Using Predictive Analytics to Help Employment Programs Target and Refine Interventions

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CDI | MDRC CENTER FOR DATA INSIGHTS

The Center for Employment Opportunities (CEO)

If we prepare persons with criminal convictions for work, they will maintain employment and remain free from incarceration.
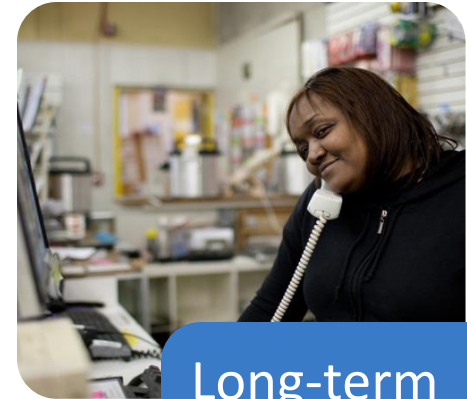

CEO Model
- Transitional Employment
- Job Placement
- Job Retention

Short-term Outcomes
- Job Readiness
- Unsubsidized Job Placement

Long-term Outcomes
- Job Attachment
- Recidivism Reduction

CEO's demonstrated impact on recidivism is unique among transitional job programs.

2004-2008
Experimental impact study of NYC program
(MDRC)

CEO **reduced re-incarceration** of participants for three years after enrollment, producing nearly $5,000 in net benefits to society.

Recidivism effects varied by subgroups, with largest impacts for participants who enrolled shortly after their release from prison.

There were no impacts on long-term employment.

2009-2012
Implementation study of five sites outside of NYC
(MDRC)

CEO sites **maintained high fidelity** to its model during replication, while improving participant engagement in some program components (compared to the NYC study).

2010-2014
QED studies in New York state and San Diego sites
(NY Division of Criminal Justice Services and Harder+Company Community Research)

CEO **reduced re-incarceration** of participants, affirming prior results. The quasi-experimental studies also suggested improvements in employment outcomes after the program.

CEO Attrition Challenge

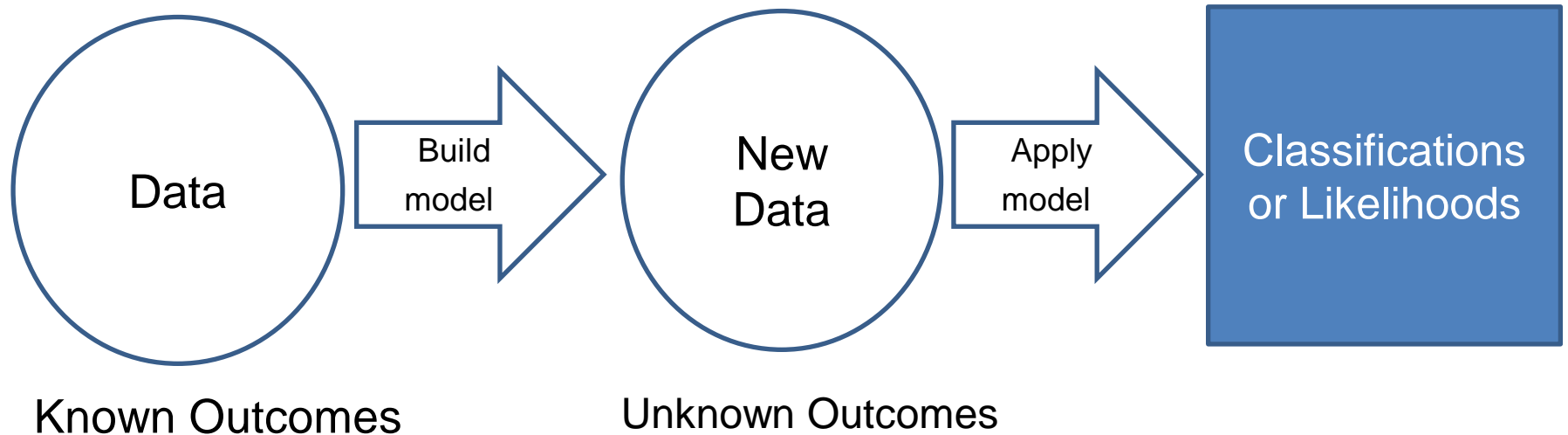FY 2016 - Attrition (% Attended Orientation)
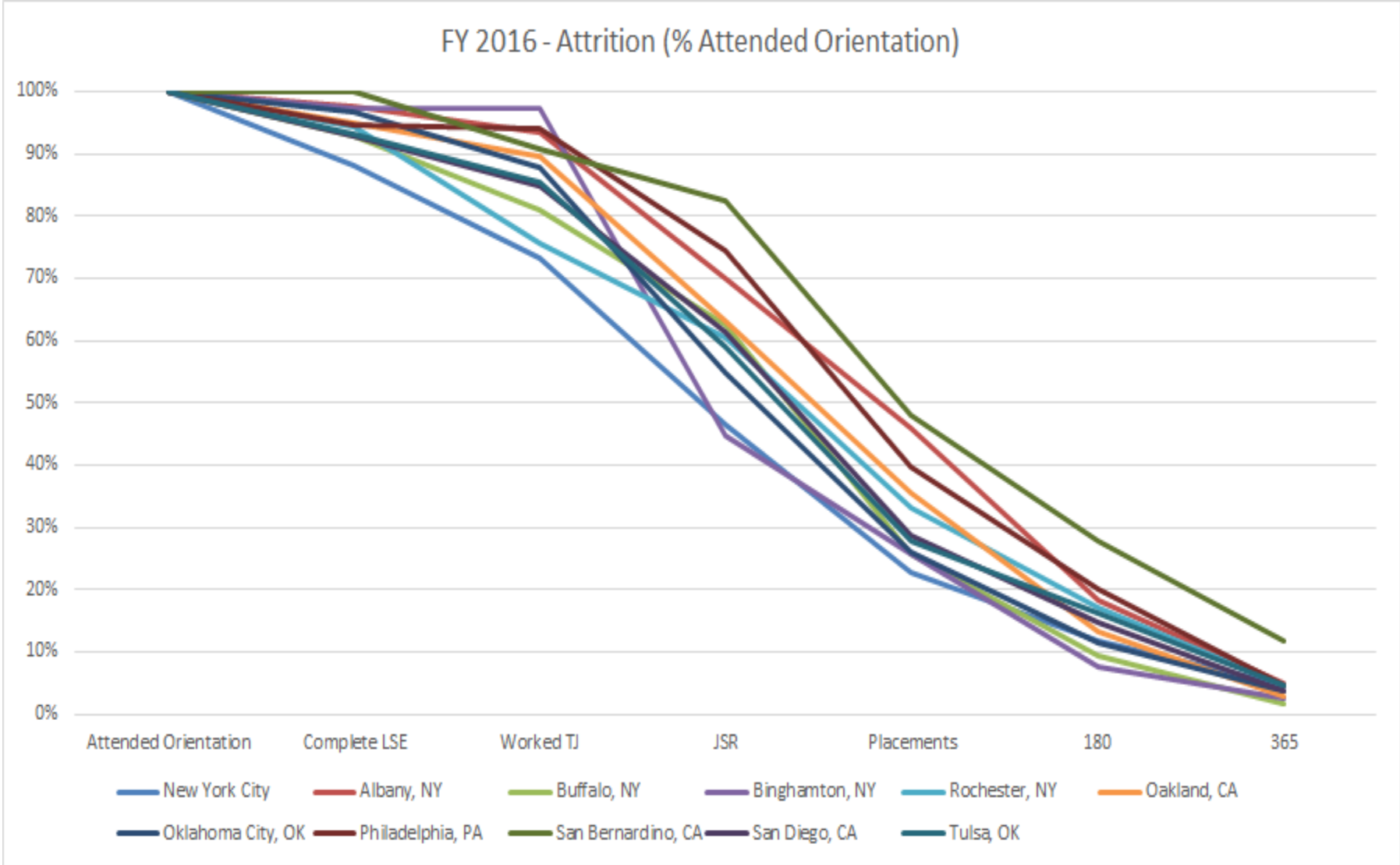
How can predictive analytics (PA) help?

We can use PA to assess individuals' risks of not reaching key milestones (or likelihoods of reaching them).

- As accurately as possible, taking advantage of all available data.
- Rapidly and iteratively as new information becomes available.
- With an easy feedback loop to staff.
- With easy to interpret results and visualizations.

What is predictive analytics?

Data → Build model → New Data → Apply model → Classifications or Likelihoods

Known Outcomes

Unknown Outcomes

Why focus on predicted [likelihoods](#)?

With a continuous risk level between 0 and 1, programs can:

- Uncover variation in individuals' risks.

- Assess how risk is distributed across and within sites and groups.

- Rank individuals' by their risk levels.

- Collapse risk levels in many ways.

How PA results can be used to improve programs

- **To better target individuals** based on their level of risk
  - To increase success of an intervention
  - To save limited resources
  - To reduce burden on some participants

- **To refine services**
  - Based on characteristics, behaviors etc. of individuals within levels of risk
  - Based on distributions of risk within and across groups and sites

Setting up the PA to provide new and valuable insights

Focus on a key milestone:
E.g., verified job placement within 6 months of intake date

Focus on for whom:
E.g. all entrants across all sites

Focus on a time point:
E.g., soon after intake

→ Identify predictors available at or before time point.
E.g., intake measures, employment history, education, criminal history

Key analytic considerations & limitations

1. Investment in measure creation is key.
2. Getting to the optimal model may or may not be complicated.
3. Using the right samples for model building and validation is not straightforward.
4. Valid evaluation is critical.
5. Not all outcomes are highly predictable and/or the right measures may not be available or high quality.
6. Predictions of risk identify opportunities to intervene, not interventions themselves.
7. Predictions are estimates and come with uncertainty.
8. There can be a trade-off between accuracy and transparency.
9. Biases in data can be perpetuated and can have ethical implications.

PA as part of multidisciplinary learning cycles
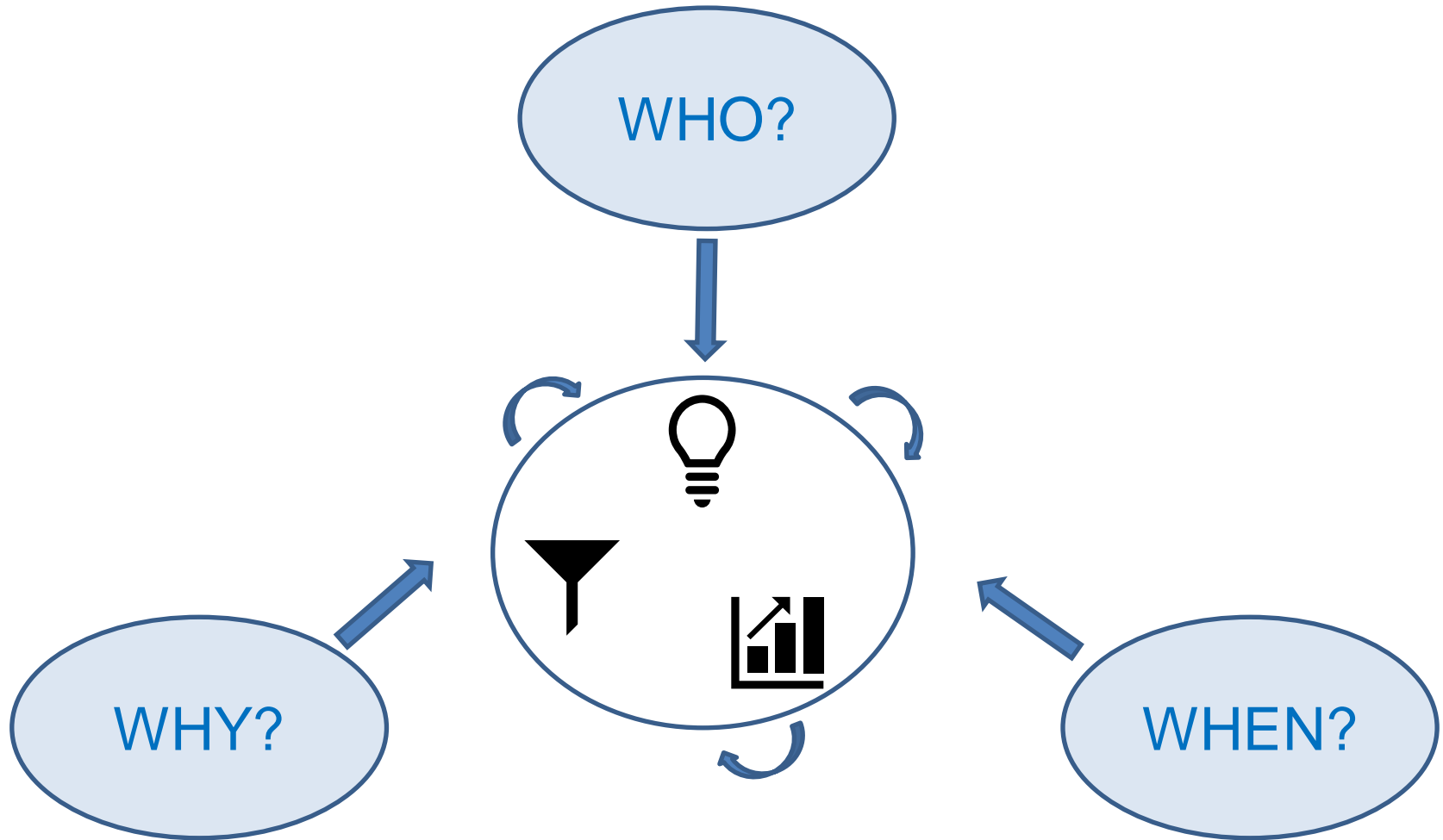
PA as part of continuous learning
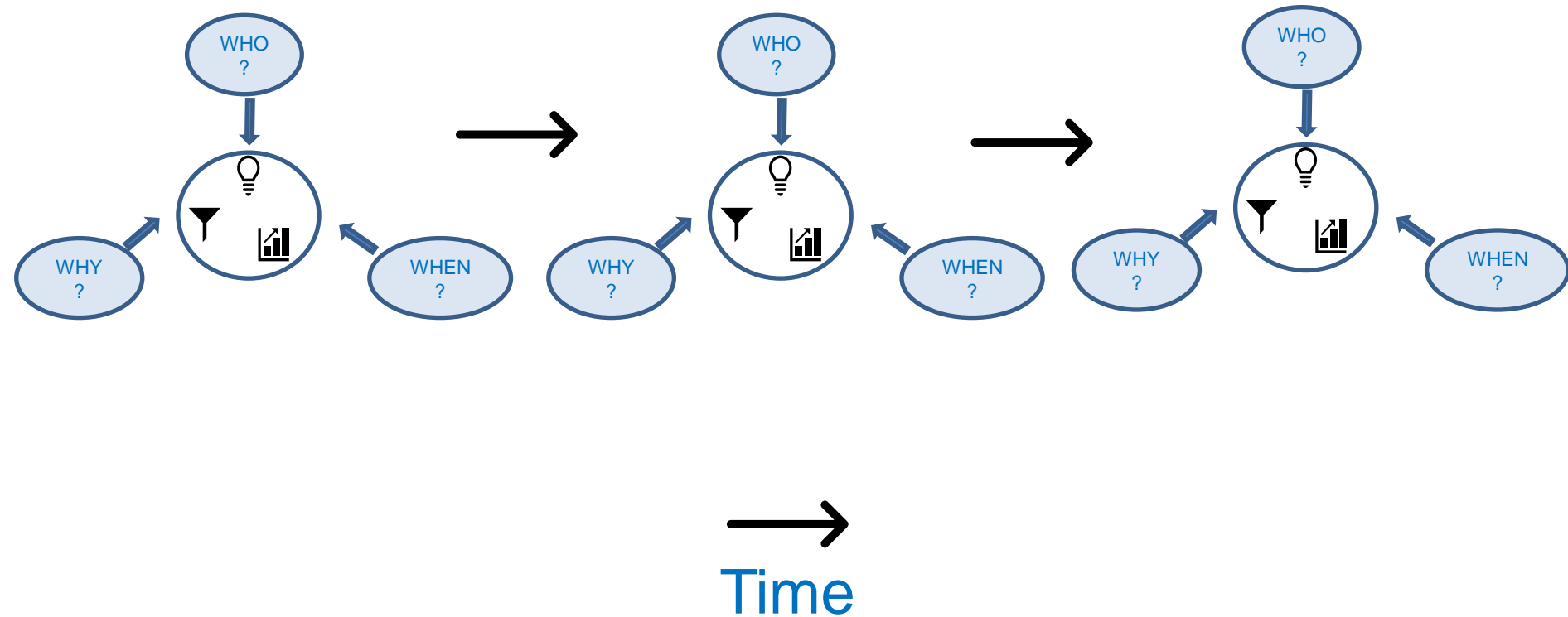
For more information:

Furthering MDRC's long-standing commitment to helping our partners improve their programs and systems through data science — producing insights that can be put into action in daily practice.

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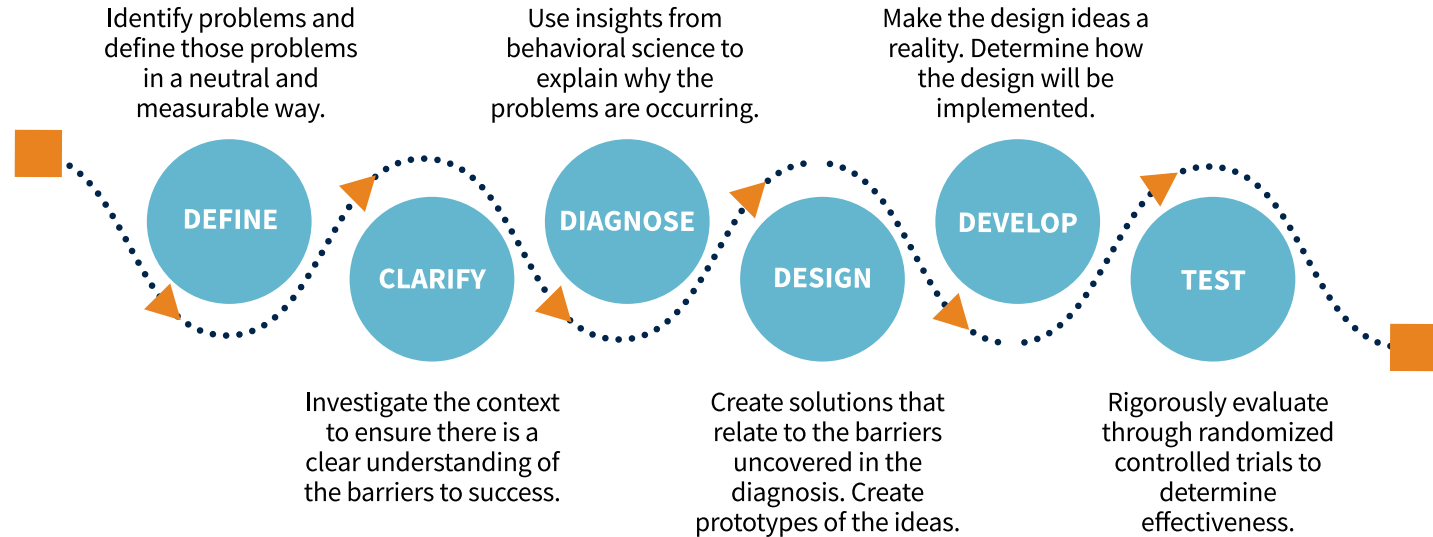Richard Hendra, PhD, Director
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Extra Slides

cabs
at mdrc

The Center for Applied Behavioral Science (CABS) combines MDRC's decades of experience tackling social policy issues with insights from behavioral science. CABS takes on pressing problems that our partners want to solve. Our approach to problem solving focuses on ensuring that people who receive services are at the center of designs.

BE.info@mdrc.org   @CABS_MDRC

Our Approach to Problem Solving

Identify problems and define those problems in a neutral and measurable way.

DEFINE

CLARIFY

Investigate the context to ensure there is a clear understanding of the barriers to success.

Use insights from behavioral science to explain why the problems are occurring.

DIAGNOSE

DESIGN

Create solutions that relate to the barriers uncovered in the diagnosis. Create prototypes of the ideas.

Make the design ideas a reality. Determine how the design will be implemented.

DEVELOP

TEST

Rigorously evaluate through randomized controlled trials to determine effectiveness.

This approach has generated proven examples including:

Simplifying information

Providing timely reminders and clear deadlines

Personalizing messages to individual circumstances

The interventions typically have low costs, from $0.01 to $10 per participant. CABS tests the impacts of interventions rigorously, usually in randomized field trials, often building on the findings by iterating, improving, and reevaluating the original designs.

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