

The Obesity Prevention Initiative: A Statewide Effort to Improve Child Health in Wisconsin

Alexandra K. Adams, MD, PhD; Brian Christens, PhD; Amy Meinen, MPH, RDN; Amy Korth, MS, RDN; Patrick L. Remington, MD, MPH; Sara Lindberg, PhD, MS; Dale Schoeller, PhD

ABSTRACT

Background/Significance: Obesity rates have increased dramatically, especially among children and disadvantaged populations. Obesity is a complex issue, creating a compelling need for prevention efforts in communities to move from single isolated programs to comprehensive multisystem interventions. To address these issues, we have established a childhood Obesity Prevention Initiative (Initiative) for Wisconsin. This Initiative seeks to test community change frameworks that can support multisystem interventions and provide data for local action as a means for influencing policies, systems, and environments that support individuals' healthy eating and physical activity.

Approaches/Aims: The Initiative is comprised of three components: (1) infrastructure to support a statewide obesity prevention and health promotion network with state- and local-level public messaging and dissemination of evidence-based solutions (healthTIDE); (2) piloting a local, multisetting community-led intervention study in 2 Wisconsin counties; and (3) developing a geocoded statewide childhood obesity and fitness surveillance system.

Relevance: This Initiative is using a new model that involves both coalition action and community organizing to align resources to achieve health improvement at local and state levels. We expect that it will help lead to the implementation of cohesive and sustainable policy, system, and environment health promotion and obesity prevention strategies in communities statewide, and it has the potential to help Wisconsin become a national model for multisetting community interventions to address obesity. Addressing individual-level health through population-level changes ultimately will result in reductions in the prevalence of childhood obesity, current and future health care costs, and chronic disease mortality.

INTRODUCTION

Data from the Centers for Disease Control and Prevention (CDC) demonstrates that the prevalence of obesity is 14% among Wisconsin children 2 to 5 years old and 12% among adolescents.¹ The rate of

• • •

Author Affiliations: Department of Family Medicine and Community Health, University of Wisconsin School of Medicine and Public Health (UWSMPH) (Adams); Center for American Indian and Rural Health Equity, Montana State University (Adams); healthTIDE, Department of Family Medicine and Community Health, UWSMPH (Meinen, Korth); UW-Extension (Korth); School of Human Ecology, UW-Madison (Christens); Population Health Institute, UWSMPH (Remington, Lindberg); Department of Nutritional Sciences, UW-Madison (Schoeller).

Corresponding Author: Alexandra Adams, MD, PhD, Department of Family Medicine and Community Health, University of Wisconsin-Madison, 1100 Delaplaine Court, Madison, WI 53726; phone 608.265.4671; fax 608.263.2820; e-mail alex.adams@fammed.wisc.edu.

increase in childhood obesity prevalence has slowed but has not stopped, thus efforts to reduce the prevalence of childhood obesity cannot be relaxed.²

Multiple national organizations including the CDC, the National Institutes of Health (NIH), the Robert Wood Johnson Foundation, the Institute of Medicine, and the White House Task Force on Childhood Obesity have emphasized the importance of a multisector approach to preventing childhood obesity.^{3,4} Doing so, however, to reduce the prevalence of childhood obesity has not been easy and the traditional public health approach is proving insufficient.

Perhaps this was best exemplified by the failure a well-designed study conducted in 8 European Union countries in 2006-2011 (the IDEFICS study).⁵ This study examined the effectiveness of school-based interventions that promoted more fruit and vegetable consumption, greater water consumption, increased physical activity, reduced TV viewing time, and lengthened sleep duration. A second control city was selected in each of the countries. The resulting cohort included over 16,000 children between 2 and 10 years of age.

The intervention had no effect on the prevalence of obesity, which actually increased 5 percentage points in both intervention and control cities. The investigation attributed the lack of effectiveness of the focus only on schools, the "top-down" design with interventions selection done by investigators, and the intervention's short duration. Our experience with community-based research indicates that engaging communities during the process of designing, selecting, and evaluating interventions is critical to increase individual commitment and have the desired effects. In addition, effective interventions to reduce and prevent obesity need to address multiple levels of the social-ecological model, with a focus on policy, systems, and environment strategies, with a particular focus on children.^{6,7}

To address these issues, the Obesity Prevention Initiative

(Initiative) has both a statewide reach and a focus at the individual community level. These prevention efforts are placing a premium on community engagement and leadership at the grassroots level via community organizing as well as at the broader, more institutional levels via coalition action in pursuit of collective impact. We hypothesize that this approach will reach more people, be more sustainable, and lead to more long-term positive health outcomes than the alternative of more narrowly focused interventions.

The Initiative's ultimate goal is to reduce the pediatric obesity rate in Wisconsin by creating a healthier environment for healthier children by making physical activity and healthy eating easier and more fun. By working to build strength with local and statewide partners, we expect that this effort will help lead to implementation of cohesive and sustainable policy, system, and environment health promotion that will change communities and support families in efforts to prevent pediatric obesity. Herein we describe the overall design and methods being used by this comprehensive initiative, and compare this Initiative's work with other large-scale obesity prevention initiatives worldwide.

APPROACH

The Initiative uses a multifaceted approach including community-based participatory research, outreach, surveillance, and dissemination to influence childhood obesity in Wisconsin (Figure 1). Each aim has faculty leadership and community partner engagement. This project has 3 core components, including an administrative core that link the cores by creating common goals. Evaluation strategies are being used within each core to assess impact. Our team comprises 14 faculty, 15 staff, and 9 graduate and other students, 11 community staff, and over 1500 community partners.

This work addresses 2 key gaps in current obesity prevention research: understanding what works in multisystem approaches to obesity, and how these approaches can be implemented through community-led change strategies. The potential to generalize our research to other public health issues is high; if successful, this work will provide not only quantitative evidence of the effectiveness of a comprehensive approach, but also will give other investigators validated tools and a new model to collaboratively engage communities in health behavior change.

Scientific Model

The Initiative uses a model that galvanizes resident leadership and seeks greater alignment of existing organizational and agency leadership. This model is built on the community-change frameworks of community organizing and coalition action, or "collective impact", is described in detail by Christens et al.⁸ The Initiative builds upon principles of community organizing, which encourages broad community participation in selecting priorities for change, conducting applied research, and taking collective action. Collective impact, on the other hand, is a framework for

building coalition infrastructure to align stakeholders in order to leverage resources, promote a common agenda, establish shared measures, and design continuous communications and feedback loops for expediting large-scale community change.⁹⁻¹¹ Our work implements both approaches in the same communities and seeks opportunities for synergy. Thus, the Initiative utilizes the most successful aspects of Shape Up Somerville, including intervention in a wide range of systems (collective impact) along with reliance on community leaders (community organizing) to both strengthen policy and environmental change and perhaps also to support behavior change in support of healthier lifestyles. We expected this to contrast with other initiatives that are focusing their coalition efforts primarily on achieving collective impact¹²⁻¹⁷ without dedicated initiatives to expand grassroots leadership.

Core Efforts

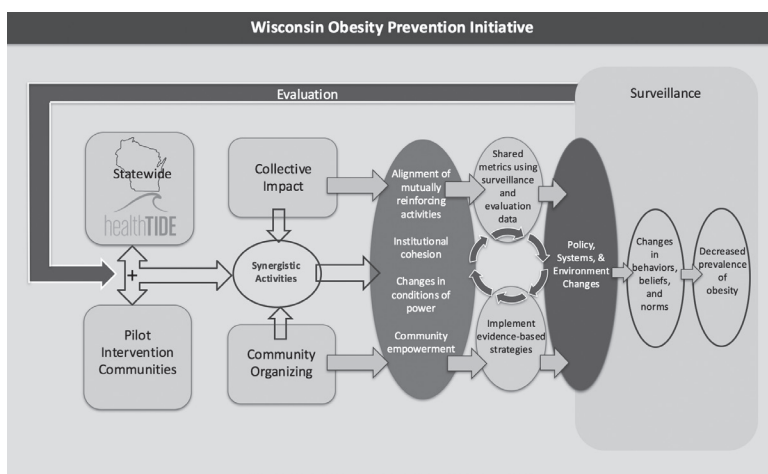
The Initiative's 3 core components are healthTIDE, Intervention, and Surveillance/Evaluation.

healthTIDE supports and expands a prior effort to initiate a statewide network of leaders from multiple institutions and organizations that began in 2012 as the Wisconsin Obesity Prevention Network. In its current form, healthTIDE works collectively through alignment of activities, building a common agenda, and engagement of community partners to disseminate and implement evidence-based obesity prevention strategy (Figure 1).

A major function of healthTIDE is to provide "backbone staff" who serve to convene, connect, and facilitate aligned efforts among partners and organizations. Specifically, staff provide infrastructure for statewide obesity prevention efforts by convening and helping form connections between diverse partners in research, governmental public health, advocacy, communities, and nonprofit organizations addressing change in the following systems: early childhood care and education, schools, active communities, healthy food retail, and advocacy.¹²

A case study of a single system collective impact team is the Wisconsin Early Childhood Obesity Prevention Initiative, presented in this issue.¹⁸ Backbone staff convened a collective impact team consisting of partners working on obesity prevention in the early childhood setting. Team members reviewed available evidence-based interventions, local and state policy strategies, ongoing research, and expert opinion, and set statewide priorities and an agenda for ongoing collective work. This has led to several completed and current research projects as well as statewide policy changes related to nutrition and physical activity in YoungStar, the new quality rating improvement system for childcare sites. This same process of convening diverse partners and organizations has been replicated with additional collective impact teams including schools, health care, food retail, and active communities. Many of the teams have set priorities, which are posted on the healthTIDE website (healthTIDE.org).

Figure 1. Core Aspects of the Obesity Prevention Initiative and Their Multiple Feedback Loops



healthTIDE (hT) works statewide; Intervention is working with 2 pilot communities. They connect their work via the ongoing involvement of community partners in identifying priorities. The Intervention Core is developing the intervention menu and providing technical support for pilot communities collective impact and community organizing initiatives. Evaluation occurs at all levels. Results are critical to understanding the Initiative's progress. Surveillance data will assist hT and communities in deciding where to focus, and in understanding the Initiative's impact.

To extend its impact to Wisconsin residents, healthTIDE also has begun creating messages and communication platforms in collaboration with the Intervention and Surveillance/Evaluation cores for evidence-based solutions to obesity, including state- and local-level public dissemination through its own platforms and other outlets including the University of Wisconsin School of Medicine and Public Health and its Wisconsin Partnership Program and Population Health Institute. Social media (Facebook and Twitter) and marketing are being used to convey that tackling the problem of obesity is both worthwhile and solvable. This coordinated and comprehensive web-based communication plan is central to creating a movement comprised of individuals and partners who are unified and aware of the identified statewide priorities

Intervention—As indicated above, intervention includes both community organizing and coalition action as frameworks to catalyze community change.⁸ Implementation of the 2 pilot intervention studies includes 2 longstanding community partners, Marathon and Menominee counties (Figure 1). A literature analysis revealed that a comprehensive mix of strategies in a variety of settings is the most effective approach for addressing obesity in communities. These counties are involved in a pilot study that involves selecting a mix of evidence-based and evidence-informed strategies that span several different settings (schools, early childhood sites, worksites, community, health care) for the communities to implement and evaluate.¹⁹ Through the Initiative, training on community action has been provided to groups of residents using a relational model of community organizing that prioritizes resident leadership.²⁰

Researchers have compiled an evidence-based and evidence-informed intervention system that consists of a menu of multisetting strategies with corresponding evaluation methods.¹⁹ As part of the intervention system creation, a group of researchers, practitioners, and community partners determined a number of potential obesity prevention interventions and created a menu of possible targeted strategies for communities. This menu, which includes different settings/systems—early childhood, schools, health care, worksites, built environment, and food systems—is being used by the pilot communities to determine strategies in a minimum of 3 sites for their community. This will ensure that each pilot community can choose evidence-based and evidence-informed strategies that they deem most appropriate for their community yet enable consistent evaluation across communities in collaboration with the Surveillance/Evaluation core.

Surveillance/Evaluation—No current system is sufficiently comprehensive or geographically specific to allow for adequate longitudinal examination of trends in child obesity at the community level. There are several systems in place aiding in childhood obesity tracking, but these do not cover all pediatric ages, and there is no coordination of datasets, despite an Institute of Medicine panel call for the establishment of action-focused surveillance systems that can inform regional disease prevention effort.²¹ To support and document the Initiative's work, an obesity surveillance system called the Wisconsin Health Atlas has been developed. This platform for aggregating and sharing data can be used by anyone across the state to track obesity and related community-health indicators.²² Working in cooperation with multiple community partners and stakeholders, a sustainable infrastructure is being created that will allow for evaluation of current interventions in the field, identification of secular trends, and identification of communities, neighborhoods, or subpopulations in need of targeted resources and interventions. Data also will be used to inform and track policy, systems, and environmental change. Figure 1 illustrates the multiple components of the surveillance system which includes data for the state as a whole,^{1,23} as well as for specific subpopulations and geographic regions.²⁴ In addition to developing the surveillance system, this core is working to develop shared metrics and is evaluating healthTIDE and community intervention outcomes (Figure 1).

UW-Madison faculty with expertise in community research, evaluation, and obesity prevention are assisting in the strategy selection process and are working with communities to set up evaluation indicators with specific reporting indicators at pre-, mid-

point, and post-3 years of intervention work, and beyond. Since the evidence base around comprehensive approaches to obesity is still building, outcome data from these pilot communities will be used to inform other Wisconsin communities.

National Advisory Board

The Initiative has a national scientific advisory board comprised of 6 nationally respected university faculty with expertise in obesity prevention, health promotion, and health communications. Two faculty are current or former directors of university-based CDC-funded Prevention Research Centers. This board meets biannually to provide feedback on the strengths and weaknesses of the Initiative's efforts. Individual faculty experts also meet with and advise the cores. In addition to this academic advisory board, healthTIDE has a leadership council comprised of 18 members from state and local public health departments, state and local nonprofits, UW-Extension, and the Healthy Wisconsin Leadership Institute. This group convenes biannually and on an ad-hoc basis to guide healthTIDE staff.

Relevance

This approach has strong similarities in scope to Shape Up Somerville. We have chosen a model similar to, but more comprehensive than Shape Up Somerville, which involved multiple systems and resulted in a decrease in the body mass index (BMI) of children and their parents, although parents were not the primary focus.^{25,26} The Initiative's central aim is to reduce childhood obesity because it is a major risk factor for adult obesity, and both childhood obesity and adult obesity are risk factors for insulin resistance, type 2 diabetes, dyslipidemia, and other chronic diseases. Changes at the statewide and community levels will improve individual-level nutrition and physical activity behaviors directly associated with weight and fitness. Furthermore, through the multi-setting, comprehensive community pilot interventions, research faculty will be able to pilot, test, and determine the population-level improvements in health.

Through this initiative, Wisconsin can be a national model for multisetting community interventions to address obesity by mobilizing resident leaders and aligning institutions and resources to achieve health improvement at local and statewide levels. Addressing these individual-level indicators through population-level changes ultimately will result in reduction in the prevalence of childhood obesity, reduced current and future health care costs, and future reductions in chronic disease mortality. Lessons learned regarding the community change processes and how they affect obesity will be helpful for other health-related efforts.

Progress

To date, healthTIDE backbone staff have been able to leverage over \$2 million in additional grant and in-kind funds to make progress on the statewide priorities identified and have set up web-based

communications including a website and social media platforms to reach the over 1500 partners statewide connected with the work of healthTIDE and to the public. The 2 pilot communities are in the process of choosing intervention strategies and giving feedback on the intervention system menu, which is being developed as an interactive website that can serve as a point of access for strategy selection criteria, evidence, technical assistance, and Wisconsin case studies. Community organizing initiatives and coalition initiatives have taken root in the communities with the goal of becoming drivers of changes in the local policies, systems, and environments that can promote healthy eating and physical activity. The surveillance system has amassed publicly available data and established agreements with Wisconsin health systems to analyze BMI data from electronic health records. Data dissemination will occur via reports, fact sheets, and an interactive website. New data sources are being added regularly.

By creating a comprehensive infrastructure and engaging multiple community, academic, and private sector partners with the Obesity Prevention Initiative, there is movement towards more comprehensive and strategic priority setting and mutually reinforcing activities statewide. This special issue of *WMJ* illustrates both the methodology we are using as well as early progress towards more comprehensive and collective work on obesity prevention with multiple local and statewide partners.

Acknowledgements: The authors thank the Marathon County and Menominee Tribal community partners and John Stedman who worked directly with our pilot communities.

Funding/Support: Funding for this project was provided by the University of Wisconsin School of Medicine and Public Health through the Wisconsin Partnership Program.

Financial Disclosures: Dr Schoeller has been issued a patent for use of conjugated lineic acid and has a patent pending for a carbon breath test to monitor energy balance.

REFERENCES

1. Ryan K, Pillai P, Remington P, Malecki K, Lindberg S. Development of an obesity prevention dashboard for Wisconsin. *WMJ*. 2016;115(5):224-227.
2. Ogden CL, Carroll MD, Kit BK, Flegal KM. Prevalence of Childhood and Adult Obesity in the United States, 2011-2012. *JAMA* 2014;311(8):806-814, 2014. doi:10.1001/jama.2014.732.
3. Office of Disease Prevention and Health Promotion. Healthy People 2020. <https://www.healthypeople.gov>. Published 2014. Accessed Oct 31, 2016.
4. Ogden CL, Carroll MD, Kit BK, Flegal KM. Prevalence of obesity in the United States, 2009-2010. *NCHS Data Brief*. 2012;82:1-8.
5. Pigeot I, de Henauw S, Baranowski T. The IDEFICS (Identification and prevention of Dietary- and lifestyle-induced health Effects In Children and infants) trial outcomes and process evaluations. *Obes Rev*. 2015;16(Suppl 2):2-3. doi:10.1111/obr.12345.
6. Story M, Kaphingst K, Robinson-O'Brien R, Glanz K. Creating healthy food and eating environments: policy and environmental approaches. *Annu Rev Public Health*. 2008;29(1):253-272. doi:10.1146/annurev.publhealth.29.020907.090926.
7. McLeroy K, Bibeau D, Steckler A, Glanz K. An Ecological Perspective on Health Promotion Programs. *Health Educ Behav*. 1988;15(4):351-377. doi:10.1177/109019818801500401.

continued on page 250

21. Twisk JW, Kemper HC, vanMechelen W. Tracking of activity and fitness and the relationship with cardiovascular disease risk factors. *Med Sci Sports Exerc.* 2000; 32(8): 1455-1461.
22. Butcher K, Sallis JF, Mayer JA, Woodruff S. Correlates of physical activity guideline compliance for adolescents in 100 U.S. Cities. *J Adolesc Health.* 2008; 42(4):360-368.
23. Pate RR, Wang CY, Dowda M, Farrell SW, O'Neill JR. Cardiorespiratory fitness levels among US youth 12 to 19 years of age: findings from the 1999-2002 National Health and Nutrition Examination Survey. *Arch Pediatr Adolesc Med.* 2006;160:1005-1012.
24. Unger JB, Reynolds K, Shakib S, Spruijtz-Metx D, Sun P, Johnson CS. Acculturation, physical activity, and fast-food consumption among Asian-American and Hispanic adolescents. *J Community Health.* 2004;29(6):467-481.
25. Stalsberg R, Pedersen AV. Effects of socioeconomic status on the physical activity in adolescents: a systematic review of the evidence. *Scand J Med Sci Sports.* 2010;20(3):368-383.
26. Wang Y, Zhang Q. Are American children and adolescents of low socioeconomic status at increased risk of obesity? Changes in the association between overweight and family income between 1971 and 2002. *Am J Clin Nutr.* 2006;84(4):707-716.
27. Trost SG, Pate RR, Freedson PS, Sallis JF. Using objective physical activity measures with youth: How many days of monitoring are needed? *Med Sci Sports Exerc.* 2000; 32(2):426-431
28. Ruiz JR, Rizzo NS, Ortega FB, Loit HM, Veidebaum T, Sjostrom M. Markers of insulin resistance are associated with fatness and fitness in school-aged children: the European Youth Heart Study. *Diabetologia.* 2007;50(7):1401-1408.
29. Allen DB, Clark RR, Peterson SE, Nemeth BA, Eickhoff J, Carrell AL. Fitness is a stronger predictor of fasting insulin than fatness in overweight male middle-school children. *J Pediatr.* 2007;150: 383-387.
30. Johnston, LD, Delva J, and O'Malley PM. Sports participation and physical education in American secondary schools: current levels and racial/ethnic and socioeconomic disparities. *Am J Prev Med.* 2007;33(4):S195-S208.
31. Landis, MJ, Peppard PP, Remington PL. Characteristics of school-sanctioned sports: Participation and attrition in Wisconsin public high schools. *WMJ.* 2007;106(6):312-318.

The Obesity Prevention Initiative: A Statewide Effort to Improve Child Health in Wisconsin

REFERENCES (continued from p 223)

8. Christens BD, Tran Inzeo P, Meinen A, et al. Community-led collaborative action to prevent obesity. *WMJ.* 2016;115(5):259-263.
9. Tamarack. Tamarack – an institute for community engagement. <http://tamarackcommunity.ca/index.php>. Published 2013. Accessed Oct 31, 2016.
10. Turner S, Merchant K, Kania J, Martin E. Understanding the value of backbone organizations in collective impact. Stanford Social Innovation Review website. http://ssir.org/articles/entry/understanding_the_value_of_backbone_organizations_in_collective_impact_1. Published July 17, 2012. Accessed Oct 31, 2016.
11. Kania J, Kramer M. Collective impact. *Stanford Social Innovation Review.* 2011;9:36-41.
12. McIntosh B, Daly A, Masse LC, et al. Sustainable childhood obesity prevention through community engagement (SCOPE) program: evaluation of the implementation phase. *Biochem Cell Biol.* 2015;93(5):472-478. doi:10.1139/bcb-2014-0127.
13. LiveWell Colorado. <http://livewellcolorado.org>. Published 2016. Accessed Oct 31, 2016.
14. Child Obesity 180. <http://www.childobesity180.org>. Published 2013. Accessed Oct 31, 2016.
15. Iowa Food & Fitness. Northeast Iowa food & fitness initiative. <http://www.iowafoodandfitness.org>. Published 2014. Accessed Oct 31, 2016.
16. GO! Austin/VAMOS! Austin. Gava. <http://www.goaustinvamosaustin.org>. Published 2013. Accessed Oct 31, 2016.
17. Iton A. Tackling the root causes of health disparities through community capacity building. In: Hofichter R and Bhatia R, 2nd ed. *Tackling health inequities through public health practice: A handbook for action*. Washington DC: Oxford University Press; 2010.
18. Meinen A, Hilgendorf A, Adams A, et al. The Wisconsin Early Childhood Obesity Prevention Initiative: an example of statewide collective impact. *WMJ.* 2016;115(5):269-274.
19. Spahr C, Wells A, Christens BD, et al. Developing a strategy menu for community-level obesity prevention. *WMJ.* 2016;115(5):264-268.
20. Hilgendorf A, Stedman J, Tran Inzeo P, et al. Lessons from a pilot community-driven approach for obesity prevention. *WMJ.* 2016;115(5):275-279.
21. Kumanyika S, Parker L, Sim L. *Bridging the evidence gap in obesity prevention: a framework to inform decision making*. Washington DC: The National Academies Press; 2010.
22. Wisconsin Health Atlas website. <http://www.wihealthatlas.org/>. Updated July 2016. Accessed Oct 31, 2016.
23. Eggers S, Remington P, Ryan K, Nieto FJ, Peppard P, Malecki K. Obesity prevalence and health consequences: findings from the Survey of the Health of Wisconsin 2008-2013. *WMJ.* 2016;115(5):238-243.
24. Gregor L, Remington P, Lindberg S, Ehrenthal D. Prevalence of pre-pregnancy obesity, 2011-2014. *WMJ.* 2016;115(5):228-232.
25. Economos CD, Hyatt RR, Must A, et al. Shape up Somerville two-year results: A community-based environmental change intervention sustains weight reduction in children. *Prev Med.* 2013;57(4):322-327. doi:10.1016/j.jpmed.2013.06.001.
26. Coffield E, Nihiser AJ, Sherry B, Economos CD. Shape up Somerville: Change in parent body mass indexes during a child-targeted, community-based environmental change intervention. *Am J Public Health.* 2015;105(2):e83-e89. doi:10.2105/ajph.2014.302361.

advancing the art & science of medicine in the midwest

WMJ

WMJ (ISSN 1098-1861) is published through a collaboration between The Medical College of Wisconsin and The University of Wisconsin School of Medicine and Public Health. The mission of *WMJ* is to provide an opportunity to publish original research, case reports, review articles, and essays about current medical and public health issues.

© 2016 Board of Regents of the University of Wisconsin System and The Medical College of Wisconsin, Inc.

Visit www.wmjonline.org to learn more.