FULL ANTHOLOGY

The Anthology of Bright Spots

IN TYPE 2 DIABETES AND PREDIABETES

A project of The diaTribe Foundation

THE diaTribe FOUNDATION

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PART I:
Introduction

BACKGROUND

The Anthology of Bright Spots in Type 2 Diabetes and Prediabetes was conceived during The diaTribe Foundation's *d16 Executive Innovation Lab on Diabetes and Obesity.* The purpose of the three-day event, in Palo Alto, CA in early 2016, was to bring together engaged leaders across diverse sectors to produce innovative, systems-level solutions that could reduce the societal burden of type 2 diabetes. Forty-two leaders across a range of fields attended, including prominent medical professionals, academics, manufacturing chiefs, healthcare policy experts, technology trailblazers, government decision makers, educators, media experts, food and nutrition scholars, and social-impact experts.

The Anthology of Bright Spots was one of the twelve core ideas created during *d16*. Several participants in the Innovation Lab asked, quite simply, "What's working? Where can we find out about existing successes?" It quickly became clear that no such inventory exists—which meant we had no way of identifying common traits of successful interventions across different populations. Recognizing the need, one of the biggest global authorities in diabetes, Dr. James Gavin, whose participation we were incredibly fortunate to have, boldly proposed a unified collection of successes: The Anthology of Bright Spots in Type 2 Diabetes and Prediabetes.

The Anthology is meant to serve as source of inspiration and idea-sharing. Importantly, it aims to show that type 2 diabetes is investable and in doing so, a strong return can be made and sustained—financially, physically, societally, and in many other ways. By creating a unified collection of success, or "Bright Spots," we hope to promote awareness, collaboration, further innovation, and investment.

If something has worked in one part of the world, maybe it can work—or even be improved upon—elsewhere. While this collection is currently largely US-based, we look forward to expansion to more global programs. We aim for the diabetes ecosystem globally to break out of its oft-mentioned silos, collaborate on promising initiatives, prompting investment, and then innovating, replicating, and scaling—and repeating. Specifically, we aim for this Anthology to inform and inspire current and potential funders about what their dollars can actually do to combat the twin epidemics of type 2 diabetes and prediabetes, all to the end that health inequity broadly speaking can be meaningfully reduced.

We began our research for the Anthology with a focus prevention for several reasons. First, prevention presents a massive opportunity to save both lives and money. In the United States, the direct costs of diabetes, not counting lost productivity and early death or disability, is nearing $200 billion per year, and growing fast. Over 30 million Americans have diabetes, over 90% with type 2. We are convinced that care alone cannot sustainably address this crisis; widespread prevention is essential. Additionally, while we could not determine how much money is spent on prevention, it is obvious that it is substantially underfunded. Finally, while we know a good deal about *what* can help prevent type 2 diabetes, we still have much to learn about *how* to fund, implement, scale, and sustain prevention efforts.

From our focus on prevention, we expanded our research into the ways that the workplace can be a target location for chronic disease prevention and management, as well as for overall health and wellbeing promotion. A significant proportion of people spend a large fraction—in many cases even the majority—of their time at work, and as a result the workplace is a logical setting in which to encourage people to engage in healthy behavior. In addition, given that employers often bear a substantial burden of health costs, it can also be in their best interests to engage in health promotion. To be clear, we are by no means the first people to consider the worksite as an ideal setting for health promotion. Rather, our goal is to provide examples that demonstrate how workplace wellness can provide both public health benefit and improve individual lives, and as a result encourage increased investment, awareness, and innovation.

We completed our research for the Anthology by focusing on "Healthcare Teams of the Future." We chose to examine innovative models for chronic care for several reasons. First, improved healthcare delivery for chronic disease prevention and care presents a massive opportunity for investment and cost-savings. Innovative, continuous, and collaborative care models are essential if we are to address the diabetes crisis in a sustainable, cost-effective way. And, we need education models that prepare health professional to design and deliver these new innovations health and healthcare.

Our hope is that this Anthology will lead to greater innovation and increased investment in preventing, managing, and treating type 2 diabetes. In our (albeit biased) view, it is one of the most urgent needs, and greatest opportunities, that exists in health today.

Ben Pallant, Amelia Dmowska, Hae-Lin Cho, Isabel Chin, and Kelly Close

A NOTE ON OUR RESEARCH METHODS IN CREATING THIS ANTHOLOGY

The creation of this document was, by choice and by necessity, highly collaborative. Because so few successes have been well-publicized, we quickly found that the best way to identify Bright Spots was through conversations with well-informed people from a variety of fields related to type 2 diabetes. To date, we have had interviews with approximately 100 educators, prevention specialists, clinicians, public health experts, non-profit innovators, behavioral interventionists, entrepreneurs, researchers, advocates, and policymakers. Each conversation yielded invaluable information, not only on what is working but also on the challenges that remain and the possibilities for future successes. Notably, we learned about many people who are hard at work tackling the many issues relevant to diabetes and its prevention and we admire how committed they are to it. We have brought together the central themes and lessons from these interviews, in a section which we have titled "Insights," a separate section from our collection of Bright Spots. In addition, the following pages contain a list of all those to whom we spoke that chose to be recognized for their contribution. We are grateful to these many contributors who aided this project by sharing their ideas, experiences, and genius with us.

Our conversations were supplemented by independent research by members of The diaTribe Foundation. We acknowledge that, in relying on such research, we may be presenting a collection that is biased in favor of those initiatives that have had the time and resources to conduct studies, publish reports, and advertise successes. We have worked hard to balance our scrutiny of these efforts with the understanding that some of the most promising programs may not be the best advertised and may not even lend themselves to traditional research methods.

THE ANTHOLOGY OF BRIGHT SPOTS EXPERT PANEL & CONTRIBUTORS

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OUR CRITERIA FOR BRIGHT SPOTS

Given the complexity of type 2 diabetes prevention, Bright Spots are not easily defined. In assessing programs for this collection, we considered five criteria:

1. **Outcomes:** Has the program demonstrated meaningful outcomes? If so, what is the evidence?

2. **Scalability & Investability:** Can the program, or at least elements of its model, be replicated in other communities? Can its model be applied in settings with limited resources or infrastructure? Is there potential for growth within its current community? Can it demonstrate meaningful returns on investment?

3. **Potential for Impact:** Can it have a sizeable impact on single individuals or communities? Can the program affect large populations?

4. **Sustainability:** Has the program demonstrated the ability to engage a relevant population or community? Does it demonstrate or suggest potential for engagement to be sustained long-term?

5. **Inspiration:** Does the program use a unique or novel approach? Does it stand out for its innovative design? Does it have the potential to excite, generate ideas, and galvanize?

Certainly, even the most successful programs may not excel in all these areas. Some are too young to have demonstrated long-term outcomes or returns on investment; others are meaningful not for their innovation but for their implementation of tried-and-tested strategies. These criteria were instead used as guideposts to determine what constitutes a Bright Spot.

PROGRAM CATEGORIES

"Gold Standard" programs set the example for others of their type. They represent a complete, complex model from which others can, and in most cases have, drawn inspiration. These programs have the potential to be the standard against which other efforts are compared. Most have a demonstrated potential for impact, scale, and sustainability.

"Prime Performers" are well-established, noteworthy efforts in prevention. While they may not be the single example against which all others are measured, they are still highly regarded. Many have demonstrated outcomes, scalability, and sustainability. Many are separated from the "gold standards" only by virtue of having received less attention or funding. Many of these programs are powerful "proofs of concept," demonstrations that prevention truly is possible.

"Innovators" are programs that stand out for their novel approaches. They are often the most entrepreneurial programs in the collection and, in many cases, have shown great potential to generate excitement. Many are still in their developmental stages, and thus outcomes or sustainability may not yet be demonstrated, but each was included based on one or more characteristics that more than deserve our attention.

These categories are not rankings, nor are our Bright Spots ranked in any way. There is, of course, a good deal of overlap among these categories. Many Innovators will become Gold Standard programs, many Prime Performers have highly innovative characteristics, and so on. The separate categories serve merely to structure the Anthology. Likewise, programs in this collection are arranged alphabetically; the order implies nothing further. This is by no means an exhaustive list of prevention efforts but reflects a collection of the best Bright Spots that exist in prevention to our knowledge. Our hope is that, as efforts and investment expand and evolve, so too will this Anthology.

PART II:
Prevention

INSIGHTS—PREVENTION

In creating this Anthology, we spoke to 100 people with backgrounds ranging from policy experts to endocrinologists and from behavioral researchers to non-profit innovators. These conversations were crucial in helping to identify the programs we considered for inclusion. We also believe the interviews also offered extraordinary insights into prevention, workplace wellness, and healthcare teams of the future overall. This section shares the most valuable lessons that emerged from those interviews. In doing so, the section brings together, from a broad variety of perspectives, both the challenges and the opportunities in preventing, managing, and caring for type 2 diabetes.

1. **The DPP is the answer.** The original Diabetes Prevention Program (DPP) study, and the various studies that have replicated and aimed to translate it, has made it clear: prevention of type 2 diabetes, or at least the delay of its onset, *is* possible in people with prediabetes through lifestyle change. We repeatedly heard the refrains that the DPP showed prevention is "not rocket science" and "not magic." We know exactly what it takes. A weight loss of as little as 5%-7% (although 10% or more may be ideal), in conjunction with 150 minutes per week of physical activity, can significantly reduce the progression of prediabetes to diabetes. The evidence is considered sufficiently conclusive that the Centers for Medicare & Medicaid Services (CMS) declared that DPP programs have a full return on investment within four years, and it announced it would start reimbursing for approved DPP involvement in 2018, the ultimate seal of approval.

2. **The DPP is not the answer.** As much as the DPP forms the foundation of many current diabetes prevention efforts, we heard two main arguments against it as the long-term solution to type 2 diabetes prevention. First, while many claim that the DPP's model for prevention is neither "magic" nor "rocket science," numerous others reminded us that it can seem almost that difficult, at least when attempted at large scale. After all, if we truly knew how to get people to achieve and sustain weight loss and be more physically active, we would be doing it already. We may know *what* it takes to delay or prevent progression of prediabetes to type 2 diabetes, but we are still uncertain regarding *how* to help people get there in an affordable, scalable way. Even Dr. David Marrero, a lead investigator on the original DPP study, as well as a leader of the translation efforts that led to the YMCA DPP, said, "We've so far tried to fit everyone to one or two models," and that just doesn't work. Dr. W. Timothy Garvey, Chair of the Department of Nutrition Sciences at the University of Alabama—Birmingham notes that the shortcomings of a one-size-fits-all are, "not surprising when you consider that obesity is a disease, and there are multiple pathophysiological mechanisms that patients must fight against to prevent weight regain following lifestyle interventions."

   The second, perhaps more persuasive argument against the DPP is that it fundamentally fails to address health at the population level. While the DPP may be effective in preventing diabetes among those already at high risk, it does little to address the broad factors underlying the high prediabetes prevalence in the first place. Prof. Paul Zimmet, who helped author the Australian National Diabetes Strategy, said, "We need to look 30 or 40 years down the track at the people who are going to get diabetes." In this sense, the DPP, while crucial to those already at high risk, is little more than a Band-Aid solution at the population level; to truly address the rapidly growing diabetes epidemic, we

need to address social determinants of health. This means changing our food systems, our norms, our education, our living spaces, and much more.

3. **Make it cool—media and marketing are essential tools for social change.** A prevention effort is only as good as its ability to attract people's participation. The most successful programs use marketing strategies and gain attention in media, including social media. We were introduced more broadly to the concept of "social marketing"—using marketing strategies to influence social behaviors, rather than consumer behaviors. And people expressed the need for marketing at many levels. Several argued that produce should be better advertised in grocery stores. Prof. Philip Home of Newcastle University, UK, argued that some of the greatest inroads can be made through cultural avenues like celebrity chefs and women's magazines. Dr. Marrero said that regulation alone is useless in the absence of accepting social change. He said, "I think you have to attack beliefs. I think you have to attack the cultural acceptance of certain things."

   Social media is an increasingly important tool for reaching and engaging people as well—its importance was voiced numerous times in our research and conversations. Dr. Deborah Greenwood, President of Deborah Greenwood Consulting and 2015 President of the American Association of Diabetes Educators (AADE), argued that the ability to engage patient populations with social media should be "a requirement of the job," especially in prediabetes and type 2 diabetes, where stigma can be such a profound barrier to engagement.

   Overall, we heard that it is important to leverage all forms media to build positive attention. Some of the most effective programs are able to do their marketing largely for free, simply by knowing how to raise excitement in a way that brings media coverage. Media coverage is particularly important in influencing the perception of any intervention: Is the effort on your side? Is it trying to support you or control you? One of the most informative examples comes from tobacco, where the key to reducing the prevalence of smoking was ultimately creating a social perception of the tobacco industry as the "bad guy" and cessation efforts as people's ally.

4. **Don't blame individuals for social and environmental challenges; work to change places and not just people.** Dr. William Polonsky, of the Behavioral Diabetes Institute, raised the concept of *attributional bias*. When others don't meet their goals, we tend to use personal factors or shortcomings, such as lack of motivation, as the explanation; when we don't meet our own goals, we attribute it to situational factors like stress or limited time. Beyond contributing to the stigma of prediabetes, obesity, and type 2 diabetes, this bias leads us to focus prevention efforts on individual engagement and motivation, rather than environmental and social determinants of health. "The people who are going to solve the diabetes epidemic in America," Dr. Polonsky said, "are going to be our urban designers." While it may be an overstatement to expect just one sort of intervention to solve an epidemic, changes in our environment certainly encourage health without forcing people to make deliberate, active, and motivated decisions. Many others echoed the sentiment that the long-term solution can only lie in shifting social and environmental factors to the point where healthy decisions are the default, rather than the exception.

5. **People make decisions based on their priorities. Prevention is rarely a priority.** In fact, we are often wrong to even assume that health itself will be the primary motivating factor in any decision. People often face far more salient motivators than health—saving money and balancing a

budget, feeding a family, advancing a career or maintaining multiple jobs, caring for loved ones, sustaining social ties, upholding cultural norms and traditions, avoiding embarrassment, avoiding wasting money, even avoiding deportation—any one of these factors, and many more, can lead a person to make reasonable, rational decisions that they *know* are not best for their physical health. People may know that vegetables are healthy, for example, but aren't ready to risk losing money if they spoil or if their family doesn't like them. Nutrition and health education are crucial but are insufficient on their own. Said Rita Nguyen, Director of Chronic Disease Prevention for the City and County of San Francisco, "We don't do enough to actually enable behavior change." We are too focused on teaching people what is healthy, and often neglect the need to learn how to make health part of daily life. Said Sarah Nelson, executive director of 18 Reasons, which administers the Cooking Matters program in San Francisco, "The nutrition-education complex is dominated by dieticians…It should be dominated by chefs."

By far the most frequently cited barrier to healthy decisions was money. People will prioritize their ability to make ends meet and feed their family over almost anything else, and we would be wrong to believe that people would act against this interest. Certainly, some health behaviors cost little or nothing extra, and for these, other barriers may be more significant. But to prevent type 2 diabetes, particularly in a way that reduces health disparities, we need to ensure that a wide variety of interventions are financially feasible, and even beneficial, even in the short term.

6. **We need to learn more about incentives and motivation.** Motivation is a major obstacle and, to some extent, a mystery for prevention. It is natural to lament low engagement rates in prevention programs. In large part, motivation and engagement remain the missing links between knowing *what* prevents type 2 diabetes and *how* to employ this knowledge. While environmental change is certainly a major part of influencing how people make decisions, we also need to learn how individual motivations work. We heard, several times, that money can be an ideal incentive—we ought to be paying people who work to stay healthy. Others question this practice and argue that we need to be far more nuanced in how we look at incentives. We spoke to Dr. Martha Nelson, of the National Institutes of Health, about the importance of behavioral economics in prevention efforts. Said Dr. Nelson, "Certainly it's not sustainable to constantly pay someone to engage in a certain behavior," but such an incentive can be useful in overcoming an "initial resistance." In many cases, she noted, "You're trying to melt away perceived barriers that aren't really there." Lifestyle change can only be sustained, let alone implemented, if these barriers are surmounted. Other experts spoke about motivation entirely outside of incentives and rewards. Dr. Robert Vigersky, Medical Director for Medtronic Diabetes and Past-President of the Endocrine Society, talked about how rapidly patients begin to implement lifestyle changes after seeing their own data from continuous glucose monitoring (CGM). Simply being able to visualize what's happening in your body can increase your understanding of how your decisions affect your health.

7. **There is widespread misperception about what constitutes meaningful lifestyle change.** One of the crucial insights of the DPP study was that even minor weight loss, equivalent to 5%–7% of body weight, makes a significant difference. Yet there remains a prevailing assumption that only major weight loss can lead to improved health, and the perceived difficulty of losing huge amounts of weight can prevent people from

attempting less drastic lifestyle change. "People are still struggling under catastrophic weight loss models," Dr. Marrero said. "It's kind of a learned helplessness model." However, Dr. Scott Isaacs, Medical Director of Atlanta Endocrine Associates, cautioned us not to take the 5%–7% rule from the DPP study as gospel—that amount of weight loss is sufficient for significant diabetes prevention, but greater weight loss may have even more substantial benefits, both for diabetes and other conditions associated with being overweight and obesity. In addition, the DPP made clear that other lifestyle factors beyond just weight are also important in preventing or delaying diabetes.

8. **Stratify risk, but don't forget whole parts of the population.** Many experts spoke to the importance of using scientific understanding for better risk stratification. R. Keith Campbell, Professor Emeritus of Pharmacotherapy at Washington State University, spoke about the potential of genetic screening for diabetes susceptibility. Paul Zimmet, Professor of Diabetes at Monash University in Australia, and others spoke on the importance of epigenetics, or impacts of the prenatal environment on DNA. We also heard, at the 9th World Congress on the Prevention of Diabetes and its Complications, that we need to refine and strengthen our definition of prediabetes. After all, some people with prediabetes will never progress to type 2 diabetes, and we aren't very good at predicting who will. More research needs to be done into the predictive efficacy of the various diagnostic tests for prediabetes, the applications of genetics to this process, and much more.

   Prof. Zimmet also reminded us, however, that population-level prevention strategies are incomplete if they don't also address lower-risk groups. He estimated that about half of type 2 diabetes cases come from populations that we consider to be at high-risk, while the other half comes from the general population. A comprehensive prevention effort needs both a community health component and a component specifically for those at the highest risk.

9. **Prevention needs to start before people develop prediabetes. Comprehensive interventions begin in childhood or even before birth.** During our conversations, we asked people about their "dream" prevention program. In response, experts in a wide variety of fields consistently spoke about the need to focus on children, infants, and even prenatal factors. Numerous times, we were reminded that ultimately, the goal is not just to change the behavior of high-risk adults, but to raise children to have a lifetime of healthy behaviors. This is not to say that multigenerational involvement is not critical, but rather to point out that the only way to achieve and sustain population-level prevention is to consider future generations.

   "Starting early" has multiple definitions. As Prof. Zimmet noted, "Governments aren't paying enough attention to maternal and child health." At the very least, the information that is collected is rarely applied to chronic disease prevention. Many others voiced the need to pay more attention to epigenetics, gestational diabetes, and other prenatal and infant factors. Many talked about the importance of nutritional and physical activity education for children, in the form of such things as school gardening, home economics and cooking classes in schools, physical education classes, health and nutritional education, and more. Others talked more broadly still about involving youth as leaders in prevention efforts to increase engagement and excitement. Youth buy-in and leadership are essential to sustain any youth-centered intervention—if kids aren't interested it won't stick. Dr. Paul Bloch, Senior Researcher and Team Leader at Steno Diabetes Center in Copenhagen, shared the story of a Danish project that

asked teens to design neighborhood planning improvements using their skills with games like Minecraft and Lego. The effort led to successful neighborhood improvements and increased mutual respect between city planners and local youth.

10. **Prediabetes is a legitimate medical condition, and we need to increase the sense of urgency around it. Knowing your risk should be a standard aspect of general health.** One of the great barriers to motivating those with prediabetes is that most people don't feel any symptoms, and thus there is little urgency around the condition. One way of increasing urgency is by working to frame prediabetes more clearly as a legitimate medical condition. Lucia Novak, Director of the Riverside Diabetes Center at Riverside Medical Associates (Riverdale, MD) and Adjunct Assistant Professor, Uniformed Services University of the Health Sciences, suggested that prediabetes "probably should be called stage one diabetes." Prof. Campbell agreed, noting, "I am a big believer in treating pre-diabetes as if it's a diagnosis of type 2 diabetes." Being able to visualize the physiological changes involved in prediabetes, even if you can't feel them, might also increase the urgency. Said Dr. Vigersky, who is interested in the use of CGM to motivate behavior change, "The concept of glucose, let alone A1c, is so foreign [to people with prediabetes] . . . But if you show them a picture of what is actually happening [after a meal, etc.] . . . they could see some relationship. They could get an understanding in the simplest terms."

    Beyond a sense of urgency, basic awareness of prediabetes is also lacking. The condition is significantly underdiagnosed, and many patients don't even get screened. In fact, 1 in 3 American adults, or a total of 84 million Americans, have prediabetes, but only an estimated 1 in 10 of those people are diagnosed.[1] Michael Warburg, managing director at Warbros LLC, said that few people know their prediabetes risk in the same way that they would be likely to know, say, their cholesterol number. He said, "I'd like to see A1c as part of everyone's personal dashboard," one that is screened for as standard practice and that holds the same prominence in people's sense of their own health as cholesterol or BMI.

11. **Some people are concerned that too much focus on prediabetes creates intimidation and raises cost.** Ms. Novak, despite expressing that we might consider thinking of prediabetes as "stage one diabetes," urged caution in forcing people into an overly "medical" sense of their health. She pointed out that interaction with medical professionals can carry stigma in prediabetes and diabetes. Such stigma can be reduced in DPPs and other prevention programs that are not run by medical professionals, as the people who facilitate them may be considered more approachable. Others added that requiring medical professionals to lead prevention programs can drive up costs and limit access. Dr. Vigersky may have phrased the perils of over-medicalization best when he said that people "naturally avoid medicalization of their lives." Especially with something like prediabetes, if we don't feel it—if it doesn't hurt—then we are unlikely to naturally want to address the issue with the attention that an illness can demand.

12. **Peer education and support help people engage with, and even accept, interventions. Successful programs regularly involve families and friends.** Interventions are often most effective when addressing social networks rather than individuals alone. Friends and family will likely have a far more personal interest in an individual's health than a healthcare provider will. Dr. Steven Edelman, Professor of Medicine at the University of California, San Diego, and founder of Take Control of Your Diabetes, said that the best awareness campaigns often involve first-degree

relatives: "Have you told your brother that he's at risk? Your son, your daughter?" Friends and family can also be powerful sources of motivation, of shared goal-setting, and of maintenance through periods of stress. Said Varun Iyengar, a medical student at Brown University, "I can have the resources to go to the gym, and the time to go to the gym, but if I have a friend who's motivating me to go there, then I'm much more likely to end up going." Dr. Polonsky said that many of the most powerful social influences aren't even active or deliberate. Even just spending time with people who are active makes you more likely to be active, simply because of the nature of social pressure.

Peer educators also represent a powerful way to increase the reach of prevention efforts. Well-informed educators can promote lifestyle change even outside of formal settings, such as by encouraging and teaching friends or colleagues. Peer education's greatest power, however, may be in reaching typically disadvantaged communities, across barriers of race, language, religion, socioeconomic status, etc. People are often more eager to engage with educators who understand and share their background or current circumstances. Peer educators need to be put into action, though; training alone is not enough. Said Ms. Nelson of 18 Reasons, "A lot of time non-profits train peer educators, but then they don't have anything for them to do."

13. **Primary care should have the capacity and the incentive to pay attention to prevention.** Many of the people with whom we spoke, especially those involved in hospital-based medicine, argued that we need to better integrate prevention into primary care. Increasing access to primary care, rather than disease-specific interventions, is potentially a more effective, and cost-effective, strategy. However, primary care professionals need to increase their focus on prevention as well—risk stratification and prediabetes screening will be most effective and widespread if they are better integrated into the primary care models that so many people already access. Primary care is currently limited by a lack of both time and incentives to engage in prevention. Part of the necessary change involves improving medical education to be more aware of obesity, prediabetes, and diabetes more generally. For example, Jessica Dong, a medical student at the University of Pennsylvania who has been active in trying to modernize medical school curricula, said that clinicians need increased training in how to avoid stigmatizing patients when addressing topics like obesity and lifestyle change. Part of the necessary change also involves enabling primary care providers to devote time to prevention, and to be reimbursed for doing so.

14. **The lack of continuity of care in our medical system fails high-risk patients.** Dr. Brendan Milliner, a Resident Physician in emergency medicine at Mt. Sinai in New York City, said, "Lack of continuity is probably the biggest single factor that leads people to us [in the emergency department]." When people's care is segmented and disrupted, it becomes substantially harder to address the increasing risk factors and red flags that precede type 2 diabetes and its subsequent complications. Discontinuous care also limits opportunities for risk stratification. For example, gestational diabetes is a known risk factor for type 2 diabetes, yet mothers generally see their obstetricians at most once or twice after delivery. The prevention opportunity presented in this piece of medical knowledge can be lost in the segmented communications between the obstetrician and an individual's future clinicians. Highly segmented care partly reflects the tendency of medical education toward specialization.

15. **Make it unavoidable. Meet people where they are, and often.** In much the same way that we repeatedly heard that we cannot expect people to act against their financial interests, we were also regularly reminded that people are unlikely to make changes perceived as inconvenient or disruptive to daily life. Dr. Polonsky said that people will rarely lower their other priorities, so we need to focus on health in ways that don't come at the expense of other things people value. Many said the secret lies in repetition—reminding and reaching out to people often enough to make attention to health unavoidable, while still limiting the message predictability that could lead people to tune out these messages.

    We were also frequently reminded that the best interventions reach people in the places and routines of their daily lives: go to people instead asking them to come to you. This need is closely tied to the importance of environmental change. Prevention efforts need to take place in schools, community centers, workplaces, social groups, city streets, and the other places where people spend the majority of their time, not just in the hospitals and medical centers that most people only occasionally visit. In particular, any added steps that are expected of individuals, especially extra medical appointments, will almost certainly serve as a barrier to engagement. The most effective screening, education, and motivation are integrated into the existing structures of daily life and normal care that people receive. This is especially important given that, as noted earlier, prediabetes is not "felt" in a physical way. The key thus lies in convenience and even desirability. Dr. Darin Olson, Assistant Professor of Medicine in the Division of Endocrinology, Metabolism, and Lipids at Emory University School of Medicine, said that the health innovator's role is in finding what people *want* that simultaneously makes them healthier.

16. **Remember metformin.** The other, often less talked-about insight of the original DPP study was that metformin alone showed significant reduction in the progression of prediabetes to type 2 diabetes. While many experts argue that lifestyle intervention should be the first step in any case and that dietary change and physical activity are feasible, we should be thinking more about the possibility of metformin, and other potential therapies for diseases like obesity, as a preventive backup or alternative in those cases where lifestyle interventions fail or make less sense. Among other things, metformin is also relatively "dirt cheap," to borrow a phrase from Dr. Nick Wilkie, Resident Physician in Emergency Medicine at University of Wisconsin, Madison.

    The major challenge, of course, is that metformin is not currently indicated for prevention, so only limited data exists on how, when, and for whom it is best used as a preventive intervention. Professor Kamlesh Khunti, Professor of Primary Care Diabetes and Vascular Medicine at the University of Leicester, UK, said that there might be great value in research that examines who is more likely to benefit from lifestyle interventions versus metformin, as patients could be directed to the most effective strategy earlier.

17. **Each community is different. Communities need the chance to express their own needs when designing interventions.** No prevention effort can be identically replicated in two different places, as each community has its own challenges. To use Dr. Marrero's example, fear of deportation is a major barrier to bringing about sustained changes in border communities in Arizona; meanwhile, the weather across four seasons is a barrier to sustained fresh food in Indiana. Dr. Marrero also said that most prevention efforts have chosen to focus on cities, at the expense of the substantial prevalence of type 2 diabetes in rural areas. Other experts echoed that interventions,

especially those involving food and diet, need to be tailored to cultural contexts. The best way to ensure that interventions fit communities is to let the communities themselves define their needs. When the people are allowed to express their own challenges, work toward the creation of their own solutions, and shape their own interventions, they are far more likely to see meaningful initiatives with long-term benefits.

18. **The right partnerships are crucial, and they might not appear where you expect.** Many of the programs we have highlighted in this Anthology effectively employ partnerships rather than trying to implement change on their own. Likewise, many of the people we spoke to, especially those who have been in community-, state-, or national-level prevention efforts, emphasized the importance of partnerships. Many of the important partnerships involve the locations and institutions with which people engage on a daily basis—schools, offices, parks and city streets, restaurants, grocery stores, and so forth. Grocery stores and other places where people purchase food, such as convenience stores, were frequently mentioned. Retail food outlets are, after all, the primary location in which food purchasing decisions are made. The advertising, layout, and selection of grocery stores are thus a primary mediator of our eating, and stores represent a valuable target for both environmental change and education. Several experts also spoke about grocery stores as a setting to deliver nutrition education in a practical, engaging, even game-like way.

    Interestingly, two potential partners that are cited as being most challenging collaborators were medical centers and governments. Unlike workplaces, schools, and grocery stores, most people rarely visit hospitals or other clinical settings. Thus, medical facilities are less likely to be the place where behavior change, or even sustained education, can take place.

    Hospitals do still have potential to be valuable partners, however. Dr. Bloch said that the key to involving hospitals in prevention is by making them places of health, not just of illness.

    Governments, while potentially quite important as an ally, can also be challenging to work with. One major challenge was politics, and particularly political turnover rates, which can often be the enemy of sustainability. Prevention is a long-term process, and the benefits are not necessarily seen within the time-frame of an election cycle, meaning that it is hard to encourage elected officials to prioritize prevention. Additionally, political shifts can lead to abrupt changes or cuts to programs and their funding. Of course, governments can also be among the most powerful allies in prevention efforts, especially in their ability to regulate and coordinate at scalet.

19. **Traditional applications of data and research may not be ideal for studying and refining prevention efforts.** Randomized Control Trials, while considered the "gold standard" of research, are exceedingly difficult to employ for prevention efforts, especially in those focused on real-world implementation. Randomization is unfeasible, if not impossible, in almost any community-level prevention effort. Time-scale is often a challenge as well, as trials are often limited to months, while prevention is more relevant over the course of years. Two alternative research models were emphasized. Several experts, including Dr. Marrero, spoke about the value of Community-Based Participatory Research, in which the community leads the process of defining research questions, goals, interventions, and more. Additionally, Dr. Bloch spoke about the need for "realistic evaluation approaches," which aim to measure real-world efficacy and impact, to gain more credibility in the world of research regarding prevention and social interventions.

Additionally, the traditional research paradigm often leads to a critical gap between academia and real-world-implementation for prevention efforts. Collaboration among academics, entrepreneurs, and program specialists or community organizers are rare, underfunded, and unlikely to garner much interest or prestige for either party involved. Finally, research tends to look at aggregates, but for prevention research in individuals, there may be just as much, or more, to learn by examining the outliers. Dr. Polonsky drew attention to the Look AHEAD trial, which in aggregate was deemed to be an ineffective intervention. Yet Dr. Polonsky noted that a small subset of participants saw substantial and sustained weight loss. He emphasized the need to examine what, exactly, sets apart these super-performers, as well as those in other interventions.

20. **There is major need for more money, but more than just money is needed. We need to focus on sustainability in prevention efforts.** We heard about numerous ways in which money itself would be valuable for both research and implementation. Funding could be used to increase access to everything from fresh produce to DPPs. It could be used to increase collaborations between academic institutions and communities and to fund more broadly the work of translating research from academia to real- world settings. Money even shapes the creation of new programs, as the promise of reimbursement makes the DPP model an appealing, and potentially limiting, basis for innovation. In addition, while prevention has powerful potential for long-term returns on investment, there are often major up-front costs. The time-frame for breaking even is often longer than an election cycle or the standard turnover time between insurance providers, meaning there is little incentive for those who control much of the funding to invest in prevention. However, while funding is valuable, money itself isn't the key to prevention. We can't simply "throw money at the problem." The money needs to be used to determine how to best implement prevention measures and then to make these possibilities a reality. This means funding the entire process: research, design, planning, implementation, innovation, evaluation, improvement, scaling, replication, and everything in between.

And lastly, and in many ways most critical insight from this Anthology of Bright Spots:

21. **Collaboration is happening, and people want more.** The single most common thing that we heard was that prevention is challenging but critically important. As one expert put it, we have been "humbled in the face of the challenges posed by prevention." Yet people spoke with equal admiration about those they saw working on prevention. People consistently spoke about the importance of those approaching the problem in different ways. We heard:
    - prevention specialists emphasize the importance of behavioral economics
    - behavioral specialists emphasize academic research
    - academic researchers emphasize translation and implementation
    - program implementers emphasize cultural awareness
    - cultural experts emphasize food systems
    - food system interventionists emphasize education
    - educators emphasize community leadership
    - community organizers emphasize hospitals
    - hospital clinicians emphasize prevention specialists

Simply put, no one specialty alone can solve this problem. We are hardly the first to suggest that the silo-ing of specialties is a barrier to health; that fact was a central motivation for this Anthology. We hope, however, that this will be the most important insight from this entire exploration of prevention: People from many sectors are ready, and eager, to collaborate around this goal. We must strive to make these collaborations possible, powerful, and lasting.

1. AGITA SÃO PAULO

PROGRAM NAME
Agita São Paulo

ORGANIZING GROUP
São Paulo State Secretariat of Health, the Studies Center of the Physical Fitness Research Laboratory of São Caetano do Sul (CELAFISCS)

LOCATION
São Paulo, Brazil

PROGRAM TYPE
Physical activity promotion, population health, free for participants, community outreach/engagement

CATEGORY
Gold Standard

- The Agita São Paulo initiative, based in São Paulo, Brazil, encourages physical activity through creative programming—spreading the message that physical activity can be unintimidating and fun.
- Program examples include walking groups, a "walk truck," an annual "24-hour walk," an event called "Via Viva" that closes roads to traffic, Gymnastics in the Park, and an Active Community Day.
- The World Bank estimates the program helps save $310 million USD in annual health care costs in Brazil.
- The programs are centered on the "Transtheoretical Model" of behavioral change, which encourages small, manageable steps to become more physically active.
- Because of *Agita's* widespread partnerships in hundreds of municipalities, the program is adaptable to fit the needs of Brazil's diverse citizens.

With an emphasis on involving children, students, workers, and older adults, the Agita São Paulo Initiative encourages physical activity along with civic engagement and mental stimulation. A number of programs stem from this broad initiative, including the following: walking groups focused on social justice, where members visit nursing homes or collect recyclable material; a "walk truck" that visits neighborhoods to promote messages about the benefits of walking; walking groups and stretching classes for children, parents, and staff; an annual "24-hour walk" on World Physical Activity Day; Via Viva, which closes 4 km of the road to traffic and opens it for cyclists, walkers, and runners; Ginástica no Parque (Gymnastics in the Park), which reaches almost 6,000 people on a monthly basis; and an annual event called Agita Galera ("move crowd" or Active Community Day), held in 5,500 schools, in which children partake exercise and discuss active living. There have been a number of reported benefits for both the population's health and the economy in Sorocaba. Between 2000 and 2004, hospitalization rates from diabetes fell by 57% and hospitalization rates for stroke fell by 50%. The World Bank reported that the program is saving $310 million USD annually in health care costs. Researchers have estimated that the Via Viva program alone has a cost-benefit of $309 USD per participant.

KEYS TO SUCCESS

Based in Behavioral Theory

Underpinning *Agita São Paulo's* success is a model of behavioral change called the Transtheoretical Model. Five particular "stages of behavior change" are crucial:

1. Precontemplation (not considering the behavior),
2. Contemplation (conscious consideration of the behavior),
3. Preparation (preparation for the behavior),
4. Action (current engagement in the behavior), and
5. maintenance (sustaining the behavior).[i]

The goal of the initiative is to encourage all people to take a step forward in this process. Under this model, sedentary people will become irregularly active; irregularly active people become regularly active; regularly active people become regularly very active; regularly very active people remain very active with a diminished risk of injury.[2] People aren't expected to make huge leaps forward all at once. *Agita* thus makes improvement an attainable goal for all.

The educational materials for *Agita* also consider motivational factors that determine the lasting power of health initiatives. Recognizing that "it is easier to feel changes in mood or self-esteem than to notice changes in body plasma, cholesterol or glucose," the materials stress the social and emotional benefits of physical activity, with physical benefits acknowledged but not as heavily emphasized.[3]

Accessible, relatable, and unintimidating

The *Agita* initiative has taken deliberate steps to be accessible and unimposing, particularly to lower-income Brazilians. A central focus from the beginning has been to spread the message that there are ways to be physically active that are not traditional or organized. The program's materials have deliberately avoided terms like "fitness" and "sports," which can create assumptions that physical activity can only be highly structured and, in many cases, costly. They opt instead for terms like "active living" and "movement," which can feel accessible to all.[4]

In addition to deliberate language, *Agita* understood the limitations that might prevent people from being more physically active. In particular, *Agita* recognized that a lack of time was the most commonly stated reason why people don't increase their physical activity. In response, they worked hard to communicate that physical activity goals can be met in many small chunks of 10–15 minutes several times each day as opposed to all at once.[5]

In addition *Agita* communicated that exercise can be conveniently incorporated into daily life through activities including household chores and walking to school or work.[6]

Collaborative and inclusive

Rather than trying to act alone, *Agita* engaged with a wide variety of partners to strengthen its efforts and to raise its profile without needing extra funds. These efforts, as well as the funding, involved the State Secretariat of Health, partner institutions in and outside the health sector, and private business partners. Importantly, the program was careful to also focus on "intrasectorial" partnerships as well; when the support of one partner was obtained, *Agita* reached out to a potential competitor of that partner within its same sector (e.g., the Industry Federation and the Chamber of Commerce).[7]

Highly visible

One of the most impressive successes of *Agita* has been its ability to gain recognition among its target population. A home visiting survey of 645 randomly selected São Paulo homes indicated that more than 55% of the population knew about *Agita*, and about half of those could communicate its main message. Notably, this awareness was well distributed among different socio-economic and educational levels.[8]

Agita has consistently raised media attention by virtue of its "mega-events"—statewide programs focused on target audiences (workers, youth, and the elderly) that garner media coverage at no added cost to the organizers.[9] For example, the *Agita Galera* (Active Community) Day was covered in some 70 state and regional newspapers and reached a potential television audience of up to 21 million people.[10] An additional feature of these mega-events is the distribution of items such as t-shirts and hats to increase recognition of *Agita* and its "brand."

The wide use of many partners has also increased the amount of free publicity, as many partner institutions have independently taken such steps as printing

Agita's messages about physical activity on paystubs, newsletters, and other company materials.[11]

Flexibility to adapt to local contexts

Because *Agita* has partnerships in hundreds of municipalities, it has been designed to fit diverse social, cultural, and economic contexts throughout the state. *Agita* uses what it calls its "two-hats" approach, in which it can emphasize either government-driven or non-governmental efforts depending on the municipality and the needs and characteristics of its citizens.[12]

Agita also demonstrates flexibility with its partner institutions, avoiding rigid or binding requirements that might turn potential collaborators away. The main purpose of its partners is to increase awareness and spread the *Agita* message through social networks; additional contributions are welcomed but not demanded. In this way, *Agita* had partnered with over 300 institutions by 2002.[13]

Medical legitimacy

Agita has earned respect for providing true health intervention rather than simply offering a public awareness campaign or an event for physical activity. For one, the organization originally tasked with *Agita's* coordination was the Studies Center of the Physical Fitness Research Laboratory of São Caetano do Sul (CELAFISCS), a respected sports sciences and research institution with both national and international recognition.[14]

In addition, *Agita* spread its message in the local medical community. The initiative worked with doctors to recommend "Agitol" or the "formula for active living," physical activity that could be written in standard prescription format and given in "doses" of 10, 15, or 30 minutes at a time, once or more per day.[15] In this way, health promotion and prevention of diabetes and obesity were incorporated into the minds and vocabularies of medical providers.

COST EFFECTIVENESS

The direct costs of *Agita* are mainly paid by the State Secretariat of Health through grants ranging from $150,000 to $400,000 per year. Given that *Agita* targets the entire state of São Paulo, with a population of about 40 million, this represents a cost of $0.01 per year or less per citizen.[16] By contrast, a 2005 World Bank report estimated that, by reducing sedentary time and increasing physical activity, the program saves the state of São Paulo $310 million per year in health expenses.[17] This equates to a return on investment of between 800% and 2,000% for the state.

ABILITY TO INSPIRE

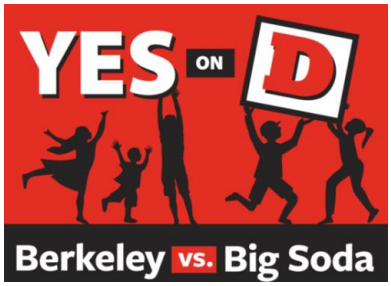
There is little doubt that the *Agita* effort has had widespread international influence. The World Health Organization (WHO) has recognized *Agita* as a model for health promotion. Multiple Latin American countries, including Argentina, Colombia, Costa Rica, Ecuador, Guatemala, Mexico, Panama, Paraguay, Peru, Uruguay, and Venezuela, have modeled their own programs after *Agita* and, in some cases, asked the São Paulo administrators to advise these programs. Portugal has also adopted a similar model. In 2000, the Physical Activity Network of the Americas was established from these efforts, and later a global NGO known as *Agita Mundo—Move For Health*.[18]

DRAWBACKS AND LIMITATIONS

Agita is a massive initiative, with funding from and programs for an entire state with over 40 million residents. The impressive cost-effectiveness of *Agita*, requiring less than one US cent per resident, is exaggerated by this scale. The cost of $150,000 for 40 million people presumably can't scale down proportionally to $1,500 for a city of 400,000. *Agita* is able to save by getting such extensive and widespread use from administrative costs, advertising materials, and other major program expenses.

Administrators have also acknowledged the challenge of sustaining the program and doing so in a way that does not permanently rely on government support.[19] This may be increasingly difficult as the program matures. Excitement may wear off, making partnerships and funding harder to come by over time. The demonstrable outcomes that currently show improvements may slow, eventually being replaced by less impressive outcomes aimed at maintenance. It will be *Agita's* challenge to remain relevant and engaging such that its benefits do not erode.

2. BERKELEY SODA TAX



NAME OF PROGRAM
Berkeley Soda Tax

ORGANIZING GROUP
The Berkeley Healthy Child Coalition

LOCATION
Berkeley, California

PROGRAM TYPE
Nutrition and healthy eating, population health, community outreach and engagement,

CATEGORY
Gold Standard

- In November 2014, Berkeley residents voted in favor of a penny-per-ounce tax on distributors of sugar-sweetened beverages (SSBs)—defeating a $2.4 million opposition campaign by the American Beverage Association.
- The tax has not only generated significant revenues for community nutrition and health efforts but has also contributed to a drop in Berkeley residents' consumption of SSBs while increasing the consumption of bottled or tap water.
- The grassroots campaign against Big Soda was highly visible, raising awareness about soda's impact on health.
- The Berkeley tax has inspired similar efforts throughout the United States, as similar soda taxes passed in six more cities and counties in 2016.

The Berkeley Soda Tax was passed in November 2014, despite a $2.4 million campaign in opposition from the American Beverage Association (compared to far fewer resources spent in Berkeley on behalf of the soda tax). Organizing efforts were led by a grassroots coalition of parents, teachers, healthcare professionals, and community leaders seeking to reduce the prevalence of obesity and type 2 diabetes. The grassroots campaign succeeded, in part, by discrediting the soda industry by displaying parallels in their tactics to the tobacco industry.[20] The penny-per-ounce tax is paid by distributors of sugar-sweetened beverages (SSBs), including soda, juice with added sugar, energy drinks, and coffee syrups. As of March 2016, the tax has generated $1.5 million that will be allocated to community nutrition and health efforts. The soda tax has had measurable impacts. A recent study published by the American Journal of Public Health showed a 21% drop in consumption of SSBs in the tax's first year. Berkeley residents also reported a 63% increase in drinking bottled or tap water. By contrast, there was a 4% increase in consumption of SSBs in Oakland and San Francisco—where a soda-tax initiative was defeated last year—and only a 19% rise in water consumption. These encouraging outcomes may have been helpful in pushing more cities toward adopting this measure; soda taxes passed in six more cities and counties 2016, including four by popular vote (Boulder, CO, and San Francisco, Oakland, and Albany, CA) and two by local governments (Philadelphia, PA and Cook County, IL).

KEYS TO SUCCESS

Highly visible

The Berkeley Soda Tax came about through a major public campaign and was passed in Berkeley by a 75% popular vote.[21] The grassroots nature of the Berkeley tax and the public campaign that led to its implementation meant that the tax assumed a dual role in changing behavior. It raised awareness in addition to prices.

Local, grassroots engagement

The campaign to implement a soda tax in Berkeley was community-led from the beginning, organized by the Berkeley Healthy Child Coalition, which comprised local stakeholders and residents. Sara Soka, a campaign manager for the Berkeley tax effort, noted that the coalition consistently, "shared decision-making power, and understood the importance of early and consistent outreach to community leaders." As a result, the "Berkeley" in "Berkeley vs. Big Soda" truly did reflect the community and its goals.[22]

Salient impact on decision-making.

While Berkeley is often touted as the first city to implement a soda tax, many cities and states had already been leveraging sales taxes on SSBs prior to the Berkeley vote. What makes Berkeley unique is that the tax is reflected in the shelf price, rather than being added upon purchase. This means that consumers see the increased price before they make a decision, and the price increase is tied directly to the product, rather than being hidden in a sum of all the sales tax paid on a purchase.[23] By making the tax more visible, it functions as a more salient factor in consumer decisions, motivating behavior change and not just raising revenue.

Easy-to-demonstrate impacts

Soda taxes benefit from measurable, understandable, and easy-to-publicize outcomes. Whereas other interventions might have to rely on more subjective reporting to approximate benefits, the impact of soda taxes can be measured through sales, pricing, and tax revenue raised. Additionally, it is relatively simple to show that the revenue raised by the tax is being used for a public benefit.

The Berkeley City Council allocated $1.5 million dollars for the 2015 fiscal year to public health efforts, including school nutrition programs, public health staff increases, and grants to reduce access to and purchase of SSBs.[24] This number was not random; rather it was based on revenues from the tax ($1.2 million in the tax's first 9 months) and motivated by a citizen board specifically focused on the health impacts of sugar-sweetened beverages. Sales and prices of soda and other SSBs, as well as non-sugary alternatives like water, can be measured as well. Berkeley saw a statistically significant (p=.046) 21% decrease in SSB consumption while neighboring cities saw a 4% increase, and a 63% increase in water consumption compared to only 18% in neighboring cities.

ABILITY TO INSPIRE

More than just raising revenues, the Berkeley Soda Tax played a role in motivating similar measures elsewhere. In 2014, more than a dozen different cities and states had proposed local soda taxes.[25] All of them failed except Berkeley's, making Berkeley the first city with a SSB excise tax by default. Since then, Philadelphia's city council approved a penny-per-ounce tax in early 2016, and the cities of San Francisco, Oakland, and Albany, California, and Boulder, Colorado approved soda taxes by popular vote in November 2016. Days after these votes, a decision by the Board of Commissioners made Cook County, Illinois (home to Chicago), the largest metropolitan area yet to implement a soda tax.

COST EFFECTIVENESS

It isn't hard to argue that soda taxes are cost effective. Although initial campaigns can be costly (the Berkeley pro-soda tax campaign cost about $3.4 million[26]), once the taxes are in place, they raise revenue rather than costing money. Predictions during the Berkeley campaign estimated that the tax would raise $1.2 million per year. The tax took effect in May 2015, and $1.2 million had already been collected by January 2016—after only 9 months. Ideally, revenues will actually decline as soda consumption drops, but a pace like this indicates that the Berkeley tax will "break even" within three years. Additionally, the money raised for the campaign did not come from the government, so the city experienced positive

returns, and it began funding public health initiatives within the tax's first year.

DRAWBACKS/LIMITATIONS

While, as mentioned above, the monetary nature of taxes makes their benefits and impacts easy to measure, it also allows for more direct counterarguments. At baseline, people can certainly be less than eager about new taxes and regulations. Moreover, opponents of soda taxes on more recent ballots have worked hard to characterize them as regressive "grocery taxes," with stores raising the prices of other foods to keep soda sales up, although there is no evidence of this effect in Berkeley. A good deal of attention ought to be paid to this question in Berkeley and in other cities and counties that follow suit with these taxes. Additionally, Berkeley was a very health-conscious community well before 2014. At least at present, a 75% popular vote would be nearly impossible in most places in the United States, let alone even a simple majority. Therefore, the stunning success of the Berkeley movement isn't necessarily indicative of the possibilities or best practices for other communities.

3. BRIGHTER BITES

NAME OF PROGRAM
Brighter Bites

ORGANIZING GROUP
Brighter Bites (non-profit); originating through a partnership of Houston Food Bank and UTHealth School of Public Health

LOCATION
Houston, Dallas, and Austin, TX; Expanding in 2017–18 to New York, NY, the Washington, D.C. metropolitan area, and Southwest Florida

PROGRAM TYPE
School-based, health education, nutrition and healthy eating, free for participants, access/ affordability, behavior change

CATEGORY
Gold Standard

- The Texas-based Brighter Bites program distributes fresh fruits and vegetables to low-income students and their parents at no cost through an interactive co-op model.
- During pick-up time, families receive bilingual handbooks, tip sheets, and recipes, and they are invited to sample healthy meals—or "brighter bites"—created with the week's recipes.
- Children also participate in the Coordinated Approach to Child Health (CATCH) healthy lifestyle curriculum in the classroom while enrolled in Brighter Bites.
- By creating a social network between parent volunteers, families, and educators, the program encourages shared behavior change to improve healthy eating habits.
- Brighter Bites leverages existing community resources—food banks and schools—to support its programming, which enabled its expansion to three different cities in Texas.
- To date, Brighter Bites has served over 20,000 families and has distributed over 10 million pounds of produce in Texas.

Brighter Bites aims to increase consumption of fresh fruits and vegetables in underserved communities. The model is intended to be easily replicable in new communities. The program reaches families by partnering with schools, Head Start programs, afterschool programs, and camps where 80% or more of the students receive free or reduced lunch. During each of the 24 weeks of the program (8 weeks in the fall, spring, and summer), every participating family receives two bags containing approximately 50 servings of fresh produce—enough for two servings of fruit and vegetables a day for a family of four. The produce, donated by local foodbanks, is bagged by parents and other volunteers in a co-op model that strengthens social ties among participating families. The food is then distributed to families at pick-up time. As families pick up the bags, the children and parents sample healthy "brighter bites"—dishes created using that week's produce. The recipes are included in the bags, along with bilingual nutrition handbooks, tip sheets, and other recipes. Over the course of the season, students also participate in the Coordinated Approach to Child Health (CATCH) program in the classroom, a validated healthy lifestyle curriculum. To date, Brighter Bites has served more than 30,000 families and distributed nearly 14 million pounds of produce in the state of Texas.

KEYS TO SUCCESS

Basis in Behavioral Theory

Brighter Bites is based on two behavioral theories: Social Cognitive Theory and the Theory of Planned Behavior.[27]

Both theories state that behaviors are socially influenced. Social Cognitive Theory argues that our own behaviors are influenced by the behaviors we observe in others. The Theory of Planned Behavior, similarly, explains that the social norms we observe, and our attitudes toward them, determine our behaviors. Brighter Bites relies on the power of social interaction, within communities, schools, and networks of people, to change behavior that will improve healthy eating.

Strengthening Social Networks

To make healthy nutrition habits a shared norm, Brighter Bites works to build relationships among the people involved. Participants report enjoying the time they spend volunteering to sort and distribute produce because it helps them build relationships with other parents in the program.[28] These relationships likely increase retention and positive attitudes toward the program. Strong social support also has the potential to help maintain the impact of the program after it ends. The use of schools as the organizing location further facilitates relationship building, as it naturally ties together parents of similarly aged children.

Participant Engagement

The co-op model, which requires parent participants to volunteer on produce distribution days,[29] likely also increases retention in the Brighter Bites program. Engaging parents in a co-op program increases participant ownership of healthy eating. This involvement may also help to reduce any sense of stigma that may result from seeing the produce as a "handout." Mandatory engagement also contributes to the network-building element of the program.

Multi-generational Engagement

Brighter Bites is, at its core, a childhood obesity intervention, but it approaches this challenge by engaging elementary school students *and* their parents. Engaging both generations yields many benefits. Parents heavily influence their children's nutritional habits, including their interactions with food environments.[30] By engaging parents, Brighter Bites can influence behavioral change in the people who purchase and prepare food—and who serve as role models—for children. While Brighter Bites is focused on fruit and vegetable distribution, parents noted statistically significant increases in other healthy food behaviors, including cooking meals from scratch, eating dinners as a family, using nutrition labels to inform food purchases, and limiting children's intake of sugar-sweetened beverages at mealtimes.[31]

In addition, by using schools as program locations, Brighter Bites can easily identify communities with the highest need by identifying schools that have high rates of free/reduced-price lunches, etc.[32] This school-based system easily connects the Brighter Bites program with the highest need participants, without additional costs and effort dedicated to advertising, recruiting, and screening for need.

Identifying High-need Populations

Brighter Bites uses socioeconomic indicators to select participant schools, working with elementary schools that have high percentages of student receiving free or reduced-price lunch—Title I schools.[33] (Title I schools have a high proportion of families defined as "low-income.") Participant populations, at least in the initial pilot programs, were predominantly Hispanic/Latino or African American, and the program materials were offered in both English and Spanish.[34] Brighter Bites, therefore, reaches populations with disproportionate rates of obesity and type 2 diabetes, suggesting that it has the potential to reduce health disparities if it displays long-term success.

Effective Partnerships to Achieve Scale and Convenience

Several crucial partnerships allow Brighter Bites to succeed. By using schools as the basis of interaction, Brighter Bites readily identifies target populations while simultaneously increasing convenience for parents. Distribution days and cooking demonstrations are timed so that parents can pick up their children from school, receive produce, and sample a recipe all at the same time.[35] Additionally, the school setting facilitates the multi-element and multi-generational nature of the program. Children learn about healthy lifestyles through the Coordinated Approach to Child Health (CATCH) curriculum in school and concurrently experience healthier behaviors at home.[36]

Further, partnerships with for-profit entities such as retailers (Target and H-E-B Grocery), distributors (Sysco and Hardie's Fresh Foods), and industry networks (Produce Marketing Association and Produce Alliance) enable Brighter Bites to work directly with all facets of the produce industry, understand their capabilities, and communicate the necessity for more fresh fruits and vegetables in the communities that need it most. Brighter Bites receives most of its food through donations from local food banks like the Houston Food Bank as well as produce growers and distributors.[37] These partnerships are mutually beneficial—they create a convenient pathway for food banks to reach high-need families, help the food industry overcome the challenge of "last mile" produce delivery, and allow Brighter Bites to distribute fruits and vegetables at a low cost.

ABILITY TO INSPIRE

Perhaps the most illustrative indication of the success of the initial pilot programs is the rapid expansion of Brighter Bites in recent years. During the 2013–14 school year, Brighter Bites reached over 2,000 families in Houston. The following year, this number increased to 3,350, along with another 1,800 families through a program expansion in Dallas.[38] The program has since expanded to the Austin area as well.[39] Brighter Bites also received the 2016 Texas Health Champion Award during Texas Obesity Awareness Week.

Brighter Bites Co-Founders Lisa Helfman and Dr. Shreela Sharma have been key inspirational contributors to the success of Brighter Bites, both its impact and expansion. They are advocates for the growth of produce availability and the implementation of nutrition and culinary education as a catalyst for behavior change and improved long-term health outcomes.

Ms. Helfman regularly participates on national panels where she has the opportunity to advocate for Brighter Bites amid industry leaders of all kinds. Dr. Sharma has testified on Capitol Hill in front of the U.S. House Committee on Agriculture, published her research on Brighter Bites in peer-reviewed journals, and presented her studies at national conferences.

Brighter Bites will expand programming to New York City, the Washington Metropolitan Area, and Southwest Florida in the 2017–18 academic year.

COST EFFECTIVENESS

Thanks to its co-op model and its partnerships with food banks and the produce industry, Brighter Bites operates at an impressively low cost. A 2016 study of the program found that families, on average, received 50–60 servings of vegetables per week at a cost of $2.65 per family per week. These costs were primarily associated with the expenses of taking inventory of and delivering the produce.[40] While reliance on donated produce may pose a challenge to scaling Brighter Bites, it does indicate a model for replicating the program in a cost-effective way.

DRAWBACKS/LIMITATIONS

Brighter Bites is still too young to know whether it will demonstrate long-term impacts on healthy eating behaviors and childhood obesity. Studies of early Brighter Bites programs indicate that healthy eating behaviors were more prevalent at the midpoint of the program than at the end, raising concerns regarding long-term behavior change.[41] It is unclear whether increases in fruit and vegetable consumption can be sustained after families finish the program, particularly in those households where budget considerations are the primary factor limiting fruit and vegetable consumption. Additionally, analyses of Brighter Bites have acknowledged that there is the potential for selection bias, with families more enthusiastic about healthy eating more likely to opt in to the program in the first place.[42]

4. CANARY HEALTH

NAME OF PROGRAM
Virtual Lifestyle Management®

ORGANIZING GROUP
Canary Health® Inc.

LOCATION
Los Angeles, California

PROGRAM TYPE
Digital, holistic, DPP translation

CATEGORY
Innovator

- As a digital platform for healthy living, Canary Health provides online peer-to-peer and professional education, self-management support, and tracking tools to promote lifestyle change and chronic disease prevention and treatment.
- Employers, health plans, and healthcare organizations partner with Canary Health primarily to enroll their at-risk employees in Canary Health's online, fully CDC recognized Diabetes Prevention Program.
- Canary Health focuses on holistic health and "Whole Person Healthcare," providing programs that also address living with chronic conditions, caregiver support, and sustainable lifestyle changes.
- Canary Health's strengths include its emphasis on mental health

Canary Health Inc. offers a collection of digital programs for healthy living, chronic disease prevention, and chronic disease self-management. Canary Health takes a holistic approach to lifestyle management, advertising "Whole Person Healthcare."[43] In addition to offering a fully CDC recognized DPP, Canary Health has programs that specifically target learning to live/thrive with chronic conditions, and training of non-professional caregivers to deliver more effective support. In essence, their work aims to help individuals create the ideal conditions to sustain lifestyle change. They also boast an impressive collection of outcomes. In addition to positive cost-saving and clinical outcomes for prediabetes, they have demonstrated improvements in depression and self-reported confidence in ability to make changes, and claim "industry-best ongoing engagement." Canary Health markets primarily to health plans, employers, and healthcare organizations, rather than to individual consumers.

WHY IT STANDS OUT

Canary Health's holistic approach and high levels of engagement demonstrate the importance of addressing an individual's broader life as part of bringing about lifestyle change. A strength of Canary Health's program is its acknowledgement of the critical importance of addressing the stress and mental health challenges related to chronic conditions; it also values and helps to leverage the support of non-professional facilitators and caregivers, such as family members. Canary Health shows us that beyond motivation, people seeking lifestyle change need holistic personal support.

5. CIGNA SUNDAY STREETS

- The Cigna Sunday Streets initiative closes a major section of streets in Houston, Texas, on one Sunday per month, six Sundays per year—allowing residents to walk, bike, and jog along the roads.
- A variety of businesses on these routes provide entertainment and programs during the event.
- After the success of the City of Houston's 2014 pilot of the program, the health insurance company Cigna assumed sponsorship of the program for future years.
- Sunday Streets shifts its location in a thoughtful manner, aiming to encourage physical activity in a low-cost, effective way while simultaneously addressing health and economic disparities.

NAME OF PROGRAM
Sunday Streets
(now Cigna Sunday Streets)

ORGANIZING GROUP
Cigna, Go Healthy Houston

LOCATION
Houston, Texas

PROGRAM TYPE
Physical activity promotion, free for participants, population health, community outreach/ engagement

CATEGORY
Innovator

Sunday Streets is an initiative designed to encourage outdoor physical activity among residents of Houston, Texas. One Sunday per month, six months a year, a section of major streets in Houston is closed to traffic from 12 to 4pm to allow residents to walk, jog, bicycle, and otherwise interact and be active outdoors in their own communities. Locations are not constant, but rather change neighborhoods each time the event occurs.[44] The program was piloted in 2014 by the city of Houston, Texas as part of their Go Healthy Houston Initiative, and after a successful first season was sponsored by Cigna. In addition to the popularity of Sunday Streets which led Cigna to become its major sponsor, Go Healthy Houston has impressive self-reported data on the programs popularity. According the Go Healthy Houston webpage, the average event is attended by some 20,000 people. Additionally, according surveys conducted by Sunday Streets, more than half of participants discover new businesses that they had not previously known about, about half of participants report being more likely to walk or bike to places in their neighborhood, and the average participant gets about two-thirds of the CDC-recommended 150 minutes of weekly physical activity during the event.[45]

WHY IT STANDS OUT

Cigna Sunday Streets is a terrific example of the way that environmental changes that encourage healthy behavior can be welcomed as a positive part of a community rather than an extra chore to be taken on for health. Simply by designating and event, the city of Houston was able to make physical activity more appealing, more fun, and more available for citizens, and do so in a way that benefitted local neighborhoods and businesses as well. Behavioral change, here, is a question of environment, rather than of individual motivation. In addition, Cigna Sunday Streets pays explicit attention to location, aiming to make an impact on neighborhood health disparities within the city. While public, outdoor events such as Sunday Streets are not unique to Houston, this particular program is worth noting because of the way that it shifts location to benefit the communities of highest need.

6. COOKING MATTERS

- Cooking Matters, which provides free cooking and nutrition classes for adults, children, and families living in underserved communities, is based on the premise that nutrition education should be coupled with cooking lessons so that meals can be healthy *and* enjoyable.
- By partnering with local organizations, Cooking Matters achieves both national-scope and optimization through customizability.
- The Cooking Matters classes emphasize basic cooking skills, money-saving tips, and reading ingredient labels.
- At the end of each class, participants receive a bag of groceries so that they can re-create the meal they learned to make during that class.
- The organization also facilitates free grocery store tours, which help families learn how to effectively purchase healthy groceries on a budget.
- In the twenty years since its inception, Cooking Matters has expanded to 1,200 locations in 44 states and has also developed online resources with healthy resources and money-saving tips for grocery shopping.

NAME OF PROGRAM
Cooking Matters

ORGANIZING GROUP
Share our Strength

LOCATION
United States of America

PROGRAM TYPE
Health education, nutrition and healthy eating, community outreach/ engagement, access/ affordability, free for participants, behavior change

CATEGORY
Gold Standard

Cooking Matters offers free, six-week-long cooking and nutrition classes for adults, children, and families living in low-income communities. The organization also offers free grocery store tours, led by volunteers, which teach families how to compare unit prices on packaged food, read nutritional labels, plan and budget for healthy meals, and identify whole grains. In Cooking Matters cooking courses, volunteer chef and nutrition educators teach essentials like preparing nutritious meals and shopping and budgeting for groceries. The classes emphasize basic cooking skills, including knife techniques, reading ingredient labels, and simple vegetable preparation. At the end of each class, adult and teen participants are given a bag of groceries with the ingredients for the recipes they learned during that day. Cooking Matters also recently expanded into online programming, with a website and mobile app that feature chef-developed, healthy recipes with full nutrition information; it also presents money-saving tips for grocery shopping, such as the MyPlate on a Budget guide. The organization recently partnered with Better Kid Care to provide an online program of the Cooking Matters for Child Professionals. In addition, a web-based training course called "The Learning Space" serves as an educational resource for volunteers and educators who wish to lead grocery store tours in their own communities. Now in its twentieth year, the Cooking Matters program has more than 1,200 locations across the country and has helped more than 265,000 low-income families learn about cooking and purchasing healthy foods.

KEYS TO SUCCESS

Outreach through Community Partnerships

Cooking Matters has expanded to hundreds of locations across the country through its effective partnerships with local nonprofits and organizations. Local organizations customize the program based on their communities' needs and establish relationships with sites that host their cooking programs or store tours. The combination of professional-level curricula and national support with grassroots resources and relationships allow for the replicability of the program in many areas.[18] Reasons, a partner organization based in San Francisco, exemplifies these mutual benefits.[18] Reasons staff coordinate free cooking classes at community host sites, including schools, shelters, housing sites, and after-school programs. The organization also employs a unique model by hosting higher-end cooking classes that bring in donors while raising awareness and financial support for the Cooking Matters curriculum.

Going Beyond Nutrition Education

Nutrition education often serves as the crux of nutritional programming; however, research suggests that nutrition education is more effective in increasing healthy behaviors when combined with cooking components.[46] Home cooking has declined over the past 40 years, decreasing by almost a quarter (23%), and some are advocating for a new emphasis to be placed on the importance food preparation at home.[47] As the Executive Director of 18 Reasons says, "Nutrition education is dominated by dieticians. It should be dominated by chefs instead." Cooking Matters classes help families not only learn about healthy eating but also learn how to make healthy foods taste good, how to maximize food resources, and how to tailor family favorites and personal preferences into healthier meals.

Indeed, a long-term study conducted by the Altarum Institute indicates that Cooking Matters has been achieving results, with 71% of adults who complete the program eating more vegetables, 66% of teens eating more fruit, and 48% of kids with increased confidence in their ability to make healthy snacks. The study indicated that families were continuing to make more home-cooked meals even six months after the program's completion. Families' attitudes toward stretching their ability to purchase healthy food have also improved.[48]

Targeting All Age Groups

The Cooking Matters program isn't just for adults; in fact, it has special cooking curricula for children, teens, and adults. By partnering in elementary, middle, and high schools, the Cooking Matters program teaches basic cooking skills early on and helps kids and teens learn how to make easy, healthy snacks with fruits and vegetables all on their own. Moreover, the Cooking Matters program for child care professionals helps day care teachers and early childhood educators create healthy food environments for the children in their care.

Empowering Community Members as Advocates for Healthy Eating

By recruiting volunteers from the community to serve as chefs and nutrition educators, the Cooking Matters program empowers "health promoters," who serve as peer educators in the communities they are from. After completing 8 session trainings, these health promoters teach cooking classes in their communities. Organizations like 18 Reasons offer small stipends for these promoters' work. Partnering with health promoters and host sites with established communities also makes recruitment easier, thereby reaching more at-risk individuals.

ABILITY TO INSPIRE

Cooking Matters has expanded broadly in recent years, with locations now in 44 states. In 2013, the program reached 49,364 participants—50% more participants compared to 2012. Moreover, Cooking Matters is rapidly expanding to new national partnerships with the National Head Start Association and Public Health Solutions. Through partnerships with Head Start, particularly, the organization is aiming to teach more families with children age five and under. Cooking Matters is also seeking to expand its digital resources; its mobile app had 20,000 downloads after its release in 2013.[49]

COST EFFECTIVENESS

Volunteers form the basis of the Cooking Matters education team, as they serve as Store Tour

Leaders, Six-Week Course Instructors, and Course Assistants. In the year of 2013, the program had 3,216 course and tour volunteers; 98% of these volunteers said they would be willing to teach another course. While the use of volunteers greatly diminishes the cost of teaching and delivering the program, the heavy reliance on volunteers may ultimately limit expansion. Moreover, the program limits its ability to enlist "peer educators" or "health promoters" from local, under-resourced communities unless volunteers are given stipends those provided by 18 reasons. Cooking Matters does partner with AmeriCorps members who serve on site across the country. In order to help families access the food they need, Cooking Matters collaborates with SNAP and works to protect SNAP funding.

DRAWBACKS AND LIMITATIONS

Although demonstrating vast success, especially in recent years, Cooking Matters may be potentially limited due to a number of factors, including reliance on volunteers to fill staffing needs. Moreover, while a follow-up study has assessed the impact of the program on behavior change after three to six months, there has been no research on the longer-term impact of the program.

7. FAITHFUL FAMILIES EATING SMART AND MOVING MORE

- Faithful Families provides nutrition and healthy living education in faith communities, with a curriculum designed to tie together faith and health.
- The nine-part curriculum is taught by a trained nutritional facilitator and a lay leader from the faith community.
- The model has inspired similar faith-based prevention initiatives in at least seven other U.S. states.

NAME OF PROGRAM
Faithful Families Eating Smart and Moving More

ORGANIZING GROUP
North Carolina Division of Public Health; NC State University

LOCATION
North Carolina

PROGRAM TYPE
Nutrition and healthy eating, peer support, faith-based, targeted population, health education, behavior change

CATEGORY
Innovator

Faithful Families Eating Smart and Moving More is a healthy living curriculum taught to a faith community by a trained nutritional facilitator along with a lay leader from the faith community.[50] The curriculum features nine lessons on topics like "Shop for Value, Check the Facts" and "Choosing to Move More Throughout the Day." The elements of the curriculum are then tied to religious teachings of the faith community in which the program is taking place. Faithful Families thus aims to tie together values of religion and health for individuals, families, and communities. The curriculum "kit" costs $150, and there are over 100 trained facilitators throughout the state of North Carolina, listed on the Faithful Families website by county.[51] The program has demonstrated clear potential for inspiration, having been replicated several times outside of North Carolina. The curriculum inspired the New Jersey Department of Health's *Faith in Prevention* program in Camden, New Jersey,[52] and was used for similar programs in Florida, Arkansas, South Carolina, Illinois, and Tennessee.

WHY IT STANDS OUT

Faithful Families is an impressive example of a prevention effort that goes to meet people where they already are: their established faith communities. While school-based programs, for example, can be logical tools for reaching children, it can be difficult to find spaces in which to regularly make contact with all generations. Faith-based communities present an opportunity to do exactly that in a setting where people are already deeply engaged. Through this format, Faithful Families might avoid some of the retention challenges faced by many lifestyle-change programs. Additionally, by connecting healthy living principles to already embraced religious values, Faithful Families has devised a way to help make lifestyle changes more permanent, even after the program ends.

8. FLORIDA DIABETES PREVENTION PROGRAM

NAME OF PROGRAM
Florida Diabetes Prevention Program

ORGANIZING GROUP
Florida Health

LOCATION
Florida

PROGRAM TYPE
DPP translation, population health, community outreach/engagement

CATEGORY
Gold Standard

- The Florida DPP is a network of state-wide diabetes prevention programs, designed to help launch programs based on the original DPP study and to support, connect, and strengthen the programs that already exist.
- The Florida DPP website includes many free resources, including "how-to" guides on starting DPP programs, advertising and marketing materials, and tools for clinicians.
- Rather than supporting un-vetted initiatives, the Florida DPP focuses on strengthening programs that have already been proven to work.
- The initiative now has well over 100 brick-and-mortar DPP programs throughout the state.

The Florida Diabetes Prevention Program is an effort to encourage and ease the creation of new DPPs in the state of Florida and to strengthen the programs that already exist. The Florida DPP is based on the simple belief that there is no need to reinvent the wheel; the original DPP study, along with many replication and translation studies, has demonstrated that development of diabetes can be significantly reduced and delayed through a standardized curriculum. Instead, the challenge is to recruit more people into DPPs in the first place. The Florida DPP increases the availability and efficacy of individual DPPs throughout the state by: providing resources to help new DPPs get started, supporting existing DPPs so that they become more successful, and working to raise awareness about diabetes prevention with clinicians, employers, and residents of Florida. An immense collection of resources is available for free on the Florida DPP website, including guides on how to start a DPP, advice on marketing programs, multi-media advertising materials, information on cost effectiveness for employers and payers, and tools for clinicians to communicate more effectively about prediabetes and risk factors. In addition, the Florida DPP establishes partnerships to make prediabetes screening and DPP enrollment more accessible.

KEYS TO SUCCESS

Evidence-based intervention, focus on access

The Florida DPP operates on a simple but powerful philosophy; rather than trying to reinvent the wheel by creating new programs and strategies, it takes a proven intervention and works to expand it to reach more people. The use of a pre-existing program model is a highly efficient strategy for coordinating interventions on a state level. Attention and resources can instead be focused on building partnerships, improving marketing, and increasing awareness.

This strategy is particularly useful given reliance on state-funding. Using an intervention with strong evidence of outcomes and known measures of cost-effectiveness can make it easier to justify and sustain funding.

Free information and resources

As a government-funded initiative, the Florida DPP can provide many of its benefits entirely free of charge—including a huge variety of free resources on its website.[53] These resources include:

- An **operations guide** that contains everything from a week-by-week lesson plan, a recommended budget for materials, suggestions for marketing and advertising, strategies for identifying lifestyle coaches, and tips for collecting and reporting data for CDC recognition.[54]
- A **best practices manual** with guidance on five key focus areas to set up a DPP for success.[55]
- The **"Business Case"** for diabetes prevention, which outlines statistics on the prevalence of prediabetes and the return on investment in prevention.[56]
- Advertising materials to recruit participants through business websites, clinicians' offices, social media, print publications, and press releases.[57]
- Advertising materials to encourage employers, clinical practices, and health plans to focus on screening and prevention.[58]

Focus on marketing and awareness

The Florida DPP's model recognizes that one of the biggest remaining challenges is getting people with prediabetes involved in the first place, let alone engaged for the long term. As such, the Florida DPP recognizes that strong marketing is critical. Beyond offering the free advertising materials mentioned above, the Florida DPP also focuses more broadly on the concept of "social marketing"—thinking about how marketing strategies can be applied to influence lifestyle and motivation, rather than just consumer behavior.[59]

Easy entry into programs

Even small barriers are likely to greatly reduce involvement in prevention programs. The more screenings that patients need, the more visits they must attend; moreover, the more time or money required to determine eligibility, the less likely patients will be to even start the process. The Florida DPP has taken many actions to make it as easy as possible for people to earn eligibility for DPPs. Most notably, the program uses a prediabetes risk-assessment quiz, available on-line, to determine eligibility.[60] As a result, participants are not required to complete clinical tests of their A1c, Fasting Plasma Glucose (FPG), etc., and instead can determine their eligibility online in just minutes.

ABILITY TO INSPIRE

The Florida DPP network has well over 100 brick-and-mortar DPP programs throughout the state.[61] Patients can locate and connect with all of these locations through the Florida DPP website. At least one other state, California, has reached out to program coordinators in Florida about the possibility of replicating the Florida DPP's model.

COST EFFECTIVENESS

The Florida DPP program has a strong argument for cost effectiveness, as DPPs have been shown to lead to returns on investment by individual studies and by actuarial review from the Centers for Medicare & Medicaid Services (CMS). In turn, the Florida DPP makes a strong case for the cost effectiveness of prevention to employers, health plans, and the state itself—indicating that the possibility for savings is, in many ways, one of the Florida DPP's keys to success.

DRAWBACKS AND LIMITATIONS

By focusing its statewide initiative specifically on pre-diabetes, Florida potentially overlooks other possible avenues for long-term prevention through social and environmental change. Of course, these two prevention approaches (targeting at-risk populations versus the general public) are not mutually exclusive, and the "social marketing" approach of the Florida DPP carries great promise for wide-reaching social change, which will hopefully be realized in the future.

9. FRUIT & VEGETABLE PRESCRIPTION (FVRX) PROGRAM

NAME OF PROGRAM
Fruit & Vegetable Prescription (FVRx) Program

ORGANIZING GROUP
Wholesome Wave

LOCATION
Bridgeport, Connecticut, with programs in many states

PROGRAM TYPE
Nutrition and healthy eating, access/affordability, personalized care/precision medicine, behavior change

CATEGORY
Prime Performer

- The FVRx Program, by Wholesome Wave, enables healthcare providers to write individual prescriptions for fruits and vegetables for low-income patients working to adopt healthy lifestyle changes.
- Patients can redeem their prescribed fruits and vegetables at participating retailers, grocery stores, and farmer's markets. Produce is either donated directly or paid for through donations.
- Patients enrolled in the program largely declare the prescription to be a success, with a large number citing increases in fruit and vegetable consumption along with a decrease in BMI.
- The FVRx program frames fruits and vegetables as "medicine," or vital components of a larger treatment plan to prevent diabetes and obesity, and thereby ensures affordability and access.

Wholesome Wave is a non-profit organization focused on improving the accessibility and affordability of nutritious foods, and by extension improving people's health, especially in low-income areas. Its Fruit & Vegetable Prescription (FVRx) program is a nutrition access program built explicitly around the idea of healthy food as medicine. As the program's title suggests, FVRx allows healthcare providers to write a formal prescription for fruits and vegetables which patients can then redeem at participating retailers, grocers, and farmers' markets.[62] Redemption of the fruits and vegetables prescription is tracked, and the program is funded by donations, either in produce donations by the retailers or from outside funding. The fruit and vegetable prescriptions are individualized to each patient and are given by the provider along with a discussion about a healthy eating plan and goals that make sense for that patient.[63]

Between 2011 and 2015, over 8,400 patients and family members received a total of $670,000 of fruits and vegetables through the program, and a new $800,000 partnership with Target began in 2016. Patients are spread throughout 10 different states, as well as Washington, D.C., and Navajo Nation. Nearly 70% of participants in 2015 cited increases in fruit and vegetable consumption, and 45% reduced their BMI over the course of the program. Additionally, almost half of participating households cited an increase in food security over the period of the program, suggesting that a meaningful impact on access.[64]

ANALYSIS

Wholesome Wave's FVRx program succeeds in legitimizing healthy food as a critical component to long term health. By framing fruits and vegetables as treatments, the program communicates that access and affordability are critical to sustained health—a message that resonates well with Wholesome Wave's other advocacy and policy efforts. Additionally, FVRx helps bridge the gap between education and implementation. No matter how many times medical providers might speak of the importance of healthy eating, patients are unlikely to make or sustain changes when money is a barrier. Through FVRx, the provider can simultaneously teach people about healthy eating and provide them with a manageable way to put this advice into practice. Moreover, unlike many food donation programs, FVRx allows providers to tailor plans to individuals, meaning that patients can adopt a healthy eating plan that fits them and their families.

Of course, FVRx is limited in its scalability because of its reliance on donations. In addition, it remains to be seen whether FVRx can have long-term effects on the fruit and vegetable consumption of its participants, especially after they leave the program. However, if FVRx is able demonstrate improved long-term health outcomes, it has the potential to influence how we view nutrition as medicine, and thus has the potential to be a powerful player in the conversation about food access and affordability. FVRx has already inspired similar healthy food prescription programs, such as VeggieRx in California. Wholesome Wave has also affected the conversation around governmental nutrition incentive programs, which seek to increase fruit and vegetable consumption among families receiving nutritional assistance, such as SNAP benefits. As such, Wholesome Wave—in part due to its FVRx program—has the potential to remain a significant player in nutrition access and affordability.

10. HEALTHY TOGETHER VICTORIA

NAME OF PROGRAM
Healthy Together Victoria

ORGANIZING GROUP
State Government of Victoria, Australian Government, and the Victoria Department of Health

LOCATION
Victoria, Australia

PROGRAM TYPE
Population health

CATEGORY
Innovator

- Before facing funding cuts in 2015, the state-wide Healthy Together Victoria program in Victoria, Australia sponsored a number of initiatives, such as healthy lifestyle awareness campaigns and workplace wellness programs.
- The various interventions were specifically targeted at multi-level health determinants, including individual psychology, food systems, and societal influences on health and behavior.
- Though ultimately defunded following a change in government, this program demonstrated a unique, systems-level approach to population health that aimed to address health disparities in both urban and rural under-resourced communities.

Healthy Together Victoria was designed as a statewide program to prevent chronic disease for some 6 million people and 79 municipal districts in Victoria, Australia. Underlying the entire effort is the concept of a "complex systems approach" to health promotion and disease prevention—a mindset which assumes that the most impactful way to bring about change is to address the diverse and interconnected determinants of health simultaneously. Interventions thus have a mutually-supportive "multiplier" effect.[65] Healthy Together Victoria's interventions range from state-level marketing and awareness campaigns to healthy lifestyle programs for individual workplaces. The various levels of intervention were designed to address health determinants such as individual psychology, food systems, and the many more societal influences on health and behavior.[66] Unfortunately, the Healthy Together Victoria's funding was cut following a change in governance in 2015, while the program was still in its early years, so there was never a chance to see what sort of long-term changes it could have.[67] In this sense, Healthy Together Victoria also demonstrates one of the major drawbacks of relying on government funding: uncertainty of sustainability.

WHY IT STANDS OUT

Although funding troubles cut short the effort's lifespan, Healthy Together Victoria is well worth recognition as an example of how a national government can coordinate a complex population health initiative a degree greater than can be accomplished at a municipal level. The initiative's systems-level approach to population health for the entire state of Victoria sought to address health disparities that exist between, and not just within, communities (e.g., plans to address the challenges facing both rural and urban areas). Such comprehensive disease prevention efforts can be quite challenging, if not impossible, in municipalities whose resources do not extend nearly as far.

11. HEALTHIMATION'S WHY WAIT

healthimation

NAME OF PROGRAM
Healthimation's Why WAIT

ORGANIZING GROUP
Healthimation, in collaboration with Joslin Diabetes Center

LOCATION
Boston, Massachusetts

PROGRAM TYPE
Online/app-based/digital, DPP translation, behavior change

CATEGORY
Innovator

- Born out of a collaboration between the Joslin Diabetes Center and Hollywood, Healthimation's app version of a successful Diabetes Prevention Program—Why WAIT (Weight Achievement and Intensive Training) demonstrates the potential of gamification for healthy behavior change.
- The Why WAIT app uses Hollywood animation and an avatar named Lena to engage users in a uniquely game-like process.
- In addition to offering personal diet and exercise recommendations, progress-tracking, and peer support, the app also syncs with wearable tech (FitBit or Apple Watch) for additional data input.

Healthimation is new company that applies Hollywood animation and gaming industry expertise to healthcare programs. Its first project is an app version, for iOS and Android, of the Joslin Diabetes Center's successful DPP(Diabetes Prevention Program), Why WAIT (Weight Achievement and Intensive Training).[68] Healthimation is a collaboration between diabetes specialists from Joslin and former executives from Warner Bros. and the nutrition app NuPlanit.[69] Their tagline is, "Movie magic meets hard science."[70] In the app, also called Why WAIT, an avatar named Lena guides participants through a customized DPP consisting of nutrition and exercise coaching, presented with game-like interactions and Pixar-esque animation. The Why WAIT app offers personal recommendations for exercise and diet, progress tracking for weekly goals, and will soon allow users to order supplies like meal replacements, groceries, and prepared dinner meals. In addition, the program promotes community-based peer support. The app also syncs with wearables (e.g., FitBit or Apple Watch) for additional data input. Healthimation is designed to leverage machine-learning; the app will get smarter as more people use it.[71] The company is currently working to obtain CDC recognition although, as it stands, CMS will not reimburse for virtual DPPs, making affordability a key consideration.

WHY IT STANDS OUT

While Healthimation is still in its early days, this unique collaboration of leaders from health and entertainment is worth noting. Such a combination is a fascinating attempt to bridge the gap between theory and practice that so often challenges diabetes prevention efforts. While DPPs have shown that meaningful prevention or delay of type 2 diabetes can be achieved through lifestyle changes, there is still meaningful work to be done on finding out how to implement interventions in ways that are accessible, affordable, and that will consistently keep participants engaged. The use of Hollywood animation and game-like interaction is an exciting, creative strategy to do exactly that, and it represents the sort of collaborative innovation that we hope to see more of in the future.

12. JAMIE'S FOOD REVOLUTION

NAME OF PROGRAM
Jamie's Food Revolution

ORGANIZING GROUP
Jamie Oliver Food Foundation and The Good Foundation

LOCATION
United Kingdom, Canada, and Australia

PROGRAM TYPE
Health education, environmental change, nutrition and healthy eating, population health, community outreach/ engagement

CATEGORY
Prime Performer

- Spearheaded by British celebrity chef Jamie Oliver, Jamie's Food Revolution has spurred national, coordinated nutrition movements in the UK, Canada, and Australia.
- The revolution's six-point plan focuses on wide-sweeping changes for governments, schools, and individuals.
- The initiative includes a number of programs, including: Jamie's Ministry of Food, which provides classes on cooking healthy meals; a social enterprise restaurant called Fifteen, which trains unemployed youth for careers in the restaurant industry; and the Kitchen Garden Program, which teaches nutrition, cooking, and gardening to schoolchildren
- Jamie's Food Revolution is also fighting sugar, working to institute a sugar drinks tax and changing the sugar content of common foods
- With far-ranging celebrity power, Jamie Oliver has greatly increased the visibility of healthy eating in the media and is clearly inspiring national efforts that seek to promote a culture of health

Jamie's Food Revolution is a coordinated collection of efforts to improve nutrition and reduce childhood obesity led by British celebrity chef Jamie Oliver. The Revolution includes many programs, all focused around healthy eating, cooking, and nutrition. At the heart of the Revolution's efforts is a six-point plan to improve nutrition and reduce childhood obesity:[72]

1. **Sugary Drinks Tax**
2. **Sugar Reformulation (changing the sugar content of common foods)**
3. **Fair Marketing**
4. **Clearer Labeling**
5. **School Food**
6. **Education**

The various efforts and programs of Jamie's Food Revolution all relate to one or more of these points. Jamie's Ministry of Food, the flagship education program of the Revolution, provides cooking classes focused on developing culinary skills and nutritional knowledge for people with little or no cooking background.[73] The Jamie Oliver Food Foundation also oversees a restaurant called Fifteen, a social enterprise (motivated by social impact rather than profit) that trains unemployed youth who have dropped out of mainstream education for careers in the restaurant industry.[74] The Kitchen Garden Program brings together nutrition, gardening, and cooking education for schoolchildren.[75]

Jamie's Food Revolution is also piloting a broader, more community-level program to reduce sugar consumption, Sugar Smart UK.[76] The pilot has worked with sports stadiums, hospitals, schools and universities, restaurants, and other local institutions to provide healthier options and, in some cases, impose a voluntary "sugar levy" on sweetened beverages. It also provides free educational materials, including downloadable flyers on sugar content to be posted on vending machines or in restaurants. The pilot has concurrently introduced the Kitchen Garden Program into local schools, and a Ministry of Food training program into the local university. All programs are presented together as a single, connected entity—the Revolution—which, taken as a whole, represents an effort to raise awareness for the six-point plan in its entirety.

ANALYSIS

Jamie's Food Revolution is an exceptional example of celebrity power in generating excitement for health causes. As of December 2016, there were well over 700,000 "Revolutionaries" who had signed up to receive news, advice, recipes, and more, all focused on increasing healthy eating in homes and communities.[77] Beyond just creating recognition and excitement, Jamie Oliver gives his Food Revolution an effective way to increase visibility and coverage in the media. Several of the programs that now make up Jamie's Food Revolution have been the subject of television programs, including the Fifteen culinary apprentice program and the Ministry of Food program. One of his early shows, *Jamie's School Dinners*, focusing on the unhealthy food in schools, inspired the "Feed Me Better" movement that influenced Britain's Parliament to invest in improving the health of school meals nationwide. Of course, the celebrity emphasis makes Jamie's Food Revolution challenging to replicate. There can only be so many "Jamies" out there at any given time, and the potential impact diminishes along with the recognition of the celebrity.

The combination of many approaches under the Revolution's umbrella sets it apart from the health-focused initiatives of many other celebrity chefs. Beyond being just a celebrity-endorsed public awareness campaign, Jamie's Food Revolution is a full-fledged effort that combines awareness-raising with action. It organizes itself around a clear, six-point political action plan, and then operates a suite of programs that reflect this mission. In addition, the Revolution appears to be working constantly to scale and spread its impact. Some programs, like Jamie's Ministry of Food, have been replicated in other countries. Others are being actively scaled to the national level. The Fifteen apprenticeship program is being replaced with a more widespread effort based on the original model. Sugar Smart UK is being piloted in a single town, but with the explicit intention of expanding to a nationwide grassroots campaign. The Kitchen Garden program provides educational resources for free, in hopes of spreading to schools throughout the UK. This focus on scalability makes Jamie's Food Revolution a strong example of how a non-governmental effort can lead to national change.

13. LARK

- Lark is an app-based (iOS and Android) DPP entirely powered by artificial intelligence, meaning users can get real-time feedback without waiting for a coach.
- A simple red-yellow-green system makes food logging simple and convenient for users.
- Lark markets both to individual users in addition to employers, increasing its availability to the general public.
- Cost for individual users is $19.99/month, which is less expensive than comparable digital DPPs with real-life coaches.

NAME OF PROGRAM
Lark

ORGANIZING GROUP
Lark

LOCATION
Mountain View, California

PROGRAM TYPE
DPP translation, online/app-based/digital, behavior change

CATEGORY
Innovator

Lark is an app-based Diabetes Prevention Program (DPP) with the unique feature of being entirely automated, based on artificial intelligence.[78] This automation means that users can receive instant feedback at any time, simply by texting their nutrition and physical activity information to their automated coach. Lark also features an option for logging meals based on a straightforward three-color system (red, yellow, and green, like a stoplight), which has the potential to reduce the burden of logging, potentially increasing retention among users who might otherwise find logging to be too much of a hassle. Likely because it uses artificial intelligence instead of live coaches, Lark costs $19.99 per month for individual users, somewhat less than comparable programs. Yes Health, the other major app-based DPP that markets directly to individuals, for example, has live coaches available 14 hours per day, but costs $39 per month for the first 4 months, and then $15 per month for the maintenance program thereafter.[79] Lark also works with healthcare providers, meaning it can compete in that market with other programs like Omada.

WHY IT STANDS OUT

Lark's use of artificial intelligence (AI) has drawn a good deal of attention, and for good reason. AI holds the promise of combining the personalized feedback, motivation, and guidance of one-on-one coaching, but the convenience, rapid responses, and low-cost scalability of automation. Lark has been named one of the "10 Best Apps of 2015" by Apple, and one of Business Insider's "10 Most Innovative Apps in the World." While Lark has not yet published any outcomes, it's curriculum is approved by the CDC's Diabetes Prevention Recognition Program (DPRP), so we are eager to see whether it can demonstrate comparable results from AI to those that can be achieved by live coaches.

14. MASS IN MOTION

NAME OF PROGRAM
Mass in Motion

ORGANIZING GROUP
Massachusetts Government

LOCATION
Massachusetts

PROGRAM TYPE
Environmental change, population health, free for participants

CATEGORY
Gold Standard

- Mass in Motion is a comprehensive health promotion program that encourages physical activity and healthy eating throughout Massachusetts.
- The initiative's multi-setting approach includes schools, childcare centers, businesses, municipalities/communities, and more.
- Mass in Motion's extensive public-private partnerships allow for state-sponsored engagement of community partners and stakeholders.
- Efforts target people at locations where they are easily reached, such as schools and workplaces.
- Pilot communities showed greater average BMI reductions than comparison communities.

Mass in Motion is a statewide initiative that promotes physical activity and healthy diets in schools, communities, childcare centers, and businesses, primarily through spearheading policy changes and supporting wellness-related programming. Since 2009, the initiative has launched a Municipal Wellness and Leadership Grant Program that supports over 60 community programs centered on helping people make healthy lifestyle changes. Mass in Motion has also introduced new state regulations that require BMI screenings and adherence to nutrition standards in public schools, as well as an Executive Order that mandates that state agencies abide by nutrition standards when making large-scale food purchases. Furthermore, Mass in Motion has created programs like Working on Wellness and MA Children at play, focused on increasing workplace wellness and developing healthy habits in preschool, respectively. The Mass in Motion Healthy Dining Program helps participating restaurants create healthier menus, and the Health Market Program works with convenience stores to increase healthy, affordable food options.

KEYS TO SUCCESS

State-sponsored, public-private partnered

Support for a program at the state level (or in the case of Massachusetts, the Commonwealth) has certain advantages in terms of scaling programming. Because of the Massachusetts government's sponsorship, Mass in Motion (MiM) could be piloted in many different communities and eventually expanded to more than 60 different cities and towns in Massachusetts.[80] The initiative can be replicated in new towns without a proportional increase in the number of resources and employees needed, as state-level employees, like coordinators. are already in place, and program materials already exist. MiM has focused on creating public-private partnerships to promote sustained health change beyond the possibilities of a stand-alone state initiative.[81]

These partnerships involve local businesses, restaurants, grocery stores, etc., in creating changes in the health behaviors of communities.

Incentives for healthy communities

MiM uses competition and rewards to incentivize healthier communities at a variety of levels. For example, MiM gives out grants of up to $60,000 to support towns and cities working on cross-sector, community efforts to promote health and wellness.[82] MiM also provides incentives for businesses that make healthy changes. The Healthy Market Program, for instance, rewards grocers that meet certain health criteria set by MiM.[83] These stores can then use the MiM designation for self-promotion.

Strong awareness of community factors and disparities

MiM displays a strong awareness of the various environmental factors that are major drivers in shaping the health behaviors of a community. MiM carefully considers the influence of the built environment on health, and develops efforts to increase the amount of safe play space and pedestrian/bike travel options in communities.[84] In addition, MiM creates programs that target residents in places where they are easy to reach and where they spend a large proportion of their time. The "Working on Wellness" program, for example, focuses on making workplaces healthier for adults,[85] while MA Children at Play is directed toward schools.[86]

ABILITY TO INSPIRE

The initial results of Mass in Motion, measured in 5 pilot communities from 2009–2011, demonstrated a 2.4% reduction in BMI, as compared to a 0.4% reduction in non-MiM control communities.[87] Parly based on this success, MiM now includes more than 60 cities and towns.[88]

COST EFFECTIVENESS

Mass in Motion distributed nearly $9 million between 2009 and 2016 to support community health programs.[89]

DRAWBACKS/LIMITATIONS

While state support helps MiM spread relatively easily to other towns in Massachusetts, this support creates potential challenges in finding additional funding. As the number of towns involved in MiM grows, the program needs to either decrease the amount of grant funding per town, or add to the general pool of grant money. Sustaining funding may also be a challenge for MiM for reasons that could impact almost any childhood obesity intervention. As the program becomes increasingly successful, the demonstrated outcomes will shift from BMI reductions to BMI maintenance, making it potentially more difficult to justify the value of the initiative.

15. MOVE!

NAME OF PROGRAM
MOVE!

ORGANIZING GROUP
U.S. Department of Veterans Affairs (VA)—Veterans Health Administration (VHA)

LOCATION
United States

PROGRAM TYPE
Targeted population, behavior change

CATEGORY
Prime Performer

- MOVE! is a weight-management program available to veterans at U.S. Department of Veterans' Affairs (VA) Medical Centers and Community-Based Outpatient Clinics.
- Over 400,000 veterans have participated since 2005.
- People can take the brief MOVE!11 questionnaire online to get an individual assessment of weight management factors.
- The curriculum has been converted into a self-guided app, MOVE! Coach, which is available for free for any interested user (iOS devices only).
- The program's foundation in an existing national system—the VA—means that participants stay in the same system long enough for the VA to see the returns of its own investment.

The VHA created the MOVE! weight management program as a cornerstone effort of the VHA National Center for Health Promotion and Disease Prevention (NCP). MOVE! was piloted in 2003–2005 and introduced nationwide in 2006.[90] The program offers a 19-week lifestyle-change curriculum for weight loss, available in all VA Medical Centers, as well as in many VA Community-Based Outpatient Clinics throughout the country.[91] It also offers a large collection of handouts and other resources available for free online through the VA website.[92] The MOVE! 11 questionnaire, which can also be taken on the website for free, is an eleven-question survey meant to identify the aspects of an individual's life that are most relevant to their own weight loss, asking about availability of family and peer support, mental health conditions, self-reported reasons for weight gain and barriers to lifestyle change, and diet and physical activity habits.[93] The online questionnaire produces an individualized report with links to handouts based on responses, as well as a complementary report for the respondent's physician.

While the in-person program is only available to veterans who receive medical care through the VA, this represents a substantial population: over 400,000 veterans have participated since 2005.[94] The VA has also taken several steps to make the MOVE! curriculum more accessible to others. The MOVE!11 questionnaire, as well as all handouts and worksheets, are available to anyone for free on the program's website. In addition, the VA introduced MOVE! Coach, a self-guided app version of the MOVE! curriculum. MOVE! Coach is free for anyone to use, although it is currently only available for iOS devices (iPhone and iPad).

ANALYSIS
MOVE! is an excellent example of how an existing structure—the VA—can be used to reach a very large population—veterans—many of whom may be at high risk for type 2 diabetes. Because participants are drawn from a common population, MOVE! groups are naturally conducive

to creating a sense of camaraderie and shared goals during the in-person sessions. It should be noted that MOVE! is a weight management program and not specifically a diabetes prevention program; the curriculum, however, has many parallels to typical DPPs and has been associated with reduced incidence of type 2 diabetes. The focus on weight, in particular, has the potential to draw a larger participant population, as it does not require a prior screening for prediabetes. In addition, the fact that this program is run through the VA addresses one other frequent challenge to the cost-effectiveness of many prevention efforts: the same people who invest in prevention will reap the benefits of savings that occur years down the road. Often, payers have disincentives on reimbursement for prevention, as high turnover rates mean that others often gain the returns on that investment. Because the VA is a national system through which veterans often receive care and coverage for decades, there is increased potential for an alignment of investments and returns.

The major limitation to using the VA as the organizing body is, of course, that only veterans can benefit. While the VA's national presence provides some opportunity for scale, as evidenced by the fact that all VA medical centers offer MOVE!, the scalability is restricted only to the one particular population. Many of the advantages of MOVE!, especially the group unity that comes from the common identity of participants and the ease of accessing the target population, would be lost if MOVE! were to be copied outside of the VA. The MOVE! Coach app and the other available online resources do, of course, represent a step in expanding the program's potential impact, but more work will need to be done to determine how lessons learned by the VA might be translated to other populations.

16. NOOM

NAME OF PROGRAM
Noom

ORGANIZING GROUP
Noom, Inc.

LOCATION
New York City, New York

PROGRAM TYPE
DPP translation, online/app-based/digital

CATEGORY
Innovator

- Noom is a digital (app for iOS and Android) DPP program featuring personal guidance from live coaches.
- Users can choose plans focused on distinct goals, including weight loss, diabetes prevention, and—in the near future—hypertension.
- Noom claims an average weight loss of 18 pounds, with significant loss sustained at 4 years.
- The app markets to businesses/employers who are billed on an outcomes basis, paying only for participants who lose 5% of their body weight or more.

Noom is an entirely app-based Diabetes Prevention Program (DPP) (available for iOS and Android) that delivers individual health and weight loss plans, including personal coaching.[95] Noom stands out for cites measured, demonstrated outcomes, something that is rare among its peer app-based DPPs, most of which are relatively new. According to Noom's website, participants lost an average of 18 pounds lost, with sustained weight loss for 4 years.[96] Additionally, sixty-four percent of participants lost at least 5% of their body weight,[97] the threshold for meaningful diabetes risk reduction according to the original DPP study. Noom is designed to adapt to each participant's progress and experiences—goals are eased during difficult periods and advice is customized to anticipate upcoming challenges. Noom also offers programs goal-specific to different goals. In addition to its standard weight loss program, it offers a diabetes prevention-specific program that focuses its education on carbohydrates and their impact on insulin response.[98] In other words, Noom works to provide a diabetes-specific concept of healthy eating, delivered as an app-based DPP through regular lessons and coaching.

WHY IT STANDS OUT

Noom distinguishes itself from many digital competitors by offering separate plans for people with different goals: one for weight loss and another more directly targeted at diabetes prevention (a third plan for hypertension is in the works).[99] In other words, Noom works to provide a general tool for healthier living as well as one customized for those at highest risk for diabetes. Improved understanding of risk-stratification in prediabetes could potentially be beneficial in maximizing Noom's impact by determining who might be best directed to which program. Lastly, Noom charges based on outcomes for its diabetes-focused programs. Businesses that work with Noom will only pay for participants who demonstrate at least 5% weight loss.

17. OMADA

NAME OF PROGRAM
Omada

ORGANIZING GROUP
Omada Health

LOCATION
San Francisco, California

PROGRAM TYPE
DPP Translation, online/app-based/digital, behavior change

CATEGORY
Gold Standard

- Omada was the first digital DPP to be recognized by the CDC's certification standards.
- Participants are matched with a 10- to 15-person support group who all start the program at the same time and a health coach— a structure that aims to provide the social support of a brick-and-mortar DPP.
- Going beyond its four "core" DPP months, Omada's maintenance program has also demonstrated high levels of engagement and sustained weight loss.
- Omada markets to employers and charges on a "bill-based-on-results" policy.

Omada is a 16-week online digital health program specifically targeted at individuals at risk for developing diabetes, cardiovascular disease, or obesity. Inspired by the NIH's Diabetes Prevention Program, Omada aims to empower individuals to make lifestyle changes by partnering participants with an online professional health coach whose role is to advise, support, and track their food consumption and exercise. In addition, this support is supplemented by interactive weekly health lessons and a social network of other participants that provide motivation and accountability. The average time commitment for participants is 2–3 hours per week, and the 16-week intervention costs $520, with an additional $12 per month for ongoing access if paying as an individual. These costs can also be covered by health plans and employers; Medicare also began reimbursing CDC-recognized providers for administering the Diabetes Prevention Program, including Omada Health, in March 2016. Research on the efficacy of Omada indicates that the total engagement of participants using Omada is 65% at 12 months, compared to 6.6% in a leading commercial weight-loss program. Furthermore, users of the program experienced increased weight loss compared to other health and wellness programs (4.7% versus 0.5%) as well as reduced A1c levels.

KEYS TO SUCCESS

Accessible and convenient

Omada is the first online program to meet the requirements set by the CDC's Diabetes Prevention & Recognition Program (DPRP). In other words, it is the only Diabetes Prevention Program (DPP) translation to be carried out online that is approved for reimbursement by Medicare. Because the program is online instead of scheduled, in-person sessions, Omada is much more accessible to people for whom scheduling or transportation to a program might serve as a barrier. While relatively few studies report on patient experiences with DPP translations, at least one study of patient experiences with Omada found that the convenience with which the program can fit into daily life was a major draw for many participants.[100]

Establish social networks

The development of communities—and the motivation and accountability that they can bring—is crucial to the success of group-style DPP translations, but could easily be lost in an online platform. Omada is deliberately designed to compensate for the loss of face-to-face community. Each enrollee in Omada is placed in a 10–15 person support group based on matching personal and demographic characteristics. The members of the group progress through the program together but don't all have to complete weekly lessons at the same time.[101] The support group communicates with each other and its assigned a personal coach to create a sense of shared effort and accomplishment, as well as accountability.

Personalized interactions

While Omada does not involve face-to-face health coaching, each participant is assigned to an advisor with whom they interact via the web platform.[102] This allows for a far more personal experience and individualized plan than would be possible through, for example, an automated app. Omada thus strikes a balance between the convenience of digital health and the precision and customizability of personal care.

Long-term maintenance

Omada, unlike many DPRP-approved DPP translations, has demonstrated the impressive outcome of weight-loss maintenance through the second year of the program with no significant change from the end of year one.[103] In other words, Omada participants—at least those who could be reached for a two-year follow-up—kept off their weight on average better than those in most DPP translations. One possible reason is that Omada has a continued program meant to maintain weight loss. This follow-up program is less hands-on, but all participants who have completed the four-month core program continue to access certain health tracking tools and online group discussions.[104] For individuals, this weight-loss maintenance program costs $12 each month, compared to the $130 per month cost of the core program. (Pricing is negotiated for employers and health plans.) For individuals with impaired fasting glucose of 110–125 mg/dl, Medicare covers $450 for the first year of a DPP and up to $180 for each year after the first, meaning the maintenance portion of Omada could be entirely reimbursed after the first year for qualifying persons with prediabetes.[105]

ABILITY TO INSPIRE

The clearest indication of Omada's demonstrated successes is its CDC recognition—Omada was the first online-only platform to receive this designation.[106]

COST EFFECTIVENESS

Omada contracts with employers and health plans, negotiating prices and operating on a "bill-based-on-results" policy.[107] Because Omada does not charge employers or insurers, in this system, for those participants who fail to demonstrate the intended outcomes, it has the potential to be even more cost-effective. If Omada truly can achieve comparable long-term outcomes to the original DPP study, it demonstrates impressive cost-efficiency.

DRAWBACKS/LIMITATIONS

While the advantages to accessibility are clear, the convenience of online platforms should not be overlooked. Convenience comes with lower commitment, meaning that low engagement and non-completion may be especially significant problems for Omada.[108] Additionally, participants have reported certain drawbacks to the online platform. An online support group lacks the face-to-face intimacy and interactivity of an in-person one, and therefore may be less effective in establishing the strong social networks that are so important for lifestyle changes. What's more, figuring out the technical components of using an online platform and regularly logging info can be tedious or challenging for some participants.[109]

18. PLUS3

- Plus3 offers customizable web and mobile apps that combine traditional workplace wellness strategies with corporate charitable-giving programs to increase motivation for employees to be healthy.
- With a variety of incentives, including challenges, competitions, charitable rewards, personal rewards, and family participation, every employee can find the best personal motivation.
- Employees engage with Plus3 through an app that features easy meal and activity logging and that can be integrated with many activity trackers.
- Plus3 has demonstrated sustained, higher-then-average engagement rates.

NAME OF PROGRAM
Plus3

ORGANIZING GROUP
Plus3.com

LOCATION
San Carlos, California

PROGRAM TYPE
Workplace wellness, online/app-based/digital, corporate responsibility, culture of wellness, behavior change

CATEGORY
Prime Performer

Plus3 is an innovative solution to increasing motivation in workplace wellness programs. It links corporate charitable giving to traditional employee wellness programs, creating an amplified incentive for workers to participate.[110] As employees participate in and record healthy behaviors, they not only earn "points" toward personal rewards, but they also prompt corresponding donations to charity. The more actions workers take for their health, the more their companies donate. In many cases, Plus3 serves as a strong win-win for employers, too; they are inviting employees to move funds that have already been designated for corporate philanthropy and now have a healthier workforce as well. Employees see additional benefits as well—their families can be added to their programs at no additional cost to the employer, helping to reinforce health promotion and charitable motivation in other areas of life outside the workplace.[111]

Plus3 offers a free mobile app to participants, which are compatible with a number of activity trackers and wearables to ease the burden of recording and logging for participants. To further strengthen the incentive, Plus3 also organizes motivational challenges of various sorts, ranging from competitions within workplaces to collaborative workplace goals. Participants can see real time updates on challenges and competition leaderboards through the Plus3 app. This combination of motivation seems to work; on their website, Plus3 notes that standard weekly participation rates range from 38% to 56%, whereas most workplace wellness programs see averages between 10% and 20%. As of December 2016, Plus3 participants have driven the donation of over $2.4 million to charity.[112] By combining gamification principles, personal incentives, and charitable motivation, Plus3 creates a workplace wellness program with above-average participation and retention rates that appeals to employers and employees alike.

ANALYSIS

Workplace wellness programs have the potential to be highly impactful for diabetes prevention, as they reach adults in a place where they are likely to spend a substantial amount of their time. However, workplace wellness programs generally struggle with meaningful engagement over the long term. Plus3 demonstrates that new and increased motivation for workplace wellness can be brought about in a way that does not add any extra cost or complication. Both employers and employees do essentially what they would have already been doing for a workplace wellness program, while Plus3 takes on the work of facilitating charitable motivation, competitions, and challenges. In addition, Plus3 allows for increased individualization by offering many possible incentives—adapting motivations to create an ideal fit for each employee, whether that comes from group challenges, individual competitions, charitable incentives, personal prizes, or family support. Of course, Plus3's model is reliant upon employers having a policy of corporate philanthropy, so this may limit the organizations that can partake. However, with strong enough results, we can only hope that Plus3 may even additionally motivate increased adoption of corporate philanthropy programs as employers see the possibility of a healthier workforce.

19. SKINNY GENE PROJECT

- Skinny Gene offers an online DPP, a brick-and-mortar DPP, and community events like cooking classes for participants in San Diego County.
- The variety of options, whether online, in-person, or community-based, allow participants to choose the program that best fits their needs.
- DPP programs have a partnership with SideKick health, which provides mobile support and easy information logging.
- Skinny Gene is organized by the J. Moss Foundation, a nonprofit organization committed to reducing health disparities and bringing health to underserved populations in the San Diego Area.

NAME OF PROGRAM
Skinny Gene Project

ORGANIZING GROUP
J. Moss Foundation

LOCATION
San Diego County, California

PROGRAM TYPE
DPP translation, online/app-based/digital, behavior change

CATEGORY
Innovator

The Skinny Gene Project is a non-profit based in San Diego focused on helping people—especially those in underserved communities—prevent diabetes. Skinny Gene takes a multi-pronged approach to preventing type 2 diabetes. At the community level, it offers cooking classes, educational games and video screenings, and other events focused on bringing about increasing awareness of diabetes prevention.[113] For individuals, Skinny Gene offers a CDC-recognized, in-person Diabetes Prevention Program (DPP), as well as a virtual DPP featuring one-on-one coaching and group support. In this way, participants can choose whether an in-person or virtual DPP is best for them.[114] Skinny Gene has also partnered with SideKick Health, which offers a free app designed to make the program more convenient, with activity tracking, food logging, suggestions for healthy living, and a gamified system for monitoring progress.[115] While Skinny Gene's DPP is available to all as a paid program, it is a non-profit focused on reducing health disparities through diabetes prevention. As such, many of its efforts and events are directed toward disadvantaged communities within San Diego County.

WHY IT STANDS OUT
Skinny Gene showcases the strength of combining many sorts of interventions: a traditional brick-and-mortar group DPP, a virtual DPP option, and community-level interventions to address underlying social determinants of health. While its DPP curriculum is not unique in any major way, it is the combination of this program with broad community interventions that demonstrates Skinny Gene's understanding that prevention requires both individual behavior change and a supportive environment.

20. SMART CHOICE AND HEALTHY BEVERAGE INITIATIVES

NAME OF PROGRAM
Smart Choice and Healthy Beverage Initiatives

ORGANIZING GROUP
University of California, San Francisco (UCSF)

LOCATION
San Francisco, California

PROGRAM TYPE
Environmental change, nutrition and healthy eating, workplace wellness, social determinants of health

CATEGORY
Innovator

- As joint programs, Smart Choice and Healthy Beverage aim to make healthier food and drink options available on the various medical campuses of the University of California, San Francisco.
- Smart Choice created a standardized system for communicating nutritional information, including printing nutrition facts on receipts and labeling healthy choices with a recognizable logo.
- The Smart Choice initiative also partnered with My Fitness Pal to create an app for health tracking to integrate with FitBit wearables.
- Healthy Beverage stopped the sale of all sugar-sweetened beverages on the campuses.

The UCSF medical system has demonstrated a concerted effort to make the food options on its three campuses healthier through two programs introduced in the last few years. In 2009, UCSF implemented Smart Choice, which created a standard system for designating healthy food options sold at UCSF.[116] Nutritional information for all food was printed directly on customer receipts, including carefully calculated information for all recipes prepared on-site. A recognizable "S" symbol was used to mark Smart Choices—healthy options. In 2013, Smart Choice expanded, partnership with the app, MyFitnessPal. The resulting program, called Smart Choice Smart U, allowed for improved fitness and nutrition tracking and included integration with FitBit, a wearable fitness tracker.[117]

In 2015, UCSF also introduced the Healthy Beverage initiative, ending the sale of all sugar-sweetened beverages on its campuses.[118] The idea was to further reinforce efforts to create a healthier food environment for all faculty, staff, students, patients, and community members. People could still bring their own sweetened beverages (i.e., it wasn't a ban), but the initiative was in part publicized with the express goal of raising awareness for and encouraging healthy decisions even off-campus.

WHY IT STANDS OUT
UCSF's Smart Choice and Health Beverage initiatives represent impressive examples of ways that changes can occur at an institutional level to create an environment conducive to healthy behaviors. Rather than simply asking individuals to make healthier decisions, UCSF actively strived to create a setting in which healthy decisions were more likely to be the default. This is a prime example of what population-level prevention looks like: increasing healthy behavior not only for those already with high health risks, but also for the entire community.

UCSF, an employer of nearly 43,000 people in San Francisco and the nearby area, with more than 40,000 hospital admissions and over 1.1 million outpatient visits every year, is no small case study. For behemoths like UCSF, interventions at the institutional level can be readily scalable, reaching hundreds, thousands—maybe even millions—of people.

21. SOLERA

NAME OF PROGRAM
Solera

ORGANIZING GROUP
Solera Health

LOCATION
Phoenix, Arizona

PROGRAM TYPE
DPP translation, online/app-based/digital, personalized care/precision medicine, quality improvement

CATEGORY
Prime Performer

- Solera operates an online network to connect eligible participants with the DPP program that best fits them based on health claims/EMR data and personal preferences.
- The Network includes hundreds of brick-and-mortar community partners, well-known weight-loss programs, and digital health programs.
- Solera submits and manages claims data, easing the burden for its partners.
- Solera's value-based health model means that the company submits claims when participants reach milestones.
- The SoleraONE app allows program participants to make up for missed sessions and easily submit information in a way that requires less work for coaches.

Solera matches individuals at risk for chronic disease, particularly diabetes, with recognized prevention programs. Solera uses an algorithm to connect qualifying patients with a program that is an ideal fit for them and for which they can receive coverage.[119] Patients are connected to Solera by providers and health plans, based on recommendations or electronic medical record and claims data.[120] Individuals can also engage independently with Solera through Solera4me.com, where they can take a "1-minute quiz" to assess their risk level for type 2 diabetes.[121] Those above a certain risk threshold can then go through matching process. Patients are matched to programs based on the following preferences:[122]

1. **Looking to prevent diabetes or lose weight?**
2. **Online or in-person class?**
3. **One-on-one or one-on-one and group support?**
4. **Fixed or flexible schedule?**

Patients can be matched to any program within the Solera Network, a collection of CDC-recognized Diabetes Prevention Programs (DPPs). The Network contains hundreds of community partners, many well-known weight-loss programs including Weight Watchers and Jenny Craig, and digital health programs including Lark, Noom, and Yes Health.[123]

Additionally, Solera introduced the SoleraONE app in late 2016, powered by HealthSlate, a Solera Network partner.[124] The app is meant to serve as a digital supplement to local, brick-and-mortar DPPs, aimed at increasing engagement and retention and improving the efficiency of in-person coaching. The app includes videos that participants can watch as make-up for lessons that they have missed. It also features a portal that is designed to make reviewing and providing feedback on nutrition and activity logs more efficient for lifestyle coaches.[125]

In this sense, SoleraONE is meant to make community DPPs more cost-efficient as well as more successful and engaging.

Solera operates on a value-based model of health; it tracks the progress and outcomes of enrollees and submits claims when these patients meet milestones. This model provides shared incentive, as neither Solera nor the partner DPPs in the network receives money unless outcomes are met.[126] Solera does the work of submitting claims—and thus lightens this load for its partners—and it potentially gives partners access to patients covered by payers that might not be otherwise reached. The health plans also see the benefit of value-based care; they reimburse based on milestones and outcomes rather than services.

ANALYSIS

Solera is an impressive example of a leading attempt to address several unmet, or at least under-met, needs in healthcare and prevention. It provides a basic form of personal "precision medicine," matching individual patients to health solutions that are likely to be the best fit for their individual needs and circumstances. It works to reduce "gaps" that would otherwise appear when payers, providers, and patients don't share knowledge of what types of prevention programs exist. Perhaps most importantly, Solera demonstrates how value-based care can incentivize the most important elements of care for all stakeholders. Payers, DPP partners in the Solera Network, and Solera itself all earn money based on milestones and outcomes like weight loss.

The characteristics that make Solera innovative and valuable also make it a successful model. Solera increases convenience for all stakeholders involved, as providers and patients who use Solera can easily identify the right prevention programs. DPPs in the Solera Network gain access to a larger patient population but don't have to take on the work of filing claims. Payers reimburse based on demonstrated milestones, meaning they don't need to pay for prevention services that cannot demonstrate impact. The "value-based" model provides value for all parties involved, including Solera. The personalization of "matching" also has the potential of long-term retention among people at risk for diabetes. In addition, the SoleraONE app indicates that Solera is dedicated to increasing convenience and efficiency for its partners, and improving engagement among DPP participants.

While we have yet to see any concrete information on whether Solera leads to actual cost-savings, Solera has started to show that it can affect diabetes prevention. Inclusion in the Solera Network is increasingly treated as a milestone for diabetes prevention programs, especially among digital programs. It is certainly not a guarantee that Solera can provide the highest level of personal precision medicine; after all, patients' stated preferences may not necessarily reflect the option that will actually keep them engaged (e.g., patients who value a program's convenience may end up in a less motivating program). Moreover, the SoleraONE app may inadvertently reduce engagement in some patients—making a missed session far less consequential, for instance. However, the concept of a combined digital and brick-and-mortar DPP certainly deserves attention in that it has the potential to provide the "best of both worlds" for participants.

22. SHAPE UP SOMERVILLE

- Initially a childhood obesity intervention, Shape-Up Somerville has become a leading example of community health promotion through environmental change.
- The program's Community Based Participatory Research (CBPR) methods mean that community members define their greatest needs and therefore shape program design.
- Shape-Up Somerville has strong partnerships with public, private, and non-profit partners throughout the community.
- Somerville has been named the Healthiest City in Massachusetts and one of the Top 10 most Walkable Cities in the U.S.
- Even as Somerville becomes a more desirable place to live, Shape-Up Somerville continues to work to address health disparities and serve low-income populations.

PROGRAM NAME
Shape Up Somerville (SUS)

ORGANIZING GROUP
In partnership with Groundwork Somerville, funded by the Massachusetts Department of Agriculture, Project Bread, and Whole Foods

LOCATION
Somerville, Massachusetts

PROGRAM TYPE
Environmental change, population health, free for participants, community outreach/engagement, culture of wellness, social determinants of health

CATEGORY
Gold Standard

Shape Up Somerville, which began in 2002 as a three-year research study on rates of overweight and obesity in schoolchildren, is a multi-faceted initiative that has expanded with the aim to build a healthier, more equitable environment for the entire Somerville community. In order to achieve this vision, Shape Up Somerville partners with a variety of municipal offices and non-governmental organizations to create environmental changes such as increased mileage of bike lanes, institutionalization of bicycle and pedestrian safety trainings for all children in the Somerville Public Schools, and undertaking a collaborative Food System Assessment to determine next steps in improving healthy, culturally-appropriate food access. A number of on-the-ground programs also stem from this initiative, including: the Somerville Mobile Farmers' Market van and bike cart which deliver healthy, culturally-relevant foods to locations with poor food access; an annual Mayor's Wellness Challenge promoting healthy opportunities around the city; and a healthy restaurant program in which restaurants produce a specific Shape Up menu or use the SUS logo next to particular dishes on the menu following a nutritionist's approval. Various studies have examined the efficacy of the Shape Up Somerville program. Notably, 7.8% of Somerville residents commuted by bicycle in 2014 (one of the highest proportions in the country), compared to 2% in 1990. One study found a decrease in obesity in Somerville from 30% to 28% in students between 2010 and 2011.[127] Another study reported that the BMI percentile for Somerville children decreased by one point compared to comparison control communities without the prevention program between 2003 and 2004.[128]

KEYS TO SUCCESS

Community Engagement

The origins of Shape Up Somerville (SUS) highlight the programs community-centered collaborative approach. The SUS movement began with the gathering of health professionals and community

advocates to discuss the nutrition and physical activity of Somerville residents and these factors link to obesity in the community. The early involvement of partners including the Cambridge Health Alliance, members of the Tufts University Friedman School of Nutrition Science and Policy, the Institute for Community Health, and the Somerville Public Health Department, to form the guiding Nutrition and Physical Task Force was critical in creating community buy-in and harnessing local leadership and support.[129] Leaders and organizations were not the only ones who influenced the SUS program's development—community member involvement and feedback was also central to the program. One of the earliest steps of the SUS program was to ask the community what it would like to see accomplished. This reflected what SUS called community-based participatory research (CBPR).[128] CBPR is intended to allow the subjects of research to guide its central questions and methods. Even in its earliest stages, SUS was carefully engaging community members by holding public forums in many languages.[128] This public outreach continued to inform SUS as it grew and took on new projects. Community input guided everything from a "walking school bus" initiative, in which children formed organized groups to walk to school, to park and play area design.[130] As a result, the initiative made changes that the public not only valued but owned.

Multisectoral approach with strong partnerships

While SUS began as a study on reducing obesity in elementary school students, it has never been limited to schools. Instead, SUS adopts a social-ecological approach to addressing childhood obesity.[128] In essence, this approach assumes that the best way to improve health is to address the many underlying causes, both physical and social, in the environment. Rather than creating a single targeted program, SUS developed various efforts with overlapping purposes. These separate programs reinforced each other through a "multiplier effect." For example, the walking school bus effort among parents and the effort to increase pedestrian and bike paths for commuters were mutually supportive.[130]

An additional benefit of using a social-ecological approach is that SUS developed numerous partnerships early on. This included community organizations that focus on issues other than childhood obesity, including groups working with immigrants, affordable housing, commuter safety, city planning, veterans, elderly residents, and the homeless.[130] As a result, SUS has grown from an elementary-school-focused program to a broader healthy community initiative without major growing pains. SUS's inclusive approach means that no one sector or stakeholder is overwhelmed by the initiative, allowing it to remain sustainable and manageable as it grows.[130]

Local Government Support

Joseph Curtatone, the Mayor of Somerville since 2004, has been a strong advocate for SUS since its early days, and his support is frequently cited as noteworthy.[131]. Certainly, having the city's support has been essential for SUS, which is now funded by the City to have two full-time staff.[131] Moreover, Mayor Curtatone's support has been crucial in both building the partnerships that make SUS so effective and in raising community awareness through public promotions.[131] The support of local government allows an initiative that starts relatively small, like this one, to coordinate and collaborate more easily with other local programs, especially those that are government-backed or affiliated. This is highly valuable in breaking down the "silos" that so often limit public health efforts. The Shape Up Somerville program eventually transitioned from a multi-year grant funding model to becoming a part of the City of Somerville's Health and Human Services Department. This incorporation into the municipal government has led to increased security and sustainability was the program does not have to rely on grants to fund core staff. With the stability of core staff intact, grants can instead be focused on special intervention projects, such as the Live Well Research Project, which was an intervention designed to prevent excess weight gain in new immigrant mothers and children from Haiti, Brazil, and Latin America.[129]

Attention to disparities and barriers

SUS confronts the fact that obesity disproportionately affects people of color and lower income families. Even from its planning stages, SUS

has carried out community input meetings in many languages and continues to provide multi-lingual educational materials and community updates, including a well-received English as a Second Language curriculum on healthy living.[131] SUS has also worked carefully to provide access and convenience for lower-income residents. The mobile farmers' market is perhaps the clearest example of this, with locations at public housing developments, senior centers, and schools and a dollar-for-dollar match program for public housing residents and food assistance recipients.[131] Traditional farmers' markets in Somerville also provide similar match programs.

ABILITY TO INSPIRE

Somerville has been recognized as the Healthiest City in Massachusetts and one of the top 10 most walkable U.S. cities.[132] Other cities have reached out to Somerville for advice on how to implement some of the SUS programs, such as the mobile farmers' market.[132] The program was enough of a success that the Somerville Department of Health and Human Services has continued to fund it even after initial grants from donor organizations ended. Shape Up Somerville was asked to join First Lady Michelle Obama's Let's Move initiative.[132] Lastly, the City of Somerville, in part thanks to changes brought about by SUS, has come to be considered a more desirable place to live over the last decade.[131]

COST EFFECTIVENESS

It is difficult to measure the cost effectiveness of SUS because the effects are diverse, wide-spread, and very difficult to quantify as a return on investment. For example, as it becomes more desirable to live in Somerville,[132] the city may see economic benefits from non-health-related factors like property taxes or growth in tourism and services industries. Additionally, the rate of turnover in Somerville schools complicates any effort to assess the long-term impacts, and in turn, assess potential healthcare cost savings on reduction of childhood obesity and inactivity.[132]

Large, early, financial investments—more than $16.5 million total from CDC and RWJF alone,[132] suggest the significant costs needed to design, build, and study large-scale, multi-level nutrition and physical activity programs. Tackling city-wide nutrition and obesity clearly requires financial investment. However, the evidence-informed tools and Policy, System, and Environmental (PSE) change strategy that have been developed by SUS, have been and will hopefully continue to be leveraged by other cities to minimize the costs other cities would need to invest in determining effective strategies. The longevity of the SUS program, which has been operating for over 15 years, makes it a valuable model to invest in; though, it should be noted the longevity of the program of the program is largely due to support of local community organizations and municipal government who highly value wellness and collaboration, and is not merely a function of cost-benefit returns.

DRAWBACKS/LIMITATIONS

It is unclear whether SUS is effective in minimizing health disparities. Certainly, SUS is designed with deliberate and admirable characteristics meant to partner with and support a number of disadvantaged groups. However, several assessments of the program's initial target outcome—childhood BMI reduction—found that weight changes are greater for boys than girls, and for white children than children of other racial/ethnic groups.[129] These data are nearly a decade old, and there are certainly other indications that SUS has been beneficial to disadvantaged communities, such as the popularity of the English-as-a-second-language curricula based on healthy eating and active living.[129] However, further research will be needed to fully demonstrate that Shape Up Somerville will be capable of reducing health disparities among residents. In a 2013 report, SUS acknowledged that "greater attention to disparities and changes to demographics" is one of its key "Directions for the Future."[129]

23. YMCA DIABETES PREVENTION PROGRAM

- As the first real-life translation of the DPP study, the YMCA's DPP program demonstrated that the study's methods and structure could be effective in real-life settings.
- By using a group-based model and its own employees as program facilitators, the YMCA significantly reduces program costs.
- After completion of the core sessions, participants attend monthly maintenance sessions for the remainder of the 12 months to sustain engagement and outcomes.
- Outcomes and modeling of the program suggest cost-effectiveness, with an estimated return on investment in three to four years.
- While it saves costs, the program's use of coaches who do not have clinical certifications has been a source of some debate

NAME OF PROGRAM
YMCA's Diabetes Prevention Program

ORGANIZING GROUP
YMCA

LOCATION
YMCA facilities across the United States

PROGRAM TYPE
DPP translation, behavior change

CATEGORY
Gold Standard

The YMCA's Diabetes Prevention Program (Y-DPP) is a small-group program specifically for individuals who are at-risk for developing type 2 diabetes. Its model is based on the original Diabetes Prevention Program (DPP) study. The program consists of 25 one-hour sessions distributed over the course of a year. The program aims to reduce participants' portion sizes and to increase physical activity by setting specific goals to lose 5–7% of body weight and increase physical activity to 150 minutes per week. In self-reported data, 94% of participants said they reduced their portion size, and 88% said they have increased their level of physical activity; 83% say their self-esteem increased; 84% report more energy; and 91% say their overall health has increased.[133]. Although there is a financial cost to enroll in the program, the YMCA website reports that the program provides financial assistance for those in need. The program is now available at 200 YMCA centers across the country.

KEYS TO SUCCESS

Group-based

The Y-DPPs normally have sessions for groups of 8–12 people at a time. The potential benefits of group interventions are two-fold. First, group settings have the potential to increase accountability, lowering drop-out rates for programs.[134] Second, group therapy increases the amount of contact time with participants while lowering costs.[135] This latter point is particularly important to the Y-DPP's success. Group sessions drastically decrease the amount spent on wages for program instructors, increasing the program's potential cost-effectiveness.[136]

Uses existing resources

Y-DPP requires few additional contributions or amenities beyond the existing infrastructure of the YMCAs, contributing to the program's cost-effectiveness. Recruitment can be done at low cost with moderate (though limited) success through mail advertising[137] or through referrals from clinicians.[138] B Group sessions are carried out in YMCA facilities, and participants can be provided with memberships to these facilities to make physical activity convenient. The leaders of the group sessions can be employees of the YMCA rather than independent behavioral experts. An early pilot of the Y-DPP found that behavioral interventionists' wages were about half of those of the original Diabetes Prevention Program study, compounding the savings that result from group, rather than individual, sessions.[139] Additionally, training YMCA staff to implement the DPP is relatively simple. In the first pilot study of the Y-DPP, staff members underwent a two-and-one-half-day training curriculum led by facilitators of the original DPP study.[140]

Sustained participant engagement

The Y-DPP features 16 weekly sessions, followed by monthly maintenance sessions for the remainder of the year.[141] The continuity of the program is critical in allowing the Y-DPP to produce sustained lifestyle changes. Many pilots have found that the proportion of participants who lose at least 5% to 7% of their weight at 10–12 months is as high as or even higher than at 4–6 months, indicating that improvements are sustained over the course of the year, rather than successes concentrated near the start of the program and then fading over time.[142] Additionally, the duration of the program does not appear to be overly prohibitive to enrollment. In fact, the majority of participants in Y-DPP pilots indicate that they would prefer an even longer program for sustained results.[143]

ABILITY TO INSPIRE

The YMCA was a recipient of the Center for Medicare & Medicaid Services (CMS) Healthcare Innovation Award, receiving a grant of almost $12 million to test its DPP.[144] The YMCA's demonstrated DPP successes played a crucial role in the 2016 CMS decision to reimburse DPPs. This distinction is particularly noteworthy, as this is the first preventive service model to be covered by Medicare.[145] While the YMCA is not the only DPP covered, the success of Y-DPP programs is explicitly noted in the CMS Office of the Actuary's recommendation to begin reimbursements for diabetes prevention.[146] The sheer growth of the Y-DPP is also indicative of its success. By 2016, there were 252 YMCA branches, in 47 states, trained to deliver the program.[147]

COST EFFECTIVENESS

The strongest testimony to the Y-DPP's cost effectiveness is certainly its role in making DPPs the first preventive service programs to be reimbursed by Medicare. In deciding to cover DPPs, the CMS found that DPP reimbursement could be expected to break even in its fourth year, based on demonstrated successes thus far.[148] In fact, the CMS actuaries' estimates suggest that, over longer periods of time, the only major possibility that could drive up costs due to DPPs would be increased lifetime medical costs due to decreased mortality rates from diabetes.[149] Additionally, a modeling study that estimates the Y-DPP's impact on coronary heart disease has found a statistically significant improvement in participants' 10-year outlook.[150]

Even before CMS decided it would reimburse for Y-DPPs, other modeling had suggested the cost effectiveness of group-format programs like the Y-DPP model. One model estimated that a group-style intervention could see a complete return on investment within three years if interventions with groups of approximately 10 people could achieve comparable efficacy as the one-on-one interventions of the original DPP.[151] This study noted that the economic benefits of the intervention are greater when younger participants are enrolled (the model compared 50 year-olds to 65 year-olds), meaning that private payers could see returns on investment even before people age into the Medicare system.[152]

DRAWBACKS AND LIMITATIONS

Early pilot studies of the Y-DPP indicated that program non-completion was more likely among black participants than any other group, and less likely among white participants than non-white

participants.[153] These results were recorded in just two locations in the same state, and thus may not extend more broadly. Nonetheless, the results indicate that deliberate recruitment and retention efforts may be needed in order to ensure that the Y-DPP can serve to reduce health disparities in diabetes and prediabetes.

Additionally, participants in pilots have given feedback that the group arrangement—which may increase commitment and accountability for some—can lead others to feel unwelcome or excluded. For example, participants have reported feeling less welcome when they are of lower socioeconomic status than others in their group.[154]

Lastly, the behavioral interventionists in the Y-DPP are not clinical professionals, unlike those in the original DPP. While reducing the number of clinicians can lead to cost savings, further research is needed in order to determine whether this change has a negative impact on outcomes.

24. YES HEALTH

- Yes Health is an all-mobile DPP platform, through which users engage in lessons, log food and activity, and receive coaching through the Yes Health app.
- Each user receives a personal plan from his or her coach that includes suggested meals, fitness activities, and well-being exercises (e.g., meditation).
- Yes Health markets directly to the consumer, meaning individuals can enroll and participate.
- Yes Health's partnership with the UCSF Diabetes Center offers additional learning opportunities to improve mobile DPPs, as users can "opt in" to have their data shared anonymously and analyzed.

NAME OF PROGRAM
Yes Health

ORGANIZING GROUP
Yes Health, in partnership with UCSF Diabetes Center

LOCATION
Mill Valley, California

PROGRAM TYPE
DPP translation, online/app-based/digital, behavior change

CATEGORY
Innovator

Yes Health is an all-mobile translation of the Diabetes Prevention Program (DPP). Through the mobile app, available for iOS and Android, users log food and physical activity, receive health education, and interact with a personal health coach.[155] Each user gets a personal plan from their coach that includes suggested meals, fitness activities, and well-being exercises (e.g. meditation). Available 14 hours a day, coaches provide motivation and custom recommendations on nutrition and fitness. Users can log nutrition and physical activity, or upload photos to receive feedback from their coaches. Yes Health's currently costs $39 per month during the 16-week core program, and then $15 per month thereafter for the maintenance program.[156]

WHY IT STANDS OUT

Yes Health, while it's still fairly new, is notable for being an entirely mobile version of the DPP. When it was introduced in late 2015, it differentiated itself from several comparable programs (e.g. Omada and Canary Health), that are either partly or entirely web-based. Yes Health has a potential leg up in convenience, as the entire program is contained in the single app, minimizing the navigation for the user. Even as a single, compact app, Yes Health maintains the major element of personal support. Through the app, users are matched with and have access to live health coaches who are available to provide one-on-one feedback. The increased convenience of an all-in-one-app setup—with the maintained benefit of personal coaching and feedback—makes Yes Health is a promising new player in digital DPPs. Furthermore, while many programs (e.g. Omada,) are marketed to healthcare and insurance providers, Yes Health is marketed directly to the consumer, meaning it any interested individual can become a user without needing to go through an employer. Lastly, Yes Health's partnership is with the UCSF Diabetes Center, offers additional learning opportunities to improve mobile DPPs, as users can "opt in" to have their data shared anonymously and analyzed to develop stronger and more personal behavioral interventions.

PART III:
Workplace Wellness

INSIGHTS—WORKPLACE WELLNESS

1. **Workplace wellness works, both for employees and employers. But it has to be done well.** Dr. Ron Goetzel of Johns Hopkins and IBM Watson Health shared that, in a 2008 Kaiser Family Foundation survey of employers, the majority claimed to have some sort of workplace health promotion program. Yet, a closer look at that same collection of employers revealed that only 7% actually had a comprehensive, evidence-based program in place. While Dr. Goetzel indicated that the proportion with evidence-based programs has increased to more like 13%, the point is nonetheless painfully clear: Countless minimally impactful efforts masquerade as wellness programs, often with little or no evaluation of their efficacy. While less comprehensive efforts may still have positive effects—they may make employees happy or help attract new hires—they generally fail to achieve the intended outcomes of workplace wellness programs, including employee wellness, increased productivity, and healthcare cost savings.

   However, well-constructed programs can still succeed, and they often do, because they stand on a foundation of evidence-based practices. In fact, the CDC's review of multi-component worksite obesity prevention and control programs demonstrated that these programs have been consistently linked to increased physical activity, reductions in weight, and reductions in percentage of body fat.[157] A systematic review conducted by the American Journal of Preventive Medicine found that workplace nutrition and physical activity programs are linked to reductions in employees' weight and BMIs, confirming the worthwhile investment in employee health.[158] To truly reap the benefits of wellness programs, employers must commit to a whole-hearted, evidence-based approach. Implementing one comprehensive intervention targeted at a single goal is likely to make a bigger difference than ineffectively trying to address many challenges, each with only minimal investment.

2. **The distinction between "healthcare" and "health" is critical for workplace wellness initiatives. The best programs look at health as a whole.** The ultimate goal of workplace wellness programs isn't just to reduce direct spending on care, but also to have employees that are healthier overall. Of course, in the long term, this should also ideally reduce direct costs, but focusing on direct costs alone overlooks some of the most substantial and easiest-to-influence ways that health affects an organization's workforce. Health is a significant driver of indirect costs, most notably through absenteeism (lost work time) and "presenteeism" (unproductive time spent at work). For example, the American Diabetes Association estimates that diabetes alone cost the United States $245 billion in 2012, of which 28% ($69 billion) was attributed to the indirect costs of absenteeism, lost productivity, and early disability and death.[159]

   Well-designed workplace health promotion programs tend to have the potential to impact both direct and indirect costs. The drivers of indirect costs, however, apply to a broader definition of health than can be captured by biometric markers or health screenings. To truly address absenteeism, and especially presenteeism or lost productivity, employers would be wise to recognize not only the physical aspects, but also the emotional, financial, intellectual, and even spiritual facets of health. By taking this comprehensive view of the

overall wellness of their employees, employers have the potential to increase productivity and employee satisfaction, and even to reduce rates of employee turnover.

3. **Every intervention has a "therapeutic dose."** Just like with medications, behavioral and environmental interventions also have an ideal "dose." Falling short of the dose is likely to weaken or completely negate the impact, and overdoing such interventions, while less dangerous than overdosing medications, has the potential to be a waste of time and resources, and even something of a nuisance. For example, Dr. Michael P. O'Donnell, founder of the *American Journal of Health Promotion* and CEO of the Art and Science of Health Promotion Institute, explained that the optimal intervention for smoking cessation features 300 minutes of "talk therapy," spread out over 8 sessions, and should be encouraged by a medical professional and supported by at least two other individuals. In most cases, going beyond these benchmarks yields minimal benefit while increasing costs, but undershooting them leads to a notable drop-off in success rates. Like smoking cessation, virtually all interventions have an ideal level of investment and involvement. Employers may want to consider directing their resources toward reaching the therapeutic dose on a few interventions, rather than attempting too many and coming up short on all of them.

4. **Incentives attract people; culture determines whether they stay.** Most incentives provide extrinsic motivation—they push you to reach a goal with the offer of a reward when you get there. The transaction generally ends here. But extrinsic motivations tend not to stick, because they don't change people's habits and more personal (intrinsic) motivations and goals. In other words, an incentive like a monetary reward for weight loss will be effective in getting people to lose weight in the short term, but is generally ineffective in sustaining that weight loss or changing eating habits in the long term. Obesity, prediabetes, and diabetes are chronic, even life-long challenges that require follow-up and sustained commitment to care.

   While incentives generally aren't sufficient to keep people engaged long-term, however, they shouldn't be written off altogether. In fact, as Dr. Michael P. O'Donnell reminded us, extrinsic motivators are quite effective at getting people's attention in the first place. Intrinsic motivation, by contrast, drives long-term change but takes time to build, as do habits. Intrinsic motivators are slow-uptake, high-retention while extrinsic motivators tend to be fast-uptake, low-retention; and a well-designed wellness program should incorporate both.

   It's important to have elements that encourage that initial engagement because a health promotion program can only be as good as its ability to get people involved in the first place. This means that, in addition to those incentives that reward employees for behaviors (rather than outcomes), employers should also consider incentives that can attract participation. But the actual value of health promotion programs results from everything that comes after employees get involved. If employers invest all their resources in getting people to show up, with no subsequent emphasis on supporting and encouraging their sustained engagement, they are unlikely to see positive results. It is critical that employers don't just create excitement upfront; the excitement needs to be justified by a program that aligns with the initial motivation and a workplace culture that supports and reinforces the behaviors that the wellness program encourages.

5. **Effective incentives reward behaviors, not outcomes.** While incentives are best for providing extrinsic motivation, it is worth

asking whether or not they can influence the intrinsic drivers of sustained change. The answer appears to be a resounding "maybe." First, it depends on the type of incentive. Most employers favor monetary incentives—a bonus, for example, or a reduction in the share of coverage costs paid by the employee. However, while money can certainly serve as a powerful motivator, it tends to function extrinsically. Given this, the other things that might function as additional rewards should be evaluated, such as positive recognition among peers or supervisors, charitable contributions in place of monetary prizes, and more.

Arguably more important is the question of what the incentives reward. The impulse is often to reward people for reaching desirable benchmarks, such as a target BMI or cholesterol. But again, the transactional form of "reach a benchmark, get a reward" (or for that matter, "miss a benchmark, get punished") fails to address long-term, intrinsic motivations. Dr. Goetzel recommends, instead of rewarding outcomes, reward behaviors. The best incentives—"smart incentives," as he calls them—aim to reward people for habits that stick long term, not for changes in the short term. Even if outcomes determine healthcare costs (or savings), healthy behaviors, and not just biometric benchmarks, should be the goal.

6. **Health champions, especially among leadership, help organizational wellness thrive.** Many people with whom we spoke emphasized that buy-in from the leaders in any organization is essential to establishing a culture that supports and reinforces an effective wellness program. Part of this comes from direct culture-setting; leaders need to "walk the talk" on workplace wellness to establish a health culture as the norm in any organization. In a more practical sense, leadership buy-in is also often the key to securing the necessary resources to create and sustain a comprehensive program. In large organizations, this works best when buy-in comes from multiple departments or areas, as this reinforces the culture in a broad way and creates many stakeholders in the program's success.

7. **Environment matters. Employers can powerfully reinforce their wellness efforts by deliberately making the healthy choice the easy choice.** What is true for virtually all health interventions holds particularly true for workplace wellness programs—the environment in which the intervention occurs directly affects its success. A nutritional education and weight loss program, for example, probably won't do well in an organization where the cafeteria doesn't offer, prominently display, and promote healthy options. That being said, many of the most important environmental factors are not so simple as having fruits and vegetables on display.

   After all, the reason that environment is so crucial in health promotion is because a person's environment determines how convenient, safe, and straightforward it is to practice any particular behavior. Does the healthy option require more or less work than an unhealthy alternative? Is it likely to be encouraged or discouraged based on what you see other people doing around you?

   Workplaces can be particularly challenging to create an environment where people can default to healthy choices. Jobs that involve extended periods of time sitting at a desk or in meetings, for example, can strongly discourage physical activity, not simply for practical reasons but also for more culture-driven reasons—disruptions from the normal sedentary habits of the workday can be discouraged as unproductive or wasted time. In this way, employers can undermine their own health interventions by discouraging, through culture, the very

behaviors that they aim to encourage in their health promotion efforts.

8. **The best interventions have an impact outside the workplace as well.** Given that a significant proportion of adults spend substantial amounts of time at work, workplaces are a logical place to focus health promotion resources. However, the best programs motivate employees to engage in healthy behaviors not only at work but also throughout their day-to-day lives outside of work. For example, many employers offer the opportunity for family involvement in their programs, whether through extending various resources and benefits like fitness classes, offering technological support to spouses of employees, or even including families in company challenges and competitions. By allowing for shared opportunities in this way, employers create social support and reinforcement for healthy behaviors.

9. **It makes sense for employers to invest in health.** The bottom line is employers benefit from investing in wellness and minimizing incurred losses due to employee illness and related loss of productivity. One study, which modeled returns on investments for workplace obesity interventions, estimated that a 5% weight loss would result in a reduction of total annual costs, including medical costs and costs of absenteeism, of $90 per person, demonstrating that workplace wellness is not only beneficial to employees, but employers too![160] Studies have also suggested that worksite health promotions interventions can improve workplace productivity, which suggests the cost-effectiveness of such programs.[161] Last, employers need to invest in their employees with chronic conditions, and it is actually cost-effective for them to do so. A 2014 RAND study estimated that the total return on investment for workplace wellness programs was $1.50—or a return of $1.50 for every dollar the employer invested in workplace wellness.[162] It is important to note that the majority of these returns were driven by investments from disease management programs. While the workplace wellness programs evaluated only invested 13% of total workplace wellness funds towards disease management programs (87% on lifestyle management programs), those investments had significantly higher returns of $3.80. In other words, there was a return of $3.80 for every dollar employer's invested in disease management programs, savings that were driven primarily by reduced healthcare costs, and secondarily by reduced absenteeism and increased productivity.[163] These findings should encourage employers to invest in their employees who have chronic conditions like diabetes, prediabetes, and obesity.

Questions to consider for an effective workplace wellness program:

The following are 20 questions that we have assembled as a tool for considering how your workplace encourages and supports health. These are meant to provide "big picture" considerations of some of the most important facets of health promotion, rather than specific ideas for programs. For more specific and detailed health assessment tools, we encourage you to explore the CDC's Worksite Health Scorecard (**https://www.cdc.gov/dhdsp/pubs/docs/hsc_manual.pdf**) and HERO Health's Well-Being Best Practices Scorecard (**http://hero-health.org/wp-content/uploads/2017/01/US-Scorecard-V4-writable_1.2017.pdf**)

Program Design and Assessment

1. Does your worksite have a health promotion program? If so, who does it cover?
2. How does your company/organization fund health promotion? Does it have an annual health promotion budget set aside?
3. How does your company/organization assess your health promotion efforts? Do you measure behaviors in addition to healthcare costs and biometric markers or outcomes?

4. What aspects of your program are modeled after evidence-based best practices? Does this include consideration of the "therapeutic dose" of initiatives? Does it allow for referral to therapy and higher levels of medical care?
5. Are programs offered to all employees, or specifically to those who meet certain criteria or risk levels?

Holistic Wellness

1. Do your employees have sufficient income and sufficient time to practice healthy behaviors?
2. What measures are in place to address mental and emotional health, including stress?
3. What elements of your program allow your employees to engage in healthy behaviors outside of work? Does this involve their families?
4. What programs does your worksite have to support people living with chronic conditions?
5. How does your wellness program incorporate chronic disease prevention?

Employee Engagement

1. How do you involve employees and their priorities in the design of your wellness program?
2. How do you engage your employees in your wellness program? What kind of incentives do you offer for participation? What reasons are there to engage beyond incentives?
3. If you offer incentives, do they reward behaviors, outcomes, biometric markers, or something else?
4. What group or communal activities are available to employees?
5. What is the central message of your wellness program? Who does it most benefit, and how is this communicated?

Healthy Culture, Healthy Environment

1. What is the central message of your wellness program? Who does it most benefit, and how is this communicated?
2. How are healthy choices made more convenient at your workplace?
3. How do aspects of the physical environment of your workplace reinforce or contradict wellness messaging?
4. How many different departments of your organization are invested in encouraging wellness? Is it seen as a benefit, or as an organizational value?
5. How do leaders in your company/ organization communicate, encourage, and model a message of wellness?

1. CREATING A CULTURE OF WELLNESS

- These organizations create cultures of wellness by combining health education with onsite efforts to promote healthy behaviors and an institutional emphasis on health as a central value.
- For employees in these organizations, health is part of the culture, and to be healthy is to be part of the community
- These organizations create environments that ease and encourage the behaviors that support wellness.
- More than just a benefit, wellness becomes a central thread of the entire organization.

NAME OF PROGRAM
Stanford BeWell and HIP, UCSF Smart Choice and Health Beverage, Massachusetts General Hospital

LOCATION
Various Locations

PROGRAM TYPE
Environmental change, nutrition and healthy eating, physical activity promotion, culture of wellness, behavior change

CATEGORY
UCSF: innovator
Stanford: prime performer
MGH: prime performer

Some of the most impressive wellness programs do more than simply offer benefits or incentives; they create an environment that encourages, and even nudges, people in the direction of healthy behaviors. These employers create a work environment in which employee wellness is the culture, not just a program.

Of course, there are many ways of doing this, and no single technique can function as a "magic bullet" for making health behaviors the norm in a workplace. In fact, as the very concept of a "culture of wellness" suggests, an emphasis on health and wellbeing pervades most, if not all, aspects of an organization. Those who create a such a culture don't just create single programs, but rather foster an environment where wellness is accessible, valued, and even expected. While there is no step-by-step path to creating a culture of wellness, the leaders in this area have several important things in common:

First, they involve all members of their community. This may, in itself, seem practical, but it involves more than making wellness programs and incentives a benefit for all employees. For example, Stanford University opens many of its health and wellness offerings to both students and employees, making healthy behavior and a strong community mutually reinforcing. In addition, wellness programs are not restricted to only people at high risk. For example, weight loss and nutrition programs are available to all, rather than requiring a minimum BMI to qualify as a covered benefit.

In addition, these workplaces reinforce health messages. Consider, for

example, the distinction between offering nutrition or weight loss classes alone, or offering them in a workplace with a cafeteria that serves healthy foods. The education alone may help to promote health, but the availability of food choices that align with this education powerfully reinforces the messaging, turning awareness into behavior without requiring extra effort on the part of employees.

Beyond simply creating a healthy environment, however, those who create a culture of wellness do so in ways that increase and ease healthy choices, rather than simply restricting unhealthy options. This encourages buy-in, sustains satisfaction with the program, and perhaps even has the potential to reinforce healthy behaviors outside the workplace.

Additionally, organizations and companies with a strong culture of wellness have leaders who support those programs. Beyond simply allocating resources for wellness, these leaders "walk the talk," actively engaging in healthy behaviors of their own, expressing support for employees who do the same, and clearly communicating that wellness is a central value of the company. And, most important, this comes not only from a single leader or department but extends throughout an organization's leadership.

Finally, employers that achieve a true culture of wellness successfully communicate that this effort is for the employees' sake, not for that of the company. Their message is, "We care about and want to support your health," not, "We want to reduce our costs."

ANALYSIS

These employers go well beyond simply implementing programs to promote health—they make wellness a central tenet of their workplaces and establish healthy behaviors as the norm. There are two central advantages to establishing a culture of wellness. The first is that it supports and reinforces the messages of more targeted health promotion programs, giving employees the opportunity to actually put the health messaging they hear into practice. Cultures of health make it easier to turn knowledge into habit. Second, cultures of wellness help to make healthy behaviors the more natural choice, perhaps even the default. Often, health messaging and education will come into conflict with settings that make it much easier to act in unhealthy ways. By contrast, in settings where health is central to the culture, there is the potential to boost the wellbeing of *all* employees, even those who don't actively engage in more concrete wellness offerings. Rather than simply trying to build increased motivation for health, these employers make good health a function of environment and not just willpower.

Innovators:

University of California, San Francisco (UCSF)—Smart Choice and Healthy Beverage initiatives.

UCSF has demonstrated a concerted effort to make the food options on its three campuses healthier through two programs. In 2009, UCSF implemented Smart Choice, which created a standard system for designating healthy food options sold at UCSF.[164] Nutritional information for all food was printed on customer receipts. A recognizable "S" symbol was used to mark Smart Choices—healthy options.

In 2015, UCSF also introduced the Healthy Beverage initiative, ending the sale of all sugar-sweetened beverages on its campuses.[165] The idea was to further reinforce efforts to create a healthier food environment for all faculty, staff, students, patients, and community members. People could still bring their own sweetened beverages (i.e., it wasn't a ban), but the initiative was publicized with the express goal of encouraging healthy decisions even off-campus.

UCSF's efforts set an example for two reasons. First, they show the influence of a community-wide environmental change. Rather than implement a specific "healthy options" cafeteria, etc., UCSF made the choice to implement its programs throughout its entire system, meaning that it became an integrated part of the UCSF environment. In addition, UCSF didn't make moves to ban employees' consumption of unhealthy foods and beverages while on site but rather focused its attention on how changing aspects of the environment could make healthy choices easier. As such, UCSF presents a strong example of a

deliberate environmental change to "make the healthy choice the easy choice."

Prime Performers:

Stanford HIP & BeWell: While Stanford's Health Improvement Program (HIP) and BeWell program are discussed in detail elsewhere in this collection, Stanford deserves an additional mention among those who create a Culture of Wellness as a standout example of how to involve all members of a community in a program in order to make health part of the culture, not just the benefits package. Stanford opens many of its health and fitness offerings not only to current employees but also to their families, to retired former employees, and to their students.[166] This broad inclusion communicates that health is a community priority, and not just a cost-saving tool among current employees. In addition, it provides the possibility for powerful social reinforcement of healthy behaviors, as being healthy aligns with developing relationships and feeling a sense of belonging within the university. This social reinforcement has great potential value for keeping people engaged long-term.

Massachusetts General Hospital (MGH): Hospitals, as settings specifically dedicated to health, seem like logical settings in which to invest in employee health as well. MGH has done impressive work in creating programs for fitness and nutrition that are combined with available onsite resources and environmental design to promote healthy behaviors.

In 2006, MGH launched the BeFit program, a 10-week nutrition and fitness education program which, on its own, is admirable but not robust enough to create a culture of wellness.[167] However, MGH backs up BeFit in several ways that powerfully reinforce each other. First, BeFit is available to all employees who receive benefits from MGH, not just those who demonstrate particular risk factors. This means that wellness is framed as important to the whole community, and not just as a way to prevent costs. More important, MGH pays careful attention to the environmental factors that support health and influence decision making. In 2010, MGH implemented "Choose Well, Eat Well," which uses a red-yellow-green labeling system to indicate healthy options in each of its cafeterias.[168] It has also supported this effort with structural changes to make healthy choices more visible in its cafeterias. Further acknowledging that convenience and opportunity are needed to put health knowledge into practice, MGH also provides discounted membership to the fitness center, The Clubs at Charles River Park to all employees.[169] Individuals participating in the Be Fit program receive free membership.

2. CUMMINS LIVEWELL CENTER

- Cummins opened a holistic LiveWell Center in Columbus, Indiana. Nearly 9,000 employees and their family members (a total of 17,000) live within a 20 mile radius of the Center.
- The clinic focuses on preventing healthcare problems through lifestyle services including stress management, exercise counseling, and nutrition classes, in addition to primary and urgent care.
- It is too early to have data available about cost savings or health outcomes, but the Cummins LiveWell Center has generated significant interest from the media and other companies hoping to replicate it.

NAME OF PROGRAM
Cummins LiveWell Center

ORGANIZING GROUP
Cummins, Inc.

LOCATION
Columbus, Indiana

PROGRAM TYPE
Corporate responsibility, culture of wellness

CATEGORY
Innovator

In 2016, the power generation corporation, Cummins Inc., opened a 28,000-square-foot LiveWell Center in Columbus, Indiana for its employees and family members. The center offers a wide variety of services that targets not just traditional healthcare but also lifestyle education and coaching. According to Premise Health— the medical services provider for the Cummins LiveWell Center, Cummins hopes to take a preventative approach to employee health to improve well-being while simultaneously bringing down the cost of healthcare.[170]

Currently, the Cummins LiveWell Center employs several physicians as well as a nurse practitioner. Premise Health states that the center has 46 employees with five full-time physician positions and visiting specialists. Services include primary care, urgent care, physical therapy, preventative services, lifestyle coaching and services, and occupational health. In fact, as a part of its lifestyle focus, the center hosts cooking classes, one-on-one exercise counseling, stress tests, and massages. All services are at a flat-cost, and some (including the exercise physiologist counseling, labs, preventative/health-coaching primary care) are free.[171]

WHY IT STANDS OUT
The Cummins LiveWell Center represents an innovative approach to employee wellness: build an off-site center dedicated to improving holistic employee health. The center, which is close enough to headquarters for easy access, tackles not just treatment but prevention,[172] reflecting the shifting paradigm in healthcare. In addition, the focus on prevention of chronic diseases via stress management, exercise counseling, and nutritional education—all of which Cummins tries to keep affordable for its employees—may prove beneficial both to healthcare costs and employee health outcomes in the long run.

Although the Cummins LiveWell Center has generated much interest and several anecdotal success stories, there isn't much data available yet on cost savings or health outcomes. Many are confident that the Cummins LiveWell Center will generate positive results, and many companies are watching the project with interest in replicating Cummins' success.

3. DIGITAL INTEGRATION FOR WORKPLACE WELLNESS

- A growing number of companies are moving into corporate wellness technology development, creating platforms for other companies to implement workplace wellness programs.
- By leveraging mobile applications and fitness trackers, these platforms help employers and employees input, track, and analyze real-time data in areas such as fitness, health metrics, emotional wellness, and nutrition.
- SonicBoom and Jiff are two examples of innovators in this field; similarly, Virgin Pulse and Limeade are examples of two prime performers.

NAME OF PROGRAM
Jiff, Limeade, Sonic Boom, Virgin Pulse

LOCATION
Various Locations

PROGRAM TYPE
Online/app-based/digital, behavior change

CATEGORY
SonicBoom: innovator
Jiff: innovator
VirginPulse: prime performer
Limeade: prime performer

Workplaces, especially large companies with many locations, may benefit from outside help in setting up, coordinating, and tracking the various aspects of wellness programs. Companies that specialize in digital integration for workplace wellness meet this need by creating platforms for their clients to achieve their health goals. These digital integrators provide individual plans that cater to their clients and leverage digital technology and fitness/activity trackers to collect and analyze (often real-time) data.

Although different companies prioritize these to varying extents, the three common goals of digital integrators are to: (1) Engage and incentivize employees, (2) Decrease healthcare costs for employers, and (3) Produce measurable improvement in health. Employers hiring digital integrators often end up with a "hub" in which they can access all of their employee data in order to measure outcomes and give out incentives. On the employee side, these platforms allow users to go to one place to input, access, and track all of their data—including physical activity, nutrition, health metrics, and emotional wellness.

Overall, the expertise provided by digital integrators may make wellness program implementation not just timelier but also more effective. Digital integrators have skill in cutting-edge technology, design, and various fields of health, including physical fitness and psychology. They also have valuable experience from former clients. Moreover, the competition in this sector drives digital integrators to innovate, finding ways to distinguish themselves using gamification or strategic partnerships.

That being said, major companies, governments, and even schools have been able to implement successful workplace wellness programs without hiring outside support. Furthermore, the major limitation is that these companies' programs focus mainly on lifestyle changes. Unfortunately, some studies argue that disease management is also a significant area of healthcare costs.[173] Of course, employees with chronic conditions do benefit from lifestyle and preventive programs; however, it is not clear that the companies described here help employers provide specific support for their employees with pre-existing conditions.

It also needs to be acknowledged that most digital integrators are sparing in the information they provide about their programs online. This makes analysis of these companies difficult. For companies hoping to work with digital integrators, it may be valuable for them to reach out directly and conduct their own research.

ANALYSIS

Building an effective workplace wellness platform is the foundation of getting health and financial outcomes. However, successful design is not just about aesthetics. What sets certain platforms apart from the large pool of companies in this sector are outcomes and innovation. Some of the most notable digital integrators are SonicBoom, Jiff, Virgin Pulse, and Limeade.

Innovators:

"Innovators" employ novel or unique strategies like gamification to distinguish themselves from other competitors. Two such digital integrators are SonicBoom and Jiff:

Sonic Boom: Sonic Boom was founded as a response to poor employee engagement with workplace wellness programs. Sonic Boom designs programs to engage and motivate employees. Employers purchase the programs as a tool to deliver effective workplace wellness programs for their employees. These customizable programs, designed with a shuttle-aircraft theme, include Sonic Striding (activity tracking), Coach's corner (personal coaching), and Caught Ya Bein' Healthy (social reinforcement for doing 'healthy' acts).[174]

Although they offer biometric screening options and a free Health Quality Assessment option for their clients, Sonic Boom focuses primarily on increasing physical activity, which they consider the most important factor of health improvement in the workplace.

One of Sonic Boom's main strengths is its ability to motivate its users with non-monetary incentives. Given that financial incentives work only to a limited extent, Sonic Boom goes beyond many wellness technology companies by using social interactions and intrinsic motivation to further engagement. It has found success, as evidenced by an average 60% employee engagement rate across all employers in the U.S. using Sonic Boom's products.[175] In addition, Sonic Boom prides itself on being different. It employs a self-described "whimsical" theme of aircraft shuttles that offers a childish energy to its clients.[176] Whether or not that limits it client base remains to be seen.

On the other hand, the major limitation of Sonic Boom is its focus on physical activity. With regards to employee health, nutrition, smoking, and chronic disease management play significant roles. Although it acknowledges the importance of these factors, Sonic Boom specializes in physical activity; and while that focus may account for producing better results, workplace wellness programs should ultimately move beyond just one piece of the health puzzle.

Not all companies are as transparent as Sonic Boom about their programs. Sonic Boom's willingness to explain exactly what their company does is a testament to their confidence in their unique delivery.

Jiff: Jiff aims to help companies lower healthcare costs by properly incentivizing employees. The Jiff process follows specific steps: 1) Identifying pain points that contribute to poor employee health and high healthcare costs, such as chronic disease, too many ER visits, or stress, 2) customizing the platform, and 3) personalizing incentives to engage employees in behaviors that will reduce the drivers of poor health and high costs.[177] Together, this creates an employer-owned hub that for benefits,

HR, and health questions. Moreover, Jiff employs gamification to further engage their clients' employees.

Like SonicBoom, Jiff uses gamification to distinguish itself from other workplace wellness technology companies, with a points system, social activities, Jiff Store, and other real-word rewards centers. The company emphasizes design-thinking in order to create engagement.

Moreover, Jiff really caters to the employers in order to help them analyze data collected on their employees' health behaviors. Their ABOS Impact Framework lays out what they call a "virtual heat map" of all of the programs, compiling metrics in order to help employers understand their programs' performances and suggest future steps for improvement.[178]

Prime Performers:
"Prime performers" have generated a significant community of satisfied customers, using evidence-based techniques to bring together various wellness tools and technologies. These digital integrators, including Virgin Pulse and Limeade, possess a wider variety of partnerships and programs that target most major aspects of well-being:

Virgin Pulse: Virgin Pulse, a branch of the established Virgin Group, has several products geared toward companies, with both online and mobile apps for employees to track their daily progress and share progress with their colleagues.

Virgin Pulse exemplifies a prime performer in workplace wellness technology as a part of Virgin's extensive group. Given its global reach (1.9 million employees covered in 185 countries[179]), Virgin Pulse has the advantage of being a well-established brand. Its resources aim to tackle physical, emotional, mental, social, economic, and spiritual dimensions of well-being.

Limeade: Limeade not only builds platforms for companies to implement a variety of wellness programs, but it also conducts its own research via the Limeade Institute.[180] The Institute uses its research to create relevant content, such as the Limeade Well-Being Assessment. Limeade also partners with other companies such as ADURO, a human performance monitor, and Fitbit, in order to provide more strategies and options for their clients.[181]

Limeade has recently gotten a lot of attention for its work in workplace wellness technology. Its programs incorporate insights and best practices developed at the "Limeade Institute" and provide educational resources beyond just platform design.

One thing that Limeade seems to do best is partner with other companies in order to provide comprehensive support to their clients. For example by partnering with Fitbit, Limeade accesses all of the benefits of using activity trackers and Fitbit's expertise. This allows Limeade and its clients to use feedback from the Fitbit data to analyze engagement in physical activity promotion programs and subsequently refine and improve them.

It's promising to see that Limeade has a prediabetes intervention program at Kindred Healthcare.[182] Limeade, unlike many of its competitors, goes beyond broadly addressing fitness and nutrition, and allows clients to deliver interventions that are tailored to specific drivers of healthcare costs.

4. FITBIT GROUP HEALTH

NAME OF PROGRAM
Fitbit Group Health

ORGANIZING GROUP
Fitbit, Inc.

LOCATION
San Francisco, CA

PROGRAM TYPE
Physical activity promotion, online/digital/app-based, behavior change

CATEGORY
Prime Performer

- Fitbit Group Health is a collection of workplace wellness offerings from Fitbit, a major manufacturer of health and wellness "wearables."
- Fitbit's offerings range from "DIY" tools for employers to complete employee wellness packages. They also include options to integrate Fitbit wearables into other popular workplace wellness programs.
- More than 1,300 companies use Fitbit devices in their wellness solutions

Founded in 2007, Fitbit has become widely known as a leading manufacturer of "wearables"—devices and technology worn on the body to track fitness and health characteristics such as steps taken, heart rate, and sleep patterns. As fitness wearables became more popular and as their accuracy was validated for measures like step count and energy expenditure, employers began incorporating devices into their health promotion offerings. One 2013 estimate held that, by 2018, more than 13 million wearable devices would be in use in corporate wellness plans.[183]

Fitbit Group Health was introduced in 2016 to integrate various offerings that Fitbit had for employers who were offering wellness packages. Fitbit Group Health was also offered to healthcare stakeholders, including insurers, clinicians, weight management specialists, and researchers.[184]

Fitbit Group Health offers various options for employers, including basic kits for "DIY" wellness solutions and comprehensive packages centered around wearables. It can also be integrated with other major corporate wellness partners, such as Virgin Pulse, Jiff, and Vitality.[185] These packages use the digital connectivity wearables to coordinate, motivate, and engage employees in wellness initiatives and to track a company's overall results and progress. Among these offerings are options to host challenges among groups of employees, tools for individuals to keep track of themselves and their teams, and dashboards for administrators to monitor and report on the entire organization.

As of 2017, at least 1,300 companies were using Fitbit as part of their corporate wellness initiatives,[186] including more than 70 of the Fortune 500 companies.[187]

ANALYSIS

Fitbit's offerings to employers reflect the main goals of most workplace health promotion programs: increased productivity and satisfaction, improving employee health, and creating a general culture of wellness in workspaces. Two major characteristics set Fitbit apart. The first is customizability—Fitbit's offerings are available to employers hoping to expand to an existing workplace wellness program by integrating a wearable, to begin an entirely new and comprehensive workplace health promotion package, or to design an individual initiative involving a wearable. Second, Fitbit Group Health offers powerful data for both individuals and employers to track their progress and improve. Individuals get all of the benefits of a wearable, including fitness tracking and apps for monitoring and logging progress. This data can be used to inform and motivate future health behaviors and shared as a way of creating community, accountability, and competition. Employers get the ability to monitor the overall progress of participants through a dashboard, and in turn use this to inform quality improvement and future changes or additions to workplace health benefits.

There has been some question raised as to the efficacy of wearables—one often-cited study found that a wearable device in combination with a lifestyle intervention did not produce greater weight loss over two years than the lifestyle intervention alone (participants in both groups did see significant weight loss).[188] However, this study used neither Fitbit's devices nor its health promotion products. A smaller study, which combined Fitbit wearables with text-message reminders, intended to prompt physical activity found that the intervention did increase physical activity among obese adults.[189] Fitbit has also published numerous case studies showing positive outcomes from its workplace health offerings.[190]

5. INTERACTIVE HEALTH, INC.

NAME OF PROGRAM
Interactive Health

ORGANIZING GROUP
Interactive Health, Inc.

LOCATION
Schaumburg, Illinois (Headquarters), Serves clients across the United States

PROGRAM TYPE
Physical activity promotion, culture of wellness, quality improvement, behavior change

CATEGORY
Gold Standard

- Interactive Health offers flexible workplace wellness programs that can be integrated into most workplaces, streamlining the development of wellness programs at various enterprises.
- Interactive Health's wellness solutions are available to employers, brokers & consultants, and Health Plan & TPA partners.
- The company offers two main programs, Healthy Triumph and Healthy Advantage.
- Interactive Health, Inc. serves over 3,000 clients across the country.
- Allows clients to collect and track health metrics, managing and leveraging data to enhance care management programs and incentivize improvements in participant health.

Founded in 1992, Interactive Health, Inc. focuses on streamlining wellness programs among employers, brokers, consultants, health plans and third-party administrators (TPAs). Interactive Health offers two main wellness programs that can be scaled to companies of various sizes: *Healthy Triumph* and *Healthy Advantage*. The more comprehensive of the two plans, *Healthy Triumph*, offers fully integrated services ranging from comprehensive biometric screening of each employee/participant, immediate intervention for participants with critical health conditions, telephonic health coaching, member website with personalized tools and resources to track health metrics and progress, connection to clinical care, and data analytics, management, and reporting. *Healthy Triumph* reports high levels of effective engagement, with a close to 70% participation rate and 77% of participants meeting their "Personal Health Goal."[191] The second plan, *Healthy Advantage*, is designed to promote health awareness within company culture. Services include onsite health screenings, one-on-one health education to review screening results, member website with personalized online resources, and data reporting and management.

Interactive Health additionally offers a variety of "Power-Up" services that can be added to enhance either of the offered wellness programs. One "Power Up" service is "Healthy Activities," an engagement platform designed to assist in creating a culture of wellness with features including activity and incentive tracking, team challenges, device and app integration and social sharing. Other "power up services" include onsite health coaching for one-on-one individualized coaching, onsite wellness management for onsite support staff, and targeted assessments such as body fat analysis, bone density screening, colorectal screening, derma (skin) scan, mobility assessment, and/or vision screening.

KEYS TO SUCCESS

Simplicity for Employers

By signing up for Interactive Health services, employers get an inclusive, integrated employee wellness plan. Interactive Health's adaptable workplace wellness programs are a straightforward way to manage employee health without having to develop and implement a wellness program from scratch. The program is incorporated into a company's existing schedule and continually supported by features such as built-in data analytics, reporting, and management, with custom employer reports that render the manager able to measure and track participation and health improvements, as well as aiding employers to administer rewards and incentives.

High Levels of Engagement

Employees enrolled in the program receive a variety of benefits, including access to a member website, which offers many online tools that are personalized to the client, as well as resources that aid to track the health of the patient and encourage them to make changes if they are necessary. IH Inc. also provides ongoing support for employers and their employees, whether they are merely implementing a program or have encountered issues of any sort. The development of an ongoing communication strategy allows employers to regularly utilize Interactive Health's wellness expertise.

ABILITY TO INSPIRE

The data demonstrating the success of Interactive Health in reducing employer's medical expenses, increasing workplace productivity, and improving employee and participant health are major sources of inspiration that workplace wellness programs can be both scalable and effective. A multi-year, independent review of Interactive Health's programs showed positive financial results for employers who invested in workplace wellness. In analyzing 56 employer groups, it was determined that employers who used Interactive Health programs had a 20% lower medical spending compared to employers not using Interactive Health. The report also included a cost trend analysis, estimating forecasted versus actual medical costs, which showed that employers using Interactive Health reduced medical spending compared to their forecasted spending by $1,332 per member per year.[192]

Workplace productivity was measured analyzing workers' compensation claims (work-related injury expense) and short-term disability claims (expense from illness and injuries sustained outside from work). In analyzing workers' compensation claims over a 3–5 year time period, the average cost per claimant was $2,554 less for Interactive Health members than non-members. Interactive Health members also returned to work an average of 11 days sooner from workers' compensation than non-Interactive Health members (27.4 vs. 38.4 days off work respectively). Looking at short term disability claims over 2–3 years, the average cost per claimant was $451 less for Interactive Health members compared to non-Interactive Health members. Interactive Health members also returned to work an average of 16.8 days from short term disability sooner than non-members (56.9 vs. 73.7 days respectively), suggesting that Interactive Health's programs can decrease participants' vulnerability and risk of serious injury and disease.[193]

These cost savings and increased productivity appear to be driven by employees' health improvements. From 2014–2015 Interactive Health reported that 82% of members with elevated risk factors lowered their blood pressure, 63% lowered triglyceride levels, 68% reduced their LDL cholesterol, 20% stopped using tobacco, and 61% reduced their glucose intake.[194]

6. MCCORMICK HEALTH AND WELLNESS CENTER & LIVING WELL WITH DIABETES

NAME OF PROGRAM
McCormick Living Healthy With Diabetes

LOCATION
Hunt Valley, Maryland

PROGRAM TYPE
Workplace wellness program

CATEGORY
Innovator

- McCormick & Company offers it employees care from an independent Health and Wellness Center close to their headquarters that employs a team of registered nurses, a physician, registered dietician, nurse practitioners, etc.
- In 2012, McCormick tested out its Living Healthy With Diabetes (LHWD) program in a small, preliminary group of 39 employees with type 2 diabetes. This program, which helped participants reduce their A1c and BMI, has enormous potential to be expanded to help McCormick's ~8000 employees.
- Although these programs are interesting, they are currently only small-scale

In 2011, spices manufacturer McCormick & Company opened a Health and Wellness Center near its Maryland headquarters for its employees. The 4,600-square foot center employs a full-time physician, two nurse practitioners, a medical assistant, three registered nurses, a licensed practical nurse, an on-site Employee Assistance Program (EAP) counselor that comes in once a week, and a registered dietician that comes in two to three times a month.[195]

McCormick offers its employees an annual wellness screening and on-site weight management (e.g., Weight Watchers meetings, fitness classes, corporate fitness challenges, diabetes prevention). It also offers smoking cessation, health coaching, and even RN house calls. Through its partnership with the University of Maryland School of Pharmacy, McCormick offers it employees the Patients, Pharmacists, Partnership (P3) program, which pairs a patient and pharmacist for regular face-to-face meetings to monitor and manage chronic diseases like diabetes.[196]

Notably, in 2012, under its then corporate manager of health and wellness, Joan Hovatter, McCormick piloted a program for employees with type 2 diabetes called "Living Healthy with Diabetes" (LHWD). The program consisted of 4 components: (1) nutritional education and support, (2) fitness and activity, (3) diabetes education, and (4) multidisciplinary coaching from the Health and Wellness Center team. As part of the 6- month program, participants also received a free 26-week Weight Watchers membership, access to a Certified Diabetes

Educator, access to the P3 program, free laboratory and health screenings, and waived copays on diabetes medications and testing supplies. As part of the P3 program, participants met with pharmacists once a month for three months, and then quarterly, during which their A1c, blood pressure, weight, lipid panel, medical adherence, and attendance were recorded. Although the group was quite small, the 39 participants with type 2 diabetes showed significant improvements in multiple outcomes. By the end of the program, 53% of the participants reached an A1c of less than 7% (from the original 35%), and 38% reached an A1c of 6.5% (from the original 18%).[197] Average weight loss was 11 pounds, and significant improvements in HDL were also measured.

Under Hovatter, the company also initiated an employee health program called "S.P.I.C.E." (Stretch your mind, prevent illness, implement healthy eating, change your knowledge, exercise).[198]

WHY IT STANDS OUT

McCormick & Company's workplace wellness center takes a laudable holistic, culture-of-health approach. Not many companies have a specific center dedicated to employee health and wellness, and McCormick's employees seem to be taking advantage of its services: 60% of employees complete the annual wellness screening. McCormick also places admirable emphasis on prevention. In 2013, McCormick reported that the number of employees with prediabetes decreased by 8% from the previous year.[199]

Besides the clinic itself, the initial pilot study of the LHWD program proved successful. As previously noted, the 39 participants with type 2 diabetes improved their BMI, A1c, and cholesterol, and lost an average of 11 pounds. That being said, the initial cohort of 39 employees is quite small, and it may be more difficult to scale the program to meet the needs of McCormick's 3,500+ employees.

However, shortly after she left McCormick in 2016, Joan Hovatter wrote that an expanded LHWD could have a much greater impact. She estimated that the LHWD program could reduce A1c by 0.24 percentage points in 6 months for employees with baseline A1c greater than 6.0%. Based on analysis, she also stated that the LHWD could save the company from $235 to $794 per patient per year. In fact, separate analysis showed that the P3 program alone has a return-on-investment of $2.50 for every $1 spent.[200]

However, the LHWD program highlights the main limitation of McCormick's employee wellness structure: scalability. As it stands, the Health and Wellness Center only provides its services to McCormick's Maryland employees. How many companies can afford to set up multiple centers at every site? Given this, McCormick's structure may benefit companies with the majority of their employees in single locations, or multi-site companies if they are able to employ telehealth. In addition, small businesses are unlikely to establish their own independent health centers, so adaptations to the model would be needed. However, if McCormick can implement LHWD beyond the pilot study with a greater number of employees, it would set a powerful example for chronic disease management.

7. MCKESSON

NAME OF PROGRAM
McKesson

LOCATION
San Francisco, CA

PROGRAM TYPE
Workplace wellness program

CATEGORY
Primer performer

- McKesson Corporation provides its employees with a comprehensive wellness program that addresses culture
- of health and disease management and prevention.
- Although McKesson has a relatively high employee participation rate, it reports mixed results in health outcomes, with employees reporting better lifestyle changes and decreases in blood pressure, but increases in blood glucose, BMI, and cholesterol.
- In 2015, McKesson received the prestigious C. Everett Koop award.

As an American pharmaceutical distributor and healthcare information technology company, it is unsurprising that the McKesson Corporation understands the importance of good healthcare. McKesson received the 2015 C. Everett Koop National Health Award for its comprehensive wellness program, which offers employees multiple services, including:[201]

- **comprehensive health benefits and assessments (designed separately for adults, children, mental wellbeing, and physical activity)**
- **an online "hub" that includes a social platform**
- **financially supported lifestyle programs for nutrition, with 10% discounts on selected healthy foods from a selected national grocer**
- **weight management with free Weight Watchers memberships**
- **smoking cessation**
- **physical activity that provides a free pedometer and health club subsidies**
- **targeted chronic condition management and medication adherence programs**

McKesson also engages its employees by using social media for communication, on-site events through employee Wellness Champs, competitions, and challenges.

As a part of its rewards program, McKesson partners with Vitality. For participating in McKesson programs or other "healthy activities," employees and families can earn (and spend) Vitality Points for gift cards and other rewards. Employees with the McKesson medical plan can even save on their medical premiums with Vitality Points.[202]

KEYS TO SUCCESS
McKesson fosters a culture of health and addresses lifestyle and disease management. McKesson's culture of health includes the use of employee Wellness Champs (like Pitney Bowes—see p. 30), an online social platform, and various worksite competitions and challenges

throughout the year that encourages participation. In addition, McKesson's use of social media for wellness communication is not as common in workplaces—especially if an online "hub" already exists. However, based on the increasing use of social media by adults (69% in 2016 compared to just 5% in 2005[203]), McKesson manages to reach its employees in various ways. In its evaluations from the Koop award, critics mentioned "personalized communication" and customizing for diversity as significant "pros" to McKesson's program.

McKesson's efforts to engage its employees via a culture of health may be why it enjoys steady and relatively high participation rates. The most recent 2014 data reports that 65.9% of employees and family members complete the health assessment, and that 83.1% complete at least one of the program's activities.[204] Furthermore, activity levels of participants increased from an average of 21 activities per year in 2011 to 106 in 2014.[205]

Regarding disease management, it is encouraging that McKesson has specific programs that target chronic disease management and medication adherence. Unfortunately, these programs don't seem to be a focus of McKesson, and the company did not report any data on chronic condition management/ medication adherence program outcomes. However, any inclusion of disease management is notable as many companies overlook it as a central aspect of workplace wellness.

The major drawback to McKesson's program is that it generates only mixed results. Although McKesson reports better job performance by 3.6% from 2012 to 2014 and promising outcomes in lifestyle metrics (e.g., physical activity, stress management, alcohol and tobacco use, and better nutrition),[206] the biometric data, especially metrics important for diabetes, did not significantly improve. Although employee blood pressure dropped (16.7% SBP and 17.1% DBP), their glucose levels, BMI, and cholesterol increased by 8.8%, 6.5%, and 13.1%, respectively.[207] The increase in BMI conflicts with the reported net weight loss of 24,759 pounds since 2012 and 159,994 attended Weight Watchers meetings.[208] In cost effectiveness, McKesson obtained an independent assessment that reports a positive return-on-investment.

Overall, McKesson features a strong program design but has mixed outcomes. Inclusion of more dedicated diabetes, obesity, or cardiovascular disease management programs, as well as additional educational resources and initiatives, could help produce better health outcomes.

8. PITNEY BOWES PROJECT: LIVING

NAME OF PROGRAM
Pitney Bowes Project: Living

LOCATION
Stamford, CT

PROGRAM TYPE
Workplace wellness program

CATEGORY
Gold standard

- Two-time winner of the C. Everett Koop Award for healthcare promotion (1996, 1998), Pitney Bowes provides several workplace wellness services for its employees, including fitness programs, stress management, back health, and free nutrition programs.
- Unlike many other programs, Pitney Bowes address both disease prevention and management, demonstrating its commitment to investing in long-term results.
- PB's culture of health and use of technology (not only fitness trackers but also telemedicine) helps distinguish it from other workplace wellness programs.

Pitney Bowes (PB), a digital commerce solutions company, has won the prestigious C. Everett Koop Award twice, in 1996 and again in 1998, for its two-part program: Health Care University (HCU) and Power of 2. In the 1990s, PB realized that its projected healthcare costs would exceed company profits by 2000.[209] In response, it established an employee wellness program based on three building blocks: Education of healthcare consumers, efficiency in purchasing practices, and employer design. Moreover, PB's strategy includes three dimensions: Demand management (described as a "focus on application of health benefits"),[210] disability management, and disease management/ prevention.

PB now has a special workplace wellness portal called Project: Living, which features a variety of annual programs and one-time initiatives, including events (e.g., Move More Week) and competitions.[211] PB even has its own Medical and Wellness Clinic in five of its US locations and offers Amwell telehealth services, including diabetes education and weight management programs and hypertension monitoring.[212] Its online portal for employees contains a tracker dashboard that can integrate data from personal Fitbit wearables and video resources (e.g., workout videos) for employees.

As part of a comprehensive rewards program, employees can earn points for both physical and emotional wellbeing, totaling up to $500 in financial incentives. Activities include biometric and preventive screening, participation in the specified healthy living programs or meQuilibrium, an online stress management program.[213] PB allows employees to substitute alternative activities assigned by the employee's physician to earn rewards, showcasing the personal nature of the program and its prioritization of employee health.

PB initially invested heavily in these programs and as of 2015, has a return on investment of 2.6 to 2.8 times. Part of this is likely due to decreased plan costs of its participating employees with diabetes, which in 2003, cost only $4,000 compared to the $6,500 industry benchmark.[214]

KEYS TO SUCCESS

On-site and telehealth services

PB helps employees get access to healthcare services through its on-site medical clinics (that provide services to ~20% of employees[215]) and Amwell telehealth (14% of US employees and families[216]). It also provides on-site fitness centers and free phone and telehealth consultations with PB nutritionists. PB also incorporates programs into its worksites through weeklong events such as the PB Fit in Fitness Week, which encourages healthy competition among colleagues. PB also encourages its employees to incorporate stretching and mini-exercises into their day, and take "healthy working" back home—emphasizing health as a central part of employee culture. PB also highlights community involvement by recruiting "Wellness Champions," or PB employees whose job is to make sure that all locations are involved in PB programs and to organize on-site activities for the community.[217] These activities include basketball games, group stretches, plank holding contests, and other group activities.

Focus on both disease management and prevention

One critique of corporate workplace wellness programs is that they don't pay enough attention to chronic disease management. Of course, prediabetes intervention and healthy living programs are important; however, employees with chronic diseases like diabetes also require (and deserve) support for their conditions. Moreover, this may benefit employers, as some studies suggest that for corporate wellness programs to decrease healthcare costs, employers must also address disease management.

Given that most corporate wellness programs only have lifestyle programs, it is impressive that PB's programs cover not just disease prevention but also disease and disability management. In 1997, PB hosted a 10-month Diabetes Management Program focused on educating and monitoring participants—PB employees, dependents, and even retirees![218]

Willingness to invest in long-term results

PB's programs in chronic disease management demonstrate its investment in long-term results. Early in the workplace wellness program implementation, PB pinpointed diabetes as a priority (others included asthma and cardiovascular disease). In 2001, PB reduced or eliminated copayments for diabetes, asthma, and hypertension medications, and started to educate its employees about these conditions. This initial investment paid off with a demonstrated return on investment. In 2003, it saw significantly lower costs for plan participants with diabetes—$4,000 versus the $6,500 industry benchmark, and in 2007, PB estimated an annual total cost offset of $39.8 million on a cost base of ~$150 million.[219] Workplace experts say that companies must be willing to invest heavily (at least initially) in order to implement an effective workplace wellness program and eventually see returns—both in cost reduction and employee health outcomes.

DEMONSTRATED BENEFITS

Besides the Koop award, PB's successes in workplace wellness have been well recognized, as PB is the 10-time recipient of the Best Employer for Healthy Lifestyles Award from the National Business Group on Health, and three-time Healthy Workplace Employer recognized by the Business Council of Fairfield County, Connecticut.

DRAWBACKS AND LIMITATIONS

Participation rates, however, vary per program. Although PB reports continuing increases in participation, given its ~14,000 employees (not to mention, retirees and family members) globally, it could reach many more people through its on-site clinics, telehealth, and planned events.

Another potential issue is scalability. One value of PB's program is that it offers many free or reduced-cost resources, and that it has improved over time. Even though PB sets a high standard for other companies, it is harder to say how many companies can (or are willing to) invest the necessary time and money to create a similar program.

9. STANFORD HEALTH IMPROVEMENT PROGRAM (HIP), BEWELL, & COORDINATED CARE

NAME OF PROGRAM
Stanford Health Improvement Program (HIP) & BeWell

ORGANIZING GROUP
Stanford University

LOCATION
Stanford, California

PROGRAM TYPE
Healthy living, fitness, behavior change

CATEGORY
Prime Performer

- Stanford HIP promotes the health of its employees by offering healthy living and fitness classes to university and hospital employees.
- Employees can also enroll in Stanford BeWell, which awards up to $580 financial incentives for participating in Wellness Profiling, the Healthy Work Environment program, and/or "Berries."
- Employees can also get credit for participating in HIP classes, two of which they get at a discounted price.
- Stanford's workplace wellness programs also tackle disease management through its partnership with Stanford Coordinated Care. Employees with chronic conditions such as diabetes can meet with a team of medical professionals with no out-of-pocket costs.

Stanford University and Hospital's Health Improvement Program (HIP) aims to motivate Stanford employees to pursue a healthier lifestyle and provide them with the opportunities and resources to do so. Faculty, staff, retirees, and families can enroll in any of over 200 healthy living or fitness classes offered on campus each quarter. Departments can also request Wellness on Wheels (WoW) classes, which come directly to the workplace.[220]

Stanford also provides disease management services for employees via Stanford Coordinated Care, which allows employees to access a team of medical professionals with no copay to help them manage chronic conditions such as diabetes.[221]

One of the newest initiatives by the HIP, Stanford BeWell provides a financial incentive of up to $580 for employees who participate in workplace wellness. Employees can choose from three separate programs that involve: 1) individual health screening and coaching, 2) fitness & healthy living activities called "Berries", and 3) a Healthy Work Environment program. HIP classes can count as credit for "Berries."[222]

Since BeWell's formal implementation in 2008, thousands of employees and spouses participate in the program each year. In 2015, 10,120 participants filled out the Stanford Health and Lifestyle

Assessment (SHALA) and 7,879 completed the Wellness Profile (screening, advising, and plan). Employees also completed 25,329 "berries."[223] According to SHALA data, Stanford employees—at least those surveyed—continue to make small but significant improvements to health metrics such as body weight, physical activity, nutrition, smoking and alcohol use, emotional health, and sleep.

ANALYSIS

Stanford University provides a pool of rich opportunities for its employees to immerse themselves in a culture of health. By engaging not only employees but also its students, retirees, family, and leadership, it fosters an entire community dedicated to healthy living. Furthermore, Stanford HIP promotes accessibility to its resources by having fitness and healthy living classes as well as health screenings available in various locations on campus and delivered on-site via its WoW program. Beyond classes, Stanford's BeWell program furthers a culture of health by encouraging departments to become healthier as a team through its Healthy Work Environment program.[224]

Perhaps the most notable aspect of Stanford HIP, however, is its partnership with Coordinated Care, which allows participants to access care for chronic conditions with no copay. Studies such as the 2014 RAND report have found that disease management, but not healthy living, programs decrease employer healthcare costs—most likely due to decreased hospitalizations.[225] In allowing employees to access a team of medical professionals that can act as or work with an employee's primary care providers, Stanford demonstrates a willingness to support employees with chronic conditions such as diabetes. While the effects on employee health and Stanford's healthcare costs are not available to the public, the existence of a disease management program is often overlooked in employee workplace wellness programs.

Admittedly, many employers may struggle to provide wellness initiatives on this scale. A major limitation of the HIP model is that many smaller employers lack the funds to build such extensive wellness programs, especially in terms of being able to provide medical teams focused exclusively on providing free care to employees. That said, HIP programs like Healthy Work Environment require few resources and can be a valuable example for other employee wellness programs to help create a similar culture of health.

10. WORKPLACE WELLNESS COUNCIL OF MASSACHUSETTS

- Workplace Wellness Council of Massachusetts aims to create networks and share best practices for workplace wellness.
- Through this coordination, workplace wellness can be scaled beyond individual employers and can more easily reach small businesses and other employers who might otherwise face barriers.
- Regional coordination can allow for investment in worksites to promote public health.
- Coordination of multiple employers also facilitates learning and research regarding best practices.

NAME OF PROGRAM
Workplace Wellness Council of Massachusetts; Integrated Benefits Institute

LOCATION
Massachusetts and San Francisco, CA

PROGRAM TYPE
Workplace wellness networks, coordinators of best practices

CATEGORY
Prime Performers

This Bright Spots, the Workplace Wellness Council of Massachusetts (WWCMA), differs from the other Bright Spots in Workplace Wellness. It emphasizes employee wellness on a broad scale, rather than focusing on employees of a specific company or on marketing a specific type of wellness product to employers. The WWCMA aim to increase attention to, investment in, and quality of workplace wellness. It does so by coordinating workplace wellness programs across employers, providing knowledge and guidance for best practices, and encouraging more employers to increase their emphasis on wellness.

The WWCMA says it "champions wellness programs to help employers encourage healthy employees, healthy families, and healthy communities across the Commonwealth."[226] It works to coordinate best practices and provide resources for employers throughout Massachusetts; it also provides a network for employers with common goals of wellness for employees and their families.

The WWCMA works toward its vision in several ways, including hosting an annual conference for Massachusetts employers, providing networking throughout the year, awarding outstanding programs, and even providing wellness certifications through The Chapman Institute, which provides professional wellness plans and development. It also provides a number of online resources to members and some that are available to the public.[227]

ANALYSIS
The WWCMA has the potential to bring deserved attention to the worksite as a place of health. Through its network for sharing best practices, the WWCMA provides an opportunity for employers of all sorts to engage in wellness initiatives, including those that might

otherwise be too small to invest in designing a careful and evidence-based program of best practices. In addition, by coordinating a regional network of wellness programs, the WWCMA works to make workplace health promotion a tool not only for individual employers but more broadly a path to health for people throughout the state. In this sense, workplace wellness can be considered a more directly investable public health effort, and not just an employer-specific benefit.

Of course, many employers have already taken on this challenge independently, in promising and impressive ways. But not all organizations have the ability to establish their own wellness programs. For some, this may be for lack of resources, especially as there can be significant upfront costs while the value is not seen until sometime later. For others, it may be an issue of scale. Small businesses may have trouble implementing programs, especially those that occur on-site, such as health education offerings or fitness options.

In providing funding, sharing models and best practices, and coordinating groups of small businesses, the WWCMA plays a role in expanding the reach of workplace health promotion.

PART IV:
Healthcare Teams of the Future

INSIGHTS—HEALTHCARE TEAMS OF THE FUTURE

1. **The sheer quantity of medical knowledge has grown to the point where no single person can keep up with it all. As a result, problem-solving and collaboration are becoming increasingly important competencies in medical professionals.** The advances of medical science are far too expansive for any professional to master through rote learning alone, and this information is only increasing. Dr. Karl Koenig, director of the Integrated Practice Unit for Musculoskeletal Care at Dell Medical School in Austin, said that, at one point, everything that was known about orthopedic medicine was contained in a single textbook. Now, just a few generations later, the knowledge has expanded exponentially, and as such, the traditional idea that "the buck stops with the doctor" is simply untenable. Dr. Koenig instead considers himself to be the leader of a team, with many professionals each working to play the role that they know best. The ability to coordinate with other professionals, as a means of delivering care that is more comprehensive than one provider can manage alone, is an increasingly important capability for medical professionals.

   Several different experts with whom we spoke similarly emphasized that no professional can keep up with the pace of new information. Virtually all of them, however, also emphasized that, thanks to technology, it has never been so easy to access such vast resources of medical knowledge in so little time. Because we have so many tools to help us "outsource" medical information, medical professionals' expertise is best used not for memorization- based learning, but rather for the things that technology cannot do—critical thinking, careful decision-making, and effective communication with patients and collaborators throughout the care process.

2. **Team-based care and learning require effective collaboration between doctors and a variety of professionals who are not physicians.** There are additional reasons, beyond the sheer quantity of medical knowledge, that people are reconsidering the "one doctor-one patient" paradigm of care. Simply put, we heard extensive discussion that many of the most important aspects of care are best delivered by a professional *other than* a physician. Sometimes this is because of time constraints—we heard numerous references to the limited time a doctor has with each patient—but much of it actually stems from the fact that many patient needs are best addressed by a professional other than a doctor. For example, many behavioral specialists may be better suited to address matters of motivation and long-term adherence to lifestyle interventions. Occupational therapists and social workers can understand various aspects of everyday life that a physician may be less likely to recognize or address. Pharmacists can help patients navigate the details of medication regimens. Peer and community health-worker-based care has been increasingly embraced as an effective way to deliver culturally attentive health care. And the list goes on. The more that physicians work closely with a team of other health professionals—and the more that these various professions can both learn and collaborate together—the more comprehensive and continuous the patient care experience will be.

3. **Cost effective team-based care involves multiple professionals all working at the "top of license."** Many experts noted that the relative lack of inter-professional collaboration is also the source of great inefficiency in an overburdened healthcare system. Countless professionals are not working at their highest level of expertise, and in many cases, they are

trying to play roles that would better fit the expertise of another. For example, a physician, lacking a collaborator, might be tasked with trying to motivate and counsel a patient as part of an intensive lifestyle intervention, even though a behavior specialist might be a better, more appropriate provider of that intervention. The detriment, in a case like this, is threefold: 1) the physician is expected to spend time working in an area where they may not have the ideal expertise, 2) the behavioral specialist is not connected to the very patient who needs that support and expert attention, and 3) the patient receives suboptimal care both because they do not receive expert behavioral support and their physician's time is divided. In an optimal health system, each professional would be working from the top of their expertise, and all of the collaborating professionals have an effective system of communication so that no aspect of the patient's experience gets lost among them.

4. **Many of the "silos" discussed in medicine are reflected in literal separations in the locations of different providers. Co-location, as a result, benefits collaboration.** Quite often, the "silos" in the health field—so often talked about in metaphor—are also quite literal. As one expert put it, "Space is a highly coveted resource," and the result is that the very professionals who should be working together end up divided into separate locations and practices. For example, Dr. Chantelle Rice, an Occupational Therapist (OT) at USC, described the challenges of building relationships with primary care physicians when the USC OT practice is in an entirely separate building from the clinics where physicians practice. Encouraging referrals from primary care to OT is hard enough thanks to the separation, and even when patients are referred, the need to schedule and attend an entirely separate visit adds an extra barrier. As a result, many of the patients who would benefit most from an OT-supported lifestyle intervention are lost to follow-up, or never encouraged to meet with a well-matched specialist in the first place. Health centers that house primary care physicians, behavioral specialists, and other varying specialists—all under the same roof—can better facilitate coordination of care.

5. **Co-location and collaboration are not the same thing. Technology can be a powerful tool to bridge the gap, especially when co-location isn't an option.** Even if professionals are working in the same space, or students are learning in the same space, they may not necessarily be collaborating with and learning from one another. Collaboration takes active engagement and communication, as well as shared decision making. While patients may theoretically benefit by having more than one provider present in the same space, true team-based care means that multiple providers need to be actively applying their own expertise and working with other providers to achieve the best overall result for the patient's needs.

   Conversely, professionals don't *need* to be in the same physical space to collaborate. Especially with the help of effective and affordable digital technology, inter-professional collaboration can increasingly be accomplished by collaborators who may even be thousands of miles apart.

6. **Rewards, regulations, and assessments shape the way medical professionals perform their roles. Addressing these top-down factors is crucial to changing delivery models at scale.** We were repeatedly reminded, by a wide variety of experts, that the healthcare system in the United States mainly offers incentives for services and actions, rather than overall results. This distinction is often referred to "fee-for-service" care, as opposed to "value-based" care. While different experts spoke to varied aspects of what constitutes "value" in care, they consistently emphasized that most health professionals, especially physicians, are given incentives not to provide overall "ownership" of a patient's health, but rather to complete a particular service as efficiently as possible, often with little emphasis on the overall picture. The message that was made clear to us was this: to expect wide-scale changes in the way

that care is delivered, there is dire need to provide top-down changes in incentives and reimbursement. In addition to moving to a healthcare system that values better health outcomes, as opposed to volume of services, future health care reimbursement should also account for the acuity and complexity of patients and populations, as to not discourage physicians from taking on highly complex or vulnerable cases. In the absence of such top-down, systemic change, healthcare providers who wish to provide comprehensive care may often do so at significant extra burdens.

7. **Discontinuous care often means that no single health professional takes "ownership" of a patient's health as a whole.** Dr. Erin Kane, an emergency physician on faculty at Johns Hopkins, described to us what this endless cycle means in reality. A patient will go to see their primary care provide (PCP) for a particular reason, the PCP will refer the patient to a specialist or to the emergency room depending on the issue, and then the specialist or emergency room admitting team will discharge the patient to follow up with the PCP with regards to the exact challenge that led the patient to seek care in the first place. Dr. Kane gave this example to illustrate that each stakeholder in this cycle simply acts by filling their particular role in the health system, often with the goal of discharging or referring the patient as quickly and efficiently as possible. All too often, what this means is that no provider ever actually takes "ownership," to borrow Dr. Kane's word, over the patient's health overall. There is no case manager, no one person accountable to make sure that patient receives the best care as a complete unit, meaning that the patient instead experiences a disjointed collection of care fragments.

   Ownership certainly does not mean that any one health professional, or even any one practice, needs to be responsible for delivering all the care for a patient. Rather, it means that a patient needs someone to be accountable for ensuring that the various providers that a patient might see combine to meet the patient's needs, rather than just checking their individual boxes and then passing the patient off. This idea of ownership is an individual-level display of the concept of value in care, ensuring that the ultimate outcome is not a series of services, but rather a complete and effective package for support for the patient.

8. **Patient-centered care means that patients themselves should be equal participants in decisions made about their healthcare.** Many experts shared the sentiment that there are two experts in every health interaction. One is the provider(s) who is an expert in the medical aspects of the disease and can communicate about risks, symptoms, and treatment options. The other, however, is the patient, who is the expert in their *experience* with the disease, and along with that their priorities, goals, and capabilities. Effective care is that in which the treatment options offered by providers align with, and are decided in conversation with, the patients and their priorities. Often, it may take many members of a care team to understand and support a patient's priorities, and the physician may not always be the best suited to lead this conversation based on expertise and time limitations.

9. **There is increasing emphasis on the importance of understanding how the daily life of a patient impacts their health and healthcare.** A crucial underlying reason for shared decision-making described above centers around the seemingly straightforward concept that a treatment plan can only be effective if a patient can actually integrate that plan in their life. A medication or other therapy or intervention may be effective in principle, but the impact it may have demonstrated in clinical trials and other patients will not be seen if a patient is unable to adhere to the regimen. While a host of factors can impact medical adherence, the experts emphasized the need to understand how the everyday aspects of a patient's life affects the ease or difficulty of a given therapy. For example, work schedules may conflict with a medication regimen or a

recommendation for physical activity, or transportation issues may be a barrier that causes a patient not to follow through on a follow-up with a behavioral specialist, etc. For health professionals, the more able they are to understand the obstacles in individual patients' everyday lives, the more likely they will be to provide treatment options that patients can actually sustain.

10. **Patients have knowledge, understanding, and power. Patients should be a part of the medical education process from day one.** Many medical educators expressed to us their desire to see medical students and other health professionals-in-training learn about the aspects of a patient's experience with health and illness outside of the healthcare setting. For example, what is it like for a person with diabetes to go to work, or to shop for food? What is it like for a person to store and take medication in their home, or exercise on a regular basis? Many of the educators who raised this subject with us emphasized that the training of health professionals should involve, from the very beginning, engaging patients from the community as "teachers" about the many facets of the patient experience. Some specialties, such as occupational therapy, are more accustomed to focusing on these everyday aspects of life, but many people with whom we spoke emphasized that health professionals would benefit from increased training on how to better focus on these daily life factors.

11. **Medical education is increasingly emphasizing the social determinants of health, but much more needs to be done.** In addition to the individual factors of daily life that shape a patient's experience, we also heard repeatedly about the need for increased emphasis on the social determinants of health—community and society-level factors that influence health outcomes. Consideration of social determinants is not new to health; it has long been a central focus of public health, for example, and it is certainly not a new concept among medical professionals either. However, our interviews were filled with repeated calls for the healthcare professionals to be involved in increased learning about the social factors that drive health outcomes.

    We heard from experts such as Deans Sue Cox and Clay Johnston of Dell Medical School, who spoke about encouraging medical students to get involved in the local community to build a fuller understanding of how community factors influence outcomes. Dr. Sarah Kim, an endocrinologist at UCSF, said she hoped medical students could learn about diabetes from experts on poverty and socioeconomic inequality as a way of understanding a critical factor underlying the burden of chronic disease. Others expressed their own variations, but the theme remained the same: medical professionals will benefit if they can understand the social and economic factors that drive health, disease, and the ways that illness is experienced.

12. **Learning in medicine is lifelong, and professionals will benefit from structures that support this.** Dr. Bon Ku of the Sidney Kimmel Medical College at Jefferson University offered us an analogy: elite professional athletes, even when at the very top of their sport, receive feedback and coaching virtually every day. There is constant opportunity for continued learning and improvement, and constant need for someone with a different perspective to comment on one's strengths, weaknesses, and opportunities to improve. Why then, Dr. Ku asked, do we assess physicians with a multiple-choice exam (the Boards) once every ten years or so, and almost never in between? Here Dr. Ku highlighted that feedback is rare among experienced medical professions. Yet feedback—from peers, patients, and supervisors—is a valuable way for any professional to continuously learn and improve in an ever-adapting clinical setting. Many experts shared with us the importance of introducing regular, effective feedback into health professions from the very beginning, and reiterated that this should be a career-long piece of the profession.

Beyond just receiving feedback, health professionals need the chance to continue learning throughout their careers. In some ways, this already exists in the form of continuing medical education (CME), or a comparable equivalent. However, several people to whom we spoke noted that CME is both incomplete and underemphasized in the health professional's role. Dr. Kunal Patel, who works on digital learning platforms for medical professionals, suggested that health professionals should have, on average, 2–4 hours per week of "protected learning time," such that development of both clinical skills and medical knowledge becomes a constant, emphasized aspect of health careers. In addition, several experts emphasized to us that standard CME, much of which is conference-based, fails to address many of the most valuable aspects of medical careers, such as inter-professional collaboration and communication with patients. To truly build the healthcare workforce of the future, we not only need to be training health professionals with a variety of important competencies as they enter their careers, but also deliberately making frequent, ongoing learning an important part of their role throughout their careers.

PROGRAMS—HEALTHCARE TEAMS OF THE FUTURE

1. COMMUNITY HEALTH WORKER NETWORK OF NYC

PROGRAM NAME
Community Health Worker Network of NYC

ORGANIZING GROUP
New York State Community Health Worker Association, Columbia University Mailman School of Public Health

LOCATION
New York City, New York

PROGRAM TYPE
Community outreach/ engagement, interprofessional/ interdisciplinary teams, access/affordability, peer support

CATEGORY
Prime Performer

- The Community Health Worker Network of New York City was founded in 2001 to serve as a place for community health workers (CHWs) to share best practices, resources, and gain training and professional development.
- The Network developed a CHW training program that has been used to train over 1,000 community health workers.
- The Network advocates for legislation and policies that support the advancement of CHW practice, such as through their participation in the New York State Community Health Worker Initiative, which sought to develop recommendations to sustain the CHW workforce.

The Community Health Worker Network of New York City was formed in 2001 as a place for community health workers (CHWs) to come together and share resources, develop friendships, and gain training and professional development. The Network, which represents over 1,000 members over 250 organizations, advances CHW practice through education, advocacy, and research.

Regarding education, The Community Health Worker Network of NYC has developed CHW training standards and has implemented CHW training programs. The evidence-based training offers 35-hour and 70-hour curricula. While the 70-hour version offers more in-depth training, both curricula are designed to help CHWs develop the skills and competencies necessary to successfully do their jobs. They include training in communication, cognitive behavioral theory, positive psychology, and behavior change. "Disease-specific" topical training is also available for CHWs working in disease-specific settings and is conducted in modules that total up to 35 additional hours. The modules include training on diabetes, asthma, hypertension, cardiovascular disease, and nutrition.[228] Beyond CHW-specific training, the Network also offers organizational development training for organizations looking to integrate CHWs into their workforce.

The Network also works to advocate for policies that advance the CHW practice. For example, it worked with the New York State

Community Health Worker Initiative to develop a report with recommendations on how to advance and sustain the CHW workforce in New York, though lessons from the report can be applied to other contexts.[229] The report included a definition of the Scope of Practice of CHWs to standardize job descriptions and recommendations for training, certification, and financing. The CHW Scope of Practice, as detailed in the report, includes seven main roles: outreach and community mobilization, community/cultural connections, case management and care coordination, home-based support, health promotion and coaching, system navigation, and participatory research.

ANALYSIS

While the role of community health worker has formally existed for decades in the United States, there has been minimal standardization around the specific role and training of the community health worker in practice. Founder and Executive Director of The Community Health Worker Network of NYC, Sergio Matos, has done substantial work in bringing CHWs to national attention, standardizing definitions and scope of practice and developing training. For example, Mr. Matos led the national coalition that developed The American Public Health Association's official definition of community health workers (CHWs) as being, "frontline public health workers who are trusted members of and/or have an unusually close understanding of the community served. This trusting relationship enables workers to serve as a liaison/link/intermediary between health/social services and the community to facilitate access to services and improve the quality and cultural competence of service delivery."[230]

The Network's work to advance CHW practice in New York and nationwide is exciting given the proven impact that CHWs can have on their clients' health, particularly in the realm of chronic conditions like hypertension and diabetes.[231] For example, one study analyzing the impact of a 6-month intervention focused on diabetes self-management education with African American and Latino adults with type 2 diabetes, found that participants who worked with a CHW had statistically significant decreases in mean HbA1c values (8.6% at baseline to 7.8% at 6 months), while those who did not work with a CHW had no change in mean HbA1c.[232] Other studies have supported the observed improvements in HbA1c levels in patients who work with CHWs, with particular benefits to high-risk patients with HbA1c levels greater than 9%.[233] These results would support the expanded use of community health workers in diabetes education and management efforts.

2. DIABETES AWARENESS & WELLNESS NETWORK (DAWN)

NAME OF PROGRAM
Diabetes Awareness & Wellness Network (DAWN)

ORGANIZING GROUP
Houston Health Department

LOCATION
Houston, Texas

PROGRAM TYPE
Physical activity promotion, nutrition and healthy eating, population health, free for participants, community outreach and engagement, behavior change

CATEGORY
Gold Standard

- The DAWN Center provides a community space focused on developing diabetes self-management skills.
- DAWN offers courses on diabetes basics, nutrition, cooking, and physical activity and provides facilities for people to practice these skills.
- Membership is free, as are the broad variety of resources offered to members.
- The DAWN Mobile Unit provides diabetes risk screenings and distributes informational resources at community events.

The Diabetes Awareness & Wellness Network (DAWN) is a free, membership-based community center in Houston for people with or at risk for diabetes and their caregivers. DAWN makes clear that it is *not* focused on diabetes diagnosis or treatment— instead it provides diabetes self-management education, intended to complement clinical care received elsewhere. DAWN's educational offerings include classes on nutrition and cooking, physical activity, prediabetes and prevention, and awareness of diabetes complications.[234] It has classes available in English and Spanish.

In addition, the DAWN center has several on-site resources available in addition to its class offerings. Any DAWN member with a note of approval from a health provider can use the fitness facilities at the center. In addition, members have access to nutrition and health coaching and goal-setting assistance.[235] On-site staff are available for support and include a public health nurse educator, fitness trainer, nutritionist, public health educators, community health workers, and a senior counselor.

All of DAWN's offerings are available for free and do not require insurance—participants only need to enroll as a member. Upon enrolling, participants receive access to diabetes self-management classes, fitness facilities, coaching, and nutrition resources. The center is open both to people with diabetes and prediabetes and to their caregivers, who might share an interest in learning more about diabetes self-management.

DAWN also offers community outreach services including a Mobile Unit. Organizations can request to have the Mobile unit present at community events, where it provides diabetes risk testing and health

coaching and distributes educational materials about diabetes awareness, prevention, and self-management.[236]

The DAWN center and its programs are supported by the Houston Health Department. The center opened in 2013 and is located in the Houston's Third Ward Multi-Service Center.

KEYS TO SUCCESS

Free for members

Accessibility and affordability are among DAWN's most obvious, and most important, strengths. Membership is free, and it comes with free access to the wide variety of resources offered by DAWN. In eliminating cost, DAWN eliminates one of the most important barriers that might otherwise prevent a large proportion of people from exploring and using the educational offerings and resources that the DAWN center has to offer.

Emphasis on support, not treatment

DAWN deliberately communicates that it is *not* a diagnosis, treatment, or care center.[237] Instead it is a resource for people who choose to take advantage of it—all of the offerings are free, optional, and aimed at developing skills and knowledge for diabetes self-management. By deliberately avoiding any sort of over-medicalization, DAWN achieves two distinct goals: First it creates an open, unintimidating space that avoids the potential sense of failure or stigma that a doctor's assessment or diagnosis might bring. Secondly, it approaches health from the everyday angle of self-management and community-building, rather than through the often-discontinuous mindset of medical check-ups.

Multiple Resources in One Location

DAWN creates a powerful setting in which to teach the skills of diabetes self-management, because it provides space for people to learn and practice many different aspects of management all in one place. Through the DAWN center, members can learn about diabetes basics and complications, nutrition, and physical activity and develop peer support networks. Moreover, they have the opportunity to practice these skills in the same place that they learn them. For example, members can work with a nutritionist on dietary goal-setting and planning and take a group cooking class in the same space. Likewise, DAWN offers both physical activity classes and allows its members to use free fitness facilities. By putting education and practice in the same space for a wide range of core self-management skills, DAWN establishes a powerful way for members of the community to better manage their own health.

Meeting people where they are

DAWN's Mobile Unit works to spread awareness of diabetes and prediabetes by going to groups of people, rather than by waiting for individuals to proactively show up. Community members and organizations can even request for the Mobile Unit to attend local events and spread awareness through informational resources and diabetes risk tests. Through its Mobile Unit, DAWN can raise awareness among people who otherwise might slip through the cracks of the standard healthcare system.

COST EFFECTIVENESS

While the it is hard to measure the direct costs of DAWN, its model has the potential to create substantial long-term cost savings if its members demonstrate measurably improved diabetes self-management. In addition, the focus on skill building for self-management and healthy living, rather than on individual one-to-one treatment and care, has the potential to create health benefits that spread beyond just DAWN members to others in their households or peer groups.

ABILITY TO INSPIRE

As a program within the health department of a large city engaged in a variety of population health initiatives, including Cities Changing Diabetes[238] and Go Healthy Houston,[239] DAWN provides an opportunity to serve as a "proof of concept" pilot for what a community-based diabetes and health promotion center might look like. If DAWN delivers meaningful progress, it can serve as a model for other, smaller cities to take on what might be, for them, a proportionally larger but still worthwhile investment in local health.

DRAWBACKS & LIMITATIONS

While the DAWN center itself provides something of an all-in-one facility for members, it also provides a potential drawback in that the centralized location may present a challenge for some members in accessibility. DAWN's benefits for members living nearby, or with easy transportation to, the center may not be available to those living in farther neighborhoods of one of the largest cities in the United States. Ideally, a city of millions could have a network of such centers, increasing accessibility for the entire population.

Likewise, the hours and course offerings at the DAWN center fall largely within standard working hours on weekdays. While DAWN offers evening hours on some weekdays, only a few of its classes are offered after 5pm on weekdays, and the center is closed on weekends.[240] While this may be unavoidable due to limited resources, it presents a significant downside, as some of the most meaningful benefits that the center can offer may be inconvenient or even impossible for a large proportion of Houston's adult population to access.

3. DELL MEDICAL SCHOOL

The University of Texas at Austin
Dell Medical School

NAME OF PROGRAM
Dell Medical School

ORGANIZING GROUP
The University of Texas at Austin

LOCATION
Austin, TX

PROGRAM TYPE
Medical education, interprofessional/ interdisciplinary teams, population health, health innovation and leadership, social determinants of health

CATEGORY
Gold Standard

- A new medical school enrolling its first class in 2016, Dell Medical School focuses on training professionals in innovation and leadership in health.
- Students engage in a nine-month Innovation, Leadership, and Discovery curriculum.
- Interprofessional education is a focus throughout the curriculum.
- Students engage in community projects and participate in case-based learning to understand the impact of social determinants on health, the complexity of health systems, and the importance of putting patient care into a broader context.

Established in 2012, and enrolling its first class of students in the summer of 2016, Dell Medical School at The University of Texas at Austin rethinks the standard medical school curriculum in the United States. While still operating on a four-year model, Dell Medical School has altered several core aspects of its curriculum to better train students in the competencies that they see as most important for the coming generation of healthcare leaders—skills including leadership, collaboration with members of various professions, community engagement, public health awareness, understanding of health systems, and more.

The curriculum contains several components that break, or at least stretch, the common mold of a four-year medical institution. For example, in their third year, students engage in a 9-month curriculum focused on "Innovation, Leadership, and Discovery." The subject of leadership is an explicit curricular focus throughout the entirety of the four years as well.[241]

As part of this third year, students can participate in a dual-degree program, meaning that they can earn a coordinate master's degree in public health, business administration, biomedical engineering, or educational psychology in addition to receiving an MD.[242] Students can also choose to engage in an independent project in one of three "areas of distinction": Healthcare Innovation and Design, Population Health, or Clinical/ Translational Research.[243] Students who opt for the independent project track are required to reach the "pilot" stage for whatever initiative they develop.[244]

Finally, Dell Medical School takes several innovative approaches to exposing its students to not only the physiology of health and medicine but also the real world of public health and individual patient experience. Students regularly work on projects that engage directly with the local Austin community, with an explicit focus on

understanding health disparities and making Austin a model community for health.[245]

Similarly, the curriculum works from the very beginning to place medical learning in a real-life context. Rather than formatting the basic science around an organ system-by-organ system approach, students are immersed from the beginning in a case-based learning format, in which scientific and medical knowledge is developed through model cases.[246] To further deliver medical education in a way that represents a real-world care context, Dell Medical School delivers a sustained, four-year focus on Interprofessional Education, giving medical students practice in collaborating with other professionals who are integral to the care process.

KEYS TO SUCCESS

Education on leadership and collaboration

Dell Medical School is founded upon the goal not only of training tomorrow's doctors but more broadly preparing the leaders who will shape and change medicine and public health at a systems level. The curriculum works to train doctors who not only strive to enact the best care in their own future practices but also to impact health and healthcare at scale. Dell Medical School's focus on training the next generation of health leaders is exemplified in its unique third-year Innovation, Leadership, and Discovery curriculum, as well as in its ongoing Interprofessional Education track.

The Innovation, Leadership, and Discovery block allows students to pursue particular focus areas of health innovation that interest them, either through the completion of a coordinate master's degree in one of four areas (Public Health, Business Administration, Biomedical Engineering, and Educational Psychology) or through an independent project in one of three areas of distinction (Healthcare Innovation and Design, Population Health, or Clinical/ Translational Research).[247] In allowing students to invest such significant focus in a specific area of interest, Dell Medical School places deliberate emphasis on (and dedicates resources to) building the skills necessary to enact change at a broader level than just one doctor with one patient.

Similarly, students at Dell Medical School participate in a track of Interprofessional Education (IPE) throughout their four years, in which they work in teams with students of other health professions, including social work, nutrition, psychology, and pharmacy. The physician, in these collaborations, is not necessarily the team leader, but rather a member of a collaborative group.[248] Through the IPE curriculum, students gain experience collaborating for team-based care and learn to see patient care from multiple perspectives.

Local engagement

Dell Medical School's emphasis on working with the Austin community, and making Austin a "model health city,"[249] demonstrates an understanding that the future of healthcare relies on broad change in the underlying determinants of health, not just in changes in the way physician's deliver care.

Case-based learning

Built around example patient cases, rather than modules focused on specific organ systems, Dell Medical School's curriculum aims to teach, from day one, that health is rooted in a complex environment. In each example case, students are asked to develop their own learning objectives, at least one of which must be focused on social determinants of health, not just pathology or physiology.[250] This continual focus on the interconnection of health and environment prepares medical students to handle the complexity of the patient experience and to understand that sickness, health, and care affect different patients in different ways. As such, Dell Medical School aims to prepare students to deliver personal care in ways that emphasize the priorities of patients.

ABILITY TO INSPIRE

In trying to improve the dominant model of medical education, Dell Medical School wants to inspire other medical schools. Of course, being still in its very early days, it remains to be seen what impact Dell Medical School will have on the norms of medical education. Nonetheless, there is hope based simply on how the effort is elevating the conversation around this topic.

DRAWBACKS/LIMITATIONS

Dell Medical School cost over $400 million to build,[251] and with its first class of future physicians comprising only 50 students,[252] the school does not necessarily represent an easily scalable model in the typical sense of the phrase. Dell Medical School's impact will largely have to come in the form of leadership and modeling. This can of course play out in more than one way—Dell Med can produce health leaders who guide system-wide improvements, it can model medical education techniques that are replicated in other settings, or its community engagement can help to develop models for cost-effective public health interventions. However, as a new institution, the actual impact remains to be seen.

One other major question concerns what happens to its students after they graduate. While Dell Medical School's goal is to train the innovators of tomorrow's health systems, its graduates will largely go on to participate in traditional residencies built mainly on the very model that Dell Medical School's mission aims to change. As a result, it remains to be seen whether the lack of a logical "next step" in the training of these future healthcare leaders will undermine Dell Med's original mission.

4. DURHAM DIABETES COALITION

NAME OF PROGRAM
Durham Diabetes Coalition

ORGANIZING GROUP
Durham Diabetes Coalition, funded by a CMS Health Care Innovation Award and the Bristol-Myers Squib Foundation, in partnership with Duke University

LOCATION
Durham, North Carolina

PROGRAM TYPE
Population health, interprofessional/ interdisciplinary teams, community outreach/ engagement, targeted population, personalized care/precision medicine, quality improvement

CATEGORY
Gold Standard

- The Durham Diabetes Coalition (DDC) combines data analytics a mapping tools with neighborhood-level health interventions to identify people and neighborhoods with high diabetes risk.
- A data-driven approach allows for neighborhood-specific public health interventions.
- People identified as having type 2 diabetes are connected with local health resources, and home visits from a multidisciplinary care team are available for the highest-risk/highest-need residents.
- The model, which leverages partnerships with local academic, government, and health partners, received a Health Care Innovation Award to expand its model and demonstrate cost efficacy in three states throughout the Southeastern United States.

The Durham Diabetes Coalition (DDC) focuses on reducing complications and death from type 2 diabetes in Durham, North Carolina, and identifying individuals who are unware that they have type 2 diabetes and connecting them to appropriate care. The DDC uses a data-driven approach in combination with multidisciplinary teams to deliver highly-targeted interventions to the people and neighborhoods in Durham with the highest diabetes risk.

To individualize neighborhood-level interventions, the "Geospatial and Analytics Team" combines mapping tools and patient health data with social and environmental information about neighborhoods to identify high-risk areas for diabetes. Carefully regulated, anonymized patient data is used by community health workers to formulate diabetes management plans that are specifically attuned to each local area's needs, including its social, health, and environmental characteristics.

With the support of the mapping done by the Geospatial and Analytics Team, a "Neighborhood Intervention Team" made up of 5 Community Health Integrators works to link people to existing resources, coordinates health and diabetes awareness events, and teaches workshops on managing diabetes.

In addition, a "Clinical Team"— featuring a physician, nurse practitioner, dietitian, social worker, and community health worker— delivers care to people with diabetes and connects them with existing community resources. The Clinical Team delivers an intensive program of home visits for some of the most at-risk or high-need patients, including people who may be homeless or uninsured.

Finally, a Diabetes Food Pantry was established in 2014, which donates healthy food to individuals who attend weekly group sessions on diabetes-related issues. The DDC has also run a media campaign encouraging people to take a diabetes risk test and sharing advice for healthy living. The media outreach included PSAs on local radio stations and in newspapers, as well as a series of 30-minute television programs called "Living Healthy" on the Durham Television Network.

KEYS TO SUCCESS

Data-driven

The Durham Diabetes Coalition (DDC) uses detailed computer modeling to create "hyper-localized" assessments of the locations in the Durham community where residents are most likely to be "high risk" patients, defined in terms of the likelihood of having an emergency room visit, hospitalization, and/or death due to diabetes in the next year. This is done using Geographic Health Information Systems (GHISs), which correlate electronic health record data to environmental data.[253] Thanks to this level of specificity, the community health workers involved in the DDC can customize interventions to specific neighborhoods and providers can use geographic data to personalize care. Additionally, the intricate mapping helps provide a clearer picture of how racial disparities affect health.[254]

Highly personalized

DDC is a remarkable example of individual care. Providers can use GHIS data to understand the environmental factors that affect particular patients' daily lives as they live with diabetes.[255] DDC's personalization goes beyond data though. In 2014, DDC launched a Diabetes Food Pantry, providing healthy food to patients who attended weekly diabetes group sessions.[256] Providers in the program also offer in-home care for the patients that it deems to be at the highest risk. These home visits may be done "tag-team" style, with follow-ups from several specialists like dieticians and social workers.[257] Lastly, a central feature of the coalition is cultural awareness in care. An advisory board works to ensure that all interventions are culturally appropriate.[258]

Multi-sectorial partnerships

The major medical partners of the DDC—Duke University's health system, the Lincoln Community Health Center, and the Durham County Department of Health—provide care to almost every resident of Durham County.[259] But the partnerships that strengthen DDC go beyond even this. Multi-sectorial clinical teams, each with a supervising physician, nurse practitioner, social worker, dietician, and community health worker, connect patients referred to the DDC with already-existing programs in Durham. These same teams do the "tag-team" care with high-risk patients.[260]

ABILITY TO INSPIRE

The DDC model, which combines data-driven analytics and mapping with community health interventions, was expanded into the Southeastern Diabetes Initiative (SEDI), which covers parts of North Carolina, West Virginia, and Mississippi.[261] The different sites use slightly different intervention models, and then share data, with the goal of coordinating and developing best practices. The SEDI is sponsored by the Center for Medicare & Medicaid Services' (CMS) Health Care Innovation Awards, as well as the Bristol-Myers Squibb Foundation.

Cost Effectiveness

The DDC, as well as the expansion of the DDC model into the Southeastern Diabetes Initiative is sponsored in part by a CMS Healthcare Innovation Award. These awards are given specifically to innovative ideas with a demonstrated potential for long-term cost-savings. The award estimates that the program's cost savings over its first three years will be just over two dollars saved for every dollar of the award.[262]

DRAWBACKS/LIMITATIONS

A major part of DDC's interventions involve connecting people with diabetes or people at high risk for diabetes with existing resources within the diabetes community. As such, the DDC benefits significantly from the wealth of local health resources already present in the community. In essence, DDC's multi-sectorial partnerships are even possible, in the first place, because of the

number of partners already present. As such, rather than having to deliver all necessary care and intervention, the DDC can largely dedicate its resources to the highest-risk, highest-need populations, while serving as a connector for the rest of Durham's residents with diabetes. While, ideally, all communities would have sufficient supports available to people with diabetes, replicating the DDC model in communities that lack health resources may initially be costlier and more challenging.

In addition, the DDC was created with the support of a major research institution, Duke University. This academic partnership meant that the DDC could build on the support of the university and its Medical Center to establish the medical, public health, and data analytics/mapping elements of its program. While it may not be critical for an academic partnership of this sort to involve an institution based in the community of focus, it does provide significant benefits, including the availability of electronic health records for the community.

Finally, the use of individual patient records and information, as always, requires careful and diligent maintenance of privacy and anonymity in order to respect patient rights and establish and maintain trust within the community.

5. FIGURE 1

NAME OF PROGRAM
Figure 1

ORGANIZING GROUP
Doctors Without Borders, Mount Sinai Health System, The BMJ, American Cancer Society, Cincinnati Children's Hospital

LOCATION
Toronto, Ontario (Headquarters); Worldwide

PROGRAM TYPE
Online/app-based/digital, medical education, interprofessional/ interdisciplinary teams, free for participants, quality improvement

CATEGORY
Innovator

- Figure 1 is a free knowledge-sharing app that allows medical practitioners to post pictures of their patients and receive real-time advice on diagnosis/treatment options.
- Specialists can provide information about their unique fields, students can learn about rare cases, and all medical practitioners can be exposed to innovative methods of treatments through the online platform.
- Patients are protected by the removal of all identifying information in compliance with privacy laws around the world.
- Figure 1 is used by millions of users in over 190 countries and has helped many patients receive faster, more accurate, and specialized care.
- The app has been called "Instagram for doctors" by the media.

Figure 1 is a free knowledge-sharing app that allows doctors to share knowledge globally. It was co-founded by Dr. Joshua Landy, Gregory Levey, and Richard Penner in 2013 with a mission to "empower all healthcare professionals to achieve clinical mastery by learning from one another." The online platform has the largest active network of medical professionals in the world. Each user can post cases of their patients (after removing all identifying information) in order to crowd-source information about potential diagnoses/treatments. This is especially useful when medical professionals are unsure how to proceed or would like a second opinion from a specialist in their field. Other practitioners can provide real-time insight and advice by commenting on cases. The platform is used to make healthcare practitioners smarter, but not in a traditional, textbook-knowledge sense. Instead, Dr. Landy emphasizes the importance of accessing "know-how" in a given moment when diagnosis and treatment are urgent.

The app also allows healthcare practitioners to learn more about innovative technology and treatments. By scrolling through cases and reading comments from other professionals, they are exposed to new methods of care. This knowledge may pique their curiosity and help improve their practice. Figure 1 also allows medical students to analyze and learn from cases they would otherwise not be able to see. In this regard, the app serves as an educational tool for students and professionals, exposing them to rare and specialized cases.

Dr. Landy was inspired to create Figure 1 because many doctors already send emails to colleagues or post on Facebook when they encounter unique cases that fascinate them. Figure 1 allows similar learning through a more confidential, streamlined platform.

ANALYSIS

Applications of Figure 1

The potential uses of Figure 1 are vast. In our highly connected world, there is no reason that doctors in the most underserved regions of the world cannot connect with specialized healthcare professionals who have the resources to help provide care. Dr. Landy states, "We have users in the military, in the jungle, and in refugee camps." For example, Dr. Rogy Masri, a volunteer for Doctors Without Borders in northern Lebanon, uploaded a picture of a patient in a Syrian refugee camp with a skin lesion to Figure 1. Masri, who is not a dermatologist, sought help from his colleagues worldwide, and received immediate advice on the diagnosis.263 Similar circumstances allowed doctors to virtually diagnose a rare rash among fishermen in Alaska as well as draw a picture of a child's heart complication described by a nurse on Figure 1.264 Knowledge-sharing apps like this one have the ability to vastly change the way we provide and manage healthcare, especially for underserved communities.

Challenges in telemedicine

One of the biggest challenges in telemedicine is ensuring patient privacy,[265] but the team at Figure 1 has addressed this in a variety of ways. Before healthcare practitioners upload cases, they must receive patient consent (subject to their jurisdictional and institutional guidelines). The team specifies in their *Community Guidelines* that users should "apply the same ethical principles you use in your practice to what you post."[266] Figure 1 also has a Content Policy for Users, which specifies that users must remove all identifying information about their patients, including names, addresses, and phone numbers. Medical practitioners, however, do have their own information, such as the name/location of their practice, on their profile. When a picture is uploaded, the app automatically blocks the patient's face, and users must manually remove unique features such as tattoos. The only time an image can be used outside the app is if it is selected for the Case of the Week and used for promotional purposes, or if it is shared with medical journals. Figure 1 has made sure to comply with regulations such as the Health Insurance Portability and Accountability Act (HIPAA) and can be seen as a model for how to ensure adequate patient privacy in telemedicine.

The future of telemedicine

Figure 1's ability to reach millions of medical practitioners in over 190 countries highlights the huge demand and potential for healthcare technology. In terms of future telemedicine and knowledge-sharing innovation, Dr. Landy says, "The most important thing you can do is research in advance to ensure that the solution you envision is a workable solution for your target population." The healthcare industry can learn from the "user-experience revolution" that has disrupted technology to put users, and patients, at the center. With apps like Figure 1, users can get rapid and reliable diagnoses and treatments for their patients, and learn about innovative, cross-cultural medical practices. For Figure 1, Dr. Landy says, "The benefit goes to the patients. Educating healthcare practitioners saves patients' lives."[267] There are many applications for patients with diabetes around the world to receive more specialized care through telemedicine and knowledge-sharing apps, including tracking blood-glucose levels, sharing tips about managing diabetes, or receiving diagnoses from medical practitioners. Figure 1 will continue to be used as medicine becomes increasingly digitized, providing opportunities for faster and more reliable diagnosis and treatment.

6. FUNCTIONAL MEDICINE COACHING ACADEMY

NAME OF PROGRAM
Functional Medicine Coaching Academy

ORGANIZING GROUP
The Institute for Functional Medicine, International Consortium for Health and Wellness

LOCATION
Highland Park, Illinois (courses offered online)

PROGRAM TYPE
Peer Support, medical education, behavior change

CATEGORY
Prime Performer

- The Functional Medicine Coaching Academy offers a 12-month course that trains health coaches to help patients manage chronic diseases and improve their overall health and wellbeing.
- Students develop skills in functional medicine, functional nutrition, mind-body medicine, and positive psychology.
- Graduates from the program further their careers as health professionals by gaining leadership and empowerment skills as well as by receiving professional accreditation and access to alumni networks.
- Patients who choose to work with a health coach, alongside medical professionals, are able to personalize their care through lifestyle changes and preventive interventions.

The Functional Medicine Coaching Academy (FMCA) is a 12-month online educational program founded by Dr. Sandra Scheinbaum and Elyse Wagner to train and educate health coaches. The founders recognize the importance of diet and lifestyle changes in chronic disease prevention as well as the usefulness of health coaches who can work alongside clinicians to improve outcomes for patients. In 2014, they started the academy to improve the lives of patients with chronic diseases. Upon completing the program, students become certified health coaches who can help patients manage chronic disease and improve their overall health and wellbeing.

ANALYSIS

Program curriculum

The online course concentrates on four areas that provide health coaches with the tools to guide their patients. The first is functional medicine. Health coaches are taught to work with their patients to understand the root causes of chronic disease. Patients' genetic, biochemical, and lifestyle data all play a role in providing a personal treatment plan. Coaches learn the skills to teach their patients how to engage in sustainable, positive diet and lifestyle changes.

The next area that coaches are trained in is functional nutrition. Coaches learn to understand food as medicine, necessary to promote our wellbeing. Coaches focus not just on what their patients eat but when and why they eat those foods as well. A specific focus is the emotional factors that cause eating behaviors. Coaches also learn that diet should be personalized according to patients' genetic expression and specific lifestyle choices. Coaches then learn to understand mind-body medicine, which "examines how emotions, thoughts, imagery and beliefs directly impact physical health, including DNA expression."[268]

This training is necessary to promote stress relief and holistic healing practices among patients.

Finally, coaches are taught to understand positive psychology. Instead of just treating symptoms of chronic disease, coaches are taught to encourage patients to thrive and live positively, which can result in favorable health outcomes. Further, coaches are taught the art of coaching, which includes skills in creating plans, overcoming barriers, and inspiring and empowering patients.

Benefits for coaches

Students who enroll in the Functional Medicine Coaching Academy gain access to a variety of resources that allow them to further their careers as health professionals. They receive accreditation from the Institute of Functional Medicine, develop confidence and leadership skills, and are able to have a positive impact on others.[269] Through teaching others to improve their health, coaches also have the opportunity to improve their own health and wellbeing. Upon course completion, students have access to networking opportunities among FMCA alumni. The many benefits of FMCA certification serve as a model for other training programs to encourage enrollment and increase the number of health coaches and peer mentors who can play a key role in chronic disease prevention and management.

Benefits for patients

Patients who choose to work with heath coaches are able to better manage their chronic disease as well as improve their overall health and wellbeing. Patients are empowered to make lifestyle changes and reach their health goals when working with coaches. They also learn how to navigate health systems; working with health coaches in conjunction with medical practitioners allows patients to receive a variety of care and get the most out of their sessions with coaches.[270]

7. HEALTH LEADS

NAME OF PROGRAM
Health Leads

ORGANIZING GROUP
Robert Wood Johnson Foundation; Multiple clinical partners including Kaiser Permanente, Massachusetts General Hospital, John Hopkins Bayview Medical Center, Bellevue Hospital Center, among others

LOCATION
Boston, MA (Headquarters), Nationwide

PROGRAM TYPE
Social determinants of health, access/affordability, interprofessional/ interdisciplinary teams

CATEGORY
Gold Standard

- Health Leads advocates for and enables health systems to address unmet basic social needs (i.e., housing, food, heat, transportation) as a form of healthcare.
- Health Leads was founded in 1996 with the goal to transform the U.S. health system from a "sickcare system" to a true "healthcare system."
- Health Leads offers a variety of services to train and build health practices' capacities, and strategies to address their patients social service needs, including Health Leads Reach, the first cloud-based platform to track and manage patients' social determinants of health.
- Health Leads also maintains a Health Leads Advocates program of volunteer college students, who provide direct services in clinic and hospital settings to connect patients to community resources.

Health Leads is a social enterprise working to improve health systems by treating prevention, socioeconomic, and social service needs as a form of healthcare. Health Leads believes that doctors should be able to "prescribe" basic social services such as food, safe housing, heat, and other key resources. Hospitals, health centers, and clinics can partner with Health Leads to build individual social needs interventions. For organizations looking to integrate basic social service skills into their health practice, there is the Health Leads Prepare Workshop. It is a five-week curriculum, consisting of weekly 90-minute webinars, individual coaching calls, and weekly activities designed to help launch or refine an organization's social needs strategy—including design, implementation, and measurement steps. Participation costs $1,500 per organization, with a discounted rate of $1,000 for free clinics and federally qualified health centers (FQHC).[271] For organizations and practices looking for more insights, Health Leads offers Assessment and Design Services on a consulting basis, working with organizations for 8–12 weeks to develop custom social needs interventions. Implementation Services are also available to support the integration of the social needs strategy and includes access to a "Dedicated Health Leads Advisor" who consults with the organization weekly to improve workflow, and to the Health Leads Collaborative, a monthly web-based series where organizations can share best practices and drive improvement.[272]

KEYS TO SUCCESS

Data-driven

Organizations looking for a simple way to track their interventions and manage patients' social service needs can purchase *Health Leads Reach*—the first and only cloud-based platform designed to enable

health systems to manage social determinants such as food, housing, and heat, and to track the success of their social needs interventions.[273] The platform can be used to screen patients for social service needs, identify relevant community resources, track progress, and analyze performance with reports to drive continuous improvement. The platform can be accessed from multiple devices as it is a secure web-based platform. However, for those looking to incorporate the platform into existing workflow, *Health Leads Reach* can be integrated into electronic health records (EHR) systems. Health Leads not only advocates for greater attention to the social determinants of health in clinical setting but also uses technology to incorporate this practice into health centers.

Training passionate advocates and developing future healthcare leaders

Health Leads builds greater consciousness around the social determinants of health and helps prepare more socially conscious healthcare professionals through its Advocate program. Health Leads Advocates are college students at partner universities who volunteer at least eight hours a week in clinics and hospitals to connect individuals and families to the basic resources they need to be healthy. These volunteer advocates can assist clinics and hospitals that may not have the capacity to fully address their patients' social service needs. This program therefore adds value to existing health care delivery systems while simultaneously teaching students social service connection skills they may not have the opportunity to develop in college or medical school, preparing these future professionals to practice more holistic healthcare.[274]

ABILITY TO INSPIRE

For over 20 years, Health Leads has been a leading advocate for integrating social needs into healthcare—an approach that has gained greater traction in recent years, perhaps best indicated by The Centers for Medicare & Medicaid Services (CMS) announcement of the new Accountable Health Communities (AHC) model in 2016. The AHC model "represents the first government-funded integration of social needs interventions into healthcare."[275] CMS is currently funding 32 organizations over five years to screen their patients for unmet health-related social needs, refer them to community services, provide navigation services to high-risk individuals to help them access community services, and promote alignment between clinical and community services.[276]

CMS' recent embracing of health-related social needs was built on evidence that addressing these needs, which were traditionally considered outside the scope of clinical care, can actually improve health outcomes and reduce health system costs. The research on Health Leads certainly seemed to have contributed to this movement. In one *JAMA* study assessing the impact of the Health Leads program in primary care patients with unmet basic resource needs, patients whose unmet social service needs were addressed with Health Leads' assistance reported reductions in blood pressure (systolic and diastolic) and LDL cholesterol levels, establishing a clear link between social service needs and clinical outcomes.[277]

Health Leads CEO, Rebecca Onie, who founded Health Leads (then Project HEALTH) as a college sophomore, has received national recognition and multiple awards including a MacArthur Genius Fellowship, the Robert Wood Johnson Young Leader Award, and an Aspen Institute Health Innovators Fellowship for her work in creating a definitive framework to address social needs within the health system.

DRAWBACKS AND LIMITATIONS

While Health Leads has championed a rightful shift in the U.S. healthcare system toward addressing social service needs and expanding what constitutes healthcare, it is clear that for people with diabetes this approach has limits. In the same *JAMA* study that assessed the impact of Health Leads involvement on various clinical outcomes, it was reported that the participation in the program had no statistically significant impact on hemoglobin A1c levels. This finding suggests that while connection to basic resource needs may have some health benefits, patients with diabetes need additional engagement and resources to address and improve glycemic outcomes like HbA1c. Further research is still needed on the direct impact of programs like Health Leads on prediabetes and its progression to diabetes.

8. INTERMOUNTAIN HEALTHCARE

NAME OF PROGRAM
Intermountain Healthcare and SelectHealth

ORGANIZING GROUP
Intermountain Healthcare

LOCATION
Salt Lake City, UT (headquarters), serving Utah and Idaho

PROGRAM TYPE
Population health, interprofessional/ interdisciplinary teams, personalized care/precision medicine, culture of wellness, quality Improvement

CATEGORY
Gold Standard

- Intermountain Healthcare operates 22 hospitals and 185 clinics serving Utah and parts of Idaho. Intermountain provides insurance for nearly half of Utah's population through its SelectHealth plans.
- Because Intermountain Healthcare provides both insurance and care, it has greater incentive to avoid long-term costs.
- Intermountain invests heavily in population health, doing so through TeleHealth Services and their LiVe Well initiative.
- SelectHealth members commit to engaging in screenings and behaviors for prevention and health maintenance in exchange for lower premiums than those offered by competing insurers.

Established in 1975, Intermountain Healthcare is the largest healthcare provider in the Intermountain West, providing both care and coverage in Utah and southeastern Idaho. Intermountain operates 22 hospitals and over 185 clinics in the region. It also operates SelectHealth, which provides insurance coverage in the region.[278]

Intermountain operates with a dedicated emphasis on innovating to create an affordable and sustainable health system. In operating both as a healthcare system and as the insurance provider for a large fraction of the people they treat, Intermountain Healthcare takes accountability for its own costs, and reaps the benefits of any health improvements and cost-savings that it can achieve among its population. One way SelectHealth promotes cost-savings is by requiring health screenings, therefore avoiding delays in care that can lead to later high costs. In exchange, SelectHealth is able to guarantee its members that health insurance premiums will rise at a substantially lower rate than most major insurers.[279]

Because it has taken on a model based on lowering or preventing costs, rather than a strictly fee-for-service model, Intermountain places a strong emphasis on population health, focusing more heavily on "upstream" factors to maintain health, prevent disease, and reduce long-term costs.[280]

One of Intermountain's most prominent examples of its population health approach is its LiVe Well initiative, a comprehensive wellness promotion effort that uses a variety of educational resources, games, and online tools to encourage and support everything from healthy eating to pregnancy to health in schools in workplaces.[281]

KEYS TO SUCCESS

Emphasis on Prevention

Through its LiVe Well initiative, and its focus on population health more broadly, Intermountain Healthcare puts effort into disease prevention to a degree far beyond most U.S. hospital systems. Beyond just treating individual patients, Intermountain Healthcare's central goal is to sustain the health of its entire patient population, working to keep patients *out* of its hospitals and clinics whenever possible. This focus on avoiding the need for care at scale, not just delivering care, makes Intermountain a leader in the effort to design a more affordable, sustainable healthcare system.

Accountability for cost reduction

While most healthcare systems in the United States operate on a fee-for-service model that, many argue, incentivizes care rather than health, Intermountain, through SelectHealth, sets overall cost limits regardless of services provided, thereby establishing a model where the incentive is all about minimizing healthcare costs. The most important means to accomplish this is by avoiding unnecessary treatment, and preventing or delaying costly conditions or complications whenever possible. In this way, the same things that are good for the patient—sustained health, prevention of disease, lower costs, and avoidance of unnecessary treatment—are also good for the healthcare system.

Focus on patient engagement

There is a heavy emphasis on making care easy and convenient for patients when they are receiving care, and engaging patients in healthy behavior when they are outside of the care setting. Intermountain offers Connect Care, which allows patients to have 24/7 digital access to urgent care through their computer or mobile device. Intermountain's TeleHealth offerings range from diabetes education to newborn care.[282]

When patients aren't receiving care, Intermountain still works to encourage health engagement through their LiVe Well initiative.[283] The LiVe Well Health Library, freely accessible online, offers extensive educational resources. Likewise, the LiVe Well campaign offers information on everything from healthy recipes to directories of weight management classes to recommendations for local hiking and biking routes in Utah.[284] Intermountain Health's SelectHealth plans require patients to engage in healthy behaviors, and the LiVe Well resources give patients the tools to do exactly that.

ABILITY TO INSPIRE

Intermountain Healthcare has received numerous awards for innovation in healthcare, including a Microsoft Health Innovation Award in 2015 and the Hearst Health Prize—recognizing outstanding achievement in managing or improving health—in 2017.[285] In 2016, the SelectHealth models were featured in the *New York Times* in an article titled, "A Novel Plan for Health Care: Cutting Costs, Not Raising Them," which highlighted SelectHealth as an innovative model for higher quality, more cost-effective healthcare.

COST EFFECTIVENESS

Many of Intermountain's strategies have already been demonstrated as cost-saving in significant ways. One example— a protocol intended to reduce C-sections and elective induced deliveries by creating a defined set of criteria for when an elective delivery is appropriate —saves an estimated $50 million per year in Utah and could potentially save $3.5 billion per year if applied to the entire United States.[286] While the long-term cost savings of SelectHealth plans are yet to be determined, Intermountain Health has estimated that its methods, which aim to prevent the need for high cost care, will result in $2 billion of savings over the next five years.[287] While this cannot be traced or credited to Intermountain's efforts alone, the state of Utah had, in 2014, the lowest healthcare expenditure per capita of any state in the U.S., fully 25% lower than the national average.[288]

DRAWBACKS AND LIMITATIONS

SelectHealth is Utah's largest insurer, making up over 40% of all group health plans and over 50% of all individual plans.[289] Because SelectHealth, not to mention Intermountain's 22 hospitals and 185 clinics, serve such a substantial proportion of the region's population, Intermountain and SelectHealth are likely to reap the benefits of their own investment in overall population health. By contrast, a health system with only a small market share of any given region may have less incentive to invest in the health of the region's entire population, as a different hospital system and/or insurer is more likely to reap the benefits of long-term cost-savings.

9. MSWEIGHT

NAME OF PROGRAM
Weight Management Counseling in Medical Schools (MSWEIGHT)

ORGANIZING GROUP
University of Massachusetts, National Cancer Institute

LOCATION
Brown University, Creighton University, Georgetown University, Harvard School of Public Health, Oregon Health and Science University, University of Alabama at Birmingham, University of Iowa, University of Louisville, University of Pennsylvania

PROGRAM TYPE
Nutrition and healthy eating, medical education, obesity

CATEGORY
Innovator

- MSWEIGHT seeks to address the muffled discussion about obesity in US health education and healthcare.
- Through a 5-year intensive study (3,311 participants at 9 of the most selective US medical schools), the program is testing a new model for teaching weight management counseling, called MS Weight.
- The results of the study are determined through the standard medical school method (OSC Exam) and self-reported assessments.
- MS Weight is the first curriculum designed to teach Weight Management Counseling (WMC) to future physicians and to compare the results to the current medical curricula.
- Once completed, results from this innovative program have the potential to change the way future doctors acknowledge and address weight management counseling.

Given that more than 2 in 3 adults in the United States are considered overweight and more than 1 in 3 U.S. adults are considered obese, there is significant need for healthcare professionals to know how to help their patients lose weight.[290] However, most physicians report limited skills or training to provide weight management counseling. In response, Drs. Judith Ockene and Rashelle Brown Hayes designed the MSWEIGHT curriculum for Weight Management Counseling in Medical Schools. They are currently leading a randomized controlled trial across 3,311 students in collaboration with the National Cancer Institute and 9 highly selective US medical schools. The study "compares the efficacy of two approaches to learning weight management counseling 1) traditional education (TE) and; 2) MS Weight, a multi-modal educational (MME) intervention."[291]

MS WEIGHT MME CURRICULUM

Whereas the study defines TE as the schools' current curriculum, which "may include topics related to the treatment of weight management and obesity" as well as "sporadic stand-alone lectures or small group discussions conducted separately or as a part of a patient interviewing or behavioral course," the innovative, multi-modal (MME) program consists of "a tested web-based curriculum, a series of interactive counseling practice opportunities with observation and feedback, video demonstrations, a formative web-based OSCE, and a school Weight Management Counseling (WMC) social media Facebook page."[292] This MSWeight curriculum offers a more in-depth, crafted approach to addressing patient weight.

STRUCTURE OF THE STUDY

Students in this randomized controlled trial learn through either TE or MME. The efficacy of each approach is measured after completion of the third year by an exam called the Objective Structured Clinical Exam (OSCE), which is already in place as the standard evaluation of medical students' skills. The secondary method of measuring efficacy is through self-report. The participating medical students assess their own skills in "the 5As:" Ask, Advise, Assess, Assist, and Arrange. This longitudinal assessment is replicated after the first and third year of school.

GOAL

When speaking with Sandra Gray from UMass Medical School Communications, Dr. Hayes said, "Our goal is to not only enhance weight management counseling skills but also to increase obesity treatment knowledge and improve attitudes on the importance and potential ease of helping patients manage their weight."[293] This is taught through hands-on opportunities, applied educational theories, and addressing common biases.

WHY IT STANDS OUT

In conducting this study, Drs. Ockene and Hayes are actively working to address what they see to be a "weak spot" in the medical education system because current curricula are not properly equipped to face the challenges of weight management in our society. The MME curriculum applies evidence-based educational and psychological theories that challenge the standards currently in place, and in doing so focuses on determining what method provides the most effective counseling skills for addressing the increased prevalence of obesity.

EFFECTIVENESS

While this study is still in progress, results from its model-program, MSQuit—designed for education on how medical students learn to address tobacco use - resulted in the creation of an innovative curriculum that significantly enhanced students' confidence in the related skills.[294] Dr. Ockene noted that both studies were designed based on research in counseling education that was conducted over 30 years. Through standardized assessment *and* self-assessment, the data regarding competence and confidence of new doctors will provide the field with invaluable information that has the potential to better equip future healthcare teams with skills to address the obesity epidemic.

10. PEERS FOR PROGRESS

NAME OF PROGRAM
Peers for Progress

ORGANIZING GROUP
University of North Carolina

LOCATION
Chapel Hill, North Carolina (Headquarters), Worldwide

PROGRAM TYPE
Peer support, population health

CATEGORY
Gold Standard

- Peers for Progress researches and advocates for peer support as a complement to clinical care for patients with chronic diseases.
- Peer supporters are trained to provide assistance in daily self-management while providing emotional support and patient advocacy. They serve an important role as bridges between patients and conventional healthcare providers.
- Peers for Progress developed a Program Development Guide, which provides concrete ways to implement peer support that can be adapted to fit cultural contexts within global health systems.
- Peers for Progress's reports on the efficacy of peer support are striking: peer support is feasible, effective, and humanizes the way patients receive care.

Peers for Progress is an organization that promotes peer support as a "key part of health, health care, and prevention"[295] globally. Founded in 2006, Peers for Progress enhances the health and wellbeing of patients through research, publications, quality improvement, and program development for peer support to help manage chronic diseases. Dr. Edwin Fisher, Global Director of Peers for Progress, says, "We have lots of good medications, but helping people to manage chronic diseases such as diabetes is where the real gap lies in care and health outcomes."[296] Peer supporters can play an integral role in filling that gap.

WHAT IS PEER SUPPORT?

As Dr. Fisher says, "Support from other people is a powerful, fundamental characteristic of human behavior" that people need to live happier, healthier lives. Through non-hierarchical, reciprocal relationships, support from laypersons with shared lived experiences has a profound ability to impact the lives of people with chronic diseases. Peers are trained to deliver care in different capacities depending on the unique environments in which they work.

Peers for Progress promotes four core functions as a framework for developing, improving, and evaluating peer support programs. The four core functions of peer support are:

- Assistance in daily management
- Social and emotional support
- Linkages to clinical care and community resources
- Ongoing support

First, peers who provide support to patients with diabetes often have diabetes themselves or are close with someone who has diabetes. Therefore, they have unique knowledge and skills about the care

practices necessary to manage chronic conditions. Furthermore, peers also come from the same communities as the people they serve, enabling them to develop relationships of trust. Peers can provide social and emotional support to patients simply by "being there" for them. On top of that, peers who are trained in empathetic listening and motivational strategies help patients cope with social, emotional, and medical stressors. The third core function of peers is to link patients to clinical care and community resources. Peers are not medical professionals, but they can provide key resources and help patients overcome personal and socioeconomic obstacles that prevent them from accessing care. Finally, peers provide ongoing support to meet the changing needs of patients over time. Diabetes is "for the rest of your life," so peer support should be readily available and should adopt proactive strategies for continued patient engagement. Timely peer support helps patients feel secure and prevents them from falling through the cracks of fragmented medical systems.

KEYS TO SUCCESS

A major strength of Peers for Progress is its flexible framework that can be applied to a variety of cultures for patients with a wide range of chronic diseases. Its approach of "standardization by function, not content" transcends societal factors while promoting quality assurance. In its Program Development Guide,[297] Peers for Progress specifies the ways that communities can develop, implement, and evaluate peer support programs. Within each of these categories, the guide outlines specific ways to recruit and train peer supporters, provide supervision and backup, and evaluate program efficacy. It also outlines ways to make sure there is infrastructure within a community to allow peer supporters to thrive, and to figure out the best ways to reach those who are most underserved and may need the most help. The framework provides specific ways to ensure success while still maintaining flexibility so communities can implement the recommendations that best fit their patients' specific needs.

ABILITY TO INSPIRE

Peers for Progress strives to humanize care within healthcare systems that can often feel impersonal. Peers make patients feel "secure, respected, and empowered" when seeking medical care. They fill the gap between healthcare providers and patients; they can provide practical advice and care while also advocating for them within the larger health community. Dr. Fisher says, "Peers end up helping patients in areas where healthcare providers have trouble. Having a good peer support program makes the healthcare provider able to do a better job in their profession and be more effective with patients."

Efficacy in improving health outcomes

Through a variety of methods, including randomized control trials, qualitative studies, and expert convening, Peers for Progress has found that peer support is both humanizing and cost-effective for patients with chronic diseases. In 2014, the organization hosted a conference to advance the field of peer support in diabetes care, and some of their key findings are explained here.

Peers for Progress found that peer support is feasible. It can be successfully implemented across the globe, regardless of socioeconomic limitations and cultural differences. There are natural helpers in every community that have the ability to serve as peer supporters, and healthcare organizations have found creative ways to integrate peers into their practice. Furthermore, patients desire peer support and see it as a valuable complement to conventional health care.

Next, Peers for Progress found that peer support is effective in improving health outcomes. Several studies have documented improved health outcomes for patients with diabetes who were involved in peer-support led diabetes education and management interventions, including improvements in glycemic control, reduction in HbA1c, fewer foot ulcers, and reductions in foot amputations.[298] The Global Evidence for Peer Support report describes that, among "14 projects funded by Peers for Progress, HbA1c declined from an average of 8.5% to 7.7%, systolic blood pressure from 137 mmHg to 134 mmHg, and BMI from 32.0 to 30.9 kg/m2."[299] These successes represent just a few of the many projects from the Peers for Progress network that have shown remarkable results.

DRAWBACKS AND LIMITATIONS

While Peers for Progress has had amazing success, there are areas in which it hopes to improve. Dr. Fisher wishes that the organization focused more on group mentoring that occurs organically, instead of solely on individual peer-patient relationships, which are more convenient to study with randomized trials.

Mr. Patrick Tang, a program manager at Peers for Progress, feels that more advocacy efforts are needed to bring peer support into the mainstream. Mr. Tang says, "In order to make systemic or policy changes, we have to have a strong advocacy arm in addition to building a strong evidence base."[300] In an era of ongoing debates about healthcare reform, the time is ripe for expansion of peer support.

11. PRIMARY CARE—POPULATION MEDICINE PROGRAM

NAME OF PROGRAM
Primary Care-Population Medicine Program

ORGANIZING GROUP
The Warren Alpert Medical School of Brown University

LOCATION
Providence, Rhode Island

PROGRAM TYPE
Medical education, population health, social determinants of health

CATEGORY
Gold Standard

- The Primary Care—Population Medicine Program (PCPM) is a dual-degree program allowing select students at Brown University's Alpert Medical School to graduate with both an MD and a Master of Science Population Medicine.
- The Masters in Population Medicine curriculum focuses on helping students develop knowledge and skills in healthcare quality, safety, leadership, a disparities, and population health.
- In their third year, PCPM students participate in a Longitudinal Integrated Clerkship—a clerkship model designed to deepen students understanding of the continuum of healthcare.

In 2015 Brown University launched the Primary Care-Population Medicine (PCPM) Program, an innovative dual degree program designed to prepare students for a career in medicine and population health leadership. The program is the first of its kind in the United States, offering medical students the opportunity to earn both a Medical Degree (MD) and Master of Science in Population Medicine (ScM) in four years. According to Dean Paul George, MD, Director of the PCPM Program, the program was developed to address the critical deficiency of primary care providers in the U.S. (an estimated shortage of 20,400 providers in 2020[301]) and to "create new-age physicians, who are well-versed in social determinants of health, health disparities, health economics, and population health."

In addition to the traditional basic science medical school curriculum, the PCPM program integrates two additional major components: the Master of Science in Population Medicine coursework and the Longitudinal Integrated Clerkship (LIC). For the Master of Science in Population Medicine, students develop the knowledge and technical skills necessary for navigating the rapidly evolving 21st century healthcare system through coursework in health systems and policy (US and abroad), biostatistics and epidemiology, quality improvement, and population and clinical medicine. Additionally, students perform scholarly work for their Masters by completing a thesis research project related to population health. The other major component of the PCPM program is the Longitudinal Integrated Clerkship (LIC), which begins in the third year of medical school. Instead of rotating through clerkships every six weeks, students in the PCPM program spend one half-day per week with a mentor in family medicine, internal medicine, obstetrics and gynecology, pediatrics, psychiatry/neurology, and surgery over the course of one year. Students are also assigned to

a patient panel of 75-100 patients, whom they accompany to health care settings such as primary care offices, specialty appointments, the operating room, rehabilitation, and home care. Through this experience, students gain insight into the realities of navigating the health care system.[302]

The program ultimately aims to graduate more primary care physicians, and also encourages specialization in areas of critical need like endocrinology and nephrology. PCPM students, however, are not required to enter a specific specialty in medicine, as the program recognizes students' interests may change over time and acknowledges "the need for physicians trained in population medicine in all specialty areas."[303]

KEYS TO SUCCESS

Engagement with local community

One major strength of the PCPM program is its facilitation of local community engagement. In the third year, students complete a "Social and Community Context of Healthcare Project," in which they learn about the health and social needs of the Providence community *from* members of the community. After speaking with community members and learning in depth about the specific local context, students propose and implement a project to address a community healthcare or social service need. Past projects have included educating people in local homeless shelters on how to deliver Narcan, an emergency treatment for opioid overdose (Rhode Island has one of the highest rates of opioid overdose-related deaths[304]) and teaching local high school students about the health effects of vaping. According to Dean George, the Social and Community of Healthcare projects are unique and rewarding as students engage in projects that are "related to medicine, but not typical of medical education."

Leveraging existing resources and talents

Dean George emphasized the importance of leveraging existing resources in creating a program that successfully alters—and enhances—the traditional medical school curriculum. While the Alpert Medical School briefly entertained creating a separate track for its PCPM students, the decision was made to keep PCPM and traditional medical students together for basic science education. The sharing of resources can go both ways. One unexpected benefit that came with the development of the PCPM program was the creation of the first course in the Masters Sequence on "Social Determinants of Health and Health Disparities." Recognizing the salience of these topics, the Alpert Medical School leadership decided to offer the course that was initially designed for the PCPM program to all of its medical students, making "Social Determinants of Health and Health Disparities" an official requirement of the first-year curriculum.

Beyond the collaboration within the medical school, the PCPM program has also leveraged the expertise of leaders from the broader university. Integrating faculty from Brown's School of Public Health and the University's Department of Economics for the Masters coursework has been critical in developing and sustaining the program.

ABILITY TO INSPIRE

Brown's PCPM program, as the first of its kind, will hopefully serve as a model for other medical schools on how to integrate population health into the traditional medical school curriculum. Commenting on the changes he hopes to see in medical education and healthcare, Dean George said, "I would love to see a course at every medical school on social determinants and health disparities [as well as] the intersection between clinical medicine and population health."

DRAWBACKS & LIMITATIONS

The PCPM *expands* upon what is considered an already dense and demanding medical school curriculum. While Dean George said that the vast majority of students can handle the additional coursework in population health, he acknowledged that the program and the additional work it requires are not for everyone.

The impact of the PCPM program on the landscape of healthcare professionals remains to be seen as the first class has yet to graduate. How students of the PCPM program fare in comparison to traditional medical students is also a question that warrants further examination as the program evolves. Lastly, given that participants are not required to go into primary care, it will be interesting to see if the program is successful in increasing interest and practice in primary care.

12. PREMIER INC.

NAME OF PROGRAM
Premier Inc.

ORGANIZING GROUP
Premier, Inc.

LOCATION
Charlotte, NC (headquarters), serves the U.S.

PROGRAM TYPE
Online/app-based/digital, medical education, quality improvement

CATEGORY
Prime Performer

- Through its multiple software programs, Premier is using groundbreaking technology to provide information and to use constant "feedback" to:
  - Tailor the continued education of physicians
  - Improve the quality of healthcare delivery
  - Allow for coordination between healthcare teams.
- Platforms include Avedis Enterprise and MedConcert, among others.
- Premier uses market analysis, performance reporting and data analytics to raise standards of treatment and improve quality of care.

As the U.S. healthcare system moves toward value-based models, healthcare metrics, data analytics and performance improvement are more important than ever. Premier provides cloud-based service platforms to allow healthcare organizations to track, manage, report and improve performance in real-time. Premier serves over 5,000 medical practices and 1.2 million healthcare professionals to support the care of over 50 million patients.

Premier's performance improvement platform focuses on the following areas:

1. Supply chain and ecommerce
2. Integrated pharmacy
3. Value-based care

While Premier's platform has many different capabilities, the most relevant for Healthcare Teams of the Future are outlined below:

1. **Premier's performance management and improvement software** helps organizations engage providers, simplify reporting for value-based payment and ultimately improve quality of care and population health. On the individual level, it gives providers real-time actionable data on patient-level gaps in care. For example, it reports the percent of total patients with HbA1c levels greater than 9 percent, identifies patient outliers to help close care gaps and suggests improvements in real time. The capability can help improve provider engagement by displaying performance trends, peer-to-peer provider comparisons and quality reporting results. It is also the first cloud capability to support performance measurement across complex healthcare delivery systems (e.g. ACOs, multiple payer delivery systems) by aggregating provider-level metrics so data can be analyzed by hospitals, networks and states. Finally, it's performance data collection and analysis can be used for

quality reporting to help organizations' participation in value-based payment models.

2. Premier also helps healthcare professionals, hospitals and health systems **improve performance, connect medical practice communities, and facilitate coordination of care.**[1]

Networks: The social network aspect of the software allows for community building among healthcare professionals and between patients and clinicians, in public and private. Organizations can share and learn from other teams and departments. Secure, private communications can be used to coordinate the care of a patient across multiple physicians.

Performance: The system tracks personal performance metrics and can compare individual performance to peers and national quality benchmarks.

Incentivizing Improvements: Gaps in performance are linked with suggestions for improvement and more efficient investments. Feedback and suggestions for how to improve quality and close performance gaps can also be crowd-sourced from the community.

ANALYSIS

As Premier summarized healthcare reform, "Value is the new economy. Measurement is the new currency."[305] In the new age of health information technology and value-based payments, platforms such as Avedis Enterprise and Medconcert can be valuable in tracking large amounts of data on health metrics, and more importantly can be used to drive performance improvement across individual providers, health care practices, and systems.

13. USC LIFESTYLE REDESIGN

- The Lifestyle Redesign program uses an occupational therapy model of lifestyle intervention to support people with a wide variety of chronic conditions.
- The occupational model places an emphasis on understanding the everyday needs and challenges one faces and establishing habits and self-management skills to address them.
- Studies of the Lifestyle Redesign model among older adults has demonstrated cost-effective improvements in quality of life based on measures of mental health, chronic pain, social functioning, and more.

NAME OF PROGRAM
USC Lifestyle Redesign

ORGANIZING GROUP
University of Southern California Chan Division of Occupational Science and Occupational Therapy

LOCATION
Los Angeles, California

PROGRAM TYPE
DPP Translation, interprofessional/ interdisciplinary teams, personalized care/precision medicine, behavior change

CATEGORY
Prime Performer

USC's Lifestyle Redesign® program is an occupational therapy treatment program aimed at supporting individuals living with a chronic condition that might benefit from a lifestyle-based intervention. Rather than taking a disease- or condition-specific approach to care, Lifestyle Redesign aims to support patients in developing the skills, habits, and management techniques that can support the everyday needs of individuals. Lifestyle Redesign offers programs for a wide variety of chronic conditions, ranging from diabetes and prediabetes to chronic pain to autism/ Asperger's spectrum among adults and teenagers.[306]

Lifestyle Redesign's model is based around creating personalized intervention plans that can help people develop skills and habits to prevent or manage the complications and challenges of chronic conditions. The model is based on the Well Elderly studies[307] conducted at USC, which used techniques of occupational therapy in a proactive, preventive way to enhance the physical and mental well-being of older adults living independently. The Well Elderly studies featured a primarily group-based intervention intended to address the risks and challenges of aging. Both studies found that individuals participating in the intervention reported significantly better outcomes in mental health, pain, social functioning, life satisfaction, and more.[308]

The Lifestyle Redesign program takes the occupational-science based methodology of the Well Elderly studies and applies it not only to the risks and complications of aging but also to a wide variety of other conditions and diseases. Whether focused on diabetes prevention, chronic stress, or ADHD, Lifestyle Redesign's goal is to deliver any and all non-medication-based interventions and supports that can help patients with their long-term management.

ANALYSIS
The Lifestyle Redesign approach offers a powerful advantage over many forms of clinical care—it addresses chronic conditions not as

isolated diseases but as an integrated and formative part of everyday life for the patients who experience them. The occupational therapy approach addresses not just the physiology of a condition but also the way it impacts and matters to the individual. As a result, the personal intervention is able to meet the self-defined needs of the patient, improve patient satisfaction, and increase the opportunity for continued engagement and motivation for both the intervention and overall self-management. Certainly, in many circumstances, there will be challenges for which medication remains the best solution, but effective lifestyle intervention has the potential to address the needs that medication alone cannot sufficiently address, including overall sense of well-being, healthy habit formation, and, in many cases, prevention, either of conditions or their complications. This lifestyle, occupation-based intervention is also beneficial in that it is well-suited to address the frequency with which chronic conditions are co-morbid, as in the case of an individual living with both diabetes and chronic stress.

Additionally, the Well Elderly 2 study demonstrated that the Lifestyle Redesign program is cost-effective, functioning at a comparatively low-cost means of improving quality of life and preventing health declines and complications over time.[309] The Lifestyle Redesign model offered in the Well Elderly studies, was primarily group-based and supplemented by occasional one-on-one visits with therapists (once per month during the nine months of each Well Elderly study), which helped make the intervention cost-effective. It should be noted that most Lifestyle Redesign interventions currently offered in clinic are individual-based. However, some group-based curriculums are offered for weight management and fibromyalgia, and a diabetes prevention group will also be available soon (modeled on the CDC DPP curriculum, supplemented with Lifestyle Redesign's occupational therapy curriculum).

14. VANDERBILT PROGRAM IN INTERPROFESSIONAL LEARNING

NAME OF PROGRAM
Vanderbilt Program in Interprofessional Learning

ORGANIZING GROUP
Vanderbilt University School of Medicine, Nursing & Divinity; Lipscomb University; University of Tennessee; Tennessee State University

LOCATION
Nashville, Tennessee

PROGRAM TYPE
School-based, medical education, interprofessional/ interdisciplinary teams, health innovation and leadership, population health, quality improvement

CATEGORY
Gold Standard

- The Vanderbilt Program in Interprofessional Learning (VPIL) is a two-year educational program designed to prepare students in medicine, nursing, social work, and pharmacy for the future of collaborative patient care.
- Students from Vanderbilt University Schools of Medicine and Nursing, Lipscomb University College of Pharmacy, and University of Tennessee and Tennessee State University Department of Social Work, work in interprofessional teams for one-half day per week in clinical settings.
- Students further develop skills necessary to deliver patient, family, and community-centered care through their education in quality improvement, patient advocacy, and health coaching, among other population health topics.

Vanderbilt University's Program in Interprofessional Learning (VPIL) is a comprehensive and innovative educational program for future health care professionals. The program, established in 2010, focuses on uniting students from five different disciplines—Medicine, Social Work, Nursing, and Pharmacy, and most recently Divinity—in order to prepare them as a team for the evolving field of medicine. The program enrolls approximately 60 students each year from four partner institutions: Lipscomb University College of Pharmacy, University of Tennessee and Tennessee State University Departments of Social Work, and Vanderbilt University Schools of Medicine, Nursing and Divinity. VPIL participants from each professional background work in interprofessional teams over the course of two academic years.

The VPIL curriculum seeks to teach patient, family, and community-centered care through a variety of curriculum components. One of the main features of VPIL is clinic-based learning. VPIL student teams work together for one half-day each week to provide care to a panel of patients, under the supervision of multi-professional providers. Students are exposed to and participate in delivering a range of healthcare and social services, including health coaching, medication counseling, arranging laboratory and imaging services, home visits, patient education sessions, and connecting patients to community resources. VPIL students also collaborate outside of the clinic, in classroom-based activities for one half-day each month. Teams are able to reflect on their experiences in the clinic, assess their performance, and discuss patient outcomes and needs. Such case-based learning emphasizes the social and behavioral determinants of

individual and community health. Students also learn about systems of care and healthcare quality improvement, actively applying their skills by developing and implementing short and long-term quality improvement projects, which culminates in a capstone project.[310]

KEYS TO SUCCESS

Clinical teamwork from the start

Students participating in the two-year program start their VPIL learning at the beginning of their graduate-education careers. This is an especially notable shift for medical students, who typically begin their clinical clerkships in the third year, after two years of classroom-based learning. However, early clinical exposure and patient interaction is not the only thing that sets VPIL apart. What truly distinguishes VPIL is the quality of that clinical exposure and the interprofessional team-based interactions that make them "collaboration-practice-ready."

This educational experience cultivates what Director of VPIL Program Development, Dr. Heather Davidson, considers to be one of the most important skills for future healthcare professionals: meaningful and effective communication. Dr. Davidson noted that the ongoing communication training required for successful healthcare professionals is multi-level, when she said these skills apply, "Not just to verbal communication, but electronic communication as well—with patients and within teams." The interprofessional teams facilitate communication between professional members of the care team, tackling one of the major challenges in healthcare, that Dr. Davidson emphasized, "that information is so incredibly fragmented." Commenting on the combined clinical and classroom learning in the program, Dr. Davidson said, "As students gain a deeper understanding of [health] systems knowledge, they are able to understand how to hand off information [to other professionals] in ways that are most effective."

Patient-centered care

One of the central values of the VPIL program is, "including the patient as a true member of the team". For patients with chronic conditions, like diabetes, this approach is incredibly refreshing because, as Dr. Davidson recognized, "So many [patients with chronic conditions], who have lived with their conditions for many years, have become experts in their own condition—yet, are still not included as a member of their care team." Thus, in addition to systems-level communication, students also learn the intimate communication skills necessary to interact with patients, or as Dr. Davidson framed it, "to sit with human beings, learn about their values and practice the best methods of engagement that is meaningful to a patient."

ABILITY TO INSPIRE

As one of the few programs of its kind, VPIL can serve as a model to other medical and health professional schools as to how to integrate interprofessional learning into school's curriculums. VPIL has already been recognized by the Journal of the American Medical Association as an exemplar program providing, "meaningful roles for medical students in the provision of longitudinal patient care."[311]

DRAWBACKS/LIMITATIONS

Given the VPIL program is relatively new and small in scale (~60 students per year), it is difficult to assess the program's impact on the healthcare landscape. Additionally, while Dr. Davidson noted that many students who join the program are attracted to it due to their interests in primary care and community health, it is unclear what proportion of graduates will actually make their careers in these fields. While Interprofessional collaboration is helpful to every specialty, it will be interesting to see if the program is able to impact the critical deficiency of health care providers in fields like primary care.

15. VIRTA

NAME OF PROGRAM
Virta Clinic

ORGANIZING GROUP
Virta Health

LOCATION
San Francisco, California

PROGRAM TYPE
Nutrition and healthy eating, online/app-based/digital, personalized care/precision medicine, behavior change

CATEGORY
Innovator

- Virta is an "online specialty medical clinic" focused on improving and even reversing type 2 diabetes
- Patients receive an individual nutritional plan focused on establishing "nutritional ketosis" through very low-carb diets.
- Patients access their care team, including an overseeing physician and a dedicated one-on-one coach, through a digital platform that also allows for biometric monitoring by both patient and provider.
- The digital platform allows for more continuous care and at-home support than traditional in-person care models.
- Initial published results show significant reductions in A1c, weight, and reduction/elimination of medications after just 10 weeks.

Virta Health launched in 2017 with a stated goal of reversing type 2 diabetes in 100 million individuals by 2025.[312] Its model for bringing type 2 diabetes into remission focuses on establishing "nutritional ketosis," in which a diet very low in carbohydrates causes the body to turn to fat and protein for energy. Virta's initial trial results found that, after just 10 weeks, participants saw an average A1c reduction of 1.1% and lost an average of 7.2% of their bodyweight. Further, a substantial proportion of trial participants reduced the dose of or eliminated their medication, including 87% of those on insulin and a majority of patients using several common varieties of oral drugs.[313] At six months these numbers continue to improve, with patients experiencing an average 12% reduction in weight and a 1.5% drop in A1c.[314]

Perhaps the most innovative aspect of Virta's model, however, is its method of reaching and supporting its patients. Virta describes itself as an "online specialty medical clinic," meaning that participating patients interact with care teams digitally through the Virta app. The care team includes physician supervision and one-on-one health coaching. Virta also includes the opportunity to participate in peer support groups for those who are interested.[315] The care team helps to develop an individual nutrition plan for each patient, monitors various biometric markers, and provides a steady source of support and guidance.

WHY IT STANDS OUT
Virta's "online specialty medical clinic" model—featuring a multi-member care team, an individualized care plan, and regular support and interaction—makes it stand out among an extensive field of apps and other digital health supports. Beyond simply providing coaching, logging, or fitness tracking support, the Virta online clinic is designed

to function as a complete diabetes care model. By allowing patients to access their providers through mobile devices, Virta presents a potentially sustainable solution to many of the barriers and challenges presented by care delivered in brick-and-mortar practices, including transportation and scheduling issues, gaps between visits, and more.

In addition, Virta's focus on reducing patients' medication needs through lifestyle change alone presents a path to long-term cost efficiency. The first published results describing Virta's outcomes from its two-year clinical trial showed that, at 10 weeks, of patients who had been taking some of the most expensive diabetes drug types, including insulin, DPP-4 inhibitors, and SGLT-2 inhibitors, a majority had decreased their dose or eliminated the medication altogether.[316] While the involved, multimember care teams mean that Virta costs more than other digital diabetes supports focused solely on management—approximated at $400 per month for individuals paying out-of-pocket (although most individuals join Virta through an employer-sponsored health plan, meaning they pay little or nothing out-of-pocket)—it has the potential to produce major long-term cost savings if the early results show multi-year sustainability.

Finally, while Virta is placing its marketing focus on individuals who have already been diagnosed with type 2 diabetes, the model has the potential to serve as a prevention tool for those with prediabetes. As such, the broader population that Virta might reach, and the potential to prevent future cases of type 2 diabetes, mean that Virta has notable opportunity for scale and for broader systems-level cost-savings over the long term.

PART V:
Appendix: Expert Panelists, Contributors and Acknowledgements

EXPERT PANEL BIOS

1. **Dr. Faith Foreman** is the Assistant Director of the Houston Department of Health & Human Services. She also serves as the Chair of Cities Changing Diabetes, a partnership program dedicated to investigating and solving the problem of diabetes in urban centers. An expert in public and community health promotion, evaluation and planning, Foreman has lead the design, implementation and evaluation of numerous health interventions at the local, state and federal level. She has a special passion for eliminating health disparities among marginalized communities and strives to bring social justice and equity to the delivery of preventive health services. She received her PhD in Public Health from the University of Texas Health Center at Houston.

2. **Dr. Timothy Garvey** is a Professor of Medicine and Chair of the Department of Nutrition Sciences at the University of Alabama at Birmingham. He obtained his MD degree, cum laude, from St. Louis University in 1978, and completed residency training in Internal Medicine at Barnes Hospital, Washington University, in 1981. He subsequently held faculty posts at the University of California, School of Medicine (Assistant Professor), Indiana University School of Medicine (Associate and full Professor), and from 1994 to 2003 was the Director of the Division of Endocrinology, Diabetes, and Medical Genetics at the Medical University of South Carolina. Dr. Garvey began working at the University of Alabama at Birmingham in 2004.

3. **Dr. James Gavin III** is a noted leader in the field of diabetes, serving as CEO and Chief Medical Officer of Healing Our Village, Inc, Clinical Professor of Medicine at Emory University School of Medicine, and Clinical Professor of Medicine at Indiana University School of Medicine. Dr. Gavin is a former president of the American Diabetes Association, recipient of the Banting Medal for Distinguished Service, and in 1991 received the Association's Clinician of the Year award for his contributions to diabetes care. In 2010, Dr. Gavin, along with the rest of the Kapche Litigation Team, received the Association's Public Policy Leadership Award for his work in defending the right of people with diabetes to live free of discrimination. He earned his PhD in biochemistry from Emory University and his MD from the Duke University School of Medicine.

4. **Dr. Bon Ku** is an Associate Professor of Emergency Medicine at the Sidney Kimmel Medical College at Thomas Jefferson University. Dr. Ku founded and directs a program that teaches medical students to solve healthcare challenges using design thinking. The first ever design program in a medical school empowers future doctors to redesign healthcare services, physical spaces and medical devices. Ku received his B.A. in Classical Studies from Penn, M.D. from Penn State College of Medicine, and M.P.P. from the Woodrow Wilson School at Princeton University. He completed an emergency medicine residency at Long Island Jewish Hospital where he was a chief resident and a fellowship in point-of-care ultrasound at Penn.

5. **Dr. David Napier** is a Professor of Medical Anthropology at University College London (UCL) and Director of its Science, Medicine, and Society Network. Professor Napier has been involved in three Lancet commissions, leading the 2014 Lancet Commission on Culture and Health. He regularly writes for the press and is lead author on a just published WHO Policy Brief on the Cultural Contexts of Health and Well-being. For his

activities with more than 100 charities and NGOs, the UK government and research councils awarded him the first Beacon Fellowship in Public Engagement. Napier is also the recipient of the Burma Coalition's Human Rights Award, and has served as a consultant on vulnerable populations in the aftermath of natural and human disasters, having, among others, worked for the World Health Organization, CRISIS UK, The United Nations, and the International Organization for Migration. He is currently the academic lead on the global Cities Changing Diabetes initiative and writing a new book on social trust.

6. **Dr. Donna Ryan** is Professor and Associate Executive Director for Clinical Research at the Pennington Biomedical Research Center. Dr. Ryan has dedicated her career to obesity management and prevention, and she has initiated a multitude of studies regarding weight loss routine in medical practice and other aspects that relate to effectively managing obesity. She has previously served as President of the Obesity Society. She is the Principal Investigator of LOSS (Louisiana Obese Subjects Study) and has been an Investigator on the Diabetes Prevention Program. She is an active mentor as Chair of the Clinical Mentoring Committee at PBRC, particularly encouraging junior women scientists. She earned her MD at the Louisiana State University School of Medicine.

7. **Dr. Barbara Troupin**, the Chief Medical Officer and VP of Clinical Development and Regulatory Affairs at Aquinox Pharmaceuticals, Inc, is a licensed physician and Diplomate of the American Board of Obesity Medicine. Dr. Barbara Troupin, MD is a family medicine doctor who practices in San Diego, CA. She has been practicing for 22 years. Dr. Troupin has worked in the therapeutic drug development aspect of medicine for over 18 years, leading strategy as well as clinical development at multiple institutions, She earned her MD and MBA from the University of Pennsylvania Perelman School of Medicine and Wharton School. She earned her BA in biochemistry and cell biology at the University of California San Diego.

8. **Dr. Jaakko Tuomilehto** is a Professor of Public Health at the University of Helsinki, Finland and is associated with the Diabetes and Genetic Epidemiology Unit of the National Public Health Institute in Helsinki, Finland. He received his medical degree and his MPolSc in psychology, sociology, and statistics from the University of Turku, Finland before acquiring his PhD in Epidemiology and Community Medicine at the University of Kuoprio, Finland. Dr. Tuomilehto has received the India's Prof. M. Viswanathan DRC Silver Jubilee Oration Award; Hans Chiari Award of the Austrian Stroke Research Society, the Kelly West Award for Outstanding Achievement in Epidemiology from the American Diabetes Association and the Peter Bennett Diabetes Epidemiology Award from the International Epidemiology Group.

9. **Virginia Valentine** is a Clinical Nurse Specialist for Sage Specialty Care in Albuquerque, NM. As an Advanced Practice Nurse, she provides clinical management and diabetes education for a wide variety of patients and clinical challenges. She is also Scientific Officer and Area Director for PromoLogics Inc., a specialty healthcare marketing agency exclusively focused on Nurse Practitioners and Physician Assistants. Ms. Valentine received her Master of Science in Nursing degree from the University of Oklahoma College of Nursing in Oklahoma City. She is Board-Certified in Advanced Diabetes Management and is a Certified Diabetes Educator. In 2006, the American Association of Diabetes Educators recognized Ms. Valentine with its Distinguished Service Award and awarded her Fellow status in 2010. Ms. Valentine is the author of Diabetes, the New Type 2. She has been living well with type 2 diabetes for over 30 years.

CONTRIBUTOR BIOS

1. **Dr. Brittany Adler** is a Rheumatology Postdoctoral Fellow at Johns Hopkins. She received her MD from the Case Western Reserve University School of Medicine and completed her residency in Internal Medicine at the University of Pennsylvania.

2. **Dr. Osman ("Ozzie") Ahmed**, MD, MPH, the director of population health at WellMed, studied at Cairo University, where he received his MD. He graduated from Zagazig University with a Master's degree in public health. He then continued on to the University of Pittsburgh, earning a doctorate degree in public health and epidemiology. He was an associate flight surgeon at NASA from 1993 to 1994.

3. **Dr. Ann L. Albright** assumed the position of Director, Division of Diabetes Translation (DDT) in January 2007. She received her doctoral degree in Exercise Physiology from the Ohio State University. Dr, Albright completed a National Institutes of Health postdoctoral fellowship in nutrition at the University of California, Davis and a clinical internship in nutrition at University of California, San Francisco (UCSF).

4. **Melissa An** is an MD candidate at the University of Missouri, where she is involved in leading the student-run clinic and global health interest group. She worked at Close Concerns as an Associate after graduating from Dartmouth College in 2014, with a major in Neuroscience and minor in the Anthropology of Global Health. At Close Concerns, she was promoted to Senior Associate in 2015 and served as the lead associate on obesity and public health coverage as well as the company's Chief Technology Officer. In her undergraduate years at Dartmouth, Melissa explored her interests for global health by leading Dartmouth's chapters of GlobeMed and China Care, in addition to serving as Executive Director of the Dartmouth Global Leadership Program.

5. **Dr. Samir H. Assaad-Khalil** is a Professor of Internal Medicine at the Alexandria University Faculty of Medicine Unit of Diabetes and Metabolism. He is a member of the Council of the Diabetes Education Study Group (DESG) and European Association for the Study of Diabetes (EASD). He is the Editor-in-Chief of the Journal of the Egyptian Association of Endocrinology, Diabetes, & Metabolism and has authored over 150 publications in the field of diabetes, lipidology, and metabolic diseases.

6. **Dr. Sanjay Bajpai** is a Senior Strategy Scientist, US Health Outcomes Engagement at Eli Lilly and Company. He studied at Ohio State University, where he earned his MS in Pharmaceutical Administration, his MABA in Marketing, and finally his PhD in Pharmaceutical Administration. He works part time as an Instructor for the Art of Living, a teen empowerment program.

7. **Dr. Abdullah Ben Nakhi**, works with the Dasman Diabetes Institute, which was established to address the growing diabetes epidemic—the fastest growing chronic condition—in Kuwait. The Dasman Diabetes Institute works to prevent, control, and mitigate the impact of diabetes and related conditions in Kuwait through research, education, and health promotion programs.

8. **Dr. Paul Bloch**, is a Senior Researcher and Team Leader at the Steno Diabetes Center, Copenhagen, focusing on health promotion.

9. **R. Keith Campbell** a professor in the Pharmacotherapy Department at Washington State University. He earned his Bachelor of Pharmacy and Master of Business Administration at Washington State University. In 1990, he was presented with the President's Faculty Excellence Award for public service.

10. **Karis Casseus** is a Clinical Assistant Professor of Nursing and is enrolled at Georgia Regents University studying to earn her Doctorate of Philosophy in Nursing. She received her BS at Georgia State University in Nursing, and her Master's degree in Nursing at Mercer University. She appeared in the 2016 Who's Who Among Students in American Universities and Colleges.

11. **Dr. Susan "Sue" Cox**, MD, MA, is the Executive Vice Dean for Academics and Chair of Medical Education of The University of Texas at Austin Dell Medical School. She also serves as President of the Alliance for Clinical Education. Prior to joining UT Austin, Dr. Cox worked for 23 years at the University of Texas Southwestern Medical School, where she served as Regional Dean of Austin Programs. She is board certified in Obstetrics and Gynecology and Maternal Fetal Medicine. She received her MD from Baylor College of Medicine, MA in Genetics and Cell Biology from University of Texas Medical Branch, and BSc from West Texas State University.

12. **Dr. Heather Davidson**, PhD, is the Director of Program Development for the Vanderbilt Program in Interprofessional Learning at the Vanderbilt University School of Medicine. She previously worked as the Manager of Strategic Initiatives at the Stanford University School of Medicine. Dr. Davidson earned her PhD in Community Psychology and Program Evaluation from Vanderbilt University, where she also earned her bachelor's degree.

13. **Jessica Dong** is a current MD/MBA candidate and University of Pennsylvania's Perelman School of Medicine and Wharton School. She worked at Close Concerns from 2012–2014 after graduating summa cum laude and Phi Beta Kappa from Dartmouth College with a BA in Biological Sciences and a minor in Environmental Studies.

14. **Dr. Bernice Dyer-Regis** is the current Coordinator of the M.Ed Health Promotion Programme at the University of the West Indies, with over twenty years combined experience in the public health sector and in academia, developing and implementing health promotion/health education programs with communities, schools and groups in collaboration with other sectors. Her research interests focus on lifestyle issues pertaining to health and wellness such as obesity and diabetes as well as issues related to population aging.

15. **Dr. Steven Edelman** is a professor of Medicine in the Division of Endocrinology and Metabolism at the University of California, San Diego. He is Director of the Diabetes Care Clinic at the Veterans Affairs Medical Center in San Diego as well as the founder and director of Taking Control of Your Diabetes (TCOYD). In 2009, he was named Educator of the Year at the American Diabetes Association Scientific Sessions.

16. **Dr. Lawrence Fischer** is the Director of the Behavioral Diabetes Research Group in the Department of Family & Community Medicine at the University of California San Francisco, where he also serves as a Professor in Family Community Medicine. His primary research activity addresses the social, behavioral, self-management support and care system factors that affect the management of both type 1 and type 2 diabetes among adults.

17. **Dr. Edwin Fisher**, PhD is a Professor in the Department of Health Behavior at the

University of North Carolina. Dr. Fisher has wide-ranging research interests. He works alongside Patrick Tang, serving as global director of Peers for Progress, a program that documents the benefits of peer support in diabetes management and conducts diverse activities to promote peer support around the world. Over his career, Dr. Fisher has led multiple large and influential research projects. Among the topics he has researched are chronic disease prevention, management and quality of life, asthma, cancer, cardiovascular disease, smoking and weight management. He earned his PhD in 1972 in clinical psychology at the State University of New York, and in 1968 graduated from Amherst College with a BA in psychology.

18. **Dr. Rafael Gabriel Sánchez** is the Head of the Research Methodology Unit at Universidad Autónoma in Madrid. He is the Head of Clinical Epidemiology Unit at Instituto IdiPAZ at Hospital Universitario La Paz. He is also a Professor of Clinical Epidemiology at the National School of Public Health in Spain, a visiting professor at National Institute of Public Health in Mexico, and serves on the Scientific Committee of Patia Diabetes. He has published over 200 original scientific articles in journals with impact in the areas of epidemiology and prevention of diabetes, cardiovascular disease, cognitive impairment, aging and risk factors.

19. **Dr. Alexandra A. Garcia**, PhD, RN, is an Associate Professor in the Family and Public Health Nursing and Nursing Administration Division. She is the director of the master's public health nursing concentration and coordinates study abroad programs for the School of Nursing. Dr. Garcia received her Diploma in Registered Nursing from The Union Memorial Hospital School of Nursing; her Bachelor's of Science from The College of Notre Dame of Maryland, and her Master's of Science from The University of Maryland at Baltimore. She earned her PhD in nursing from The University of Texas at Austin School of Nursing.

20. **Dr. Paul George**, MD, MHPE, is the Director of the Primary Care-Population Medicine Program and Director of second year Integrated Medical Science curriculum at the Brown University Alpert Medical School. He also serves as an Assistant Professor of Family Medicine at Brown. He completed his residency training in Family Medicine at Brown where he was Chief Resident. He graduated magna cum laude from Brown University, where he also earned his medical degree. He received his Masters in Health Professions Education from the University of Illinois, Chicago.

21. **Dr. Deborah Greenwood** is President and Owner of Deborah Greenwood Consulting, specializing in diabetes and digital health with the goal of engaging, educating and empowering people affected by diabetes through technology. Her research interests include technology-enabled models of care, digital health, e-Patient engagement and social media for self-management support. She earned her Ph.D. in nursing science and healthcare leadership, with a focus in informatics, from the Betty Irene Moore School of Nursing at UC Davis. She worked for Sutter Health for 10 years, most recently as a research scientist and program director for the largest AADE accredited DSMES program. She was the 2015 President of American Association of Diabetes Educators.

22. **Dr. Ron Goetzel** is the Vice President of Consulting and Applied Research at IBM Health, as well as a senior scientist at Johns Hopkins. He has worked as a Research Professor at Emory University and served as Vice President of Data Analysis and Evaluation Services at Johnson & Johnson. He has co-authored several publications, including many on workplace health promotion. He received PhD in Applied

Social Psychology from New York University.

23. **Dr. Linda Gonder-Frederick** is an Associate Professor of Psychiatry and Neurobehavioral Sciences and Head of the Division of Behavioral Medicine at the University of Virginia School of Medicine. Her research focuses on behavioral and psychological issues associated with diabetes, including fear of hypoglycemia, psychological and metabolic impacts of continuous glucose monitoring in diabetes, driving safety and diabetes, and the development of internet interventions in behavioral medicine. She received her PhD from the University of Virginia.

24. **Dr. Laura Gray** is the Associate Professor of Population and Public Health Sciences at the University of Leicester. She joined the University of Leicester in 2008 after being awarded her PhD from the University of Nottingham. She has an interest in diabetes prevention and management and has been the senior statistician on many studies in these areas. In 2015, she graduated from the UK Innovators in Diabetes program.

25. **Tracee Hall**, MPH, a Houston, Texas native, serves as the Director of Community Partnerships in the Department of Population Health and previously served as the Director of Public Health and Community Engagement in the Health Disparities Division at the Dell Medical School. Ms. Hall completed her undergraduate studies in Biology at Hampton University and received her Master of Public Health from Tulane University School of Public Health and Tropical Medicine with a dual concentration in Maternal and Child Health and Health Communication/Education.

26. **Mervi Hara** is the Executive Director of Finland's Action on Smoking and Health program, directing the strategic planning of various national projects on tobacco policy. She began her career in public health in 1982 at the Cancer Society of Finland and in 1989 at the University of Helinski, Department of Public Health. She received her MA in communication from the University of Helsinski.

27. **Prof. Philip Home** is a Professor of Diabetes Medicine at Newcastle University and practiced in diabetes care and disorders of lipid metabolism at the Newcastle Diabetes Centre and at the Newcastle Hospitals until end of 2011. He was Vice-chair of the NICE Appraisal Committee, the UK drug reimbursement advisory committee and Consultant Physician in Newcastle (both to 2011), and has been Clinical Lead to UK and International Diabetes Federation guidelines. In the UK Philip Home has been Chairman of the Joint Royal College of Physicians/ Specialist Societies' Endocrinology and Diabetes Committee, and was Senior Scientific Advisor to the UK Type 2 Diabetes guidelines Initiative, having been Senior Clinical Advisor to the NICE Type 1 Diabetes Guidelines Development Group.

28. **Dr. Albert M. Hutapea** is a Professor of Human Physiology at Universitas Advent Indonesia and is a certified human physiologist and exercise physiologist. He received his PhD in Human Physiology from Mahidol University in Thailand. He also earned his MPH and BSc in biology from the Adventist University of the Philippines

29. **Dr. Mahmoud Ibrahim** is the Director of the Education, Dedication, Care (EDC) Center for Diabetes. He also works as a Consultant Endocrinologist, as an Editor of the *Annals of Internal Medicine, Middle East Edition*, and is a member of the Michigan Center for Diabetes Translational Research. Dr. Ibrahim studied at the Ain Shams University in Cairo, Egypt.

30. **Dr. Scott D. Isaacs** is a board-certified endocrinologist, obesity medicine specialist and medical director at Atlanta Endocrine

Associates. Dr. Isaacs founded Atlanta Endocrine Associates in 2000 as the first endocrine specialist in Atlanta with a focus in weight loss and obesity management. He attended medical school at Emory University School of Medicine and continued on for residency and fellowship in Endocrinology, Lipids, Diabetes and Metabolism. He currently serves as a clinical faculty member at Emory University School of Medicine. Since 1998, Dr. Isaacs has focused his medical practice on endocrinology and medical weight loss. Dr. Isaacs has published research on diabetes, thyroid and obesity in multiple medical journals. A frequent speaker to national and international groups, he is a Diplomate of the American College of Physicians and American Board of Obesity Medicine and a Fellow of the American College of Physicians and the American College of Endocrinology.

31. **Varun Iyengar** is an MD candidate at the Brown University Alpert Medical School. He worked as a Senior Associate at Close Concerns from 2014–2016. He also worked as a Research Assistant at his alma mater, Amherst College. He studied at Oregon Episcopal School and Amherst College, where he received his B.S. in neuroscience.

32. **Dr. Jenny Jin** is an orthopedic surgeon at Brigham and Women's Hospital in Boston, MA. She completed her residency in the Harvard Combined Orthopedic Residency Program, was Chief Resident at Massachusetts General Hospital, and completed her fellowship training in arthroplasty at Brigham and Women's Hospital. She worked at Close Concerns from 2006-2008 after graduating Harvard College summa cum laude and Phi Beta Kappa with a degree in Chemistry. During her medical school training at UC San Francisco she studied the use of nano-aligned tubular conduits for the use of nerve repair in a rat model in Dr. Hubert Kim's lab.

33. **Dr. S. Claiborne "Clay" Johnston**, MD, PhD, has served as the inaugural Dean of The University of Texas at Austin Dell Medical School since 2014. He also serves as the Vice President of Medical Affairs and is the Frank and Charmaine Denius Distinguished Dean's Chair in Medical Leadership at Dell Medical School. Dr. Johnston previously served as Associate Vice Chancellor for Research at the University of California San Francisco. He is a neurologist, specializing in stroke care and research. He received his PhD in Epidemiology from the University of California Berkeley, MD from Harvard Medical School and BSc in Physics from Amherst College.

34. **Dr. Erin Kane** is currently an emergency physician at Johns Hopkins Hospital and Howard County General Hospital and the assistant medical director of John Hopkins Capacity Optimization at Johns Hopkins Hospital. She studied at Harvard, where she earned a Bachelor's of Arts in History and Science, and eventually her medical degree. She has co-authored several publications, notably an article on a pilot program that taught medical students about obesity among other noteworthy pieces. Prior to her residency at John Hopkins Hospital, she served as the senior associate at McKinsey and Company where she helped clients from hospitals, health care, and payor in public and private sectors. At Close Concerns, Erin Kane helped transform the organization by being one of the founders of diaTribe in 2006.

35. **Anita Khimani** works as a Critical Care Registered Nurse (CCRN) at Emory University Hospital in Georgia. She graduated second in her class at Aga Khan University, then received her Masters at Georgia State University (GSU) as she worked as a family nurse practitioner. She received the National Conclave of Grady Graduate Nurses Scholarship in 2014.

36. **Dr. Dhruv Khullar**, MD, MPP, is a physician at New York-Presbyterian Hospital and researcher at the Weill Cornell Department of Healthcare Policy and Research. He is a contributor at the New York Times, where he writes about the intersection of medicine, health policy, and economics. He previously worked in the ABC News Medical Unit and at the White House Office of Management and Budget, focusing on Affordable Care Act implementation. He completed his training in internal medicine at the Massachusetts General Hospital and Harvard Medical School. He earned his MD from the Yale School of Medicine and his Masters in Public Policy from the Harvard Kennedy School, where he was a fellow at the Center for Public Leadership.

37. **Prof. Kamlesh Khunti** is the Head of Department and Professor of Primary Care Diabetes and Vascular Medicine at the University of Leicester. He leads a research group that is currently working on the early identification of, and interventions with, people who have diabetes or are at increased risk of developing diabetes. His work has influenced national and international guidelines on the screening and management of people with diabetes. He is Director of NIHR CLAHRC East Midlands and Co-Director of a Clinical Trial Unit. He is a NIHR Senior Investigator and principal investigator on several major national and international studies and received the NIHR Senior Investigator Award in 2014. Professor Khunti has recently been elected as a Fellow of the Academy of Medical Sciences. Professor Khunti is currently an advisor to the Department of Health, a Clinical Advisor for the National Institute for Health and Care Excellence (NICE) and member of the Primary Care Study Group of the European Association for the Study of Diabetes (EASD). He is past Chair of the Department of Health–RCGP Committee on Classification of Diabetes and past Chair of the NICE Guidelines on Prevention of Diabetes. In addition, he is co-Director of the Diabetes MSc at Leicester University and the BMJ Diabetes Diploma.

38. **Dr. Sarah Kim**, MD, is an Associate Professor of Medicine at University of California San Francisco's Division of Endocrinology, Diabetes, and Metabolism. Dr. Kim practices at Zuckerberg San Francisco General Hospital where she treats people with type 1 and type 2 diabetes. She completed an Advanced Diabetes Fellowship at UC San Francisco after completing training in internal medicine, pediatric, and a specialization in Endocrinology, Diabetes, and Metabolism at University of California Los Angeles. She received her MD from Tufts University School of Medicine.

39. **Dr. Karl Koenig**, MD, MS, is the Medical Director of the Musculoskeletal Institute and Assistant Professor of Surgery & Perioperative Care at The University of Texas at Austin Dell Medical School. He also serves as the Residency Program Director and leads the initiative to improve access to musculoskeletal care for Austin's underserved population. Dr. Koenig completed his residency training at Dartmouth-Hitchcock Medical Center in Orthopaedic Surgery, where he also graduated from the Dartmouth Institute for Health Policy and Clinical Practice, focusing on patient outcomes and cost-effectiveness research. He received his MD from Baylor College of Medicine and his undergraduate degree from Massachusetts Institute of Technology.

40. **Adam Kraus** is an MD/MPH candidate at the Icahn School of Medicine at Mount Sinai, where he is a Dean's Scholar in Global Health. His academic interests include the intersection of medicine, global health, and social justice, especially as it relates to migratory populations. He has spent time in Peru, New Zealand, Thailand, Haiti and most currently in the Dominican Republic

addressing health disparities. Currently, he is working on a project to better understand the unique barriers to perinatal healthcare faced by Haitian women and their newborn babies living in the Dominican Republic. He is also very involved in the East Harlem Health Outreach Partnership—Sinai's student-run free clinic offering care to the uninsured populations in East Harlem, New York City. He worked for Close Concerns in Summer 2013 as the Dartmouth Fellow, after which he graduated from Dartmouth College in Spring 2014 with a degree in Anthropology modified with Global Health.

41. **Davida F. Kruger** has worked over 30 years as certified nurse practitioner in diabetes research and clinical practice at Henry Ford Health System/Detroit, Michigan. Ms. Kruger has served as past Chair of the American Diabetes Association (ADA) Research Foundation, and past President of Healthcare and Education of the ADA. She is presently the Editor-In-Chief of Clinical Diabetes was previously editor of Diabetes Spectrum. She is a member of the diaTribe Advisory Board. A principal investigator on numerous diabetes care research projects, she is widely published including authoring the book The Diabetes Travel Guide and has been honored by numerous awards including The ADA Wendell May's Award.

42. **Dr. Mick Kumwenda** is the Director of Renal Services at Glan Clwyd Hospital NHS and a Consultant Nephrologist on the Betsi Cadwaladr University Health Board. He holds multiple degrees including an MB, ChB, FRCPUK, and MSc from the University of Liverpool. He serves as the regional adviser for North Wales to the Royal College of Physicians and is President of the Kidney Patient Association for North Wales.

43. **Dr. Joshua Landy**, MD, is the co-founder and Chief Medical Officer of Figure 1, a free-access, mobile health startup that serves as a repository of medical images and network for the global medical community. He is a critical care specialist, completing his critical care medicine residency at the University of Toronto. He also trained in Internal Medicine at the University of Alberta and earned his MD from the University of Western Ontario.

44. **Dr. Adam Z. Law** is a Clinical Assistant Professor of Medicine at the Joan and Sanford I. Weill Department of Medicine Division of Endocrinology and Metabolism at the Weill Cornell Medical College. He is the Chair of Ithaca's Cayuga Medical Center's Graduate Medical Education committee and has served as Chair of the Department of Medicine. He received his M.D., M.Sc. and B.Sc. from the University of London.

45. **Dr. Tao Le**, MD, MHS, is the Chief Education Officer at ScholarRx and Senior Editor of First Aid for the USMLE Step 1, where he works to develop evidence-based, adaptive learning solutions designed to address the most pressing curricular issues facing medical schools across the globe. He is the Chief of the Allergy and Immunology Division of the Department of Medicine at the University of Louisville School of Medicine. He earned his MD from University of California San Francisco and completed his residency training in internal medicine at Yale University and his allergy and immunology fellowship training at Johns Hopkins University.

46. **Dr. Douglas Levy**, PhD, MPH, is an Assistant Professor of Medicine at Harvard Medical School and Assistant Professor in Health Care Policy at the Mongan Institute for Health Policy at Massachusetts General Hospital. His primary area of research is focused on studying how public health, healthcare finances, and health services policies can improve primary and higher order prevention to improve population health.

47. **Al Lewis**, the co-founder and CEO of Quizzify, wears multiple hats. He's an author whose critically-acclaimed bestseller on outcomes measurement, Why Nobody Believes the Numbers, was named 2012 healthcare book of the year in Forbes. Cracking Health Costs: How to Cut Your Company's Health Costs and Provide Employees Better Care, released in 2013, was also a trade bestseller. His 2014 book Surviving Workplace Wellness, co-authored with Vik Khanna, has also received accolades. He is also one of the population health field's most-acclaimed speakers, as well as a prolific author and interviewee on outcomes economics, having been featured in almost every major lay and healthcare publication. Before entering the population health field, Al was a partner at Bain & Company. He holds two degrees from Harvard, where he also taught economics, and his economic policy book was made into a show on the Washington, DC NPR affiliate.

48. **Dr. Edward Lin** has served as the Surgical Director of the Emory Bariatric Center since 2006. He is the Chief of the Division of General and GI Surgery in the Department of Surgery at Emory University's School of Medicine. Dr. Lin also serves as the Director of the Emory Clinic Gastroesophageal Treatment Center and Esophageal Physiology Lab and as the Associate Program Director of the Emory Endosurgery Fellowship. He is currently a Professor of Surgery in the Division of General and GI Surgery at the Emory University School of Medicine Department of Surgery. In 2009, he received the Junior Surgery Residents Faculty Teaching Award, Department of Surgery, Emory University School of Medicine. He received is Doctor of Osteopathy degree from the Des Moines University-College of Osteopathic Medicine and Surgery and MBA from Emory University.

49. **Marissa Lynn** is currently an MD candidate at Harvard Medical school and graduated Summa Cum Laude and Phi Beta Kappa from Dartmouth College in 2013. While at Dartmouth she majored in Biology and minored in Asian and Middle Eastern Studies. She completed biomedical research focused on developing novel therapeutics for pancreatic cancer for which she was recognized with a Barry M. Goldwater Scholarship. After college she spent two years in South Korea on a Fulbright Teaching Assistantship (ETA) Fellowship, where she taught English in an all-boys middle school and served at the Fulbright Korea ETA Program Coordinator. Now in medical school she plans to pursue residency training in ophthalmology.

50. **Dr. Julia Marley,** a principal research fellow at the University of Western Australia's Rural Clinical School, concentrates on outcomes of diabetic patients at Kimberley Aboriginal Medical Service Council (KAMSC) clinics. She is also chairs the Kimberley Aboriginal Health Planning Forum Research Subcommittee. She received her PhD in 2001 and Masters of Public Health in 2016.

51. **Dr. Graham T. McMahon**, MD, MMSc, is the President and CEO of The Accreditation Council for Continuing Medical Education (ACCME). Dr. McMahon serves as Associate Dean for Continuing Education and Associate Professor of Medicine at Harvard Medical School, teaching at both Harvard Medical School and Brigham and Women's Hospital in Boston. He also serves as Editor for Medical Education at the *New England Journal of Medicine*. Dr. McMahon is board certified in internal medicine; and endocrinology, diabetes, and metabolism. He earned his doctoral degree in medical education from the National University of Ireland, he MD from the Royal College of Surgeons in Ireland, and Master of Medical Science in Clinical Research from Harvard Medical School.

52. **Dr. J. Greg Merritt**, PhD, is the founder of Patient is Partner, where he works as an educator and patient advocate. He previously worked as Director of the Coleman-Munger Fellows Program and Senior Associate Director of University Housing at the University of Michigan. He received his PhD in Higher Adult and Lifelong Education from Michigan State University and bachelor's degree in psychology from Bradley University.

53. **Dr. David G. Marrero** is a distinguished expert in diabetes education and research. His work focuses on medication adherence, community health programs, early diabetes intervention and translational medicine. His research interests also include strategies for promoting diabetes prevention, improving diabetes care practices used by primary care providers and the use of technology to facilitate care and education.

    Twice awarded the Allene Von Son Award for Diabetes Patient Education Tools by the American Association of Diabetes Educators, Dr. Marrero has been nominated to *Who's Who in Medicine and Health Care* in 2000, served as associate editor for *Diabetes Care* (1997–2002) and is the associate editor for *Diabetes Forecast*. He was selected for an Alumni of the Year award from the University of California, Irvine in 2006 and Outstanding Educator in Diabetes in 2008 by the American Diabetes Association. In 2016, he served as the president for health care and education of the American Diabetes Association. As the Executive Director of the UAHS Center for Elimination of Border Health Disparities (CEBHD), Dr. Marrero provides leadership to build strong collaborations with other UAHS centers, such as the Center for Population Science and Discovery; the Center for Elimination of Disparities in Diabetes, Obesity and Metabolism; the Center for Applied Genetics and Genomic Medicine; and the Center for Biomedical Informatics and Biostatistics. Dr. Marrero received a bachelor's degree (1974), master's degree (1978) and doctorate (1982) in social ecology from the University of California, Irvine.

54. **Dr. Brendan Milliner** joined Close Concerns in 2008 after graduating from Amherst College with a degree in neuroscience. After a year with the team, he headed to the east coast for med school, and is currently finishing his last year of Emergency Medicine residency at Mount Sinai Hospital in New York City. He has a strong interest in global health and the use of portable ultrasound in areas without access to other advanced imaging. When not at work he can be found rock climbing, biking, and perfecting his dumpling recipe.

55. **Michelle Napier-Dunnings** is both Executive Director of Michigan Food & Farming Systems (MIFFS) and Chief Communications Officer of Michigan Public Health Institute (MPHI). Michelle has worked with governmental agencies, educational institutions, businesses, and non-profit collaboratives tackling challenges in food systems, healthcare, and organizational development. Michelle earned her MFA from Virginia Commonwealth University and her BA in Psychology/Biology from Earlham College.

56. **Dr. Martha Nelson** served as a medical writer and researcher at Close Concerns from 2003 to 2005 and continues to engage with the company. She graduated with a Biology degree, magna cum laude, from Amherst College in 2004. She studied infectious disease dynamics during her doctoral study, completing her PhD at the Pennsylvania State University in 2008 with a thesis titled 'The genomic evolution of influenza A virus.' Martha is now a Staff Scientist at the Fogarty International Center at the National Institutes of Health (NIH) in Bethesda, MD. Martha's father, paternal grandfather, great-grandmother, and great-uncle all have had type 2 diabetes, and

Martha retains a keen interest in diabetes therapeutics, prevention, and basic research.

57. **Sarah Nelson** has worked on food-related projects in the Bay Area since 2008. She launched Cooking Matters in the Bay Area in 2010. In her previous work with Bay Area farmers' markets, she created the Bay Area's first Market Match program, which gives farmers' market customers who use food stamps extra funds to spend at the market, and a Veggie Rx program that helps diabetes patients. In 2011, she founded the nonprofit Three Squares, which merged with 18 Reasons in 2013.

58. **Dr. Rita Nguyen** is the Director of Chronic Disease Prevention for the City and County of San Francisco Department of Public Health. She has been working for much of her life to unite the humanitarian promise of medicine with the pursuit of social justice. As an undergraduate at Stanford, she helped start a student-run free clinic near her hometown on the east side of San Jose. During her residency at Brigham and Women's Hospital, she led physician advocates in the greater Boston area to champion reforms that would create a better healthcare system for all.

59. **Blake Niccum** is an MD candidate and The University of Virginia School of Medicine. His research focuses on innovation and entrepreneurship in medical education. Niccum was recognized as a University of Virginia Medical School's C. Richard Bowman Scholar, an award dedicated to medical students who, at the end of their third year of medical school, has excelled in the clinical portion of the medical curriculum and exemplifies integrity, enthusiasm, and compassion.

60. **Lucia Novak**, the director of Riverside Diabetes Center in Riverdale, Maryland, received her Bachelor's degree in the science of nursing at Duquesne University and earned her Master's at the Catholic University of America. In April 2015, she was awarded the title of Master Clinician at the Walter Reed National Military Medical Center.

61. **Dr. Michael P. O'Donnell**, PhD, MPA, MPH, is the founder, president and editor-in-chief of the *American Journal of Health Promotion* and is the CEO of the Art and Science of Health Promotion Institute. He has managed more than 50 workplace health promotion programs for medium, large, and very large employers over the span of three decades. He received the Elizabeth Fries Health Education Award from the James F. and Sarah T. Fries Foundation in 2011. Dr. O'Donnell earned a PhD in Health Behavior and Health Education from the School of Public Health at the University of Michigan, an MBA in General Management and an MPH in Hospital Administration from the University of California, Berkeley. He completed his undergraduate work in Psychobiology at Oberlin College.

62. **Dr. Darin Olson** is a physician at Emory University and Atlanta VAMC. He earned his BSC in electrical engineering at Duke, then proceeded to receive his PhD in Biomedical engineering at Boston University. He continued on to Boston University School of Medicine, where he acquired his MD. He is a board member of Team Type1.

63. **Ani Othman** is a registered nurse and certified diabetes educator in at Essentia Health's Lakewalk Clinic in Duluth, Minnesota.

64. **Dr. Thomas Parry** is President Emeritus of the Integrated Benefits Institute. Before co-founding IBI, he served 11 years as Research Director at the California Workers' Compensation Institute. His research at CWCI encompassed a wide variety of topics in workers' compensation, including medical treatment patterns, vocational rehabilitation costs and effectiveness, legal costs and trends, medical utilization, mental stress claims, and physical therapy patterns

of care. Parry received his bachelor's, master's and Ph.D. degrees from the University of California, Berkeley.

65. **Dr. Kunal Patel**, PhD, MD, is the Medical Director of Advocacy & Research at iHeed, which is dedicated to developing, fostering and supporting innovation in health education globally through providing online education and training programs. Dr. Patel is a Travel and Tropical Medicine physician and academic and global health specialist. He received his PhD in Clinical Medicine and medical degree from Trinity College and his MRCS in Surgery from the Royal College of Surgeons.

66. **Dr. William H. Polonsky** is the president of the Behavioral Diabetes Institute. He received his PhD in clinical psychology from Yale University and has served as Chairman of the National Certification Board for Diabetes Educators, Senior Psychologist at the Joslin Diabetes Center in Boston and Instructor in Psychiatry at Harvard Medical School. He is an active researcher in the field of behavioral diabetes, a licensed clinical psychologist and certified diabetes educator. Dr. Polonsky has served on the editorial boards of numerous lay and professional journals in diabetes, including Diabetes Care, Clinical Diabetes, Diabetes Forecast, Diabetes Self-Management and Diabetes Health. He is a member of the diaTribe advisory board.

67. **Dr. Beth Pyatak**, PhD, MS, MA, is an assistant professor at her alma mater, USC. She has primary research interests in the intersection of chronic care management, occupational engagement and health and well-being among individuals with chronic illness and/or disability. In 2011 she was awarded a Mentored Career Development Award through the Southern California Clinical and Translational Science Institute (SC CTSI) to develop a lifestyle intervention aimed at improving health and quality of life outcomes among young adults with both type 1 and type 2 diabetes. Her educational history includes a BA in Psychology in 2002 from USC, a MA in Occupational Therapy at that same school in 2004, and a PhD in Occupational Science in 2010. She returned to the University of Southern California in 2015 for her Master of Science (MS) in Clinical, Biomedical and Translational Investigations.

68. **Dr. Chantelle Rice**, OTD, is the Director of the USC Occupational Therapy Faculty Practice and is an Associate Professor of Clinical Occupational Therapy at University of Southern California's Chan Division of Occupational Science and Occupational Therapy. As a Certified Diabetes Educator, she works predominantly with Lifestyle Redesign® Weight Management and Diabetes Management clients while also managing the practice's administrative operations. Dr. Rice received her bachelor's and master's degrees in occupational therapy from USC in 2008, and earned her Doctorate of Occupational Therapy degree from USC in 2009.

69. **Dr. Shreela Sharma** is the co-founder of Brighter Bites. She received a BSc in physical therapy at the University of Mumbai, an MA in physical therapy at the University of Iowa, an RD in nutrition and dietetics at the University of Houston, and A PhD in epidemiology at the University of Texas Health Science Center at Houston, which is where she now works as an Associate Professor.

70. **Lorraine Stiehl** has been a diabetes partner and patient advocate for over 30 years. She is the co-author of *What To Do When Your Partner Has Type 1 Diabetes: A Survival Guide*. Lorraine has been active with the Juvenile Diabetes Research Foundation (JDRF) since 1987. As a local, regional and national staff member for 14 years, she launched 17 chapters in 13 states and raised millions of dollars to support diabetes research. As a volunteer leader, she served

as national chair for grassroots advocacy and chaired the national advocacy committee on the international board of directors. Lorraine helped to create the University of California, San Francisco Diabetes Center, partnering with its renowned diabetes researchers and clinicians for 13 years. Through her family's consulting firm, StiehlWorks, Lorraine has provided marketing, communications, and development leadership to The diaTribe Foundation, Diabetes Hands Foundation, Diabetes Research Connection, Diabetes Empowerment Foundation, Students With Diabetes, Lymphoma Research Foundation, and the California Institute for Regenerative Medicine.

71. **Patrick Yao Tang**, MPH, is the Program Manager at Peers for Progress, a program of the Department of Health Behavior in the Gillings School of Global Public Health and the Department of Family Medicine in the UNC School of Medicine. He manages Peers for Progress projects and collaborations, providing technical assistance to collaborators in the form of resource development, program design and evaluation, and expert training. He earned his Master in Public Health, with a focus on Health Behavior, from the University of North Carolina at Chapel Hill and his BA in Molecular Biology from Princeton University.

72. **Roy Thomas** is the present Managed Care Medical Liaison at Dexcom. He attended the State University of New York at Buffalo, earning a degree in pharmacy. He has worked as a Senior Clinical Manager of Payer Relations at CVS Health, and a clinical pharmacist at United Healthcare.

73. **Dr. Anne Thorndike**, MD, MPH, is an Assistant Professor of Medicine at Harvard Medical School and an Associate Physician at Massachusetts General Hospital. Her clinical and research interests are in the prevention and treatment of obesity through lifestyle modification. She is currently researching the effects of population-based interventions that utilize behavioral economics strategies to promote healthy food choices at worksites and in low-income communities. She received her MD from UMASS Medical School and completed her residency at University of Chicago Hospitals, and a Fellowship at Massachusetts General Hospital.

74. **Dr. William Tierney**, PhD, MD is the inaugural Chair of the Department of Population Health, and a professor of Population Health, at the Dell Medical School at The University of Texas at Austin. He practiced general internal medicine at Eskenazi Health in Indianapolis where he was Chief of Internal Medicine from 2009 to 2014. He has a master's degree from Harvard University and holds a Ph.D. from Stanford University in administration and policy analysis.

75. **Dr. Melissa Tjota** is an MD/PhD candidate at the University of Chicago. She recently finished her PhD coursework in immunology and will be returning to medical school for her last two years. Melissa Tjota worked at Close Concerns from 2008–2010 as a full-time associate after graduating from Harvard College summa cum laude and Phi Beta Kappa with a degree in Biochemical Sciences and a secondary field in Spanish.

76. **Dr. Guillermo E. Umpierrez** first joined the Emory University School of Medicine faculty from 1992–1997. He returned in 2003 to focus on diabetes and metabolic disorders. Dr. Umpierrez's research interests include mechanisms for ß-cell dysfunction in minority populations with ketosis-prone type 2 diabetes, the effects of free fatty acids on insulin secretion and hypertension in obese patients, and the inpatient management of insulin in critical and noncritical patients. In 2009, Dr. Umpierrez received the "Outstanding Service Award for the Promotion of Endocrine Health of an

Underserved Population" from the American Association of Clinical Endocrinologists (AACE).

77. **Col. Dr. Robert Vigersky**, former president of the Endocrine Society and Director Emeritus of the Diabetes Institute at the Walter Reed National Military Medical Center, is medical director for Medtronic Diabetes. He has focused on the use of technology and decision-support systems to improve outcomes for patients with diabetes and has been interested in developing a composite metric for at least 10 years.

78. **Michael Warburg** is the co-founder and Managing Director of Warbros Venture Partners, a private investment firm focused on expansion stage companies with unique consumer product or business service offerings. Prior to co-founding Warbros, Michael spent the majority of his career in commercial banking. He went through the Commercial Bank Management Training Program at J.P Morgan & Co. in New York and later worked for Fleet Bank in Providence, RI and Fleet/Shawmut in Hartford, CT. The last seven years of this period were spent managing and performing "workouts" involving loan transactions of $1–20 million in a variety of industries. Through this process he became intimately familiar with the many financing options available to companies and the methods they can use to improve performance and attract equity. Following this commercial banking experience he co-founded a financial consulting business that served to raise debt and equity for small to mid-sized companies. Mike received his BS from Brown University and MA in Accounting from the University of Rhode Island.

79. **Mark Wigley** has written extensively on the theory and practice of architecture and is the author of *Constant's New Babylon: The Hyper-Architecture of Desire* (1998); *White Walls, Designer Dresses: The Fashioning of Modern Architecture* (1995); and *The Architecture of Deconstruction: Derrida's Haunt* (1993). He co-edited T*he Activist Drawing: Retracing Situationalist Architectures from Constant's New Babylon to Beyond* (2001). Wigley has served as curator for widely attended exhibitions at the Museum of Modern Art, New York; The Drawing Center, New York; Canadian Centre for Architecture, Montreal; and Witte de With Museum, Rotterdam. He received both his Bachelor of Architecture (1979) and his Ph.D. (1987) from the University of Auckland, New Zealand.

80. **Dr. Nick Wilkie** is an emergency medicine physician at the University of Wisconsin Hospital and Clinics. He received his MD from the University of Vermont College of Medicine. He graduated from St. Olaf College with a BA in Chemistry and Psychology and then earned his master's degree in neuroscience from the University of Edinburgh, Scotland. Nick worked for Close Concerns in 2009–2011. His primary interest in diabetes is the role of the nervous system and diabetes-related pathologies. He had a strong focus at Close Concerns on diabetes market research.

81. **Dr. Mark Yarchoan** is a Hematology-Oncology Fellow at The Johns Hopkins Kimmel Cancer Center. He completed an internship and residency in Internal Medicine at the University of Pennsylvania, after receiving his MD from the Perelman School of Medicine at the University of Pennsylvania. He is interested in translational research in gastrointestinal oncology, with a focus in novel immunotherapies. Mark worked for Close Concerns as a full time associate from 2007–2009, where he was an editor of Diabetes Close Up and a frequent contributor to Closer Look and diaTribe. Mark received a BA from Amherst College.

82. **Susan Yake** is a clinical dietician and a certified diabetes educator and the current

industry chair at Diabetes Care and Education Dietetic Practice Group. She studied food and nutrition at Brigham Young University—Idaho, receiving her BSc in dietetics. Her various awards include: Navy Surgeon General Blue Health Promotion and Wellness Award (2009–2014), Gold Star Award (1998–2008), Heroes of TRICARE—From the Pentagon Office of Assistant Secretary of Defense (2005), Seattle Federal Executive Board's Public Service Award (2002), and Civilian of the Quarter (2011 & 1996).

83. **Prof. Paul Zimmet** is Professor of Diabetes at Monash University and formerly Director Emeritus, Baker IDI Heart and Diabetes Institute. In 1984, he founded the International Diabetes Institute which merged with the Baker Institute in 2008. He is on the diaTribe advisory board. He is Honorary President of the International Diabetes Federation and has an extensive international record in diabetes and obesity research, particularly in epidemiology and public health. His research predicted and has charted the evolving global type 2 diabetes epidemic.

84. **Dr. Yun-Ping Zhou,** PhD, is Executive Director, Scientific and Medical Affairs at Merck. He joined Merck Research Laboratories in 2003 as a Research Fellow, and participated or led several diabetes drug discovery programs before becoming the Director for Scientific Affairs in China. He is also an experienced general endocrinologist and has broad interests in basic science and in clinical medicine. Prior to joining Merck, Dr. Zhou was a scientist at Metabolex, and a Research Assistant Professor at the Department of Medicine at the University of Chicago. Yun-Ping completed his residency at the Air Force General Hospital in Beijing in 1985, and served as the attending physician at the Department of Endocrinology in Shanghai Changhai Hospital from 1989 to 1992. He then started his research career at the Karolinska Institute in Sweden and obtained a Ph.D. degree in 1996. He is well known to the fields of islet biology and diabetes research, and has contributed to 40 articles in international peer reviewed journals and several patents.

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Onward!

Ben Pallant and Kelly Close

PART VI:
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The lead author of the Anthology of Bright Spots, Ben Pallant, joined The diaTribe Foundation in 2016 after graduating summa cum laude and Phi Beta Kappa from Bowdoin College, where he studied Sociology and Chemistry. He has done research on both bio-organic synthesis and public health, the latter project taking place in Siem Reap, Cambodia and focusing on clinical manifestations of dengue fever. During his semester abroad in Vietnam, South Africa, and Argentina, he focused on community-level factors impacting global health. In addition to his work on this project, he also writes long-form pieces for diaTribe.org and The diaTribe Foundation, including, most recently, "The vastly underestimated epidemic of diabetes."

AMELIA DMOWSKA
Amelia Dmowska joined The diaTribe Foundation in 2016 after graduating with honors from the University of Chicago, where she completed a degree in English Language and Literature and a minor in Biological Sciences. During her undergraduate years living on the South Side of Chicago, she was heavily involved in working to increase vulnerable populations' access to health education. In addition to her role as a contributor to the Anthology of Bright Spots, she is organizing d17, a gathering in late 2017 where leaders across diverse sectors will come together to work together on systems-level solutions that could reduce the societal burden of type 2 diabetes and pre-diabetes and heighten the urgency and need for action around the epidemic.

ISABEL CHIN
Isabel Chin joined dQ&A and The diaTribe Foundation in 2017 after graduating magna cum laude from Brown University with a concentration in Public Health and as a member of the Program in Liberal Medical Education. Isabel dedicated her summers during college to working in Los Angeles to improve access to healthcare for vulnerable Medicaid patients and helping to bring innovative health services to LA County such Housing for Health, which provides permanent supportive housing to homeless patients with complex medical needs. She continued her work to better homeless healthcare with the Rhode Island Medical Navigator Partnership as a patient advocate and health care navigator. Having lived with Type 1 Diabetes for 20 years, Isabel has a personal connection to the amazing work happening at dQ&A, The diaTribe Foundation, and Close Concerns. She is passionate about improving diabetes education and healthcare worldwide and has worked with American Youth Understanding Diabetes Abroad (AYUDA) to design and implement curriculum for diabetes educational camps for children and their families in Quito, Ecuador and Santo Domingo, Dominican Republic. Isabel is grateful to her family, friends, and endocrinologist, Dr. Francine Kaufman, all of whom have helped to make her life with diabetes so joyous and successful and she hopes to make a similar positive impact in the lives of others with diabetes.

HAE-LIN CHO
Hae-Lin Cho joined Close Concerns as a Dartmouth Fellow in the spring of 2017 during her senior year of Dartmouth College, where she is a pre-medical student, majoring in Biology and minoring in Spanish. She is a member of Phi Beta Kappa and a Rufus Choates Academic Scholar. Due to her strong interest in oncology, Hae-Lin has been doing undergraduate research on the role of regulatory T cells in melanoma tumorigenesis in the Turk Lab at Geisel Medical School, which she started as a James O. Freedman Presidential Scholar, and has taken part in the Dartmouth Cancer Scholar program. At school, she is a part of GlobeMed at Dartmouth, the editor in chief of the Dartmouth Journal of Undergraduate Sciences, and volunteers with Cancer and Patient Services. In her free time, Hae-Lin enjoys painting, reading, writing, and going on hikes.

KELLY L. CLOSE
Kelly Close is the Founder and Chair of The diaTribe Foundation, a nonprofit established in 2013 to improve the lives of people with diabetes and prediabetes and to advocate for action. Kelly also founded Close Concerns in 2002, the leading organization globally in understanding the science, regulation, and commercial environment behind diabetes. Kelly's work prior to establishing Close Concerns and The diaTribe Foundation focused on life sciences more broadly. Over nearly a dozen years, she worked in finance and consulting at Goldman Sachs, Merrill Lynch, and McKinsey & Company. Kelly has a BA in Economics and English, magna cum laude, from Amherst College and an MBA from Harvard Business School.

The Anthology of Bright Spots

IN TYPE 2 DIABETES AND PREDIABETES

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