

Developing and Optimizing Behavioral Treatments to Prevent and Treat Disease

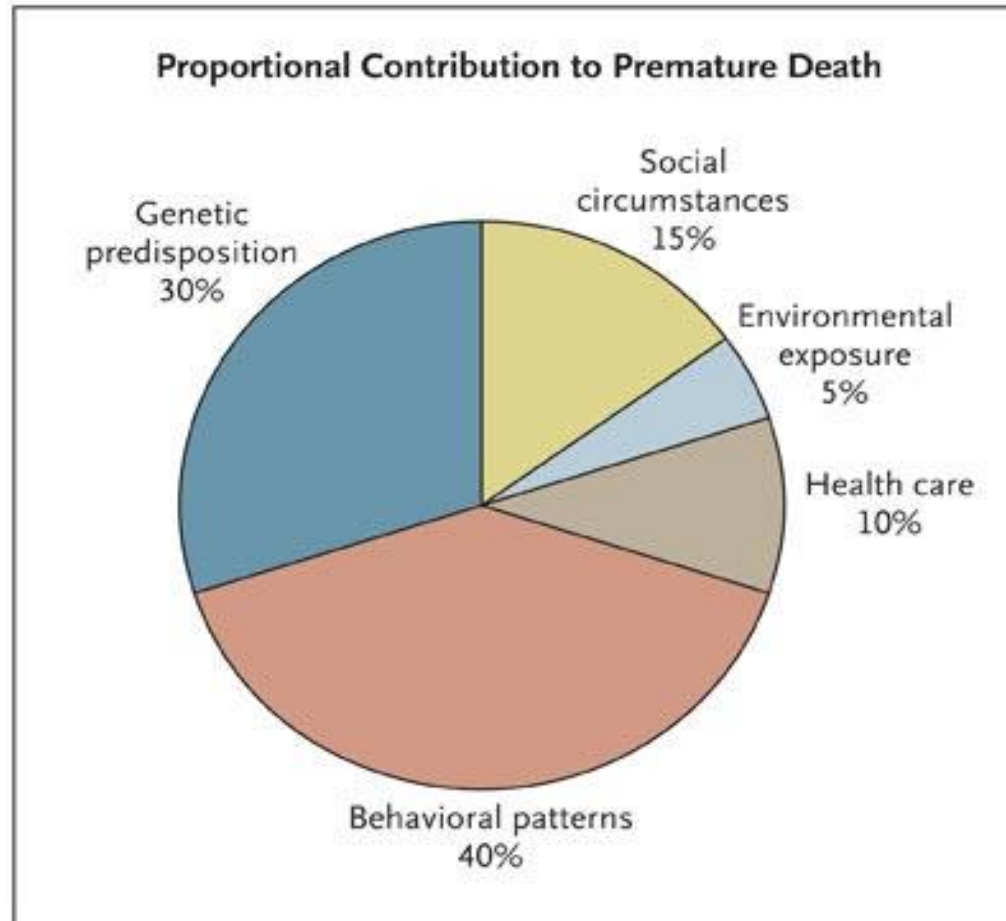
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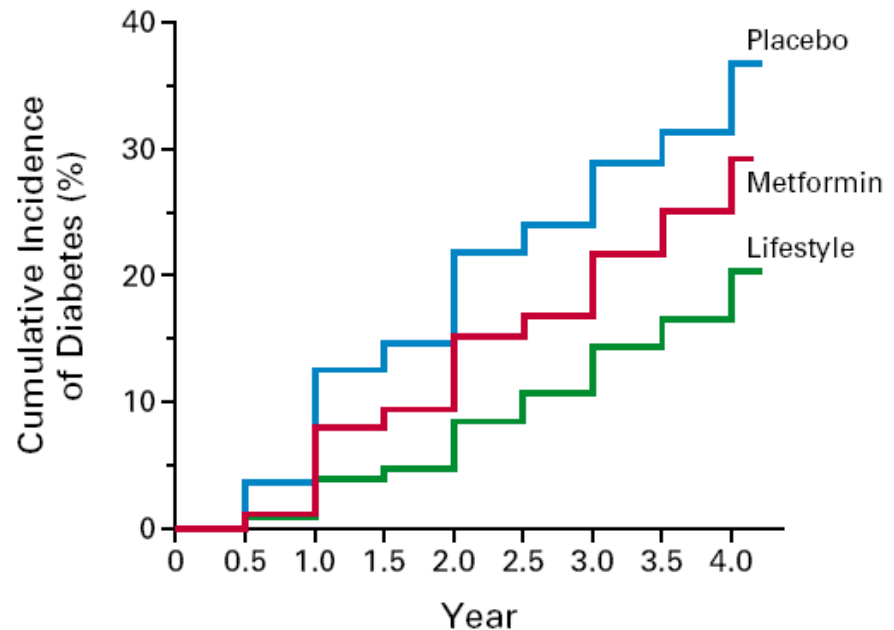
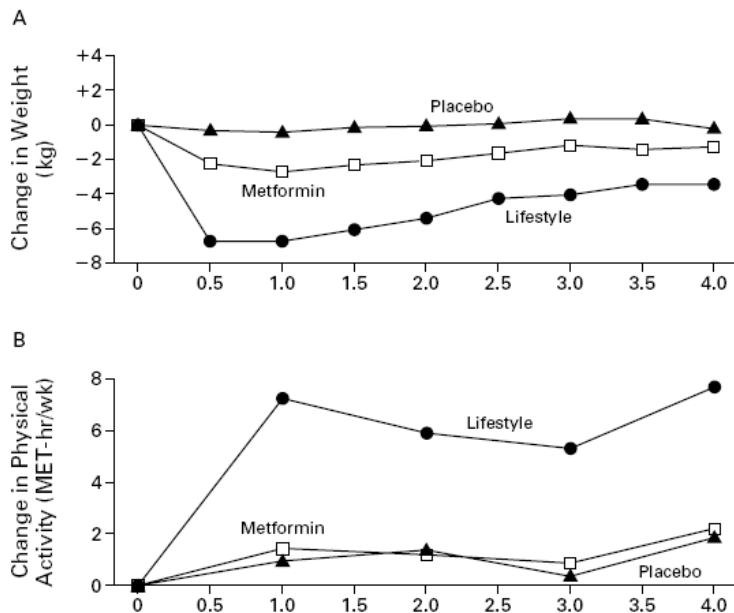
April 2, 2014



Changing unhealthy behaviors is the “single greatest opportunity to reduce premature deaths...”



Improving dietary and physical activity behaviors can have powerful effects on health ...



A 7% weight reduction and 2.5 hour per week activity increase led to a 58% reduction in the cumulative incidence of Type 2 diabetes in older insulin-resistant individuals (Diabetes Prevention Program Research Group, 2002).

...but challenges remain: Rates of adherence to CV meds are low

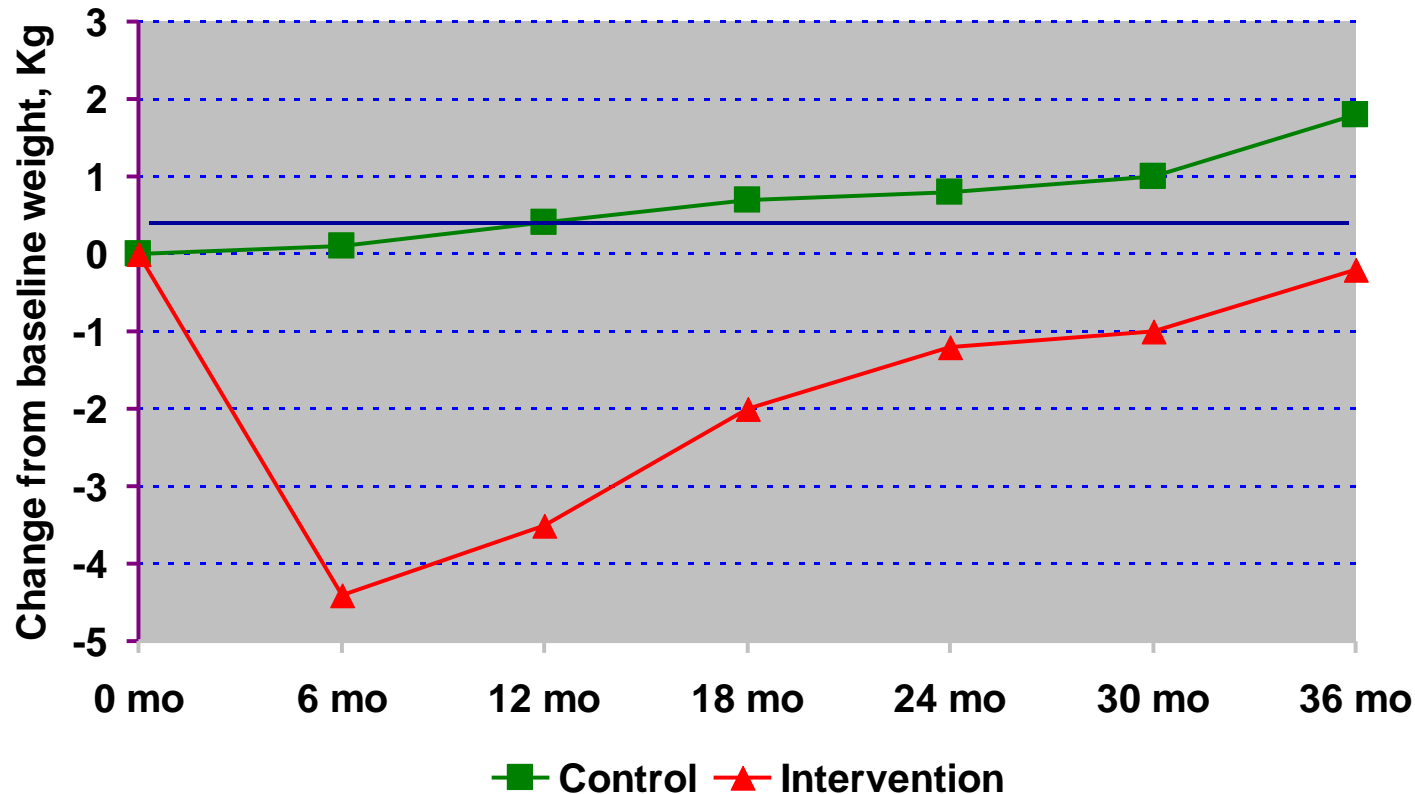
Table 2. Medication Adherence during Follow-up.*

Variable	Absolute Adherence†			P Value
	Full Prescription Coverage	Usual Prescription Coverage	Absolute Difference (95% CI)	
	percentage points			
All patients§				
ACE inhibitor or ARB	41.1±39.8	35.9±38.1	5.6 (3.4–7.7)	<0.001
Beta-blocker	49.3±37.5	45.0±36.6	4.4 (2.3–6.5)	<0.001
Statin	55.1±37.7	49.0±37.3	6.2 (3.9–8.5)	<0.001
All three medication classes	43.9±33.7	38.9±32.7	5.4 (3.6–7.2)	<0.001
Patients who filled at least one prescription				
ACE inhibitor or ARB	66.5±29.6	60.8±30.7	5.8 (3.6–8.1)	<0.001
Beta-blocker	65.0±28.9	61.0±28.9	4.0 (2.1–5.9)	<0.001
Statin	70.5±27.0	65.0±28.4	5.5 (3.6–7.5)	<0.001
All three medication classes	67.4±15.5	62.9±26.3	4.5 (2.5–6.4)	<0.001

Even when behavior change is successful, maintenance of healthy behaviors across time is challenging

Trials of Hypertension Prevention II:

Weight loss over 36 months in 2382 overweight pre-hypertensives



- Behavior powerfully affects health
- Changing behavior can improve health outcomes
- The Challenge: to develop new & more effective approaches to changing health-related behaviors

How can we design more effective behavior change interventions?

In biomedical research, a well-defined translational process exists that guides the development of new basic biological discoveries into efficacious therapies

Building better behavioral interventions depends on defining a similar process to accelerate the translation of basic behavioral science research into more effective behavioral interventions

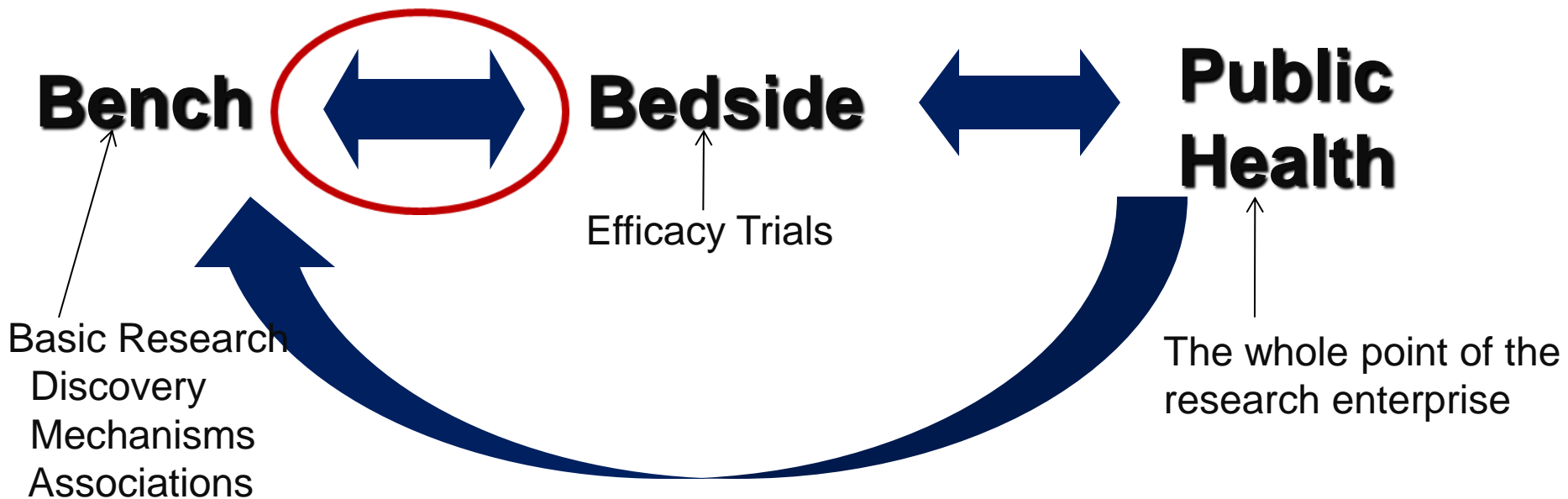
The Translational Research Spectrum

T0/T1 Translation

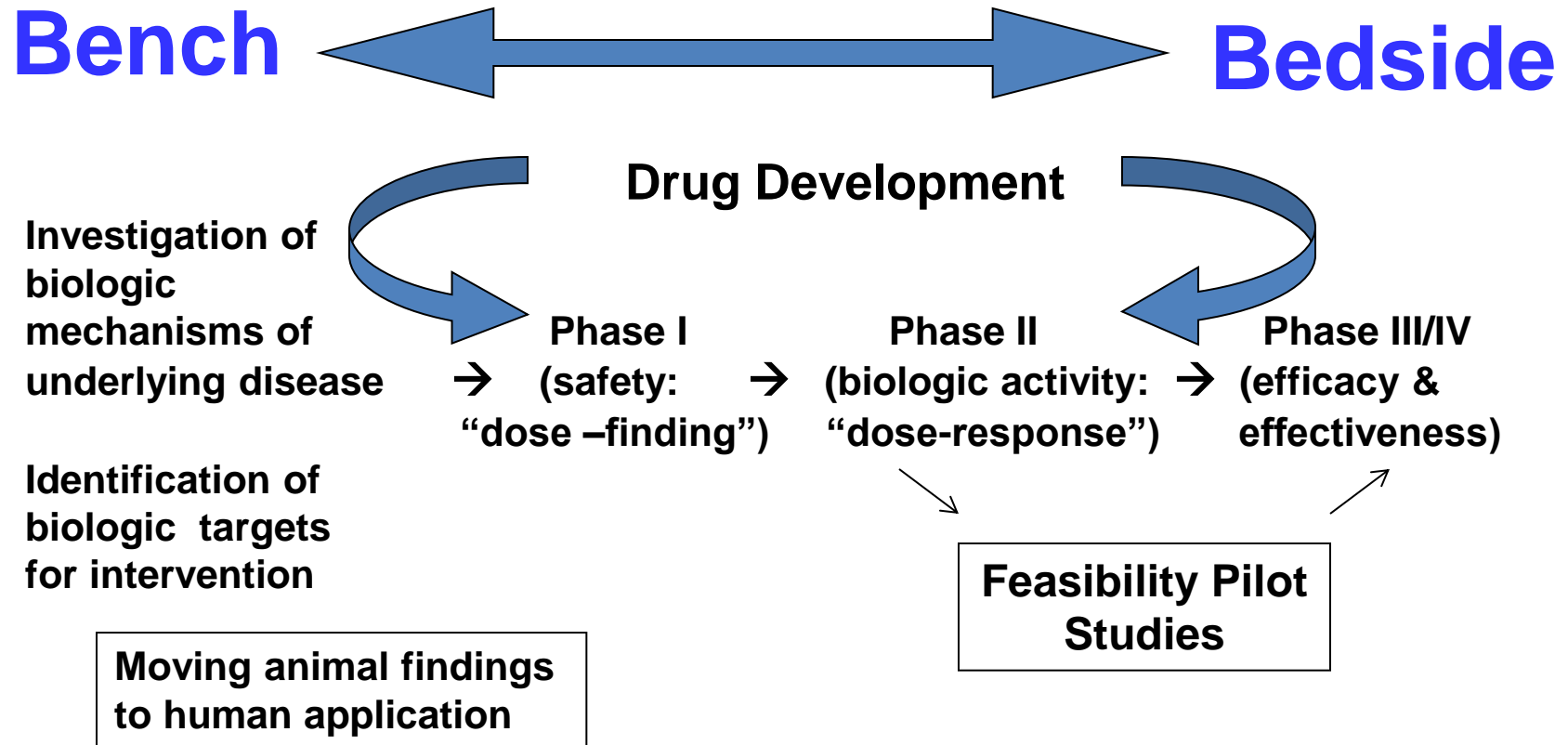
Basic science discoveries
used to develop new
treatments

T2-T4 Translation

Testing use of proven therapies in
clinical practice & community
settings



T1 biomedical research model: Drug development



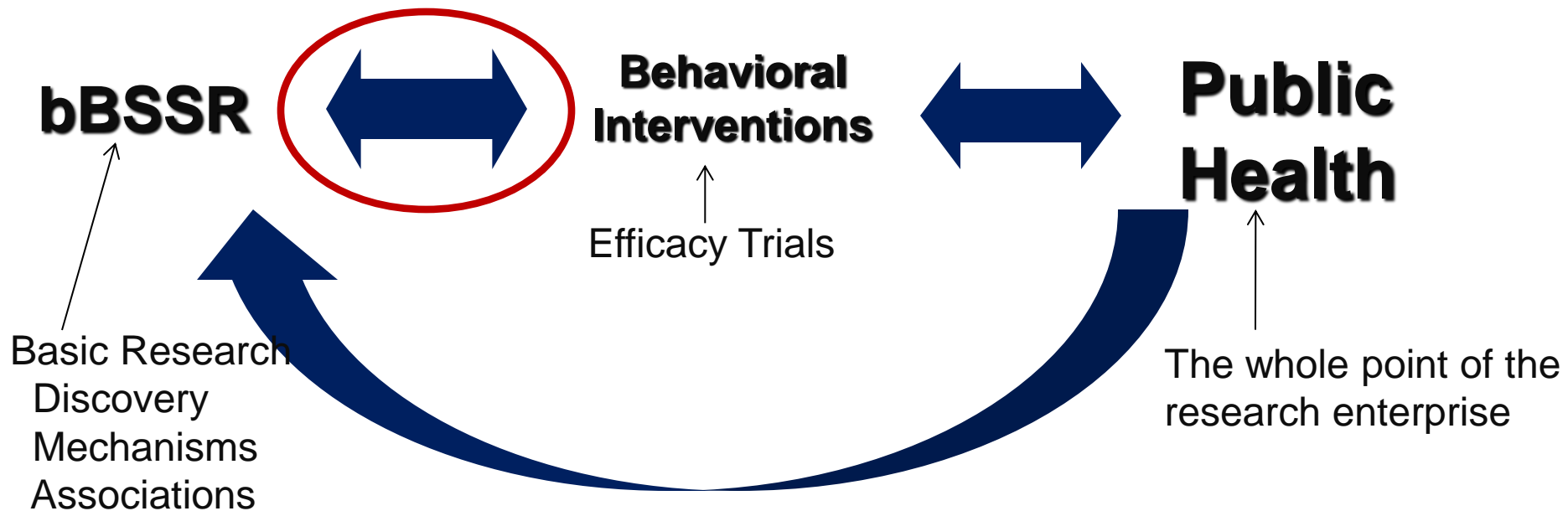
...applied to behavioral science research

T0/T1 Translation

Basic science discoveries
used to develop new
treatments

T2-T4 Translation

Testing use of proven therapies in
clinical practice & community
settings



Challenges to conducting “Translation I” research in the behavioral sciences

- **There is no standardized, widely accepted “paradigm” or framework** to describe & guide the behavioral intervention development process (as is true for drug development research, which conforms to a widely accepted regulatory process)
- **There is no real consensus on the types of study designs and methods** most useful and appropriate for early-phase behavioral intervention development research
- **Lack of industry support** for health behavior intervention development (no equivalent to the pharmaceutical industry)
- **Few NIH funding opportunities**, no training opportunities, review groups not set up to review translation I/behavioral intervention development
- **Few incentives to create & maintain interdisciplinary teams** required to conduct translational research;
- **Lack of academic recognition** for bridging basic-clinical fields of study & for developing behavioral interventions
- **High-risk nature** of translational and intervention development research

Why define a framework and methods to guide the behavioral intervention development process?

- The drug development model, while not without flaws, has resulted in the creation & testing of many life-saving and life-extending treatments
- Use of a framework and identification of well-defined and appropriate methods in behavioral intervention development research can:
 - Accelerate the flow & development of new, innovative approaches to changing behavior from basic studies of human behavior to efficacious interventions
 - Encourage the development of behavioral interventions that are well-characterized, appropriately tested & optimized prior to testing in larger, more expensive Phase III trials – ultimately leading to better, more powerful behavioral interventions
 - Lead to identification of “failures” earlier in the process, allowing for refinement of interventions and reducing premature testing of “weak” behavioral interventions in Phase III trials

Obesity Related Behavioral Intervention Trials (ORBIT) RFA program

- **Objective:** To translate findings from basic research on human behavior to develop more effective interventions to reduce obesity & improve obesity-related health behaviors
- **Mechanism:** U01 (Cooperative agreement)
 - 7 ORBIT research centers
 - 1 Resource & Coordination Unit (RCU) to facilitate cross-study activities
- Each research center supports interdisciplinary project teams of basic and applied biological, clinical, behavioral and social scientists who are developing novel obesity-related interventions through formative & experimental research, early phase trials & pilot studies



Translating Ideas into Interventions: The Process of Developing Behavioral Interventions

NIH-sponsored Workshop

December 6-7, 2010

- *What **model or framework** can we use to guide the behavioral intervention development process?*
- *Which **study designs & methods** are most appropriate for the development of behavioral interventions?*
- *How do we create environments that **foster creativity** & encourage the development of innovative behavioral interventions?*



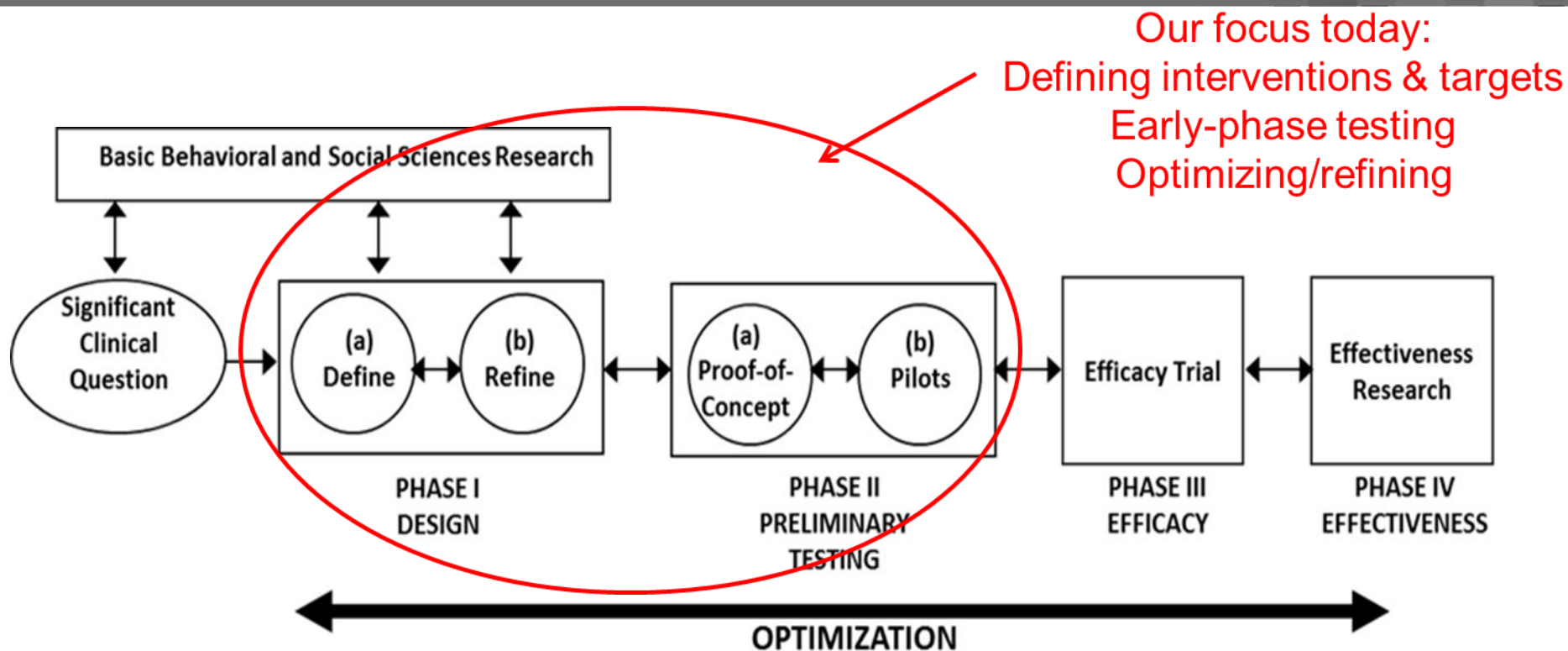


Figure 1. The ORBIT Model for Behavioral Treatment Development

Questions about behavioral intervention development designs & methods

- What designs and methods are most likely to yield productive results when developing and testing behavioral interventions?
- What types of small-N designs are appropriate for early-phase intervention development? How are appropriate sample sizes determined for early-phase behavioral intervention studies?
- Should behavioral intervention development studies employ randomized designs?
- Should control groups be used in early phase trials and pilot studies? What kinds of control groups are most appropriate?

Questions about behavioral intervention development designs & methods

- How should we determine optimal dose, frequency, duration & intensity of a behavioral intervention?
- What milestones should be used to inform “go/no-go” decisions required to proceed through the stages of behavioral intervention development research?
- What role can qualitative and mixed methods play in designing and testing behavioral interventions?
- How can alternative approaches, such as fractional factorial, adaptive and engineering designs be used in the development of behavioral interventions?

Some T1/intervention development designs and methods which we will discuss today

- **Defining targets and interventional components:**
 - Experimental and observational studies in the laboratory and field
 - Sequential analysis and coding of patient-provider interactions
 - “User-centered” design using qualitative & hybrid (mixed-methods) approaches
 - Small single case & case series studies
- **Refining/optimizing & proof-of-concept studies**
 - Quasi-experimental, within-subjects designs
 - Dose-finding studies
 - Factorial and fractional factorial designs
 - Adaptive interventions and Just-in-Time adaptive interventions (JITAI) designs



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