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Design of Multilevel Interventions for Obesity

Bonnie Spring, PhD
Director, Center for Behavior and Health
Institute for Public Health and Medicine
Northwestern University Feinberg School of Medicine

Social Ecological Intervention – In search of Synergy

"interventions that target determinants at multiple levels and mutually reinforce each other are likely to produce larger and longer lasting effects than interventions that target determinants at only one level"

-Weiner, Clauser, Lewis
JNCI, 2012

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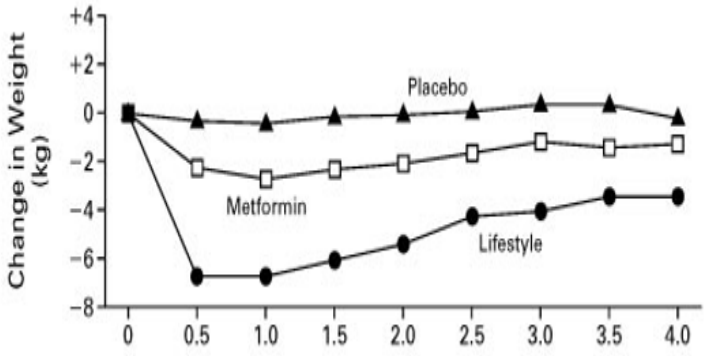
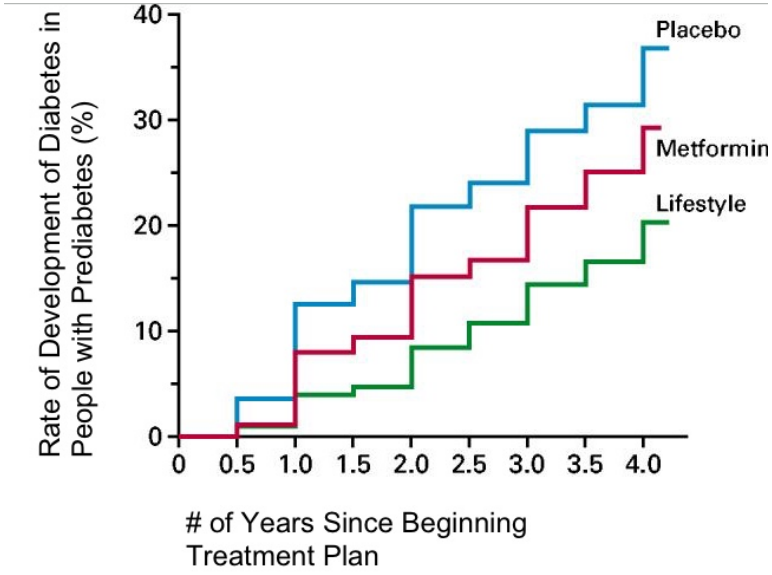
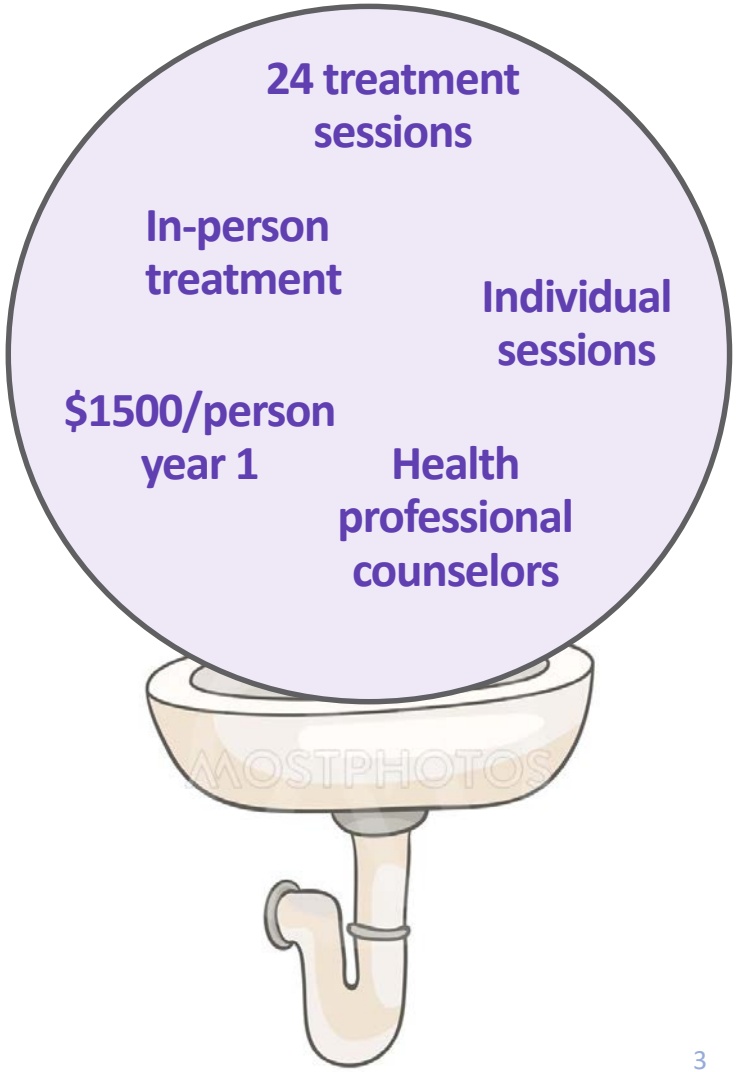
DPP – Gold Standard Clinical Obesity Treatment

Diabetes Prevention Program – NEJM, 2002

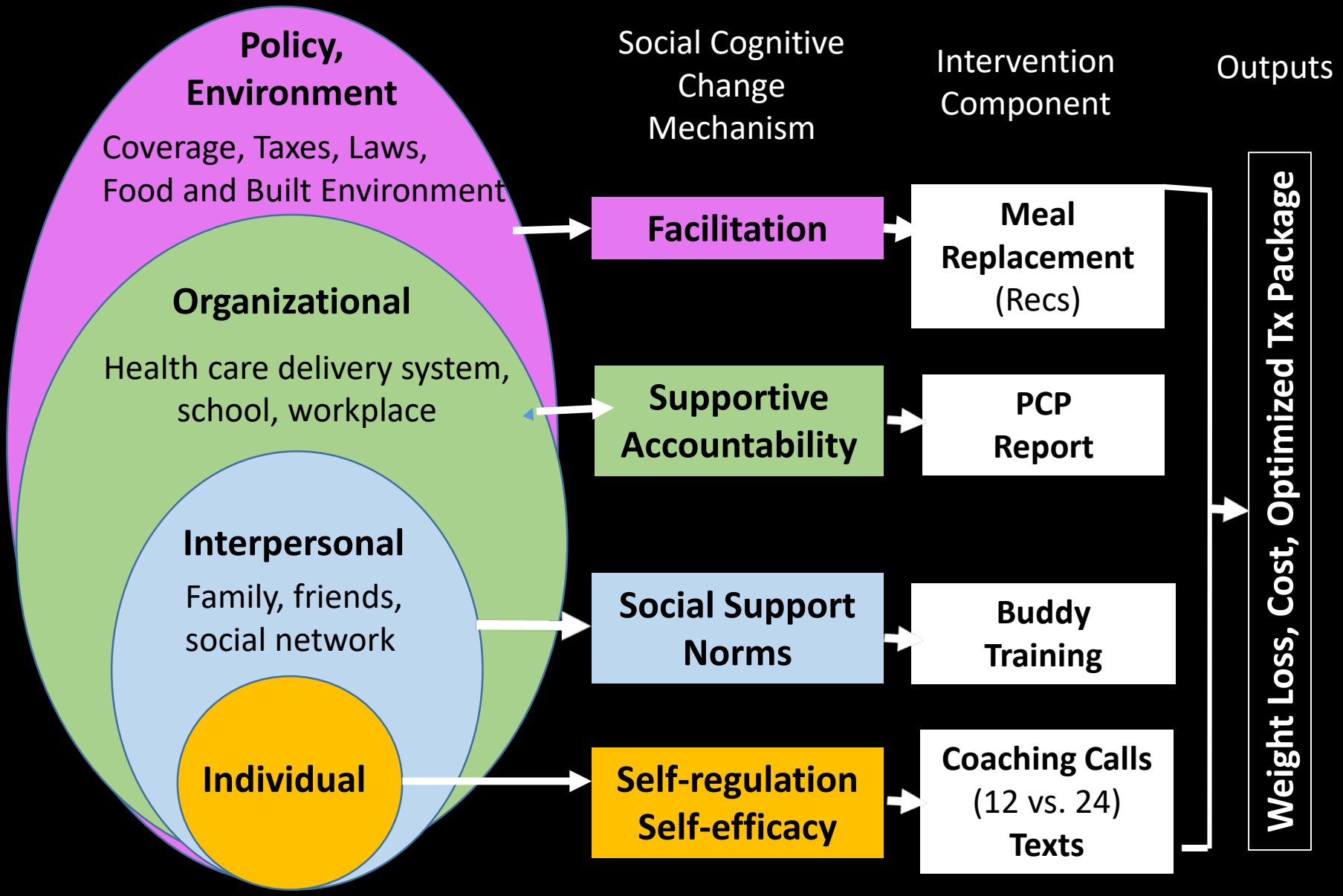




DPP Treatment Package

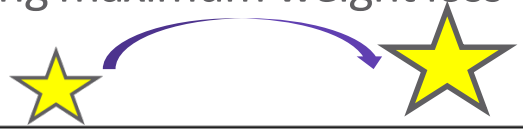


Ecological Framework for Obesity Intervention



Intervention Optimization Aims:

1. Which components contribute most to 6 month weight loss at what cost?
2. Apply to build a tx package yielding maximum weight loss attainable for ≤$500



N = 562

6 month Retention:

84.3%

Table 3. Experimental Conditions

Exp. Cond-ition	CORE (App, Ed)	# Coaching Sessions	Report to PCP	Texts	Meal Repl.	Buddy Training
1	Yes	12	Yes	No	No	No
2	Yes	12	Yes	No	Yes	Yes
3	Yes	12	Yes	Yes	No	Yes
4	Yes	12	Yes	Yes	Yes	No
5	Yes	12	No	No	No	Yes
6	Yes	12	No	No	Yes	No
7	Yes	12	No	Yes	No	No
8	Yes	12	No	Yes	Yes	Yes
9	Yes	24	Yes	No	No	No
10	Yes	24	Yes	No	Yes	Yes
11	Yes	24	Yes	Yes	No	Yes
12	Yes	24	Yes	Yes	Yes	No
13	Yes	24	No	No	No	Yes
14	Yes	24	No	No	Yes	No
15	Yes	24	No	Yes	No	No
16	Yes	24	No	Yes	Yes	Yes

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Spring, Pfammatter, et al, *Obesity*, July 2020

Coaching Call Adherence

	12-call condition	24-call condition
M (SD) Calls Completed	10 (3)	19 (6)***
M (SD) Total Call minutes	155 (22)	232 (120)***
M Minutes Per Call (SD)	15 (6)	13 (5)***

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Decision-making: build treatment package that maximizes 6-month weight loss for <$500

Combination	Calls	Meal Replacement	Text Message	PCP Report	Buddy Training	Y-hat (6-mo weight change)(kg)	Y-hat (percent achieving 5% weight loss)	Y-hat (percent achieving 7% weight loss)	Cost	
21	12	No	No	Yes	Yes	-6.11	57.13	51.77	$427.00	$74.9 / kg
1	12	No	No	Yes	No	-3.40	34.48	25.86	$337.00	
5	12	No	No	No	Yes	-5.05	46.56	31.02	$414.00	($85.4 / kg)
17	12	No	No	No	No	-5.24	52.95	41.17	$324.00	$67.1 / kg

Good news for public health

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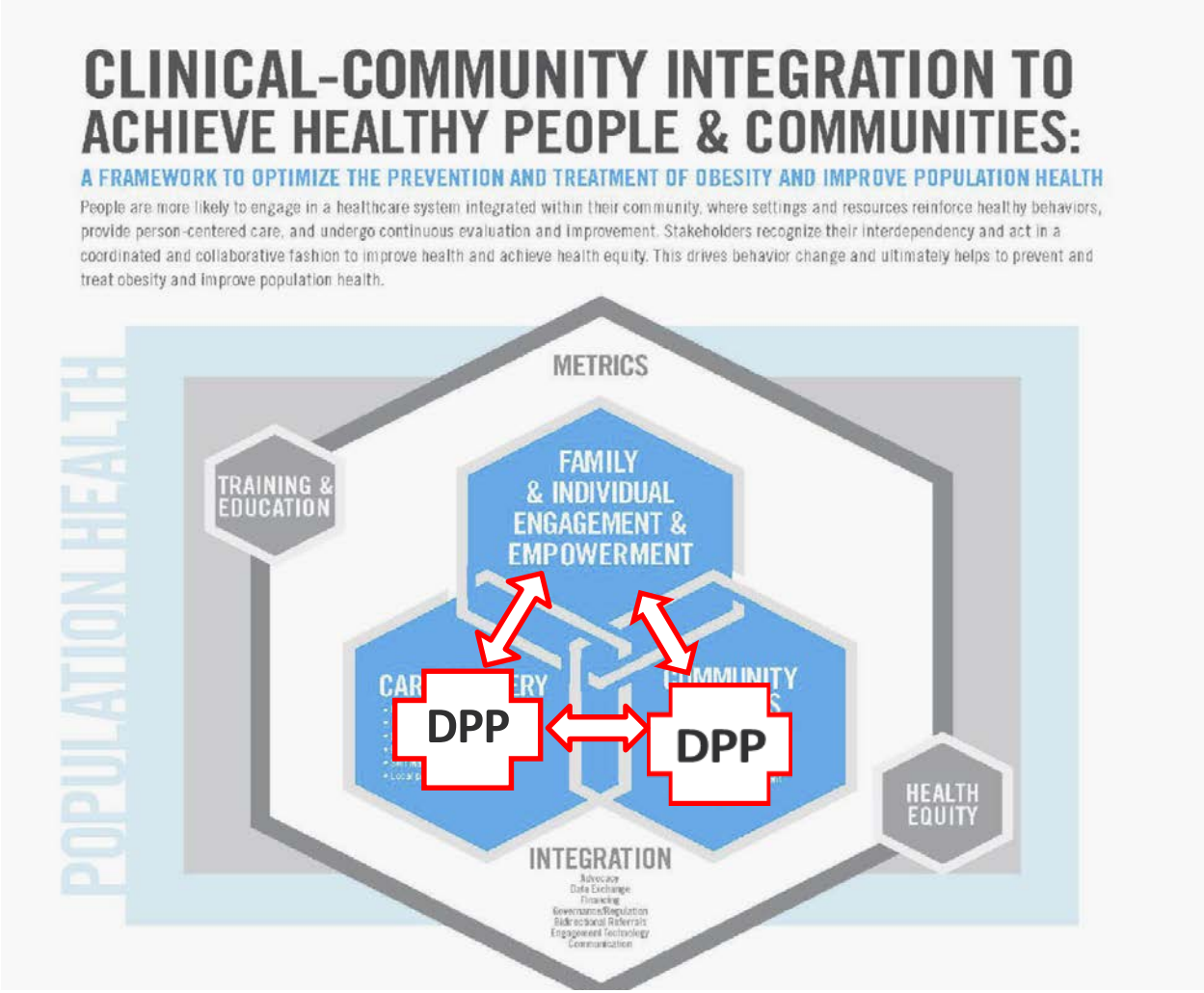

Roundtable on Obesity Solutions; Food and Nutrition Board; Institute of Medicine. *The Current State of Obesity Solutions in the United States: Workshop Summary*. Washington (DC): National Academies Press (US); 2014.

Conclusions



1. Multilevel intervention holds promise
2. Understand multilevel system synergies and constraints on implementing obesity intervention
3. Continually optimize for effectiveness and efficiency within context.

- NIH
  - R01DK108678 (Spring)
  - R01DK097364 (Spring)
  - T32CA193193 (Spring)
- AHA
  - 14SFRN20740001 (Spring)

Thank you!

bspring@northwestern.edu

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