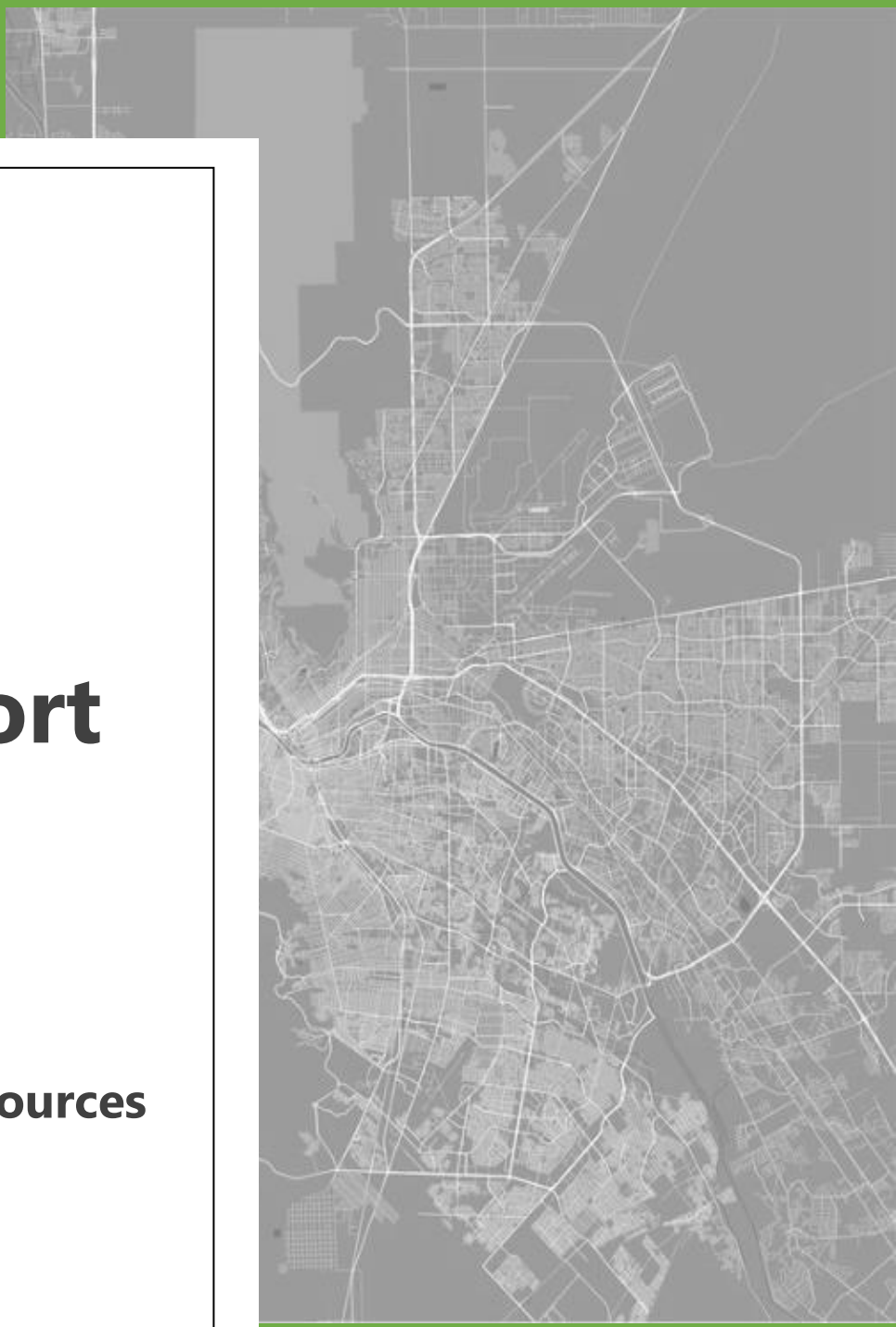
Paso del Norte Health Foundation

Diabetes Assessment Phase 1 Report



Prepared by: Health Resources in Action

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PASO DEL NORTE HEALTH FOUNDATION

COLLEGE OF HEALTH SCIENCES
THE UNIVERSITY OF TEXAS AT EL PASO

Health Resources in Action
Advancing Public Health and Medical Research

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Executive Summary

Project Overview

In 2019, the Paso del Norte Health Foundation (hereby referred to as the Foundation), partnered with Health Resources in Action (HRiA) and the University of Texas at El Paso (UTEP) to conduct an assessment of diabetes services in El Paso county. The goal of this assessment was to identify challenges, service gaps, and potential opportunities to increase screening for and management of diabetes in the region. This effort was prompted by the Foundation's board, the El Paso Diabetes Council, and additional initiatives at the state and local health department level.

This report is meant to serve as a benchmark and guide to inform current and future planning efforts of the Foundation and others by presenting a range of evidence-based strategies that can be adopted by multiple sectors throughout the community moving forward. Recommendations are organized by four levels of the socio-ecological model and are presented for the consideration of diverse stakeholders including community services, government, education, business, and philanthropy, among others. The next phase of this process will begin in the summer of 2020 with the convening of the El Paso Diabetes Council and project advisory group for a prioritization process and action planning.

Approach and Methods

A mixed methods approach was used to collect data for this report. This process was informed by the El Paso Diabetes Council and a community advisory group. The community advisory group, made up of nine (9) individuals ranging from community residents to on-the-ground health care staff, was convened to ensure that feedback was solicited throughout the process. Specific methods employed for the assessment include:

- **Secondary data** collected for this assessment were synthesized from a variety of sources including the Behavioral Risk Factor Surveillance Survey (BRFSS), U.S. Census American Community Survey (ACS), vital records, and the National Diabetes Surveillance System (NDSS).
- **A scan of services** was conducted using data collected by the City of El Paso Department of Public Health, Paso del Norte Institute for Healthy Living, and publicly available information online.
- **Key informant interviews-** Researchers from UTEP conducted 16 in-depth interviews with community stakeholders to determine whether appropriate resources exist to meet the American Diabetes Association (ADA) 2019 recommended A grade and B grade standards of medical care, and to identify community/culture-centered strategies for the county to best reach the recommended standards of care.
- **A literature review** was conducted to assess the landscape of current evidence-based interventions and recommendations to screen for, diagnose, and manage diabetes that could be adopted by a wide range of community stakeholders. Relevant case studies and research briefs were also reviewed as part of this process.

Each data source for the primary and secondary data has its own set of limitations, which are detailed in their respective appendices in this report. The assessment report provides one component of a complex topic and disease that has many facets to it. It is based on readily available data and information gathered between 2019-2020. In addition, this analysis was set to include additional primary data collected from community focus groups. However, due to the COVID-19 pandemic and social distancing restrictions, researchers were unable to organize groups in the given project timeline. Lastly, while type 1 and

gestational diabetes are also important to explore given the severity of these diseases in the region, estimates of diabetes in this report do not differentiate between type 1, type 2 diabetes, and gestational diabetes. However, as type 2 diabetes accounts for 90-95% of all diabetes cases, that data presented in this report are more likely to be characteristic of type 2 diabetes.

Background and Context

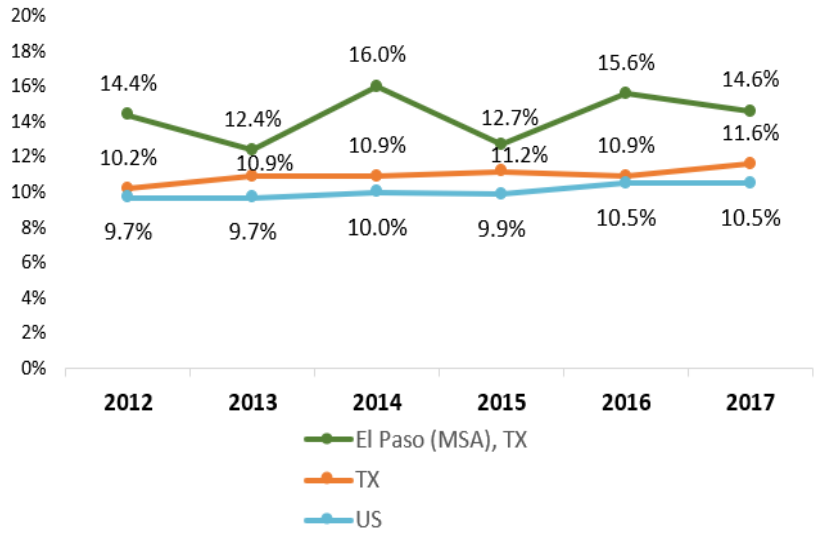
Over 34 million Americans have diabetes. Of these, more than 7 million have diabetes and are undiagnosed.

Diabetes mellitus (DM), a metabolic condition caused by the body's inability to either produce or use insulin to regulate blood sugar, afflicts more than 34 million—or 11% of people in the United States. Of these, an estimated 7.3 million adults have diabetes but are undiagnosed (Center for Disease Control and Prevention, 2020). Type 2 diabetes accounts for 90-95% and is a largely preventable progressive disease influenced by numerous risk factors such as obesity, smoking, high blood pressure, physical activity, and poor diet. Historically diagnosed in adults, this form of diabetes is now also being diagnosed in children at higher rates. Many of those diagnosed with Type 2 diabetes, including the approximately 31% who are undiagnosed, do not fully manage the disease due factors including limited access to care, socioeconomic, and societal factors (Pérez-Escamilla, R., Garcia, J., & Song, D. 2010). Diabetes poses a major health and financial burden in the United States, especially in states such as Texas that have seen the prevalence of the disease steadily grow in the last decade from 9.3% of the state's population in 2010, to 12.6% of the population in 2019 (CDC, 2018). In addition, nearly 7 million Texans, 37% of the state's total population, have prediabetes with blood glucose levels higher than normal but not yet high enough to be diagnosed diabetes (ADA, 2018).

Diabetes Prevalence and Incidence in El Paso

Residents of El Paso County—an area comprised of over 800,000 residents—experience diabetes prevalence rates higher than the state overall (14.6% and 10.5% respectively). As seen in the figure to the right, the El Paso metropolitan statistical area has exceeded state and national averages of adults who have reported a diabetes diagnosis over the last eight years, hovering between 12-16%. While the median age of El Paso County is relatively young (32 years old), residents face significant health concerns associated with diabetes including hypertension (25%), high cholesterol (23%), and high levels of obesity (35%), (Texas BRFFS, 2017). Approximately 14.6% of El Paso residents—or more than 117,000 residents—have diabetes, and it is estimated that more

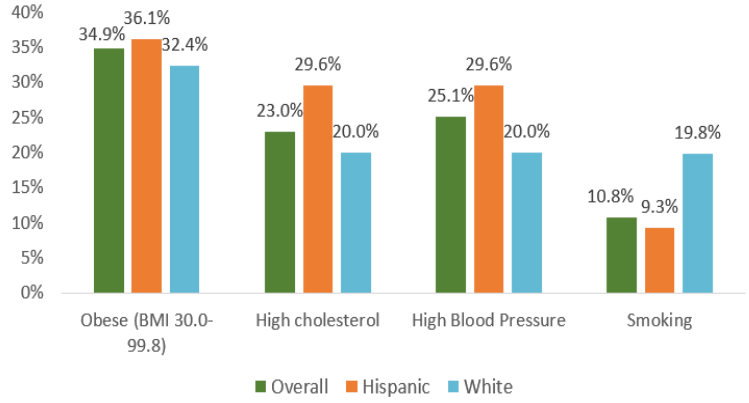
Percent of Adults Reporting Diabetes, by Geography, 2012-2017



SOURCE: Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Division of Population Health. BRFSS Prevalence & Trends Data 2017

than a third are undiagnosed. (Texas BRFFS, 2017). The impacts of diabetes are further compounded in the region due to several social determinants—or the economic and social conditions that influence health status—including high levels of poverty (21%) and uninsured rates (24%), (American Community Survey, 2019). Diabetes prevalence is most common among those aged 65 and older (43%), and highest for Black and Hispanic residents (17% and 12% respectively). When adjusted for age between 2015-2017, males experienced a mortality rate due to diabetes of 38%, compared to 28% of females (Healthy Paso del Norte, 2017). A higher proportion of adults who identified as Hispanic—El Paso's largest population group—were more likely to exhibit other chronic and acute conditions such as obesity (36.1%), high cholesterol (29.6%), and high blood pressure (30%).

Prevalence of Co-Existing Conditions & Risk Factors by Race/Ethnicity, Adults in El Paso County, 2017



SOURCE: Texas Behavioral Risk Factor Surveillance System as Reported by Health Paso del Norte, 2017
NOTE: Data were not reported for Black or Asian populations

Scan of Services in El Paso

A scan of services was conducted using data collected by the City of El Paso Department of Public Health, Paso del Norte Institute for Healthy Living, and publicly available information on the internet. The purpose of the scan was to identify organizations providing diabetes services in order to assess service gaps or potential future partnerships. Services were found using a basic Google search to assume information a community member would be able to find on their own. A detailed table of these services can be found on pages 8-9. Within the city of El Paso, three federally qualified health centers (FQHCs) that provide diabetes-services to residents were identified in this scan. Four hospital and clinic settings—both public and private—were identified, as well as five nonprofit/community-based organizations, and two teaching and research institutions. Of the fourteen organizations identified, only three were recognized by the Center for Disease Control's Diabetes Prevention Program (DPP), three organizations had American Association of Diabetes Educators (AADE) accredited diabetes self-management education and support (DSMES) and one was recognized by the ADA.

Findings from Key Informant Interviews

In addition to a scan of services, a cross-sectional team of local experts at the University of Texas at El Paso College of Health Sciences conducted comprehensive interviews with 16 key informants in the fall of 2019. Interviews were conducted with representatives of primary care and internal medicine, diabetes quality improvement health systems, diabetes resource organizations, health insurance providers, worksites, and school district leadership. The goal of the interviews was to determine whether: 1) appropriate resources exist to meet the ADA 2019 recommended A grade and B grade standards of medical care; and 2) to identify community/culture-centered strategies for El Paso County to best reach the recommended standards of care. From this assessment, researchers found that "there is a disconnect between the CCM health system and community sectors that contributes to the ADA standards of care not being fully met for El Paso County residents" (Concha et al., 2020).

Across all interviews, there was agreement that linking people with diabetes to community resources, like social services, can help improve the current work and efforts of each sector within the CCM. Findings from this assessment identified communication between health care medical providers, health

insurers, people with diabetes, community resources, and school districts as a challenge and an opportunity for improving diabetes prevention and management. There was consensus by all interviewees that diabetes education and more collaboration is needed. A key theme that arose from these interviews was that federally funded organizations were more likely to offer comprehensive services that aligned with many of the ADA Standards of Diabetes Medical Care compared to non-federally funded and privately funded organizations. Both federal and non-federal organizations reported limited resources and barriers related to health insurance coverage for diabetes services. In addition, many sectors interviews were unaware of existing community prevention and management community resources.

From a social determinant perspective, low levels of health literacy and education among individuals with diabetes was identified as one of the main barriers to the prevention and successful management of diabetes. Living in low income, limited infrastructure neighborhoods and food desert communities were identified as additional barriers for people living with diabetes. The UTEP team recommend bridging this gap by improving communication and collaboration between the health delivery system, diabetes management support channels, those involved in treatment decision cycles, clinical information systems, diabetes community resources, and policy advocates. While the scope of this assessment was type 2 diabetes, it should be noted that children with diabetes, particularly children and adolescents living in low income households, were identified as a population that needed more attention, both in the qualitative findings and by the advisory group for the project.

> **"We need educators and diabetes care specialists in all areas [of care], because we don't have enough of those experts… some of these segments of the population are going unnoticed and ignored."**
>
> **-Key Informant, Federally Funded Organization**

Key Themes from Literature Review and Sector- Specific Recommendations

HRiA conducted a review of the available peer-reviewed literature and one Congressional report to better understand the landscape of current evidence-based interventions and recommendations to screen for and diagnose, prevent, and manage type 2 diabetes. When possible, the literature review highlights research that includes Hispanic/Latino populations and/or focuses on the US border region. For the purposes of this report, HRiA organized recommendations for type 2 diabetes using a socioecological perspective taking into consideration factors that occur at the individual, organizational, community, and public policy levels. HRiA has categorized recommendations by a range of sectors that can be engaged in diabetes-associated work moving forward. The table on pages 14-16 details these sectors and provides examples of the industries represented in each category, and the proceeding table summarizes evidence-based recommendations identified in the literature review and relevant case studies.

Foundation- Specific Opportunities and Recommendations

Opportunity 1: Support the establishment of a collaborative body with shared responsibility that influences county-level change related to diabetes and chronic disease prevention.

Based on findings and recommendations across all methods of this assessment, the highest priority identified to facilitate improved outcomes related to diabetes in El Paso is to support the establishment of a collaborative body or coalition. The purpose of this group should be to create and maintain active partnerships at the state and local levels to jointly pursue issues related to diabetes in order to influence

change through a collective voice. The proposed group should have a clear, central purpose with a strong decision-making structure for developing a collaborative diabetes plan for El Paso County to address priority issues and identify opportunities for shared investment. The group should engage diverse viewpoints in planning processes to ensure organizational support and ownership, ultimately leading to more coordinated implementation efforts across the region. The Foundation should leverage learnings and successes from past initiatives for this effort, including the US- Mexico Border Diabetes Prevention and Control Project, or the Walk El Paso program.

This work should not take a "top down" approach—that is, higher authority figures that determine larger goals that will filter down to the tasks of lower level employees. In comparison, it is critical that this sort of initiative take a "bottom-up" style approach in decision-making process that gives the entire group a voice in county-wide goals in order to have buy-in from the many partners it will take to move the needle on population health outcomes as they relate to diabetes. As an example, there is an opportunity to reassess the current structure and membership of the El Paso Diabetes Council and additional ad-hoc diabetes workgroups to ensure that efforts are not duplicated and there is equal representation from frontline staff members, community residents, and organizational leadership. It is recommended that the proposed collaborative or coalition consist of a Steering Committee—a group of 12-15 cross sector members who provide broad strategy and agenda setting, and General Membership who would be made up of a larger subset of the community and would serve to inform, support, and implement the work of the Collaborative. Page 18 provides an example of an administrative structure that can be adopted as a first step in this process. In order for this group to be successful, there will need to be a convener or coordinator to play the role of a neutral facilitator in the process. This convener/coordinator should serve as the administrative "backbone" responsible for coordinating and supporting implementation efforts and committee activities of the partners involved in the proposed coalition. Apart from providing overall operations management for the collaborative, the identified convener or coordinator should serve as a thought leader with a proven track record of diabetes and community engagement expertise.

Example Timeline and Activities for Opportunity 1:

0- 6 Months:

- 1.1. Identify facilitator/convener of collaborative group that is responsible for recruitment and coordination of county-wide diabetes coalition; onboard facilitator and co-create roles and responsibilities.

6-12 Months

- 1.2. Begin recruitment of organizations to participate in county-wide diabetes coalition Steering Committee.
- 1.3. Establish roles and decision-making structure for collaborative group, including Steering Committee members and potential co-chairs.

12-36 Months

- 1.4. Convene Collaborative Steering Committee and develop shared agreements of process and timeline for developing a diabetes action plan.
- 1.5. Identify and build off of successes of initiatives like the US- Mexico Border Diabetes Prevention and Control Project, or the Walk El Paso program.
- 1.6. Develop communication strategy to disseminate information related to newly established Collaborative.
- 1.7. Begin recruitment of larger subset of organizations to participate in Collaborative's General Membership group.

Opportunity 2: Strengthen infrastructure support for groups in El Paso County working on diabetes prevention.

Findings from key informant interviews and the services scan identify opportunities to strengthen infrastructure support for local groups working on early detection and diabetes management in El Paso. For example, in the fall of 2020, the El Paso Health Department will be required by the state to track referrals to diabetes services on the 2-1-1 information call line. This change will require the health department to create and support processes to track and monitor these data, which is likely to be resource intensive. Next, there is an opportunity to build capacity for, and increase referrals to, diabetes prevention programs in El Paso. For example, the Foundation can work to promote participation in ADA-recognized, AADE-accredited, and/or licensed DSME programs. Part of this process should be to identify barriers of offering DSME and DPP programs at local organizations with the goal of increasing the number of programs available in the county, prioritizing those who participate in worksite wellness initiatives. Closely related would be providing financial support for organizations interested in DPP or ADA accreditation, subsidizing incentives to promote long-term engagement, and investments in telehealth—especially in light of COVID-19.

In addition, the Foundation could promote education campaigns and message that improve awareness among residents through media, presentations to local groups, and the distribution of educational materials, among other methods. This includes uplifting and supporting the work of local groups who are exemplar in following a Chronic Care Model approach like local FQHCs, and community organizations committed to diabetes programming and research, including the El Paso Diabetes Association; Bienvivir Diabetes Prevention Program; Project Vida; The University of Texas at El Paso projects like the Diabetes Garage (Concha, 2020); and early detection of metabolic dysregulation using water T2 biomarker led by Texas Tech University Health Science Center, among others (Robinson et al., 2017). A promising consideration for investment would be to provide infrastructure support to physically co-locate diabetes-related services, which evidence suggests improves care and minimizes access barriers for residents. One opportunity to consider leveraging in this model if adopted is collaborating with institutions of higher learning who have been funded for diabetes-related interventions. These groups are well-positioned to support capacity challenges and provide technical assistance for community-based organizations with limited resources.

Example Timeline and Activities for Opportunity 2:

0- 6 Months:

- 2.1. Support the local health department to track referrals to diabetes services on the 211-call line.
- 2.2. Promote participation in ADA-recognized, AADE-accredited, and/or licensed DSME programs through media campaign, presentations, or health materials.
- 2.3 Support the work of local groups who are exemplar in following a CCM approach.
- 2.4. Identify barriers to offering DSME and DPP programs at local organizations with the goal of increasing the number of programs available in the county.

6-12 Months

- 2.5. Assist in maintaining and updating the city's web-based resource directory to ensure chronic disease resources are readily available for providers and the general public.
- 2.6. Provide financial support for organizations interested in accreditation, subsidizing incentives to promote long-term engagement, and investments in telehealth—especially in light of COVID-19.

12-36 Months

- 2.7. Provide infrastructure support to physically co-locate diabetes-related services; collaborate with institutions of higher learning who have been funded for diabetes-related interventions.

Opportunity 3: Expand support and influence change in healthcare systems to be more closely aligned with ADA standards, including more coordinated data efforts in El Paso County.

Findings from the UTEP team's key informant interviews identified a disconnect between the chronic care model health system and community sectors that contribute to the ADA standards of care not being fully met for El Paso County residents. This disconnect between sectors has led to a fragmented approach to diabetes care in the region, where private and public institutions approach care differently, track data differently, and rarely collaborate or share information. Improving population health requires a coordinated approach that takes thoughtful planning and investment in long-term success. For long-term transformation to be possible, it is imperative that federally funded organizations (i.e., community-based organizations, FQHCs, migrant health clinics), non-federally funded, and privately funded organizations more closely align their standards of care from both a practice and reporting structure perspective.

There is an opportunity for the Foundation and the proposed collaborative or coalition to advocate for systems-level change in the region to address these divides. For example, key informant interviewees and the El Paso Diabetes Council identified a lack of funding and reimbursement as a barrier to expanding diabetes care in the area. The collaborative group could address these barriers by advocating for reimbursement models that incentivize prevention, e.g., for diabetes education classes; supporting policies aiming to expand use of Electronic Medical Records or Health Information Exchanges by all diabetes and chronic care providers; and supporting efforts to ensure Medicare beneficiaries and uninsured patients pay lower medication costs. Advocacy efforts should also be focused on transforming practice approaches that are evidence-based, such as adopting the integration of primary and behavioral health care (IBH) through collaborative care models which have found to result in improved clinical and behavioral outcomes, provider engagement, and patient satisfaction (Kwan et al., 2014). Such models have been found to be particularly effective for improving behavioral treatment among vulnerable patients; however, the feasibility and long-term sustainability of collaborative care models have proved challenging due to limited resources. As such, the Foundation could consider funding early integrated health efforts that incentivize local providers to adopt IBH models that standardize screening and assessment procedures to include biopsychosocial factors related to the progression of diabetes outcomes.

Further, it is critical that timely and relevant public health data are available in order to facilitate continuous and systematic collection and analysis of health-related indicators needed for effective planning and implementation efforts. Currently, gaps exist for how and when data are collected in the region; this includes how data are stratified for populations that experience health disparities, for example, data by race and ethnicity, foreign-born residents, educational attainment, and socioeconomic status. There is an opportunity for the proposed collaborative to advocate in terms of regional data efforts. For example, the group can work with health payers and clinicians to track diabetes care data through patient insurance claims and clinical data to publish quarterly data on diabetes specific measures. In turn, more empirical data would be available to assess the impact of diabetes and plan appropriate interventions and evaluation efforts. Similarly, there is an opportunity to support efforts for closed-loop referrals in El Paso, where sending providers receive a report from the receiving provider after completion of the visit that resulted from a referral, which is a common practice in clinics throughout the country. While close-loop referral processes are important for care coordination and follow up care, the process requires a level of organizational readiness that some groups may not be prepared for. As such, if this strategy is adopted, investments in the early planning, capacity building, and resource allocation (e.g. hardware and software)

for partner organizations is critical to the success of this initiative. PHIX, the county's health information exchange, is well-positioned to lead these efforts with the support of the health department and state, as they have invested substantial resources in coordinating information sharing among private and public providers since 2016. Support for these efforts can be operationalized by supporting legal agreements and technical infrastructure needed to move these initiatives forward.

Example Timeline and Activities for Opportunity 3:

0- 6 Months:

- 3.1 Support efforts with PHIX for closed-loop referrals in El Paso, where sending providers receive a report from the receiving provider after completion of the visit that resulted.
- 3.2. Support legal agreements and technical infrastructure needed to increase partners involved in the HIE. Investments in the early planning, capacity building, and resource allocation (e.g. hardware and software) for partner organizations is critical to the success of this initiative.

6-12 Months

- 3.3. Begin process to identify quality measures and shared metrics amongst sectors that are involved in the HIE, making sure to include behavioral health data and build off the lessons learned from PHIX's pilot program.
- 3.4. Work with health payers and clinicians to track diabetes care data through patient insurance claims and clinical data to publish quarterly data on diabetes specific measures.
  3.5. Build the capacity of healthcare systems to implement system-wide changes involved in IBH by facilitating access to continuing education for health care professionals, e.g., subsidizing conferences, conventions, webinars, and sponsoring nationally recognized consultants in IBH that use the "train the trainer" models.

12-36 Months

- 3.6. Advocate for reimbursement models that incentivize prevention, e.g., for diabetes education classes; supporting policies aiming to expand use of EMRs or Health Information Exchanges by all diabetes and chronic care providers; and supporting efforts to ensure Medicare beneficiaries and uninsured patients pay lower medication costs.
- 3.7. Transform practice approaches that are evidence-based, such as adopting the integration of primary and behavioral health care (IBH) through collaborative care models which have found to result in improved clinical and behavioral outcomes, provider engagement, and patient satisfaction.
- 3.8. Support more robust surveillance systems to increase quality of data to identify individuals with early onset of diabetes, which was also identified as a barrier by key informants.

Conclusions

This report summarizes the work conducted by Health Resources in Action and UTEP as of Spring 2020 through a review of existing data, a literature review, services inventory, and discussions with a community advisory board and key informants. The assessment is meant to serve as a benchmark and guide to inform current and future planning efforts of the Foundation and others in the community. Findings from this report are meant to guide future efforts and identify opportunities for collaboration to increase screening for and management of diabetes in El Paso County. The next step in this process is to work with the Foundation and the El Paso Diabetes Council, in conjunction with key stakeholders and community residents, to develop prioritization criteria to identify 2-4 priority areas of focus to move diabetes related work forward in the region, culminating in the development of a community-wide action plan and implementation strategy.

Introduction

Project Overview

In 2019, the Paso del Norte Health Foundation (hereby referred to as the Foundation), partnered with Health Resources in Action (HRiA) and the University of Texas at El Paso (UTEP) to conduct an assessment of diabetes services in El Paso county. The goal of this assessment was to identify challenges, service gaps, and potential opportunities to increase screening for and management of diabetes in the region. This effort was prompted by the Foundation's board, the El Paso Diabetes Council, and additional initiatives at the state and local health department level.

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Approach and Methods

A mixed methods approach was used to collect data for this report. This process was informed by the El Paso Diabetes Council and a community advisory group. The community advisory group, made up of nine (9) individuals ranging from community residents to on-the-ground health care staff, was convened to ensure that feedback was solicited throughout the process. Specific methods employed for the assessment include:

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and to identify community/culture-centered strategies for the county to best reach the recommended standards of care. In addition to these 16 interviews, HRiA conducted three (3) additional interviews with local experts that have been also been synthesized in this section.

- **A literature review** was conducted to assess the landscape of current evidence-based interventions and recommendations to screen for, diagnose, and manage diabetes that could be adopted by a wide range of community stakeholders. Relevant case studies and research briefs were also reviewed as part of this process.

Limitations

Each data source for the primary and secondary data has its own set of limitations, which are detailed in their respective appendices in this report. Overall, for data in the report, it should be noted that different data sources use different ways of measuring similar variables (e.g. different boundaries for neighborhoods and towns, different questions to identify race/ethnicity). The assessment report provides one component of a complex topic and disease that has many facets to it. It is based on readily available data and information gathered between 2019-2020. There may be a time lag for many data sources from time of data collection to data availability. Some data are not available by specific population groups or at a more granular geographic level due to small sub-sample sizes or data that do not currently exist. In some cases, data from multiple years have been aggregated to allow for data estimates at a more granular level or among specific groups.

In addition, this analysis was set to include additional primary data collected from community focus groups. However, due to the COVID-19 pandemic and social distancing restrictions, researchers were unable to organize groups in the given project timeline. Lastly, while type 1 and gestational diabetes are also important to explore given the severity of these diseases in the region, estimates of diabetes in this report do not differentiate between type 1, type 2 diabetes, and gestational diabetes. However, as type 2 diabetes accounts for 90-95% of all diabetes cases, that data presented in this report are more likely to be characteristic of type 2 diabetes.

Background and Context

Diabetes mellitus (DM), a metabolic condition caused by the body's inability to either produce or use insulin to regulate blood sugar, afflicts more than 34 million—or 11% of people in the United States. Of these, an estimated 7.3 million adults have diabetes but are undiagnosed (Center for Disease Control and Prevention, 2020). There are three major types of diabetes: type 1—also called juvenile diabetes—when the pancreas produces little or no insulin; type 2 diabetes—the most common form of the disease—is when the body either resists the effects of insulin or does not produce enough of the hormone; and gestational diabetes, which is diagnosed for the first time during pregnancy (gestation). Type 2 diabetes accounts for 90-95% and is a largely preventable progressive disease influenced by numerous risk factors such as obesity, smoking, high blood pressure, physical activity, and poor diet. Historically diagnosed in adults, this form of diabetes is now also being diagnosed in children at higher rates. Many of those diagnosed with Type 2 diabetes, including the approximately 31% who are undiagnosed, do not fully manage the disease due factors including limited access to care, socioeconomic, and societal factors (Pérez-Escamilla, R., Garcia, J., & Song, D. 2010).

Diabetes poses a major health and financial burden in the United States, especially in states such as Texas that have seen the prevalence of the disease steadily grow in the last decade from 9.3% of the state's population in 2010, to 12.6% of the population in 2019 (CDC, 2018). In addition, nearly 7 million Texans, 37% of the state's total population, have prediabetes with blood glucose levels higher than normal but not yet high enough to be diagnosed diabetes (ADA, 2018). Texas is among the 10 states collectively responsible for over 50% of the national cost of diabetes (Johnson et al. 2019). According to the American Diabetes Association, medical costs associated with diabetes per person increased from $8,417 to $9,601 (2017 dollars) and will continue to rise as the diabetes incidence rate is expected to quadruple across the state over the next two decades (ADA, 2018).

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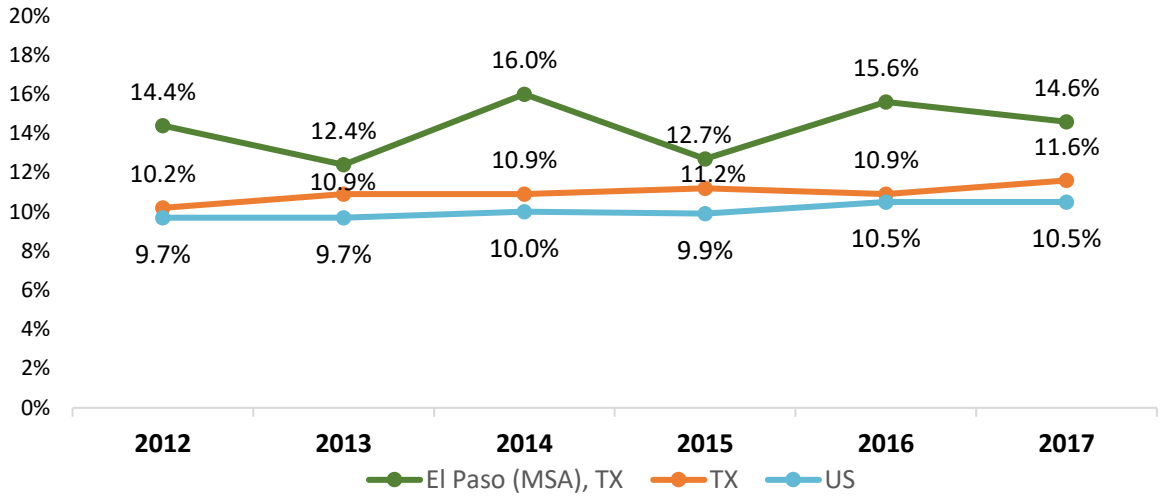
Diabetes Prevalence and Incidence in El Paso

Residents of El Paso County—an area comprised of over 800,000 residents—experience diabetes prevalence rates higher than the state overall (14.6% and 10.5% respectively). As seen in Figure 1, the El Paso metropolitan statistical area has exceeded state and national averages of adults who have reported a diabetes diagnosis over the last eight years, hovering between 12-16%. While the median age of El Paso County is relatively young (32 years old), residents face significant health concerns associated with diabetes including hypertension (25%), high cholesterol (23%), and high levels of obesity (35%), (Texas BRFFS, 2017). Approximately 14.6% of El

Paso residents—or more than 117,000 residents—have diabetes, and it is estimated that more than a third are undiagnosed. (Texas BRFFS, 2017).

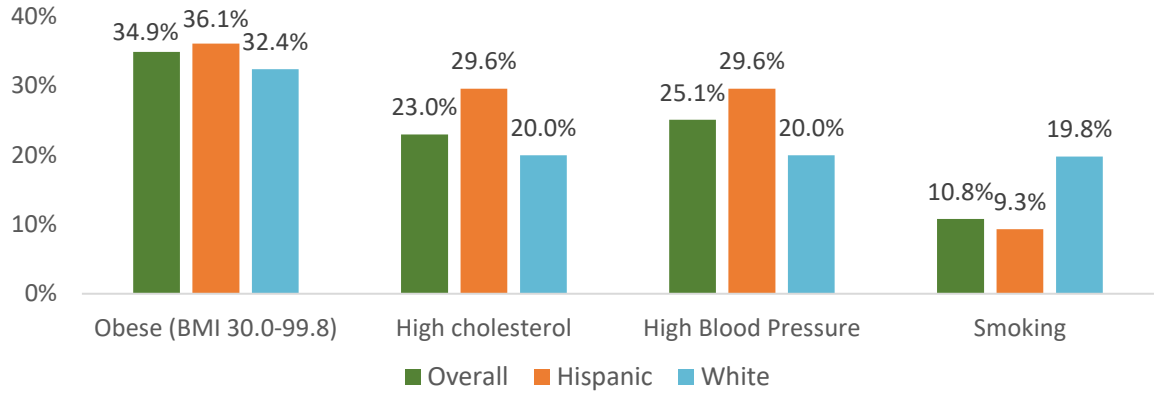
Figure 1. Percent of Adults Reporting Diabetes, by Geography, 2012-2017



SOURCE: Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Division of Population Health. BRFSS Prevalence & Trends Data 2017

While the prevalence of reported diabetes across El Paso was 14.6% in 2017, there were notable differences in the distribution across the population. Diabetes prevalence is most common among those aged 65 and older (43%), and highest for Black and Hispanic residents (17% and 12% respectively). When adjusted for age between 2015-2017, males experienced a mortality rate due to diabetes of 38%, compared to 28% of females (Healthy Paso del Norte, 2017). Further, as shown in **Figure 2**, a higher proportion of adults who identified as Hispanic—El Paso's largest population group—were more likely to exhibit other chronic and acute conditions such as obesity (36.1%), high cholesterol (29.6%), and high blood pressure (30%). Though the rates for co-existing are high in the region, the prevalence of these comorbidities have been steadily trending downward over the last ten years. The exception to this is obesity rates which have continued to rise, from 28.5% in 2015 to 34.9% in 2017 (Healthy Paso del Norte, 2017).

Figure 2. Prevalence of Co-Existing Conditions & Risk Factors by Race/Ethnicity, Adults in El Paso County, 2017

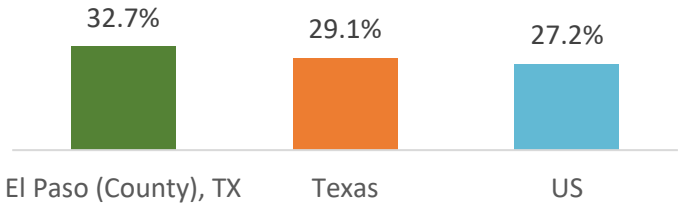


SOURCE: Texas Behavioral Risk Factor Surveillance System as Reported by Health Paso del Norte, 2017
NOTE: Data were not reported for Black or Asian populations

The impacts of diabetes are further compounded in the region due to several social determinants—or the economic and social conditions that influence health status—including high levels of poverty (21%) and uninsured rates (24%), (American Community Survey, 2019). Further, more than a quarter of El Paso residents self-reported their health status as either poor or fair in 2017—a measure of health-related quality of life (HRQoL) in a population that helps characterize the burden of disabilities and chronic diseases in a community (County Health Rankings and Roadmaps, 2017).

Diabetes affects roughly one in five Medicare beneficiaries nationally aged 65 and over. In El Paso, the percentage of Medicare beneficiaries who were treated for diabetes reached one-third in 2017 (**Figure 3**). Data show that Medicare beneficiaries with diabetes face challenges regarding access to care, higher out of pocket expenses, and more likely to report poor health status overall (Centers for Medicare and Medicaid, 2017).

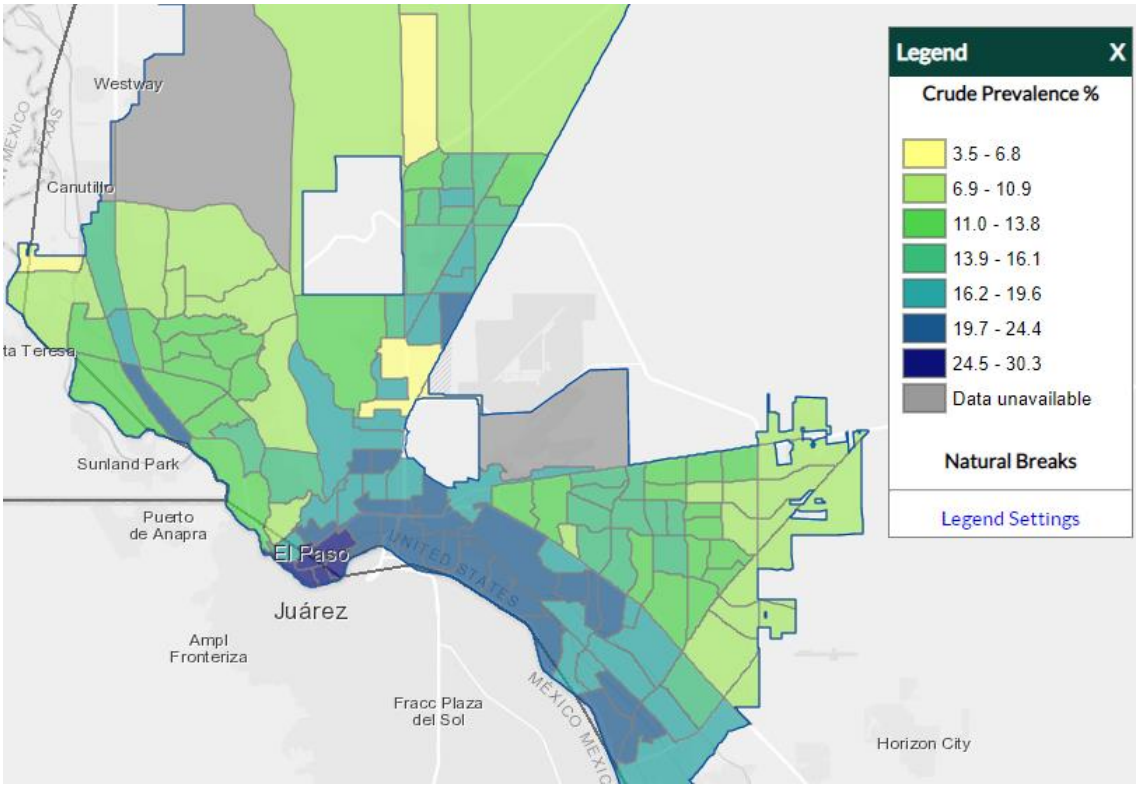
Figure 3. Percentage of Medicare Beneficiaries who were treated for Diabetes, by Geography, 2017



SOURCE: Texas Behavioral Risk Factor Surveillance System as Reported by Health Paso del Norte, 2017
NOTE: Data were not reported for Black or Asian populations

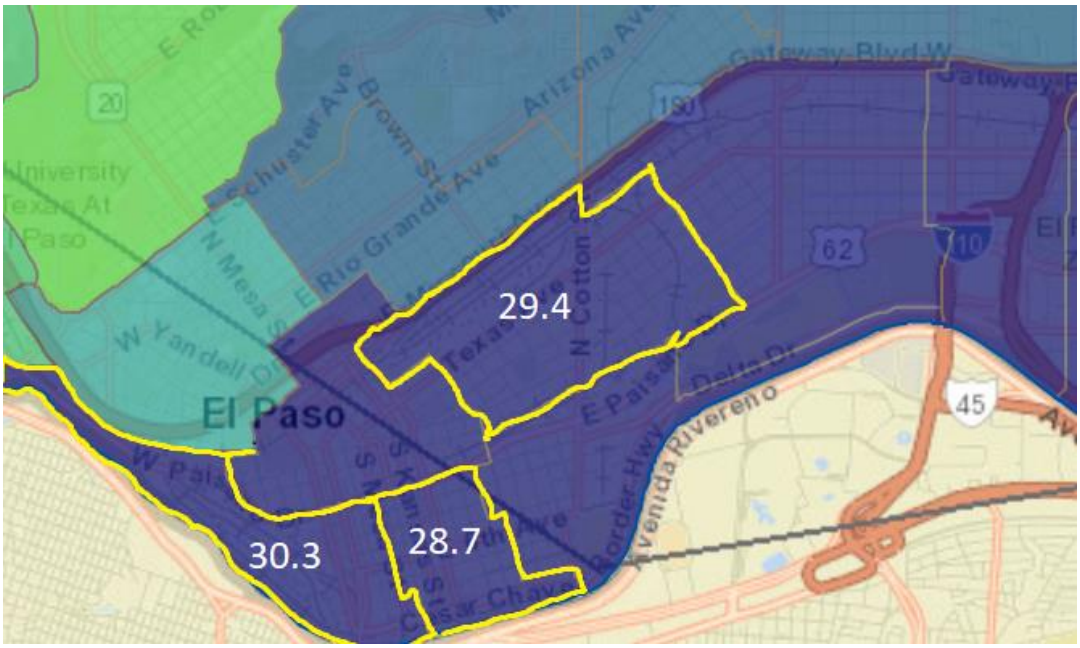
Disparities also exist in the distribution of diabetes across the population by census tract. **Figure 4** shows model-based estimates for adults diagnosed with diabetes across the region. When examined on a more granular level, data show that Census tracts 18, 19, and 21—which run through the 79901 zip code—have the highest crude prevalence rates of diabetes in the county (**Figure 5**). These census tracts also have higher poverty rates than the county as a whole, all with over 50% of residents living below the poverty line (ACS 2018, 5-year estimates).

Figure 4. Model-based estimates for Adults Diagnosed with Diabetes, El Paso County, 2017



SOURCE: Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, 500 Cities Project. BRFSS Prevalence & Trends Data 2017

Figure 5. Model-based estimates for Crude Prevalence of Adults Diagnosed with Diabetes by Census Tract, 2017



SOURCE: Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, 500 Cities Project. BRFSS Prevalence & Trends Data 2017

Scan of Services in El Paso

A scan of services was conducted using data collected by the City of El Paso Department of Public Health, Paso del Norte Institute for Healthy Living, and publicly available information on the internet. The purpose of the scan was to identify organizations providing diabetes services in order to assess service gaps or potential future partnerships. Services were found using a basic Google search to assume information a community member would be able to find on their own.

Within the city of El Paso, three federally qualified health centers (FQHCs) that provide diabetes-services to residents were identified in this scan. Four hospital and clinic settings—both public and private—were identified, as well as four nonprofit/community-based organizations, and two teaching and research institutions. Of the thirteen organizations identified, only three were recognized by the Center for Disease Control's Diabetes Prevention Program (DPP), three organizations had American Association of Diabetes Educators (AADE) accredited diabetes self-management education and support (DSMES) and one was recognized by the ADA. The following table summarizes each organization reviewed, the diabetes-related services they provide, and information related to relevant certifications and active partnerships with the Foundation.

Table 1. Services Scan of Diabetes-Related Resources in El Paso County, 2020

Organization	Type	Services Provided	Certified Program	PdNF Grantee/Partner
Federally Qualified Health Centers				
Centro de Salud Familiar La Fe, Inc.	Federally Qualified Health Center	• Diabetes prevention and management health education	AADE Accredited DSMES	Yes
Centro San Vicente	Federally Qualfified Health Center	• Insuling Teaching on a one-on-one basis		Yes
Project Vida Health Center	Federally Qualified Health Center	• Diabetes self-management education (7 week course) • Free glucometer	CDC Recognized DPP AADE Accredited DSMES	Yes
Hospitals and Clinics				
El Paso Children's Hospital	Public Hospital	• Inpatient and outpatient services for children with type 1 and type 2 diabetes	ADA-recognized DSMES Program Sites	Yes
El Paso Family and Pediatric Clinic	Clinic	• Understanding Diabetes Type 1 and Type 2 • New Diet and Meal Planning Needs • Prescriptions for Insulin and other medication • Exercise needs • Foot Care • Understanding and avoiding complications • Self-glucose monitoring and equipment		
University Medical Center of El Paso-Diabetes Management	Teaching and Research Hospital, Level 1 Trauma Center	• Diabetes self- management education (4 classes) • Medical literacy components include learning to read lab values (kidney levels), insulin injection education, directed medication		
Hospitals of Providence	Private Hospital	• Diabetes health education		

Organization	Type	Services Provided	Certified Program	PdNF Grantee/Partner
Nonprofits and Community Based Organizations				
Bienvivir Senior Health Services	Community-based healthcare program	• Focused on keeping seniors in their homes	CDC Recognized DPP	
El Paso Diabetes Association	Non-profit organization	• Diabetes management education • Medical nutritional therapy with Registered Dietician • Support Groups • Free community classes focusing on prevention, management, healthy eating, PA, blood glucose montioring, stress management, medication adherence	AADE Accredited DSMES	Yes
Familias Triunfadoras Inc.	Non-profit organization	• Serves low income women in • Provides Roadway to Health Curriculum (two week sessions on Diabetes)		Yes
Project Bravo	Non-profit organization	• Partners with El Paso Diabetes Association to provide screenings, presentations, diabetes classes • Children's camps for teens and children		Yes
Trinity Health Coaching, inside the Intelligent Office Building	Private nutrition and health coaching	• Nutrition and meal services • Diabetes management education • DPP Lifestyle change program providers	CDC Recognized DPP	
Teaching Insitutions				
Texas Tech- Center of Emphasis in Diabetes and Metabolism	Teaching and Research Insitution	• Diabetes Education program including certified diabetes educator	AADE Accredited DSMES	
University of Texas El Paso	Teaching and research institution	• Multiple active research projects related to diabetes (e.g. Diabetes Garage)		Yes

Adapted from Huerta, D. (2019), City of El Paso Department of Public Health and Paso del Norte Institute for Healthy Living (2017)

Findings

Key Informant Interviews- Key Themes

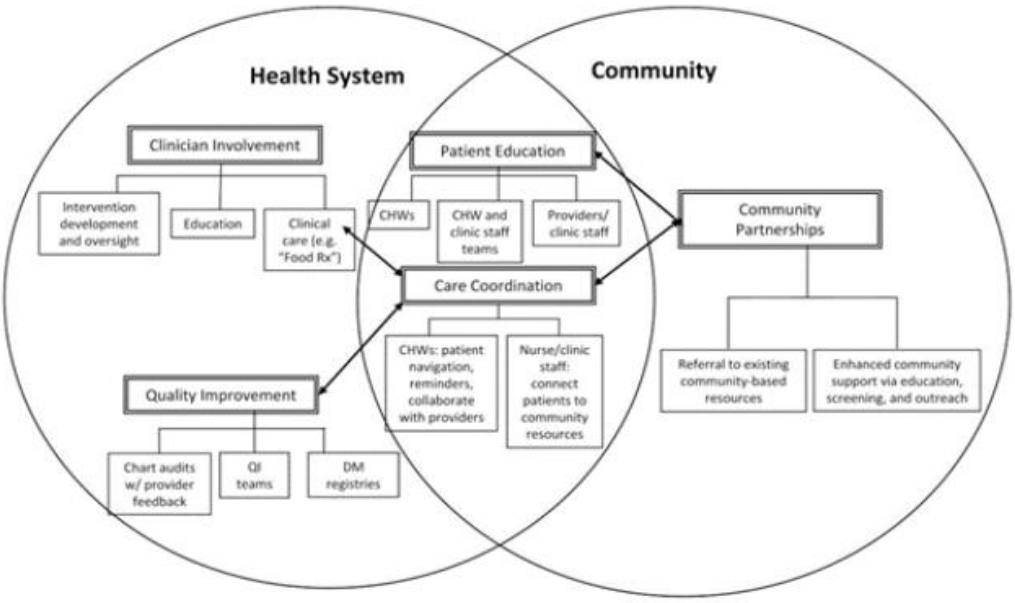
In addition to a scan of services, a cross-sectional team of local experts at the University of Texas at El Paso College of Health Sciences conducted comprehensive interviews with 16 key informants in the fall of 2019. Interviews were conducted with representatives of primary care and internal medicine, diabetes quality improvement health systems, diabetes resource organizations, health insurance providers, worksites, and school district leadership. The goal of the interviews was to determine whether: 1) appropriate resources exist to meet the ADA 2019 recommended A grade and B grade standards of medical care; and 2) to identify community/culture-centered strategies for El Paso County to best reach the recommended standards of care.

Per the UTEP report, "The team used the ADA Standards of Medical Care in Diabetes - 2019 report to inform the creation of six interview guides for the Chronic Care Model (CCM) health system and community sectors (i.e., *health delivery system, diabetes management support channels, treatment decision cycle, clinical information systems, diabetes community resources, and policy advocates*). The ADA recommends the CCM as an evidence based (i.e., A grade) model for system level improvements and the optimization of care for people with diabetes. Interview questions were derived from eight overarching ADA recommendations and their specific A grade and B grade standards of care recommendations." (Concha et al., 2020). Appendix A: Qualitative Report contains the full detailed qualitative assessment report, which delves deeper into these findings and recommendations as well as detailed methodology, and the specific A grade and B grade ADA standards.

The Chronic Care Model (CCM) is an organizational approach to caring for people with chronic disease in a primary care setting. The system is population-based and creates, supportive, evidence-based interactions between an informed, activated patient and a prepared, proactive practice team.

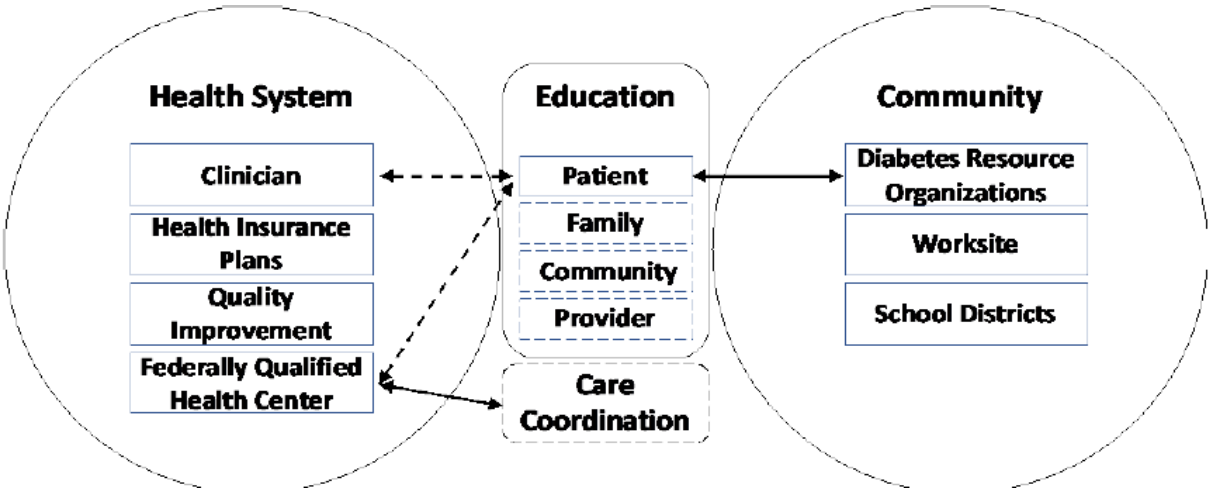
From this assessment, researchers found that "there is a disconnect between the CCM health system and community sectors that contributes to the ADA standards of care not being fully met for El Paso County residents" (Concha et al., 2020). **Figure 6** illustrates the chronic care model, including how collaborations and partnerships between the health system and community sector facilitate patient engagement via education and diabetes care coordination. **Figure 7**, however, shows the present state of the chronic care model in El Paso, where solid arrows represent established linkages in community; dashed arrows represent establish but not fully met linkage; dashed boxed represent linkages that are non-existent or not fully met.

Figure 6. Chronic Care Model



Peek et al. 2014, as cited by Concha et al., Diabetes Assessment in the County of El Paso, Texas, 2020

Figure 7. Assessment of Present state of CCM in El Paso County, 2020



SOURCE: Concha, J., Duarte-Gardea, M., Moya, E., Portillo, D. Bajpeyi, S., (2020). Diabetes Assessment in the County of El Paso, Texas: Qualitative Report

NOTE: Solid arrows represent established linkages in community; dashed arrows represent establish but not fully met linkage; dashed boxed represent linkages that are non-existent or not fully met.

Across all interviews, there was agreement that linking people with diabetes to community resources, like social services, can help improve the current work and efforts of each sector within the CCM. Findings from this assessment identified communication between health care medical providers, health insurers, people with diabetes, community resources, and school districts as a challenge and an opportunity for improving diabetes prevention and management. There was consensus by all interviewees that diabetes education and more collaboration is needed. A key theme that arose from these interviews was that federally funded organizations were more likely to offer comprehensive services that aligned with many of the ADA Standards of Diabetes Medical Care compared to non-federally funded and privately funded organizations. Both federal and non-federal organizations reported limited resources and barriers related to health insurance coverage for diabetes services. In addition, many sectors interviews were unaware of existing community prevention and management community resources.

From a social determinant perspective, low levels of health literacy and education among individuals with diabetes was identified as one of the main barriers to the prevention and successful management of diabetes. Living in low income, limited infrastructure neighborhoods and food desert communities were identified as additional barriers for people living with diabetes. The UTEP team recommend bridging this gap by improving communication and collaboration between the health delivery system, diabetes management support channels, those involved in treatment decision cycles, clinical information systems, diabetes community resources, and policy advocates.

Recommendations from the representatives interviewed included more and improved coordination, communication, and collaboration between community level resources and the health care system. This includes communication, collaboration and coordination between school systems and medical providers, health care systems and community resources, and coordinated systems between medical providers and health insurers. Lastly, while the scope of this assessment was type 2 diabetes, it should be noted that children with diabetes, particularly children and adolescents living in low income households, were identified as a population that needed more attention, both in the qualitative findings and by the advisory group for the project.

"We need educators and diabetes care specialists in all areas [of care], because we don't have enough of those experts… some of these segments of the population are going unnoticed and ignored."

-Key Informant, Federally Funded Organization

Literature Review- Key Themes and Sector-Specific Recommendations

HRiA conducted a review of the available peer-reviewed literature and one Congressional report to better understand the landscape of current evidence-based interventions and recommendations to screen for and diagnose, prevent, and manage type 2 diabetes. When possible, the literature review highlights research that includes Hispanic/Latino populations and/or focuses on the US border region. Each sub-topic of the review closes with a summary of recommendations for each respective topic. The full literature review found in **Appendix B**: Literature Review details these findings and also delves deeper into type 1 and gestational diabetes. For the purposes of this report, HRiA organized recommendations for type 2 diabetes using a socioecological perspective taking into consideration factors that occur at the individual, organizational, community, and public policy levels. Since social determinants occur at various levels of the model and interact in complex ways that impact behaviors and health outcomes, recommendations that are adopted should simultaneously target strategies at each socioecological level in order to more effectively reduce risk for, and burden of diabetes in El Paso. In addition to being organized by the socioecological model, HRiA has categorized recommendations by a range of sectors that can be engaged in diabetes-associated work moving forward. Figure 8 details these sectors and provides examples of the industries represented in each category, and the proceeding table summarizes evidence-based recommendations identified in the literature review and relevant case studies.

Figure 8. Sector Wheel Used to Organize Literature Review Findings

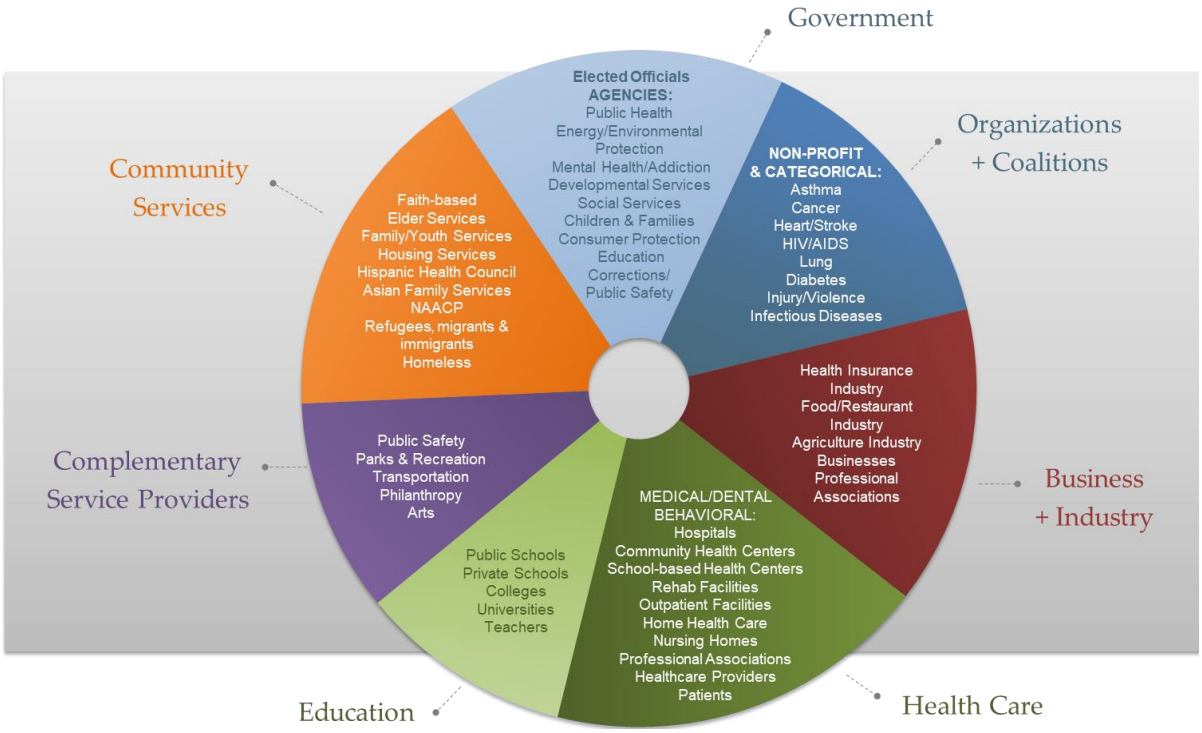


Table 2. Sector Recommendations Based on Literature Review and Case Studies

	Community Services (faith-based, elder services, family-youth services, etc.)	Government	Nonprofit + Coalition	Business + Industry	Healthcare	Education and Teaching Institutions	Complementary Service Providers (Philanthropy, Parks & Recreation, Transportation, etc.
Individual (knowledge, attitudes, skills)	• Adopt community screening efforts that emphasize information sharing, skills building, and social networking [1,2] • Highlight and leverage work of local expertise in chronic disease prevention and diabetes management (e.g. Diabetes Garage, Texas Tech's early screening tests, etc.) [3, 26, 27]	• Promote education campaigns and messages that improve awareness among residents through media, presentations to local groups, and the distribution of educational materials, among other methods. [3] • Offer referrals to diabetes-serving organizations like the local Diabetes Associations and care providers [1]	• Provide expertise in chronic disease risk factor prevention in worksite wellness initiatives, including cultural tailoring [20, 21, 22] • Promote education campaigns and messages that improve awareness among residents through media, presentations to local groups, and the distribution of educational materials, among other methods. [3]	• Adopt community screening efforts that emphasize information sharing, skills building, and social networking [1,2] • Offer referrals to diabetes-serving organizations like the local Diabetes Associations and care providers [1]	• Leverage community health workers for diabetes self-management interventions that focus on goal setting and self-management, ensuring interventions include multiple points of contact with participants over a protracted period (e.g. 10 points of contact delivered over at least 6 months [20, 21, 22, 23]	• Raise student and constituents' awareness about chronic disease prevention and control programs in El Paso [6, 17] • Train personnel to screen middle school children for pre-diabetes using acanthosis nigricans marker, as indicated by a pigmented rash on the child's neck or axilla.[6]	• Highlight and leverage work of local expertise in chronic disease prevention and diabetes management (e.g. Diabetes Garage, Texas Tech's early screening tests, etc.) [3, 26, 27] • Promote education campaigns and message that improve awareness among residents through media, presentations to local groups, and the distribution of educational materials, among other methods. [3]
Organizational (organizations, social institutions)	• Prioritize screening services in areas with a highest prevalence of diabetes (e.g. census tracts 18, 19, 21) [4] • Involve family members in	• Develop and maintain a web-based chronic disease resource directory for providers and the public; work with proposed backbone convener as necessary [3]	• Identify opportunities for cultural tailoring of evidence-based interventions that are led by lay persons or community educators [21, 22]	• Adopt elements of Diabetes Prevention Programs in worksite wellness initiatives, consider 1-hour sessions offered during lunch for 12-24 weeks [7, 8, 9, 10, 11, 12]	• Standardize regional approach for integrating psychosocial care into diabetes management including tailoring treatment plants to patient social support and self-efficacy [14, 15]	• Adopt multi-component interventions focused on nutrition, physical activity, and behavioral health for residents of racial/ethnic	• Adopt elements of Diabetes Prevention Programs in worksite wellness initiatives, consider 1-hour sessions offered during lunch for 12-24 weeks [7, 8, 9, 10, 11, 12]

	Community Services (faith-based, elder services, family-youth services, etc.)	Government	Nonprofit + Coalition	Business + Industry	Healthcare	Education and Teaching Institutions	Complementary Service Providers (Philanthropy, Parks & Recreation, Transportation, etc.
	conversations related to health [24, 25]	• Adopt county-wide surveillance system that compliments current data efforts [3]			• Adopt quality improvement strategies focused on health care systems to support the communication of diabetes-related information between providers, including case management, audits and feedback, clinician education, clinician reminders, financial incentives, and electronic patient registries. [16]	and socioeconomic backgrounds most vulnerable to obesity and diabetes. [17]	
Community (relationships between organizations)	• Offer and deliver diabetes prevention and management interventions in partnership with community-based organizations like the Diabetes Association, the Texas Tech early screening Study (Dr. Cistola), and the Diabetes Garage (Dr. Concha) [26, 27]	• Create/maintain active partnerships at the state and local levels to jointly pursue issues related to diabetes in communities, among health care, providers, persons with diabetes, and those at risk for diabetes. [3]	• Coordinate implementation of a county-wide marketing campaign to raise awareness about prediabetes and that type 2 diabetes can be prevented [26]	• Advocate to make El Paso a certified Blue Zones Community—a community-wide approach that works with all sectors of the community to improve well-being at worksites, schools, restaurants, grocery stores, faith-based community, and local organizations [29]	• Create a pre-diabetes registry based on electronic medical records to identify cases eligible for screening that may be missed during medical visits [5] • Incorporate IBH models like the chronic care model into health care settings, implementing decision-support tools, and ensuring community involvement in model implementation [14, 15]	• Adapt multi-level diabetes prevention interventions such as Bienestar model in San Antonio, TX and the NEEMA school-based diabetes intervention. [18, 19]	• Sponsor or subsidize technological advancements and treatment options such as Telehealth, especially in light of COVID 19

	Community Services (faith-based, elder services, family-youth services, etc.)	Government	Nonprofit + Coalition	Business + Industry	Healthcare	Education and Teaching Institutions	Complementary Service Providers (Philanthropy, Parks & Recreation, Transportation, etc.
					• Organize opportunities for provider education, training, and professional networking		
Policy	• Support policies for Medicaid and other health payers to provide reimbursement for evidence-based diabetes education classes, including prediabetes education. [30, 31, 33]	• Advocate for reimbursement models that incentivize prevention methods [3, 30, 31] • Work collectively across private and public payers to align payment incentives and quality measures [3, 30, 31] • Sponsor or support legislation and funding that promotes chronic disease prevention and control. [31, 33] • Secure Additional funding for FQHCs at the local level for them to expand services for low-income individuals	• Support policies for Medicaid and other health payers to provide reimbursement for evidence-based diabetes education classes, including prediabetes education. [30, 31, 33]	• Support policies for Medicaid, and other health payers to provide reimbursement for evidence-based diabetes education classes, including prediabetes education. [30, 31]	• Advocate for reimbursement models that incentivize prevention methods [3, 30, 31] • Advocate for Medicare beneficiaries and uninsured patients to pay the same prices for diabetes medications as patients in other countries like Australia, the United Kingdom, and Canada. [32, 33] • Work with health payers to track diabetes care data through patient insurance claims and publish quarterly data on diabetes specific measures, so more empirical data are available [34]	• Support policies for Medicaid, and other health payers to provide reimbursement for evidence-based diabetes education classes, including prediabetes education [30, 31]	• Advocate for reimbursement models that incentivize prevention methods [3, 30, 31, 33] • Support policies for Medicaid, and other health payers to provide reimbursement for evidence-based diabetes education classes, including prediabetes education. [30, 31, 33] • Work with health payers to track diabetes care data through patient insurance claims and publish quarterly data on diabetes specific measures, so more empirical data are available [34]

Foundation-Specific Opportunities and Recommendations

Opportunity 1: Support the establishment of a collaborative body with shared responsibility that influences county-level change related to diabetes and chronic disease prevention.

Based on findings and recommendations across all methods of this assessment, the highest priority identified to facilitate improved outcomes related to diabetes in El Paso is to support the establishment of a collaborative body or coalition. The purpose of this group should be to create and maintain active partnerships at the state and local levels to jointly pursue issues related to diabetes in order to influence change through a collective voice. The proposed group should have a clear, central purpose with a strong decision-making structure for developing a collaborative diabetes plan for El Paso County to address priority issues and identify opportunities for shared investment. The group should engage diverse viewpoints in planning processes to ensure organizational support and ownership, ultimately leading to more coordinated implementation efforts across the region.

This work should not take a "top down" approach—that is, higher authority figures that determine larger goals that will filter down to the tasks of lower level employees. In comparison, it is critical that this sort of initiative take a "bottom-up" style approach in decision-making process that gives the entire group a voice in county-wide goals in order to have buy-in from the many partners it will take to move the needle on population health outcomes as they relate to diabetes. As an example, there is an opportunity to reassess the current structure and membership of the El Paso Diabetes Council and additional ad-hoc diabetes workgroups to ensure that efforts are not duplicated and there is equal representation from frontline staff members, community residents, and organizational leadership.

It is recommended that the proposed collaborative or coalition consist of a Steering Committee—a group of 12-15 cross sector members who provide broad strategy and agenda setting, and General Membership who would be made up of a larger subset of the community and would serve to inform, support, and implement the work of the Collaborative. The steering committee should consist of a cross-section of individuals at a range of organizations including hospitals, health centers, local public health, teaching institutions, community-based organizations, and residents with or at-risk of diabetes. The group would serve as the decision-making body on key elements of the county-wide implementation plan and monitor progress and adjust accordingly. The Foundation should leverage learnings and successes from past initiatives, including the US- Mexico Border Diabetes Prevention and Control Project or the Walk El Paso program.

Below (Figure 9) is an example of an administrative structure that can be adopted as a first step in this process. In this structure, an Operations Committee, made up of the backbone coordinator and Steering Committee Co-chairs, would be responsible for resolving operational challenges requiring immediate action; for problem solving with the coordinator, and for serving as a consultative role. Lastly, within this administrative structure, work groups should be formed to develop and execute annual work plans to carry out activities for the top priorities identified by the group. This would involve the broader membership and enlisting new members from diabetes-serving institutions. Each work group should be chaired by individual members of the Steering Committee.

Figure 9. Example of Potential Administrative Structure for Proposed County-Wide Diabetes Collaborative

Steering Committee:
- Sets strategic direction and policy
- Manages work plans and accountability of work groups
- Individual members chair workgroups
- Meets 4-8 times per year

Operations Committee:
- Resolves challenges requiring immediate action
- Provides direction to the coordinator
- Meet 4 times a year or as needed

General Membership:
- Attends events
- Shares information
- Participates in work groups

Work Groups:
- Executes work plans
- Involves broader membership and lists new members from communities served
- Regularly scheduled meetings as per work plan

While establishing a group such as this will take between 1-2 years to plan for and recruit, it is critical for longer-term sustainability of the collaborative efforts that are needed to address an issue as complex as diabetes. In order for this group to be successful, there will need to be a convener or coordinator to play the role of a neutral facilitator in the process. This convener/coordinator should serve as the administrative "backbone" responsible for coordinating and supporting implementation efforts and committee activities of the partners involved in the proposed coalition. Apart from providing overall operations management for the collaborative, the identified convener or coordinator should serve as a

thought leader with a proven track record of diabetes and community engagement expertise. In other case studies reviewed for this assessment, organizations such as local health departments—or other organizations who have the capacity and political will to convene groups across sectors—have been effective in this role. It is recommended that at least two staff people be identified to coordinate these efforts (1 FTE senior or director level position, and .5 FTE support staff). Staffing structure may grow or change depending on the needs of the Collaborative. **Appendix C**. Example of the Role/Responsibilities for the "Backbone/Lead Convener(s)" has an example of a description of duties that can be adapted when looking for a coordinator or backbone convener.

Example Timeline and Activities for Opportunity 1:

0- 6 Months:

- 1.1. Identify facilitator/convener of collaborative group that is responsible for recruitment and coordination of county-wide diabetes coalition; onboard facilitator and co-create roles and responsibilities.

6-12 Months

- 1.2. Begin recruitment of organizations to participate in county-wide diabetes coalition Steering Committee.
- 1.3. Establish roles and decision-making structure for collaborative group, including Steering Committee members and potential co-chairs.

12-36 Months

- 1.4. Convene Collaborative Steering Committee and develop shared agreements of process and timeline for developing a diabetes action plan.
- 1.5. Identify and build off of successes of initiatives like the US- Mexico Border Diabetes Prevention and Control Project, or the Walk El Paso program.
- 1.6. Develop communication strategy to disseminate information related to newly established Collaborative.
- 1.7. Begin recruitment of larger subset of organizations to participate in Collaborative's General Membership group.

Opportunity 2: Strengthen infrastructure support for groups in El Paso County working on diabetes prevention.

Findings from key informant interviews and the services scan identify opportunities to strengthen infrastructure support for local groups working on early detection and diabetes management in El Paso. For example, in the fall of 2020, the El Paso Health Department will be required by the state to track referrals to diabetes services on the 2-1-1 information call line. This change will require the health department to create and support processes to track and monitor these data, which is likely to be resource intensive. Paso del Norte Health Foundation can support these efforts and also assist in maintaining and updating the web-

based resource directory to ensure chronic disease resources are readily available for providers and the general public.

Next, there is an opportunity to build capacity for, and increase referrals to, diabetes prevention programs in El Paso. This can be done in a variety of ways based on the Foundation's strategic direction for the next several years. For example, the foundation can work to promote participation in ADA-recognized, AADE-accredited, state-accredited/certified, and/or licensed DSME programs. Part of this process should be to identify barriers of offering DSME and DPP programs at local organizations with the goal of increasing the number of programs available in the county, prioritizing those who participate in worksite wellness initiatives. Closely related would be providing financial support for organizations interested in DPP or ADA accreditation, subsidizing incentives to promote long-term engagement, and investments in telehealth—especially in light of COVID-19. In addition, the Foundation could promote education campaigns and message that improve awareness among residents through media, presentations to local groups, and the distribution of educational materials, among other methods. This includes uplifting and supporting the work of local groups who are exemplar in following a Chronic Care Model approach like local FQHCs, and community organizations committed to diabetes programming and research, including the El Paso Diabetes Association; Bienvivir Diabetes Prevention Program; The University of Texas at El Paso projects like the nationally recognized Diabetes Garage (Concha, 2020); and early detection of metabolic dysregulation using water T2 biomarker led by Texas Tech University Health Science Center (Robinson et al., 2017).

A promising consideration for investment would be to provide infrastructure support to physically co-locate diabetes-related services, which evidence suggests improves care and minimizes access barriers for residents (Sanchez, K., Watt, T., 2012). One opportunity to consider leveraging in this model if adopted is collaborating with institutions of higher learning who have been funded for diabetes-related interventions. These groups are well-positioned to support capacity challenges and provide technical assistance for community-based organizations with limited resources. This model would be mutually beneficial for all parties involved; for example, local researchers are often tasked with building the evidence-base by recruiting a large enough sample size to examine if interventions have significant impacts. Community-based organizations often have resource constraints that limit the amount of services offered to community residents. By co-locating both groups, researchers can recruit members of community-based organizations while alleviating cost-intensive screening and management services for CBOs. From a population health perspective, this model also facilitates a process to build the evidence-base, which may ultimately lead to more research dollars directed to the region.

Example Timeline and Activities for Opportunity 2:

0- 6 Months:

- 2.1. Support efforts of the local health department to track referrals to diabetes services on the 2-1-1 information call line, which will be mandated by the state as of Fall 2020
- 2.2. Promote participation in ADA-recognized, AADE-accredited, state-accredited/certified, and/or licensed DSME programs through media campaign, presentations, or health materials.
- 2.3 Support the work of local groups who are exemplar in following a Chronic Care Model approach like local FQHCs, and community organizations committed to diabetes programming and research, including the El Paso Diabetes Association; Bienvivir Diabetes Prevention Program; Project Vida; The University of Texas at El Paso projects like the Diabetes Garage (Concha, 2020); and early detection of metabolic dysregulation using water T2 biomarker led by Texas Tech University Health Science Center, among others (Robinson et al., 2017).
- 2.4. Identify barriers to offering DSME and DPP programs at local organizations with the goal of increasing the number of programs available in the county, prioritizing those that are offered through worksite wellness initiatives.

6-12 Months

- 2.5. Assist in maintaining and updating the city's web-based resource directory to ensure chronic disease resources are readily available for providers and the general public.
- 2.6. Provide financial support for organizations interested in DPP or ADA accreditation, subsidizing incentives to promote long-term engagement, and investments in telehealth—especially in light of COVID-19.

12-36 Months

- 2.7. Provide infrastructure support to physically co-locate diabetes-related services, which evidence suggests improves care and minimizes access barriers for residents; collaborate with institutions of higher learning who have been funded for diabetes-related interventions.

Opportunity 3: Expand support and influence change in healthcare systems to be more closely aligned with ADA standards, including more coordinated data efforts in El Paso County.

Findings from the UTEP team's key informant interviews identified a disconnect between the chronic care model health system and community sectors that contribute to the ADA standards of care not being fully met for El Paso County residents. This disconnect between sectors has led to a fragmented approach to diabetes care in the region, where private and public institutions approach care differently, track data differently, and rarely collaborate or share information. Improving population health requires a coordinated approach that takes thoughtful planning and investment in long-term success. For long-term transformation to be possible, it is imperative that federally funded organizations (i.e., community-based organizations, FQHCs, migrant health clinics), non-federally funded, and privately funded organizations

more closely align their standards of care from both a practice and reporting structure perspective. As such, a critical next step to better coordinate care in the region is to assess health systems to identify opportunities for quality improvement and collaboration.

There is an opportunity for the Foundation and the proposed collaborative or coalition to advocate for systems-level change in the region to address these divides. Systems and policy change are cost-effective ways for localities to improve community health, but what is needed is the political will and a meaningful commitment from multiple sectors. For example, key informant interviewees and the El Paso Diabetes Council identified a lack of funding and reimbursement as a barrier to expanding diabetes care in the area. The collaborative group could address these barriers by advocating for reimbursement models that incentivize prevention, e.g., for diabetes education classes; supporting policies aiming to expand use of Electronic Medical Records or Health Information Exchanges by all diabetes and chronic care providers; and supporting efforts to ensure Medicare beneficiaries and uninsured patients pay lower medication costs, similar to those in countries with lower costs like the United Kingdom, Australia, and Canada.

Advocacy efforts should also be focused on transforming practice approaches that are evidence-based, such as adopting the integration of primary and behavioral health care (IBH) through collaborative care models which have found to result in improved clinical and behavioral outcomes, provider engagement, and patient satisfaction (Kwan et al., 2014) . Such models have been found to be particularly effective for improving behavioral treatment among vulnerable patients; however, the feasibility and long-term sustainability of collaborative care models have proved challenging due to limited resources. As such, the Foundation could consider funding early integrated health efforts that incentivize local providers to adopt IBH models that standardize screening and assessment procedures to include biopsychosocial factors related to the progression of diabetes outcomes. Support could include building the capacity of healthcare systems to implement system-wide changes involved in IBH by facilitating access to continuing education for health care professionals, e.g., subsidizing conferences, conventions, webinars, and sponsoring nationally recognized consultants in IBH that use the “train the trainer” models. In order for these efforts to be successful, there will need to be a county-wide plan to implement incremental steps across healthcare systems to standardize these approaches.

Further, it is critical that timely and relevant public health data are available in order to facilitate continuous and systematic collection and analysis of health-related indicators needed for effective planning and implementation efforts. Currently, gaps exist for how and when data are collected in the region; this includes how data are stratified for populations that experience health disparities, for example, data by race and ethnicity, foreign-born residents, educational attainment, and socioeconomic status. Much of the

data available for the county are self-reported, which is more prone to bias and measurement error. Further, though prevalence of prediabetes is an important indicator in assessing the overall burden of the disease, the Texas Behavioral Risk Factor Surveillance System (BRFSS) does not have direct estimates of prediabetes prevalence for all Texas counties. These limitations pose challenges in the ability to fully understand the magnitude of diabetes in El Paso and thus the ability to plan resourcefully. In order to strengthen regional data efforts, it is recommended that the Foundation support more robust surveillance systems to increase quality of data to identify individuals with early onset of diabetes, which was also identified as a barrier by key informants.

There is an opportunity for the proposed collaborative to advocate in terms of local data efforts. For example, the group can work with health payers and clinicians to track diabetes care data through patient insurance claims and clinical data to publish quarterly data on diabetes specific measures. In turn, more empirical data would be available to assess the impact of diabetes and plan appropriate interventions and evaluation efforts. These data should be disaggregated and available to the public via a community dashboard, media, presentations, websites, and other creative methods of outreach.

Similarly, there is an opportunity to support efforts for closed-loop referrals in El Paso, where sending providers receive a report from the receiving provider after completion of the visit that resulted from a referral, which is a common practice in clinics throughout the country. While close-loop referral processes are important for care coordination and follow up care, the process requires a level of organizational readiness that some groups may not be prepared for. As such, if this strategy is adopted, investments in the early planning, capacity building, and resource allocation (e.g. hardware and software) for partner organizations is critical to the success of this initiative.

PHIX, the county's health information exchange, is well-positioned to lead these efforts with the support of the health department and state, as they have invested substantial resources in coordinating information sharing among private and public providers since 2016. Because of the organization's foundational work connecting healthcare systems, PHIX could begin the process to identify quality measures and shared metrics amongst sectors. These measures should also include behavioral health data and build off the lessons learned from PHIX's pilot program to integrate mental health data into the HIE. Support for these efforts can be operationalized by supporting legal agreements and technical infrastructure needed to move these initiatives forward.

Example Timeline and Activities for Opportunity 3:

0- 6 Months:

- 3.1 Support efforts with PHIX for closed-loop referrals in El Paso, where sending providers receive a report from the receiving provider after completion of the visit that resulted.
- 3.2. Support legal agreements and technical infrastructure needed to increase partners involved in the HIE. Investments in the early planning, capacity building, and resource allocation (e.g. hardware and software) for partner organizations is critical to the success of this initiative.

6-12 Months

- 3.3. Begin process to identify quality measures and shared metrics amongst sectors that are involved in the HIE, making sure to include behavioral health data and build off the lessons learned from PHIX's pilot program.
- 3.4. Work with health payers and clinicians to track diabetes care data through patient insurance claims and clinical data to publish quarterly data on diabetes specific measures.
  3.5. Build the capacity of healthcare systems to implement system-wide changes involved in IBH by facilitating access to continuing education for health care professionals, e.g., subsidizing conferences, conventions, webinars, and sponsoring nationally recognized consultants in IBH that use the "train the trainer" models.

12-36 Months

- 3.6. Advocate for reimbursement models that incentivize prevention, e.g., for diabetes education classes; supporting policies aiming to expand use of Electronic Medical Records or Health Information Exchanges by all diabetes and chronic care providers; and supporting efforts to ensure Medicare beneficiaries and uninsured patients pay lower medication costs.
- 3.7. Transform practice approaches that are evidence-based, such as adopting the integration of primary and behavioral health care (IBH) through collaborative care models which have found to result in improved clinical and behavioral outcomes, provider engagement, and patient satisfaction
- 3.8. Support more robust surveillance systems to increase quality of data to identify individuals with early onset of diabetes, which was also identified as a barrier by key informants.

Conclusions

This report summarizes the work conducted by Health Resources in Action and UTEP as of Spring 2020 through a review of existing data, a literature review, services inventory, and discussions with a community advisory board and key informants. The assessment is meant to serve as a benchmark and guide to inform current and future planning efforts of the Foundation and others in the community.

Secondary data findings from this assessment show that El Paso residents have experienced diabetes prevalence rates higher than the state overall for at least the last eight years of recorded trend data. Residents of the county also experience health related concerns including hypertension (25%), high cholesterol (23%), and high levels of obesity (35%) at disproportionate rates. A review of services shows that of thirteen local organizations identified providing diabetes-related services in El Paso, only two are

recognized by the Center for Disease Control's DPP, three organizations had AADE accredited DSMES and one was recognized by the American Diabetes Association. A systematic review of findings from key informant interviews identified a disconnect between the chronic care model health system and community sectors that contribute to the ADA standards of care not being fully met. A literature reviews shows promising evidence-based strategies that can be adopted by a wide range of community sectors at the individual, organizational, community, and public policy levels. Since social determinants occur at various levels and interact in complex ways that impact behaviors and health outcomes, strategies that are adopted should simultaneously target initiatives at each level to more effectively reduce risk for, and burden of diabetes in El Paso.

There were three key overarching opportunities identified for the Foundation's consideration, each presented with examples of strategies that can be adopted moving forward. They include:

- **Support the establishment of a collaborative body with shared responsibility that influences county-wide change related to diabetes and chronic disease prevention.** The proposed group should have a clear, central purpose with a strong decision-making structure and should engage diverse viewpoints in planning processes.
- **Strengthen infrastructure support for local groups working on diabetes prevention.** These efforts should involve partnership with the health department and include building capacity for referrals to diabetes prevention programs, identifying barriers of offering DSME and DPP programs at local organizations, and providing infrastructure support to physically co-locate diabetes-related services.
- **Expand support and influence change in healthcare systems to be more closely aligned with ADA standards, including more coordinated regional data efforts.** These efforts should include advocating for systems-level change in the region to address the various existing divides, assessing health system and regional surveillance systems to increase quality of data metrics used and data made available, working with health payers to track diabetes care data, integrating mental health data into the HIE, and supporting legal agreements and technical infrastructure.

Findings from this report are meant to guide future efforts and identify opportunities for collaboration to increase screening for and management of diabetes in El Paso. The next step in this process is to work with the Foundation and the El Paso Diabetes Council, in conjunction with key stakeholders and community residents, to develop prioritization criteria to identify 2-4 priority areas of focus to move diabetes related work forward in the region. The culmination of this work will result in the development of a community-wide action plan that details an engagement and implementation strategy to increase screening and management of diabetes in the county.

Report References

American Diabetes Association, (2018). Economic Costs of Diabetes in the US in 2019. Diabetes Care Mar 2018, dci180007; DOI: 10.2337/dci18-0007. Available from: https://care.diabetesjournals.org/content/early/2018/03/20/dci18-0007

America's Health Rankings analysis of CDC, Behavioral Risk Factor Surveillance System, United Health Foundation, (2020). Accessed from https://www.americashealthrankings.org/explore/annual/measure/Diabetes/state/ALL

Centers for Disease Control and Prevention. National Diabetes Statistics Report, (2020). Atlanta, GA: Centers for Disease Control and Prevention, U.S. Dept of Health and Human Services; 2020.

Centers for Medicare and Medicaid Services. Diabetes Occurrence, Costs, and Access to Care among Medicare Beneficiaries Aged 65 Years and Over Available from: https://www.cms.gov/Research-Statistics-Data-and-Systems/Research/MCBS/Downloads/Diabetes_DataBrief_2017.pdf

Concha J., Duarte-Gardea, M., Moya, E., Portillo, D., Bajpei, S., (2020) Diabetes Assessment in the County of El Paso, Texas

Concha, J. (2020). Association of State and Territorial Health Officials (ASTHO) Presentation. Innovative State Strategies for Diabetes Prevention. Available from: https://astho.org/Webinars/Innovative-State-Strategies-for-Diabetes-Prevention/03-04-20/

Johnson EP, Dunn M, Cooper M, Bhakta N. (2019). Diabetes Prevention Program Sites Compared with Diabetes Prevalence and Ratio of Primary Care Physicians in Texas. Prev Chronic Dis 2019;16:190175. DOI: https://doi.org/10.5888/pcd16.190175.

Kwan BM, Valeras AB, Brown Levey S, Nease DN, Talen ME. (2014). An evidence roadmap for implementation of integrated behavioral health under the Affordable Care Act. *AIMS Public Heal*. 2015;2(4):691-717. doi:10.3934/publichealth.2015.4.691

Lopez L, Golden SH. (2014). A New Era in Understanding Diabetes Disparities Among U.S. Latinos--All Are Not Equal. Diabetes Care 2014 Aug;37(8):2081-3.

Paso del Norte Institute for Healthy Living. (2017). Paso del Norte Region Diabetes Asset Scan

Pérez-Escamilla, R., Garcia, J., & Song, D. (2010). Health care access among Hispanic immigrants ¿Alguien está escuchando? [Is anything listening?]. *NAPA Bulletin*, *34*(1), 47–67. https://doi.org/10.1111/j.1556-4797.2010.01051.x

Robinson, M.D., Mishra, I., Deodhar, S. Deohdar, S., Patel V., Gordon., R., Brown., K., Johnson., L, O'Brynant, S.,

Cistola, D.(2017). Water T_2 as an early, global and practical biomarker for metabolic syndrome: an observational cross-sectional study. *J Transl Med* **15,** 258. https://doi.org/10.1186/s12967-017-1359-5

Sanchez, K., Watt, T., (2012). Collaborative care for the treatment of depression in primary care with a low-income, Spanish-speaking population: outcomes from a community-based program evaluation. *Prim Care Companion CNS Disord. 2012;14(6):PCC.12m01385. doi:10.4088/PCC.12m01385*

Literature Review Table References

1. Kelly, M. P. (1998). Diabetes screening and health education at Roman Catholic churches along the West Texas Mexico border. *American Journal of Health Studies*, *14*(1), 48.
2. Baig, A. A., Locklin, C. A., Wilkes, A. E., Oborski, D. D., Acevedo, J. C., Gorawara-Bhat, R., ... & Chin, M. H. (2014). Integrating diabetes self-management interventions for Mexican-Americans into the catholic church setting. *Journal of religion and health*, *53*(1), 105-118.
3. Association of State and Territorial Health Officials (ASTHO), North Dakota Improves Diabetes through a Cross-sector Approach to Prevention and Commitment to High-Quality, Guideline-based Care. Accessed from: https://www.astho.org/Prevention/Chronic-Disease/Diabetes/North-Dakota-Improves-Diabetes-Through-Cross-Sector-Approach-to-Prevention/
4. Wright, D., Little, R., Turner, D., & Thornley, T. (2019). Diabetes Screening Through Community Pharmacies in England: A Cost-Effectiveness Study. Pharmacy, 7(1), 30.
5. Holliday, C. S., Williams, J., Salcedo, V., & Kandula, N. R. (2019). Clinical Identification and Referral of Adults With Prediabetes to a Diabetes Prevention Program. Preventing Chronic Disease, 16.
6. Cottrell, L., John, C., Murphy, E., et al. (2013). Individual-, family-, community-, and policy-level impact of a school-based cardiovascular risk detection screening program for children in underserved, rural areas: The CARDIAC project. J Obes. doi:10.1155/2013/732579
7. Ockene, I. S., Tellez, T. L., Rosal, M. C., Reed, G. W., Mordes, J., Merriam, P. A., ... & Ma, Y. (2012). Outcomes of a Latino community-based intervention for the prevention of diabetes: the Lawrence Latino Diabetes Prevention Project. American Journal of Public Health, 102(2), 336-342.
8. Katula, J. A., Vitolins, M. Z., Rosenberger, E. L., Blackwell, C. S., Morgan, T. M., Lawlor, M. S., & Goff, D. C. (2011). One-year results of a community-based translation of the Diabetes Prevention Program: Healthy-Living Partnerships to Prevent Diabetes (HELP PD) Project. Diabetes Care, 34(7), 1451-1457.
9. Katula, J. A., Vitolins, M. Z., Morgan, T. M., Lawlor, M. S., Blackwell, C. S., Isom, S. P., ... & Goff Jr, D. C. (2013). The Healthy Living Partnerships to Prevent Diabetes study: 2-year outcomes of a randomized controlled trial. American Journal of Preventive Medicine, 44(4), S324-S332.
10. Shrestha, A., Karmacharya, B.M., Khudyakov, P., Weber, M.B., Spiegelman, D. (2018) Dietary interventions to prevent and manage diabetes in worksite settings: A meta-analysis. J Occup Health. doi:10.1539/joh.17-0121-RA
11. Hafez, D., Nelson, D. B., Martin, E. G., Cohen, A. J., Northway, R., & Kullgren, J. T. (2017a). Understanding type 2 diabetes mellitus screening practices among primary care physicians: a qualitative chart-stimulated recall study. BMC Family Practice, 18(1), 50.
12. Brown, S.A., García, A.A., Zuñiga, J.A., Lewis, K.A. (2018) Effectiveness of workplace Diabetes prevention programs: A systematic review of the evidence. Patient Educ Couns. doi:10.1016/j.pec.2018.01.001
13. Albright, A. L., & Gregg, E. W. (2013). Preventing type 2 diabetes in communities across the US: the National Diabetes Prevention Program. American Journal of Preventive Medicine, 44(4), S346-S351.
14. Stellefson, M., Dipnarine, K., & Stopka, C. (2013). The chronic care model and diabetes management in US primary care settings: A systematic review. Preventing Chronic Disease, 1-21.
15. Elissen, A. M., Steuten, L. M., Lemmens, L. C., Drewes, H. W., Lemmens, K. M., Meeuwissen, J. A., ... & Vrijhoef, H. J. (2013). Meta-analysis of the effectiveness of chronic care management for diabetes: investigating heterogeneity in outcomes. Journal of Evaluation in Clinical Practice, 19(5), 753-762.

16. Tricco, A. C., Ivers, N. M., Grimshaw, J. M., Moher, D., Turner, L., Galipeau, J., ... & Tonelli, M. (2012). Effectiveness of quality improvement strategies on the management of diabetes: a systematic review and meta-analysis. The Lancet, 379(9833), 2252-2261.
17. Foster, G.D., Linder, B., Baranowski, T, et al. (2010). A school-based intervention for diabetes risk reduction. *N Engl J Med*. doi:10.1056/NEJMoa1001933
18. Treviño, R.P., Yin, Z., Hernandez, A., Hale, D.E., Garcia, O.A., Mobley, C. (2004). Impact of the Bienestar school-based diabetes mellitus prevention program on fasting capillary glucose levels: A randomized controlled trial. *Arch Pediatr Adolesc Med*. 2004. doi:10.1001/archpedi.158.9.911
19. Shaw-Perry, M., Horner, C., Treviño, R.P., Sosa, E.T., Hernandez, I., Bhardwaj, A. (2007). NEEMA: A school-based diabetes risk prevention program designed for African-American children. J Natl Med Assoc.
20. Glazier, R. H., Bajcar, J., Kennie, N. R., & Willson, K. (2006). A systematic review of interventions to improve diabetes care in socially disadvantaged populations. Diabetes Care, 29(7), 1675-1688.
21. Rothschild, S. K., Martin, M. A., Swider, S. M., Tumialán Lynas, C. M., Janssen, I., Avery, E. F., & Powell, L. H. (2014). Mexican American trial of community health workers: a randomized controlled trial of a community health worker intervention for Mexican Americans with type 2 diabetes mellitus. American Journal of Public Health, 104(8), 1540-1548.
22. Two Feathers, J., Kieffer, E. C., Palmisano, G., Anderson, M., Sinco, B., Janz, N., ... & Wisdom, K. (2005). Racial and Ethnic Approaches to Community Health (REACH) Detroit partnership: improving diabetes-related outcomes among African American and Latino adults. American Journal of Public Health, 95(9), 1552-1560.
23. Palmas, W., Findley, S. E., Mejia, M., Batista, M., Teresi, J., Kong, J., ... & Carrasquillo, O. (2014). Results of the northern Manhattan diabetes community outreach project: a randomized trial studying a community health worker intervention to improve diabetes care in Hispanic adults. Diabetes Care, 37(4), 963-969.
24. Oser, T. K., Oser, S. M., McGinley, E. L., & Stuckey, H. L. (2017). A novel approach to identifying barriers and facilitators in raising a child with type 1 diabetes: qualitative analysis of caregiver blogs. JMIR Diabetes, 2(2), e27.
25. Macaulay, G. C., Boucher, S. E., Yogarajah, A., Galland, B. C., & Wheeler, B. J. (2019). Sleep and Night-time Caregiving in Parents of Children and Adolescents with Type 1 Diabetes Mellitus–A Qualitative Study. Behavioral Sleep Medicine, 1-15.
26. Concha, J. (2020). Association of State and Territorial Health Officials (ASTHO) Presentation. Innovative State Strategies for Diabetes Prevention. Available from: https://astho.org/Webinars/Innovative-State-Strategies-for-Diabetes-Prevention/03-04-20/
27. Robinson, M.D., Mishra, I., Deodhar, S. Deohdar, S., Patel V., Gordon., R., Brown., K., Johnson., L, O'Brynant, S., Cistola, D.(2017). Water T_2 as an early, global and practical biomarker for metabolic syndrome: an observational cross-sectional study. *J Transl Med* **15,** 258. https://doi.org/10.1186/s12967-017-1359-5
28. National Institute of Minority Health and Health Disparities. (2017). A Social Marketing Campaign Empowers Youth to Comat Type 2 Diabetes. Accessed from: https://www.nimhd.nih.gov/news-events/features/community-health/social-marketing-campaign.html
29. Blue Zones (2018). Blue Zones Project City: Fort Worth Well-Being Surges, U.S. Score Drops. Accessed from: https://www.bluezones.com/2018/09/blue-zones-project-city-fort-worth-well-being-surges-u-s-

score-drops/

30. Ashkenazy, R., Abrahamson, MJ. (2006). Medicare Coverage for Patients with Diabetes: A National Plan with Individual Consequences. Journal of General Internal Medicine J Gen Intern Med. 2006 Apr; 21(4): 386–392. doi: 10.1111/j.1525-1497.2006.00403.x
31. Pozniak, A., Olinger, L., Shier, V., Physicians' Perceptions of Reimbursement as a Barrier to Comprehensive Diabetes Care. American Health Drug Benefits. 2010;3(1):31-40.
32. US House of Representatives Committee on Oversight and Reform for the 16th Congressional District of Texas (2019). Price of Diabetes Drugs for Seniors and the Uninsured in the United States and Abroad. US House of Representatives.
33. Konchak, J. N., Moran, M. R., O'Brien, M. J., Kandula, N. R., & Ackermann, R. T. (2016). The State of Diabetes Prevention Policy in the USA Following the Affordable Care Act. *Current diabetes reports*, *16*(6), 55. https://doi.org/10.1007/s11892-016-0742-6
34. Golden, S. H., Maruthur, N., Mathioudakis, N., Spanakis, E., Rubin, D., Zilbermint, M., & Hill-Briggs, F. (2017). The Case for Diabetes Population Health Improvement: Evidence-Based Programming for Population Outcomes in Diabetes. *Current diabetes reports*, *17*(7), 51. https://doi.org/10.1007/s11892-017-0875-2

Appendix A: Qualitative Report

Diabetes Assessment in the County of El Paso, Texas

Qualitative Report

Presented to the

Paso del Norte Health Foundation

By

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April 30th, 2020

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EXECUTIVE SUMMARY

In Fall 2019, The University of Texas at El Paso (UTEP), College of Health Sciences team initiated a qualitative community diabetes assessment via 16 key informant interviews with health care and community diabetes stakeholders to:

Determine whether appropriate resources exist to meet the American Diabetes Association (ADA) 2019 recommended A grade and B grade standards of medical care[1], and

b) Identify community/culture-centered strategies for the County of El Paso to best reach the recommended standards of care.

The team used the American Diabetes Association (ADA) Standards of Medical Care in Diabetes - 2019 report to inform the creation of six interview guides for the Chronic Care Model (CCM) health system and community sectors (i.e., *health delivery system, diabetes management support channels, treatment decision cycle, clinical information systems, diabetes community resources and policy advocates*).[1-5] The ADA recommends the CCM as an evidence based (i.e., A grade) model for system level improvements and the optimization of care for people with diabetes.[2] In 2019, the UTEP team, consisting of behavioral health, social science, and diabetes researchers, proposed to interview representatives of primary care and internal medicine, diabetes quality improvement health systems, diabetes resource organizations, health insurance providers, worksites, and school district leadership. The interview questions were derived from eight overarching ADA recommendations and their specific A grade and B grade standards of care recommendations. See Appendix A and B for the original proposal, detailed methodology, and the specific A grade and B grade standards.

A total of 16 interviews have been completed with representatives from each sector of the Chronic Care Model. See Appendix C for a detailed account of the number of individuals invited, number of declines, and the number of non-responses. From the Health System sector, three medical clinicians, two representatives from quality improvement health systems, and two health insurance representatives were interviewed. Representatives of medical clinicians included one internal medicine doctor, one endocrinologist, and one pediatrician. From the Community level sector, two diabetes organization representatives, two health insurance representatives, three large worksite representatives, and four school district representatives were interviewed. The duration for each interview was an estimated hour. All the interviews were primarily conducted in English and transcribed in English by an independent party.

FINDINGS

Based on the overarching eight ADA Standards of Medical Care -2019 recommendations and the specific A and B grade standards that were prioritized by the team (see Appendix B), the interviews reveal that there are disconnects between the Chronic Care Model (CCM) Health System and Community sectors. These disconnects contribute to the standards of care not being fully met for the residents of El Paso County. This in turn, creates challenges for the optimization of existing diabetes resources to improve diabetes care coordination. The interviews also reveal opportunities to bridge the disconnect between Health System and Community sectors by improving collaborations to improve diabetes education among patients, their families, the community, and health care clinicians. There was consensus across all interviews that diabetes education and more collaboration is needed in El Paso County to meet the needs of people with diabetes, which suggests that Health System and Community sector representatives are in a readiness for action stage.

The CCM (figure 1), illustrates that collaborations and partnerships between the Health System and Community sectors can facilitate patient engagement (i.e. activation), via education, and diabetes care coordination for patients. Figure 2 a/b, however, illustrates our findings and demonstrates our interpretation of the disconnect between Health System and Community sectors. Our qualitative assessment found that the core elements of the CCM do exist in El Paso County and can be maximized by bridging the Health System and Community sectors. This bridge can be accomplished through improving communication and collaboration between the *health delivery system, diabetes management support channels, treatment decision cycle, clinical information systems, diabetes community resources and policy advocates.*

Figure 10. Chronic Care Model CCM (Peek et al. 2014)

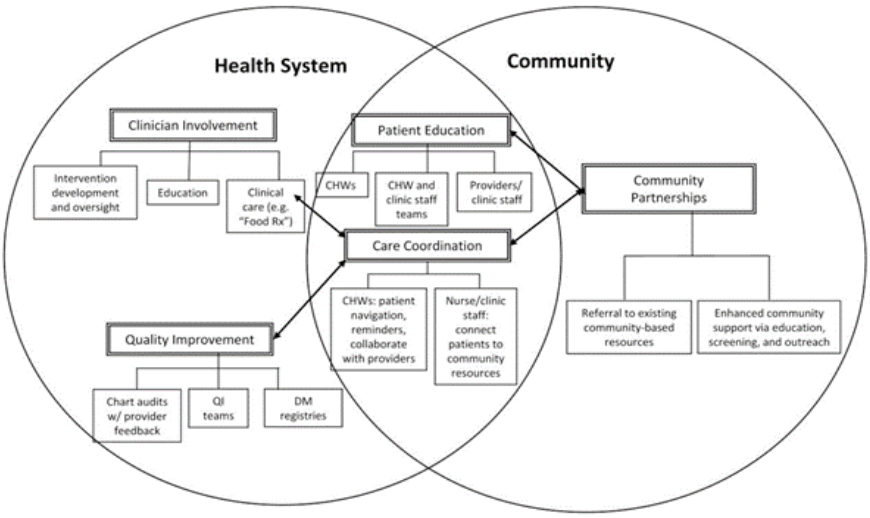


Figure 11a. Assessment of Present state of CCM in El Paso County

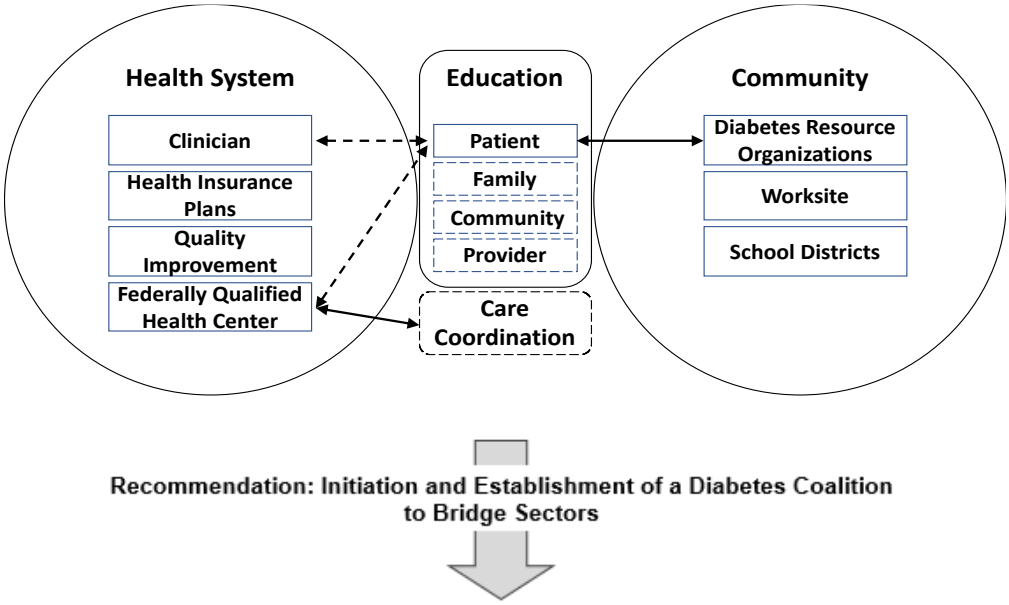
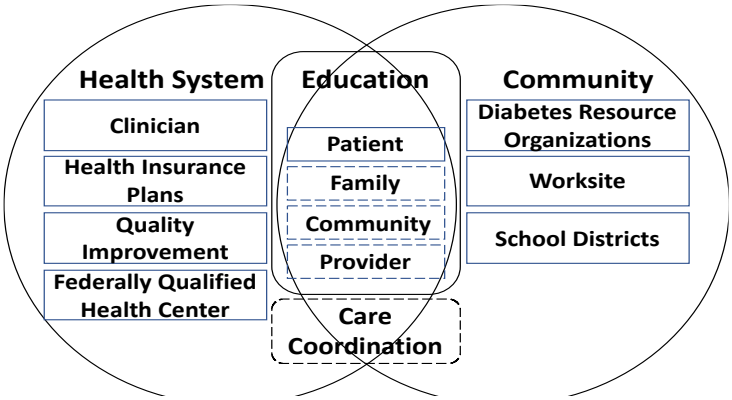


Figure 2b. Expansion to include Education across Patient, Family, Community, and Health Provider



Note: Solid arrow represents an established linkage. Dashed arrow represents an established but not fully met linkage.

Dashed Boxes represent not fully met or non-existent.

We further identified discussions with Health System and Community sector representatives exemplifying where and how some of these disconnections occur. Discussion themes found throughout the interviews indicated that agencies/organizations that are federally funded are most likely to offer comprehensive services that are aligned with many of the ADA Standards of Diabetes Medical Care compared to non-federally funded and privately funded agencies/organizations. Across all interviews, there was agreement that linking people with diabetes to community resources, like social services, can help improve the current work and efforts of each sector within the CCM. Many sectors, however, were unaware of existing community prevention and management community resources.

One population that was identified as needing more attention, both from the Health System and Community level sectors, is children with diabetes, particularly children/adolescents and families living in low income social contexts. The low levels of health literacy and education among individuals with diabetes was identified as one of the main barriers to the prevention and successful management of diabetes. Living in low income, limited infrastructure neighborhoods and food desert communities were additionally identified as barriers and challenges for people living with diabetes. Lastly, communication between health care medical providers, health insurers, people with diabetes, community resources, and school districts were highlighted as a challenge and an opportunity for improving diabetes prevention and management. Interview summaries specific to each ADA Standard of Diabetes Medical care are provided in the subsequent pages following this executive summary.

Recommendations from the representatives interviewed included more and improved coordination, communication, and collaboration between community level resources and the health care system. This includes communication, collaboration and coordination between school systems and medical providers, health care systems and community resources, and coordinated systems between medical providers and health insurers.

UTEP RESEARCH TEAM RECOMMENDATIONS

El Paso TX County is in an opportune situation to bridge Health System and Community sector resources. Based on our findings, there is consensus for a need to improve the current system of diabetes prevention and care in El Paso County.

To bridge Chronic Care Model (CCM) sectors, we recommend the initiation and establishment of a diabetes coalition with representatives from each CCM sector (federally funded, non-federally privately funded, community partners) with a primary goal of systematically cataloging and strategically promoting diabetes education for people with diabetes (children, adolescents, pregnant women and women of childbearing age, adults, and elderly). Based on comments made from Health System and Community representatives, we further recommend an expansion of the CCM by including evidence-based or standardized diabetes education (e.g., DSMES) not only at the patient level but also at the family, community, and health care profession levels. Given that education (formal and diabetes) was highlighted as one of the most central components for improving diabetes care and health outcomes, both in our assessment and the CCM, we recommend that the first step and goal of the diabetes coalition is to create a virtual space to catalog/centralize all local diabetes education resources and their intended target groups and literacy levels. This first step will: a) identify programs to make Health System and Community sectors aware of such resources, b) identify gaps in diabetes education, c)

identify opportunities for meeting the needs of children, adolescents, and their families, c) identify opportunities for meeting the needs of underserved, under/uninsured, hidden, and vulnerable populations, and c) initiate a concerted plan to address these gaps.

The establishment of a diabetes coalition can further lead to an improvement in coordinated care across the CCM sectors and across federally funded and non-federally/privately funded organizations. Moreover, a diabetes coalition can provide a space for clinicians and their staff, quality improvement teams, diabetes educators, community health workers, diabetes resource organizations, worksites, school districts, and community organizations to have conversations leading to unified actions aimed at diabetes prevention, optimal management, and coordinated care, quality medical care. We also recommend a coalition so that partners can dialogue and share their best-practice strategies to meet the ADA standards of diabetes care.

LIMITATIONS

The interviews represent a select group of individuals who agreed to participate in the diabetes assessment interviews. The findings of this report are not generalizable to the larger El Paso County Health System and Community sectors.

Interview Summaries on Resources to Meet American Diabetes Association Standards of Medical Care

Standard 1: Improving care and promoting health in populations *(See Appendix B: A grade 1.3, 1.5, 1.7, B grade: 1.1, 1.2, 1.6)*

Theme 1: Contrast between federally funded and non-federally funded private organizations

Theme 2: Awareness of community resources is needed

Theme 3: Consensus collaboration is needed

Theme 4: Diabetes Education is needed

Within the CCM Health System sector, clinician, quality improvement, diabetes resource organization, and health insurance organization representatives indicated the utilization of a diabetes care team approach with varying levels. Across all representatives in the Health System sector the main theme was related to difference in federally funded organizations and non-federally funded organizations. Organizations/agencies that are primarily funded via the federal government indicated a more comprehensive, collaborative, and proactive approach to meeting the needs of all populations including underserviced and vulnerable populations.

Federally funded organizations indicated a larger diabetes care team network, while private and non-federally funded organizations rely mainly on in-house diabetes intervention/treatment approaches to primarily meet the needs of their patient population. While federally funded organizations indicated systematically assessing the social context (i.e., food insecurity, housing stability, financial barriers) of people with diabetes and referring to social services at a broader scale, non-federally and privately funded organizations indicated that the patients' social context was taken into consideration mainly when patients expressed their social context as a health care challenge. Moreover, non-federally funded and privately funded organizations were less likely to utilize community resources or technology to assist patients with their self-management. Clinicians, specifically, were very direct about not having awareness about many community resources to refer their patients. While all organization representatives stated that diabetes education is essential for patients, clinicians identified that a nutritionist can/should be the main source of information for patients. Federally funded organizations were more likely to identify lay health coaches or navigators and community health workers as an important resource for diabetes education and to connect to healthcare and social services.

The following selected quotes exemplify the themes identified for Standard of Care 1:

Federally funded org 1: *Our center is a,…federal qualified health center. And for that we have integrated services. Under the integrated services, obviously we provide diabetes care, and we have two ways to do it. We do - the diabetes care through our medical providers and is under intervention. … and also we provide behavioral health services in our health center and we provide behavioral health services to our diabetes clients or the diabetes patients. And as well dental services…… contracts are for to refer clients, especially for a specialist,…. And we do outreach in different ways. We do outreach through presentations. We do outreach to health fairs,*

events and community events. …. And our main goal is to access community to the services. How we do that? In the internal navigation, we were - we have three, four navigators here in our building that in these building in which they work with partners, external partners…….. We are in 13 schools in [omitted school district] and we have our navigators there in which we - these navigators, the main piece that they do is access clients. They access students to behavioral health services that we provide through LPCs inside of the schools……. external partners that we, for example [omitted treatment place] or with the court - in the court and also in the consulate. We have different partners in which one time a week, one day a week, we go with them and we do a - we act as - we raise our clients, their clients to our services. This is the external - external navigation.

Federally funded org 2: *….."so we have a lot of responsibility with our community. ... we reach out to members based on doctors' referrals, depending on the medical condition. We do have community referrals - if they came across any member that is struggling with diabetes, for instance. We have a collaboration with the school nurses that we can also get those referrals so we can help, and claims data….. We do a lot of service coordination, I think is our priority……We do have a social needs assessment within the appointment, and as you talk to these parents, and you build up rapport, these parents start disclosing to you more and more and more, and that's when you have to be very selective on how to help. I have an own thing that I say - you have to teach how to get the fish, not give them the fish all the time, you know? "*

Non-federally funded org 1: "*Pretty much the plan is me. ….And I think it's very important that here in [omitted city] there's not that many physicians per patients. So, most practices have a lot of patients and it's really hard to take care of all of those patients by one sole provider, which we hire mid-levels and things like that. So as a community, I think it's the whole group of us that take care of these patients, but there's not that many specialists as well - especially endocrinologists. So, I usually take care. Primary care doctors are the ones that have to be dealing with these patients and taking care of these patients and avoiding other comorbidities or complications from this disease." "So pretty much, I mean that's - usually it's me. My office is - I have an MA and also we - and I also have a dietician in my office, which helps me manage these patients."*

The primary difference between federally funded organizations and non-federally funded and privately funded organizations is the reporting structure. The federal government requires its contractors and grantees to follow certain guidelines of assessment and systematic reporting. This includes a more systematic and comprehensive assessment of patient's social context and impact on underserved and vulnerable populations. Unique to most federal funded organizations is the low-income populations served, thus, the need to utilize and refer to these populations to additional community resources to meet their needs. Non-federally funded and privately funded organizations are less likely to service low income and uninsured populations who may have more personal resources to meet their needs.

Federally funded Interview 101: *"But all these things that you mentioned, you know, is part of the social services, is part of the social determinants of health, is part of the social environment of the client. And we do that when they are in the care coordination. When they start doing these interventions with their assessment, the big assessment that we have, and we start asking questions and see, we noticed that maybe the client are*

having issues with food... And we do that in the care coordinators, the promotoras - they know all these resources and we will bring the clients to the resources.

Privately funded Interview 112: " *Well, most of my patients are economically, socially doing well and they have the means to eat appropriately. I mean they - like I said, most of them have - the Type 1s have insulin pumps, which out in the community sometimes we don't see that. Okay. And that's - most all of them are insured. Okay. And I think my patient population is very different from the patient population that we see out in the community."*

The main challenges and barriers identified for meeting the needs of all populations including underserviced and vulnerable also differed across federally funded and non-federally funded organizations. Federally funded organizations indicated that there are not enough resources or manpower to address the large number of people living with diabetes, including diabetes education and health care. The primary challenge for non-federally funded organizations included the limitation that health insurance organization place on treatment for patients with diabetes. Clinicians indicated that the quality of treatment they can provide to patients is influenced by what the insurance companies will cover for the patient. There was thematic consensus across federally funded and non-federally funded organization that the lack of education (formal for low income populations and diabetes specific) and patient engagement about diabetes was also a major barrier for improvement in diabetes self-management outcomes.

Federally funded Interview 108 *"We should have – we need enough – we need educators and diabetes care specialists in all of these areas, and because we don't have enough of you know, those experts, some of these segments of population are being you know, going unnoticed and ignored."*

Federally funded Interview 102: "*What [omitted federally funded org] needs to do is reach out to our population with diabetes type 2, type 1 – more staff…….Two people cannot make a lot of difference. I'm very passionate of what I do, O love what I do. I think it's just me, but I wish [omitted federally funded org] could have a department that could have many guys, we could fix [sic diabetes issue]."*

Privately funded Interview 112: *"Okay. And that's where it needs to be fixed. There's not enough resources for these patients that cannot afford it. There's insurance companies are also a big problem. And I can tell you that as physicians we get rated, regarding how well you have your patient's control. So have a major insurance company, they'll say, well this doctor's having his patients very well controlled. So good star for him and everything. But sometimes the insurance will say you don't have your patient very well controlled. And my problem that I have, and I have had these discussions with insurance, is that, well I asked you if I want to prescribe this medication for my patient and you don't cover it. So how do you expect me to control your patient when you're only authorizing Metformin?"*

Privately funded interview 112: *"Making them aware of their resources because, I mean, nobody has come to my office and telling me we have these resources for your patients. And even some other patients from the hospital, they tell me, well, I mean there's no resources. All classes are booked. We don't have that many classes. So I mean, it's a big problem. Like, which is why you guys are doing this."*

Standard 2: Diabetes diagnosis (risks, tools, algorithms) lifestyle management via Diabetes Self-management Education and Support (DSMES) *(See Appendix B: A grade: 2.15, 2.18, B grade: 2.1, 2.7, 2.14)*

Theme 1: A1c used for diagnosis

Theme 2: Informal assessments of prediabetes or risk factors for diabetes

Within the CCM Health System sectors, representatives of clinician and quality improvement organizations indicated the use of glycosylated hemoglobin A1c (HbA1c) to diagnose diabetes. Informal screening for prediabetes and type 2 diabetes among asymptomatic adults was reported to occur with subjective informal indicators of diabetes risk, primarily obese weight status. Based on respondents' discussion, women with a history of gestational diabetes are less likely to be screened for prediabetes or diabetes. It is believed this should occur with a woman's obstetrics/gynecology (OB/GYN) physician. In relation to the standard of assessing for family history of type 2 diabetes and race/ethnicity, representatives indicated these factors are documented at clinical intake but not necessarily used in the algorithm for screening and diagnosing diabetes. Representatives from quality improvement sectors indicated that they followed the ADA Standards of Medical Care algorithms for diabetes diagnosis. The following quotes exemplify representatives' strategies for diabetes diagnosis and screening.

Clinician 111: *"So nowadays, A1C is a very good tool because it is pretty much well-standardized, the A1C value in order to make a diagnosis. The numbers are very clear. Any number that is above 6.5 A1C, it is consistent with a diagnosis of diabetes. Any number that is in between 5.7 and 6.4, consistent with prediabetes." ….. "So if there is a strong family history, that will be another issue that will tell us that we need to screen at a younger age."*

Clinician 104: *it's part of the demographic is that we collect all that information. We collect all the family history, social history, natal history, into the first basically when we have a new patient.*

Clinician 112: *"For pre-diabetes? It's pretty much the same. I mean, if I see that they're getting to those numbers, I don't wait until they get there. I put them on and I tell them well I do give him a chance because I just tell them, well you're getting pre-diabetes. We can do this."*

Quality improvement 107: *""Right now we're using the A1c and then every patient that comes in with our [inaudible] plan has to have an A1c."*

It is important to note that the clinician comments represent their respective fields (internal medicine, endocrinology, and pediatrics) and are not representative of other clinicians and practitioners in El Paso TX. Quality improvement representatives come from hospital systems in El Paso, TX, and do not represent all hospital systems in El Paso.

Standard 3: Diabetes Prevention and Delay *(See Appendix B: A grade: 3.2, B grade: 3.3, 3.8)*

Theme 1: Contrast between federally funded and non-federally funded private organizations

Theme 2: Patient and provider education is key

Theme 3: Diabetes education resources and cross sector collaboration is needed

Among the clinician, diabetes resource organization, worksite and school district representatives interviewed, there was a distinct contrast among the federally funded and non-federally funded organizations' awareness of the Diabetes Prevention Program (DPP). Federally funded organizations were aware and referred to the DPP, while those in non-federally funded and privately funded organizations were not aware of DPP. Federally funded organizations indicated that they encouraged their clients to use phone apps to monitor their eating and physical activity habits. Technology assisted diabetes prevention interventions were less likely to be considered as a tool for preventing diabetes. Worksites, however, reported using incentive programs via the website portal to promote employee wellbeing. Incentive programs for preventing diabetes included, health challenges, points for health behaviors, exercise and gym use incentives and worksite health screening health fairs and education programs. Although worksites provided such opportunities, they identified employee participation among those at more risk as the main challenge.

Clinician 104: *"Interviewer: Are you aware of the diabetes prevention program in the community?*

Respondent: No"

Clinician 111: "*I'm not aware of the programs here for diabetes prevention in [omitted city]."*

Clinician 112: "*Interviewer: Okay. And do you refer them out to - are you aware of the diabetes prevention program?*

Respondent: No."

Worksite Interview 115: *"So, we've incentivized the wellness program. In addition to that, employees if they join challenges - we do walking challenges, we do walking, getting your steps in type of challenges, or we've even*

done like lower your sugar intake. Because we know that sugar is the poison that leads to diabetes. So, we've done challenges where a full month you have no sugar, also incentivized. So, those are points based, not necessarily funding. But they are points based and at the end of the year they do end up with a points-based system. So, let's say I have a thousand points. I can use that towards merchandise that we offer."

Across all sectors, patient education (both formal and diabetes specific education) and provider education were identified as necessary for the prevention and delay of diabetes across the life span, however, two clinicians and worksite organizations did not identify Diabetes Self-management Education and Support (DSMES) programs as a resource for receiving such education. All sectors expressed that more community resources, communication, cooperation and cross sector collaborations were necessary to improve education to prevent and delay diabetes.

Resource organization 108: *"A lot of times, what we try to do is really educate the physicians. Also on that, is letting them know that if they have any patients with pre-diabetes to send them our way because we really put them through the same classes as someone who has diabetes because we think it's they – education is the key in that in prevention"*

Standard 4: Comprehensive Medical Evaluations and Assessment of Comorbidities

(See Appendix B: A grade 4.22, B grade: 4.1, 4.3, 4.20)

Theme 1: Contrast between federally funded and non-federally funded private organizations

Theme 2: Knowledge vs. Application

Theme 3: Time Challenges for Comprehensive Evaluations

Them3 4: Limited specialty care for comprehensive evaluations and referrals

According to the ADA a comprehensive medical evaluation should include assessments of biopsychosocial factors related to the progression of diabetes outcomes. Across both the Health System (i.e., clinician, health insurance organization) and Community sectors (i.e., diabetes resource organization, worksites, school districts), organizational representatives recognized the importance of comprehensive evaluations. A continued theme found was a difference in how federally funded vs. non-federally funded organizations approached comorbidity assessments. Federally funded organizations followed more standardized evaluation and assessment approaches, while, non-federally funded organizations relied on more subjective or base on need assessments (e.g. red flag indicators) of comorbid conditions, particularly related to mental health, medical evaluations or social/financial barriers.

Federally funded organization on mental health: ""Yes, again, because we are FQHC federal qualified health center and we have integrated services. And talking about integrated services is that all that are clients have received every single time that they come to go see their doctor they received this PHQ9? I don't remember the name of the tests that they received for depression or anxiety. PHQ9, I believe. But we had a couple of these specific tool that every single client, even though they come to wherever a thing. Maybe they come to see their doctor including maybe to come to family planning, they received this tool. And they answer this tool and always the provider have access to that and in order to integrate behavioral health to their services….if the doctors see that client needs behavioral health, he called the care manager and the care manager comes and start doing the treatment as well. But also if the client have diabetes, for example, they referred to the care coordination, we work holistically and we work in very, very close with the whole wellbeing of the person

Non-federally funded on referral on mental health: *"I mean, if you want a psychiatrist, good luck. I mean, honestly, some of them are - don't take insurance. Most of them are only cash pay. So that's a big one. We don't have psychiatrists. Psychologists also they cannot prescribe here in the state of Texas. Clinical psychologists. Okay. That's a big one. I sometimes refer my patients. I like psychologists better than a psychiatrist because they work on both ends. Not only prescribing a medication, but --….Yeah. So I usually prescribe them, and I have to send them to [omitted city] because the ones here do not - cannot prescribe."*

Private funded organization on mental health: "*Well, it's questioning to the patient. And sometimes it's as easy as entering the room and seeing how they do behave, just to know that they're very anxious. Or how they interact with you. They're normally the ones that will forward that information to you that they're very anxious. And then we provide treatment or we refer to someone to do that."*

Private funded organization on mental health: "Respondent: Anxiety is pretty much just patients will tell you the diagnosis itself. I mean, I can't go out from my house. I feel like I'm going to - something's bad going to happen. I have heart palpitations. I went to the ER the other day because I was having chest pain and they're like young or something and they're no -

Interviewer: So you're picking up on the symptoms.

Respondent: All red flags."

Clinicians in the private sector specifically expressed the challenge of assessing for mental health problems when there is limited specialist available for referral or limited health insurance coverage for these conditions. Federally funded organizations indicated that they were more likely to refer out to social services case managers and social workers community resources to address mental health or social and financial problems. It was more evident that federally funded organizations have a larger referral network for psychosocial issues than non-federally funded organizations, which at times appeared to create a more collaborative care team approach.

Health insurance organization representatives indicate that coverage for diabetes related screenings, diabetes related comorbid conditions, and mental health coverage are available for adults with diabetes. Clinicians, however, indicated that there is limited coverage on treatments that do not allow for comprehensive collaborative care.

One of the challenges mentioned for conducting a comprehensive evaluation is time constraints for extensive assessments. The conditions to be less likely to be systematically assessed are, tuberculosis, and cognitive dementia. While all sectors acknowledge a patient-centered approach is necessary, language used in the interviews indicate less of a strength-based communication approach.

Private funding organization: *"We do not usually screen. Like you mean screening for tuberculosis? I don't hardly because then, I mean, we see it a lot here in [omitted city] because we're close to Mexico. But I mean, unless they have symptoms and that's when I would screen for tuberculosis. And most of the times, most patients are sometimes exposed already. They're either had the vaccine in Mexico, so it's just about symptoms pretty much. They're coughing blood, weight loss, night sweats, and oh my God stay away - out the door."*

Both the Health Systems and Community sector representatives recognize the importance of comprehensive medical evaluations and comorbidity assessments for mental health, chronic conditions, tuberculosis, addictions and cognitive functioning, however express a system that does not facilitate the application of these evaluations and assessments in their organizations. Discussions with representatives revealed a "make due" approach for meeting this standard.

Standard 5: Diabetes lifestyle management via Diabetes Self-management Education and Support (DSMES)
(See Appendix B: A grade: 5.4, B grade: 5.1)

Theme 1: Patient and provider education is key

Theme 2: Contrast between federally funded and non-federally funded private organizations

Theme 3: DSME not utilized to full potential

Health System and Community sectors, clinician and large worksite organization (including school districts) representatives mainly indicated not utilizing local diabetes self-management education and support programs or other standardized diabetes self-management programs. One clinician indicated referring to Diabetes Self-Management and Education Support (DSMES) programs but also indicated this resource was not utilized to its full potential or used at a full scale. Clinicians primarily indicated that they conduct in house one-to-one education with patients and not family members while resource organizations indicate they provide both diabetes education in groups or one-to-one settings. Federally funded organizations were found to refer individuals to more educational community resources compared to non-federally funded organizations.

Private funded org: Interviewer. "So, do you use any self-management education program?

Respondent: *Not really. I mean we have printed data that we provide to the patient here in the office. And from certain companies they do provide also their other tools for the patient. Let's say if I prescribe a certain medication from a certain pharmaceutical company. They have some programs for teaching to the patient on how to use that insulin, for example. And in addition, do have the program of that only focuses on the insulin, but also on dietary training as well."*

Private funded org: "*I don't know how much that everyone knows there is a certification that a provider can get that makes you a certified diabetic educator in some form. So I don't think that there is a big connection with it unfortunately…. I really don't think so. I could be wrong but when I talk to the providers whether it's a nurse practitioner, an MD or PA, they will say 'oh yeah my diabetic patient this this and that' but I don't know if they know how much of a specialty you can be just from treating diabetes. So I think that is still sorely needed as well too. "*

Regarding the use of technology for diabetes lifestyle management, one diabetes resource organization indicated that they utilize a phone app to support their clients' diabetes management. One clinician indicated that the use of Continuing Glucose Monitoring technology devices are useful for his patients in better managing their diabetes.

Federally funded org: "*Apps that they ca, especially with their eating. We have one for diabetes type 1 that they help the parents count the arbs – that it's super unique, and the one I learned in a seminar that we went [omitted college], and it was awesome, because they can count the carbs. And you know what? We try to educate as much as we can whenever they presented any conference around the area. I have only [omitted organization], they're the ones that put together one [omitted program], and I like that one. This year was very unique because the person did a lot of technology for these members. So whenever it comes to nutrition, I think I have like three, go to look in the App Store."*

Private funded org: "*Well, the technology that became available are the CGMS data. And it is helpful because patients are able to scan the data from the sensor into their phones. And that information can be shared among a lot of other people. Especially on the younger population, and this is a very useful tool so the parents and the providers are able to follow what happened with these blood sugars at a distance"*

Based on the interviews, representatives reveal efforts and/or the importance to referring people with diabetes to lifestyle programs but lack of coordination across sectors to address the substantial number of people in El Paso with diabetes can be a challenge. Across all sectors, education was identified as an essential component of diabetes lifestyle management. Identified challenges and barriers to people with diabetes engaging in lifestyle modification programs/behaviors include; poverty, lack of formal education, food deserts, physical

environments that do not support health behaviors. It was also identified that children and families of children with diabetes are more likely not to have diabetes educational and management resources. Health System and Community sector representatives have also indicated cases where children and their families have experienced interactions with medical clinicians that are not patient-centered.

Federally funded org commenting On Private funded org: *"he was going to fire them from the practice. And I'm like wow – but that' an easy way to go. Well, the father came in and screamed to me, and tell me this, and tell me that - okay. So, how do you think the father feels having three children with diabetes type I? You tell me. And he was very upset at me asking him that - how dare you ask me that. How dare you want to fire those kids from your practice without referring to another endocrinologist? So I met with the parents, and I met with the kids, and I explained to them, because CPS was involved - CPS called me, the lady, and she's like, I couldn't find anything. These kids are well, they're taken care of very well - I don't get it."*

Standard 6: Obesity Management (See Appendix B: A grade: 8.2, B grade: 8.1)

Theme 1: **BMI is assessed at intake**

Theme 2: Subjective assessment of BMI used to inform care

Theme 3: Physical activity important for weight loss

Theme 4: Lack of structured *programs for people with diabetes*

Clinician and quality improvement representatives recognized obesity as a risk factor for diabetes; however, there was no indication that recommended or prescribed therapies are designed to maintain more than a 5% weight loss (Grade A). Both sectors identified that dietary and nutrition education are important for people with diabetes and that this should come from a nutritionist or registered dietician. Although, physical activity was also identified as important therapy or approach for weight loss, representatives indicated more structured physical activity programs were needed in El Paso TX. Much of the education on physical activity was shown to occur between clinicians and patients.

Clinician 3: "*So I always encourage all my patients to walk at least 25 minutes a day, a brisk walk. And I tell them, I mean,it's not going to take much of your time. It will relax you. You'll enjoy it,you'll thank me later. So I always encourage that. Diet obviously is the other one and some of them I do encourage to join the gym"*

Quality Improvement 2: *"I've still seen that a lot of providers are still putting the morbid obesity, and they're not looking at the specific BMIs and classifying the subtypes, unfortunately. And at least for me, I feel it's a very old term, morbid obesity. And that it's actually obesity Class 1, depending on the BMI. And unfortunately, I don't see a lot of that being documented that way…* So, actually they're looking at our B*MI, because we do do that. But they just see a BMI that's going to be in the obesity range and they say it's morbid obesity encompassing……. And I don't agree with that. And so, when I see that, the first thing is I look at their BMI and then I look back and I change the diagnosis to exactly where they are in the BMI range and what class. Because that's where we're at now. …..I've actually seen that diagnosis and when I go in to see the patient, I look at the patient and I'm thinking I don't ... from my eye I'm thinking, no, that's not obesity. And then I look at their BMI and it doesn't reflect that either. So, unfortunately, it's very subjective."*

Both clinician and quality improvement representative reported documenting patient Body Mass Index (BMI) at each patient encounter. Discussions regarding weight, however, revealed that subjective assessments of weight informed how clinicians' approached diabetes care and treatment. There was a consensus that addressing obesity is a challenging and difficulty topic to tackle both because of the stigma associated with the condition, physical disability, and because of the lack of physical activity resources designed for people with diabetes.

Clinician: *Yes, the weight loss is introduced, since there is a stigma about the weight loss and the diet related to the weight loss,we introduce it as diet modification that will intervene in the diabetes, that will have a positive effect on their weight.*

Clinician 3: "*I don't know. I mean, I guess they're - some of them have tried in the past and they are not successful. So failure, I think it's probably the major one. But the other one is everything hurts. They're older. My knees, back. I cannot exercise because I have osteoarthritis. I have both knee replacement. My back has had five surgeries. I mean it's like - so I think in my case that's the one --….Physical disabilities, osteoarthritis. What to me it's self-explanatory. You can't move. Everything hurts. There's no way you're going to do exercise."*

Standard 7: Diabetes in Older Adults *(See Appendix B: B grade: 12.3)*

Theme 1: Contrast between federally funded and non-federally fund

Theme 2: Intergenerational living as a challenge/barrier

Clinician, diabetes resource organization, and health insurance organization representatives indicate that systematic screening for early detection of mild cognitive impartment or dementia and depression among people with diabetes aged 65 and over is partially met. Federally funded organizations reported specific care coordination for older adults with diabetes. While health insurance representatives stated that coverage for health assessment for older adults is available, screening for conditions specific to older adults was not fully met.

Federally funded org: *"Well, again is older adults we do the care coordination. We do obviously the primary care services with the doctors. The doctors do the - they have the intervention work with diabetes and they refer to the care coordinators and we work with them directly one-to-one."*

Clinician: *"If there is a thought about the possibility of dementia, yeah, there are some screening tests that can be done. I don't do it myself. I tend to refer to the specialist."*

Private Health Insurer: "*Interviewer: And what about cognitive evaluations for dementia for your older patients?*

Respondent: *Yes, we do. We're going to start - okay, remember that [omitted insurance], it's starting in January 2020 with the Medicare populations, okay? And that's one of the - any patient that is, I think, it's 80 - don't quote me on that, I think it's 80 and over, and have a diagnosis of diabetes, a diagnosis of dementia or Alzheimer's, or any other chronic conditions will qualify for a program.*

So this new Medicare population, we're going to focus a lot on behavioral and diabetes, which is awesome."

Representatives that work closely with the older population commented that the main challenge for working with this population are set behaviors, attitudes, cultural beliefs and practices about diabetes. Representatives discussed how it is more difficult to engage this population in behavior change. Although, more difficult, it was noted that behavior change is possible by using case managers, community health workers or family members to work closely with this population. Representatives also indicated that time and a patient-centered approach can engage this population in health behaviors. This was discussed as a hand holding approach with this population. It was also noted that one of the challenges working with this population is the intergenerational family relationships. Often times, older adults with diabetes are living with their children and grandchildren and rely on their children as navigators for their disease (e.g. drive them to doctor's appointments assist with translation). If the family is not fully available or supportive of their care, this can become a barrier for their medical care. In addition, the role of matriarchy and influence of ancestors in shaping culture and norms were highlighted.

Federal funded org: *"There is a lot of matriarchy. A lot of, a lot of- more matriarchy than patriarchy, here in [omitted city] it's different - it's very interesting, I love this. I mean, I'm like, okay - so that's when I have to do like my phone calls, and I'm calling, "what happened ma'am why couldn't you go?" "Ay, it's because my mom..." "Let's see, what is happening with your mom, let's see, talk to me." Maybe she's not part of [omitted org] plan, but I do research, and I tell my co-workers, hey - research. If you're finding out that this lady is having issues taking, for instance, to the appointment because the grandma is sick, I mean, find out what's going on, and see what is available within the community so we can knock down that barrier."*

"The older population is the type of population that I deal the most - I think that becomes, again, from our roots, from our family from our ancestors, okay, because they do not believe in medication because they do not believe in doctors. Kids, their kids, their next generation, think the same. They're learning from their parents. And because we are this borderland community, we still have those type of issues when you go to the houses, when you call them."

Standard 8: Diabetes in Children/Adolescents (See Appendix B: A grade: 13.5, B grade: 13.1, 13.12, 13.13, 13.16)

Theme 1: Support for children with diabetes is lacking

Theme 2: Better coordination/communication between schools and clinicians is needed

Across the clinician, diabetes resource organization, health insurance and school district representatives, the pediatrician, one health insurance plan, and school districts provided specific information regarding children with diabetes. Preconception counseling among girls of childbearing age (Grade A) with diabetes was not reported. Assessment of children's social adjustment and distress was not being assessed or reported. Likewise,

the assessment of eating disorders was not reported. School representatives elaborated on how they conduct health screenings during registration to assess for risks and how they use the findings to engage parents in conversations.

We—at the beginning of the year—we do—when they do an online registration, they do a health questionnaire—the parents. The nurses review it, and then they find out who are students that are—that have diabetes, or any children—some of the parents will write when they are pre-diabetic. And then the nurse will call them, or bring them in physically, to find out, exactly. We get orders from them, and who are they seeing—so we follow-up to make sure that we know all the information on that particular student. When we do our screenings, we do—acanthosis screenings, and even though they are just mandated for first, third, fifth, seventh by the state, we do—if you see a student—all of our nurses—if we see a student that's, say, they're in for scoliosis-screening, or they're in for because they're sick with a cold—if we notice that they have the acanthosis on them, we'll go ahead and screen them, write them up, and send a referral home."

Clinician Interview 111: *"Okay. That's usually referring to the younger patient. But again, we need their support. It's not up to the provider only to just to deal with the disease. We need the help of the team of educators and dietitians, certainly."*

Another respondent described how the state legislative mandated program called the Texas Risk Assessment for Type 2 Diabetes. It is while the child is taking the vision/ hearing and scoliosis screening. Only 1st, 3rd, 5th, & 7th graders are mandated to be screened but is done in both public and private school. They are screening the kids for acanthosis nigricans.

School District 109: *"You can look that up with the acanthosis. In the heart of the matter, we're screening the kids when we do our other mandatory screenings, hearing, and vision and really identifying those kiddos that we think have an issue. We're going to do a height and weight. We're going to do a BMI on them. We're actually doing twice; bring them back in and do it a couple weeks later. The referral goes out to the parents straight away, though. Saying, "We saw some markings. This is indicative of but not necessarily diabetes because it's hyperinsulinemia," so we let parents know. They get upset. You know what I mean? If we don't phrase that quite correctly. We are checking those indicators and we're normally noticing that those kids' BMIs are high. They already have some blood pressure issues. That kind of thing. So, it's a good opportunity for them to identify with the parents. We ask parents come in and talk to us. Start with their endocrinologist. Maybe working with our pediatrician what we can do help them."*

Health insurance and school district representatives expressed the need for a better assessment of the number of children in El Paso with diabetes. They felt that this would help them target more resources to these families. While schools conduct screenings and referred children with risk indicators of diabetes, these were sometimes not followed up with a diagnosis from the provider. School district representatives mainly stated that better communication with doctors was important to properly serve children with diabetes. Health insurance and

school district representatives were eager for community wide collaborations or the establishment of coalitions to address the substantive need in El Paso. Many of the schools are in low income and food desert areas thus access to healthy foods continue to be a challenge. School representatives reiterated the importance of working with parents and caregivers to ensure that children living with diabetes receive the support services and medical care they need.

Quote:

The majority of time when the kids get diagnosed with diabetes type I, parents have the stigma that it is their fault, okay? So I have to go over a little bit more emotional and behavior modification, modifying their behavior, their thinking and say hey, it's not your fault. This is something that they're born with it, and it's not because you drink, you didn't drink, you eat, you didn't eat. I had a parent one time that told me, why did this happen to me, [omitted name]? We are vegetarian, and I am very consistent on the type of food intake my daughter has - she was four years old. I do not understand why she had diabetes type I. So she started crying, you know, and it's very, very sad, and I have to go tweak everything around and lower down my level and say hey - it's not your fault. So we do a lot of motivational interviewing with these parents, and a majority of the parents, I can tell you 95 percent of the interviews that I have done, that in the assessment you have to lower down yourself and be one-to-one - like I'm your friend, I am your neighbor that understands you, and this is what, you know, show them a lot of coping mechanisms, okay, and it's very tense. So this is how, with our intervention comes within the house within the home visit.

We do have a social needs assessment within the appointment, and as you talk to these parents, and you build up rapport, these parents start disclosing to you more and more and more, and that's when you have to be very selective on how to help. I have an own thing that I say - you have to teach how to get the fish, not give them the fish all the time, you know? Because in the type of community that we live, we tend to feel that oh, I need to have, I need to have. So I instruct this family, this is what you have to do, okay? Now your son is diagnosed with diabetes type I - what are the items that you need? What do you need? You need an insulin pump, you need to have a glucometer, in case his sugars go very low. You need to learn how to use a glucometer - you need to follow your doctor's instructions."

School District Interview 109: *"We have some physicians we refer to. Unfortunately, they tell them, "Wash your neck," or – so all we can do is get the information out there and hope that our local pediatricians are also working with us on that. So, normally, we'll send the referral home. There is a section for the provider to fill out. Sometimes, they'll bring that back to us. Not always, but sometimes we'll say, "Okay. We're going to monitor BMI. Put student on calorie diet. Whatever information they might fill out at the bottom. Sometimes, they're telling them to inform the patient to wash neck. Some of that kind of situation."*

School District 109: Respondent: Yes, yes. I think if we had some clinics or we had some mobile units, or we had – especially in our [omitted high school name] area; [omitted high school name] – I think it could make a bit impact.

00:35:51 I mean, we even toured one time the area and there's hardly any grocery stores down in [omitted area of city] like with fresh fruit, vegetable. So, I mean, I do think that's a whole paradigm shift but they're not going

to buy it if it's not there or it's too expensive. It's cost prohibitive. So, I do think some of that has to start just grassroot efforts in those neighborhoods.

Health System and Community sector Suggested Recommendations to meet Standards

In addition to questions specific to the ADA standards of diabetes medical care, we asked Health System and Community Sector representatives to provide suggestions on how to improve diabetes care and outcomes in El Paso County. The following are suggestions provided by the sector representatives.

Objective 2: Identify community/culture-centered strategies for the County of El Paso to best reach the recommended standards of care. Suggestion and strategies on hypothetical if unlimited resources/Meeting standards of care/Additional suggestions

MEDICAL PROVIDERS (PRIMARY/INTERNAL MEDICINE)

- Increase specialty care, mental health providers, and dieticians
- Diabetes health care team are limited and there is lack of proper reimbursement
- Issue with insurance providers not allowing for more expensive drugs to be used for treatment. Medications like GLP-1s offer added benefits such as weight loss and decreased cardiovascular mortality, but insurance will not cover because of the cost
- Additional resources, possible gyms that focus on health care

QUALITY IMPROVEMENT HEALTH SYSTEMS

- Having a one stop shop, one location where each aspect of diabetes can be taken care of
- Rural areas around El Paso county need additional resources and they should come from organizations that provide on those services. The organizations should expand on the work that they already do
- Expansion of support groups
- Advocacy for people with diabetes needs to be done in order to get the funding that is here in El Paso
- Learning more about the El Paso community and tailor education specific to the individual with diabetes

DIABETES RESOURCE ORGANIZATION REPRESENTATIVE

- Additional access to different resources that are available
- A complete collaboration and holistic approach to addressing diabetes care
- Additional Diabetes Resource Organizations getting addition certifications
- There is a disconnect with all sectors dealing with the community and everyone is addressing diabetes care in a disconnected approach
- Expanding upon resources that already exist, such as cooking classes
- Incorporating more mental health support and expanding those services to young adults with type 1 diabetes

HEALTH INSURANCE REPRESENTATIVE

- More interaction with the community and find out what the need is
- Additional resources and staff are needed
- Building of a coalition that includes insurance providers, schools, and senior citizen centers

- Hold a conference so that children can learn to defend themselves when being bullied. Speakers could consist of Sheriff's department and stakeholders

WORKSITES

- Additional programs to assist people with diabetes
- Improve physical environment to support health for people with diabetes by adding more parks and walking paths
- Additional funding for FQHCs at the local level for them to expand services for low-income individuals
- Start a grassroots effort for nutrition education in schools
- Improve communications strategies to change the thinking of self-care as an individual act
- Improve better reporting of diabetes and include empirical data

SCHOOL DISTRICTS

- Increase community resources to also include increase number of physicians in the El Paso community
- Increase services to rural areas of the county
- Start a campaign to raise awareness of the prevalence of diabetes within the community
- Break stigma of going to the doctor

References

1. American Diabetes Association Standards of Medical Care in Diabetes – 2019. Diabetes Care 2019, 42(S1).
2. American Diabetes Association (2019). Improving care and promoting health in populations: Standards of Medical Care in Diabetes – 2019; 42(Supplement 1): S7-S12. https://doi.org/10.2337/dc18-S001
3. American Diabetes Association (2017). Promoting health and reducing disparities in population. *Diabetes Care*; 40(Supplement 1):S6-S10. https://doi.org/10.2337/dc17-S004
4. Dutta MJ, Communicating about culture and health: theorizing culture-centered and cultural sensitivity approaches. *Commun Theory* 2006;17:304–28. doi:10.1111/j.1468-2885.2007.00297.x
5. Stellefson M., Dipnarine K., Stopka C. (2013). The Chronic Care Model and diabetes management in US primary care settings: A systematic review. Prev Chronic Dis; 10:120180 DOI:http://dx.doi.org/10.5888/pcd10.120180

Appendix B: Literature Review

Contents

Intervention Opportunities Across the Diabetes Continuum: Review of the Literature

Objectives

In 2019, Paso del Norte Health Foundation (hereby referred to as the Foundation), partnered with Health Resources in Action (HRiA) and the University of Texas at El Paso (UTEP) to conduct an assessment of diabetes services in El Paso to identify challenges, service gaps, and potential opportunities to increase screening for and manage diabetes (including prediabetes, Type 1, Type 2, and gestational diabetes) for persons residing in El Paso. This multi-phase process will result in the development of an action plan that will be presented to the El Paso Diabetes Leadership Council in the Spring of 2020 to support efforts in developing a set of strategies for improving the continuum of care for diabetes in the region. As a first step in the process, Health Resources in Action conducted a review of the available peer-reviewed literature and one Congressional report to better understand three key topics:

1. The landscape of current evidence-based interventions and recommendations to screen for and diagnose type 2 diabetes, prevent type 2 diabetes, and manage type 2 diabetes;
2. Responses to and coping with type 1 diabetes diagnoses for young children and health care seeking practices for caregivers of young children with type 1 diabetes; and
3. Experiences with and interventions focused on gestational diabetes.

When possible, this literature review highlights research that includes Hispanic/Latino populations and/or focuses on the US border region. Each topic closes with a summary of recommendations that emerged from this review.

Topic 1.1: Pre-Diabetes and Type 2 Diabetes Screening and Diagnosis

The American Diabetes Association (ADA), US Preventive Services Task Force, and Medicare Part B each identify several health status and sociodemographic risk factors that guide diabetes screening practices. The ADA recommends screening overweight or obese adults with at least one risk factor for pre-diabetes and type 2 diabetes for persons >45 years of age every three years (Martinez et al., 2019). By comparison, the US Preventive Services Task Force recommends screening overweight or obese adults 40-70 years of age and screening at earlier ages or lower body mass index (BMI) for individuals with family history of diabetes or personal history of gestational diabetes, as well as members of high-risk racial/ethnic groups (Martinez et al., 2019). Finally, Medicare Part B eligibility criteria for type 2 diabetes screening include the following risk factors: hypertension, dyslipidemia, BMI $\geq$30, or previous identification of an elevated impaired fasting glucose or glucose tolerance (Koller et al., 2013). Medicare Part B also permits diabetes screening for recipients with two or

more of the following: BMI >25 but <30; family history of diabetes; aged 65+ years, or history of gestational diabetes or delivery of a baby weighing >9 lbs (Koller et al. 2013).

In terms of screening tests, the ADA recommends screening that involves fasting glucose and/or 2-hour glucose tests. The American Association of Clinical Endocrinologists (AACE) recommends that a diagnosis of pre-diabetes be confirmed on a different day with a repeat test and confirmation of a diagnosis of pre-diabetes with a test of fasting plasma glucose levels (Martinez et al., 2019). The oral glucose tolerance test was characterized as a simple screening methodology used to screen participants into the Diabetes Prevention Project (Ockene et al., 2012). Barry and colleagues (2017) examined the efficacy of pre-diabetes tests and found that HbA1c was not sensitive or specific for detecting pre-diabetes, whereas fasting glucose was specific, but not sensitive.

In a recent assessment of diabetes screening practices following the 2010 ADA diabetes screening guidelines, Evron and colleagues (2019) found that 78% of age-eligible patients were screened for diabetes in a three-year period; the majority of tests conducted were glucose tests (86%). While HbA1c tests were performed less frequently (14%), they were more common among high risk patients (e.g., overweight or obese individuals with hypertension, dyslipidemia, and/or hypoglycemia).

Hafez and colleagues (2017a) conducted chart-stimulated recall interviews with primary care providers (PCPs) in an academic health system to better understand factors that influenced diabetes screening practices and provider communication of findings with patients. When asked about reasons for not screening for type 2 diabetes, PCPs cited a previously normal screening test (49%) and a visit for a non-health maintenance examination (48%). The most common reasons PCPs provided for screening patients for type 2 diabetes were knowledge of a previously abnormal screening test (49%), patients' weight (42%), and patients' age (38%). PCPs reported 95% of test results to patients. When patients were found to have pre-diabetes, in 58% of cases PCPs recommended weight loss and increased physical activity, while they did not recommend participation in a Diabetes Prevention Program or metformin.

As part of a Centers for Medicare and Medicaid Innovation demonstration project, the American Medical Association worked with the YMCA of the USA to evaluate a quality improvement strategy to increase screening, testing, and referral of Medicare patients with pre-diabetes to Diabetes Prevention Programs (DPPs) at local YMCAs (Holliday et al., 2019). Use of the modified version of the American Medical Association's Clinician Diabetes Prevention Toolkit for Identifying Patients with Prediabetes, coupled with systems changes (e.g., workflow changes and process maps to identify and refer patients to YMCA Diabetes Prevention Programs; training; technical assistance; standardized referral forms) were associated with increased screening and

referrals to Diabetes Prevention Programs for Medicare patients with pre-diabetes (Holliday et al., 2019). Holliday and colleagues (2019) found that the highest referrals for the Diabetes Prevention Program were among practices that created a pre-diabetes register using their electronic medical records.

Limitations of and Considerations Regarding Literature Reviewed

There are several limitations of the screening and diagnosis literature reviewed above. First, pre-diabetes and type 2 diabetes screening is not framed as a public health intervention. Second, diabetes screening and diagnosis recommendations largely focus on older age and history of health-related risk factors for diabetes, with limited attention to differential risk of diabetes by subgroup (e.g., race/ethnicity, socioeconomic status). Third, assessments of pre-diabetes and type 2 diabetes varied across studies.

Recommendations

Several studies recommended screening high-risk individuals for pre-diabetes and type 2 diabetes (Crawford 2017; Martinez et al., 2019). The literature review elicited mixed recommendations regarding type 2 diabetes assessments, with some studies recommending an initial screening with fasting or random glucose tests and confirmation with HbA1c (Evron et al., 2019, Martinez et al., 2019), while Meyerowitz and colleagues (2019) recommend HbA1c testing in hospital and general practice settings.

Best practices for screening patients for pre-diabetes and type 2 diabetes identified in this review include: locating diabetes screening services in areas with a high prevalence of diabetes (Wright et al., 2019); creating a pre-diabetes registry based on electronic medical records to identify cases eligible for screening that may be missed during medical visits (Holliday et al., 2019); and framing screening and referral for diabetes as a quality improvement strategy (rather than a requirement) to gain buy-in from the health care team (Holliday et al., 2019).

Topic 1.2: Interventions to Prevent Type 2 Diabetes

Currently, public health approaches to diabetes prevention are focused on lifestyle and weight loss interventions. The Diabetes Prevention Program (DPP) was the most common diabetes prevention intervention identified in this literature review, with a strong evidence base that includes several randomized controlled trials, systematic reviews, and studies of the translation of the DPP to community-based settings. The DPP is a structured lifestyle intervention designed to improve nutrition, physical activity, and behavior change strategies related to diabetes prevention.

In a systematic review and meta-analysis, Sumamo and colleagues (2013) identified seven lifestyle interventions that demonstrated a decrease in the risk of diabetes up to 10 years after the intervention – the

longest assessment of long-term outcomes identified in this review. In a comparative effectiveness study of lifestyle interventions relative to metformin treatment for participants at risk of diabetes, O'Brien and colleagues (2015) found that for both intervention arms participants with a college education experienced a greater reduction in risk of diabetes incidence than participants with lower educational attainment.

Adaptations to the Diabetes Prevention Program include translating the individual-based design to group-based sessions implemented in community settings (e.g., parks, recreation centers, African American churches) (Katula et al., 2011; Katula et al., 2013; Kramer et al., 2009; Boltri et al., 2011; Ockene et al., 2012), culturally tailoring the DPP intervention (Boltri et al., 2011; Ockene et al., 2012); creating a literacy-sensitive DPP curriculum (Ockene et al., 2012); facilitation of the DPP intervention by community health workers (Katula et al., 2011 and Katula et al., 2013); and collaborating with multiple community partners (Ockene et al., 2012).

Participation in the DPP was associated with significant decreases in blood glucose (Katula et al., 2011; Boltri et al., 2011), insulin (Katula et al., 2011; Katula et al., 2013; Ockene et al., 2012), weight (Kramer et al., 2009; Dunkley et al., 2014; Katula et al., 2011; Katula et al., 2013; Ockene et al., 2012), waist circumference (Kramer et al., 2009; Katula et al., 2011; Katula et al., 2013), body mass index (Kramer et al., 2009; Katula et al., 2011; Katula et al., 2013), total cholesterol (Kramer et al., 2009), non-HDL cholesterol (Kramer et al., 2009), systolic blood pressure (Kramer et al., 2009), and diastolic blood pressure (Kramer et al., 2009).

Cross-Sector Collaborations for Diabetes Prevention and Management

Cross-sector collaborations to support community members with or at risk of diabetes generally provide chronic disease support in community settings, often with a focus on vulnerable populations. Cross-sector collaborations may involve collaborations with the health care sector and/or public-private partnerships. Tung et al. (2018) conducted a qualitative assessment to identify factors that motivate stakeholders (e.g., business, community development, faith-based) to engage in a cross-sector diabetes collaboration with an academic medical center, with a focus on in a low-income residents in Chicago, IL. A key motivating factor that emerged across stakeholders was that collaboration provided an opportunity to promote community health among vulnerable populations. Additionally, stakeholders described collaboration as facilitating financial support, brand enhancement, access to specialized skills or knowledge, professional networking, and the involvement of health care systems in community-based activities. The following sections describe community-based diabetes prevention and management interventions identified in this review.

Food Pantry and Food Bank Diabetes Prevention and Management Interventions

Food insecurity, or insecure and/or inconsistent access to nutritious food disparately affects low-income individuals and households, who often turn to food pantries or food banks to meet their dietary needs. One systematic review by Long et al., (2019) identified six food pantry or food bank interventions that examined implications of health interventions in food pantry or food bank settings for the prevention or management of chronic diseases, including type 2 diabetes, overweight/obesity, cancer, and HIV. Four of the six studies delivered health education (e.g., nutrition, physical activity, diabetes self-management), along with providing healthy foods (e.g., fruits, vegetables, lean meats, whole grains). Across all six studies, the majority of participants were women, and the mean age ranged from 45.9 ears to 56.6 years. Two of the identified studies involved predominantly Latina/o clients, and three out of six studies focused explicitly on diabetes, while for another study the inclusion criteria pertained to the prevalence of overweight/obesity. Information regarding food pantries and food banks was limited in the articles reviewed. Only one of the three studies focusing on type 2 diabetes demonstrated a statistically significant improvement in glycemic control. Results were mixed when examining intervention effects on BMI and waist circumference.

Seligman et al. (2018; reviewed in the Long et al., 2019 systematic review) conducted a randomized control trial at food pantries affiliated with food banks in Oakland, CA; Detroit, MI; and Houston, TX. Clients with Hba1c $\geq$7.5% were randomized to a waitlist control or 6-month intervention that involved access to healthy food, diabetes education, health care referrals, and glucose monitoring. At six months, Seligman et al. (2018) reported significant improvements in food security, food stability, fruit and vegetable intake, while the authors found no difference in diabetes self-management, diabetes distress, depressive symptoms, or HbA1c.

School-Based Diabetes Prevention Interventions

Based on this review, school-based interventions to prevent diabetes included diabetes screening practices and multi-level, multi-component school-based interventions. One diabetes screening study by Cottrell et al., (2013) described training personnel to screen middle school children in Appalachia for pre-diabetes using acanthosis nigricans marker, as indicated by a pigmented rash on the child's neck or axilla. The authors complemented diabetes and cardiovascular screening activities with referrals for consultation with a provider, student education regarding cardiovascular and diabetes risk, and policy changes to enhance diabetes and cardiovascular screening of students (Cottrell et al., 2013). In a separate study, a natural experiment in California examined the association of optional parental notification of mandated school-based BMI screening results with

changes in student BMI from fifth grade to seventh grade (Madsen, 2011). Findings indicated no change in BMI for students from fifth to seventh grade, nor variation in this association by race/ethnicity (Madsen, 2011).

In terms of multi-level school-based diabetes prevention interventions, the Bienestar school-based intervention focused on diabetes prevention for low-income fourth-grade Mexican American students in San Antonio, TX (Treviño et al., 2004). The 32-session multi-component intervention included a health class, physical education curriculum, family program, school cafeteria program, and afterschool health club (Treviño et al., 2004). Relative to students in the control schools, students at schools who received the Bienestar intervention demonstrated improvements in fasting capillary glucose levels, fitness scores, and dietary fiber intake. However, there was no difference in percent body fat and dietary saturated fat intake among students in intervention vs. control schools (Treviño et al., 2004).

Additionally, the NEEMA school-based diabetes prevention intervention is a 14-week intervention that was adapted from Bienestar and focused on reducing diabetes risk for African-American children in San Antonio, TX (Shaw-Perry et al., 2007). The NEEMA intervention included student health education in classroom settings, after school programs that included physical activity, home-based engagement through Family Fun Fairs, and a food service programs delivered in the cafeteria. Evaluation of the NEEMA intervention indicated improvements in student fitness laps, fasting capillary glucose, and percent body fat (Shaw-Perry et al., 2007).

A more recent study of a multi-component school-based diabetes prevention interventions focused on middle school students of racial/ethnic and socioeconomic backgrounds most vulnerable to obesity and diabetes (Foster et al., 2010). The intervention focused on nutrition, physical activity, behavioral knowledge and skills, and communications and social marketing (Foster et al., 2010). Relative to control schools, students at schools that received the intervention demonstrated improvements in BMI, waist circumference, fasting insulin levels, and prevalence of obesity (Foster et al., 2010).

Worksite Wellness Interventions for Diabetes Prevention and Management

Systematic reviews and single empirical articles regarding worksite interventions indicated a strong focus on implementing the Diabetes Prevention Program in workplace settings, while some studies focused on worksite wellness programs more broadly. A RAND review of worksite wellness programs among employers with ≥50 employees found that 56% of employers with wellness programs focused on diabetes (Mattke et al., 2013a). Another RAND review of employers with ≥200 employees found that 92% of employers reported having a wellness program that was not restricted to diabetes (Mattke et al., 2013b). Among wellness programs, exercise (63% of employers), smoking (60% of employers), and weight loss (53%) were the primary areas of focus

(Mattke et al., 2013b). However, estimates indicated that less than 20% of employees participated in wellness interventions offered at workplaces (Mattke et al., 2013b). It was unclear from this review whether wellness interventions focused on the broader workforce, or employees at particular risk of cardiometabolic conditions such as diabetes. Another systematic review of worksite interventions by Shrestha and colleagues (2017) found that worksite wellness interventions were associated with significant improvements in HbA1c and fasting glucose, with greater intervention effects seen for women relative to men and for individual-level interventions relative to environmental interventions. This latter finding may be in part influenced by the time span of the intervention assessment.

In a review of workplace diabetes prevention interventions, Hafez et al., (2017b) report that the Diabetes Prevention Program was the most common and more intensive workplace intervention identified in their review and demonstrated greater weight loss among participants than less intensive worksite interventions. Brown and colleagues (2018) reported common elements of worksite Diabetes Prevention Programs, including: group sessions (<20 employees) focused on healthy eating, physical activity, and/or monitoring and managing diabetes and cardiovascular and 1-hour sessions offered during lunch or other times during the workday for 12-24 weeks. By comparison, single empirical studies evaluating the effectiveness of the Diabetes Prevention Program when implemented at worksites (e.g., County offices, Union Pacific Railroad, manufacturing plant) demonstrated that intervention participation is associated with weight loss, declines in body mass index, increased physical activity, and reduced dietary fat intake (Barham et al., 2011; DeJoy et al., 2013; Giese and Cook, 2014).

Faith-Based Interventions to Screen for Diabetes and Deliver Health Education and Referrals

Interventions in faith-based settings offer another promising opportunity to screen community members for diabetes and to deliver diabetes prevention and management interventions. Kelly (1998) examined the effectiveness of faith-based organizations as a community setting to deliver a combined diabetes screening and health education intervention in a large city along the Texas Mexico border. Church-based screenings were most likely to identify high blood sugar in older Latinas/os living within one mile of the Roman Catholic churches that participated in the intervention. Individual health education was offered to all participants and participants with high blood glucose levels identified during screening were encouraged to speak with health educators on site and received referrals to physicians and local Diabetes Association classes. As with other studies, the majority of participants identified as Latina/o and women. Fully 95% of participants characterized places of worship as appropriate for health screening and health education, citing as facilitating factors the population (low income, older), convenience, and a strengthened sense of connection with the church. The challenges to

church-based interventions identified by participants included participants seeking the church as a refuge from their worries and preference for health care settings to address health concerns.

Baig et al. (2014) conducted focus group discussions with mostly Mexican American adults who identified as Catholic to understand how diabetes self-management interventions can leverage faith-based organizations as community assets to reach Latinas/os with diabetes. Participants expressed interest in church-based interventions for diabetes management and stressed the importance of programs that emphasized information sharing, skills building, and social networking.

Limitations of and Considerations Regarding Literature Reviewed

Notably, the Diabetes Prevention Program was the most common diabetes prevention intervention identified in this literature review. While the original DPP program was individually focused and oriented towards health care settings, recent DPP interventions have focused on the translation of the DPP to community-based settings, delivering the intervention in group-based formats, and tailoring the DPP intervention to racial/ethnic minority communities. Strong national support (e.g., NIH, CDC) for the Diabetes Prevention Program may contribute to the strength of the evidence base for this intervention. While the DPP programs identified focused on middle-aged adults, an important gap in this literature review pertains to diabetes prevention initiatives focused on children, youth, and younger adults.

Recommendations

Recommendations regarding diabetes prevention interventions that emerged from this literature review include: implementing intensive, comprehensive lifestyle interventions for high-risk populations (Sumano et al., 2013; Kramer et al., 2009; Albright & Gregg 2013); translating the DPP model to community-based settings (Katula et al., 2011; Katula et al., 2013; Boltri et al., 2011; Ockene et al., 2012); delivering the DPP intervention in a primarily group-based format (Ockene et al., 2012); ensuring that community health workers lead diabetes prevention interventions (Katula et al., 2011; Katula et al., 2013); culturally tailoring interventions (Ockene et al., 2012); tailoring interventions to participants' educational attainment and literacy levels to ensure robust intervention effects across socioeconomic statuses (O'Brien et al., 2015, Ockene et al., 2012); and collaborating with multiple community partners (Ockene et al., 2012).

Topic 1.3: Type 2 Diabetes Management Interventions

Diabetes management interventions identified in this literature review were largely individual-level interventions and mostly focused on interventions based at or in collaboration with health care systems. The following section describes four type 2 diabetes management interventions: (1) integrating psychosocial care

into diabetes care; (2) Chronic Care Management; (3) other health care systems interventions; and (4) Lifestyle-Based Diabetes Education and Self-Management Interventions.

Integrating Psychosocial Care into Type 2 Diabetes Care

The American Diabetes Association emphasizes the importance of integrating psychosocial assessments and care into primary care visits for persons with type 2 diabetes (Young-Hyman et al., 2016). Recommendations include:

- Integrating psychosocial assessments and intervention into each phase of primary care delivery (e.g., initial assessment, annual visits, major life changes);
- Using validated tools to assess diabetes-related distress, depression, anxiety, disordered eating, and other stressors;
- Addressing identified psychosocial issues by making referrals to interventions or behavioral health care providers;
- Providing training regarding diabetes self-care during the initial patient visit and on an annual basis;
- Tailoring treatment plans to patient social support and self-efficacy for diabetes management;
- Referring patients to blood glucose awareness training; and
- Monitoring patients for diabetes-related distress, particularly when treatment targets are not met.

Chronic Care Management

The Chronic Care Management (CCM) model was the type 2 diabetes management intervention approach with the strongest evidence base, as indicated by several systematic reviews and meta-analyses of randomized controlled trials assessing outcomes associated with implementation of CCM models. CCM models refer to team-based diabetes care that is: integrated into primary care settings and designed to reduce barriers to care; provides diabetes self-management support; addresses health care delivery system design (e.g., coordinating care processes); and leverages clinical information systems to track progress on diabetes-related outcomes (Stellefson et al., 2013). The literature regarding CCM models often focused on middle-aged and older adults. Some, though not all CCM models identified in this review include clinic-community partnerships.

One meta-analysis found that interventions that include more than two CCM model components demonstrate modest improvements in glycemic control (Elissen et al., 2013). In a descriptive synthesis of the literature, Stellefson and colleagues (2013) report the following results of each CCM component:

- Organization of the health care system to support the implementation of a CCM model: Associated with improved quality of diabetes care, rates of eye exams, HbA1c, blood pressure, cholesterol, and weight.

- Diabetes self-management support: Associated with improvements in physical activity, and slight improvements in HbA1c, blood pressure, cholesterol, and connections with case managers.
- Decision support to primary care providers for diabetes care: In some cases, associated with improved diabetes knowledge, HbA1c, and HDL.
- Specialized decision support services for primary care providers delivering diabetes care (e.g., problem-based learning meetings, telephone and email support, telemedicine): Associated with improved communication between diabetes educators, primary care providers, and patients; HbA1c; medication management and adjustment processes; and stronger support networks.
- Clinical information systems: Linked with improved tracking of patient health outcomes and provider responses to clinical data (e.g., medication adjustment).
- Incorporate community resources and policies: Linked with provider training in CCM models for diabetes management, greater access to funding, and administrative support for CCM implementation.

Recommendations. The American Diabetes Association recommends incorporating CCM models into health care settings, aligning treatment plans with CCM models, implementing decision-support tools, and ensuring community involvement in model implementation (American Diabetes Association, 2017). In a systematic review, Stellefson et al. (2013) call for CCM models that leverage community-based resources and public health policies to improve diabetes outcomes.

Other Health Care Systems Interventions

Other diabetes management interventions in health care settings that emerged from this review include the implementation of a computerized clinical decision support system and broader quality improvement strategies. Jeffrey and colleagues (2013) found that the implementation of a computerized clinical decision support system into ambulatory diabetes management systems was associated with improvements in HbA1c and patient quality of life and reductions in diabetes-related hospitalizations. In a more comprehensive assessment of health systems quality improvement strategies, Tricco and colleagues (2012) described quality improvement strategies focused on health care systems and health care providers to support the communication of diabetes-related information between providers, including: case management, audits and feedback, clinician education, clinician reminders, financial incentives, and electronic patient registries. At the patient level, quality improvement strategies included incorporating patient reminder systems, educating patients about diabetes, and promoting diabetes self-management (Tricco et al., 2012). In a meta-analysis, the Tricco and colleagues (2012) report that quality improvement strategies across multiple levels were linked with increased likelihood of patients receiving prescriptions for diabetes and diabetes-related comorbidities,

screening (e.g., retinopathy, renal function, foot abnormalities). However, statin use, hypertension control, and smoking cessation did not improve (Tricco et al., 2012). Interventions focused only on health care professionals were associated with improved health and self-management outcomes only for patients with poor HbA1c control (Tricco et al., 2012).

Recommendations. Tricco and colleagues (2012) recommend implementing quality improvement strategies focused on health care systems and health care professionals. In an effort to improve access to diabetes-related medications, a recent report by the House of Representatives Committee on Oversight and Reform for the 16th Congressional District of Texas calls for ensuring that Medicare beneficiaries and uninsured patients pay the same prices for diabetes medications as patients in Australia, the United Kingdom and Canada.

Lifestyle-Based Type 2 Diabetes Education and Self-Management Interventions

Lifestyle interventions for adults with type 2 diabetes focused on diet modifications, increasing physical activity, and patient education regarding diabetes management. Some, though not all interventions identified in this review were delivered by community health workers.

Chen and colleagues (2015) conducted a systematic review and meta-analysis of randomized controlled trials involving lifestyle interventions – including pharmaceutical care; group counseling about diabetes self-management, education on lifestyle modifications, structured and personalized exercise prescription, supervision by a case manager, physical activity, and diet education – and found lifestyle interventions were associated with improvements in body mass index, HbA1c, systolic blood pressure, and diastolic blood pressure. Notably, Chen and colleagues (2015) found no difference in HDL and LDL between intervention and control groups. When looking more specifically at intervention components and associations with health outcomes, Huang and colleagues (2016) found that dietary modifications were associated with reduced systolic and diastolic blood pressure; physical activity was associated with reduced diastolic blood pressure, and patient education was not associated with any differences in HbA1c, blood pressure, or cholesterol for participants in the education intervention when compared to the control group.

In a systematic review of lifestyle interventions for socially disadvantaged populations, Glazier and colleagues (2006) found that cultural tailoring of interventions, interventions lead by lay persons or community educators, one-on-one interventions with individualized assessment and reassessment, a focus on behavior-related tasks, providing feedback to intervention participants, and more than 10 points of contact delivered over a long period (at least 6 months) demonstrated positive results. By comparison, interventions focused on didactic teaching or knowledge building did not demonstrate positive results (Glazier et al., 2006).

The literature review yielded several individual studies (compared to systematic reviews and meta-analyses) involving randomized controlled trials of community health worker/promotores interventions. Many community health worker interventions focused on individuals with type 2 diabetes who are low-income and/or identified as African American or Hispanic/Latino. Common elements of community health worker interventions included cultural tailoring of diabetes self-management interventions with opportunities to discuss and practice goal setting and self-management, interventions lead by community health workers, and referrals to social and support services (e.g., housing, medical insurance). Often, the intervention was delivered in multiple formats, including group sessions, one-on-one visits, telephone follow-up, and/or accompaniment to one clinic visit with the participant's primary care provider (Rothschild et al., 2014; Two Feathers et al., 2005; Palmas et al., 2014; Staten et al., 2012). One intervention involved the cultivation of leadership within the intervention group to provide participants with ongoing emotional and behavioral support after the first six months of the intervention (Spencer et al., 2018)

Community health worker interventions involving participants with type 2 diabetes demonstrated improvements in: understanding of diabetes self-management (Spencer et al., 2018); dietary knowledge (Two Feathers et al., 2005); dietary practices (Two Feathers et al., 2005; Staten et al., 2012); physical activity knowledge (Two Feathers et al., 2005); physical activity (Rothschild et al., 2014; Staten et al., 2012); HbA1c levels (Two Feathers et al., 2005; Rothschild et al., 2014; Spencer et al., 2018); body mass index (Staten et al., 2012); waist and hip circumference (Staten et al., 2012); systolic blood pressure (Staten et al., 2012); diastolic blood pressure (Staten et al., 2012); total cholesterol (Staten et al., 2012); diabetes-related distress (Spencer et al., 2018); depressive symptoms (Spencer et al., 2018); and diabetes social support (Spencer et al., 2012). In contrast, Palmas and colleagues (2014) found a non-significant trend toward HbA1C reduction. Additionally, Rothschild and colleagues (2014) found no effect of the community health worker intervention on blood pressure control, glucose self-monitoring, or adherence to medications or diet.

Limitations of Literature Reviewed. Several diabetes management interventions were relatively brief (e.g., 3-5 months), and few studies examined long-term outcomes of the intervention. Spencer and colleagues (2018) found that several intervention effects seen at 6 and 12 months since the start of the intervention were not sustained at 18 months, perhaps attributed to the reduced intensity of the intervention beyond 6 months.

Recommendations. Based on their systematic review, Glazier and colleagues (2006) recommend ensuring that community health worker interventions incorporate multiple points of contact with participants over a protracted period, with a focus on strengthening and sustaining diabetes self-management skills. Individual studies included several recommendations specific to community health worker interventions,

including: tailoring community health worker interventions to the local and cultural context (Two Feathers et al., 2005; Rothschild et al., 2014; Staten et al., 2012); developing community-based interventions (Two Feathers et al., 2005); strengthening social support (Two Feathers et al., 2005); enhancing self-efficacy to adopt and sustain diabetes self-management practices and lifestyle modifications (Rothschild et al., 2014; Staten et al., 2012); delivering interventions over a longer period (e.g., 2 years) (Rothschild et al., 2014); strengthening intervention fidelity (Palmas et al., 2014); and sustaining intervention effects with volunteer peer-leader models (Spencer et al., 2018).

Topic 2.1: Factors Influencing Delayed Diagnosis of Type 1 Diabetes in Young Children

The literature regarding type 1 diabetes diagnoses in children, and responses and coping amongst children and family members pertained to diagnoses in young children, predominantly children 2 to 12 years of age. These studies involved surveys of parents or caregivers, interviews with parents, and/or a review of medical record information.

Smith-Jackson and colleagues (2018) estimate that 34% of children with type 1 diabetes experience a delayed diagnosis. When compared to children without a delayed diagnosis, children with a delayed diagnosis were more likely to be: diagnosed in the emergency room; transported by ambulance or life flight; hospitalized; admitted to Intensive Care; and experience diabetic ketoacidosis (Smith-Jackson 2018). According to Muñoz and colleagues (2019), 68% of children with a missed type 1 diabetes diagnosis experienced diabetic ketoacidosis. Smith-Jackson and colleagues (2018) found that younger children were at greater risk for a missed type 1 diabetes diagnosis. Moreover, parents recounted frustration in receiving a prompt diagnosis for their child, which they linked with challenges in scheduling an appointment with a primary care provider, glucose testing, and the dismissal of concerns by providers (Smith-Jackson 2018).

In interviews with parents of young children with type 1 diabetes, health care providers, and teachers, Townson and colleagues (2018) report that parents of children diagnosed with type 1 diabetes sought support from other sources (e.g., family members, internet) before consulting health care providers. Providers highlighted the rarity of type 1 diabetes diagnoses and the importance of considering type 1 diabetes when examining sick children (Townson et al. 2018).

Based on interviews with parents of young children with type 1 diabetes, Rankin and colleagues (2014) identified two pathways to type 1 diabetes diagnoses in young children. The prompt pathway to diagnosis involved parents who had knowledge of diabetes (had type 1 diabetes themselves, had gestational diabetes, health care professionals, or knew someone who had the disease) (Rankin et al., 2014). Parents with no

knowledge of type 1 diabetes and its symptoms described delayed pathways to diagnosis (Rankin et al., 2014). Several parents in the delayed group noted that type 1 diabetes symptoms (e.g., bed wetting, weight loss) were confused with normal stages of children's development and described young children's challenges in communicating symptoms. Despite making prompt appointments with health care providers, some parents reported that the doctor did not notice the signs, contributing to delayed diagnosis. Regardless of the pathway to diagnosis, parents reported high levels of distress when their child was diagnosed with type 1 diabetes. This response was exacerbated for parents in the delayed pathway, who reported feelings of guilt and blame and reflected on what they could have done to better detect and diagnose their child's condition (Rankin 2014).

Limitations of Literature Reviewed

Notable gaps in the literature regarding family-level responses to type 1 diabetes diagnoses in children include a limited focus on Latina/o families, cultural factors (e.g., stigma, the role of other care givers (e.g., older siblings, extended family members), and the role of other systems (e.g., schools) in supporting families in diagnosing and managing type 1 diabetes for young children.

Recommendations

Recommendations to facilitate earlier diagnoses of type 1 diabetes in young children include ensuring that pediatricians consider type 1 diabetes when evaluating patients with non-specific symptoms (Muñoz 2019); conducting glucose screenings (Smith-Jackson et al., 2018); educating parents to raise awareness of type 1 diabetes symptoms that warrant medical treatment (Smith-Jackson et al., 2018); community-based intervention to raise awareness about type 1 diabetes signs for stakeholders to facilitate timely diagnoses (Townson et al., 2018); screening parents for psychological distress when their child is diagnosed with type 1 diabetes and regularly thereafter (Rankin et al., 2014); and providing parents with emotional and psychological support to parents (Rankin et al., 2014).

Topic 2.2: Information, Sleep, and Support Needs For Families with Young Children with Type 1 Diabetes

In interviews with parents of young children with type 1 diabetes, Rankin and colleagues (2016) identified several information and support needs for families at two critical points: (1) during hospital admissions when children are diagnosed with type 1 diabetes and (2) upon returning home shortly after their child is diagnosed. During the hospital admission, parents reported information overload when providers used clinical terminology to describe their child's diagnosis and instructions for managing type 1 diabetes. Parents also reported distress upon learning of their child's diagnosis, which impeded their ability to absorb the information providers shared. Parents in this sample identified the need for details regarding managing their

child's diabetes before being released from the hospital, while also desiring more emotional support as they processed the diagnosis. Upon returning home, parents reported several challenges in managing their child's type 1 diabetes, including: explaining the condition to children; explaining the need for daily injections; administering injections; mitigating children's fear; and concerns among inflicting pain on their children when conducting injections. While parents described increased confidence to monitor their children for signs of hypoglycemia during the day, another concern that emerged pertained to nocturnal hypoglycemia. In particular, parents expressed concerns that they would not detect symptoms when their child was asleep, that their child would not wake up, and the potential for their child to die in bed due to nocturnal hypoglycemia. As a consequence, many parents described sleeping lightly, being vigilant throughout the night, and/or experiencing disrupted sleep, each of which contributed to parental exhaustion. Parents cited several reasons for not discussing these concerns with their child's provider, including perceptions that providers lack personal experience parenting a child with type 1 diabetes and concerns that parents would not receive empathetic and non-judgmental support from providers.

Resonating with findings by Rankin and colleagues (2016), in interviews with parents of children with type 1 diabetes and a survey, Macaulay and colleagues (2019) found that more than half of parents reported poor sleep quality. Parents cited glucose monitoring and fear of hypoglycemia as contributing to parental sleep disturbance. Two distinct time periods emerged that contributed to greater sleep disturbances: (1) immediately following a diagnosis of type 1 diabetes and (2) when using a new diabetes technology. Mothers described greater night-time care burden and sleep disturbance than fathers (Macaulay et al., 2019).

In a qualitative analysis of blogs of caregivers of children with type 1 diabetes, Oser and colleagues (2017) find that fear and worry were common reports among caregivers, continuing – though evolving – beyond the point of diagnosis. Caregivers recalled persistent physical and emotional burdens of managing their child's type 1 diabetes and described technology as helpful for managing the condition and reducing concerns about hypoglycemia, though they also characterized alarms as compounding caregiver burdens (Oser et al., 2017). Caregiver frustrations with perceived missed or delayed diagnoses were also common (Oser et al., 2017).

With respect to children's' sleep, Jaser and colleagues (2017) found that 67% of children met the criteria for poor sleep quality. Poor sleep quality was associated with severe hypoglycemia and diabetic ketoacidosis, poorer parental sleep quality, poorer parental well-being, and parental fear of hypoglycemia, though not linked with the use of diabetes technology.

When examining barriers to insulin pump use for children with type 1 diabetes, Commissariat and colleagues (2017) found that compared to non-pump users, pump users had lived with their type 1 diabetes diagnosis for longer, were more likely to have annual household incomes >$75,000, have a parent with at least a college education, and conduct frequent blood glucose monitoring. Barriers to insulin pump use included: concerns about physical interruptions and therapeutic effectiveness. In some cases, financial burden was a concern.

Recommendations

Recommendations regarding parent information and support needs as they cope with a child's diagnosis of type 1 diabetes include: providing emotional support and practical advice to parents as they adjust to their child's diagnosis (Rankin et al., 2016); offering support within the first few weeks following the diagnosis (e.g., home visits, phone calls) (Rankin et al., 2016); providing experiential training to providers regarding managing type 1 diabetes for young children (Rankin et al., 2016); increasing pediatric diabetes care teams' awareness of diabetes-related factors that affect parental sleep (Macaulay et al., 2019); considering the mixed effects of diabetes technologies (Macaulay et al., 2019); tailoring parental support and education (Macaulay et al., 2019; Commissariat et al., 2017); and addressing socioeconomic barriers to insulin pump use (Commissariat et al., 2017).

Topic 3: Experiences with Gestational Diabetes and Interventions to Prevent or Manage Gestational Diabetes

Carolan-Olah and colleagues (2017b) conducted interviews with Mexican-origin women in El Paso who had gestational diabetes to better understand their experiences with gestational diabetes. Findings indicated five themes regarding a path of gradual adjustment to gestational diabetes: (1) an initial stage of distress and fear as women processed their diagnosis; (2) realizing the major lifestyle changes required (e.g., diet, exercise, glucose monitoring, insulin medication); (3) learning to manage gestational diabetes, which included carefully managing dietary intakes, which contributed to hunger, frustration, boredom, repetitive meals, and occasional low blood glucose levels until they developed strategies to manage their diabetes; (4) finding motivation to manage gestational diabetes, which was influenced by a desire to maximize their baby's health, interest in improving their own health, and interest in investing in their family's health over the long-term; and (5) following providers' instructions regarding lifestyle modifications despite limited understanding. Common misunderstandings about gestational diabetes included: (1) perceiving women had a mild case of gestational diabetes; (2) misunderstandings about food values and permitted foods; and (3) viewing that they were 'on a diet' for the rest of their pregnancy, rather than adopting modifications for the rest of their life. Several beliefs and perceptions also shaped these perceptions and experiences, including that the baby would know if the

mother cheated on her diet, the baby could taste that the mother at during pregnancy, and a strong interest in managing their gestational diabetes despite these challenges. Additionally, social and family commitments shaped the timing and content of meals. Women described feelings of fear, self-blame, guilt, and failure, which attenuated as women adjusted to their diagnosis.

In a systematic review, Carolan-Olah and colleagues (2017a) identified seven intervention studies, including 2 interventions to prevent gestational diabetes among Hispanic women (1 study in the US, 1 study in Mexico) and 5 interventions to promote normal blood glucose levels among women with gestational diabetes (2 studies in the US, 3 studies in Mexico). This review suggests that intensive dietary counselling over a prolonged period, along with a low calorie, low glycemic index diet may be reduce risk of or improve management of gestational diabetes.

Limitations of Literature Reviewed

Additional interventions (e.g., Dulce Mothers, Centering Pregnancy) not included in Carolan-Olah et al., 2017a focus on preventing or managing gestational diabetes among Latina women.

Recommendations

Recommendations that emerged from this review include: developing materials written for women with low literacy levels that explain lifestyle modifications needed and are sensitive to women's food values (Carolan-Olah et al., 2017b) and develop culturally adapted interventions for pregnant Latina women (Carolan-Olah et al., 2017a).

CITATIONS

Albright, A. L., & Gregg, E. W. (2013). Preventing type 2 diabetes in communities across the US: the National Diabetes Prevention Program. American Journal of Preventive Medicine, 44(4), S346-S351.

American Diabetes Association. (2017). Standards of medical care in diabetes—2017 abridged for primary care providers. Clinical diabetes: a publication of the American Diabetes Association, 35(1), 5. / American Diabetes Association. (2019). Summary of Revisions: Standards of Medical Care in Diabetes—2019. Diabetes Care, 42(Supplement 1), S4-S6.

Baig, A. A., Locklin, C. A., Wilkes, A. E., Oborski, D. D., Acevedo, J. C., Gorawara-Bhat, R., ... & Chin, M. H. (2014). Integrating diabetes self-management interventions for Mexican-Americans into the catholic church setting. *Journal of religion and health*, *53*(1), 105-118.

Barham, K., West, S., Trief, P., Morrow, C., Wade, M., Weinstock, R.S. (2011). Diabetes Prevention and Control in the workplace: A pilot project for county employees. J Public Heal Manag Pract. doi:10.1097/PHH.0b013e3181fd4cf6

Barry, E., Roberts, S., Oke, J., Vijayaraghavan, S., Normansell, R., & Greenhalgh, T. (2017). Efficacy and effectiveness of screen and treat policies in prevention of type 2 diabetes: systematic review and meta-analysis of screening tests and interventions. BMJ, 356, i6538.

Boltri, J. M., Davis-Smith, M., Okosun, I. S., Seale, J. P., & Foster, B. (2011). Translation of the National Institutes of Health diabetes prevention program in African American churches. Journal of the National Medical Association, 103(3), 194-202.

Brown, S.A., García, A.A., Zuñiga, J.A., Lewis, K.A. (2018) Effectiveness of workplace Diabetes prevention programs: A systematic review of the evidence. Patient Educ Couns. doi:10.1016/j.pec.2018.01.001
Carolan-Olah, M., Duarte-Gardea, M., & Lechuga, J. (2017a). A systematic review of interventions for Hispanic women with or at risk of Gestational diabetes mellitus (GDM). Sexual & Reproductive Healthcare, *13*, 14-22.

Carolan-Olah, M., Duarte-Gardea, M., Lechuga, J., & Salinas-Lopez, S. (2017b). The experience of gestational diabetes mellitus (GDM) among Hispanic women in a US border region. Sexual & Reproductive Healthcare, 12, 16-23.

Chen, L., Pei, J. H., Kuang, J., Chen, H. M., Chen, Z., Li, Z. W., & Yang, H. Z. (2015). Effect of lifestyle intervention in patients with type 2 diabetes: a meta-analysis. Metabolism, 64(2), 338-347.

Commissariat, P. V., Boyle, C. T., Miller, K. M., Mantravadi, M. G., DeSalvo, D. J., Tamborlane, W. V., ... & Laffel, L. M. (2017). Insulin pump use in young children with type 1 diabetes: sociodemographic factors and parent-reported barriers. Diabetes Technology & Therapeutics, 19(6), 363-369.

Cottrell, L., John, C., Murphy, E., et al. (2013). Individual-, family-, community-, and policy-level impact of a school-based cardiovascular risk detection screening program for children in underserved, rural areas: The CARDIAC project. J Obes. doi:10.1155/2013/732579

Crawford, K. (2017). Review of 2017 diabetes standards of care. Nurs Clin North Am, 52(4), 621-63.

DeJoy, D.M., Padilla, H.M., Wilson, M.G., Vandenberg, R.J., Davis, M.A. (2013). Worksite Translation of The Diabetes Prevention Program: Formative Research and Pilot Study Results From FUEL Your Life. Health Promot Pract. doi:10.1177/1524839912461014

Dunkley, A. J., Bodicoat, D. H., Greaves, C. J., Russell, C., Yates, T., Davies, M. J., & Khunti, K. (2014). Diabetes prevention in the real world: effectiveness of pragmatic lifestyle interventions for the prevention of type 2 diabetes and of the impact of adherence to guideline recommendations: a systematic review and meta-analysis. Diabetes Care, 37(4), 922-933.

Elissen, A. M., Steuten, L. M., Lemmens, L. C., Drewes, H. W., Lemmens, K. M., Meeuwissen, J. A., ... & Vrijhoef, H. J. (2013). Meta-analysis of the effectiveness of chronic care management for diabetes: investigating heterogeneity in outcomes. Journal of Evaluation in Clinical Practice, 19(5), 753-762.

Evron, J. M., Herman, W. H., & McEwen, L. N. (2019). Changes in screening practices for prediabetes and diabetes since the recommendation for hemoglobin A1c testing. Diabetes care, 42(4), 576-584.

Foster, G.D., Linder, B., Baranowski, T, et al. (2010). A school-based intervention for diabetes risk reduction. *N Engl J Med*. doi:10.1056/NEJMoa1001933

Giese, K.K., Cook, P.F. (2014).Reducing obesity among employees of a manufacturing plant: Translating the diabetes prevention program to the workplace. Work Heal Saf.. doi:10.3928/21650799-20140305-02

Glazier, R. H., Bajcar, J., Kennie, N. R., & Willson, K. (2006). A systematic review of interventions to improve diabetes care in socially disadvantaged populations. Diabetes Care, 29(7), 1675-1688.

Hafez, D., Nelson, D. B., Martin, E. G., Cohen, A. J., Northway, R., & Kullgren, J. T. (2017a). Understanding type 2 diabetes mellitus screening practices among primary care physicians: a qualitative chart-stimulated recall study. BMC Family Practice, 18(1), 50.

Hafez, D., Fedewa, A., Moran, M., O'Brien, M., Ackermann, R., Kullgren, J.T. (2017b). Workplace Interventions to Prevent Type 2 Diabetes Mellitus: a Narrative Review. Curr Diab Rep. doi:10.1007/s11892-017-0840-0

Holliday, C. S., Williams, J., Salcedo, V., & Kandula, N. R. (2019). Clinical Identification and Referral of Adults With Prediabetes to a Diabetes Prevention Program. Preventing Chronic Disease, 16.

Huang, X. L., Pan, J. H., Chen, D., Chen, J., Chen, F., & Hu, T. T. (2016). Efficacy of lifestyle interventions in patients with type 2 diabetes: a systematic review and meta-analysis. European Journal of Internal Medicine, 27, 37-47.

Jaser, S. S., Foster, N. C., Nelson, B. A., Kittelsrud, J. M., DiMeglio, L. A., Quinn, M., ... & T1D Exchange Clinic Network. (2017). Sleep in children with type 1 diabetes and their parents in the T1D Exchange. Sleep Medicine, 39, 108-115.

Jeffery, R., Iserman, E., Haynes, R. B., & CDSS Systematic Review Team. (2013). Can computerized clinical decision support systems improve diabetes management? A systematic review and meta-analysis. Diabetic Medicine, 30(6), 739-745.

Katula, J. A., Vitolins, M. Z., Rosenberger, E. L., Blackwell, C. S., Morgan, T. M., Lawlor, M. S., & Goff, D. C. (2011). One-year results of a community-based translation of the Diabetes Prevention Program: Healthy-Living Partnerships to Prevent Diabetes (HELP PD) Project. Diabetes Care, 34(7), 1451-1457.

Katula, J. A., Vitolins, M. Z., Morgan, T. M., Lawlor, M. S., Blackwell, C. S., Isom, S. P., ... & Goff Jr, D. C. (2013). The Healthy Living Partnerships to Prevent Diabetes study: 2-year outcomes of a randomized controlled trial. American Journal of Preventive Medicine, 44(4), S324-S332.

Kelly, M. P. (1998). Diabetes screening and health education at Roman Catholic churches along the West Texas Mexico border. *American Journal of Health Studies*, *14*(1), 48.

Koller, E. A., Chin, J. S., & Conway, P. H. (2013). Diabetes prevention and the role of risk factor reduction in the Medicare population. American Journal of Preventive Medicine, 44(4), S307-S316.

Kramer, M. K., Kriska, A. M., Venditti, E. M., Miller, R. G., Brooks, M. M., Burke, L. E., ... & Orchard, T. J. (2009). Translating the Diabetes Prevention Program: a comprehensive model for prevention training and program delivery. American Journal of Preventive Medicine, 37(6), 505-511.

Long, C. R., Rowland, B., Steelman, S. C., & McElfish, P. A. (2019). Outcomes of disease prevention and management interventions in food pantries and food banks: a scoping review. *BMJ Open*, *9*(8), e029236.

Macaulay, G. C., Boucher, S. E., Yogarajah, A., Galland, B. C., & Wheeler, B. J. (2019). Sleep and Night-time Caregiving in Parents of Children and Adolescents with Type 1 Diabetes Mellitus–A Qualitative Study. Behavioral Sleep Medicine, 1-15.

Madsen, K.A. (2011). School-based body mass index screening and parent notification: A statewide natural experiment. Arch Pediatr Adolesc Med. doi:10.1001/archpediatrics.2011.127

Martinez, L. C., Sherling, D., & Holley, A. (2019). The Screening and Prevention of Diabetes Mellitus. Primary Care, 46(1), 41-52.

Mattke, S., Liu, H., & Caloyeras, J., et al. (2013a). Workplace Wellness Programs Study: Final Report. Rand Heal Q.

Mattke, S., Schnyer, C., & Van Busum, K.R. (2013b). A Review of the U.S. Workplace Wellness Market. Rand Heal Q.

Meyerowitz-Katz, G., Seelan, S., Gaur, P., Francisco, R., Ferdousi, S., Astell-Burt, T., ... & Hng, T. M. (2019). Detecting the hidden burden of pre-diabetes and diabetes in Western Sydney. Diabetes Research and Clinical Practice, 151, 247-251.

Muñoz, C., Floreen, A., Garey, C., Karlya, T., Jelley, D., Alonso, G. T., & McAuliffe-Fogarty, A. (2019). Misdiagnosis and Diabetic Ketoacidosis at Diagnosis of Type 1 Diabetes: Patient and Caregiver Perspectives. Clinical Diabetes, cd180088.

O'Brien, M. J., Whitaker, R. C., Yu, D., & Ackermann, R. T. (2015). The comparative efficacy of lifestyle intervention and metformin by educational attainment in the Diabetes Prevention Program. Preventive Medicine, 77, 125-130.

Ockene, I. S., Tellez, T. L., Rosal, M. C., Reed, G. W., Mordes, J., Merriam, P. A., ... & Ma, Y. (2012). Outcomes of a Latino community-based intervention for the prevention of diabetes: the Lawrence Latino Diabetes Prevention Project. American Journal of Public Health, 102(2), 336-342.

Oser, T. K., Oser, S. M., McGinley, E. L., & Stuckey, H. L. (2017). A novel approach to identifying barriers and facilitators in raising a child with type 1 diabetes: qualitative analysis of caregiver blogs. JMIR Diabetes, 2(2), e27.

Palmas, W., Findley, S. E., Mejia, M., Batista, M., Teresi, J., Kong, J., ... & Carrasquillo, O. (2014). Results of the northern Manhattan diabetes community outreach project: a randomized trial studying a community health worker intervention to improve diabetes care in Hispanic adults. Diabetes Care, 37(4), 963-969.

Rankin, D., Harden, J., Waugh, N., Noyes, K., Barnard, K. D., Stephen, J., ... & Lawton, J. (2014). Pathways to diagnosis: a qualitative study of the experiences and emotional reactions of parents of children diagnosed with type 1 diabetes. Pediatric Diabetes, 15(8), 591-598.

Rankin, D., Harden, J., Waugh, N., Noyes, K., Barnard, K. D., & Lawton, J. (2016). Parents' information and support needs when their child is diagnosed with type 1 diabetes: a qualitative study. Health Expectations, 19(3), 580-591.

Rothschild, S. K., Martin, M. A., Swider, S. M., Tumialán Lynas, C. M., Janssen, I., Avery, E. F., & Powell, L. H. (2014). Mexican American trial of community health workers: a randomized controlled trial of a community health worker intervention for Mexican Americans with type 2 diabetes mellitus. American Journal of Public Health, 104(8), 1540-1548.

Seligman, H. K., Smith, M., Rosenmoss, S., Marshall, M. B., & Waxman, E. (2018). Comprehensive diabetes self-management support from food banks: a randomized controlled trial. *American journal of public health*, *108*(9), 1227-1234.

Shaw-Perry, M., Horner, C., Treviño, R.P., Sosa, E.T., Hernandez, I., Bhardwaj, A. (2007). NEEMA: A school-based diabetes risk prevention program designed for African-American children. J Natl Med Assoc.

Shrestha, A., Karmacharya, B.M., Khudyakov, P., Weber, M.B., Spiegelman, D. (2018) Dietary interventions to prevent and manage diabetes in worksite settings: A meta-analysis. J Occup Health. doi:10.1539/joh.17-0121-RA

Smith-Jackson, T., Brown, M. V., Flint, M., & Larsen, M. (2018). A mixed method approach to understanding the factors surrounding delayed diagnosis of type one diabetes. Journal of Diabetes and its Complications, 32(11), 1051-1055.

Spencer, M. S., Kieffer, E. C., Sinco, B., Piatt, G., Palmisano, G., Hawkins, J., ... & Heisler, M. (2018). Outcomes at 18 months from a community health worker and peer leader diabetes self-management program for Latino adults. Diabetes Care, 41(7), 1414-1422.

Staten, L. K., Cutshaw, C., Reinschmidt, K., Stewart, R., Roe, D. J., & Davidson, C. (2012). Effectiveness of the Pasos Adelante chronic disease prevention and control program in a US-Mexico border community, 2005-2008. Preventing Chronic Disease, 9.

Stellefson, M., Dipnarine, K., & Stopka, C. (2013). The chronic care model and diabetes management in US primary care settings: A systematic review. Preventing Chronic Disease, 1-21.

Sumamo Schellenberg, E. S., Dryden, D. M., Vandermeer, B., Ha, C., & Korownyk, C. (2013). Lifestyle interventions for patients with and at risk for type 2 diabetes: a systematic review and meta-analysis. Annals of Internal Medicine, 159(8), 543-551.

Townson, J., Gallagher, D., Cowley, L., Channon, S., Robling, M., Williams, D., ... & Gregory, J. W. (2018). "Keeping it on your radar"—assessing the barriers and facilitators to a timely diagnosis of type 1 diabetes in childhood: A qualitative study from the early detection of type 1 diabetes in youth study. Endocrinology, Diabetes & Metabolism, 1(1), e00008.

Treviño, R.P., Yin, Z., Hernandez, A., Hale, D.E., Garcia, O.A., Mobley, C. (2004). Impact of the Bienestar

school-based diabetes mellitus prevention program on fasting capillary glucose levels: A randomized controlled trial. *Arch Pediatr Adolesc Med*. 2004. doi:10.1001/archpedi.158.9.911

Tricco, A. C., Ivers, N. M., Grimshaw, J. M., Moher, D., Turner, L., Galipeau, J., ... & Tonelli, M. (2012). Effectiveness of quality improvement strategies on the management of diabetes: a systematic review and meta-analysis. The Lancet, 379(9833), 2252-2261.

Tung, E. L., Gunter, K. E., Bergeron, N. Q., Lindau, S. T., Chin, M. H., & Peek, M. E. (2018). Cross-Sector Collaboration in the High-Poverty Setting: Qualitative Results from a Community-Based Diabetes Intervention. *Health Services Research*, *53*(5), 3416-3436.

Two Feathers, J., Kieffer, E. C., Palmisano, G., Anderson, M., Sinco, B., Janz, N., ... & Wisdom, K. (2005). Racial and Ethnic Approaches to Community Health (REACH) Detroit partnership: improving diabetes-related outcomes among African American and Latino adults. American Journal of Public Health, 95(9), 1552-1560.

US House of Representatives Committee on Oversight and Reform for the 16th Congressional District of Texas (2019). Price of Diabetes Drugs for Seniors and the Uninsured in the United States and Abroad. US House of Representatives.

Wright, D., Little, R., Turner, D., & Thornley, T. (2019). Diabetes Screening Through Community Pharmacies in England: A Cost-Effectiveness Study. Pharmacy, 7(1), 30.

Young-Hyman, D., De Groot, M., Hill-Briggs, F., Gonzalez, J. S., Hood, K., & Peyrot, M. (2016). Psychosocial care for people with diabetes: a position statement of the American Diabetes Association. Diabetes care, 39(12), 2126-2140.

Appendix C. Example of the Role/Responsibilities for the "Backbone/Lead Convener(s)"

Project Management

- Engage subject matter experts in committee efforts, prioritization, and implementation
- Develop/plan, launch and coordinate assessment efforts
- Provide overall strategic management of partners, stakeholders, and members
- Track accountability and ensure smooth processes
- Solve problems and resolve conflicts among partners, as needed
- Identify and engage facilitator(s) as appropriate
- Manage planning and prioritization processes
- Track and communicate progress on annual plans
- Work with chairs to develop project timeline and workplan for each workgroup and committee
- Staff all workgroups, committee, and advisory group meetings and work with chairs to set and distribute agendas and meeting materials
- Work with chairs to manage workgroup deliverables ensuring timely completion
- Provide monthly status reports and quarterly status reports to committees and workgroups
- Respond to committee/advisory group requests and special projects, as appropriate

Thought Leadership

- Responsible for timely and relevant thought leadership, messaging and other communications, such as regular client communication and external messaging
- Serve as chief writer and editor for the creation and production of regularly distributed content or communications to create or promote diabetes thought leadership
- Bringing new ideas and suggestions to the table to improve processes or deliverables
- Coordinate across partners to understand priorities and requirements to increase impact of diabetes work in El Paso
- Manage relationships with diverse groups and proactively drive conclusions and delivery

Budget/Funding/Grants

- Write, submit, and manage grant applications and award requirements
- Manage the budget and expenses of committee including IT and photocopy needs; website, meeting travel, and all materials and deliverables
- Manage invoices and budget
- Identify external funding opportunities for diabetes related work in El Paso

Operations

- Providing overall operations management (e.g. fiscal responsibilities, MOU's, contracts, grant documentation, etc.).

Membership

- Work with committee chairs to recruit new members when vacancies arise
- Work with chairs of workgroups and committee to engage new sectors in the initiative
- Orient new members of the committee/project

Communication/Promotion

- Maintain committee website including determining content, design, etc.
- Maintain up to date distribution lists for all workgroups, committees, advisory groups
- Develop and implement communication strategy working with the communication workgroups
- Promote project and committee initiatives

Logistics

Meeting logistics for all steering committee, operations, and work groups including:

- Work with committee chairs and essential attendees to schedule all meetings
- Send calendar invites and attend all meetings including providing AV support
- Serve as staff to the committee
- Create and maintain master calendar of all Collaborative meetings
- Arrange space/room reservation and parking and communicate logistics to meeting attendees
- Send reminders/invitations and track responses and attendance
- Arrange food and respond to transportation needs
- Publicize meetings as appropriate
- Maintain and update all meeting lists/rosters

Meeting materials for all workgroups, committee, advisory group including:

- Working with chairs to create and finalize agenda
- Identify presents and work/assist presenters in preparation for meeting(s)
- Develop, print and distribute meeting packets- slides, background materials, etc.
- Take all meeting minutes and /notes and manage follow up items