DESIGN as a Tool for Public Health Innovation

Amy Schwartz, PhD

Public Health challenges require systemic solutions that drive change at the individual, community, and societal levels. Design Thinking can help create innovative solutions by inspiring new ways of framing problems and expanding the public health armamentarium with new tools and methods. Design thinking is a problem-solving approach used across design disciplines from product design to architecture. This approach leads to human-centered solutions by direct engagement with end users throughout the process, blending research, design, and prototyping in iterative cycles. Design Thinking has been applied to a wide range of complex problems and helps multidisciplinary teams balance technology, desirability, and feasibility to achieve integrated and effective systemic solutions (see Brown, 2008).

Amy Schwartz

Several conceptual areas from the design domain are especially relevant to Public Health: Visualization and Affordances, Design for Healthy Behavior Framework, and Design Research Methods. I'd like to introduce Public Health practitioners to these concepts to start a dialogue about how we can partner in creating and sustaining innovative solutions to achieve better public health.

Visualization and Affordances

John Snow was a physician and is credited with being the father of epidemiology. I would say that he was also a designer. His famous map was an incredibly effective visualization that revealed an important insight into the relationship between cholera cases and drinking water pumps in London. This visual design convinced the city of London that there could be a link between the Broad Street pump and the disease. Visualization is an effective way to present quantitative information so that anyone—even those without scientific training—can take it in. It is a way to tell a story about relationships, and visual storytelling is an act of design.

John Snow's map (1854)

But while visual design was great at getting the city's attention, it was not enough to change behavior. This required an intervention. It was a simple and effective intervention that did not require a change in belief for the users or an acceptance of germ theory by the scientific community. They removed the pump handle. This uncomplicated intervention was also an act of design.

Snow started with a visual design that told a story (the map) and then went to modifying a design affordance (the pump handle). A design affordance is a property of a physical design that engenders a behavior "naturally"—i.e., with little or no learning or instruction. Don Norman, in his important book, The Design of Everyday Things, uses the example of a door that opens in only one direction. If the door has a fixed handle, then it is asking to be grasped and pulled to open the door. This affordance is so strong that we pull rather than push on a door that has the natural design wrong—even if we use the door all the time. (Thus, the need for signs on doors that have the affordance wrong.)

Pump handle

Poor Design: requires further explanation

Good Design: appealing and intuitive (Odenplan subway stairs)

Thoughtful application of design affordances in the built environment can help drive healthy behaviors. Consider the example of a stairway in the Stockholm Odenplan subway station. Stepping on the stair plays a musical note to encourage use of the stairs over the escalator. This creates a design affordance for walking up the stairs, rather than riding the escalator.

Another interesting example of a design affordance was created to address a problem with Alzheimer's patients. Alzheimer's patients can wander, get confused, disoriented, and agitated. Many facilities place patients in locked areas or put electronic tracking devices on them. The Benrath Senior Center nursing home in Germany used the affordance of a bus stop as a waiting place in an attempt to solve wandering in a more humane way. They designed an affordance for controlled wandering. Patients can wander around the grounds, but end up sitting at the bus stop as a natural resting place. They are safe to stay there until the staff brings them back to their rooms.

> "**Stepping on the stair plays a musical note to encourage use of the stairs over the escalator.**"

"Bus station" at the Benrath Senior Center

Design for Healthy Behavior Framework

Visualizations and affordances are relatively simple design tools that help us tell a story about relationships and foster behavior change. But not all behavior change challenges are addressed as easily as taking a pump handle off. To the right is a design framework that has been used to develop innovative interventions for more complex behavior change challenges ranging from medication adherence to saving money to preventative health screenings.
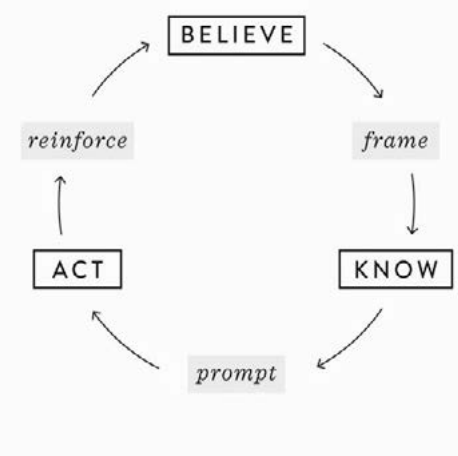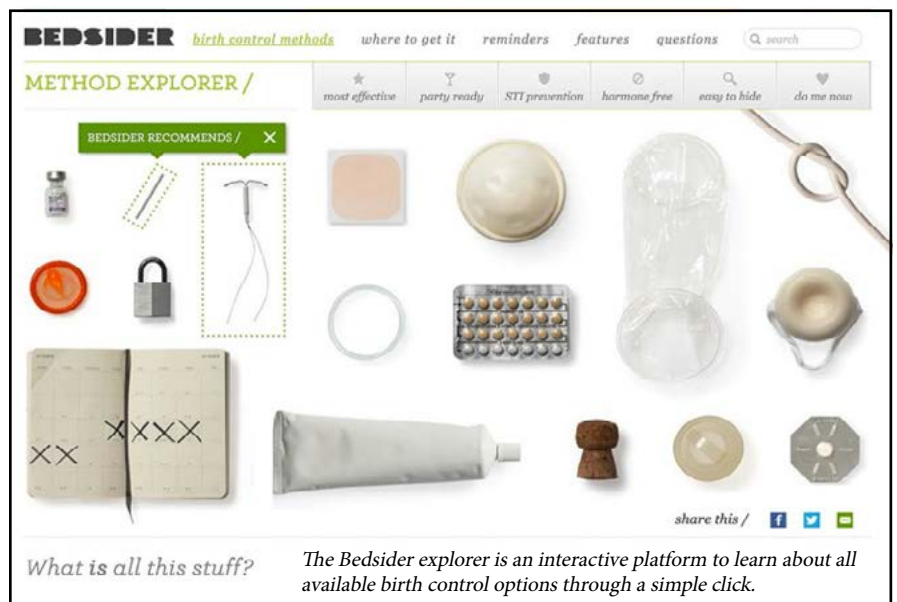

This framework is useful for both diagnosing and generating potential solutions to behavioral challenges. Behavior change challenges will differ in where the sticking points are in terms of both the specific challenge and the individual.

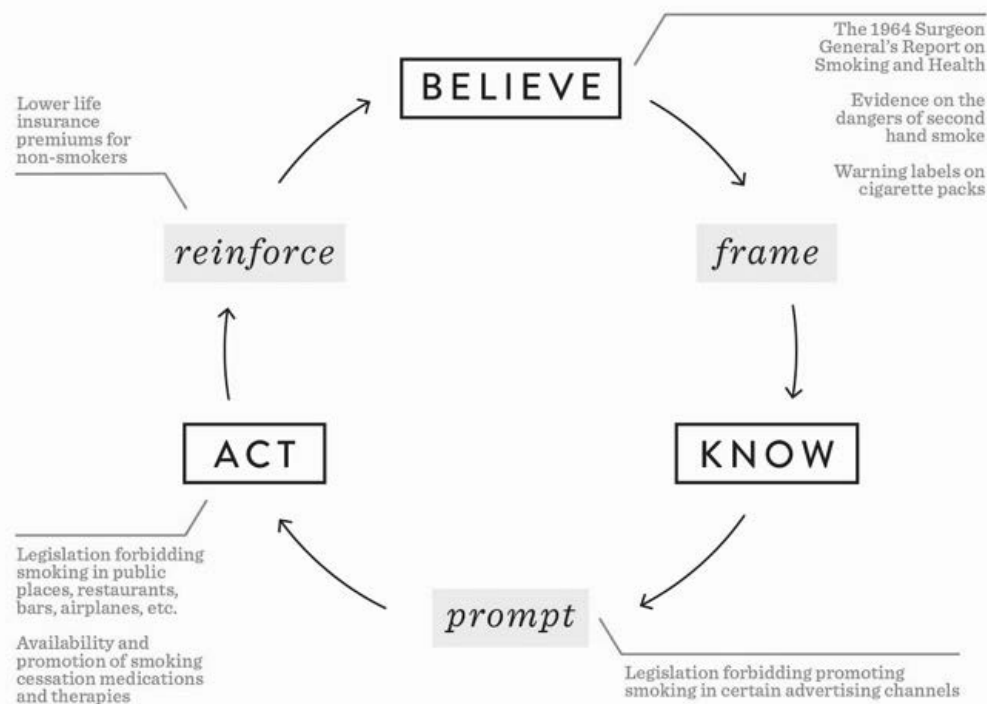Design for Healthy Behavior Framework (adapted from Klein, Wustrak, & Schwartz, 2006)

Consider a simple example like flossing your teeth. You probably *believe* that flossing your teeth leads to better health—both dentally and beyond. You have a mental model or *frame* about how flossing does this. You *know* what to do. (How many times has the hygienist demonstrated this to you?). You *prompt* yourself to floss when you brush your teeth by leaving the floss out right next to your toothbrush. But the problem with flossing is with the *act*. It is awkward and kind of unpleasant. When we do it, it does feel good afterwards, so there is some *reinforce*ment here. But if we want to get more people to floss their teeth more regularly (and not just the week before they go to the dentist), we need to tackle the design of the flossing act itself—not better prompting or evidence that it is important.

     Flossing is a relatively simple example. Most health challenges need design responses for many, if not all, of the links in this framework. We want people to get into a virtuous loop of healthy behavior that becomes habit. The Bedsider system to prevent unplanned pregnancy used this framework to drive research and design activities. The final design thoughtfully addresses all of the links through a website, a text messaging system, and print materials.

The Bedsider explorer is an interactive platform to learn about all available birth control options through a simple click.

Good design in health communication: screenshot from www.bedsider.org

"Most health challenges need design responses..."

Smoking reduction intervention componenets

cc Lindsay Fox

This design framework can be useful for analyzing public health stories—both successful and unsuccessful ones. Consider the success of the reduction in smoking in the US that has been achieved in the last 50 years.

Belief that smoking led to health problems was addressed through the 1964 Surgeon General's report linking smoking to lung cancer. Warning labeling on cigarette packs also drove belief. Additionally, evidence about the dangers of secondhand smoke was important here. Legislation preventing advertising on television helped attack the *prompt* link. Advertising messaging can be an effective prompting mechanism to drive people to certain behaviors—either healthy or unhealthy. The *Act* link was addressed in multiple ways, through legislation against smoking as well as creation and promotion of smoking cessation methods and medications. *Reinforce*ment is given to non-smokers through lower life insurance.

This framework can help drive better holistic design consideration of all the elements in the creation of new public health interventions. We can also look at unsuccessful interventions and gain insight into where we went wrong.

Design Research Methods

Design research methods inspire new ways to learn about and engage individuals and communities in their health. These methods are mostly qualitative and are adapted from diverse fields like psychology, anthropology, and journalism.

Methods can be especially useful when we want to explore and develop a wide range of early design ideas for new interventions. Assessment of the interventions through quantitative research studies should be a later step in the process.

Some relevant design research methods include:

- Behavioral Archeology: looking for evidence of people's activities inherent in placement, wear patterns, and organization of places and things.
- A Day in the Life: participants catalog the activities and contexts they experience throughout an entire day.
- Draw the Experience: participants visualize an experience through drawings and diagrams.
- Behavior Sampling: participants record and evaluate their current situation whenever they get a text.

The US Surgeon General's Office is currently experimenting with design research and innovation methods. Shown here is an example from a community meeting that was recently held in Flint, Michigan. As community members entered the meeting, they were asked to fill out a "MabLibs" sheet. This was a simple way to "break the ice" and get some input from each community member to feed smaller group discussion and education sessions. Many design research methods engage through participation and can complement the Community Based Participatory Design methods used in public health, expanding the public health toolkit.
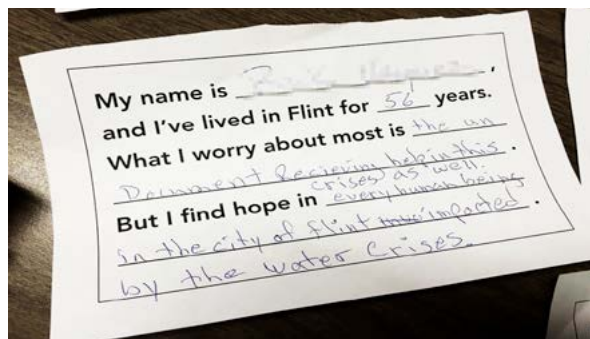

Good design in survey research: MadLibs feedback sheet from Flint community meeting

Partnering to Innovate in Public Health

Public health challenges represent some of the most complex and important issues in any society. There have been many successes, but there is a long way to go. Viewing these challenges through a design lens can lead to new ways of engaging individuals and communities, new insights, and new interventions. Designers are passionate about making change in the world and are eager to partner with public health practitioners to drive innovation.

Amy Schwartz's current focus is to bring human-centered design thinking to health and wellness problems today. Amy holds a PhD in cognitive psychology from Yale University.
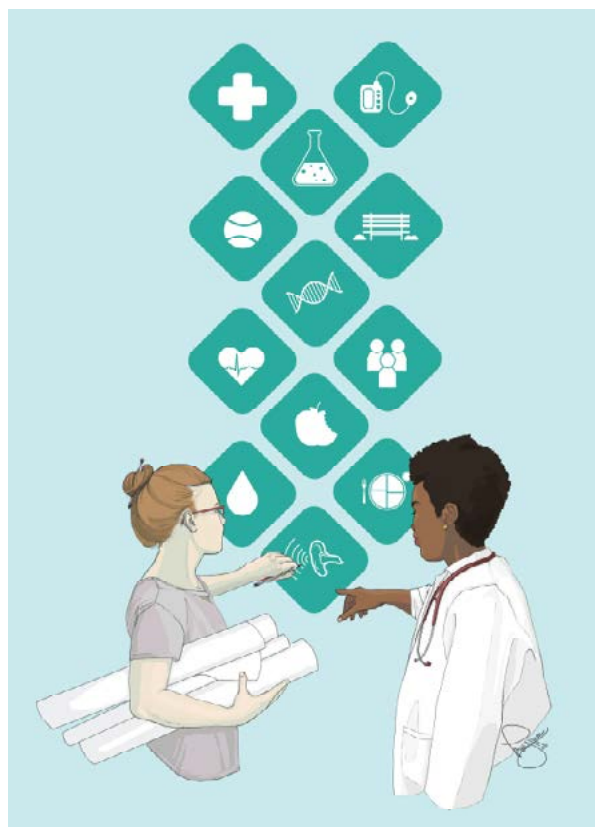
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