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Advancing Community Health and Well-Being with Behavioral Science

Insights and Lessons from the Field

Authors:
Jessica Leifer
Erin Sherman
Ted Robertson
Owen Footer
Jaclyn Lefkowitz
Suman Gidwani

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Contents

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About ideas42

We're a non-profit looking for deep insights into human behavior—into why people do what they do—and using that knowledge in ways that help improve lives, build better systems, and drive social change. Working globally, we reinvent the practices of institutions, and create better products and policies that can be scaled for maximum impact.

We also teach others, ultimately striving to generate lasting social impact and create a future where the universal application of behavioral science powers a world with optimal health, equitable wealth, and environments and systems that are sustainable and just for all.

For more than a decade, we've been at the forefront of applying behavioral science in the real world. And as we've developed our expertise, we've helped to define an entire field. Our efforts have so far extended to 40 countries as we've partnered with governments, foundations, NGOs, private enterprises, and a wide array of public institutions—in short, anyone who wants to make a positive difference in peoples' lives.

Visit ideas42.org and follow @ideas42 on Twitter to learn more about our work. Contact us at info@ideas42.org with questions about applying behavioral science to health.

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EXECUTIVE SUMMARY

We need new answers to long-standing questions about health and well-being. It is well known that Americans today are less healthy than peers in similarly wealthy countries, even as we spend greater and greater percentages of GDP on health care. But the issues underlying this challenge aren't confined to the details of how health care is structured or insured, or the performance of new health technologies; they also extend into our homes, communities, and relate to our behaviors.

With support from the Robert Wood Johnson Foundation, ideas42 launched the *Community Health and Well-Being Project* to explore whether a new tool—*applied behavioral design*—could be used to design solutions that improve health outcomes in community. Applied behavioral design is an approach to building programs, products, and services based on the science of how humans think and act, and practical knowledge about how to create solutions that work. In this report, we describe the applied behavioral design approach and illustrate how health practitioners can use it in their work.

Over the course of the project, more than 170 communities expressed interest in using applied behavioral design to make progress on their communities' most pressing health issues, from behavioral contributors to heart disease and diabetes, to parenting and safe sex, to mental health and substance abuse. Representatives from nineteen communities attended a workshop to learn more about the approach, and three partnered with us on applied behavioral design projects. We worked with:

1. Our Lady of Bellefonte Hospital and the public school district in **Ashland, KY** to **reduce consumption of sugar-sweetened beverages** and increase water drinking among local families.

2. Catholic Charities of Fort Worth and Luscinia Health in **Tarrant County, TX** to increase on-time refills and **adherence to prescription medications** for chronic conditions among Catholic Charities clients.

3. Members of the B'more for Healthy Babies initiative in **Baltimore, Maryland** to **increase prenatal care providers' submission of risk assessments** and referrals to community-based support for Medicaid-eligible pregnant patients.

In each community, we developed new insights about factors influencing these behaviors and designed and implemented interventions informed by behavioral science to improve outcomes. We achieved some significant successes and learned a great deal about applying behavioral design to this field in the process. For example:

1. In Ashland we learned the habit of consuming sugar-sweetened beverages (SSBs) can be triggered automatically in specific contexts, and that people set a reference point for appropriate consumption of SSBs based on the behavior of their peers. Drawing on these and other insights we designed an intervention that ***reduced SSB consumption by as much as 36%,*** while increasing consumption of water—a promising result we look forward to testing at larger scale.
2. In Tarrant County we found the lack of positive feedback for taking medication reduced adherence among patients with asymptomatic chronic conditions in low-income communities. We also ***gathered encouraging insights about the magnitude of savings people with these conditions can attain*** with behaviorally designed micro-incentives and reminders.
3. In Baltimore, we learned that health care providers are aware of the need to complete important Risk Assessment forms, but do not always see the resultant positive impact for patients; however, ***a comprehensive set of provider behavior interventions, paired with improved technology, could give health systems a chance*** to connect more at-risk patients with the services they need.

We also emerged with questions about the opportunities and approach. For instance, could we do more to put the tools of applied behavioral design directly in the hands of practitioners working to improve community health so they can apply them independently? Could we apply behavioral insights to address deeper, systemic issues affecting community health and well-being like bias and the many social determinants of health? And could we fold behavioral science into the design of health care systems and policies, leading not only to incremental improvements in Americans' health, but to large-scale ones? We believe the behavioral science community can do all these things, and in so doing, make a lasting impact.

THE COMMUNITY HEALTH PROBLEM AND THE OPPORTUNITY

When we talk about health care in the United States, images of doctor's offices and insurance paperwork often jump to mind. But hospitals and physicians' practices make up just a small part of the health landscape, and the medical care we receive is not the only force shaping our health. What we do outside the doctor's office has a big impact too, including what we eat, how we move, how much we sleep, the risks we take, and the care we seek. The public health community recognizes the importance of these foundational behaviors and, alongside the social determinants of health, such as where we live and whether we can access healthy food, seeks to shape them.

In particular, ***behaviors and practices like how much we drink, what we eat, and whether we are physically active are estimated to be among the most significant contributors to health and well-being,*** following key socioeconomic factors, like income.[1] For example, research has shown that the number of alcoholic drinks an adult consumes per day contributes to an increase in risk of up to 50% for colorectal cancer, and up to 300% for cancers of the mouth and throat.[2] Physical activity—even at low and moderate levels—has been shown to reduce risk factors for some cancers and chronic diseases, including cardiovascular disease, diabetes, and osteoporosis.[3] There are other important behaviors too. For instance, when we don't get enough sleep, we suffer cognitive deficits, including lapses in attention that can lead to serious accidents.[4] And those accidents have consequences: unintentional injuries are the leading cause of death in the U.S. for people ages 1 to 44.[5] Research on critical health topics from cancer[6] to longevity[7] suggests our genes determine a lesser part of our lifetime health outcomes; the rest is driven by our environment and our behaviors.

With evidence regarding the benefits of these behaviors mounting, one might imagine we would be walking more, drinking in moderation, sleeping better, and so on—but in general, we are not. About a quarter of American adults report they are never physically active, the percentage of American adults who report eating fruits and vegetables daily has plateaued,[8] and 1 in 3 adults don't get adequate sleep per night.[9] Americans continue to exhibit a variety of risky and unhealthy behaviors across the board—we're likely all guilty of this at some point in our lives, from skipping prescribed medications[10] to texting while driving.[11]

Even within clinical delivery systems, where the U.S. is commonly regarded as a leader in innovation, new advances have been mostly confined to the performance of medical procedures or the development of new technologies, not people's engagement with health and health care. But ***major advances in clinical care will only reach their full potential if accompanied by good behaviors and practices,*** by both health care providers and patients. For example, patients need to effectively follow through on a recommended course of treatment to stay healthy once they leave the hospital. And providers must use medical technologies—from expensive lab

tests to antibiotic and narcotic painkiller prescriptions—for their intended purpose, and not in cases where they are clinically inappropriate.

How might we encourage people to adopt healthy behaviors as they go about their lives outside of the doctor's office? One way is by applying insights from behavioral science to design programs and products so they work with how people actually behave, and can help them follow through on their own intentions—through something we call ***applied behavioral design.***

What is applied behavioral design?

Applied behavioral design is an approach to investigating problems in human behavior and building solutions that can solve or overcome them. It is steeped in the science of human decision-making and behavior, drawing on fields like behavioral economics, psychology, and sociology, and has a keen focus on engineering solutions for real-life contexts. In health and health care, a growing body of evidence has illustrated that insights from the field can be applied to tackle core problems, from smoking[12] and medication adherence[13] to reducing inappropriate prescriptions[14] and getting people vaccinated for the flu,[15] all in a cost-effective way.

THREE PRINCIPLES OF BEHAVIORAL SCIENCE

1 Humans are fallible	2 Our odd choices are often predictable and systematic	3 Choices are context-driven
We sometimes act at odds with our own self-interest and fail to follow through on our own intentions	Some choices that don't maximize beneficial outcomes have been documented repeatedly across cultures, decades, and immediate situations	Choices (good and bad) are frequently driven by the context in which we make decisions and act, as opposed to personal characteristics

Science for Practice

The science of human behavior is complex. While a nuanced understanding is critical for practicing applied behavioral design, the key aspects can be summed up in three principles. Combined, these principles offer a helpful lens through which to view human behavior, allowing us to look at old problems in new ways and inspiring new solutions.

The first principle is that humans sometimes make odd choices. We can behave counter to our own self-interest and fail to follow through on our own intentions. For example, we may realize we should save money for retirement, but fail to act accordingly—even if we want to save more and have disposable income that we spend to fulfill more immediate desires.[16]

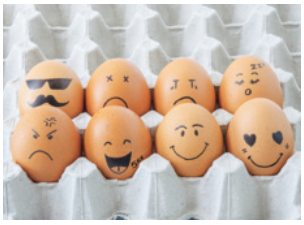
The second principle is that many of these failures in decision-making and behavior are predictable and systematic. They arise from the use of cognitive shortcuts, or heuristics, which evolved over time to help us manage our attention and energy and kept our ancestors alive in difficult circumstances.[17] For example, the tendency to follow social norms could have ensured social cohesion and cooperation in small groups of *homo sapiens* millennia ago; today, it both promotes desirable behaviors—like cooperating with friends and neighbors—and undesirable ones—like bowing to peer pressure.

That brings us to the third and final principle: our context, or the environment in which we live, tends to predict more of our behavior (good and bad) than do our personal characteristics, including intelligence and personality.[18] As a result, poor outcomes are often generated by shortcomings in the design of our context, and not by failings in ourselves. Critically, this means that, by designing context knowledgably, we can nudge people's behaviors in a healthy direction.[19]

Engineering for Context

Context is a broad concept, including everything from the physical or digital environment, like the design of a supermarket or an electronic health record, to the social or cultural environment, to how choices are framed and presented to us, to the time of day or year. One context that affects millions of people is chronic scarcity—the experience of living in poverty—which research has shown can have significant impacts on decision-making and behavior.[20]

FIGURE: Multiple aspects of context

Physical Environment	Social/Cultural environment	Presentation of choice	Mood/affect
			
Timing	**Chronic Scarcity**	**Processes**	**Digital Environment**
			

Given the importance of context in decision-making and behavior, a key component of designing behavioral solutions is investigating the decision-making context, and assessing opportunities for improving it. For example, behavioral scientists in the early 2000s identified that the default option

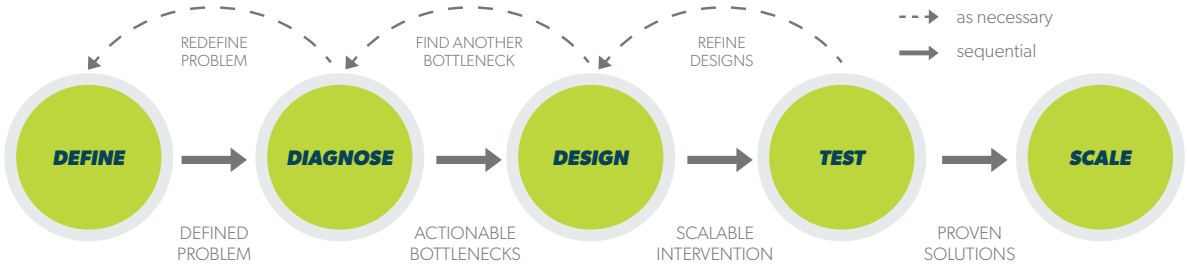
in employees' retirement plans had an outsized effect on their enrollment status and contribution level.[21] This simple insight informed a highly scalable solution: changing the default so employees were automatically enrolled in a retirement savings plan.

The importance of context also means that testing and iterating is a critical component of engineering solutions that work. A program or service that influences people positively in one situation may need to be altered to work in another situation—and sometimes may not work at all. For these reasons, applied behavioral design—just like other applied sciences—includes a well-formulated prototyping process.

The Applied Behavioral Design Process

At ideas42, our applied behavioral design process draws on this knowledge and has five major stages: Define, Diagnose, Design, Test, and Scale. Our process was developed in collaboration with top academics in behavioral science to identify behavioral barriers and design scalable solutions to overcome them.

- **Define.** Our first step is to accurately define the problem, focusing on a specific behavior. We eliminate assumptions about what may be contributing to the problem and possible solutions.
- **Diagnose.** Our diagnosis process generates insights about contextual features and cognitive processes contributing to the problem. We create an initial "behavioral map" and continually refine it to hone hypotheses as additional data are collected and analyzed. Our data comes from site visits, interviews, literature reviews, and the analysis of existing qualitative and quantitative information. The insights we generate look specifically at how the particular context can generate behavioral bottlenecks.
- **Design.** Drawing on our diagnosis and the behavioral science literature, we design scalable interventions that address the key bottlenecks. Designs range from small-scale changes to existing programs and products to more complex interventions. We work closely with partners, providing operational and technical assistance, to finalize and implement the designs. We build designs that could be scaled later if our test proves promising.
- **Test.** To determine the validity of our hypotheses and the efficacy of the design, we rigorously test interventions, ideally through a randomized controlled trial (RCT)—the gold standard in evaluations.
- **Scale.** Once we know what works, we then seek to refine our designs and adapt them for scale using any of a variety of channels, including policy change, dissemination and replication, or through the creation of new organizations or services.



A breakthrough moment

Applied behavioral design is poised for a breakthrough moment in community health. Medical providers, public health practitioners, and the public writ large have long understood that health outcomes are driven, at least in part, by people's behaviors, ***but the growing field of behavioral science is now clarifying how context impacts behavior and offering potential solutions.*** Research centers like the Center for Health Incentives & Behavioral Economics at the University of Pennsylvania and the Penn Nudge Unit have published tens of papers about using behavioral science to improve health, and ideas42 and our partners are also contributing to the field's knowledge base. For example, in an early application of behavioral science for community health, we partnered with the University of Cape Town to design a friendly competition between several departments of a South African government office to help people be more active while at work. Program participants showed an average of 2.8 kg of weight loss, as well as improvements in other standard markers of health such as BMI, cholesterol level, and blood pressure.[22] More recently, we worked with New York City's Office of Labor Relations to implement and test a communications campaign that integrated behavioral levers to increase flu vaccination rates among city employees. Ultimately, 10% more flu vaccinations were administered at work sites thanks to the campaign.[23]

In addition, we have ***more and better data about people's behavior than ever before, and new ways of reaching people at scale*** due to the proliferation of digital technologies and platforms. The applications, virtual assistants, and tools we interact with in our day-to-day lives can be excellent channels for thoughtful applications of behavioral insights. And, as these systems and platforms also collect and curate thousands of data points about our interests, needs, and behaviors, they can not only enable us to identify behavioral problems, but also to run quick experiments to inform smart refinements and iterations on behavioral solutions over time.

Finally, ***as the way we value and pay for care evolves, so too will the desire to invest in helping patients change key behaviors*** to improve long-term outcomes. We believe the shift toward value-based care and away from fee-for-service models will incentivize more and more health care providers to attend to the challenge of developing, measuring, and scaling up new approaches—and result in increased interest in and demand for the tools of behavioral design.

THE COMMUNITY HEALTH AND WELL-BEING PROJECT

Informed by our past work to encourage safe and healthy behaviors, and eager to build on the existing research and explore the impact behavioral science can have on Americans' health, ideas42 initiated the *Community Health and Well-Being Project*. The project aims were twofold:

1. To test a model of applying behavioral insights—using the ideas42 *applied behavioral design* method—to generate novel solutions to solve pressing community health problems, particularly in low-income communities.

2. To build on the existing behavioral science research by both identifying behavioral barriers in community health and designing fresh, behaviorally-informed solutions.

To achieve these goals, we organized the project into four phases of work:

Phase 1: In the first phase, we launched a *Request for Problems* (RFP) in April 2017. This RFP, titled *Using Behavioral Science to Advance Community Health and Well-Being,* invited communities to apply to partner with ideas42 on a behavioral design project and identify a critical health challenge facing their community that they believed could be solved using behavioral insights. The RFP was distributed widely and resulted in more than 170 eligible applications from across the United States. Most applications focused on issues facing disadvantaged, low-income communities. The RFP allowed us to gauge demand for the behavioral approach, assess which problems are most pressing for communities, and identify potential candidates for partnership in behavioral design projects. To support the development of applications, ideas42 also hosted a webinar, which provided a high-level overview of behavioral science, how to select and write a strong behavioral problem statement, and the application process as a whole.

Phase 2: In the second phase, we invited 45 attendees, representing a diverse portfolio of 19 finalist communities and organizations, to participate in a *Behavioral Science Workshop* in September 2016. This two-day event provided a highly interactive, immersive experience in the ideas42 framework for diagnosing behavioral problems and designing interventions. The agenda included presentations and group activities, as well as opportunities to engage with ideas42 staff and other participants. The workshop stimulated enthusiasm for and built capacity in behavioral design, and enabled us to identify top candidates for longer-term partnership. All 19 communities in attendance requested to be considered for future partnership with ideas42.

Phase 3: In the third phase, we selected three communities to formally collaborate with us in designing, implementing, and testing behavioral science interventions to improve their community's health and well-being. These *applied behavioral design* projects ran from December 2016 to October 2018.

The three selected communities and their problems of focus were:

Community	Partner organization	Description of partner organization	Problem of focus
Baltimore, Maryland	B'more for Healthy Babies *Every baby counts on you*	BHB is a Baltimore City initiative led by the Baltimore City Health Department with support from Family League of Baltimore, the Johns Hopkins Center for Communication Programs, and HealthCare Access Maryland. BHB brings together communities, organizations, and resources so that every baby might have the best start possible. BHB's vision is for all Baltimore babies to be born at a healthy weight, full term and ready to thrive in healthy families.	Providers submit Prenatal Risk Assessment (PRA) forms, which may reduce fetal and infant mortality, at a low rate. We'd like them to submit forms at a higher rate.
Tarrant County, Texas	Catholic Charities Fort Worth	CCFW offers direct assistance to low-income residents of the 28-county Roman Catholic Diocese of Fort Worth. CCFW's mission is to provide service to those in need, to advocate compassion and justice in the structures of society, and to call all people of goodwill to do the same.	Catholic Charities clients with chronic conditions do not fill or refill their maintenance prescriptions on time. We'd like them to reduce the time between when they should have filled their prescription and when they actually did so.
Ashland, Kentucky	Bon Secours Our Lady of Bellefonte Hospital	OLBH is a 214-bed facility that is part of the Bon Secours Kentucky Health System and provides a variety of services, from primary care to pediatric, urgent and specialty care. It offers community health services, including a program to help families become healthier called "Fit Families."	Local youth are drinking an excess of soda and sugar-sweetened beverages. We'd like them to replace sugar-sweetened beverages with water.

Each project followed ideas42's *applied behavioral design* process, which enabled us to pinpoint bottlenecks in decision-making and behavior and generate hypotheses about the contextual features that stood in the way of a desired behavior. Armed with this understanding, we designed and implemented interventions based on behavioral insights and evaluated the impact of these designs.

Phase 4: In the final phase, ideas42 developed a specific communications plan to disseminate learnings and key results—both null and positive results. Our goal was to ensure the broader behavioral science and community health fields could share our learnings and build upon them in future work. This report is the fruit of that effort.

FIGURE: The Community Health and Well-Being Project

WHAT WE'VE LEARNED

Community health organizations are hungry for behavioral insights

One thing was immediately clear from our RFP: a broad array of communities and organizations are excited about the potential to apply behavioral science to design solutions for community health issues. More than 170 communities applied to participate in the project through the RFP, and they represented a diverse swath of geographies, populations, and community health issues. Whether community-based organizations, hospitals or health care organizations, public health departments, or other groups, organizations working to improve public health are seeking new approaches like behavioral design.

Though most submissions came from non-profit community-based organizations (89), government agencies or departments (22), hospital or health care organizations (21), or schools, colleges, or universities (18), we also received submissions from businesses, federally recognized Indian tribes and tribal organizations, and other public health agencies, including public housing authorities. This speaks to the breadth of types of organizations that are keen to learn more about behavioral science and participate in behavioral design projects.

Lead Organization Type	Number of Applications
Non-profit community-based organization	89
Government agency or department	22
Hospital or health care organization	21
School, college, or university	18
Community coalition or resident group	7
Business	1
Local foundation	1
Other	11

We found the highest number of submissions came from Southeast (38) and Mideast (30) communities, closely followed by communities in the Great Lakes (24), Southwest (24), and Far West (21). The remaining submissions came from communities in the Plains (12), New England (10), and Rocky Mountains (7), or organizations serving multiple regions (4). We were encouraged to see a high number of submissions from states with especially high need of community health solutions like Alabama, Arkansas, Georgia, Louisiana, Mississippi, Tennessee, and West Virginia. We also found submissions came from urban, rural, and suburban communities: about 18% of applications were submitted on behalf of rural communities, 45% on behalf of suburban or mixed communities; and 37% on behalf of urban communities.[i]

[i] Counties and regions of multiple communities were generally designated as "suburban/mixed."

Most applicants were interested in applying behavioral science to improve outcomes for disadvantaged communities, often low-income communities. These included communities of color (38), children and/or adolescents (32), vulnerable populations like immigrants, the elderly, and previously incarcerated persons (10), or a combination of these (15). We also received four applications specifically focused on Appalachian communities (as described by the applicant), and 13 applications on behalf of native communities (as described by the applicant).

Finally, a diverse set of community health problems was identified. Though most related to the foundational behaviors of healthy living like healthy eating and diet (25%) and active living or physical activity (20%), many other issues were noted, including: access to health care and social services (14%); parenting (8%); medication adherence and care decisions (8%); drug use (8%); mental health (7%); education or learning (5%); urban environment and community-building (5%); public safety and criminal justice (4%); smoking (4%); housing (3%); income and wealth (3%); and domestic violence (2%).

Population	Total Applications
Communities of color	38
Children and/or adolescents	32
Vulnerable populations (includes immigrants, elderly, and previously incarcerated persons)	10
Multiple priority populations	15

From our perspective, the majority of these problems were well suited to a behavioral science approach. Behavioral problems come in many forms: some applications related to building and maintaining regular and repeatable behaviors, like walking to school, drinking more water, reading to children at night, or eating more fruits and vegetables, while others related to encouraging important but occasional or one-time behaviors, like receiving the full HPV vaccine sequence or enrolling in a health insurance plan. Both single and repeat behaviors are great candidates for behavioral design. The key is not whether it is a one-time or repeat behavior, but whether the behavior reflects some kind of predictable or systematic bias in behavior, like low uptake of beneficial practices, limited completion of initiated processes, or low levels of follow-through on one's own intentions.

Though we would have loved to invite all 170+ communities to participate in our *Behavioral Design Workshop* and ultimately partner with them on applied behavioral design projects, we simply could not offer the opportunity to all. We hosted 45 representatives from 19 communities with particularly promising applications[ii] at a two-day *Behavioral Design Workshop*. The workshop was designed to begin building organizational capacity in the application of behavioral science to pressing community health challenges, and to this end, it provided an overview of behavioral science principles, took a deep dive into three important psychological phenomena (social norms, limited attention, and present bias), introduced our *applied behavioral design* process, and reviewed some basics of redesigning communications (such as emails, phone scripts, and text messages) to increase audience engagement and follow-through with listed instructions.

[ii] For details on partner application reviewing criteria, see the appendix.

You can learn about our thinking on this topic and how to meet the great demand for training in behavioral science in the ***What's Next*** section at the conclusion of this report.

Leading Issue Areas [iii]	Total Applications
Healthy eating and diet	44
Active living or physical activity	35
Access to health care and social services	23
Parenting	14
Medical Actions (including adherence & care decisions)	14
Drug Use	13
Mental health	12
Education or learning	8
Urban Environment	8
Public Safety/Violence or Criminal Justice	7
Smoking	7

Diagnosis reveals the behavioral workings of community health issues

Following the *Behavioral Design Workshop*, we selected three communities to partner with us to run applied behavioral design projects. In these projects, we developed a number of insights regarding the impact of psychological and contextual features on three selected health habits and practices: consuming sugar-sweetened beverages, taking medication for chronic conditions as prescribed, and connecting low-income women who are pregnant to prenatal care services. A summary of insights from each partnership can be found in our project briefs, referenced below and at ideas42.org. A few examples are presented below.

Automaticity: ***Many of our health behaviors and practices are automatic, often not the result of conscious choice. In Kentucky, we learned that consuming sugar-sweetened beverages (SSBs) is often an automatic, ingrained habit. Certain contexts—locations, activities, and times of day—trigger a desire to drink SSBs.***

Every day, each of us performs countless behaviors that are so familiar to us that we don't even think about them: our habits. Habits save us time and cognitive energy, but at a cost. Once a habit is formed, it can be very challenging to change—and the new habits we develop on purpose can take a long time to become effortless.

» Links to Individual Project Briefs

- Reducing consumption of sugar-sweetened beverages in Ashland, KY
- Taking medication for chronic conditions in Arlington, TX
- Connecting low-income women who are pregnant to critical prenatal care services in Baltimore, MD

[iii] Some applications had more than one area of focus (e.g. healthy eating and physical activity). Each noted area was counted.

Through interviews and surveys conducted at Our Lady of Bellefonte Hospital in Ashland, Kentucky, we learned that parents and children alike consume sugar-sweetened beverages (SSBs), including soda, sweet teas, and sweetened sport drinks, with considerable predictability. It seemed a variety of contexts—locations, activities, and times of day—triggered drinking SSBs in a routine and automatic way.

For example, in one interview, a young woman recounted how each weekday she had a soda on the way to work, one during lunch, one when she returned home from work, and one during the evening while watching TV. This report of consistent routines around sugary drinks was common. 100% of the families surveyed indicated they "always" drank SSBs with certain meals or activities—like with pizza ("pop and pizza"), at the movies, at work-site events, or at church meetings. Many did not appear to contemplate the choice to drink or not in each of these instances. Instead, drinking sugar-sweetened beverages seemed an automatic, routine behavior.

This finding was not entirely surprising, as it is echoed by an existing body of research on habit formation which shows that people often consume food or drinks as a result of largely unconscious context-response associations.[24] What was interesting, though, was that these habits persisted despite a self-pronounced intention to drink fewer SSBs. In essence, cues in the interviewees' environments were guiding their behavior, even when they intended to behave differently.

Social Context and Identity: ***All else equal, we tend to behave how people like us behave. In Kentucky, we found families set a reference point for appropriate consumption of sugar-sweetened beverages based on the behavior of their peers and how they viewed themselves.***

The behavior of our peers and our sense of self have significant impacts on our behavior. When we see that others have done something, we're more likely to do it too[25]—and we tend to conform to norms that we perceive as prototypical for members of our group.[26] This includes what we eat and drink: people eat more when those around them eat more and they eat less when those around them eat less.[27] People also choose what to eat and drink on the basis of whether those choices appear to be accepted social norms. Generally, people are more likely to behave in a way that aligns with their identity than against it and to compare their behavior to others who they view as similar to them.

From our research in Kentucky, we learned that social norms and identity may influence SSB consumption too. When asked whether their drinking habits were similar to or different from their friends and family, each person we interviewed reported they were similar, though our survey data showed considerable variations in consumption by family and by person. In addition, we found some people we interviewed used identity labeling, defining themselves (or their family members) in terms of their behavior. Specifically, some defined themselves as a person "on pop" or a person "on water." This identity labeling supported the notion that individuals may set up reference points for the appropriate number of SSBs to consume by considering what their peers do, rather than an

outside, objective standard. In this example, it may be that Individuals "on pop" allow themselves to drink multiple SSBs each day as a result of only comparing their habits to other pop drinkers, rather than to their full community or to guidelines provided by outside groups. This insight could translate to a variety of other habitual behaviors. For instance, if individuals who smoke label themselves as "smokers," they may set different reference points for appropriate behavior than those who they see as categorically different, like "non-smokers."

Feedback: ***Failures in feedback often contribute to poor follow-through on important health behaviors. In Texas, we learned a lack of positive feedback for taking medication reduces adherence for patients with asymptomatic chronic conditions.***

People are generally motivated to take actions they are rewarded for and avoid actions they are punished for, particularly when these rewards and punishments are experienced in close temporal proximity to a precipitating behavior. In everyday life, this means people are more likely to continue engaging in behaviors that leads to rewards.[28] Feedback on behavior, whether through the physical and emotional states the behavior induces or from an outside source, can condition people's behaviors into habits over time.

A lack of immediate feedback was a common barrier to medication adherence among the individuals we interviewed in our project with Catholic Charities in Fort Worth, Texas. These patients with chronic asymptomatic diseases, such as hypertension or type 2 diabetes, were neither rewarded nor punished for adhering to their doctor's advice: when they forgot to take their medication, nothing happened. One interviewee told us "I have no daily noticeable symptoms," while another stated "I can't feel if the blood pressure meds are working. I don't notice [when I skip it] for most of them, like the cholesterol, blood pressure, and blood sugar ones." One interviewee discussed being able to sense when she had missed a dose, but lacked specific feedback to know how to correct for the error. She said: "you know you're missing something, but can't tell exactly what. Then you realize. But there are no significant consequences in day to day life." The lack of feedback makes it much more likely people will skip doses without noticing.

Further complicating matters, many people we spoke to felt worse when they adhered to their prescriptions due to the medications' side effects. This generated positive reinforcement for *skipping* doses, as the unpleasant side effects would ebb once the drug had left patients' systems. The asymmetry between long-term, hard-to-notice positive effects and short-term negative side effects could work to perpetuate non-adherence.

Psychological Distance: ***When the impacts of our behaviors are psychologically distant and difficult to imagine, we're less likely to invest in them. In Baltimore, we learned providers are aware of the need to complete the Prenatal Risk Assessment form in principle, but they do not always see the positive impact of this work on their individual patients.***

Immediate feedback (or the absence thereof) is not only important for patients: it influences providers too. It is often difficult for health care providers to see the impacts of their work, particularly the impact of paperwork, on a patient's health down the road. We found this to be the case in our research with prenatal care providers at practices across Baltimore while investigating barriers to completing and submitting the Maryland Prenatal Risk Assessment (PRA) form. Specifically, we found that many providers did not know what happened to the PRA after they submitted it. For example, one interviewee shared she knew the PRA was for the Health Department, but did not know the Health Department did anything for her patients on the basis of the form. Echoing this sentiment, other interviewees expressed shock at the Health Department's high success rate of providing women with services on the basis of the PRA. When care providers do not understand the potential benefits of some work, they are naturally unlikely invest in it.

These and other comments revealed there is significant psychological distance between some health behaviors, like filling out the PRA, and their impact. When the impact of a specific action feels psychologically distant to someone, he or she may be less motivated to follow through on it. In this case, the distant consequences—expert triage, community services, and ultimately child survival—failed to motivate staff to take the concrete action of filling out PRAs. Ensuring that individuals can visualize in detail the impact of their efforts on down-the-road health outcomes may be an important aspect of encouraging healthy behavior.

These insights share much in common with one another: they all highlight that long-term health is often a distant concern in our day-to-day lives, even in the professional lives of our physicians and nurses. As currently designed, our health care and community contexts often don't provide the cues or structures that would help patients and providers prioritize healthy behaviors amid conflicting environmental influences. The institutions that support Americans' health can undoubtedly do more to tackle these barriers.

Applied behavioral design can generate community health solutions

Drawing on these and other insights, we set out to design new solutions to improve outcomes related to our three target behaviors: consuming fewer sugar-sweetened beverages, taking medication for chronic conditions as prescribed, and connecting low-income women who are pregnant to valuable prenatal care services.

Reducing consumption of sugar-sweetened beverages in Ashland, KY

Fit Families Intervention

In collaboration with the Fit Families program at Our Lady of Bellefonte Hospital, an area hospital in Ashland, KY, we designed and tested the impact of a multi-component intervention for children and their families focused on reducing consumption of sugar-sweetened beverages (SSBs). The intervention was designed to directly address the behavioral barriers we identified. The intervention included five components delivered over two coaching sessions:

ELEMENT 1

SELF AFFIRMATION ACTIVITY

To build motivation and self-efficacy, families completed a self-affirmation activity, in which they wrote about one of their values and why it is important to them. Self-affirmation can prepare people for challenging information by buffering their self-esteem, increasing receptiveness to attitude or behavior change.[29]

ELEMENT 2

INFORMATION ABOUT THE HEALTH COSTS OF SSBS

To provide emotionally-resonant information about the health costs of SSBs, families completed an activity visualizing how much sugar is in different drinks, what the health consequences of sugar are, what the health benefits of water are.

ELEMENT 3

GOAL-SETTING ACTIVITY

To channel motivation from the previous activities toward plan-making, participants completed a goal-setting activity based on the WOOP (Wish-Outcome-Obstacle-Plan) model, to develop specific goals and plans for how to make healthier choices about beverages. To accompany this activity, families received a home audit scorecard they could use at home to identify ways to make their home environment more conducive to healthy choices.

ELEMENT 4

FINANCIAL COSTS ACTIVITY

A financial costs activity, which helped families calculate the costs of their SSB purchases, including identifying alternative ways they may want to spend money they would save if purchasing fewer sugary drinks.

ELEMENT 5

GROCERY SHOPPING PLANNING ACTIVITY

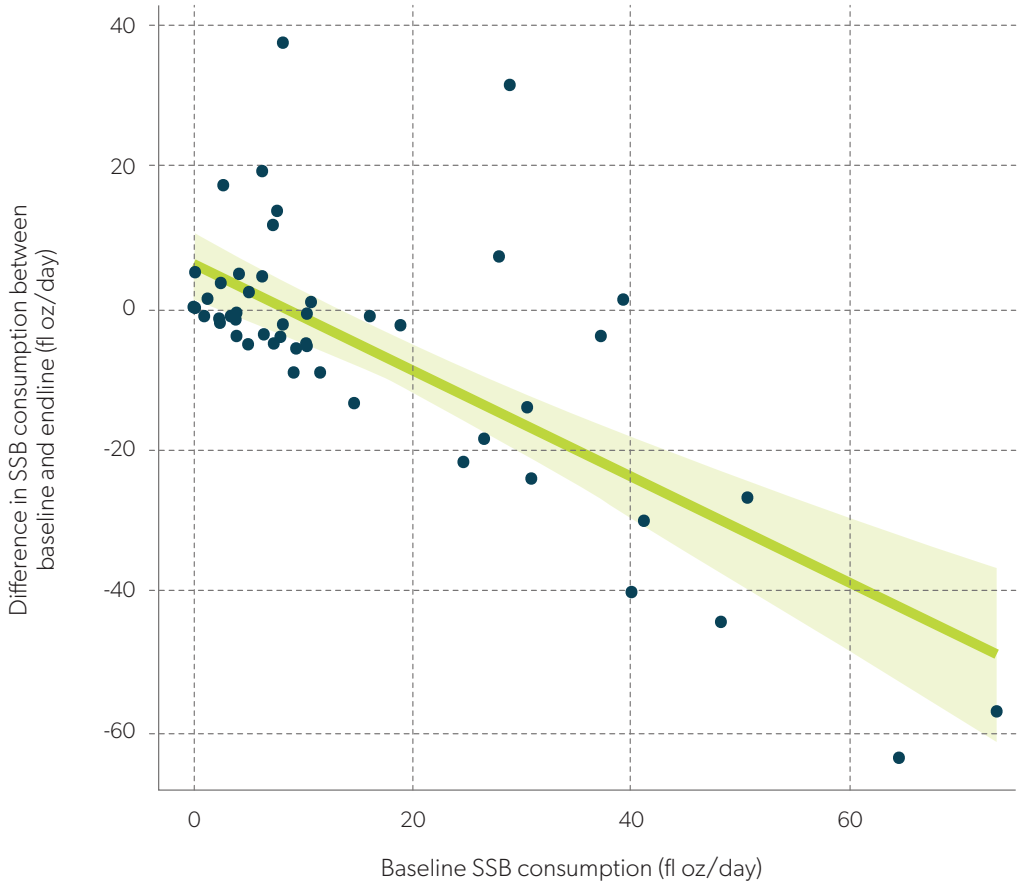
A grocery shopping planning activity that helped people make healthier choices in the grocery store by providing a simple guide to healthier alternatives to SSBs (with traffic light coding), setting goals for new drinks to try based on the guide, and creating a plan for the grocery store in the form of a shopping list with implementation intentions.

We evaluated the intervention by randomly assigning each family to receive either the two-session curriculum (62 individuals in 19 families at Session 1) or a control that consisted of standard public health resources and coaching (67 individuals in 23 families at Session 1). To measure drink consumption, participants in both groups completed a Beverage Intake Questionnaire in each session, and responded to occasional text messages asking about drink consumption.

We found participants in the treatment condition who were consuming high levels of SSBs at the beginning of the study benefited the most from our intervention, and those consuming the lowest levels benefited the least (or not at all). When we estimated the main effect of treatment solely on participants who drank at least one SSB per day before the study, those receiving the intervention consumed 19 fewer fluid ounces of SSBs per day on average compared to the control group, down from an average baseline rate of about 30 fluid ounces per day.[iv]

FIGURE A: The association between treatment effect (y-axis) and baseline SSB consumption (x-axis)

The effectiveness of the treatment depends on a participant's baseline SSB consumption.



[iv] p=0.08

Fruit Splash Pilot

In addition, we piloted a program called *Fruit Splash* for students through an after-school program at a nearby elementary school. The 10-week program encouraged students to drink more water by teaching them how to infuse water with fruit and providing weekly packages of fruit for each household.

Every week, around 60 students were given packages of mixed fresh fruit, enough to make three pitchers of infused water that week, along with a recipe card for making the infused water. Each recipe card contained simple instructions on how to prepare the drink and included fun health-related tips and facts to inform them about the benefits of fruits and water consumption. The program initially provided students with a combined water filter/infuser to ensure that families had the materials necessary to infuse their water.

Students participating in the Fruit Splash program were given pre- and post-study questionnaires on their beverage consumption and attitudes and behaviors related to SSBs, and feedback forms to comment on the program. Parents were also given pre- and post-study questionnaires to measure the indirect effects of the program on adults in the household. Results indicated that ***students and their parents, on average, reported an increase in drinking water after the program, nearly doubling a child's water intake from 17.6 fl oz/day to 34.9 fl oz/day for students.*** Consumption of sugary drinks was also reduced, as students reported drinking less sugary beverages on average after the Fruit splash program, from 21.1 fl oz/day to 11.8 fl oz/day. From this program, students also reported liking flavored water and plain water more at the end of the program, suggesting that the pilot had improved their attitudes as well.

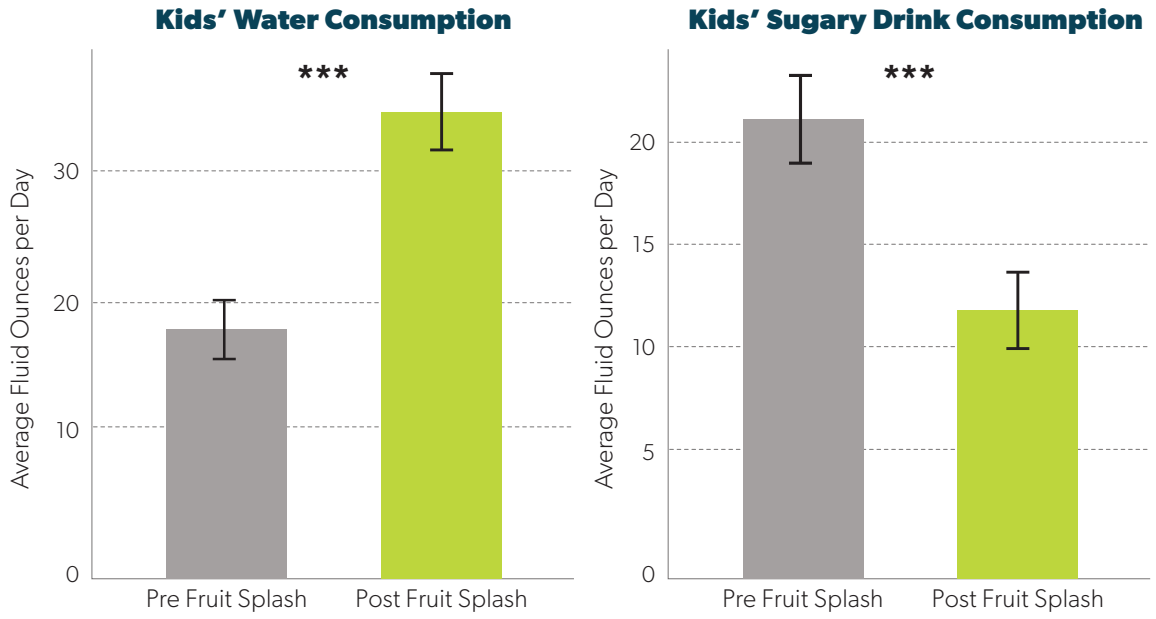
Based on these results, ***students who participated in Fruit Splash consumed about 28g less sugar and 140 fewer calories per day, on average, from drinks.*** If students didn't replace those calories through other changes to their diet, that means they reduced their caloric intake enough to avoid about 2.8 pounds of weight gain over the course of the trial. In addition, parents of the kids who participated in Fruit Splash consumed about 15g sugar and 70 calories less per day, on average, from drinks. Families reported an average of 11 total pitchers made, which suggests that most families produced at least one pitcher of fruit-infused water a week.

The Fruit Splash pilot cost $65.77 per student participant. This figure includes the costs of pitchers, printing and shipping materials, fruit and boxes, and ideas42 staff time—though it does not include our partners' time, which was provided on a volunteer basis to deliver the intervention. When accounting for reported changes in water consumption across students and their families, we estimate that the pilot boosted water consumption by the equivalent of 7 servings, or 56.1 ounces, of water per dollar spent. That's about 1.75 servings per family member participating.

In consideration of program sustainability, we asked participants how much they would be willing to pay per week to participate in the Fruit Splash program. The mean response was $7.64 per

week, and the median was $5 per week. The cost of the pilot per student, per week in this 10-week pilot was $6.58, inclusive of relatively high start-up costs (e.g., program designer time and pitcher costs). ***At longer durations and with less program design time, the Fruit Splash program could potentially be self-sustaining.***

FIGURE B: Students' mean water consumption (left) and SSB consumption (right) before and after Fruit Splash



**** group means significantly different, p <0.01*

Our confidence in these results is limited by the evaluation design, which includes pre- and post-measurement without a comparison group and relies on self-reported data. Nevertheless, these promising results and successful implementation suggest that *Fruit Splash* may be able to make a scalable impact on water consumption for students and parents. We believe this model merits further study in Kentucky and similar North American contexts.

Taking medication for chronic conditions in Tarrant County, TX

In partnership with Catholic Charities of Fort Worth (CCFW) and Luscinia Health, ideas42 designed and piloted a behavioral rewards program linked to Luscinia Health's RefillWise card—a pharmacy discount card—to help CCFW clients refill their prescriptions on time. The program sought to provide participants with an immediate, tangible benefit, as well as to reduce some of the burden of paying for expensive medications by providing the discount RefillWise card.[v] The program also offered feedback and created accountability for refilling prescriptions.

[v] The potential savings from using the RefillWise card varied by the prescription.

The full intervention included the following three components:

ELEMENT 1

MICRO-INCENTIVES REWARD PROGRAM

A micro-incentives reward program that offered small financial rewards for fills and on-time refills using the RefillWise card. When participants completed their first fill with the card, regardless of timing, they received a $5 digital gift card to a pharmacy chain delivered via text message. For all subsequent prescription refills, participants had the opportunity to earn points, but only if they refilled on time. Based on research suggesting that unpredictable rewards may be more motivating than fixed ones, we chose to randomly vary the exact amount of points earned upon each refill, ranging from 10 to 90 (in multiples of 10). Participants also earned 100 points for completing each of the interactive text message activities described below. Every 500 points could be redeemed for a $5 digital gift card.

ELEMENT 2

REMINDER AND FEEDBACK TEXT MESSAGES

Reminder and feedback text messages. Once participants filled their first prescription during the pilot, they received text message reminders three days before they had to pick up their next refill. They also received messages each time they earned or missed out on points, in order to provide encouragement and make the rewards (or lost rewards) more salient.

ELEMENT 3

SERIES OF INTERACTIVE TEXT MESSAGES

A series of interactive text messages to prompt plan-making, particularly around incorporating medications into routines and overcoming potential obstacles that could prevent people from taking or refilling medications. The series included:

- *A cue investigation activity* to encourage habit formation by identifying re-occurring tasks in a participant's daily routine during which they could take their medications.
- A *goal-setting and planning activity* in which participants set goals related to medication adherence, brainstormed potential obstacles that could affect their ability to achieve those goals, and created plans to overcome those obstacles.

We piloted the rewards program by randomly assigning 95 CCFW clients to either a control or treatment group. Participants in both groups received the RefillWise discount pharmacy card to address high medication costs and low affordability. Clients in the control group received the existing RefillWise rewards program: a $5 digital gift card upon the first fill, and additional $5 digital gift card for every 10 fills. Clients in the treatment group received the full intervention described above.

To measure adherence, we collected pharmacy data on prescription fills and refills participants picked up using the RefillWise Card. Of the 42 participants in the treatment group, seven engaged with the card (e.g., they had a prescription called in, checked the price, etc.), and three of those participants followed through with picking up their medication. In the control group, 13 participants engaged with the card, and seven followed through. Despite a lower number of treatment participants using the card, descriptive data shows that they filled more prescriptions: 27 fills versus 18 in the control group, although this difference is not significant given the small sample

size. Additionally, two out of the three treatment users filled their medications across three and four months, while no one in the control group filled beyond two months. While the small number of observations in the pilot prevents us from concluding whether the increased refill activity is due to the intervention, future research with larger samples could explore whether this is an early indication of true habit formation and improved adherence.

Given that cost is a significant barrier for this population of CCFW clients, we analyzed the savings participants received by using the RefillWise card. On average across both groups, savings per fill averaged $13.40.[vi] The potential savings varied widely by the type of medication, and was subject to additional changes over time and across locations. ***Within the control group, participants saved on average a total of $45 per person,***[vii] ***whereas the treatment saved a total of $96 per person.***[viii] For both groups, ***the total amount saved per person amounted to over 41% of the total cost*** they would have had to pay for their prescriptions.

Because the size of the RefillWise card discount varies by medication, pharmacy location, and time, it is possible that the uncertainty around the potential incentive limited the potential effectiveness of the rewards program by discouraging card usage. Anecdotally, we also heard that participants often had multiple pharmacy discount cards, and would use whichever one offered the greatest savings. Future interventions could evaluate whether sending personalized messages emphasizing how much people could save would increase card use, or test this program with a larger sample of participants that already uses the card on a regular basis.

Finally, while most participants who used the discount card saw meaningful savings, it may not have been sufficient to overcome the large structural barrier of affordability. In this context where the majority of participants are low-income, achieving significant impact will require more substantial financial interventions that reduce medication costs. ***By combining techniques such as a behaviorally informed rewards program with financial support, we could help countless people with chronic conditions living in poverty adhere to their medication regimens*** and improve their long-term health.

Connecting low-income pregnant women to critical prenatal care services in Baltimore, MD

In 2009, Baltimore City had one of the worst rates of infant mortality in the country, with 128 babies dying before their first birthdays. The city struggled to address the two leading causes of infant mortality: babies born too soon and too small, and babies dying in their sleep. In response, leaders from the government, nonprofit, academic, community, and corporate sectors came together to launch B'more for Healthy Babies (BHB). This initiative, led by the Baltimore City Health Department (BCHD) with Family League of Baltimore (FL) and HealthCare Access Maryland (HCAM), works to

[vi] N=49, SD=32.69

[vii] N=7, SD=53.26

[viii] N=3, SD=92.83

improve policies and services and mobilizes community members in comprehensive approaches that support mothers, babies, and families. By 2017, the infant mortality rate had declined by 36 percent from 2009.[30] Despite this great progress, Baltimore has a long way to go, with infant mortality rates still substantially above the national average.[31] BHB and ideas42 partnered to apply a behavioral lens to the problem of infant mortality, focusing on the prenatal risk assessment (PRA) form, which acts as a gateway to many important community-based services.

The PRA form is intended to be completed by staff during a patient's first prenatal care obstetrical visit and again if the pregnancy's risk ever changes. Though the form is legally required by the state to be completed for all pregnant patients on medical assistance, BCHD epidemiological analysis suggests that the completion rate was about 65% between 2012 and 2015. After the PRA form is completed and submitted, HCAM's care coordination program—BHB's centralized intake system for pregnant and postpartum women and infants—forwards it to the relevant managed care organization for official use, and refers the patient to appropriate supportive health services: home visits, a free crib, WIC, and more. Mortality data from BDCH revealed that pregnant patients in Baltimore City on medical assistance who do not receive a PRA are about five times more likely to face fetal or infant loss than pregnant patients who do, highlighting the potential power of this tool. Prenatal care staff are not submitting complete PRA forms to HCAM for all patients who need them. We want staff to submit forms for all patients who need them, at any time they need them. Therefore, ideas42 worked with BHB to nudge prenatal care staff to complete PRAs for all patients on medical assistance who receive prenatal care.

We fielded six solutions overall, four of which we deployed as a unified intervention via a randomized controlled trial. The solutions were:

»ELEMENT 1

QUARTERLY TRACK RECORD REPORT

A quarterly track record report sent to each office included feedback and peer comparisons. Each report featured a graph comparing the number of PRAs the office completed to the number of PRAs offices like them completed, with the intention of making discrepancies salient and spurring practices to consider their causes.

»ELEMENT 2

PRA CHECKLIST

A PRA checklist including the three basic steps of PRA submission and tips on how to complete them: (1) Talk to a patient about the PRA, including talking points; (2) Fill out the form, including the office's unique identification number; (3) Fax the form, including the appropriate fax number. The checklist was intended to reduce the cognitive effort and risk of errors associated with completing the PRA.

»ELEMENT 3

PATIENT AND PRACTITIONER TESTIMONIALS

Patient and practitioner testimonials so staff were able to more vividly experience the improved outcomes resulting from PRAs and hear stories from and about people similar to their patients.

ELEMENT 4

PRA BEST PRACTICES WEBSITE

A website including PRA best practices and a quiz that staff could take to evaluate their PRA process. Especially for prenatal care offices without clear PRA completion processes, and for offices that viewed PRAs as legally required but not medically helpful, this intervention was intended to help them assess themselves against a clear standard and receive tailored feedback.

ELEMENT 5

NETWORKING EVENTS

On a non-randomized basis, we held two networking events for prenatal care stakeholders across roles: providers, home visitors, HCAM employees, WIC employees, BCHD employees, and more. These events allowed different groups of people to interact and see their identity as part of a large health care team.

ELEMENT 6

PRA CHAMPIONS PROGRAM

Also on a non-randomized basis, we established a PRA Champions program to empower a current prenatal care staff member to champion efforts to increase PRA completion rates. BHB provided Champions with over-the-phone support. Note that enrollment in the Champions program was low due to limited resources available for outreach.

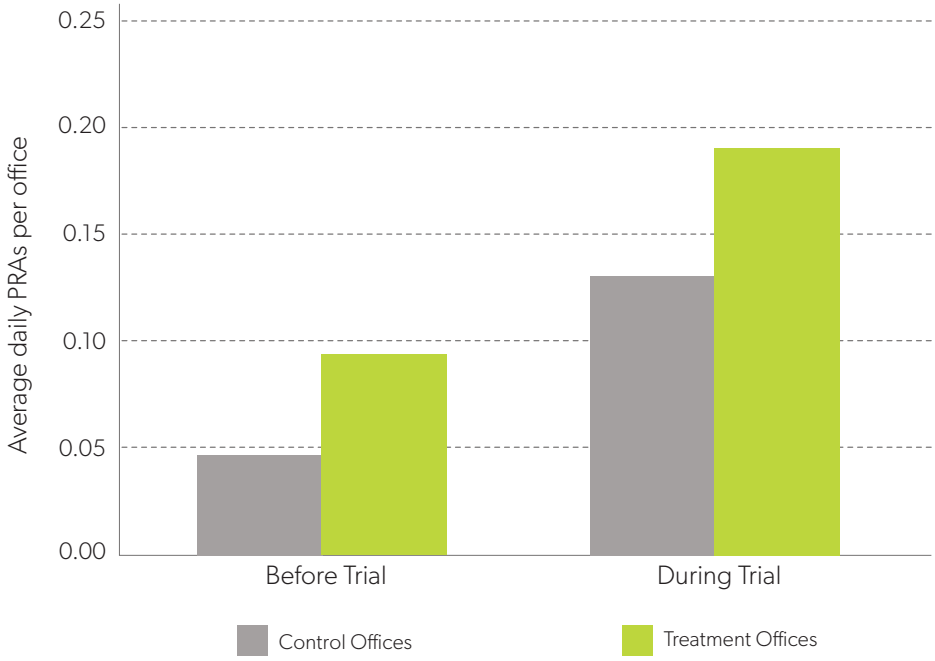
BCHD identified 49 prenatal care offices to include in our sample, including primary obstetrics & gynecology offices, maternal-fetal medicine specialists, and a few specialized practice arrangements (e.g., mobile and residential clinics). Offices with known administrative commonalities, such as being affiliated with the same health care organization, were assigned to clusters, and randomization was additionally stratified according to BCHD-provided categories of office size.

We conducted a differences-in-differences analysis comparing treatment and control offices over the six-month trial period (March-August 2018) and the same period the preceding year. ***We found a marginal increase in the number of PRAs submitted in 2018 vs. 2017 ($p=0.075$), which was large in size: over twice as many PRAs were submitted in 2018 compared to 2017 across treatment and control groups.*** We also found some suggestion of imbalance between the treatment and control groups, independent of the treatment effect itself ($p<0.12$). The effect of the intervention, while directionally positive, was not significant ($p>0.1$). We additionally assessed differences over time and between groups for PRAs submitted on behalf of Medicaid-enrolled patients, and results were substantively similar.

Several data- and implementation-related challenges affect our confidence in these results. For example, all MFM specialist offices in the sample were, by chance, assigned to the treatment condition before we became aware of their divergent mental model regarding PRAs. While this issue would likely cause our effect estimates to be conservative, other issues' directional impacts are less clear. For instance, we were unable to attribute some PRAs to specific offices due to insufficient or ambiguous information on the form, while approximately 6% of the PRAs recorded during the pre- and post-trial periods were submitted by practices not included in our sample. It is also possible that some offices did not receive the full treatment. When we performed in-person outreach at treatment offices, most reported that they had not seen the track record report previously, although we had provided it ahead of time through available postal addresses, email addresses, and fax numbers.

It's important to note that, because we did not have access to information about the number of pregnancies in the Baltimore area during the pre- and post-trial periods, observed increases in submitted PRAs over time may not represent an improved rate of submission overall. That said, birth rates in Maryland have been flat in recent years,[ix] so unless trends abruptly changed between 2017 and 2018, the magnitude of the difference between submissions in 2017 and 2018 suggests that prenatal care offices have substantially improved their PRA submission rates on average.

FIGURE C: The average number of PRAs submitted per day, per office across time and groups.



In parallel with our efforts to improve submissions of PRAs, BHB stakeholders have been working on additional innovations to improve referrals for maternal and child health. Electronic options for PRA submission are being piloted at prenatal care offices throughout the city, and these pilots could lead to a broader integration of PRAs into electronic health record systems, reducing provider time and attention required to submit referrals. Similar efforts are underway for other maternal and child health referrals, such as the postpartum infant maternal referral (PIMR) used in hospitals that deliver infants. Efforts like these, as well as refined behavioral interventions, could continue to reduce the behavioral barriers associated with connecting pregnant women to the services they need.

[ix] National Center for Health Statistics, final natality data. US Census Bureau. Population estimates based on bridged race categories released by the National Center for Health Statistics. Accessed February 6, 2019. www.marchofdimes.org/peristats

The scale at which this study was run—at the city jurisdiction level—presented several key limitations to analysis, reach, and messaging. While BCHD is responsible for collecting data on maternal and child health, they do not have unencumbered access to data about the number of prenatal care visits for pregnancies in their jurisdiction; Medicaid, operating at the state level, owns relevant data, and health care organizations and MCOs also possess it. This means that while we can assess whether more or fewer PRAs were submitted by groups of practices, at this time we cannot assess whether their submission rate improved, nor whether incremental PRA submissions are related to improved birth outcomes. The project's outreach was also limited to practices according to BCHD's jurisdiction and familiarity, although patients may seek care outside their home jurisdiction. Finally, while BCHD is a known authority in Baltimore City, prenatal care offices may respond more strongly to messengers such as the health care organization to which they belong or the insurance company that pays for patients' treatment, since the authoritative relationship between provider and employer or payer is more direct. We look forward to exploring integrated partnerships to help health care systems better serve their patients during pregnancy and early childhood.

Across our three partnerships, ***our results demonstrate both that behavioral approaches can help us understand the causes of and design potential solutions for community health challenges, but also that local settings can be challenging environments for behavioral design studies.*** Health behaviors are critical to health outcomes, and improving them demands creativity, flexibility, and persistence from all stakeholders. We will explore some of the key learnings about how to conduct behavioral design in community health contexts below.

Partner organizations gained knowledge and insights—on behavioral design and beyond

Over the course of the project, we worked closely with our partners on the applied behavioral design process. Near the end of the project, we checked in with each partner organization to understand how the process influenced their work and what they took away from the collaboration.

While our partners' takeaway insights were diverse, we noticed a few common themes, including that the benefits of applying behavioral design to one problem extended beyond that specific project's outcomes, and that when circumstances were right, the partnership served to accelerate the fulfillment of our partners' missions in exciting ways. Below we summarize a few insights.

Insight 1: Thinking behaviorally can change your strategic perspective

Across the board, our partners reported unearthing new and unexpected insights regarding their programs and clients through their applied behavioral design process. Some of these even challenged organizational assumptions, or surfaced new opportunities to better serve clients.

For instance, our partners at B'more for Healthy Babies (BHB) noted the experience refreshed their understanding of how to approach maternal health issues. Amy Secrist, Maternal Referral Program Coordinator at the Baltimore City Health Department (BCHD)'s Bureau of Maternal and Child Health, had previously understood that providers face a number of barriers when it came to completing prenatal risk assessments, and found behavioral design to be a helpful tool to dissect those barriers and address them. "We can benefit from taking a step back and really diagnosing what's going on," she explained. "I had made the assumption that the staff who complete the PRA have so many challenges, so many things going on—[this project] confirmed that, but has given me a deeper understanding of what those challenges look like and how we can work with them, rather than adding this on their plate as another stressor or piece of paperwork." She also mentioned that she'd begun to adopt a behavioral lens on other projects related to maternal and child health, including for risk assessment at delivery.

Mary J. Runnels, Fit Families healthy community facilitator at Our Lady of Bellefonte Hospital (OLBH), had a revelation about a root cause of sugar consumption among Fit Families participants: "Families had said that a barrier in getting healthier options… was that the pop is cheaper. [Bottled] water is still expensive… But once [families] used the intervention, they gained a new perspective, and were surprised how much they could save by switching to water." Recognizing that the interventions could shift mindsets changed her perception of clients, their motivations, and how best to serve them. OLBH's reframed perception of clients' behaviors is already contributing to their thinking about other key issues. Holly Canfield, former grants manager at OLBH, explained: "Now I always have behavioral thoughts in the back of my mind when I think about our community health problems."

> ***"Now I always have behavioral thoughts in the back of my mind when I think about our community health problems.***
>
> — Holly Canfield, former grants manager at OLBH

For another of our partners, financial matters were already top of mind—sometimes to the exclusion of other factors. As Catholic Charities Fort Worth (CCFW)'s primary mission is to provide service to those in need, this has often meant a front-and-center focus on poverty and solving urgent financial problems with clients. As our behavioral design project on medication adherence began, more attention was drawn to the importance of clients' health in long-term well-being. Merrissa Kuylen, research manager at CCFW, said that "while we are currently serving clients in a holistic manner, including addressing mental and physical health, we are always attempting to identify barriers to a thriving existence. The behavioral aspect of medical adherence and clients experiencing barriers can contribute to the growing knowledge and ability to address issues related to clients' health."

Insight 2: Working behaviorally can build new skills

Our partners also noted that working on an applied behavioral design project helped them develop new skills and identify some tactical changes they could make in their programs and approaches.

For example, our partners at CCFW, who had a strong foundation in research and evaluation, were beginning to build out an internal design team. As CCFW and ideas42 worked together, CCFW the importance of diagnosing problems before moving into solution design, and determined they could embed some of ideas42's diagnosis practices into their internal design processes. "As CCFW constructed the design arm of its own research and evaluation team, it was beneficial to the team to participate in program design from the ground up," said Merrissa at CCFW. She found herself thinking, "How can I integrate learned behavioral science processes and procedures into existing research projects?"

The BHB initiative's contributors at the Johns Hopkins University Center for Communication Programs (CCP) also possessed a wealth of experience designing communications to shift behavior, but aspects of the applied behavioral design process still influenced their thinking. At one point in our discussion, senior program officer Amber Summers said, "Hearing you interview, you ask really objective questions and they help drill down to the specifics of the behavioral journey from start to finish. It was a way of asking questions about why something isn't happening."

> ***[Behavioral designers] ask really objective questions… [to] help drill down to the specifics of the behavioral journey.***
>
> — Amber Summers, senior program officer at John Hopkins University CCP

Insight 3: Just one project can generate interest and momentum

Encouragingly, our partners' also shared stories about how working on an applied behavioral design project generated interest and momentum in innovation generally.

As noted above, for BHB and CCFW, the applied behavioral design process provided useful fodder to integrate into already well-developed research and development processes. We asked our partners around the end of implementation if any aspects of our process were still shrouded in mystery. Amber from CCP replied, "I really appreciate that throughout the collaboration, you've been very transparent with your processes. You've provided documentation at each step and kept us informed of the intention and goal of each phase along the way. Having all the different pieces in one place, I could walk through the most important phases of the process."

When we began working with our partners at OLBH, they were less comfortable with research and design processes—but our collaboration changed that. "I didn't have a lot of research experience," said Mary from OLBH. "Now that I have the experience, I feel much more comfortable being a part of something like this." The team also noticed that program participants seemed more engaged: participation, attendance, and persistence all felt much improved. Participants in the treatment

group were now experiencing a curriculum tightly designed around a behavioral goal, which seemed new and fulfilling for them. “They feel like they’re learning and accomplishing something,” said Mary.”

The fruits of the project may be reaped by a broader group of stakeholders, as well. Hospital leadership, as well as outside researchers, have shown interest in the Fit Families work and in joining the team for its next steps. Holly from OLBH told us that the project “allowed us to form a research coalition and engage with our community and state on conducting this kind of research.” She went on to describe budding partnerships and grant opportunities that the experience and evidence generated by the project had opened to the team.

> ***[This project] allowed us to form a research coalition and engage with our community and state on conducting this kind of research.***
>
> — Holly Canfield, former grants manager at OLBH

ideas42 is committed to making the tools of behavioral design accessible to all organizations pursuing social good. We’re encouraged by these signs that our community health partners have both begun to adapt these tools for their own purposes, and to scaffold from our results onto new partnerships that tackle other mission-critical behavioral problems.

Community health can be a challenging context for behavioral design

This brings us to a few challenges we and our partners faced in the course of this work.

Challenge 1: Applied behavioral design takes time

Our partners noted how behavioral design is an “intentional” process, one that takes time and requires sustained efforts. While we believe this intentionality pays off, we know it can be challenging for partners to sustain these efforts, as they are often short on time and have numerous initiatives underway.

Addressing this issue often requires providing resources (e.g. funding) to partners, such that they can reserve and allocate time to supporting and advancing the project; but it can also be benefitted by securing top-level buy-in for the project. When senior managers are committed to an applied behavioral design effort, they can help carve out space for it within the organization, and help mid-level managers and front-line staff prioritize it in their day-to-day or week-to-week work.

As behavioral design applications in the health space mature, we may begin to see shorter timelines and a broader array of tried-and-tested solutions that can be quickly tailored for new contexts.

Challenge 2: Applied behavioral design can address some—but not all—barriers

Applied behavioral design is particularly effective at addressing "last-mile problems"—the small, late-breaking details of a program's delivery that have outsized implications for its uptake or impact. But it can also be used to improve the rest of the journey, by informing the *design* of programs or policies aimed at making products and services more affordable, available, and accessible. For example, in Baltimore, we learned that until very recently, providers could not submit PRAs electronically, they had to be completed by hand and faxed. This resulted in many problems, including errors due to illegible handwriting or typographical errors and poor care coordination. But today, drawing on recommendations about how to simplify and streamline the PRA submission process that emerged from our diagnosis work, Baltimore is piloting various prototypes for electronic submission.

Though behavioral design can make an impact on some upstream and structural barriers, it cannot solve for all of them. When structural barriers play a large role in the problem, the potential of applied behavioral design may be limited. For example, in Tarrant County, we found that many CCFW clients were uninsured or underinsured and, as such, struggled to afford their prescription medications—an enormous barrier to taking them as prescribed. In Ashland, we found that locals were wary of drinking tap water due to past instances of well water contamination and poor communication of boil-water advisories. We also learned that bottled water was costly (in many cases costing as much or more than sugar-sweetened beverages). In these instances, our task was not to persuade people to overlook these factors, but to help them make smart choices within their contexts.

Challenge 3: Sensitive data means challenges in research and evaluation

The security of health care data is of paramount importance. The Health Insurance Portability and Accountability Act (HIPAA) includes a number of measures to secure sensitive and personal information, and medical organizations—from small practices up to the largest insurers and government organizations—are bound by them and the norms that have grown to support them. Human subjects research is also governed by a code of ethics, and, of course, by Institutional Review Boards (IRBs), to ensure that researchers do not infringe upon the rights of research subjects. While these structures have patient and participant interests at heart, they can slow the pace of innovation, and impacted our work in diagnosis, design, and testing.

Diagnostic research—including participant interviews, observation, and administrative data analysis—is a critical input to the design of context-appropriate interventions. Though we were not surprised by the sensitivity of working with health data and human subjects, we were dismayed by how involved and lengthy review times were. For example, in our collaboration with CCFW, each step of our interaction with participants—from initial interviews to user tests to implementing the program itself—involved close communication with our IRB, and revisions resulted in many

unanticipated delays.[x] Merrissa at CCFW mentioned that while she was impressed with idea42's thoroughness, the IRB amendment process was slower than she expected, though she understood the pace stemmed from the adherence to HIPAA regulations and concerns with individuals' health information. Future efforts should consider how to make the IRB process faster, or explore the possibility of improving services such that IRB approvals are not required but ethical research practices and adequate privacy protections are still ensured.

Additionally, recruiting participants in our partnership with CCFW was difficult due to opt-in requirements. As HIPAA does not permit third parties to contact patients based on their health data, targeted outreach was untenable. Ultimately we had to recruit study participants by casting a wide net and funneling them through a multi-step process, which was onerous for CCFW staff, and reduced both the pace of recruiting and the number of participants we had in the study.

Gleaning insights from analysis of existing health data also presented challenges. In Baltimore, we worked closely with a BCHD epidemiologist to understand the relative risk factors associated with PRA submission (or non-submission). However, the data pertaining to Medicaid patient care and outcomes was formally owned by the state-level Medicaid office—not by the city health department, which processes PRAs—such that we were unable to assess the percentage of pregnant patients for whom PRAs were submitted, or other statistical links between factors like Medicaid enrollment, PRA submission, and birth outcomes. This limited access to data ultimately affected our ability to define the problem and design a well-powered evaluation.

[x] Our collaboration with BHB, while reviewed by an IRB, was deemed a public health practice initiative due to its context specificity.

WHAT'S NEXT

Our work in Maryland, Tarrant County, and Ashland demonstrated the promise of using behavioral design to improve community health, but also the challenges. To maximize the value of applied behavioral design, and to enhance its ability to address local-scale problems and solutions, we propose a few approaches. These recommendations are based on our learnings from this project and from others.

Develop new models for learning about applied behavioral design

In a prior section of this report, we discussed the high demand for behavioral design approaches, which was revealed during our RFP process. Unfortunately, most of the demand went unmet: just over 1 in 10 RFP applicants were able to attend the Community Health Workshop, and only 3 of more than 170 applicants were able to partner on an applied behavioral design project. In other words, more than 98% of applicants missed the opportunity to collaborate as they wanted. The field of behavioral design owes it to health practitioners to develop new models of engagement and capacity building—ones that can reach more organizations and be effectively tailored to meet their diverse needs.

Behavioral designers need to think beyond the one-off workshop. Though the Community Health Workshop did successfully develop some organizational capacity for behavioral design (see selection of feedback below), it was clear that more training and support would be required to build the knowledge and skills organizations need to initiate and run applied behavioral design projects on their own. A one-time training, even an immersive and hands-on one, is just too limited. It can't effectively dive into all the critical topics, including how to identify and define behavioral problems; how to investigate context to build an understanding of how it influences decision-making and behavior; how to generate solution ideas based on diagnoses; how to test solutions; and how to adapt them for scale. And even if it could, it wouldn't offer sufficient opportunities to practice and develop these skills.

Similarly, behavioral design work should not only be available to those who can collaborate with behavioral design firms like ideas42, or to situations where randomized controlled trials or other robust evaluations can be conducted. Either would limit the pool of candidate organizations to those most able to commit large amounts of resources to a relatively new and innovative approach.

SELECTION OF FEEDBACK FROM
THE BEHAVIORAL DESIGN WORKSHOP

> ***The workshop has been very thought provoking. Throughout all of it the insights you have touched on has made me rethink what we are doing in my agency.***

> ***As a public health professional, changing the emphasis from what people know to helping them make it easier to do [was relevant to my work]. Learning to work with human nature instead of against it.***

> ***Getting more concrete tools and strategies to use on specific project and a way to communicate with colleagues. I came in with a fair bit of the theory [and] learned so much more. Hearing it related to application was critical to knowing how to apply.***

To expand the availability of behavioral design, we should build approaches that can reach more community health leaders and develop more capacity among those leaders. One approach ideas42 has explored in recent years is behavioral design coaching. ideas42 has designed an applied behavioral design curriculum, which can be delivered over as few as three and as many as 18 months, wherein teams from a dozen or so different organizations in the fields of post-secondary education, financial health, and international health have completed behavioral design projects with ideas42 guidance and oversight. Participants in these programs have emerged with a deeper understanding of behavioral design as a process, not merely a collection of academic insights or quick tips for optimizing communications.[xi] Alternatively, we could consider designing professional development programs, internships, fellowships, and other apprenticeship models, through which practitioners in the field could train for a career in behavioral design or integrate behavioral design into their work.

Marry behavioral design with work on the social determinants of health

Today, a growing number of practitioners in community and public health are rightly focusing on shaping the social determinants of health (SDOH)—the "conditions in the environments in which people are born, live, learn, work, play, worship, and age that affect a wide range of health, functioning, and quality-of-life outcomes and risks," according to Healthy People 2020, an initiative by the Department of Health and Human Services—in order to improve outcomes and reduce health inequities and disparities. A large body of research has demonstrated that these conditions

[xi] To learn more about ideas42's behavioral design coaching approach, reach out to esherman@ideas42.org or visit ideas42.org/BDP, where we share detailed participant insights and case studies from the coaching-focused Behavioral Design Project for Promoting Financial Health.

play a significant role in our health and well-being. Our own work in this project also revealed this as well: it was challenging to design effective behaviorally-informed solutions in the presence of significant upstream barriers.

That said, we believe the principles of behavioral science can be applied to aid practitioners in their work on SDOH, by ***1) shedding a light on potential mechanisms underlying how various social determinants impact individual and communal health decisions and behaviors, and 2) by helping practitioners think about how to design new resources and contexts such that they result in their intended changes.***

For example, we know that income has a significant impact on people's health and well-being. Behavioral scientists have written extensively on how the experience of living in poverty—the context of chronic scarcity—influences decision-making and behavior. Their research has not only revealed that the behaviors we may observe among people living on low incomes tell us much more about the condition of poverty itself than about the motives, skills, or character of the people who are experiencing poverty, but why, and what we can do about it.

We also know that access to key resources, like healthy food, is critical. But as behavioral scientists we are keenly aware of the fact that facilitating access to a key resource like this is not enough to spark change. The adage of "if you built it they will come" is simply not true. For a resource to achieve its intended impact it must be taken up or used regularly, and even perfectly designed products and services may fail to attract or keep users. Behavioral science can help practitioners think about not only how to design new resources, but also how to frame them, in order to facilitate their take up and regular use within a community.

To support practitioners in applying a behavioral science lens in their SDOH work, ideas42 could consider producing and sharing content on how to investigate the impact of certain SDOH contexts, like poverty, on health practices and behaviors, and how to design for better outcomes given these contexts. They could come in the form of video-based modules, webinars, or short training sessions. We could also consider offering advice or guidance on the design of new SDOH initiatives, and either partnering with a set of practitioners to design and roll out new programs, or by consulting on the design of these programs or their roll-out and scale-up plans.

As behavioral designers we want to not only generate knowledge about specific health behaviors and interventions, but also to tackle these more difficult and complex SDOH issues. The community health and behavioral design fields have many frontiers to chart together, and the journey has just begun.

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