

Questions and Answers

Mind the Gap — Designing and Adapting Interventions to Promote Community Health: A Multilevel, Stepwise Approach

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Q: How does your intervention design approach compare to other intervention planning approaches such as Intervention Mapping or Green's Precede-Proceed Model?

A: My approach differs from Intervention Mapping and the Precede-Proceed model in several ways. One is in the level of detail provided for the process. The Precede-Proceed Model provides a high-level guidance on areas to consider when designing an intervention while Intervention Mapping provides very detailed tasks across six steps. When designing interventions, I found that Precede-Proceed didn't provide enough guidance while Intervention mapping was too prescriptive and time-intensive to implement. I tried to strike a balance with my design process by offering clear direction on how to proceed without being overly prescriptive. Other ways that my approach differs is the importance of creating a conceptual model that shows the causal relationships to be evaluated and the mechanisms of change. My approach also includes specific discussion (and even steps) regarding how to engage community.

Q: What are some good sources for identifying evidence-based interventions?

A: My book, "Designing interventions to Promote Community Health: a Multilevel, Stepwise Approach" (APA, 2022) includes a table that shows a list of sources for evidence-based interventions. As an example, NCI's Evidence-Based Cancer Control Program (<http://ebccp.cancercontrol.cancer.gov>) and Blueprints for Healthy Youth Development website (<http://blueprintsprograms.org>) are included as examples of EBIs that identify core elements of the intervention and provide direct links to the intervention developer, intervention materials, and training and technical support for implementing the intervention.

Q: You mentioned the need for creative people on the intervention team. What do you mean by that? How have you found creative people to work on your projects?

A: Designing intervention strategies (messages, materials, training) that will engage the target audience is an essential element of an effective intervention. I have found it very useful to hire creative people from the community of interest who have experience in engaging with the target audience to help develop the intervention strategies. In my projects we have hired creative teachers, graphic artists, and playwrights to help develop intervention strategies such as curriculum, media messages, promotional materials, and 'radio shows' to engage participants.

Q: Many of my colleagues are excited about using MOST as well as other Adaptive approaches in their intervention work. What are the advantages and disadvantages of those approaches relative to your intervention design approach?

A: MOST is very useful in testing intervention components (defined by Linda Collins as any part of an intervention that can be separated out for study) prior to evaluating an intervention in an RCT. Using a MOST approach, the investigator identifies the intervention component to be examined (i.e., 'Does adding a face-to-face component to an eHealth intervention result in better outcomes?' or 'Is the counseling intervention as effective with only 4 sessions as compared to 8 sessions?'). This approach allows an intervention to be built, incrementally by testing different components, before testing in an RCT. The disadvantage to this approach is the number of potential iterations of interventions to be tested may be quite large, so decisions need to be made about the most important intervention components to evaluate. It is also important that a focus on those determinants to be targeted for change in the intervention are not lost in the MOST process.

Other adaptive approaches that involve altering the content, dose, or general approach of the intervention to achieve a good outcome for individuals are much more difficult to do in a multilevel intervention that targets the social and physical environments. While intervention components that focus only on the individual environment can be more easily and quickly manipulated it is not possible to quickly alter exposure to intervention components targeting a change in the social environment (i.e., turn off or on social support) or the physical environment (i.e., manipulate prices to impact behavior).

Q: It seems counterintuitive to 'break apart' and mix and match behavior change theories. Isn't it important to test the theories as they are specified?

A: When we are attempting to positively impact health in a community, behavioral theory should be used in a pragmatic way to help us understand either what constructs (or determinants) have been found to be protective or risk factors for health behavior or to help us understand how behavior change occurs. Our goal as community interventionists is not to test theory but to use theory to guide our programs and practice.

Q: How different would your approach be if you're doing a nationwide study versus one specific area?

A: The two multilevel community interventions that I mentioned in the talk both included schools and communities from across the country. CATCH was evaluated in California, Louisiana, Minnesota, and Texas. TAAG was evaluated in Arizona, California, Louisiana, Maryland, Minnesota and South Carolina. Designing a multilevel intervention to be tested in sites across the country has some challenges as well as some advantages. The challenges include that there may be some variability in the determinants that are important in some states and not others. For example, the weather has a greater impact on levels of activity for girls in Minnesota as compared to girls in California. In addition, the school PE requirements differed from state to state. In developing the intervention, we chose to intervene on the determinants that were relevant for girls, schools and community across all of the states and we created some flex in the intervention protocol to allow for some differences between states. The big advantage in evaluating both CATCH and TAAG in multiple states was that the interventions were designed to be disseminated, reflecting the needs and resources available in multiple communities.

Q: Can you reiterate or share a clear definition of "multilevel" intervention?

A: Multilevel interventions are interventions designed to influence more than one contextual level, including groups, organizations, and the community (Clouser et al, "Multilevel intervention research: Lessons learned and pathways forward. JNCI Monographs, 2012 (44),49-55.)

Q: Could you talk a little more about mediation analysis and its application in identifying key determinants?

A: *The determinants that emerge as significant mediators tell us something important about how our intervention worked. When a determinant is found to be a significant mediator between our intervention activities and our health outcome, it tells us that the change in the outcome was, in part, attributable to a change in that determinant driven by intervention strategies. That tells me that those mediators are active ingredients related to the change in the outcome.*

*The thing that gets tricky is that we may develop several intervention components that we expect will effect change in a determinant. In my talk, I mentioned that three of the TAAG components could be expected to impact girls' perceptions of self-efficacy (TAAG PE, Health education, and TAAG Promotions) because they built skills around being active and provided vicarious learning about being active; our mediation analysis showed that a change in self-efficacy mediated the intervention's impact on the outcome. However, the mediation analysis doesn't tell us **which one of those components** was most responsible for the change in self-efficacy or if all three components were needed to impact self-efficacy. To determine which components were necessary to impact change in an intervention, you would need to do something like Linda Collins' MOST work or a comparative effectiveness analysis like CATCH. An important thing to remember is that the factor being targeted by an intervention is the DETERMINANT; the components are a vehicle for instituting change in the determinant. Don't lose sight of the determinants when looking for the active ingredient. I agree with NCI's definition of an active ingredient as including the content, delivery and change strategies used to positively impact a determinant.*

Q: Do you conduct and publish each stage of a study separately? For example, a publication each for the literature review for empiric evidence, formative assessment, intervention design, and intervention evaluation?

A: *I almost always publish a: 1) **study design paper** that includes the rationale for the intervention (including the literature review that shows that the health problem to be considered is an important public health problem), describes the population that I'm going to work with (and evidence that they are at risk for the health problem to be studied), my primary and secondary outcomes and the study design; 2) paper on the **formative work**; 3) a paper on the **intervention design and conceptual model**; 4) a paper on the **process data**; and a 5) **primary outcome paper**. There are usually other papers published- often one on baseline data that shows risk in my population to be studied, a mediation paper, many papers on secondary outcomes, and papers examining exploratory hypotheses.*

Q: Have you investigated sustainability for the programs you studied? If so, did you run into any barriers? How did you address them?

A: *For CATCH, we obtained a grant from NHLBI to study the institutionalization of CATCH in schools several years after the intervention trial research was completed. We called the research "CATCH-ON". Our results are described in a monograph published in Health Education and Behavior, Volume 30, August 2003 and describe what school components were maintained and which were diluted over time. In addition, CATCH as a school-based health promotion program has been disseminated nationwide as the Child Approaches To Cardiovascular Health.*

We also received funding from NHLBI to conduct a tracking study to determine if the eating and activity improvements that we saw at the end of the main CATCH trial were sustained in the youth exposed to

CATCH. We call that study the CATCH Tracking study (Nader PR, Stone EJ, Lytle LA, et al. Three-year maintenance of improved diet and physical activity: The CATCH cohort. Archives of Pediatric and Adolescent Medicine. 1999;153:695-704.) The tracking study showed that the behavioral changes instigated by CATCH in the elementary grades (diet and activity changes) persisted as the cohort moved into early adolescence.

Q: How, if at all, can AI be used to create models for interventions?

A: I can imagine that AI might be used to generate materials for an intervention and I can imagine AI as being used to identify potential evidence-based interventions for a health issue. But I don't see it able to create intervention designs or models that reflect the needs and resources of communities. Interventions need to be designed or tailored to meet the needs of community; that involves understanding resources, community history and priorities, and understanding how systems within communities operate at a human, interpersonal level.