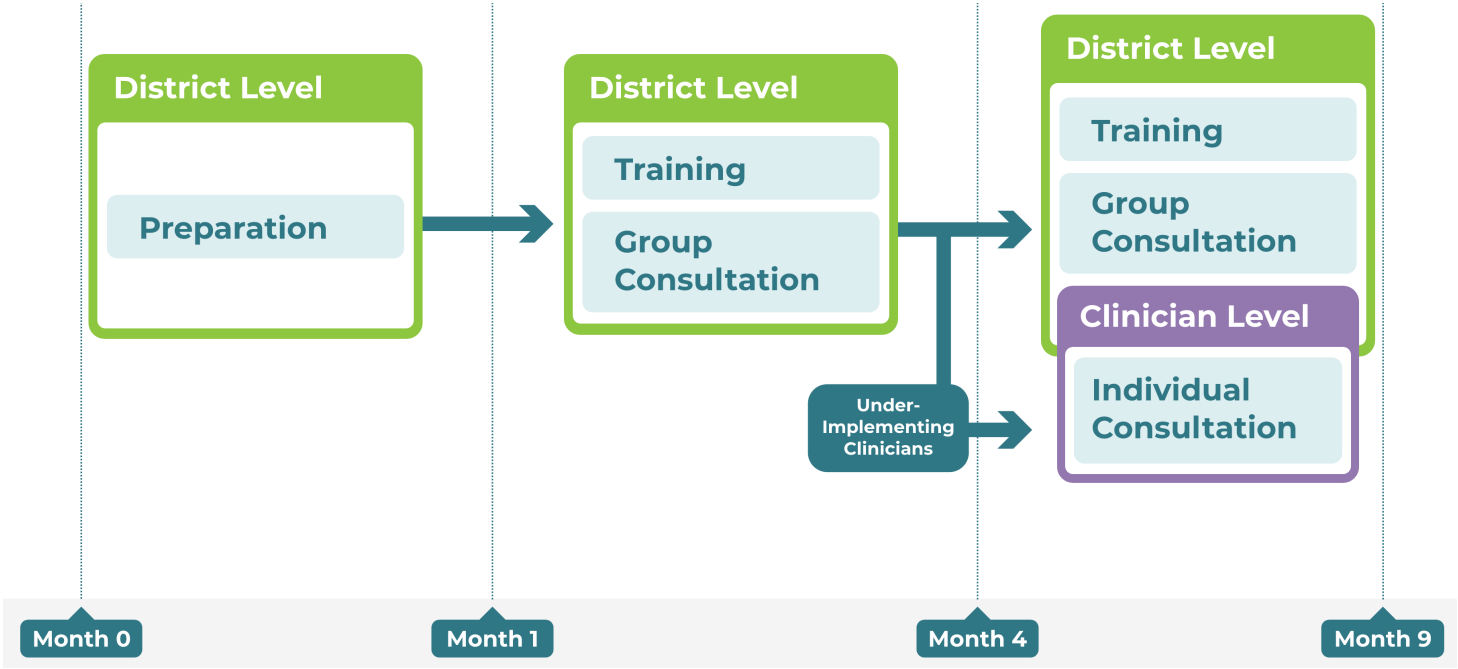


Under-implementing Clinician:
Collected 1+ outcome measure on <40% of students served in first 4 months

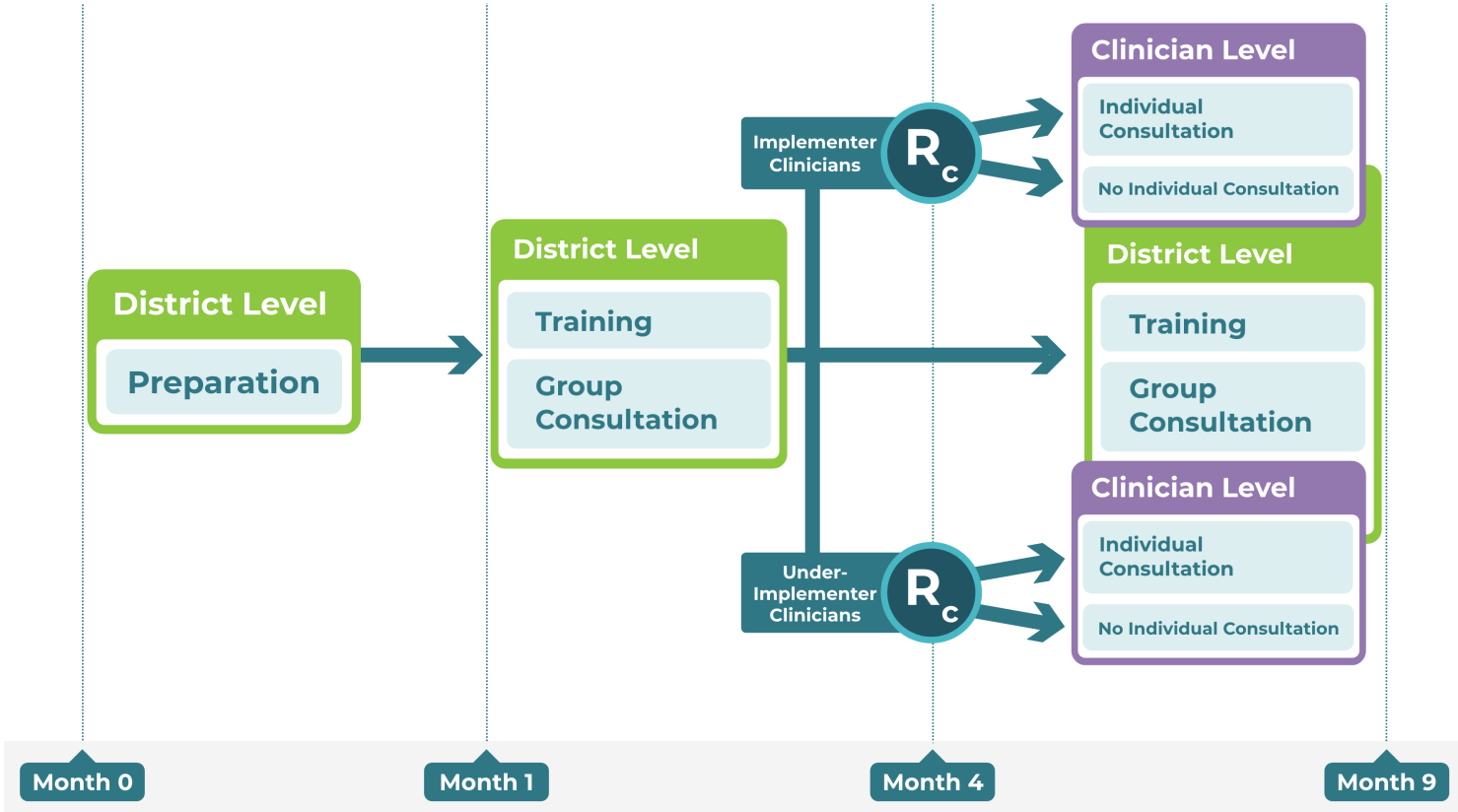
Back to Optimization Questions #2 and #7 in FOCUSS

	Type	In the context of FOCUSS
2	Later phase strategies	What is the average effect of clinician-level Individual Consultation?
7	Ongoing tailoring variables	How do we define “under-implementing clinician”?

Two-arm Optimization Randomized Trial

The FOCUSS Study

PI: Elizabeth Connors, Yale



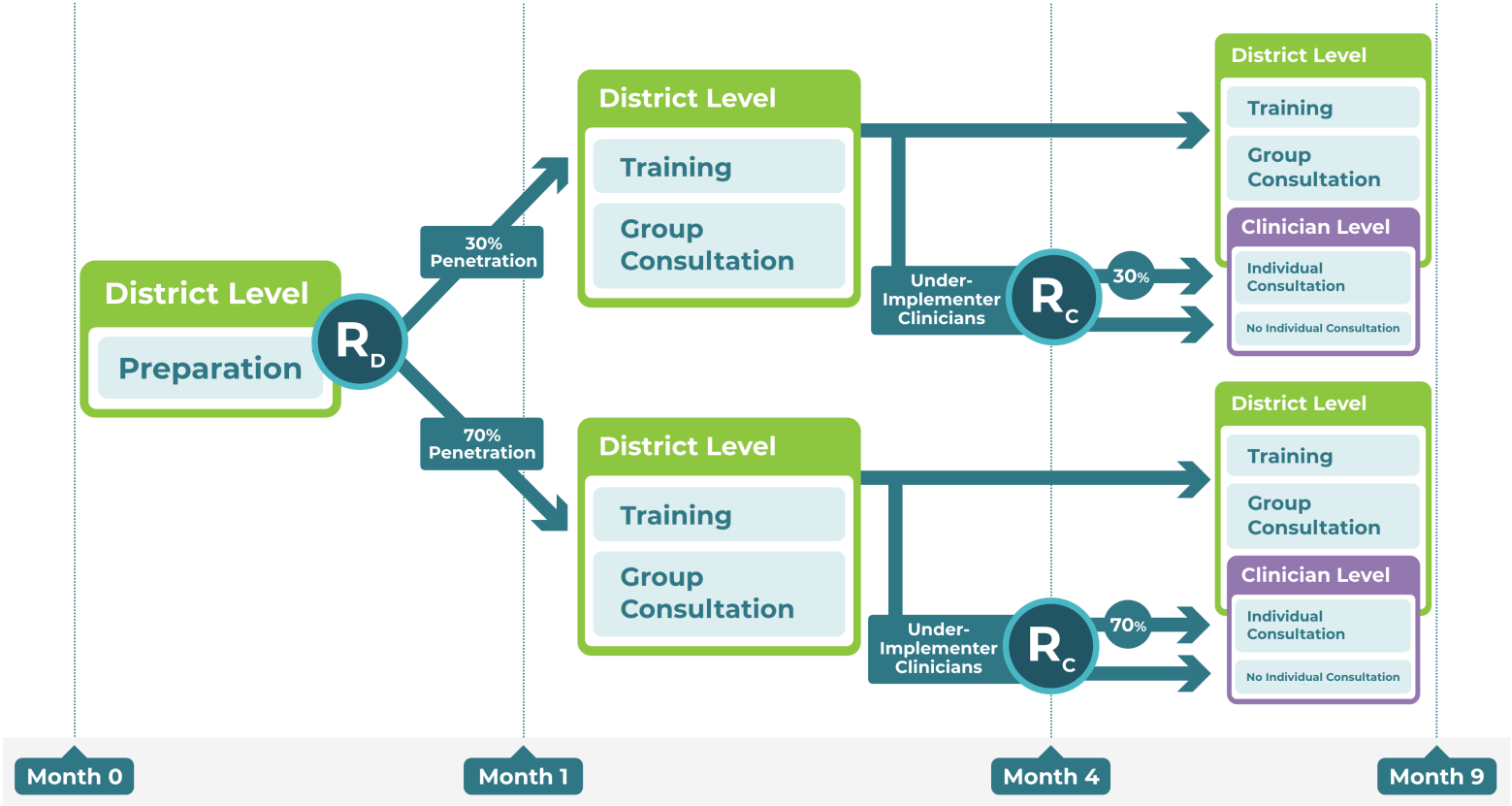
Optimization Questions: Concerning Spillover

	Spillover Questions!	In the context of FOCUSS
12	Optimal tipping point effect?	Effect of providing Individual Consultation to 30% vs 70% of under-implementers in a district?
13	Outer level strategies that engender beneficial spillover?	Target a random 1/2 of under-implementing clinicians vs up to 1/2 on a first-come first-serve basis?

A Hypothetical, Multilevel SMART

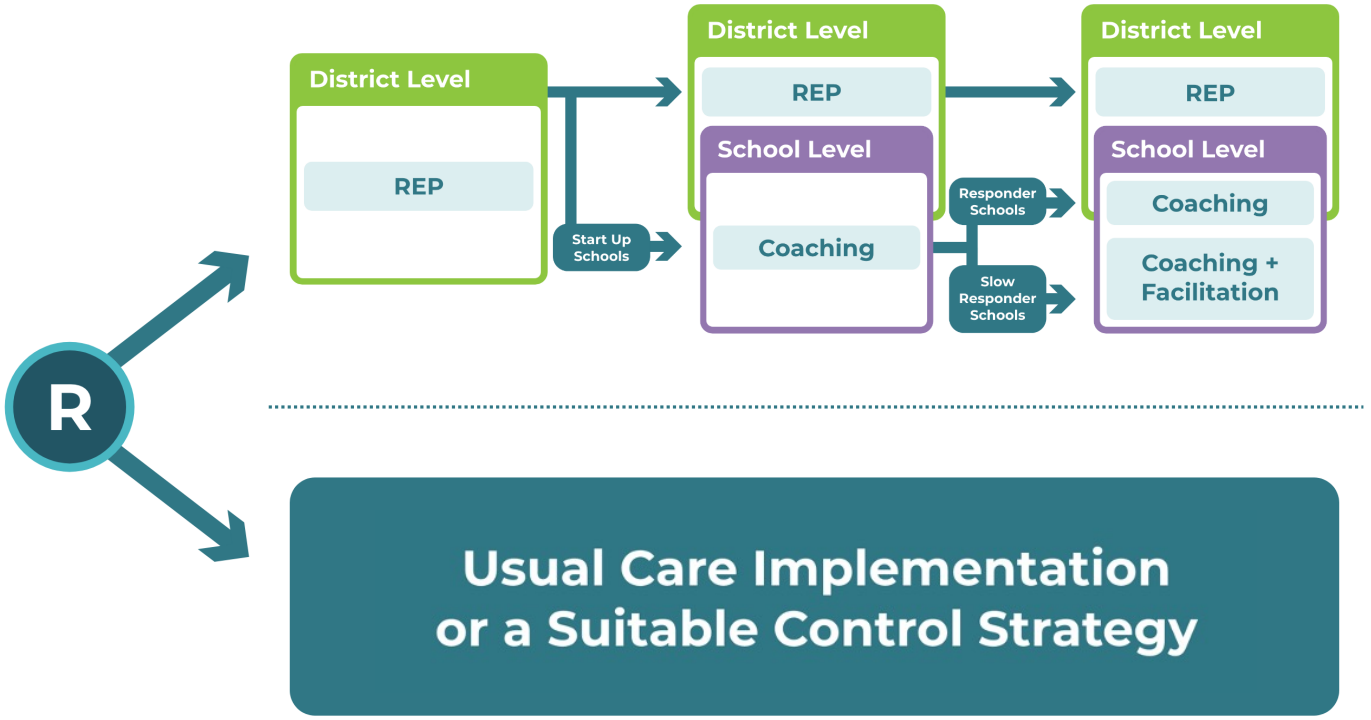
Illustrated using FOCUSS

PI: Elizabeth Connors, Yale



Evaluation and optimization are very different.

This is evaluation.



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R324B210001 (UMich, d3c);
R305B210004 (UWash, A. Lyon)