

Implementation of Diabetes Prevention in Health Care Organizations: Best Practice Recommendations

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Abstract

Approximately 1 in 3 American adults has prediabetes, a condition characterized by blood glucose levels that are above normal, not in the type 2 diabetes ranges, and that increases the risk of developing type 2 diabetes. Evidence-based treatments can be used to prevent or delay type 2 diabetes in adults with prediabetes. The American Medical Association (AMA) has collaborated with health care organizations across the country to build sustainable diabetes prevention strategies. In 2017, the AMA formed the Diabetes Prevention Best Practices Workgroup (DPBP) with representatives from 6 health care organizations actively implementing diabetes prevention. Each organization had a unique strategy, but all included the National Diabetes Prevention Program lifestyle change program as a core evidence-based intervention. DPBP established the goal of disseminating best practices to guide other health care organizations in implementing diabetes prevention and identifying and managing patients with prediabetes. Workgroup members recognized similarities in some of their basic steps and considerations and synthesized their practices to develop best practice recommendations for 3 strategy maturity phases. Recommendations for each maturity phase are classified into 6 categories: (1) organizational support; (2) workforce and funding; (3) promotion and dissemination; (4) clinical integration and support; (5) evaluation and outcomes; (6) and program. As the burden of chronic disease grows, prevention must be prioritized and integrated into health care. These maturity phases and best practice recommendations can be used by any health care organization committed to diabetes prevention. Further research is suggested to assess the impact and adoption of diabetes prevention best practices.

Keywords: prediabetes, diabetes prevention best practices, National Diabetes Prevention Program, lifestyle change program, American Medical Association

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Correction added on June 29, 2021 after first online publication of June 23, 2021: The article reflects Open Access, with copyright transferring to the author(s), and a Creative Commons Attribution Noncommercial License (CC-BY-NC) added (<http://creativecommons.org/licenses/by-nc/4.0/>).

Introduction

DIABETES MELLITUS IS one of the nation's most prevalent chronic diseases, currently affecting more than 34 million Americans¹ and leading to increasing economic and social burdens. At the same time, approximately 1 in 3 American adults has prediabetes,¹ a condition that is characterized by blood glucose levels that are above normal but not high enough to be diagnosed as type 2 diabetes. Individuals with prediabetes are at increased risk of progression to type 2 diabetes, yet more than 84% are unaware that they have this condition.¹

Type 2 diabetes can potentially be prevented or delayed in adults with prediabetes through evidence-based treatments. The landmark US Diabetes Prevention Program (DPP) study demonstrated that intensive lifestyle intervention was effective at reducing the incidence of type 2 diabetes. At approximately 3 years follow-up, the incidence of diabetes was 58% lower among those who received intensive lifestyle intervention compared to those who received placebo treatment.² Since this study, lifestyle interventions for the prevention of type 2 diabetes have been successfully translated and delivered in a variety of settings and modalities.^{3–8} Based on evidence from the DPP study and subsequent translational studies, Congress authorized the Centers for Disease Control and Prevention (CDC) to establish the National Diabetes Prevention Program (National DPP) lifestyle change program in 2010 to address the rising incidence of type 2 diabetes.⁹ The program is a structured and group-based intensive behavioral change program designed to help adults with overweight or obesity who are at risk for type 2 diabetes to prevent or delay its onset. During the first 4 years (February 2012 through January 2016) of program implementation, 14,747 adults were enrolled and attended a median of 14 sessions over an average of 172 days.¹⁰ As of April 2019, more than 324,000 individuals have participated in the National DPP lifestyle change program offered by more than 3000 partner organizations.¹¹ Currently, there are more than 1800 in-person, online, and/or distance learning lifestyle change programs offered by health care organizations, community-based organizations, and digital health providers registered with the National Diabetes Recognition Program.¹²

American Medical Association Diabetes Prevention Workgroup

The American Medical Association (AMA) established the prevention of type 2 diabetes as a long-term strategic goal in 2012 and has collaborated with health care organizations across the country to build sustainable diabetes prevention strategies. In 2017, the AMA formed the Diabetes Prevention Best Practices Workgroup (DPBP) with representatives from 6 health care organizations actively implementing diabetes prevention: Henry Ford Health System; Intermountain Healthcare; Loma Linda University Health; University of South Carolina School of Medicine-Columbia Campus; Trinity Health; and University of California, Los Angeles, (UCLA) Health.* DPBP established the goal of disseminating best practices to guide other health care organizations in implementing diabetes prevention strategies that identify and manage patients with prediabetes. Each organization had a unique strategy, but all included the National DPP lifestyle change program as a core evidence-based intervention. Organizations delivering the

National DPP lifestyle change program must meet national standards to ensure fidelity and quality, including the use of certified coaches and curriculum and close tracking of participant physical activity minutes and weight. Recognition as a DPP lifestyle change program by the CDC requires achievement of specific performance metrics. At the time of manuscript submission, these metrics included an average weight loss of 5% and minimum engagement standards among participants. The DPBP organizations are all fully recognized by the CDC, indicating that these standards and performance metrics are being successfully met and sustained over time.

Although there were varying models of implementation at each organization, it became clear that some basic steps and considerations were common among these diverse systems. With this awareness, the DPBP synthesized the best practice implementation recommendations that will be presented in the following sections for other health care organizations. This process spanned 2 years and included in-person meetings, conference calls, and semi-structured interviews with teams from each DPBP member organization. These teams consisted of individuals with varied professional qualifications, including endocrinology, primary care medicine, sports medicine, physical therapy, nutrition, osteopathic medicine, cardiovascular health, medical administration, research, community health, and nursing. Common activities conducted at DPBP institutions formed the foundation for the recommendations. The diverse geographic locations and patient populations served by DPBP members and their multidisciplinary professional backgrounds support the broad applicability of the recommendations. Each DPBP member collected metrics specific to her/his organization's diabetes prevention strategy and maturity phase.

Implementation Maturity Phases

Implementing diabetes prevention at a system level usually involves several stages over time. DPBP grouped implementation-structured activities into 3 strategy maturity phases: (1) Getting Started, (2) Planning for Growth, and (3) Advancing Innovation (Tables 1–3). Although the three phases interconnect, each has distinct and specific characteristics that can propel the organization into the next phase, and activities may repeat themselves in each phase.

The Getting Started phase (Table 1) is the start-up period during which an organization obtains organizational support and commits to establishing a diabetes prevention strategy that offers treatment options for prediabetes, such as a CDC-recognized lifestyle change program, secures the necessary workforce and funding, and establishes a National DPP lifestyle change program offering. Planning for Growth (Table 2) is the subsequent phase during which an organization advances the strategy by increasing overall awareness, building infrastructure, expanding clinical engagement, offering the National DPP lifestyle change program to additional sites, or further developing the program curricula and coaches to expand program reach and enrollment. The Advancing Innovation phase (Table 3) occurs when diabetes prevention becomes part of routine clinical operations for an organization and the focus is on population management and sustainability. At this point, strategy milestones and processes can be broadly shared and insights from implementation can be applied to other quality improvement initiatives.

TABLE 1. BEST PRACTICE RECOMMENDATIONS FOR GETTING STARTED MATURITY PHASE

Key focus areas are to obtain organizational support, secure workforce and funding resources, and begin offering a National Diabetes Prevention Program (National DPP) lifestyle change program.

Organizational Support

- Align diabetes prevention strategy (strategy) goals and expected outcomes with the organization's strategic plan and mission.
- Use available data, such as Community Health Needs Assessment results and community and patient diabetes data, to illustrate the return on investment and anticipated improvement in health outcomes from the strategy.
- Form an interdisciplinary leadership/advisory group to guide strategy and increase visibility.

Workforce and Funding

- Develop a budget and estimate the short-term and long-term costs of the strategy; conduct networking to secure the necessary resources.
- Identify the available workforce and build an interdisciplinary project team to execute strategy activities.
- Identify existing short-term and long-term funding sources, such as community benefit dollars, grants, and insurer benefits.

Promotion and Dissemination

- Develop a communications and outreach plan along with key messages about strategy for the entire organization and community.
- Share success stories and outcomes from strategy implementation early, often, and in many venues.
- Use available existing materials and educational resources, such as posters, flyers, and handouts.

Clinical Integration and Support

- Identify and recruit clinical champions, including providers and other care team members.
- Adapt processes to increase prediabetes identification and management, and facilitate referrals to a National DPP lifestyle change program.
- Determine the process to integrate clinical decision-support tools and other health information technology, and begin to engage key stakeholders.

Evaluation and Outcomes

- Define the goals of the strategy and the criteria for success.
- Develop quantitative and qualitative assessments of strategy progress that include informal feedback from key stakeholders, such as patients, physicians, and lifestyle change program coaches.
- Determine the metrics to assess the current state of identification and management of patients with prediabetes, and use the results to guide activities.

Program (National DPP Lifestyle Change Program)

- Obtain guidance and technical assistance as needed for adhering to the CDC standards and achieving recognition; establish processes for collecting and submitting required CDC reporting metrics.
- Monitor lifestyle change program outcomes and identify areas of success and areas for improvement.
- Incorporate structured onboarding and skills development for coordinators and coaches.
- Develop quality assurance methods, such as structured performance feedback for coaches, for delivery of a lifestyle change program.

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AMA, American Medical Association; CDC, Centers for Disease Control and Prevention; DPP, Diabetes Prevention Program.

As an organization completes each maturity phase, the reach and population effects of a strategy likely will increase; however, benefits of a strategy are seen in all phases as patients with prediabetes receive an evidence-based intervention. Although the maturity phases are sequential, the timing for each phase is variable. Organizations may opt to remain in one phase longer, or some organizations may require less time than others to execute a phase, depending on prior experience with diabetes prevention. For example, an organization that has an established CDC-recognized National DPP lifestyle change program may progress through Getting Started within a few weeks, whereas an organization that is starting a new program may need months to progress in this phase.

DPBP outlined best practice implementation recommendations for each maturity phase, which are presented in Tables 1–3. The recommendations are classified into 6 overarching categories:

Organizational support recommendations encompass implementation activities that assist with obtaining leadership buy-in, demonstrating alignment with organizational mission, and sharing the expected or actual impact and return on investment from implementing diabetes prevention.

Workforce and funding recommendations focus on securing and maintaining the resources and team members needed to execute and sustain a diabetes prevention strategy. Interdisciplinary teams are essential and include ambulatory clinical care team members, data analysts, researchers, clinical operations personnel, health coaches, and diabetes educators as potential core team members.

Promotion and dissemination recommendations concentrate on raising awareness of a strategy, sharing success stories, and publicizing and/or publishing results within and outside an organization.

Evaluation and outcomes recommendations center on measuring the impact and progress of the strategy and supporting the collection of quantitative and qualitative metrics and data.

TABLE 2. BEST PRACTICE RECOMMENDATIONS FOR PLANNING FOR GROWTH MATURITY PHASE

Key focus areas are to increase and systemize clinical engagement, increase overall awareness of strategy, and expand program and prediabetes management.

Organizational Support

- Continue to cultivate leadership support for the diabetes prevention strategy (strategy) through regular updates and results.
- Query stakeholders to determine ways to increase support for the strategy, and adjust activities based on feedback.
- Pilot a quality improvement initiative or incentive for diabetes prevention.

Workforce and Funding

- Identify additional business units and departments to engage in the strategy, such as clinical operations.
- Estimate resources needed to increase reach and spread of the strategy; develop a cost-effective, feasible plan for expansion.
- Secure ongoing funding of the strategy, such as community health and benefits budgets.

Promotion and Dissemination

- Use marketing and communications to increase overall awareness of the strategy both inside and outside the organization.
- Create or identify forums to share strategy benefits and outcomes.
- Highlight aggregate outcomes from program participation, such as reduction in weight and increase in physical activity.

Clinical Integration and Support

- Leverage existing champions and recruit additional champions to expand awareness and clinical engagement in the strategy.
- Provide education to all clinical care teams on the identification and management of patients with prediabetes; consider offering training on shared decision-making and counseling techniques.
- Integrate and optimize clinical decision-support tools and health information tools for prediabetes, such as referral platforms.
- Improve and standardize referral and bidirectional feedback processes between clinical care teams and lifestyle change program providers.

Evaluation and Outcomes

- Begin to collect and monitor clinical metrics, such as the number of patients with prediabetes who receive a referral to a National Diabetes Prevention Program (National DPP) lifestyle change program.
- Expand the initial qualitative and quantitative evaluation methods.
- Continue to monitor the progress and impact of the strategy.

Program (National DPP Lifestyle Change Program)

- Automate processes for collecting and submitting required metrics for program recognition; continue to regularly monitor the delivery quality and metrics of the lifestyle change program.
- Establish an ongoing coach, staff a professional development program, and offer additional skills training, such as motivational interviewing.
- Select and certify coaches to become master trainers for the lifestyle change program.
- Consider expanding program offerings, such as group physical activity opportunities, based on participant requests and needs.

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AMA, American Medical Association; DPP, Diabetes Prevention Program.

Clinical integration and support recommendations outline activities to increase engagement from clinical care teams and improve the identification, referral numbers, and management of patients with prediabetes.

Program recommendations support the activities associated with the launch and expansion of a high-quality National DPP lifestyle change program offering or collaboration with an external community-based National DPP lifestyle change program.

When planning or executing within these 6 overarching categories, certain foundational structural processes and principles apply throughout all implementation phases and activities. DPBP noted that although variability among health care organizations in patient demographics exists, leadership teams must ensure throughout the planning and implementation process that from historically marginalized/

minoritized communities are receiving the benefits of the diabetes prevention strategy. It is essential to apply a health equity lens in the development of all diabetes prevention activities and processes. The purpose of an equity lens is to be deliberately inclusive as an organization makes decisions on process and outcomes. This also ensures that patients with prediabetes are identified and managed with culturally competent care throughout all diabetes prevention phases.

Other foundational processes include the optimization of health information and digital health technology to ensure that the diabetes prevention strategy is linked to the continuum of care for each patient. To successfully integrate clinical decision support tools and other health information technology, the identification of key stakeholders within the organization needs to be applied consistently throughout the maturity phases.

TABLE 3. BEST PRACTICE RECOMMENDATIONS FOR ADVANCING INNOVATION MATURITY PHASE

Key focus areas are to share achievements and ensure the sustainability of strategy and improvements.

Organizational Support

- Ensure continued visibility and provide regular updates on the diabetes prevention strategy (strategy) to the organization's leadership.
- Adopt system-wide goals or incentives for diabetes prevention that align vertically and laterally (eg, leadership goals align with clinical care team goals).

Workforce and Funding

- Use an established advisory group, champions, and project team for other prevention initiatives.
- Monitor operational costs and maintain the cost-effectiveness of the strategy.
- Secure additional funding sources for the strategy, such as reimbursement for the National Diabetes Prevention Program (National DPP) lifestyle change program through insurance coverage or employer benefits.

Promotion and Dissemination

- Continue to highlight success stories that demonstrate the benefit of the strategy to the organization and the larger community.
- Externally publish and present learnings and results of the strategy.
- Advocate for diabetes prevention locally and nationally through such activities as writing commentaries, white papers, or legislative briefings or responding to open comments for programs and policies.

Clinical Integration and Support

- Provide regular reporting to care teams on metrics related to prediabetes identification and management; address any negative trends, such as decreased program referral rates.
- Use the entire care team to identify and manage patients with prediabetes.
- Offer multiple evidence-based treatment options for patients with prediabetes.

Evaluation and Outcomes

- Track population-level outcomes and additional health outcomes, such as reductions in blood glucose levels or the incidence of diabetes.
- Revise existing metrics and evaluation methods as needed.
- Solicit ongoing feedback on the strategy from all stakeholders.
- Consider data exchange with external sources, such as health plans and state health departments, to improve local and national efforts related to diabetes prevention.

Program (National DPP Lifestyle Change Program)

- Create a multidirectional communication flow and enable care coordination between the lifestyle change program, clinical care teams, patients, and other service organizations to address participant needs.
- Continue to monitor the quality and process the efficiency of the lifestyle change program.
- Offer advanced skills training or cross-train coaches to deliver other programs.
- Monitor and address coordinator and coach attrition.

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Implementation Road Map: Demonstrating Best Practice

The best practice implementation recommendations developed by DPBP can be used by health care organizations as a road map in each maturity phase.

Getting started phase

During the Getting Started phase, obtaining organizational support and establishing the necessary resources for workforce and funding are often the initial requisite steps, and assessing existing resources can be helpful. For example, the Henry Ford Health System team identified an established group of faith-based nurses to deliver the National DPP lifestyle change program. The nurses were already embedded in the community and training them as lifestyle coaches allowed the team to begin offering the program in many locations. Loma Linda University Health team members included faculty and students from the university's

School of Public Health as well as fitness center staff who delivered the program, and clinical care case managers who recruited eligible patients.

To help gain initial buy-in across the organization, existing data such as local diabetes prevalence rates can be highlighted. Trinity Health used results from its Community Health Needs Assessment to incorporate funding for National DPP lifestyle change program offerings into its community health and benefits budget.

Stakeholder engagement is critical because diverse groups (in and out of the organization) can synergistically help make the case for implementing and sustaining diabetes prevention services. In the case of UCLA Health, the diabetes prevention team was able to form a partnership with departments that are not traditionally linked to clinical care or clinical operations, such as campus recreation services, occupational health, and human resources. This team diversity helped achieve broad organizational support.

Planning for growth phase

In the Planning for Growth phase, clinical engagement and endorsement, integration of digital health tools, and dissemination of strategy processes and metrics can drive expansion. Engaging clinical champions and educating care teams can raise overall awareness of a diabetes prevention strategy. Thus, partnership with clinical champions increases needed buy-in from frontline clinical providers who may help identify, refer, and encourage patients to participate in the National DPP lifestyle change program offering. Training members of care teams on specific counseling or communication techniques to address prediabetes with patients also can improve the overall identification and management of prediabetes. At UCLA Health, pharmacists engaged in a shared decision-making process with identified patients on their prediabetes treatment options; patients who participated in this process had an increased uptake of the National DPP lifestyle change program and/or metformin.¹³

Incorporating digital health tools to support systematic identification and management of prediabetes, including referrals to programs, also can drive further clinical engagement. For example, Loma Linda University Health experienced an uptrend in referrals to the National DPP lifestyle change program when an electronic referral order was made available and providers were educated on the National DPP lifestyle change program as a resource for their patients. The Henry Ford Health System also recognized the potential role technology could play in advancing its strategy and implemented a diabetes prevention module within its electronic health record that included best practice alerts, an electronic referral to its National DPP lifestyle change program, and a prediabetes registry. Processes for National DPP lifestyle change program referrals and bidirectional feedback between program providers and care teams were refined and standardized to maximize efficiency and utility. Collectively, these changes led to a significant increase in the number of clinical referrals and improved patient outcomes.

Another strategy emphasized by DPBP is to increase support from key system stakeholders for diabetes prevention by consistently sharing data and metrics regarding program processes and outcomes. For example, University of South Carolina Family Medicine implemented a quality improvement project with its residents that focused on ensuring all patients eligible for abnormal glucose screening were receiving the necessary laboratory testing and that those with prediabetes were formally diagnosed and counseled on treatment options. The team recognized that emphasizing identification along with program referral was necessary to the success of its strategy and used data to help drive improvement in prediabetes identification and management.

The Planning for Growth phase also presents new opportunities, such as additional skills training for lifestyle coaches, to build capacity and longevity of a National DPP lifestyle change program offering. Trinity Health has trained its lifestyle coaches in motivational interviewing to improve participant engagement and retention, whereas UCLA Health and the Henry Ford Health System have internal master trainers to train new coaches in their organizations.

Programs also may augment and enhance their offerings to meet participant needs. For example, Loma Linda University Health provided participants with free memberships

to its fitness center, and lifestyle coaches led group physical activity for participants interested in exercising together after regularly scheduled program sessions.

Advancing innovation phase

In the Advancing Innovation phase, strategy sustainability is a key focus. By this phase, diabetes prevention should be part of routine clinical processes of care, and organizations should be offering a variety of treatment options for prediabetes. For example, Intermountain Healthcare developed a care process model for its entire system that includes the National DPP lifestyle change program, an introductory prediabetes educational session, medical nutrition therapy, and pharmacotherapy as options in managing patients with prediabetes.

The Advancing Innovation phase is also an appropriate time for health care organizations to use promotion and dissemination to broadly share strategy achievements. Complex mixed method evaluation and outcomes tracking can help organizations demonstrate long-term sustainability of a strategy. Intermountain Healthcare developed a method to track the conversion rates of patients with prediabetes to type 2 diabetes to demonstrate the lasting benefit of this work. This sophisticated evaluation builds in opportunities to test and adapt the strategy activities to meet the changing health care landscape.

Many DPBP members have presented or published details of their diabetes prevention strategies at national conferences and in peer-reviewed journals,^{13–22} whereas others have disseminated their results in less formal ways. These range from ongoing presentations at internal medical group summits, to huddle discussions, to participation in prevention workgroups such as the DPBP.

Conclusion

As the burden of chronic disease in the United States and worldwide grows, prevention must be prioritized and integrated into health care. The recent public health emergency (PHE) and COVID-19 pandemic have demonstrated the need to prioritize prevention of chronic disease, health equity, and investing in new models of delivery. During the PHE, DPBP members continued to support and engage in diabetes prevention activities, pivoting to offer the National DPP lifestyle change program using virtual platforms to maintain offerings and observed continued clinical and participant engagement. Previous and future publications from DPBP organizations may offer more details about each strategy and results.

More work is needed to explore innovation and advance equity within diabetes prevention. The maturity phases and best practice implementation recommendations outlined herein can be used by any health care organization committed to diabetes prevention to launch and sustain an effective strategy and improve the health of patients and communities. Further research is suggested to assess the impact and adoption of diabetes prevention best practices.

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Authors' Contributions

Ms. Williams: manuscript conception and drafting, data collection, analysis and interpretation, critical review and revisions, and final approval of the version to be published. Dr. Sachdev: manuscript conception and drafting, data collection, analysis and interpretation, critical review and revisions, and final approval of the version to be published. Dr. Kirley: manuscript conception and drafting, critical review and revisions, and final approval of the version to be published. Dr. Moin: drafting, critical review and revisions, and final approval of the version to be published. Dr. Duru: drafting, critical review and revisions, and final approval of the version to be published. Ms. Sill: drafting, critical review and revisions, and final approval of the version to be published. Dr. Brunisholz: drafting, critical review and revisions, and final approval of the version to be published. Dr. Joy: drafting, critical review and revisions, and final approval of the version to be published. Ms. Aquino: provided revisions and final approval of the version to be published. Ms. Brown: provided final approval of the version to be published. Dr. O'Connell: provided revisions and final approval of the version to be published. Dr. Rea: provided revisions and final approval of the version to be published. Ms. Craig-Buckholtz: provided revisions and final approval of the version to be published. Dr. Witherspoon: provided revisions and final approval of the version to be published. Ms. Bruett: provided revisions and final approval of the version to be published.

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