Ohio Commission on Minority Health

Medical Expert Panel on Obesity & Diabetes:

White Paper

Achieving Equity and Eliminating Obesity and Diabetes Disparities within Racial and Ethnic Populations

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While the White paper has benefited greatly from their input and guidance, the views presented in this final discussion paper do not necessarily represent the decisions, policies or views of individual panel members or their organizations/departments/institutions.

We are grateful for our medical experts' passion and commitment to address this public health crisis in Ohio, and to develop recommendations designed to reduce obesity and diabetes within all of Ohio's racial and ethnic populations. The panel members are listed below and their organizational affiliations are located in Section VIII of the White paper.

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Executive Summary

Background and Medical Expert Panel Overview

Since 1987, the Ohio Commission on Minority Health (OCMH) has been at the forefront of addressing health disparities and health inequities in Ohio. The persistent nature of health inequities, the effect of social determinants and new opportunities for systemic change requires expertise to address old challenges and maximize new opportunities. In 2014, the OCMH established the Medical Expert Panel Series as one of its strategies to overcome health disparities and achieve health equity in Ohio. The panels function under the OCMH's Communication Committee and each panel is comprised of experts with extensive experience in addressing inequitable health outcomes of minority populations based on research, policy formulation, modification of clinical practices and enhancement of public health interventions. The panels are designed to think "outside the box" and to challenge conventional practices and policies. Often health improvement strategies are well intentioned but consistently fail to meet thresholds necessary to overcome disparities. Over a twelve (12) week period, the panels deliberate on a particular health issue which culminates into a set of practical recommendations that if implemented can effectively address disparities.

According to the CDC, type 2 diabetes is more prevalent in minorities with non-Hispanic Blacks experiencing 77% greater risk of incidence (CDC- Health Disparities, 2011). The prevalence of diabetes was examined in the National Health and Nutrition Examination Survey (NHANES), which is composed of cross-sectional surveys of nationally representative samples of the civilian, noninstitutionalized US population (Menke, 2015). The age-standardized prevalence of diabetes was higher among non-Hispanic Black participants at 21.8%, non-Hispanic Asian participants at 20.6%, and Hispanic participants at 22.6% respectively, when compared with non-Hispanic Whites participants rate of 11.3%. Astonishingly, the undiagnosed rates were highest among non-Hispanic Asian participants at 50.9% and Hispanic participants at 49.0%, more so than all other racial/ethnic group.

According to the 2009, Ohio Obesity Prevention Plan, "Ohio and the nation are experiencing obesity epidemics that are threatening the health of our children, the productivity of our workers, the vitality of our communities, the affordability of our health care system and our overall quality of life" (Ohio Department of Health, (ODH) 2009). The 2008-2009 Ohio Family Health Survey revealed a trend of increasing obesity rates by age Ohio datasets with every Ohio county exceeding the target rate of obesity (State of Ohio: Family Health Survey, 2009). To reverse these trends will require coordinated, upstream, midstream and downstream strategies to impact the health of our state, reduce health disparities and the associated costs.

The Ohio Commission on Minority Health's Medical Expert Panel on Obesity and Diabetes (OCMHMEP-O/D) purpose is to offer insight and recommendations to address diabetes mellitus and obesity in Ohio with the goal of achieving health equity. The OCMHMEP-O/D seeks to influence the thinking, actions and policies, which function to transcend the status quo of unacceptable high incidence and prevalence rates of these diseases.

Long-term success will be evidenced by achievement of diabetes and obesity rates among minorities and other disadvantaged groups that mirror those of the referent group with the **best** health outcomes for these conditions. Our goal is not that mortality due to diabetes and/or obesity be eliminated, but that all Ohio residents, regardless of race, ethnicity or social-economic status have the same chances of survival and optimal health.

The OCMHMEP-O/D considered a variety of perspectives and acknowledges that obesity and diabetes disparities emanate from the intersection of many social issues, which are referred to as social determinants of health. These include, but are not limited to, inadequate access to quality healthcare, poverty, insufficient access to evidence based interventions, institutionalized racism, unequal economic opportunity, educational attainment, prolonged exposure to food insecurity and ineffective policy coordination.

The 2001 U.S. Surgeon General in the Call to Action to Prevent and Decrease Overweight and Obesity acknowledged that "while the magnitude of the problem is great, the range of potential solutions is even greater. The design of successful interventions and actions for prevention and management of overweight and obesity will require the careful attention of many individuals and organizations working together through multiple spheres of influence" (Office of Surgeon General (US), 2001, Section 3 p. 1)

The Commission convened this panel to address Ohio's significant challenge of diabetes and obesity disparities, which are among the worst in the nation.

As the reader reviews the entire document, there are a number of points to consider:

We must embrace a full understanding of the both the scope of the diabetes and obesity pandemic as well as the impact in the US and in Ohio. This includes an epidemiologic overview; disease etiology, factors influencing disease trends, disease complications; disease predisposition for racial and ethnic minorities; as well as the impact of social determinants of health.

- We must strategically focus on obesity as a major risk factor for diabetes. This includes a brief discourse on the long-range implications of childhood obesity; surgical interventions to address extreme cases of obesity; and macro-level review barriers to obesity prevention.

- The challenge of diabetes/obesity disparities did not occur overnight. Therefore, substantial reductions in diabetes and obesity morbidity and mortality rates will require a well-coordinated response over a protracted period of time along with resources that last beyond conventional budget cycles or priorities of any one administration.

- It is imperative that new measures be initiated with the goal of improving the quality of care delivered by providers and clinicians who serve a diverse patient population. This approach will help to ensure that our shift to "pay-for-performance" initiatives avoid the unintended consequence of reduced access to populations who have disproportionate rates of chronic disease with poor health outcomes.

- No single institution has the capacity to solve obesity and diabetes. Moreover, while substantial financial resources are needed, money alone will not solve this problem. In fact, the US spends more money on healthcare, yet still ranks almost at the bottom among the 30 top western industrialized countries for health outcomes. Governmental agencies, community-based organizations, healthcare institutions, faith-based organizations and private industry must provide leadership within their spheres of influence to effect meaningful change. This will require unprecedented collaboration and the integration of new and non-traditional partners to provide leadership within their areas of expertise.

The OCMHMEP-O/D acknowledges that there are important political considerations surrounding this topic. Recommendations, which solely focus on clinical and programmatic interventions without analyzing the political dimensions of these social determinants of health, are less likely to lead to equitable health outcomes. The OCMHEP-O/D addresses political aspects of obesity and diabetes in regards the promulgation of policies to improve positive health outcomes for obesity and diabetes.

Categories and Scope of Interventions

The OCMHMEP-O/D identified **seven key focus areas** that must be addressed in a comprehensive manner to achieve health equity in diabetes and obesity outcomes. These include:

1. Assuring access to healthcare.
2. Building and sustaining capacity within communities and institutions to proactively overcome health inequities.
3. Establishing and sustaining care coordination protocols to screen high risk populations, improve individual quality of care through continuing education of healthcare professionals, and linking individuals and families to comprehensive health and community services.
4. Improving meaningful use of data to make informed clinical and policy decisions resulting in improved health outcomes along with improving public availability of provisional or preliminary data along with annual reporting.
5. The development of a competent workforce to effectively address the multifaceted challenges of diabetes and obesity.
6. Directly addressing social determinants of health which are primary contributors of obesity and diabetes disparities.
7. Empowering patients to make healthy life style choices and practice effective disease self-management.

The Significance of Intervention Levels

These seven identified strategies must be implemented based upon the appropriate scope to achieve health equity. By scope, we mean identifying the level of impact described as "upstream", "midstream" and "downstream" interventions. Upstream interventions involve policy approaches through laws, rules, and regulations. Midstream interventions are those activities to improve health that occur as the result of an organization's sphere of influence. Downstream interventions are those practices that influence health status and public health outcomes by direct services. The strategies are not mutually exclusive to a particular scope and indeed function across a wide continuum. The OCHMMEP believes that fully implementing the following recommendations that contain upstream, midstream and downstream interventions, if implemented over a protracted period, will significantly reduce the burden of diabetes and obesity disparities within racial and ethnic populations in Ohio.

This document provides recommendations that go beyond the use of advanced medical technologies, which can result in managing devastating chronic disease but fail to prevent these diseases in the first place. Instead these recommendations call for an integrated approach that includes, but is not limited to, access to quality healthcare; policy formulation which addresses social determinants; program integration; strategic use of data; and a thorough understanding of dynamic political processes which influence health outcomes (US Department of Health and Human Services Office on Minority Health, 2011).

I. Summary of Recommendations

The OCMHMEP–O/D supports Senate Bill 287 which if passed will require the creation of a State of Ohio Diabetes Plan. We recognize this is an opportunity to ensure the consideration and adoption of the recommendations set forth in this White paper to address long standing racial and ethnic obesity and diabetes health disparities in Ohio.

Provider Access

- Develop strategies to further increase the ratios of physicians (providers) to patients and diversify the health professional pool from which to staff medically underserved/health professional shortage areas across Ohio.
- Determine the extent to which Patient Centered Medical Home (PCMH) practices are aware of and prepared to offer culturally appropriate care coordination services for individuals who are obese, pre-diabetic and/or diabetic and develop strategies for addressing opportunities for improvement.
- Conduct a semiannual audit of the Ohio Medicaid managed care plans' provider panels to verify that providers have capacity to accept new diabetic patients.
- Coordinate with managed care plans and health systems to verify the "active" or "open" status of providers to accept new diabetic patients for identifying geographical gaps in provider capacity, and provider availability. Then, ameliorate as appropriate.
- Given the significant disparity in health of persons with obesity and diabetes experiencing depressive symptoms, we recommend screening all diabetics utilizing a validated culturally appropriate screening tool. Appropriate assessment, follow-up, and intervention are necessary to improve access and treatment of diabetic patients in Ohio. Broadening access to behavior health services will be an essential component to the proper assessment and treatment of this population.
- Ensure that provider quality measures reward (rather than penalize) providers with a disproportional number of disadvantaged minorities and/or Medicaid recipients in their practices.
- Incentivize providers to serve high-risk populations that historically have higher mortality and morbidity outcomes.
- Support public and private healthcare providers who serve those most at risk with competitive reimbursement, as well as ensure these same providers are not penalized by known disparate outcomes in the populations they serve.
- Incentivize healthcare providers to accept Medicaid patients by improving overall reimbursement, as well as incentivize providers to treat disadvantaged minorities by improving reimbursement to providers with higher proportional target populations.
- Incentivize primary care services by rewarding practices based in underserved communities by using innovative payment and service delivery models.
- Provide resources to increase the number of providers who provide interpreter services, and to reimburse providers for the costs incurred.
- Provide reimbursement incentives (for increased quality) for having a diverse and multi-lingual staff as this has been proven to improve outcomes.
- Develop strategies to address challenges in the distribution of providers in rural areas and in urban communities where the physician to patient ratios are of concern.
- Increase the number of minority primary care providers by increasing upstream educational access for the medical fields.

- Partner with local elementary, middle and high schools and universities to establish pipeline programs that mentor students and support transition into the rigorous college setting. These programs can be assisted with scholarship funding in order to retain students interested in the healthcare professions.
- Increase loan repayment and incentives for minorities to serve underserved populations with significant chronic disease disparities.

Access to Medication & Devices

- Review pharmacy eligibility policies that place a Medicaid (or any other insurance) enrollee with diabetes at risk of interrupted access to medically necessary medication.
- Prevent interruptions in allowed medication approvals due to changes in pharmacy formulary contracts.
- Ensure that there is access to long acting medications for high-risk populations to facilitate the ability to effectively manage the disease.
- Ensure that there is access to medications that are proven effective with racial and ethnic populations.
- Ensure full financial coverage for diabetes devices and supplies for testing and medication administration.

Obesity/Diabetes Prevention, Education & Management

- Development of a statewide Obesity and Diabetes Prevention Plan with a specific focus on reducing disparities within racial and ethnic populations.
- Develop statewide recommendations for state agencies, health departments, hospitals, clinics and physician offices for implementing prevention plans that are culturally and linguistically appropriate.
- Ensure that all Ohio funded obesity and diabetes prevention plans are culturally and linguistically appropriate and designed to meet the needs of diverse populations to ensure impact within those most at risk.
- Ensure patient and family engagement in, decision-making and implementation of programs in the community.
- Enhance patient/population health literacy and eHealth literacy.
- Increase awareness and use of the Diabetes Self-Management Programs (DSMP) available throughout the state with physicians and medical professionals.
- Increase funding of self-management programs to maintain capacity and incentivize potential partners.
- Conduct a comprehensive community assessment to identify existing diabetes education programs in the state, identify gaps in resources, expand capacity, determine language accessibility and assess the needs of constituents.
- Provide Diabetes Prevention Plans that improve overall health for individuals at high risk of developing diabetes, support for smoking cessation for pre-diabetics and diabetics, and support weight loss counseling for pre-diabetics and diabetics at minimal or no cost.
- Ensure that leaders and trainers for self-management programs are from various ethnic backgrounds, races, and preferably speak other languages.
- Identify a broad base of potential partners to include non-traditional, faith-based, community-based cultural agencies, clinics, universities, senior centers and veterans centers) to expand capacity, language accessibility and sustainability.
- Implement strategies to screen and refer high-risk patients into diabetes prevention programs and diabetes self-management programs that are cost effective, sustainable and culturally sensitive.
- Expand capacity for DSMP targeting racial and ethnic communities throughout Ohio.
- Identify funding to bring evidenced based self-management programs to scale in Ohio.
- Determine the accessibility (language/location) of the DSMP within census geographies with a high incidence and prevalence of racial and ethnic hotspots.

- Identify the diabetes self-management programs provided by each Medicaid managed care plan and consumer's ability to access programs.
- Explore methodology and data collection for seamless, electronic bidirectional referral between medical provider and DSMP/Diabetes Prevention Program (DPP) provider in the community.

Healthcare Professional Education

- Advocate for state licensure boards to incorporate the National Standards for Culturally and Linguistically Appropriate Services (CLAS) training courses as part of licensure and recertification.
- Incorporate Community Health Workers (CHW) who are respected in the minority communities as a link between the family and the healthcare system.
- Train healthcare providers to screen and provide culturally competent care for children with obesity, prediabetes, type 2 diabetes, and co-morbidities.
- Teach all healthcare providers how to use appropriate and non-stigmatizing language in discussing weight concerns with children and families.
- Provide standardized resources (paper and electronic) for children, adults, families and healthcare providers that are appropriate for those with limited health literacy and limited English proficiency e.g., the American Academy of Pediatrics Institute of Health Childhood weight resources (https://ihcw.aap.org).
- Provide Medicaid Technical Assistance Policy Program (MEDTAPP) funding for further research with a focus on health disparities and equity in treatment, access to care, patient engagement, and outcomes for minority populations with type 2 diabetes and obesity.
- Support policy for reimbursement and open formularies for treatment for children and adults with severe obesity such as bariatric surgery, inpatient hospitalization protocols and medications.
- Require healthcare providers to implement learning opportunities to ensure healthcare professionals are aware of current best practices related to obesity, diabetes, behavioral change strategies, and other risk factors as well as best practices on how to counsel patients with unhealthy behavior, by promoting patient behavioral change.
- Increase the capacity of medical, nursing and other health professions curricular to teach the principles and benefits of healthy diet and exercise patterns.

Food Access

- Expand the "Healthy Food for Ohio" program throughout the state.
- Require that all foods that compete with school meals must be consistent with federal recommendations for reduced fat, saturated fat, cholesterol and sugar and sodium content.
- Collaborate with public and private partners to improve the infrastructure to enforce policies to ensure access to potable drinking water.
- Target the elimination of food deserts within high disparate areas that house racial and ethnic minorities.
- Incentivize fast food outlets that provide and encourage healthy options in high diabetes disparate areas.
- Increase the availability of affordable, free, ethnic cookbooks and recipes that offer healthy and appetizing dishes to allow individuals to make healthier food choices.
- Expand the capacity of farmers markets by including cooking demonstrations to increase consumption of fresh vegetables.

Children & Schools

- Integrate health and wellness topics into the school curriculum.
- Promote identification of language capability in provider gateway-portal directories.
- Expand programming that complies with the Center for Disease Control and Prevention (CDC) Coordinated School initiatives such as, "Whole School, Whole Community, Whole Child" (WSCC) program in Ohio. http://www.cdc.gov/healthyyouth/wscc/
- Coordinate with state and school district officials to implement strategies to limit the sale of soft drinks, candy bars, and foods high in calories.
- Coordinate with state and school district officials to include in school wellness and nutrition policies, a component that reduces and/or eliminates the sale of sugar-sweetened beverages (SSBs) on school grounds, including sports venues, and as part of school-based activities such as fundraising efforts. These policies should be consistent with recommendations from Institute of Medicine's Nutrition Standards for Foods in Schools, Leading the Way toward Healthier Youth.
- Provide education and training regarding the potential health effects of SSBs, diabetes, and obesity to teachers, school nurses, parents, and other influential adults and emphasize their role as models for healthy beverage consumption.
- Implement school based diabetes prevention programs along with programs designed to increase student healthy food choices and create a supportive school environment.
- Explore opportunities to increase the capacity of school nurses to co-manage and refer as need at-risk children.
- Ensure access to counseling for obese children that includes a psychosocial assessment.
- Expand physical education activities and increase physical activities in school to combat obesity.

Exercise Initiatives

- Increase funding to improve built environments (playgrounds) in minority and low-income neighborhoods to make them safe and walk-able.
- Increase reimbursement to local YWCA's and YMCA's for exercise and physical activity for children and adults and to implement DPP.
- Improve accessibility to safe public places for activity through shared-use agreements.
- Provide incentives for purchasing exercise equipment.

Tobacco Use

- Ensure routine diabetes screening for clients who identify as smokers.
- Make referrals to the Ohio Tobacco Quit Line upon identification of any tobacco use.
- Prescribe Nicotine Replacement Therapy (NRT) as medically appropriate and ensure access by reducing the cost of this type of therapy.

Care Coordination

- Promote the Pathways Community Hub Model as a model of care coordination to be considered to reduce health disparities within diabetes and obesity and ensure the provision of care coordination services,
- Promote the collaboration of care coordination models and the use of Community Health Workers (CHW) between public, private and nonprofit entities, along with Medicaid managed care plans, to ensure that high risk diabetes patients have timely and culturally competent access to treatment.

- Assess and ensure there is integration and coordination of behavioral health, medical care, health education, smoking cessation programs, chronic disease self-management programs and peer support programs that are culturally appropriate and patient centered.
- Increase the pool of available CHW through the provision of funding that provides tuition reimbursement and develops a pipeline program to encourage training and employment of CHW's within target populations.

Workforce

- Mandate the provision of cultural and linguistic competency training of healthcare professionals to improve quality care to diverse populations.
- Establish policies that adopt the National CLAS standards, to include cultural competence training, that require training for managed care plans, healthcare, behavioral health, and health related workforce to overcome unequal access to quality care and healthcare disparities.
- Collect and publicly report data on the healthcare and healthcare related workforce diversity at the state level to include race and ethnicity to promote and increase a more diverse workforce.
- Develop ongoing, funded approaches to assess, monitor, and determine the status of workforce goals (e.g., National CLAS standards are met).
- Communicate OCMHMEP-O/D endorsement of the Ohio Statewide Health Disparities Collaborative Workforce Development Strategic Plan to help Ohio create a healthcare workforce that has the competencies needed to effectively assess, respond to, and collaborate with organizations to eliminate health disparities in Ohio.
- Identify providers who are able to offer services in languages other than English via interpreters or a qualified provider.
- Reimburse providers that use accepted translation resources to encourage the proper communication with patients speaking non-English languages.
- Create policy strategies that incentivize treating non-English speaking patients, which requires frequent communication to ensure quality interactions.
- Fund grassroots resident led strategies that engage vulnerable populations via training of lay leaders and/or community health workers.

Social Determinants of Health

- Provide economic incentives for the implementation of regional strategies that address social economic status variables in, employment, graduation rates, and housing.
- Recommend that state agencies responsible for stimulating economic growth develop investment plans in census geographies with the worse diabetes prevalence, incidence, mortality and self-management rates.
- Fund neighborhood level revitalization programs in historically under-resourced and marginalized communities targeting racial and ethnic communities, high dropout rates, higher unemployment, high number of residents in lower-wage jobs. All of these circumstances influence health and influence the incidence of diabetes and obesity.
- Promote primary education program development in science, technology, engineering, especially in under-resourced communities and provide the resources necessary to assist students from these neighborhoods to matriculate through such programs.

Data

- Assure that new and existing health data systems within state and local government adhere to the United States Department of Health and Human Services (HHS) Data Standards for Race, Ethnicity, Primary Language, and Disability Standards.
- Support local health departments and other relevant entities in the acquisition and use of geospatial-mapping technology to identify and prioritize populations with low educational attainment, low income, poor housing (rental vs. owned), in high need census geographies.
- Combine data sets from public health (e.g., Vital Statistics), state agencies, and the Ohio Hospital Association to develop near real-time data to plan, monitor and evaluate interventions.
- Require that publicly funded population surveys collect and report disaggregated data on race, ethnicity and primary language.
- Require the collection of disaggregated data to include race, ethnicity and primary language within all state data systems and Medicaid managed care contracts.
- Require funded entities to engage in community-based participatory research approaches with their targeted populations.
- Develop aggressive diabetes disparity targets that can be used as the basis for funding decisions and performance metrics for statewide health systems, to include addressing social determinants of health.
- Continue to invest in the state's capacity to use geospatial technology to identify and prioritize census geographies and incorporate small area analyses to identify disparate health outcomes, for focused interventions and to evaluate effectiveness of interventions.
- Require a question on death certificates to identify whether the cause of death was related to obesity or diabetes and use the supporting data to drive funding decisions.
- Improve the accuracy of race and ethnicity and primary language data on the birth and death registries.

Tax/Subsidy Strategies

- Levy city, state, and federal taxes on soft drinks and other foods high in calories.
- Provide tax incentives to encourage employers to provide weight management programs to staff.
- Establish a policy to provide a greater proportion of and reduced cost for healthier beverage alternatives in relation to sugar sweetened beverages (SSBs).
- Collaborate with policymakers to eliminate advertising of SSBs aimed at school venues.
- Revenues from SSB pricing adjustments should be earmarked for support programs to prevent obesity and diabetes.

Use of Technology

- Funding for the development of cost effective culturally specific mobile applications that encourage exercise and better nutrition that target use within younger age groups.
- Fund and distribute glucometers with memory as these have been shown to be more reliable when tracking blood glucose levels than diaries, which have frequent errors.
- Enhance clinician education for culturally competency through Electronic Medical Records (EMR) technology prompts for culturally competent discussions with patients.

Media Strategies

- Use EMR prompted, targeted messaging, targeting racial and ethnic populations.
- Provision of culturally appropriate targeted education on obesity and diabetes in the form of interactive video and printed material.
- Provide state funding to the state health department for mass media health promotion campaigns that are culturally and linguistically appropriate.
- Develop a media campaign that would complement the Ad Council prediabetes campaign messaging, such as, "Don't Sugar Coat It."

Engaging Population Groups

- Require funded entities to engage in community-based participatory research approaches with their targeted populations.
- Make screening for type 2 diabetes readily available within non-traditional community settings.
- Integrate care management within patient community care settings to further support vulnerable populations.

Clinical Care of Diabetes

- Encourage provider participation in Patient Centered Medical Homes
- Ensure patients are seen every 3 to 4 months and other times when clinically necessary.
- Better utilize available technology among patients, providers, and community health workers to relay health information electronically by e-mail, secure digital messaging, or by phone.
- Always remind patients of impending clinic appointment by telephone, e-mail, text message or other secure electronic device.
- Develop and implement protocols to assure that every clinical encounter should include medication review, vital signs, body mass index (BMI) and foot exams.
- Enact protocols to assure that at 3-6 month intervals an HbA1C test, a lipid panel and a spot urine microalbuminuria/creatinine ration are provided, then annually if stable.
- Guarantee specialist reimbursement for annual eye examinations and foot care.
- Support multi-cultural nutritional and dietary counseling as needed, but no less than annually.

Multiple Audiences:

The prevention and control of obesity and diabetes among racial and ethnic populations must involve multiple stakeholders. Below is a list of recommendations that is not intended to be exhaustive, that covers a broad array of organizations/stakeholders to address the disparities in these diseases in a comprehensive manner.

Legislators:

1) Consider all the recommendations set forth in this White Paper as policy strategies designed to reduce obesity and diabetes within Ohio's racial and ethnic populations.
2) Support Senate Bill 287 to ensure the development of a State of Ohio Diabetes Plan.
3) Require the State of Ohio Diabetes Plan to reflect specific recommendations and policies to address significant health disparities and inequities for obesity and diabetes, including root causes (social determinants of health). This plan must also include disparities by race and ethnicity, income and overall costs to the state of Ohio.

4) Require state agencies to collect and provide both population level and granular Racial, Ethnic, and Language (REAL) data and make this data publicly available for public health interventions.
5) Ensure that state agencies implement diabetes and obesity plans that target populations that have disproportionate incidence, prevalence and mortality rates among racial and ethnic populations.
6) Increase funding to the Ohio Commission on Minority Health, the Ohio Department of Health and the Ohio Department of Aging for grants for diabetes prevention programs to high risk populations.
7) Support legislation that ensures healthcare professionals receive cultural and linguistic competency training.

Hospitals/Healthcare providers/Clinics/Federally Qualified Health Centers:

1) Increase resources to assure the provision of diabetes prevention education programs.
2) Link and refer patients to DSMP.
3) Ensure all health professionals are trained on how to educate patients on preventative care.
4) Develop protocols to assure persons with obesity and diabetes receive follow up to ensure linkage to care coordination services.

Businesses:

1) Collaborate with private industry to provide educational materials to employees on healthy eating and weight management.
2) Implement best practices for worksite wellness programs which incentivize employees to exercise and stop smoking.
3) Promote healthy lunch-time activities.

Consumer:

1) Prevent smoking behaviors within your personal spaces, participate in smoking cessation activities, consume more fruits and vegetables, engage in some type of physical activity most days of the week, establish a healthy diet and obtain a healthy weight.
2) Talk with your doctor about setting goals to prevent obesity and diabetes
3) Work with your local health and city council officials to increase access to healthy foods and exercise opportunities.

Civic, Public/Private Organizations, Community Volunteers, Faith based Organizations:

1) Advocate for legislation which supports care for the underserved and at risk population. (Presumptive Eligibility, Affordable Care Act, Medicaid coverage up to 200% of the Federal Poverty Level (FPL).
2) Advocate for funding to churches and other faith-based initiatives to educate on diabetes prevention
3) Host community forums on Healthy Living and tobacco cessation, etc.
4) Use websites, social media, bulletin boards, program inserts, educational classes, and faith services to educate about diabetes and obesity.

Agencies - All:

1) Use social marketing techniques to promote interventions to address diabetes and obesity disparities, educate the community and provide resources.
2) Focus efforts in "Hot Spot" areas.
3) Promote access to diabetes self-management programs.
4) Provide cultural and linguistic competency training.
5) Initiate a statewide "Let's Move Campaign".
6) Create statewide marketing campaigns to end obesity and raise the awareness of diabetes.
7) Raise the awareness of diabetes and obesity disparities and solutions within your families and communities.

II. Alignment with National, Federal, and State Plans

The OCMHMEP-O/D recommendations are aligned with the Robert Wood Johnson Foundation's core mission for public health, "to reduce the leading causes of preventable death with special emphasis on underserved populations and health disparities, this serves as our perpetual North Star" (Resolve, 2014).

The OCMHMEP-O/D concurs that, "Health is created through the interaction of individual, social, economic, and environmental factors, and in the systems, policies, and processes encountered in everyday life. These include job opportunities, wages, transportation options, the quality of housing and neighborhoods, the food supply, access to healthcare, the quality of public schools and opportunities for higher education, racism and discrimination, civic engagement, and the availability of networks of social support. When groups (within a state) face serious social, economic, and environmental disadvantages, such as structural racism, unemployment, and a widespread lack of economic and educational opportunities, health inequities are the result." (Minnesota, 2015)

Communities across Ohio are devastated by high rates of infant deaths, diabetes, cardiovascular disease, cancers, and other preventable infectious diseases. According to the Health Policy Institute of Ohio's 2014 Health Value Dashboard it is important to identify and address disparities, or gaps, in outcomes between different racial and ethnic groups in order to improve health for all Ohioans. Ohio must address the many factors that affect population health outcomes and healthcare costs. Ohio struggles when it comes to the physical, social and economic environments that impact health.

"Policy and decision makers often do not make the connection between these social determinants of health and the resulting drain on resources. The inability to make the connection perpetuates skyrocketing costs and limited improvements in disparate health outcomes" (Minnesota, 2015).

The OCMHMEP-O/D concurs with the Healthy People 2020 objectives for Diabetes. Our efforts are to ensure that the targets are achieved within each racial and ethnic population in Ohio. For example, the Healthy People 2020 target for diabetic adults with at least two A1C measurements in the past twelve months is 71.1%. In 2014, Ohio had an overall score of 71.6, with White, non-Hispanic diabetic adults a 74.8 while Black non-Hispanic diabetic adults had a rate of 60.2%.

Therefore, the OCMHMEP-O/D strongly recommends the implementation of an overarching state plan, policies, strategies and allocations that have a strategic intentional focus to ensure the achievement of these targets for racial and ethnic populations in Ohio.

III. Statement of the Problem

Obesity has been recognized as a major health problem by the World Health Organization (WHO), U.S. Surgeon General, the CDC, and the National Institutes of Health (NIH). The CDC defines obesity for adults as more weight than is considered healthy for a given height. An adult is considered obese if their body mass index (a measure to determine overweight and obesity) is calculated at 30 or more. However, a child is considered obese if their body mass index exceeds the defined threshold (85 percentile and below the 95 percentile) (CDC, Adult defining, 2016). (http://www.cdc.gov/obesity/adult/defining.html).

The CDC defines diabetes as a disease in which blood glucose levels are abnormally high due to the body's inability to process insulin. When blood glucose fails to get into the body's cells, many serious health issues can occur including heart disease, blindness, kidney failure and amputations. The prevalence of diabetes in the United States was estimated at 29.1 million in 2012 (CDC, National Diabetes Statistics, 2014). According to UnitedHealth, the nation's largest health insurer, half of all Americans are destined to become diabetic or pre-diabetic by the year 2020 based on findings in the 2010 United States of Diabetes Report (United Health Center,

2010). Diabetes is also a pandemic. The World Health Organization (WHO, 2014) projects diabetes will be the seventh leading cause of global death by 2030. The CDC projects that by 2050, diabetes prevalence will have increased to 50 million people in US. Nationally when compared to non-Hispanic Whites adults; the risk of diagnosed diabetes was 18% higher among Asian Americans, 66% higher among Hispanics, and 77% higher among non-Hispanic Blacks. National estimates of diagnosed diabetes are not available for all minority groups, but of the data collected for American Indians and Alaskan Natives who receive healthcare from Indian Health Services showed a 2.3 times higher rate (16% vs. 7.1% in Whites) (CDC, 2014).

The 2011 oversampling by the CDC of Asian Americans in the NHANES study yielded data that demonstrated a high prevalence of diabetes in Asian Americans (CDC, 2011). The high prevalence of diabetes within racial and ethnic populations requires cultural appropriate approaches to screening, prevention and treatment**.** One example is the "Screen at 23," national campaign that calls for screening of Asian Americans for diabetes at a BMI of 23 as opposed to the current guideline of 25 (Screen at 23, n. d.). Currently, the American Diabetes Association and the WHO have also endorsed lower BMI screening thresholds. Recently, the National Council of Asian Pacific Islander Physicians along with a coalition of diabetes advocates launched a successful effort in San Francisco resulting in the passage of a resolution to expand diabetes testing to Asian American who are generally not considered an overweight population. The Asian and Pacific Islander Obesity Prevention Alliance recognizes that awareness efforts must battle the long-standing health myth of Asian Americans being the "model-minority". This myth continues to perpetuate the denial of risk factors for diabetes in Asian American communities (Karlamangla, 2016).

According to the CDC, obesity and diabetes are both treatable and preventable diseases. However, given the current state of health inequities in the United States, disadvantaged populations do not have full access to the needed resources to avoid these devastating conditions. Therefore, the solutions to this problem must be multifaceted, interoperable and forward thinking. Overcoming obesity and diabetes related health inequities is very complex. This is partially due to the life cycle of these conditions, their sequelae, and the challenging social conditions, which drive weight gain and inactivity to dangerous levels for disadvantaged populations. The degree to which obesity and diabetes are a function of personal responsibility, the ability of the government to protect population health, access to healthcare, having a genetic predisposition, or the extent private industry makes unhealthy products readily available, are all important issues to consider.

Epidemiology of Diabetes and Obesity

Diabetes is the most common metabolic disorder affecting significant number of people who reside in diverse geographic locations around the world. The major concerns regarding diabetes have grown because of the alarming impact the disease has globally. In this context, the International Diabetes Federation (IDF) reported that diabetes affected 382 million people worldwide in 2013 and is projected to increase to approximately 592 million by 2035 with the majority affected residing in developing countries (IDF, 2014). The IDF data reveals that the global incidence of diabetes is estimated at 4 million people per year and 1.2 million per year in the US. Unfortunately, approximately 28-36% of individuals with diabetes in developed countries and 50-62% in underdeveloped countries remain undiagnosed. Furthermore, approximately 35% of adults living in developed countries have prediabetes, a major precursor of diabetes (IDF, 2014)

While globally, diabetes ranks as the ninth leading cause of death in most countries comparatively it ranks as the sixth leading cause of death in the US. Variations in rankings are impacted by the economic development of the country, socioeconomic status as well as race/ethnicity. Given these trends, the WHO projects diabetes will be the seventh leading cause of death in 2030 (WHO, 2014).

A state level examination reveals that Ohio now has the eighth highest adult obesity rate in the nation, according to The State of Obesity: 2015 Better Policies for a Healthier America ("The State of Obesity", 2015). Unfortunately, Ohio's adult obesity rate in increasing, ranking at 32.6 %, up from 20.6 % in 2000 and from 11.3 % in 1990. Racial disparity gaps are continuing to widen in Ohio, in 2012 Blacks had a 79 % higher age –adjusted diabetes death rate compared with Whites (43.4 per 100,000 and 24.3 per 100,000 respectively) (Ohio Department of Health, (ODH), 2015). Our analysis of the rising prevalence rates of diabetes at the global, national and local level, clearly supports the recommendations set forth in this White paper.

Factors affecting increasing trends of diabetes

Despite the enormous medical and technological advances, the increasing prevalence and incidence of diabetes remain relentless. There are several important epidemiologic factors that partly account for the increasing prevalence of diabetes:

1. The prevalence of diabetes increases with age (after age 35 in Ohio) and among selected race/ethnicities. In Ohio, the prevalence of diabetes is significantly higher among Black, non-Hispanic adults (17.1 %) compared to White, non-Hispanic adults (11.1 %) (ODH, 2012).
2. With the increasing prevalence of adults being overweight or obese, the prevalence of prediabetes (fasting glucose= 100-125mg/dl or AIC= 5.7-6.4%) continues to increase in most populations. In 2014, 7.6% of Ohio adults reported being told by a doctor that they have prediabetes (ODH, 2013).
3. There have been exponential increases in the screening of individuals for diabetes and prediabetes by primary care providers. This has been attributed, in part, to the change in the diagnostic classification in 1997 (American Diabetes Association, (ADA)) that recommended a lower fasting glucose level (>126mg/dl) as diagnostic cut off point for diabetes. Furthermore, in 2010, hemoglobin A1C >6.5% was introduced as another simple and a more practical diagnostic criterion for the diagnosis of diabetes (ADA, 2011).
4. Recent reduction in the overall mortality in diabetic patients due to remarkable improvement in quality of healthcare, improved access and delivery have led to increasing longevity and life expectancy for patients with diabetes (CDC, 2014).
5. The increasing obesity/overweight and putative genetic pool serve as triggers for type 2 diabetes (ADA, 2012).

Hence, these multiple factors have cumulatively resulted in the apparent increase in the populations affected by the diabetes and the associated complications.

According to the 2015 Impact of Chronic Disease in Ohio report, in 2012, 11.7 percent of adults reported having ever been diagnosed with diabetes, with men having a similar prevalence of diabetes when compared with women. The report further reveals that the prevalence of diabetes decreases with increasing household income. Ohioans with a household income less than $15,000 per year were 2.3 times more likely to have diabetes compared with those earning $75,000 or more per year, according to 2012 data. Similar to household income, diabetes prevalence decreases as educational attainment increases. The data listed below in Table 1, identifies that Ohioans who had not completed high school were 2.4 times more likely to report being diagnosed with diabetes compared with those who earned a college degree. Table 4.1 further reflects that in 2012, Black Ohioans had the highest prevalence of diabetes (16.0 percent) while Ohioans of "Other" races had the lowest prevalence (5.1 percent) (ODH, 2015).

Table 1

Diabetes: Prevalence

Estimated prevalence of adults (age 18+) ever diagnosed with diabetes, Ohio and the United States, 2012

	Ohio Prevalence (%)	95% CI	U.S. Prevalence (%)#
Total	11.7	11.0 - 12.4	9.7
Sex			
Male	12.5	11.4 - 13.6	10.3
Female	10.9	10.0 - 11.8	9.4
Race/Ethnicity			
White	11.3	10.5 - 12.0	9.4
Black	16.0	13.1 - 19.0	13.6
Other	5.1	2.4 - 7.8	9.6
Multi-Racial	11.6	6.2 - 17.0	9.3
Hispanic	11.6	6.6 - 16.6	9.8
Age Group			
18 - 24	1.2	0.3 - 2.1	-
25 - 34	2.9	1.7 - 4.0	2.2
35 - 44	6.9	5.1 - 8.7	5.3
45 - 54	11.1	9.5 - 12.6	9.9
55 - 64	19.0	17.0 - 21.1	16.3
65+	23.3	21.5 - 25.1	20.8
Household Income			
<$15,000	15.5	13.0 - 18.1	14.8
$15,000 - $24,999	15.7	13.6 - 17.8	13.1
$25,000 - $34,999	13.3	11.1 - 15.4	11.2
$35,000 - $49,999	13.5	11.3 - 15.6	10.0
$50,000 - $74,999	8.1	6.6 - 9.6	6.8*
$75,000+	6.7	5.4 - 7.9	
Education			
<High school	17.0	14.1 - 19.9	15.0
High school graduate	12.6	11.4 - 13.7	11.0
Some college	11.6	10.3 - 13.0	9.4
College graduate	7.2	6.2 - 8.2	6.8

Source: 2012 Ohio Behavioral Risk Factor Surveillance System, Ohio Department of Health, 2013; 2012 Behavioral Risk Factor Surveillance System, Centers for Disease Control and Prevention, 2013.
U.S. prevalence is the median prevalence of the 50 states, D.C. and U.S. territories.
* U.S. estimate is for $50,000+.

- As shown in Table 4.1, in Ohio in 2012, 11.7 percent of adults reported having ever been diagnosed with diabetes, according to data from the Ohio BRFSS.
- In Ohio in 2012, men had a similar prevalence of diabetes compared with women.
- In 2012, black Ohioans had the highest prevalence of diabetes (16.0 percent) while Ohioans of "Other" races had the lowest prevalence (5.1 percent).
- Diabetes prevalence increases as individuals age. In 2012, only about 1 percent of Ohioans age 18-24 had ever been diagnosed with diabetes, while nearly one quarter of adults age 65 and older had been diagnosed.
- The prevalence of diabetes decreases with increasing household income. Ohioans with a household income less than $15,000 per year were 2.3 times more likely to have diabetes compared with those earning $75,000 or more per year, according to 2012 data.
- Similar to household income, diabetes prevalence decreases as educational attainment increases. In 2012, Ohioans who had not completed high school were 2.4 times more likely to report being diagnosed with diabetes compared with those who earned a college degree.

Ohio Department of Health 30 Healthy Ohio

Note. From *"The Impact of Chronic Disease in Ohio: 2015"* by Ohio Department of Health, 2015, p.30.

<u>Diabetic complications</u>

The chronic diabetic complications include both macrovascular disease (coronary artery disease, stroke and peripheral vascular diseases) and microvascular disease (blindness, kidney failure and leg amputation). The consequent human toll of these organ diabetic compilations affects not only the patients, but also their family and caregivers. In this regard, diabetes remains the leading cause of blindness, kidney failure requiring dialysis and leg amputations. Furthermore, diabetes is a major cause and contributor to deaths in several populations. Specifically, cardiovascular disease remains the leading cause of death in patients with diabetes, accounting for 75-80% of all deaths in patients with diabetes (Look AHEAD Research Group & Wing, 2010) In this regard, cardiovascular mortality correlates with the number of long-term complications. The presence of one to three of the complications listed above increases proportionately by two to three fold, the mortality rate associated with diabetes.

Economic cost of diabetes.

The escalating cost of diabetes continues to adversely influence the economic health of the country, especially in the third world countries with limited resources. IDF estimated the global cost of diabetes in 2013 was over $500 billion. According to the CDC 2014 National Diabetes Statistics Report, (Figure 1) the estimated cost of diabetes for the US in 2012 exceeded $245 billion, with $176 billion being attributed to direct medical costs (CDC, 2014). In fact, diabetes accounts for 17% of the healthcare cost in US. Approximately 42 % of the cost of diabetes can be attributed to institutionalized care, (hospitalization and rehabilitation) and loss of work productivity.

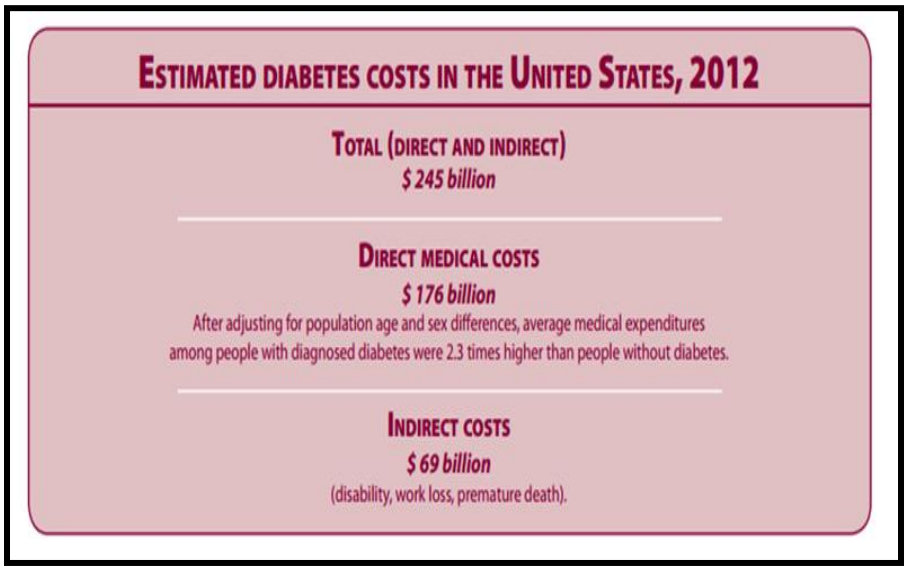


Figure 1. Data showing estimated diabetes costs in the United States, 2012. From "*National Diabetes Report"* by Center for Disease Control and Prevention, 2014, p. 1.

The United States of America is on track to become the United States of Diabetes. This is based on the 2010 United States of Diabetes Report by United Health's Center for Health Reform and Modernization. This report details the widespread epidemic of type 2 diabetes and its warning sign, prediabetes, and its far-reaching impact across the country. It is estimated that by 2020, over 50 % of adults in America will have diabetes or prediabetes. Yet a startlingly number, more than 90 %—of people with prediabetes, and approximately 24 % of people with diabetes, are unaware of their condition. This epidemic will have significant repercussions for people's health and life expectancy. According to the National Health Interview 2012 Survey and the Indian Health Service's National Patient Information Reporting System, there are racial and ethnic differences in diagnosed diabetes (Figure 2).

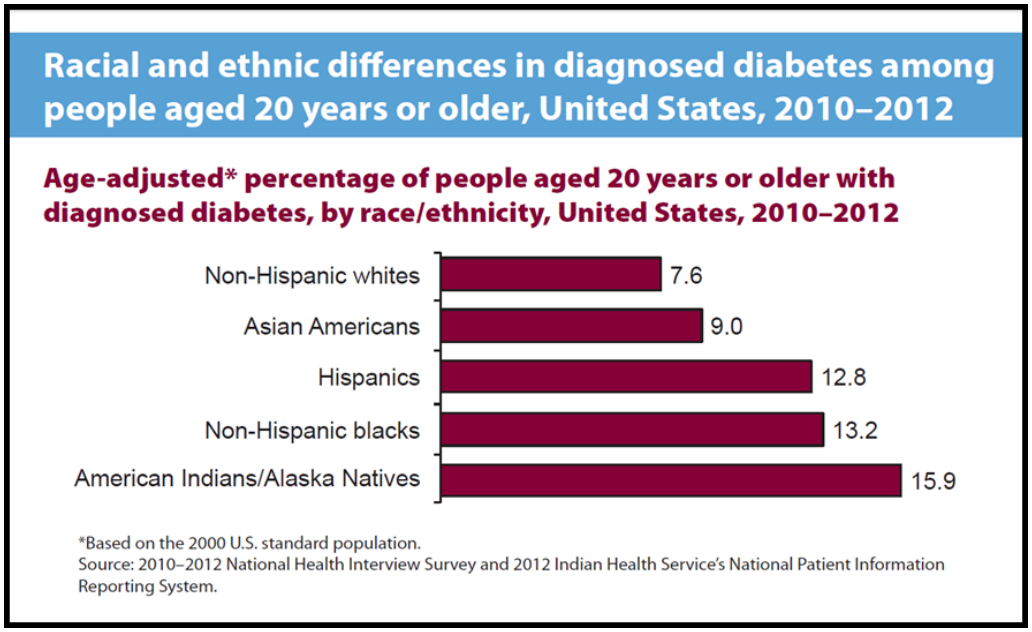


Figure 2. Data showing estimated diabetes costs in the United States, 2012. From "*National Diabetes Report"* by Center for Disease Control and Prevention, 2014, p. 2.

It will also have a tremendous impact on the out-of-control U.S. healthcare costs, resulting in increased financial pressures on families, businesses, employers, and both state and federal government. This new study estimates that health spending associated with diabetes and prediabetes is about $194 billion this year approximately seven % of total U.S. health spending). That cost is expected to rise to $500 billion by 2020 (Center for Health Reform, 2010). According to the Ohio Department of Health's, Impact of Chronic Disease in Ohio: 2015 Report, "Diabetes cost the state of Ohio approximately $4.6 billion in medical costs and absenteeism from the workplace in 2010. The vast majority of the costs associated with diabetes ($4.5 billion) were medical costs, including office visits, outpatient visits, emergency room visits, inpatient hospitalizations, home healthcare, vision aids, medical equipment, prescription medications and nursing homes." The Health Policy Institute of Ohio reports that adult diabetes is one of Ohio's greatest health challenges, which contributes to the state's ranking in the bottom quartile among U.S. States. Unfortunately, Ohio ranks 47th on a composite measure of health value – the combination of healthcare costs and population health, weighted equally. The 2009 Ohio Department of Health, Division of Family and Community Health Services 'Report on Body Mass Index for Third-Graders found that among low-income, preschool-age children, Hispanics have the greatest prevalence of overweight and obesity. The prevalence in 2007 was 33.9 % for Hispanic children, 25.3 % for Black children and 27.2 % for White children. Further, the 2009 Ohio Department of Health Ohio Obesity Prevention Plan recognizes targeted efforts are needed to best impact those most at risk, whose needs may be different because of life circumstance, age, education, culture, language, etc. The economic consequences of obesity are becoming increasingly evident. Americans currently spend nearly $100 billion, and Ohio spends an estimated $3.3 billion, to address the consequences of limited physical activity and poor nutrition annually.

Trends of obesity

Over the past 30 years, most societies have witnessed dramatic and transformational changes in social, behavior, dietary habits as well as physical activity participation leading to increasing epidemic of overweight/obesity. The increased availability of high caloric-density food and sugary drinks as well as increased sedentary lifestyle is implicated in the global and US epidemic of obesity. This trend is also seen in Ohio as reflected in Figure 3 showing the increase in the percentage of the population with diabetes and the associated risk factors.

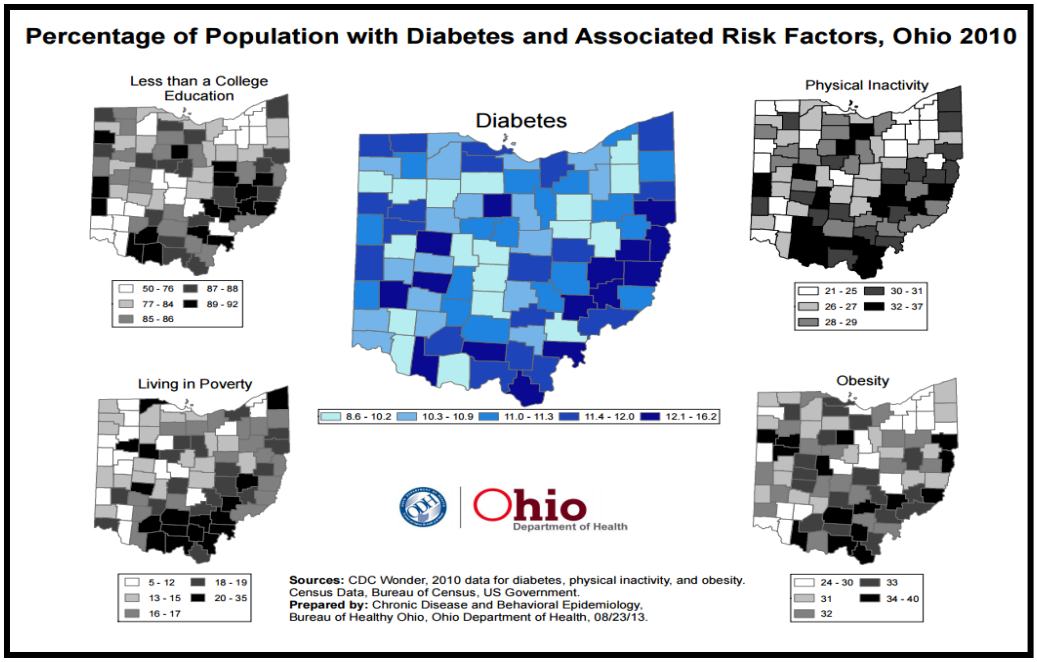


Figure 3. Data showing percentage of population with diabetes and associated risk factors in Ohio, 2010. From "*Chronic Disease Map Gallery: Diabetes Prevalence and Contributing Factors*" by Ohio Department of Health, 2013, p. 1.

In addition, as underdeveloped countries transform to western lifestyle, the rates of obesity and the associated comorbidities also increase. Indeed, in the U.S. 70-100 million Americans (30-40%) are overweight or obese (CDC, 2014). However, the prevalence varies among racial/ethnic populations and is disproportionately higher (50-70%) in minority populations than Caucasians (35%) (CDC, 2014). (www.cdc.gov/diabetes/statistics).

Obesity is not only a major etiological factor, in diabetes, but in hypertension, heart disease, stroke, degenerative joint arthritis, depression, obstructive sleep apnea, cancer and physical disability. However it, should be emphasized that obesity is the major driving force of the epidemic of diabetes in the world and U.S. Additionally, obesity (as measured by BMI and waist circumference) is a strong component of metabolic syndrome, a major predictor of type 2 diabetes and cardiovascular mortality. In this regard, the direct and indirect economic cost of obesity in US is estimated at $270 billion dollars annually (CDC, 2014).

Influence of Nature and Nurture on Trends of Diabetes and Obesity

Obesity occurs in 90% of patients with type 2 diabetes. There is a strong evidence to support that genetic and environmental factors are key players in the development of diabetes. This has led to the concept of "nature vs. nature" or "thrifty gene" theory in the emergence of epidemics in several populations who adopt western lifestyle. In these populations, the prevalence of diabetes and the associated complications are much higher in the minority populations, especially those with lower socioeconomic status, limited educational attainment and low levels of physical activity. In Ohio, the prevalence of diabetes is significantly higher among Black, non-Hispanic adults (17.1 %) compared to White, non-Hispanic adults (11.1 %). Similar to national trends, the prevalence of diabetes in Ohio decreases as annual household income increases; 18.9 % of adults with an annual household income less than $15,000 have diabetes, compared to 6.4 % of those with an annual household income of $75,000 or more. Inversely, Ohio prevalence of diabetes is significantly lower among college graduates compared to those adults without a college degree (ODH, 2015).

Racial/ethnic factors for diabetes and obesity

A major challenge facing the prevention, treatment and management of diabetes and obesity is the increased genetic predilection and predisposition in certain ethnic and racial populations. Specifically, diabetes and obesity affect racial and ethnic minority populations such as African Americans, Hispanics, Native Americans Indians, Alaskan Natives and Pacific Islanders who are generally more obese when compared with Caucasians. Similarly, long-term diabetic complications and mortality also disproportionately affect minority populations, with rates 2-3 times higher than in Caucasian populations in the U.S. Although, the exact cause of the ethnic disparities remains controversial, it is postulated to be multifactorial. In this context, genetic and epigenetic susceptibility and environmental, lifestyle factors and psychosocial determinants (depression, stress etc.) are extremely important contributors. Unfortunately, despite the unprecedented scientific accomplishments and breakthroughs in genetic mapping, the exact "diabetes gene" or genetic marker for general diabetes remains unknown (ADA, 2012).

Prevention of diabetes and long-term complications

a) Primary Prevention: Prediabetes is a major precursor for type 2 diabetes and occurs in 35-40% of the general populations globally and in U.S. One of the most important and major observation in recent times are the evidence-based, randomized studies that affirm that type 2 diabetes is preventable among both minority and majority populations (Diabetes Prevention Program Research Group, 2002; Pan et al., 1997; Tuomilehto et al., 2011). In this regard, the Diabetes Prevention Program (DPP) was unique in that it comprised multiethnic and multiracial populations in U.S. The DPP recruited U.S. ethnic populations with prediabetes and randomized them into the three arms; lifestyle, metformin (a medication), and placebo. The study demonstrated that lifestyle and behavior changes resulting in 5-7% weight loss were associated with at least 58% risk reduction for the development of type 2 diabetes when compared with the placebo. This primary prevention strategy has been very effective in several ethnic populations. Thus, the increasing translation and implementation of modified DPP in diverse communities is a great testimony of the effectiveness of diabetes prevention programs.

b) Secondary Prevention: Strategies to manage patients with diabetes often include lifestyle and behavior changes as well as medications. The goal of the secondary prevention is to prevent or delay the progression of diabetes as well as prevent the development of complications. Although, lifestyle and behavior modification are often recommended, the compliance or adherence by persons with diabetes is often poor. Consequently, less than 50% of persons with diabetes are able to achieve the recommended A1C goal of less than 7% (American Diabetes Association, 2016). Therefore, integrated diabetes and obesity programs are urgently needed to prevent the progression of diabetes and the associated secondary complications (Look AHEAD Research Group & Wing, 2010). In this regard, new antidiabetic medications that have not only glycemic effect, but also influence obesity and cardiovascular outcomes (mortality) will continue to emerge as new therapeutic strategies for patients with diabetes. Finally, metabolic surgery has recently been endorsed by several major scientific organizations for selected, obese diabetic patients, to treat not only obesity, but to improve metabolic control for patients with type 2 diabetes (Bariatric Surgery). Indeed, metabolic surgery, while limited in scope and availability in several countries, is extremely effective resulting in at least 80% remission rate in obese patients with type 2 diabetes (Aziz, 2013). Indeed, a study published in the Journal of the American Medical Association (JAMA) concluded that bariatric surgery is extremely effective resulting in significant remission rates in obese patients with type 2 diabetes (Yska, de Boer, Leufkens, Wilffert, de Heide, de Vries, and Lalmohamed, 2015).

c. Tertiary Prevention: The major concern in the care of diabetes is the development and progression of macrovascular and microvascular complications with irreversible end organ damage. Therefore, strategies to prevent or reduce these complications and the associated deaths are imperative in patients with diabetes. Thus, effective intervention strategies are needed to reduce the risk factors for long-term complications of diabetes and the associated comorbid conditions that lead to increasing functional limitations, poor quality of life (QOL) and

ultimately death. These approaches should be individualized, multidisciplinary, culturally sensitive, and affordable and delivered by team of dedicated, experienced staff and healthcare providers who are culturally competent in diabetes management (Inzucchi et al., 2015).

IV. Addressing Health Disparities in Obesity and Diabetes Disparities while Pursuing Health Equity

Despite medical advances resulting in longer and healthier lives, persistent and well-documented health disparities exist between different racial and ethnic populations. Therefore, the ability of these groups to attain the best health possible, or achieve health equity, remains elusive due to social, economic, and environmental disadvantage experienced where individuals live, learn, work and play (U.S. Department of Health and Human Services Action Plan, 2011). While there are decades of research to document health disparities and the importance of social determinants of health, much of this work has been unfamiliar to leaders outside of public health (Larson & Story, 2008). Since 2002, the annual Agency for Healthcare Research and Quality (AHRQ) and the National Health Disparities Reports (NHDR) have documented the status of healthcare disparities and quality of care received by racial, ethnic and socio-economic groups in the United States (AHRQ, 2008). The AHRQ (2008) documented The National Healthcare Disparities Report finding that racial and ethnic minorities often receive poorer quality of care and face more barriers in seeking care including preventive care, acute treatment, or chronic disease management, than do non-Hispanic White patients. According to the Ohio Department of Health, 2015 Impact of Chronic Disease in Ohio Report, disparities most often occur among populations that are marginalized because of sex, race/ethnicity, age, socioeconomic status, geographic location, religion, disability, sexual orientation and/or other characteristics associated with discrimination. This report further indicates that prevalence, incidence and mortality data demonstrate that the burden of many chronic diseases in Ohio is higher among disparate populations (e.g., older age, Black race, low income and low education). This is clearly indicated in Table 2 listed below which highlights the social determinants of health in Ohio related to chronic diseases. Ohio's prevalence estimates for each of the chronic diseases presented in this report (heart disease, stroke, diabetes, cancer, COPD, asthma and arthritis) are all significantly higher among populations with the lowest income and lowest education. In addition, chronic disease mortality rates by race/ethnicity indicate that Blacks have higher death rates of heart disease, stroke, diabetes and cancer compared with other racial groups.

Table 2

Overview: Disparities and Social Determinants

Disparities: Health disparities are differences in health conditions and health status between populations. Disparities most often occur among populations that are marginalized because of sex, race/ethnicity, age, socioeconomic status, geographic location, religion, disability, sexual orientation and/or other characteristics associated with discrimination. Prevalence, incidence and mortality data presented throughout this report demonstrate that the burden of many chronic diseases in Ohio is higher among disparate populations (e.g., older age, black race, low income and low education). For example, as shown in **Table 1.3**, prevalence estimates for each of the chronic diseases presented in this report (heart disease, stroke, diabetes, cancer, COPD, asthma and arthritis) are all significantly higher among populations with the lowest income and lowest education. In addition, chronic disease mortality rates by race/ethnicity indicate that blacks have higher death rates of heart disease, stroke, diabetes and cancer compared with other racial groups.

Social Determinants: Social determinants of health are the social, economic and physical conditions in the environment in which people are born, live, learn, play, work and age. Social determinants influence the health of people and communities and affect a wide range of health, functional and quality-of-life outcomes and risks (see **Table 1.4**).[10] These conditions are shaped by the amount of money, power and resources that people have and are influenced by policy choices.[11] Addressing the social determinants of health is a primary approach to reducing health disparities and achieving health equity, where everyone has the opportunity to attain their full health potential and no one is disadvantaged from achieving this potential because of their social position or other socially determined circumstance.[10]

Populations with a significantly higher prevalence# of selected chronic diseases, Ohio, 2012

	Sex	Older Age	Black Race	Household Income <$15,000	<High School Education
Heart Disease	X (male)	X		X	X
Stroke		X		X	X
Diabetes		X	X	X	X
Cancer	X (male)	X		X	X
COPD*		X		X	X
Asthma	X (female)		X	X	X
Arthritis	X (female)	X		X	X

Source: 2012 Ohio Behavioral Risk Factor Surveillance System, Ohio Department of Health, 2013.
#This table reflects disparities in prevalence estimates only and does not account for disparities in incidence and/or mortality rates.
* COPD = Chronic Obstructive Pulmonary Disease

Examples of social determinants of health

Social/Economic Factors
- Income
- Education
- Employment
- Access to/Quality of Health Care
- Discrimination (e.g., race, class)
- Social Support
- Access to/Availability of Food

Physical Conditions
- Environment (e.g., green space)
- Built Environment (e.g., sidewalks)
- Work/School/Recreational Settings
- Household/Community Design
- Toxic Substances (e.g., pollution)
- Physical Barriers (e.g., building accessibility)

Ohio Department of Health 10 Healthy Ohio

Note. From *"The Impact of Chronic Disease in Ohio: 2015"* by Ohio Department of Health, 2015, p.10.

Health disparities are persistent in virtually every health condition and disease. The consistent gap in health disparities and health inequities highlights the importance of raising the awareness and broadening the leadership to develop policy strategies to eliminate health disparities, improve healthcare access, increase workforce diversity, and cultural/linguistic competency, and to prioritize the availability and meaningful use of health data and research for all populations (National Partnership for Action, 2011).

The health equity lens of this White paper is intended to be a catalyst for change. Thus, it focuses on the root causes of social determinants of health to influence one's overall quality of life.

V. Understanding the Impact of Racism on Social Determinants of Health that impact Diabetes and Obesity

Racial and ethnic health disparities in diabetes have existed in Ohio for over 30 years. The OCMHMEP-O/D acknowledges the growing body of research that demonstrates the impact of racism as a social determinant in health disparities. While racial disparities for diabetes mortality rates are evident, the ability to address the causal factors constitutes major challenges for communities, practitioners, and institutions working to address this problem. The work of noted researchers and institutions such as Dr. Camara Jones, Robert Smedley, and the Kirwan Institute provide useful concepts to understand the impact of racism (Jones, 2000; Smedley, et al., 2003; Staats, et al., 2016). When strategically applied, these concepts can promote systemic change in addressing the issue of racism and help us to improve disparities in obesity and diabetes. Given the availability of data and research, the OCMHMEP-O/D recommends that any serious initiative to overcome disparities in diabetes and obesity mortality rates must contain a robust set of strategies to address the related social determinants of health.

VI. Rationale and Discussion

Access to Care

Reducing racial and ethnic disparities in the incidence, prevention and treatment of obesity and diabetes in Ohio can be addressed in part by improving access to quality healthcare. One of the most important factors to address in improving access is reducing the racial and ethnic gap in insurance coverage and ensuring adequate coverage for the screening, treatments and prevention of both obesity and diabetes (Smedley, Stith, & Nelson, 2003). Insurance status is an important predictor of quality of care. Recommendations must include increasing the number of individuals insured through private insurance, publicly funded programs (Medicaid) and through exchange programs. Additionally, when insured, there must be affordable coverage for screening and evidence –based programs in the prevention and treatment of obesity, diabetes and the co-morbid conditions that can result from both. Wellness screenings, A1C and blood glucose monitoring, BMI and risk assessments, mental health evaluation and treatment, and weight management programs that include behavioral modification, increasing physical activity, dietary counseling and bariatric surgery have all positively impacted obesity and diabetes. While the Patient Protection and Affordable Care Act has decreased the number of uninsured individuals, many of these programs in Ohio, currently provide no coverage for medical or surgical weight loss options.

Studies show that when you control for type of insurance, race and ethnicity still negatively predict quality of care. The reasons for these disparities are multifactorial and are partially explained in Figure 4.

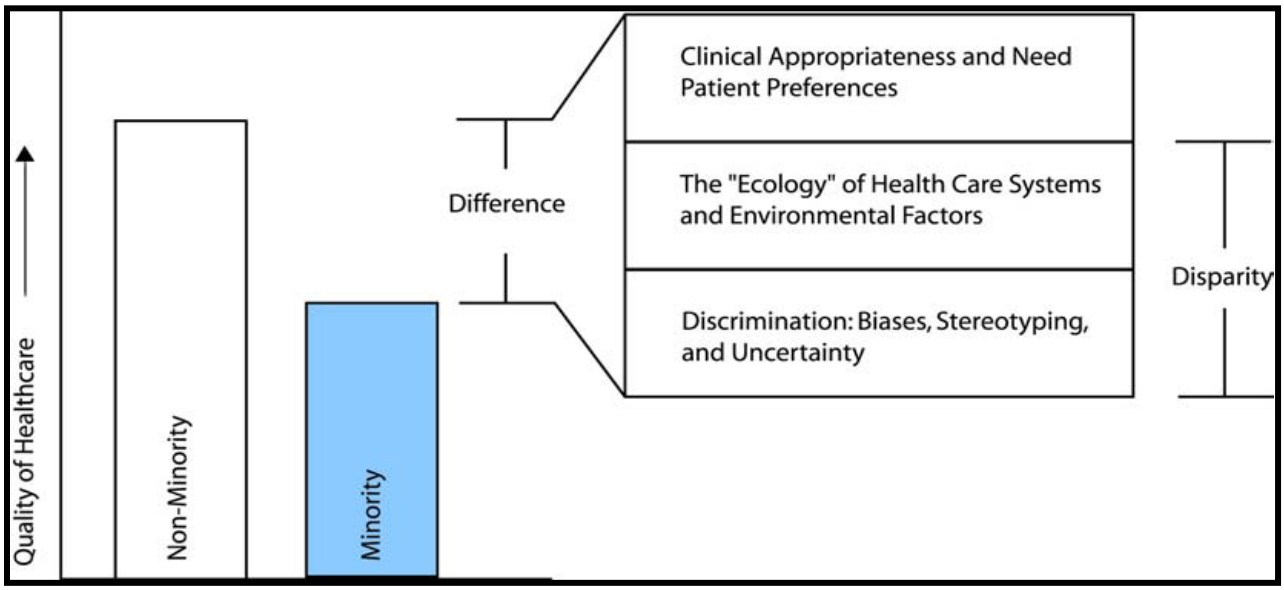


Figure 4. Data showing impact of the quality of healthcare on minority health disparities, 2001. From *"Differences, Disparities, and Discrimination: Populations with Equal Access to Healthcare"* by Gomes and McGuire, 2001, p.4.

Adjusting for health insurance, income, age, sex, marital status, education, health status, region of the country, and residence in a metropolitan area, Hispanics and African Americans were significantly more likely to lack a usual source of care and were less likely to use any ambulatory care services than White Americans (Smedley et.al., 2003). It is therefore necessary to ensure that geographic accessibility by identifying regions at risk, identify health provider shortage areas, and implement strategies to increase access to comprehensive and continuous care. Interventions may involve multidisciplinary teams in a variety of community resources. One such project, REACH 2010, reduced racial and ethnic disparities by utilizing healthcare institutions, community- and faith-based organizations and civic groups, libraries, professional associations, government and business organizations,

and local media (Jenkins et.al., 2004) Successful projects such as these include patient education, nurse case management, treatment algorithms, outreach with community health workers, patient incentives, continuous quality improvement, and group visits (Chin, Walters, Cook, & Huang, 2007)

Access to care is essential. Increasing the number of Ohioans with health coverage, requiring that all insurance-types provide adequate and affordable coverage for the prevention, diagnosis and treatment of obesity and diabetes, and ensuring adequate numbers of culturally competent healthcare institutions and providers are all necessary to overcome healthcare disparities in Ohio.

Access to Behavioral Health Services

Diabetics have a 24% higher incidence of depression when compared to the general population (Nouwen et al., 2010). In particular, this is seen largely in type 2 diabetics who have associated comorbidities leading to variable disability (Nouwen et al., 2010). Studies further suggest episodes of acute depressive symptoms last 8 to 12 weeks in duration for the general population, whereas up to 73% of diabetics, experiencing depressive symptoms will have persistent complaints at 12 months and 79% will have recurrence at 5 years (Holt et al, 2014). Diabetics with depressive symptoms reveal reduced quality of life, impaired self-management skills, increased complications, and reduced life expectancy (Holt and Katon, 2012). Given the significant disparity in health of persons with obesity and diabetics experiencing depressive symptoms, we recommend screening all diabetics utilizing a validated culturally appropriate screening tool. Appropriate assessment, follow-up, and intervention are necessary to improve access and treatment of diabetic patients in Ohio. Broadening access to behavioral health services will be an essential component to proper assessment and treatment of this population.

Access and Capacity: Diabetes Self-Management Programs and Diabetes Prevention Programs

Background

Research has shown that community-based Diabetes Self-Management Education (DSME) is an effective intervention for improving glucose levels among adults of various racial and ethnic backgrounds with type 2 diabetes, (Partnership for Prevention, 2008). The goals of DSME are to improve quality of life, reduce diabetes-related complications, and to minimize healthcare costs. The Diabetes Self-Management Program was developed by Stanford University researchers and proven to make significant improvements in diabetes among participants in the study. The Diabetes Prevention Programs (DPP), a nationally recognized program by the Centers for Disease Control (CDC) is also a proven lifestyle change program for preventing type 2 diabetes (http://patienteducation.stanford.edu). Eligible participants for DPP are those who are at risk for diabetes or who have been diagnosed with prediabetes by a healthcare provider. Research had shown that people with prediabetes who take part in a structured lifestyle change programs could cut their risk of developing type 2 diabetes by 58% (71% for people over 60 years old). The primary lifestyle modifications included healthier eating and 150 minutes of weekly physical activity which led to average participant loss of 5% to 7% of their body weight. The study also found that even after 10 years, people who completed a DPP were one third less likely to develop type 2 diabetes, (DPP, 2002). Community-based DSMP and DPP can be offered in settings outside the home, including clinics, schools, or worksites and faith-institutions. It is important to provide convenient locations, community support, and ensure cultural relevance to participants in order to reaching people who have limited access to formal healthcare.

Access to Primary Care Providers and Diabetes Programs

The *County Health Rankings & Roadmaps* estimates that Ohio has an adequate overall primary care physician population of 1,300 patients to one physician. There are wide variations from county to county, with the ratio as

high as 14,900:1 in rural Morgan County, (with only one provider for the entire county) to Cuyahoga and Delaware counties that have better ratios closer to 800:1 (County Health Rankings, 2016). What these somewhat encouraging numbers do not indicate is the paucity of physicians with ethnic and culturally diverse backgrounds. The Association of American Medical Colleges (AAMC), 2014 report of the US physician workforce revealed that "out of the total U.S. MD active physicians, 4.1% were Black or African American, 4.4% were Hispanic or Latino, 0.4% were American Indian or Alaska Native, 11.7% were Asian, and 48.9% were White" (AAMC, 2014).

Figure 5 below shows the virtually stagnant progress of minorities (with the exception of Asian woman and men) over the last 30 years. Further examination of the already low national numbers of African American, Hispanic Latino, and America Indian or Alaskan Native physicians, in each case, less than half are in primary care positions as exemplified in Figures 6, 7, and 8. This extremely small number of ethnic primary care physicians adversely impacts access, cultural competence, patient centered care, language barriers, and more.

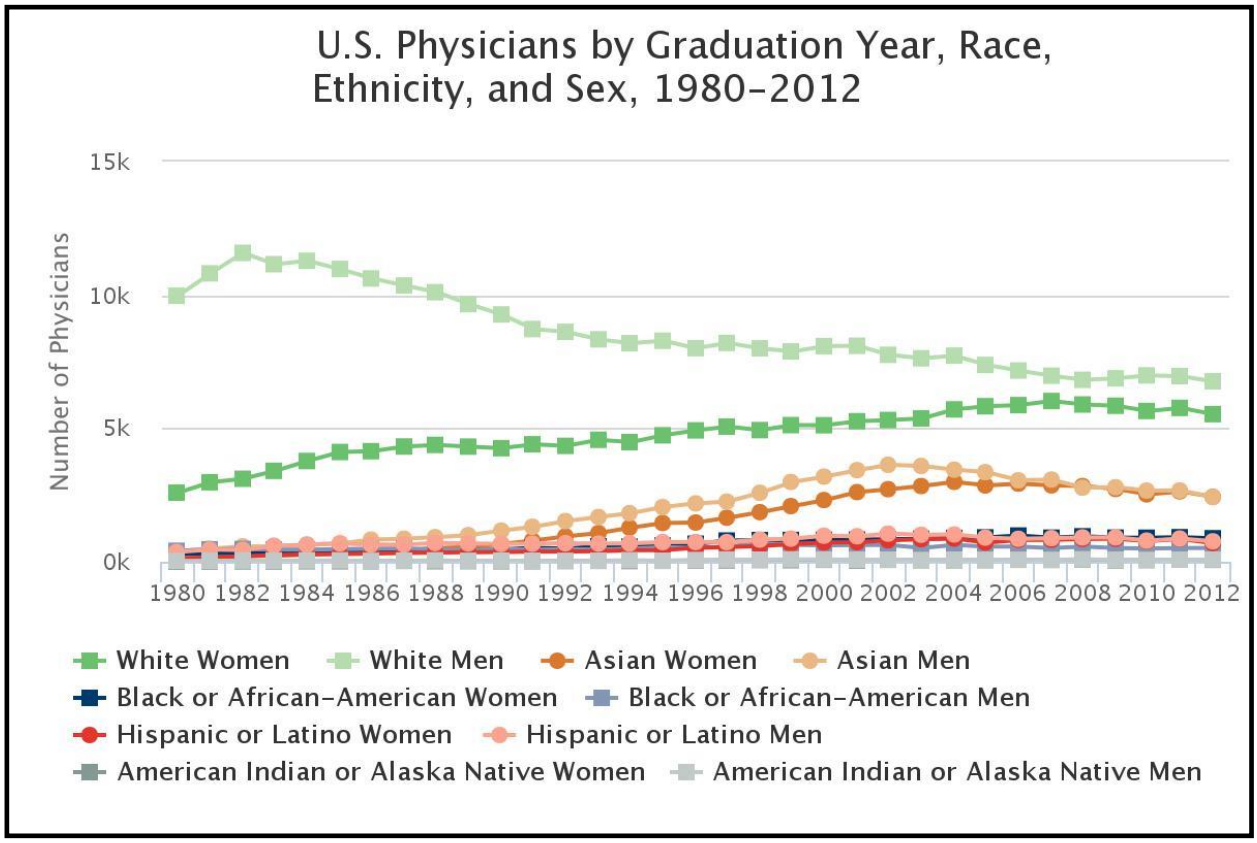


Figure 5. Data showing U.S. Physicians by Graduation Year, Race, Ethnicity, and Sex in the United States, 1980-2012. From "*Diversity in the Physician Workforce: Facts and Figures 2014"* by Association of American Medical Colleges, 2014, Section 3.

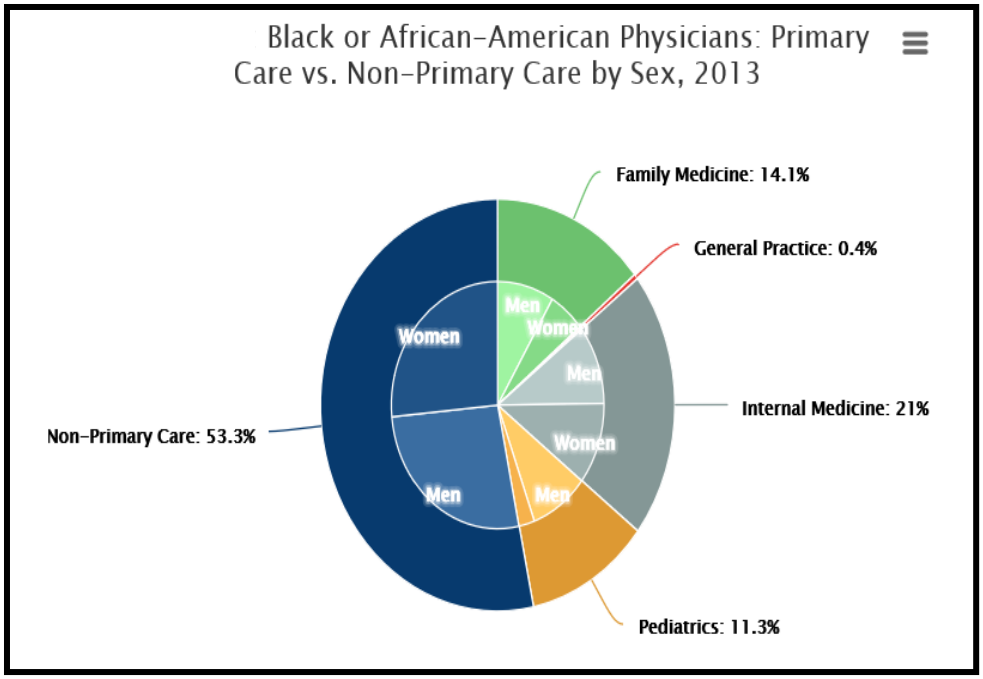


Figure 6. Data showing Black or African-American Physicians: Primary Care vs. Non-Primary Care by Sex in the United States, 2013. From "*Diversity in the Physician Workforce: Facts and Figures 2014"* by Association of American Medical Colleges, 2014, Section 2.

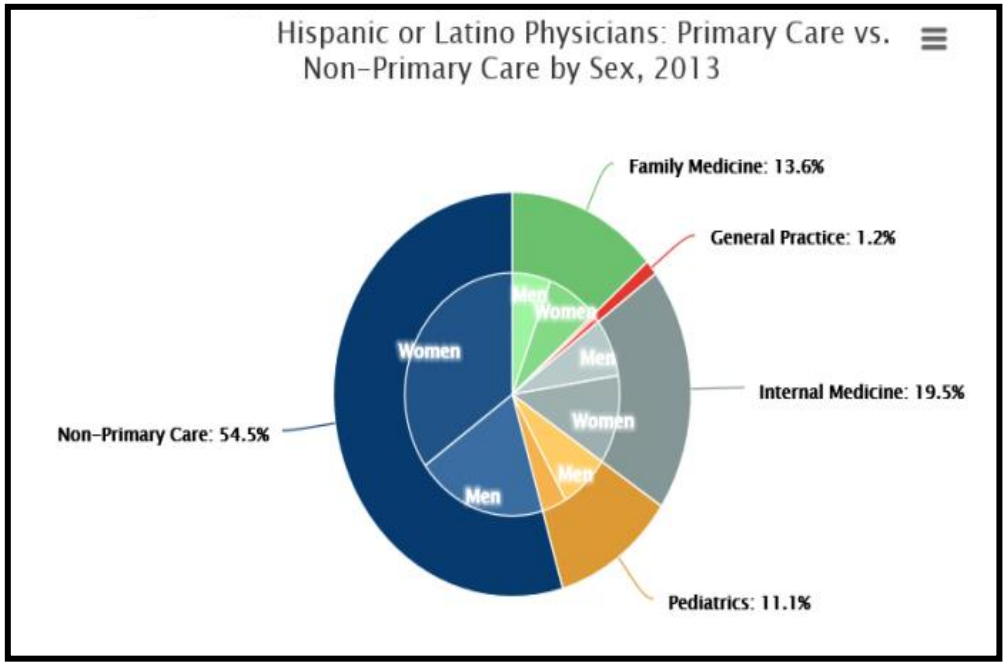


Figure 7. Data showing Hispanic or Latino Physicians: Primary Care vs. Non-Primary Care by Sex in the United States, 2013. From "*Diversity in the Physician Workforce: Facts and Figures 2014"* by Association of American Medical Colleges, 2014, Section 2.

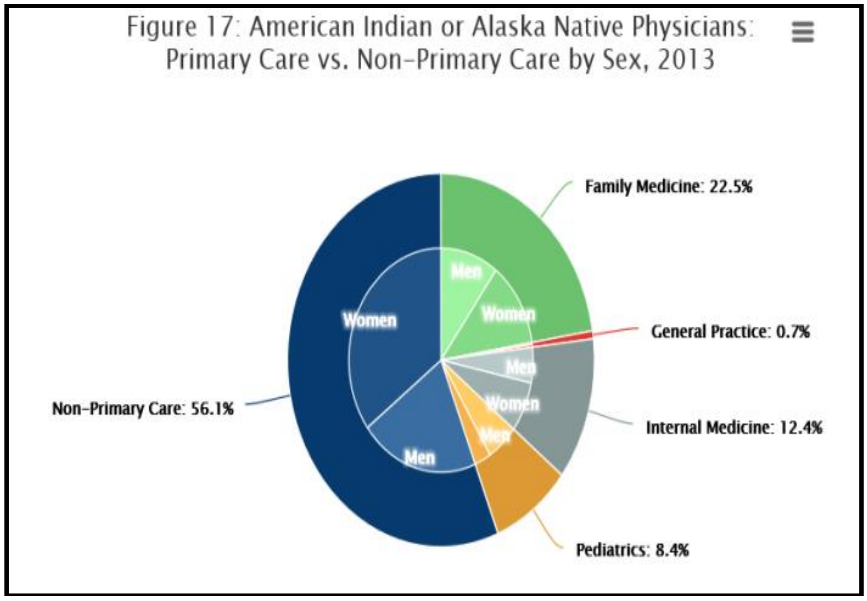


Figure 8. Data showing American Indian or Alaska Native Physicians: Primary Care vs. Non-Primary Care by Sex 2013. From "*Diversity in the Physician Workforce: Facts and Figures 2014"* by Association of American Medical Colleges, 2014, Section 2.

In Ohio, there are 855 African American physicians (3.2% of the total) (Figure 9) yet African Americans make up 12% of the population. This is a ratio of 1,654:1, Black patients to Black doctors. For the Hispanic/Latina physicians the ratio is 931:1(Figure 10) (AAMC, 2014). The Native American numbers are so small (37 physicians) that their ratio (590:1) (Figure 11) is ineffective because the distance to travel for care is prohibitive.

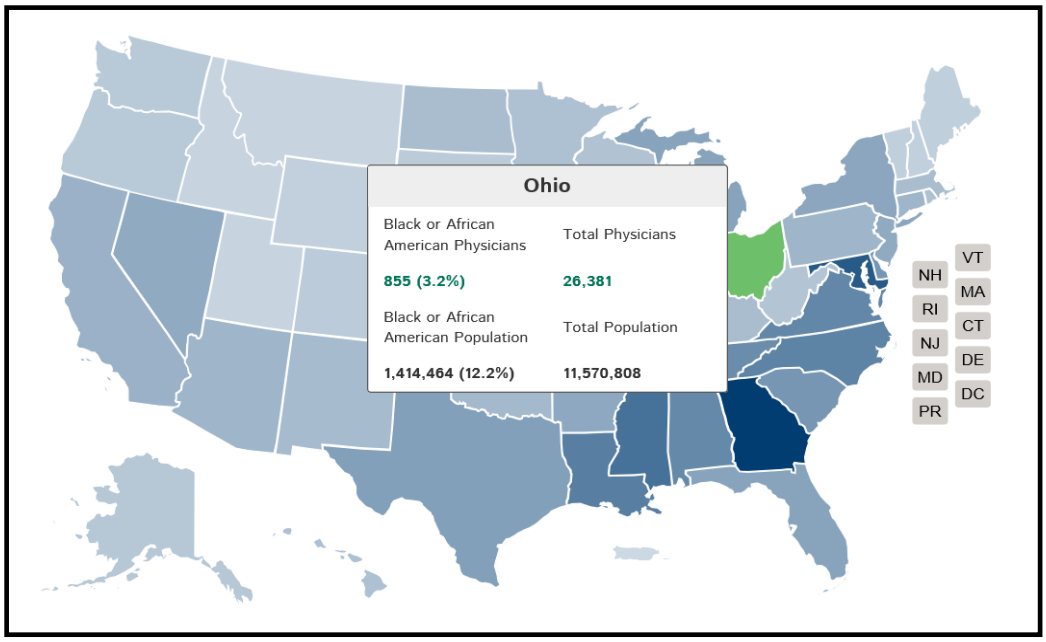


Figure 9. Data showing Black or African American Physicians in Ohio, 2013. From "*Diversity in the Physician Workforce: Facts and Figures 2014"* by Association of American Medical Colleges, 2014, Section 3.

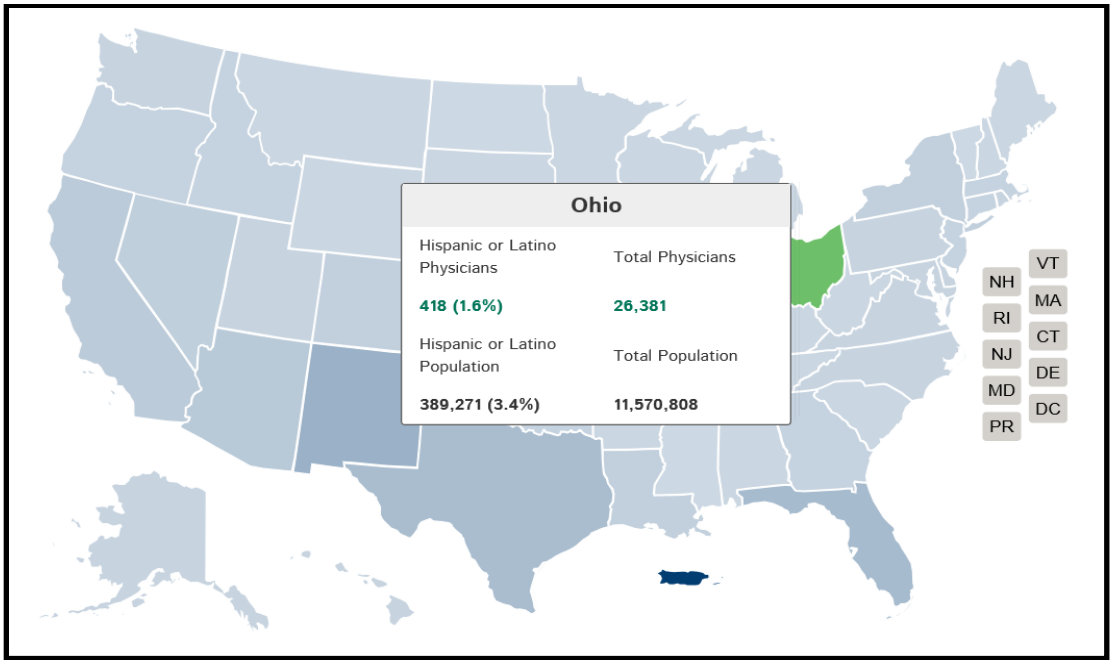


Figure 10. Data showing Hispanic or Latino Physicians in Ohio, 2013. From "*Diversity in the Physician Workforce: Facts and Figures 2014"* by Association of American Medical Colleges, 2014, Section 2.

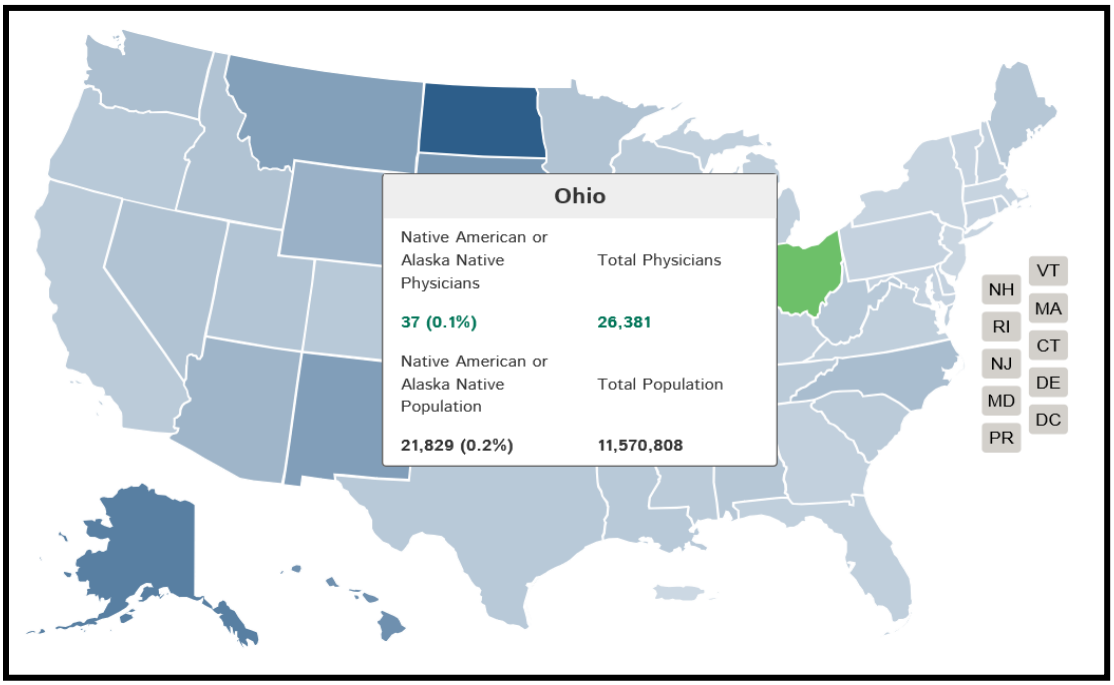


Figure 11. Data showing American Indian or Alaska Native Physicians in Ohio 2013. From "*Diversity in the Physician Workforce: Facts and Figures 2014"* by Association of American Medical Colleges, 2014, Section 2.

Access to appropriate culturally competent primary care providers for minority Ohioans is poor overall despite the high number of total physicians. In addition, the actual percentage of primary care providers available for diabetes care is generally half the already low number of culturally competent primary care providers. A study looking at cultural perspectives of African Americans, Asian Indians, Latinos and Whites found that members of racial/ethnic minority groups are more likely than Whites to identify cultural competency and providing a holistic

approach to care as important to healthcare quality."(Bagchi, Af & Leonard, 2012). Traylor and colleagues at the Health Services division of the National Institute of Health found that patients predictably chose culturally similar physicians when they had a choice and that "patient language, preferences, and the racial composition of the physician workforce predict race/ethnicity concordance," (Schmittdiel, 2015; Traylor, Schmittdiel, Uratsu, Mangione, & Subramanian, 2010).

Accessing diabetes programs can also be challenging according to AHRQ, (2008) Healthcare Disparities Report that revealed that racial and ethnic minorities have limited access to disease management programs, which perpetuates the likelihood of disparities in chronic diseases. According to the CDC 2010 Diabetes county level prevalence data, 50% of Ohio counties with the highest prevalence of diabetes in the state do not have, within their borders, (or within a 5-mile radius), an American Diabetes Association (ADA)- approved diabetes self-management education program. In addition, 34.8% of those counties at the next highest level of diabetes prevalence do not contain, or are within 5 miles of, an ADA-approved program as well.

Currently, Ohio only has 18 CDC recognized Diabetes Prevention Programs across the state (Ohio Department of Health, 2016). Similarly, the Ohio Department of Aging has also implemented evidenced based programs entitled "Healthy U", which are facilitated through its twelve Area Agencies on Aging for caregivers and older adults who have difficulty self-managing their chronic conditions. Unfortunately, the maximum capacity of these state department programs is not readily available. In addition, each of the Medicaid Managed Care Organizations are required to provide access to disease management programs for their members. We must ensure that members are both aware and have access to these programs. These program's capacity and availability should be monitored closely so that Ohio communities are served in a fair and equitable fashion. It is also imperative that community physicians and providers are both aware and are encouraged to refer patients to these valuable diabetes prevention and self-management programs.

Sustainability

The fee for DPP varies among providers ranging from no cost to more than $400 for a yearlong program. For low -income at-risk individuals the cost of these programs are a significant barrier. Currently, DPP nor DSMP are a required insurance benefit through the Affordable Care Act (ACA). Therefore, it is at the discretion of third party payers whether to cover these programs. Recognizing the large burden of diabetes on the increasing senior population, Medicare will begin covering DPP programming for its beneficiaries in 2017 (CDC, 2016)

DSMP programs are available at no cost to participants through the funding that the Ohio Department of Aging receives from the Administration for Community Living. Federal funding is not sufficient to reach underserved, low income and rural areas and to sustain the programs. This evidenced based program requires a robust infrastructure that can support multiple sites and collect data, which is integral to sustainability (US Department of Health and Human Services, 2016).

Understanding Unequal Access to Healthy Food

According to the California Center for Public Health Advocacy, 2007 Designed for Disease Study, the place in which individuals live significantly impacts their access to food. Furthermore, poor minority populations are also more likely to have higher increased access to fast food and reduced access to healthy foods resulting in increased rates of obesity and disease. The importance of the effect of diet on health outcomes is both established and continuing to accumulate strong evidence. An ideal healthy diet has been described by multiple organizations, most notably by the U.S. Department of Agriculture (USDA), in the *"Dietary Guidelines for Americans 2015-2020, Eight Edition."* The U.S. Dietary Guidelines recommend: 1) Following healthy eating patterns across the lifespan; 2) Focus on variety, nutrient density and amount; 3) Limit calories from added sugars and saturated fats

and reduce sodium intake; 4) Shift to healthier food and beverage choices and 5) Support healthy eating patterns for all (US Department of Health and Human Services and US Department of Agriculture, 2015).

The American Heart Association (AHA) dietary pattern recommends balancing energy intake and physical activity to achieve and maintain a healthy body weight, consuming a diet rich in vegetables and fruits, choosing whole-grain, high-fiber foods, and consuming fish, especially oily fish. Studies demonstrate that increased adherence to the recommended USDA, American Heart Association Mediterranean and the Dietary Approaches to Stop Hypertension (DASH) dietary pattern was associated with 11-26% lower risk of all-cause and cardiovascular disease mortality in both men and women, as well as 11-24% reduction in cancer mortality for men and women (Liese et al., 2015; Reedy et al., 2014).

A recent study examining overall diet quality in Americans from 1999-2012, demonstrated a decline from 55.9% Americans with a poor diet in 1999 to 45.6% in 2012 (Rehm, Peñalvo, Afshin, and Mozaffarian, 2016).
Additionally, research has noted disparities in diet quality by race/ethnicity, education and income level. However, non-Hispanic, Black adults, and Mexican American adults, did not show diet quality improvements. Moreover, some low-income individuals were noted to have an increase in poor diet consumption (Solman, 2016).

The relationship to poor diet, food insecurity and diabetes management was established in an article published in *Diabetes Care.* According to Lyles et al (2013), the lack of availability to nutritionally adequate foods and the day-to-day changes in the availability of food makes diabetes self-management more difficult. This was noted by the significantly higher levels of HbA1c in food insecure participants when compared to those who were food secure (Lyles et al., 2013). The primary reason for this food insecurity, as particularly noted among underserved individuals is the aspect of "food deserts." A food desert is a community with limited access to healthy foods and a disproportionate number of fast food outlets. These areas are often found in low-income communities where residents' access to healthy food is limited. In addition, residents who live in food deserts, experience a higher prevalence of diabetes. According to the Food Trust (a nationally recognized nonprofit organization dedicated to ensuring universal access to affordable, nutritious food), the grocery gap noted in several communities studied led to diet-related illnesses such as obesity and diabetes (Karpyn et al., 2010).

With food deserts in mind, the ability to consume fresh food protects against diabetes and obesity and goes beyond the concept of communities taking personal responsibility for health. In many communities, even if the residents had a level of readiness to regularly consume fresh fruits and vegetables, these types of foods are largely unavailable. This is further exemplified by the maps (Figure 12 and 13) listed below of Cleveland, Ohio and Dayton, Ohio. The maps reflect data from the 2010-14 American Community Survey of minority populations below the poverty level and their proximity to retail stores by census tract. Despite these cities being at opposite ends of the state, they clearly show some of the same challenges. Both cities have census tracts with the highest percentages of minorities below the poverty level which are less likely to live near retail stores who sell healthy food. Given the vital importance that diet plays in obesity and diabetes control, it is imperative that access to healthy eating options be improved. In April 2011, the Center for Disease Control and Prevention, Division of Nutrition, Physical Activity and Obesity released the Children's Food Environment State Indicator Report, 2011. This report measures the number of healthy and less healthy food retailers within census tracts across each states as defined by typical food offerings in specific types of retail stores. This presents an opportunity for communities and policies makers to increase access to much needed healthy foods.

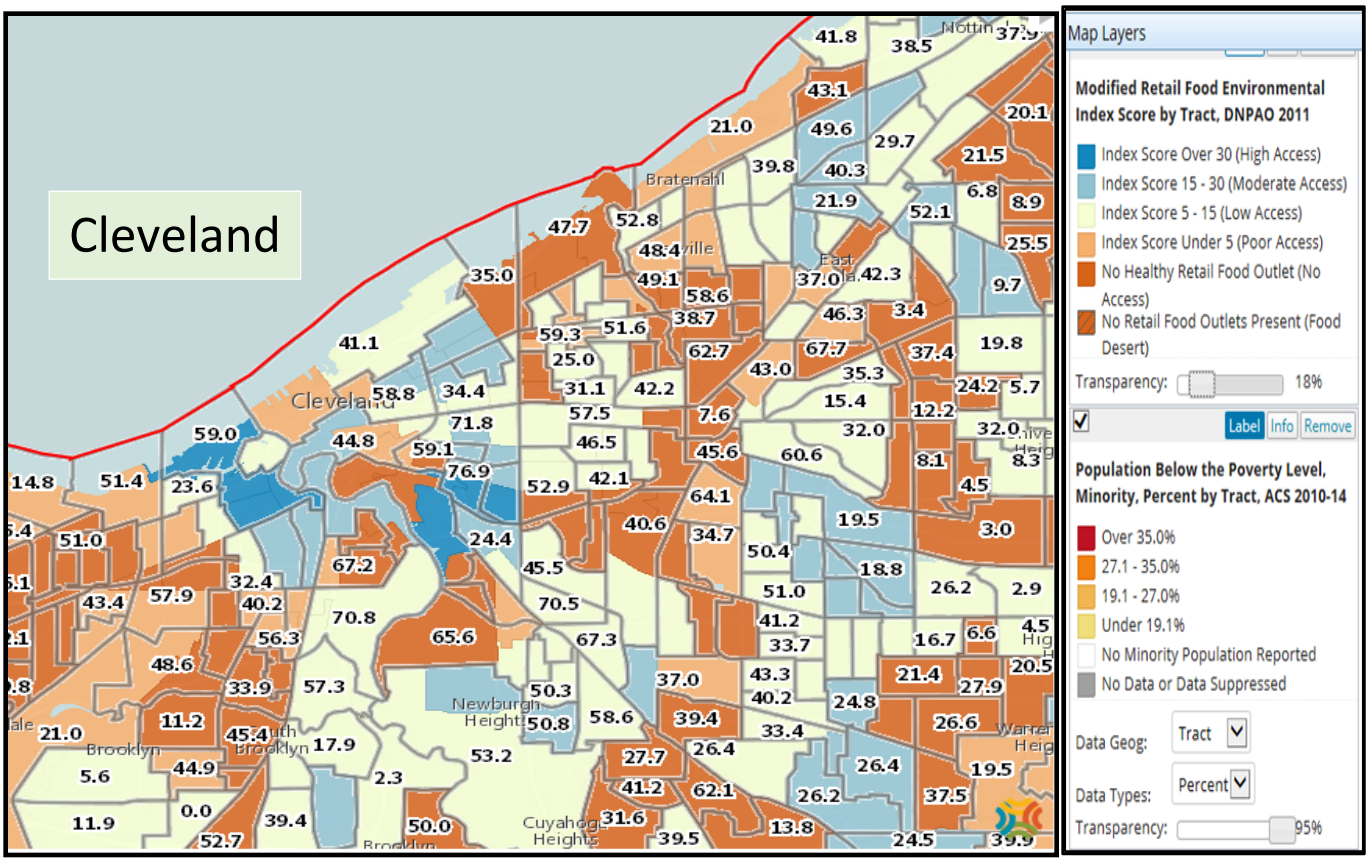


Figure 12. Data showing Bivariate Thematic Map of Cleveland with the Percentage of Minority Population Below the Federal Poverty Level and the 2011 CDC Modified Retail Food Environmental Index by Census Tract, Ohio, 2010-2014. From "*American Community Survey* "- Map generated through www.CommunityCommons.org, 2014.

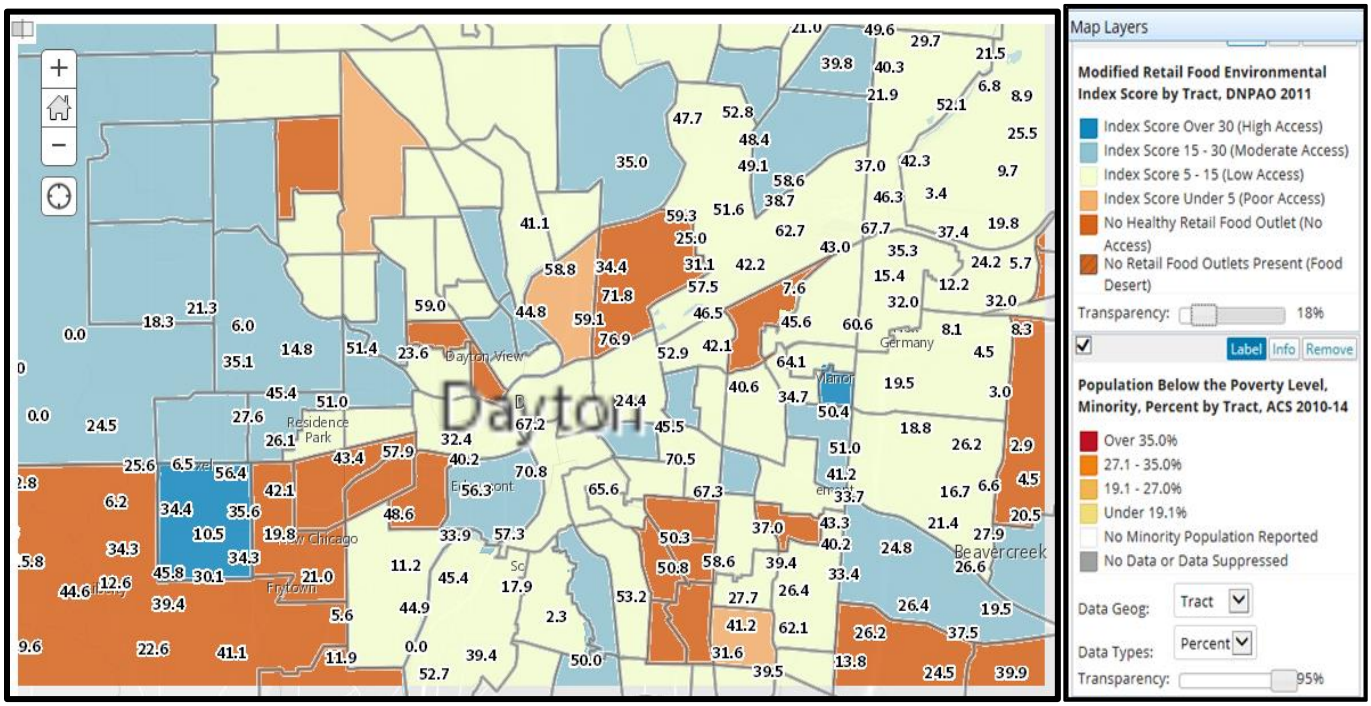


Figure 13. Data showing Bivariate Thematic Map of Dayton with the Percentage of Minority Population Below the Federal Poverty Level and the 2011 CDC Modified Retail Food Environmental Index by Census Tract, Ohio, 2010-2014. From "*American Community Survey* "- Map generated through www.CommunityCommons.org, 2014.

Diabetes in Children

The foundation for good health, is established in childhood and continues throughout the life span. This foundation is built through the child's experience within the context of their family and community. Without a strong foundation, unhealthy lifestyle behaviors are easy to adopt and lead to chronic health conditions that over time prove increasingly difficult to reverse. Two such preventable chronic health conditions are childhood obesity and youth type 2 diabetes.

Childhood obesity is defined as an age and gender-specific body mass index above the 95th percentile on the Center for Disease Control and Promotion 2000 Growth Chart. Approximately 17% of children (2-17 years) in the United States (US) live with obesity, with a disproportionate burden on racial and ethnic minority and low-socioeconomic populations, (Ogden, Carroll, Kit, & Flegal, 2014). The prevalence of obesity is higher among non-Hispanic Black and Hispanic youth than among non-Hispanic White youth but not for non-Hispanic Asians. (Figure 1) Among children 12-19 years old, 13% have a body mass index of 30 and above, analogous to an adult with obesity (Ogden et al., 2014). These disparities persist even as rates of obesity begin to stabilize or decline in some age groups (Ogden et al., 2014). When compared with children on private insurance plans, decreases in early childhood obesity rates were less pronounced among children on Medicaid (Wen et al., 2012). A subpopulation of children with obesity have severe obesity, which places them at an increased risk for type 2 diabetes. Currently 6.3% of children 2-17 years old have severe obesity defined as a body mass index that is 120% of the 95th percentile for age and gender, (Skinner, Perrin, & Skelton, 2016). The prevalence rates for children with severe obesity has increased between 1999-2014, with higher rates among Blacks and Hispanic populations, (Skinner et al., 2016). Black adolescents with obesity demonstrate poorer endothelial function, a risk factor for cardiovascular disease when compared to their Caucasian counterparts. (Hoffman, 2012)

Recent estimates indicate that the incremental lifetime direct medical costs for a child with obesity who remains obese as an adult compared to a child that is a healthy weight and remains normal weight as an adult is $19,000 (Finkelstein et al., 2014). At the current rate of childhood obesity (roughly 17% of the 73.7 million U.S. children), the estimated total incremental cost multiplies to over $238 billion (Finkelstein et al., 2014). Together, these findings underscore an urgent need for effective and sustainable childhood obesity interventions, with focused attention on racial and ethnic minorities and populations with low-socioeconomic status.

Nationally, only 68% of pediatricians and 39% of family physicians regularly assess the obesity status of their pediatric patients using BMI percentiles (Huang et al., 2009). Yet, parents identify the physician's office as the preferred setting to address weight-related concerns for their child (Eneli, Kalogiros, McDonald, & Todem, 2007). Furthermore, overweight adolescents are more likely to attempt weight loss strategies when counseled by their physician in primary care (Saelens, Jelalian, & Kukene, 2002). Thus, a recent push has been to train providers on how to screen and manage the child with obesity in a manner that is culturally competent and cognizant of the health disparities and inequities that exist with lifestyle risk factors and treatment.

Recommendations for testing youth for type 2 diabetes align with criteria for adults. The American Academy of Pediatrics recommends testing all children who are overweight or obese with a BMI ≥ 85th percentile, starting at age 10 years or younger, if puberty occurs earlier, and if they present any of the following risk factors: a) Family history of diabetes, b) Conditions associated with insulin resistance, hypertension, dyslipidemia, polycystic ovarian syndrome, or large-for-gestational-age (LGA) birth weight, c) Maternal history of diabetes or gestational diabetes during child's gestation. It is recommended that children need to be tested every 2-3 years.

Prevalence and Characteristics of type 2 Diabetes in Youth:

According to the 2014 CDC estimates, 0.25% of youth younger than 20 years have been diagnosed with type 1 or type 2 diabetes (type 1 or type 2); which is approximately 208,000 individuals (CDC, 2014). Compared with other groups, non-Hispanic White children and adolescents had the highest rate of new cases of type 1 diabetes.

(Figure 14). Among 10-19 year old non-Hispanic Black and American Indian/Alaskan Indian youth, more than 50% and 75% of the new cases of diabetes are type 2 diabetes, respectively (Figure 15). Data from the National Institute of Health funded multicenter study, the Treatment Options for type 2 Diabetes in Adolescents and Youth (TODAY) study has provided valuable insights on the characteristics of type 2 diabetes in youth. The TODAY study reported disparity for new onset diabetes, revealing that at diagnosis, Hispanics had the lowest prevalence of hypertension (8%) compared with non-Hispanic Black (14%) and non-Hispanic White (18%) patients, (Narasimhan & Weinstock, 2014).

Treatment failure defined as poor glycemic control was particularly high with 50% failure rate in the study population (Group, 2012). Disparities were noted with failure rates of 53% in non-Hispanic Blacks, 45% in Hispanics, 35% in non-Hispanic Whites, and 39% in American Indians (Group, 2012).

The TODAY study revealed a rapid progression of associated cardiovascular and diabetic comorbidities over 36 months (Figure 16) indicating that these children will live with a chronic disease that places them at significant morbidity and risk of mortality.

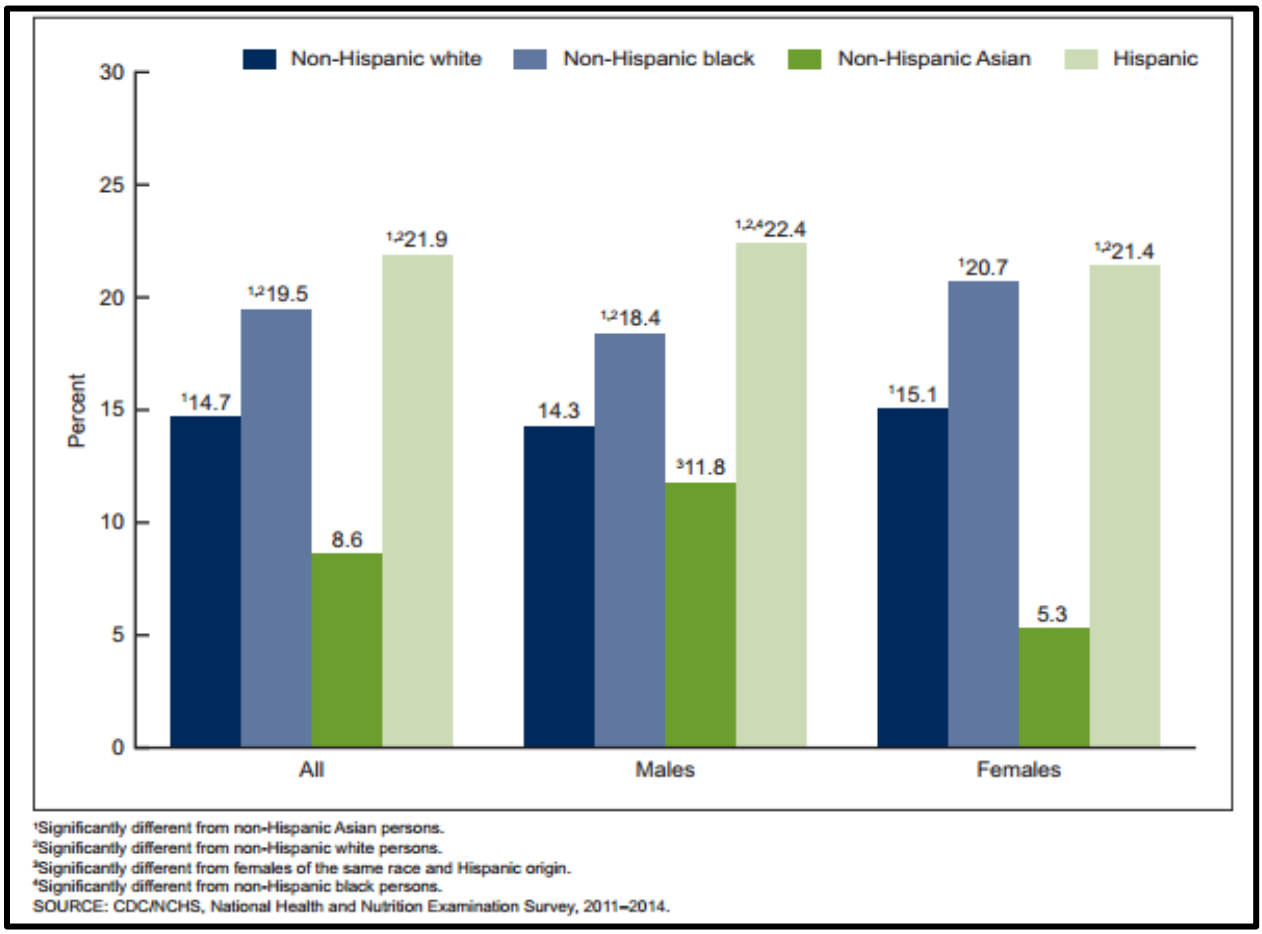


Figure 14. Data showing prevalence of childhood obesity by sex and race and Hispanic origin, 2011-2014 in the United States, 2011-2014. From "*Prevalence of Obesity among Adults and Youth, US, 2011-2014*" by Ogden, Carroll, Fit and Flegal, National Center for Health Statistics, 2015, Brief 219, p. 4.

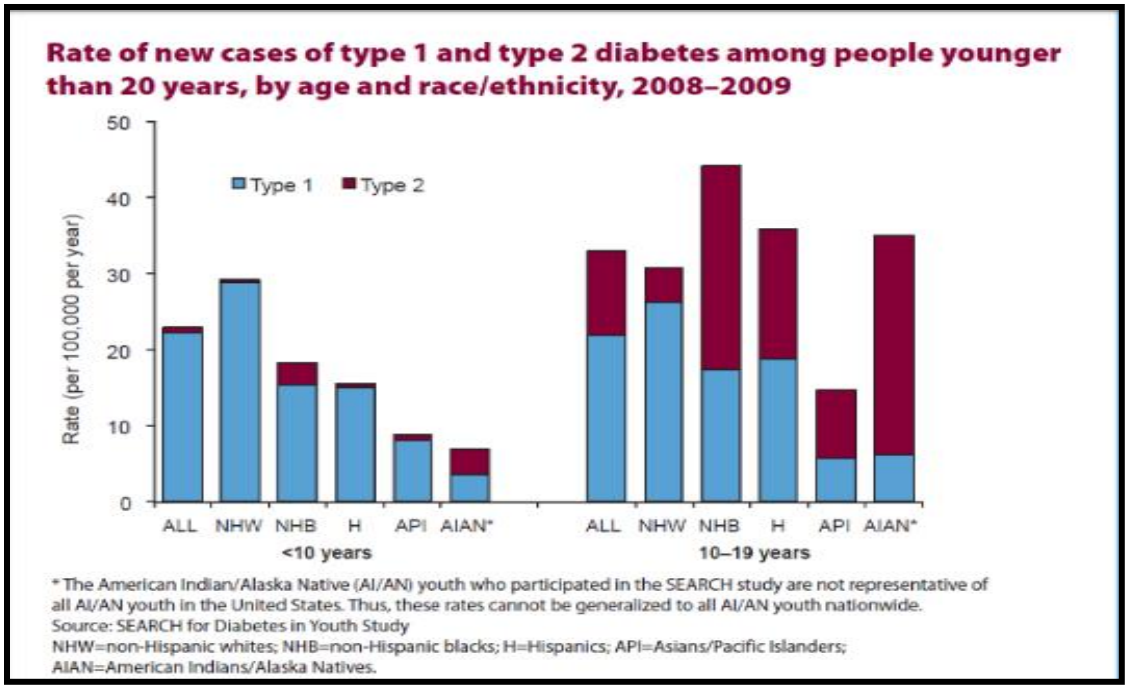


Figure 15. Data showing new cases of type 1 and type 2 by age, race/ethnicity, United States, 2008-2009. From "*National Diabetes Report"* by Center for Disease Control and Prevention, 2014, p. 4.

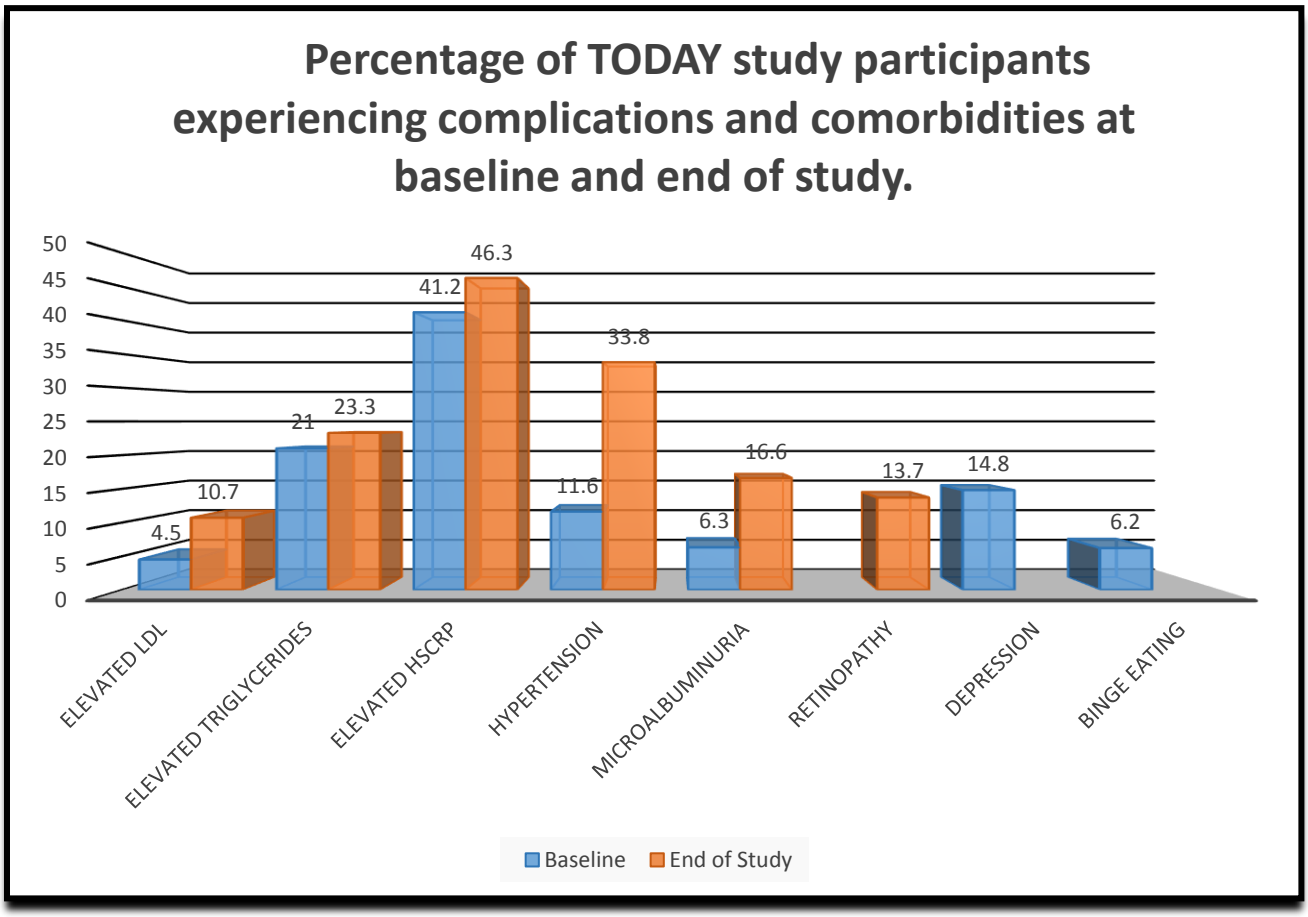


Figure 16. Data showing percentage of TODAY study participants experiences complications and comorbidities at baseline and end of study, United States, 2014. Adapted from "*Youth-Onset type 2 Diabetes Mellitus: Lessons Learned from the TODAY Study*" by Narasimhan & Weinstock, 2014, p 811-813.

Diabetes and Tobacco

Tobacco use remains the single largest preventable cause of death and disease in the U.S. More than 480,000 Americans die each year from cigarette smoking with more than 41,000 of these deaths from exposure to secondhand smoke (U.S. Department of Health and Human Services, The Health Consequences of Smoking, 2014). In addition, smoking-related illness in the United States costs more than $300 billion a year, including nearly $170 billion in direct medical care for adults and $156 billion in lost productivity (U.S. Department of Health and Human Services, 2010). In 2014, an estimated 40 million U.S. adults were current* cigarette smokers. Of these, 76.8% (30.7 million) smoked every day, and 23.2% (9.3 million) smoked some days (CDC, Ohio BRFSS Annual Report, 2014)

In the 2014 Surgeon General's Report, The Health Consequences of Smoking-50 Years of Progress, smoking was newly identified as a causal link to diabetes. This report concludes that the risk of developing diabetes is 30–40% higher for active smokers than nonsmokers. The risk of developing diabetes increases as the number of cigarettes smoked increases. Additionally, smokers are more likely than nonsmokers to have difficulty with their insulin regime dosing (U.S. Department of Health and Human Services, The Health Consequences of Smokng, 2014). This in turn places diabetic smokers at higher risks for serious health complications including heart and kidney disease; decreased blood flow in lower extremities that can lead to infections, ulcers, and possible amputations; retinopathy and peripheral neuropathy (U.S. Department of Health and Human Services, The Health Consequences of Smoking, 2014).

In 2014, an estimated 21.0 % [95% CI: 19.7-22.3] of Ohio adults reported that they currently smoke cigarettes. Respondents with lower levels of education and annual household income were significantly more likely to be current smokers. An estimated 38.9 % [95% CI: 33.5-44.4] of respondents with less than a high school education were current smokers, compared to 7.3 % [95% CI: 6.0-8.6] of college graduates (U.S. Department of Health and Human Services, The Health Consequences of Smoking, 2014).

Among persons with diabetes in Ohio from 2011-2014, 55.3 % [95% CI: 53.5-57.1] had a history of ever smoking, compared with 47.4 % [95% CI: 46.6-48.1] of persons without diabetes. The prevalence of current smoking among persons with diabetes was 17.7 % [95% CI: 16.2-19.1]. Black, non-Hispanics with diabetes had a significantly higher prevalence of current smoking [23.9 %, 95% CI: 19.2-28.6] compared to White, non-Hispanics with diabetes [16.3 %, 95% CI: 14.8-17.8] in Ohio during this time.

Diabetes and Oral Health

Social determinants, such as race and income, are a large factor in the prevalence of disease in minority communities. Studies have shown that race, income, where one lives, a high-sugar diet, and education level can lead to both poor oral health and diabetes (Hill, Nielsen, & Fox, 2013). Poor oral health can have subtle and exorbitant effects on overall quality of life, including cavities, loss of teeth, infection, periodontal disease (gum disease) and decreased economic capacity/output with missed school and work. Periodontal disease and oral pain are the number #1 unmet need for children in Ohio (Kuhlman, 2013). The data continues to reflect a higher rate of dental disease among minority and low-income individuals that among their affluent counterparts.

Periodontal disease and diabetes have been found to have a "two-way relationship" meaning, diabetes contributes to gum disease and tooth decay, and periodontal disease contributes to diabetes. (Mealey, 2006). Treatment for periodontal disease is usually not covered by dental insurance, which leads to expensive out of pocket costs for individuals with or without dental coverage. 56% of Ohioans who fall 138% or more below the federal poverty line do not have dental insurance and Medicare does not cover the costs of dental treatments (American Academy of Periodontology, 2015; Interact for Health, 2013). Over time, to manage limited access to care and/or limited

awareness of preventative techniques, a safety-net (Ohio Department of Health–Oral Health, 2000) of clinics and emergency care facilities have become the main resource for dental care in minority communities.

In Ohio, as of January 1, 2016, the Ohio Medicaid program began covering procedures to evaluate, treat, and maintain periodontal disease. (American Academy of Pediatrics, 2015). This change can improve the landscape of care, but the issue shifts from who is covered to if coverage is adequate for care. As it stands, even with Medicaid expansion, reimbursement levels remain at the same level since 2000, 60-65% of current costs of care. (Ohio Dental Association, 2016). Also, without complete Medicaid reimbursement, many safety-net clinics cannot afford overhead to continue running. The high treatment costs and lack of access to care creates environment in which adults without insurance are more likely to delay necessary dental treatment causing debilitating pain and costly emergency (CostHelper, 2012) room visits.

Most periodontal disease can be prevented or maintained with cost-effective daily oral hygiene habits (Sinclair & Edelstein, 2005) and routine dental exams. Prevention services can also decrease periodontal disease thus minimize the complications due to diabetes. Dollars spent on preventive services save $4 million wasted in emergency room costs. Prevention includes educational services, increased access to care, lifestyle changes, and dental care coverage. Through changes in lifestyle, such as reducing sugar in the diet, preventative techniques can have reciprocal effects on both periodontal disease and diabetes.

Dietary intake is the main contributor of both dental disease and diabetes. To avoid the ill effects of high sugar and refined carbohydrates, health professionals should promote diets with complex carbs and avoid cariogenic diets--foods high in refined carbohydrates, which can lead to cavities and exacerbate diabetes. (Kracher, 2016). Next to dietary changes, prevention through education, proper oral hygiene techniques are paramount for disease prevention. Most Americans do not brush their teeth correctly or visit a general dentist to maintain proper oral hygiene. It has been noted that diabetes can be detected at annual dental visits. Funding totaling $156 million federal dollars was recently allocated to 47 states, including Ohio, for preventive dental services. Our aim is to build on that progress.

Care Coordination

Care coordination for high-risk patients has become an essential component for patient-centered medical homes in the modern era. National Committee for Quality Assurance (NCQA) 2014 goals for patient-centered medical homes encourage additional emphasis on care management for high-need populations. Patient-centered medical homes operating within the upper quartile have effective care managers serving multiple roles including performing direct patient-centered duties, patient tracking, information dissemination, and open/frequent communication with physicians and office staff (Taliani, et al., 2013). Diabetes is considered one of the most expensive chronic illnesses in the United States, but despite high expenditures, very few patients with diabetes are at goal when reviewing their targets for A1C, blood pressure, and cholesterol. This underscores, the importance of improved resources and improved coordination of care of high risk populations (Saydah, et al., 2004)

To directly address health disparities in obesity and diabetes, expanding the healthcare workforce to include certified community health workers has already demonstrated success when community health workers are linked to care coordination activities. "Across the country, Community Health Workers (CHWs) are gaining recognition for their role in building the health service infrastructure of under-served communities. Whether they are known as community health advisors, patient navigators, peer outreach workers, lay health aides, *promotores(as)*, or guides," (Redding, 2012). The Ohio Board of Nursing certifies community Health Workers in Ohio. Since 2014, Ohio Medicaid, through the OSU Government Resource Center has funded grants to train Community Health Workers, help them become certified, and place them in jobs that serve the Medicaid population.

The OCMHMEP-O/D recommends the integration of care management within patient care settings to further support our vulnerable populations. Quality care management should be designed based on prior research and reflect the following characteristics: (1) Monitoring of care plans; (2) Frequent follow-up; (3) Regular outreach to assess health status; (4) Extensive support for disease management including self-care; (5) Coordination of specialty services, and (6) Linkages with community resources (Braverman, et al., 2001; Caminal, et al., 2001; Bojadzievski, & Gabbay, 2011). Statewide resources need to be cataloged within a central electronic database with emphasis on both state initiated programs and local community resources to better serve care management within a patient care center.

Addressing Health Literacy

Health literacy is defined as "the degree to which individuals have the capacity to obtain, process, and understand basic information and services needed to make appropriate decisions regarding their health." (Health Literacy, 2004) Patients with poor health literacy have lower disease-specific knowledge, report lower quality of life, and have worse outcomes when including additional confounders such as education and socioeconomic status (Health Literacy, 2004; Baker, et al, 1996; Dewalt, et al. 2004; Rothman, et al., 2004; Rothman, et al., 2005). Poor health literacy in people with diabetes is an independent risk factor associated with worse diabetes knowledge, self-management, and glycemic control (Health Literacy, 2004; Baker, et al, 1996; Dewalt, et al. 2004; Rothman, et al., 2004; Rothman, et al., 2005; Chisolm, et al., 2011). Prior studies have revealed that a modified diabetic teaching models with emphasis on low health literacy improved diabetes self-management skills and outcomes (Wallace, et al., 2009; Wolff & Malone, et al., 2009).

The U.S. Department of Health and Human Services reports that 'the cultural and linguistic differences among patients directly impact their health literacy levels, which in turn contributes to an increased prevalence of health disparities" among racial/ethnic minorities and vulnerable populations," (US Department of Health and Human Services, 2008). Given the disparity in care for diabetic patients with low health literacy, we recommend a multi-faceted approach to the dissemination of materials to help educate providers to ensure adequate assessment and management of vulnerable patients.

Formal seminar training to enhance health literacy knowledge and assessment are necessary to help providers utilize the necessary tools to advance care plans for vulnerable minority populations with reduced health literacy (Kirsch, 1993). We recommend organizational training for appropriate statewide dissemination of validated tools to better serve our vulnerable populations and broaden resource access.

Workforce

It is predicted that by 2043, the United States will become a majority-minority nation and the Black/African American population will increase by approximately 20 million individuals in 2060. Despite these statistics, it was noted that only 5.4% of the RN population was African American, to serve the roughly 12% African American population in the United States (Phillip & Malone, 2014). This gap in the workforce can be attributed to several factors; the inadequate public educational systems in inner city neighborhoods, lack of exposure to healthcare professions at an early age, high school dropout rates among minority students, and programs to enhance entry into the healthcare professions. All these factors contribute to the small number of students who matriculate into the various healthcare professions. It is critical to address this lack of diversity as it has been shown that increasing the racial and ethnic diversity in healthcare can positively impact health disparities in general and disparities in diabetes in particular (Cohen, Gabriel, & Terrell, 2002). To effectively address health disparities, the healthcare workforce needs culturally competent and diverse individuals to meet the needs of a rapidly changing patient population (Phillips & Malone, 2014).

In addition, an increase in the diversity of the healthcare workforce can increase service accessibility to underserved communities, meet the needs of minority population groups, and initiate community based research in these communities (Phillip & Malone, 2014).

In addition, Ohio should ensure the increase of opportunities to expand community health workers as well as ensure the increase in Certified Diabetes Educators (CDEs) http://www.ncbde.org/certification_info/mentorship-program offering training, support, and mentorship to those healthcare providers interested in obtaining this specialized certification. The Sullivan Alliance formed by former U.S. Secretary of Health and Human Services, Louis W. Sullivan, M.D., is one of the organizations leading the efforts to strengthen the quality of the healthcare workforce through increasing the number of ethnic and racial individuals in health professions. This organization prioritizes initiatives across all the various health disciplines and has regional consortiums of minority undergraduate colleges with academic health centers.

The OCMHMEP-O/D endorses the Ohio Statewide Health Disparities Collaborative Workforce Development Strategic Plan to help Ohio create a healthcare workforce that has the competencies needed to effectively assess, respond to, and collaborate with organizations to eliminate health disparities in Ohio. The Ohio Statewide Health Disparities Collaborative (OSHDC) is a collaboration of individuals and organizations working together to achieve health equity and eliminate health disparities in Ohio. The workforce development subcommittee has developed a strategic plan to drive activities providing opportunities to assess and enhance efforts to address workforce health disparities, inequities and promote equity knowledge.

Healthcare Professionals

Another important concern is the attention primary care physicians give to obesity management. A study done by the Veteran's Affairs Medical Center found that only 10% of clinicians informed obese patients of their body mass index (BMI) while only 8% referred obese patients to a dietician/nutritionist. Overall this study revealed that the majority of clinicians did provide routine weight management services for obese patients. The most prevalent barriers to obesity care were poor education during medical school and residency, and the lack of information provided by the VHA to both clinicians and patients about available weight management services (Forman-Hoffman, Little, & Wahls, 2006). Clinician education with suggested referrals, culturally competent discussion training, diet approaches, and added resources could be incorporated into their EMR screens for their use with patient discussions. Waiting and exam room education targeted for the patient's obesity or diabetes in the form of interactive video or audio programs can make better use of the time spent waiting for the physician.

By providing culturally appropriate weight management advice during a medical encounter, being aware of weight management services available in the community, and discussing the implications of obesity on future health, patients can benefit on multiple levels. Healthcare professionals caring for patients with diabetes should maintain disease specific professional and cultural competency. Offerings should be in a variety of formats including live, web-based and remote options. Professional continuing education for diabetes and obesity should be offered throughout the state in multiple arenas including medical schools, colleges, universities, the workplace, medical centers, clinics, and patient centered medical homes. Recommendations include standardized cultural competency offerings to ensure consistency across the state to have a competent diversified workforce.

Other interventions may involve educating multidisciplinary teams in a variety of community resources. One such project, REACH 2010, reduced racial and ethnic disparities by utilizing healthcare institutions, community- and faith-based organizations and civic groups, libraries, professional associations, government and business organizations, and local media (Jenkins et al., 2004). Successful projects such as these include patient education, nurse case management, treatment algorithms, outreach with community health workers, patient incentives, continuous quality improvement, and group visits. This community-based participatory research project included

patient (education, empowerment), communities (community health worker, community-based case management, coalition building, advocacy), provider (audit/feedback), and healthcare organization (patient registries, continuous quality improvement) change. This is one of the few interventions that formally measured and demonstrated a reduction in racial disparities (Chin, Walters, Cook, & Huang, 2007).

Another way to address disparities and inequities is through sensitizing healthcare providers to understand the increased risk and barriers to treatment faced by patients with obesity and diabetes. Productive communication and interaction between providers and patients are essential. Cultural competency training programs for providers and empowerment programs that encourage patients to be more active partners in their care are examples of possible interventions. Additionally, the concept of "cultural leverage" which is, "a focused strategy for improving the health of racial and ethnic communities by using their cultural practices, products, philosophies, or environments as vehicles to facilitate behavior change.

Building upon prior strategies, cultural leverage proactively identifies the areas in which a cultural intervention can improve behaviors and then actively implements the solution". Cultural interventions can occur at three possible levels: individual as person/patient, access, and healthcare environment. Individual oriented interventions modify health behaviors of individuals within communities. Access-oriented interventions increase the community's access to the existing healthcare system. Healthcare environment interventions modify the healthcare system or organization to more effectively serve patients and communities (Fisher, Burnet, Huang, Chin & Cagney, 2007). Cultural understanding and "leveraging" has been shown through several studies to increase access to care and improve outcomes.

Culturally and Linguistically Appropriate Services

Culturally and Linguistically Appropriate Services (CLAS) are put forth by healthcare organizations in order to decrease health inequalities according to the United States Department of Health and Human Services (2008). These are services created in order to cater to populations with diverse cultures and languages, with the goal of increasing positive health outcomes for those populations. There are 14 national standards for CLAS and these become significantly important when dealing with racially and ethnically diverse patients, a majority of whom have inadequate health literacy. With the significant disparity in diabetes among the minority population groups, it is critical to understand the impact of health literacy in these patient populations (U.S. Department of Health and Human Services, America's Health Literacy, 2008).

According to the United States Department of Health and Human Services, only 2% of Black adults are proficient in health literacy, while 57% have either basic or below basic health literacy levels (U.S. Department of Health and Human Services, America's Health Literacy, 2008). In order to improve the health outcomes of the Black population, low-income persons, aging individuals, and those with below basic or basic health literacy, accessible and culturally and linguistically appropriate services must be provided.

Engaging Populations

It has been shown that there is a direct relationship between historical patterns of discrimination and today's community-based health challenges (National Research Council, 2001). Some of these historical drivers are redlining, public housing, racial discrimination, zoning, land use practices, public school education, and racial segregation. All these factors are known to play a role in the social determinants of health and are involved in the increasing incidence of type 2 diabetes in the United States (Hill, et al., 2013). Specific to Asian-Americans, mortality data is distorted by underrepresentation in epidemiologic surveys and aggregation of Asian Americans masking the heterogeneity of diverse Asian-American subgroups (Keppel, Pearcy & Heron, 2010).

According to Hill et al (2013) most diabetic interventions have a biological and behavioral focus, such as diet and physical activity. These interventions do not take various socio economic factors into consideration and therefore fail to engage the population groups most impacted with these diseases.

The Community-Based Participatory Research (CBPR) approach has been deemed as one of the most effective interventions in addressing health issues related to health disparity which can lead to health equity (Shultz, et al, 2005). It does so by involving and working with individuals in the community who are most directly affected by the issues so they can partake in the development of appropriate solutions.

The model below, (Figure 17) which was developed by the Center for Closing the Health Gap, utilizes the community based participatory research (CBPR) approach as a grassroots intervention strategy by engaging the same population of individuals who need the assistance in order to empower these individuals to advocate for themselves in order to develop a culture of health. This strategy is a step in the right direction to target the inequity and disparity in healthcare, primarily diabetes (Schulz et. al., 2005). Research has indicated that the CBPR approach increases diabetes educational knowledge, awareness, and engages participant involvement in their health, which has been proven to alleviate diabetic disease burden through improvement in health conditions (Schulz et. al, 2005).

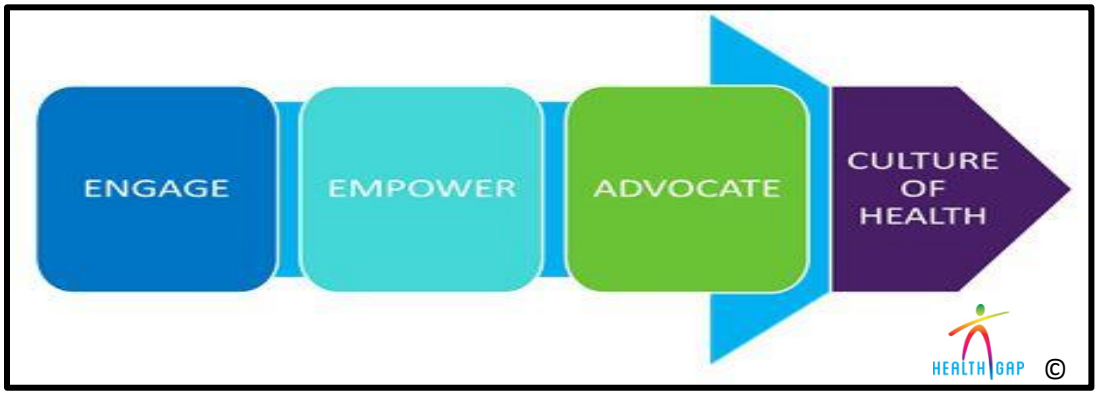


Figure 17. Data showing the components of the Center for Closing the Gap CBPR Model, Cincinnati, Ohio, 2013. From "*Ohio Managed Care Organization Presentation*" by Center for Closing the Health Gap, 2013

Minorities suffer from a higher prevalence of diabetes morbidity and mortality (CDC, MMWR, 2011). It is time to steer away from the "one size fits all" notion and consider the grassroots approach as an effective means in engaging minority populations and groups of patients who suffer from higher disease burdens. This approach ensures that individuals are being met "where they are," and are involved in all aspects of the intervention, as patient lifestyle choices are constrained by the resources in their community.

Data

Progress toward reductions in obesity and diabetes disparities can only be determined by sustained measurement of meaningful process and outcome metrics. Subjective descriptions of improvement are no longer acceptable for actual progress. Only well-established metrics that can be independently verified should be accepted to measure a decline in diabetes disparities. The OCMHMEP-O/D prioritizes the availability and meaningful use of data, which includes the timeliness of final data, as well as the importance of making provisional or preliminary data available. It is important to note that policy makers, healthcare systems, service providers and consumers cannot afford to wait over extended periods of time to determine if implemented interventions were effective. The sustainability of our collective effort is largely dependent upon our ability to demonstrate improved health outcomes along with a return on investment.

According to the Institute of Medicine, (IOM), 2009 Report on Race Ethnicity and Language Data, both population level and granular REAL (Racial, Ethnic, and Language) data contains important markers of progress toward fewer diabetes deaths in all communities. Systemic interventions aimed at populations are best measured by population-level data, even when such data are imperfect. REAL data are equally important in discerning progress or absence of change in a specific site (IOM, 2009).

The identification and removal of the numerous social determinants of health outcomes requires collection of granular data.

To make data useful to a wide array of stakeholders, all forms of health data should meet several criteria:

1. Health-related data should be collected in formats that allow pre-specified analyses to be performed and communicated promptly and clearly to users and the public (IOM, 2009).

2. Population level data should be:
    a. Compatible with national (CDC) metrics to allow comparison with other states so that Ohio can benefit from the experiences of others.
    b. Available to the public as it is assembled (preliminary or provisional data) and reported, and in final form (National Partnership for Action, 2011).
    c. Available to users from all health-interested communities: public health, medicine, academia, funding agencies, advocacy groups, media, and the general public.
    d. Presented to the public in formats that are specific to populations and geographic regions.
    e. Ensure oversampling within smaller populations (National Partnership for Action, 2011).

3. Granular data should be:
    a. Tested for reliability before being adopted in final form; REAL data should be presented to the population from which it is being collected to assure it reflects the intended metrics (IOM, 2009).
    b. Presented at intervals as it is being collected so that quality improvement measures and interventions can be applied and tested repeatedly.

<u>Use of Technology</u>

The use of cutting edge technology to reduce the prevalence of obesity and diabetes has the potential to have wide-ranging positive implications. We now have the ability to use Fitbits, smart phones, and watches to monitor our diets and encourage exercise. Food journal apps allow a person to better track their caloric, fat, and nutritional intake (Davis, n.d.). Diabetes apps (Figure 18) also provide users with ways to better track their blood sugars, diet and other essential data.

With disparities in obesity for African Americans, Hispanic-Latinos, as well as Native Americans, apps that are culturally appropriate and provide culturally appropriate nutritional suggestions need to be developed and refined (Gustafson, 2012). Funding for the research and development of culturally specific apps that encourage exercise and better nutrition can be very cost effective when started at younger ages and are designed to complement users' current lifestyle and conditions.

Figure 18. Data showing Diabetes Buddy phone applications that allow users to track blood sugars, diet and other essential data, United States, 2012. From "Practical Pointers" by Tran, J., Tran, R, and White, 2012, Clinical Diabetes, Volume 30, Number 4, p 174.

A review of the latest technologies found a startling paucity of technologies directed specifically at minority populations. The most prevalent technology available is the "text for health" program where specific texts are sent to recipients that include healthy suggestions (Hall, Cole-Lewis, & Bernhardt, 2015). Reviews have found these to be efficacious in impacting behavior related to "diabetes self-management, weight loss, physical activity, smoking cessation, and more . . ." (Hall, Cole-Lewis, & Bernhardt, 2015). Another small study found a trend toward success when mobile interventions encouraged minority girls to consume less sugary beverages and to eat more green vegetables (Nollen, and Mayo, 2014).

Other interventions which can easily be adapted include:

- Virtual Mentors (HERE) with encouraging advice and suggestion for better health.
- Smart Monitors that can measure blood glucose without finger sticks.
- Individual Telemedicine & Chronic Care Management through primary care providers.

Media Strategies

Having an effective media strategy for educating the public regarding the myriad of issues and complications of obesity and diabetes can potentially be a low cost and highly effective approach to public education and 'up-stream' prevention of a very costly problem. Any impact made at any age will positively influence behavior in individuals and groups for a more additive effect. Using well-informed and targeted messaging to specific minority groups disproportionately affected by diabetes and/or obesity can have a substantial short-term and long-term impact of the health of our entire community. The Pew Research Center found that 74% of the US population used social networking sites with 76% of woman and 72% of men on the internet (Pew Research Center, 2015). Use of these sites on home computers and mobile phones has historically been consistent across racial minorities (Pew Research Center, 2015). Unsurprisingly, the use of social media peaks in the 18 to 29 year

old range at 90% (Figure 19). Though the lowest social media users were the 65+ age group, nearly half of those surveyed (46%) accessed social media (Figure 20). Based on the Pew study and countless others, it is clear that impacting change through education is best channeled through social media. The other advantage of social media is the ability to target audiences. Through metrics and usage data, a targeted educational campaign can be aimed at any population, and with language and socially appropriate messaging.

Although there are socioeconomic changes in social networking usage with lower percent usages in lower strata, the usage still exceeds 50% across rural, urban, and suburban locations (Figure 21) (Pew Research Center, 2015). Social networking and game applications have the potential to act as educational tools for obesity and diabetes information. A study of Internet Trends commissioned by a major mobile phone company found that users check their phones 150 times a day for various reasons (Meeker and Wu, 2013). To not use some of those opportunities to improve health would be a great loss.

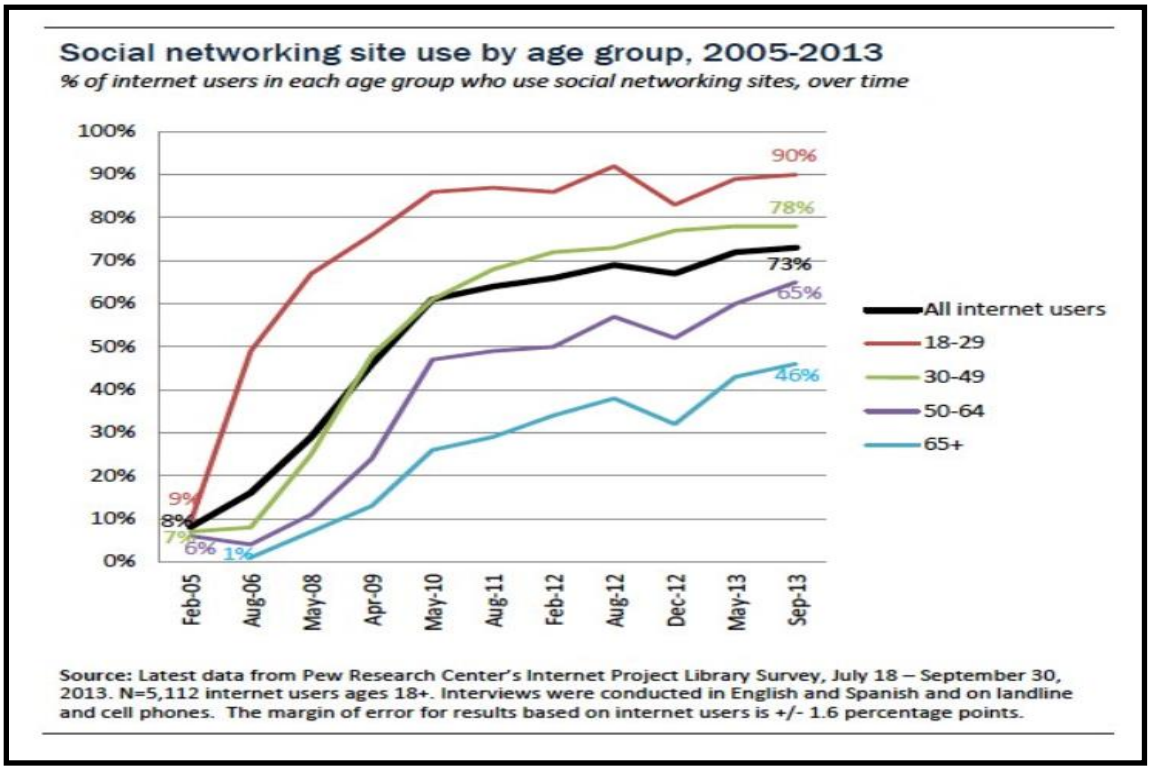


Figure 19. Data showing social networking site use by age group in United States, 2005-2013. From *"Internet Project Library Survey"* by Pew Research Center, 2013, p. 1.

Social Networking Use Has Shot Up in Past Decade

Chart | Data | Embed

Year	Internet Users	All Adults
2005	10	7
2006	16	11
2008	34	25
2009	50	38
2010	60	46
2011	65	50
2012	67	55
2013	73	62
2014	74	62
2015	76	65

Source: Pew Research Center surveys, 2005-2006, 2008-2015. No data are available for 2007.

Figure 20. Data showing increase in social networking use by adults in United States, 2005-2015. From *"Social Media Usage: 2005-2015"* by Andrew Perrin, 2015, p.1.

Social Networking on Mobile Phones

% of cell phone owners who use a social networking site on their phone

	All cell phone owners (n=1,954)	40%
a	Men (n=895)	39
b	Women (n=1,059)	41
	Age	
a	18-29 (n=340)	67[bcd]
b	30-49 (n=562)	50[cd]
c	50-64 (n=587)	18[d]
d	65+ (n=429)	5
	Race/ethnicity	
a	White, Non-Hispanic (n=1,404)	36
b	Black, Non-Hispanic (n=234)	48[a]
c	Hispanic (n=180)	49[a]
	Annual household income	
a	Less than $30,000/yr (n=447)	38
b	$30,000-$49,999 (n=316)	40
c	$50,000-$74,999 (n=272)	48[a]
d	$75,000+ (n=538)	45[a]
	Education level	
a	No high school diploma (n=156)	33
b	High school grad (n=542)	37
c	Some College (n=490)	42[a]
d	College + (n=752)	43[ab]

Source: Pew Internet Spring Tracking Survey, March 15 – April 3, 2012. N=2,254 adults ages 18+. Interviews were conducted in English and Spanish and on landline and cell phones. Margin of error is +/- 3 percentage points for results based on cell phone owners.

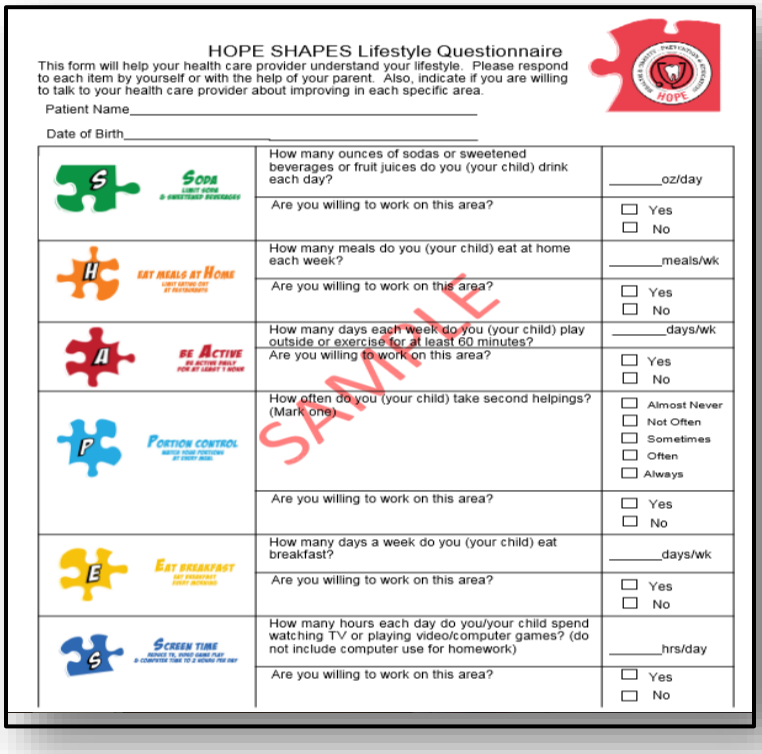
Note: Percentages marked with a superscript letter (e.g., [a]) indicate a statistically significant difference between that row and the row designated by that superscript letter, among categories of each demographic characteristic (e.g. age).

Figure 21. Data showing social networking use on mobile phones by age, race/ethnicity, household income and education level in United States, 2012. From "*Internet Project Library Survey*" by Pew Research Center, 2013, p. 1.

Patient Education

It is recommended that patient education sessions incorporate culturally sensitive messages that are specific to the person's health problem. Further, to enhance effectiveness, these encounters should be discussion focused with a series of questions and suggested incremental interventions.

A study done in 2012, in Diabetic Medicine found that having a diabetes self-risk assessment questionnaire coupled with a multimedia health promotion campaign was able to increase awareness of individual's risk for diabetes (Zhang, et al., 2012). The approach also incorporates getting permission to address problems and asking if the person is willing to modify their behavior, rather than merely *'preaching at the patient'* with broad ranging interventions that may not apply them. Figure 22 highlights a lifestyle questionnaire to allow health professionals to tailor to patients needs.



HOPE SHAPES Lifestyle Questionnaire

This form will help your health care provider understand your lifestyle. Please respond to each item by yourself or with the help of your parent. Also, indicate if you are willing to talk to your health care provider about improving in each specific area.

Patient Name_____

Date of Birth_____

S — Soda	How many ounces of sodas or sweetened beverages or fruit juices do you (your child) drink each day?	_____oz/day
	Are you willing to work on this area?	☐ Yes ☐ No
H — Eat Meals at Home	How many meals do you (your child) eat at home each week?	_____meals/wk
	Are you willing to work on this area?	☐ Yes ☐ No
A — Be Active	How many days each week do you (your child) play outside or exercise for at least 60 minutes?	_____days/wk
	Are you willing to work on this area?	☐ Yes ☐ No
P — Portion Control	How often do you (your child) take second helpings? (Mark one)	☐ Almost Never ☐ Not Often ☐ Sometimes ☐ Often ☐ Always
	Are you willing to work on this area?	☐ Yes ☐ No
E — Eat Breakfast	How many days a week do you (your child) eat breakfast?	_____days/wk
	Are you willing to work on this area?	☐ Yes ☐ No
S — Screen Time	How many hours each day do you/your child spend watching TV or playing video/computer games? (do not include computer use for homework)	_____hrs/day
	Are you willing to work on this area?	☐ Yes ☐ No

SAMPLE

Figure 22. Data showing Hope Shapes Lifestyle Questionnaire, California, 2007. From *"Health & Obesity: Prevention and Education - Providing Clinicians with the Skills and Tools to Assess, Prevent, and Treat Pediatric Obesity"* by Jeanne Huang, 2007, p.10.

School Policies

The deleterious effects of obesity have a profound impact on chronic disease risk, morbidity, mortality, as well as its' high medical, psychological, and social cost. When combined with its multiplicity of causes, its persistence from childhood to adulthood, the limitations of successful treatment options; the hazards of pharmacological treatment, along with the complexities of treatment guidelines create the argument for increased attention to the prevention of excessive weight gain starting as early in life as possible.

Taken together, the volume of information speaks to a critical importance of preventing undue weight gain in young children and adults, a process that depends largely on parents but does not divulge from the responsibility of school and school-related programs. The responsibility for what and how much children need and how much

physical activity they engage in is ultimately related to a social structure. (Birch & Fisher, 1998). Early recognition of obesity in children by parents is of the upmost importance. Early recognition allows interventions to start at a younger age.

Among Ohio's third-grade public-school students alone, 18% are obese, and an additional 17% are overweight.(Oza-Frank, Norton, Scarpitti, Wapner, & Conrey, 2012). In addition, approximately 47.5% of Medicaid children in Ohio are overweight or obese, compared to 30.1% for children with private insurance (Cuttler, et al., 2008). In 2010, the Ohio State Senate passed the Healthy Choices for Healthy Children legislation. This bill will render children more physically active by incorporating physical activity into the school day, expose them to healthier, more nutritious food options outside the lunch room by removing sugar-sweetened drinks and encourage schools to screen for body mass index (BMI) in kindergarten, 3rd, 5th, 7th and 9th grades. Although this legislation will improve obesity identification rates, it did not provide support or guidance on treatment, a crucial element for any screening program.

In 2007, the Robert Wood Johnson Foundation pledged $500 million to fight childhood obesity. Michelle Obama "Let's Move" campaign also focused on children and healthy lifestyles and many health organizations have followed her lead. "Let's Move" focused the nation's attention to schools and daycare centers, which, because of federal law and other changes, now offer more fruits and vegetables and fewer sugar drinks in vending machines.

Recent research indicates that "…students who participate in the National School Lunch Program, which restricts the sale of carbonated soft drinks in the same location where lunch is being served, consume significantly less added sugar than nonparticipants do. Among participants, the mean intake of added sugars contributed 17% of their daily caloric intakes, compared with 20% for nonparticipants," (CDC, 2010, p. 11). In recent years, the Alliance for a Healthier Generation developed School Beverage Guidelines which were designed to promote the student consumption of lower-calorie and nutritious beverages outside of school meals (CDC, 2010).

These guidelines have been adopted by the American Beverage Association along with several beverage producers through a voluntary agreement with the Alliance. In addition, these guidelines supported the provision of an annual analysis to assess the impact of the guidelines. "According to a 2007 independent evaluation of the program, nearly 80% of all school beverage contracts were in compliance with these guidelines, contributing to an almost 60% drop in beverage calories shipped to schools since 2004," (CDC, 2010, p.12). Based on the CDC 2010 evaluation related to the consumption of sugar-sweetened beverages, the reduction in the purchase of regular carbonated soft drinks was observed among high school students after the implementation of these guidelines. This evaluation also indicated that the average student purchased 12.5 ounces of regular carbonated soft drinks per week in schools in 2004, but by the 2007–2008 school year, these soft drink purchases decreased by one-third to two-thirds of a can per student per week (CDC, 2010).

Unfortunately, trends in the prevention and treatment of obesity are not improving. This provides the opportunity for policy makers to consider strategies increase physical education activities in school, improve access to no-cost community based weight loss activities and promote evidence-based practices to address risk factors for obesity.

Barriers to Obesity Prevention

Data indicates that Americans are consuming more calories but are not compensating for them with increased physical activity. Despite efforts such as the National Cancer Institute's 5-A-day campaign to increase consumptions of fruits and vegetables (CDC, 5-A-day, 2005). Recommendations to consume less calories are counterproductive to the economic imperatives of our food system. Massive efforts by food manufacturers and restaurant chains to encourage people to buy their brands undoubtedly play a role for the current state of obesity and diabetes. Promotions, pricing, packaging, and availability all encourage Americans to eat more, not less.

The food industry spends billions annually on advertising and other consumer promotions. This level of advertising spending highlights the need for increased investments for diabetes and obesity prevention campaigns along with educational strategies to increase knowledge of the importance of healthy diet and activities.

In addition to eating more, the energy expenditure for Ohio and the United States is related to our current environment. Our current lifestyle saving devices, from mobile phones, automobiles to e-mails reduce energy expenditures. The wonders of modern civilization, such as central heating lead to less energy costs in maintaining body temperature, and air-conditioners make it much more comfortable on hot summer days to stay inside watching television or playing on computers. Dangerous neighborhoods, or the perception thereof, discourages people from walking, playing with pets, pushing strollers, playing, jogging, or permitting children from playing outdoors. Many suburban neighborhoods are structured for driving since they may not have sidewalks and may lack stores, entertainment, or other destinations within walking distance.

Meanwhile, the decline of tax support for many public school systems and the need for competing academic priorities have forced schools to regulate physical education to the category of "Frill". Many school districts have had to eliminate physical education classes entirely, and fewer schools offer any opportunity for students to be physically active during the school day. (Ling, Robbins, & Hines-Martin, 2016). The continual reduction of physical activity opportunities make it clear why we need to create environments that foster healthy, active lifestyles.

Tax and Subsidy Strategies

According to the CDC (2010) Guide to Strategies for reducing the consumption of Sugar Sweetened beverages, sugar-sweetened beverages (SSBs) (Figure 23) are the largest source of added sugar and an important contributor of calories in the U.S. diet (Block, 2004). SSBs also tend to have few, if any, nutritional benefit. While the definitions used by researchers have varied (Bleich, Wang, Wang, & Gortmaker, 2009; Lim et al., 2009; Wang, Bleich, & Gortmaker, 2008) we define SSBs to include soft drinks (soda or pop), fruit drinks, sports drinks, tea and coffee drinks, energy drinks, sweetened milk or milk alternatives, and any other beverages to which sugar, typically high fructose corn syrup or sucrose (table sugar), has been added. Although the presence of protein and other nutrients differentiates sweetened milk and alternative milk beverages from other SSBs, adding sugar to plain milk can substantially increase the calories per serving without increasing the overall nutrient value of the drink. In 1965, per capita consumption of SSBs (excluding sweetened milks) was 50 kcal/day (2.5% of total calories) among adults in the United States (Duffey and Popkin, 2007). Currently, consumption is estimated at 224 kcal/day (11% of total calories) among youth (Wang et al., 2008) and 203 kcal/day (9% of total calories) among adults (Bleich, et al., 2009). On a typical day, 80% of youth and 63% of adults consume SSBs (Wang, et al., 2008). The highest consumers of SSBs are adolescents aged 12 to 19 years (13% total calories), particularly males, non-Hispanic Blacks and Mexican-Americans, those who are low-income, or obese (14% to 16% total calories) (Wang, et al, 2008). Several social and environmental factors have been linked to the purchase and consumption of SSBs. According to the Robert Wood Johnson Foundation, 2008 Research Brief, these factors include advertising and promotion; increased portion sizes; (Flood, Roe, & Rolls, 2006) fast food consumption;

(French, Story, Neumark-Sztainer, Fulkerson, & Hannan, 2001) television watching; (Miller, Tavares, Rifas-Shiman, & Gillman, 2008) permissive parenting practices; (Haerens, et al., 2008) parental SSB consumption; (Vereecken, Keukelier, & Maes, 2004) and increased access to SSBs in the home and school (Elfhad, Tholin, & Rasmussen, 2008; Grimm, Harnack, &Story, 2004, Wang, et al, 2008).

Sugar-Sweetened Beverages

Sugar-sweetened beverages are those that contain caloric sweeteners and include:

Soft drinks: Nonalcoholic, flavored, carbonated or non-carbonated beverages usually commercially prepared and sold in bottles or cans

Soda, pop, soda pop: Same as soft drink

Fruit drinks, punches, or ades: Sweetened beverages of diluted fruit juice

Sports drinks: Beverages designed to help athletes rehydrate, as well as replenish electrolytes, sugar, and other nutrients

Tea and coffee drinks: Teas and coffees to which caloric sweeteners have been added

Energy drinks: Most energy drinks are carbonated drinks that contain large amounts of caffeine, sugar and other ingredients, such as vitamins, amino acids, and herbal stimulants

Sweetened milks or milk alternatives: Beverages prepared by blending sweetened powder or syrup and milk*

**Though the body's response to added sugar in milk may differ from that of other SSBs because of the presence of protein and other nutrients, adding sugar to milk substantially increases the calories per serving.*

Figure 23. Data showing definitions of sugar-sweetened beverages, United States, 2010. From "The CDC Guide to Strategies for Reducing Consumption of Sugar-Sweetened Beverages by Center for Disease Control and Prevention, 2010, p. 4.

The 2014 article, The Real Cost of Food: Can taxes and subsidies improve public health, highlights that suboptimal diet quality is among the leading factors associated with death and disability in the United States (Mozaffarian, Rogoff, & Ludwig, 2014; Murray, et al., 2013). The state of US health report, suggested strategies designed to address suboptimal diet and are focused mainly on increasing nutrition education through dietary guidelines and food package labeling. However, this approach places responsibility for healthier diets on an individual's ability to make informed choices rather than addressing the complex, powerful environmental determinants of dietary habits (Murray, et al., 2013). Not surprisingly, this strategy has fallen short, as demonstrated by the increasing rates of obesity, diabetes, and other diet-related illness. In view of the potent external influences on dietary choices and the unsustainable costs of increasing chronic disease, more active policy interventions are needed to help individuals adopt healthier diets.

Given the need for a multifaceted approach, food pricing strategies including taxation and subsidies may be effective and market friendly mechanisms for influencing dietary behavior (Table 3) (Mozaffarian, et al., 2012). Such strategies incentivize healthier options while still allowing for consumer choice. Notably, the combination

of taxation (to reduce selection of unhealthy foods) and subsidies (to increase selection of healthful foods) offers a balanced, evidence-based approach.

Table 3

Table. Tax/Subsidy Framework for Improving Diet and Public Health

Policy Component	Retail (Packaged and Supermarket) Foods	Restaurant and Other Food Service Establishments
Simple flat tax (eg, 10%-30%)	Most packaged foods requiring a US Food and Drug Administration food label For practical considerations, foods made by small businesses that currently are below the threshold for requiring a label would not be taxed Tax exemptions as well as subsidies for additional specific healthful retail foods could be available over time	Chain restaurants, large cafeteria vendors Options include taxing all fast food and quick-serve chain restaurants or all large chain restaurants (eg, consistent with current federal menu labeling regulations under the Affordable Care Act); in either case, tax exemptions or even subsidies for serving specific minimally processed food items could be implemented over time
Subsidy[a]	Minimally processed healthful foods including fruits, nuts, vegetables, beans, seafood, plain yogurt, vegetable oils, and minimally processed whole grains	School lunch and after-school programs Current programs have limited funding for serving healthful meals; the combination of lower prices for minimally processed healthful foods (due to the retail food subsidy) with greater funding for school and after-school meals could radically alter the healthfulness of foods served to children

Note: From "*The real cost of food: Can taxes and subsidies improve public health*" by Mozaffarian, et al., Journal of American Medical Association, 2014, Volume 312, Number 9, p. 890.

VII. Call to Action

As denoted in this report, the United States, despite being the leader of technological and medical innovations, continues to have among the highest diabetes mortality rates compared to all other advanced nations. Ohio residents, and particularly its indigenous African American population, contribute significantly to this shocking high diabetes mortality rate. Ohio cannot put a price tag on the number of lives that have been prematurely lost. With each loss of life, there is a lost opportunity and a diminished faith in the existing healthcare system.

This report emphasizes the numerous social determinants that contribute to our embarrassing mortality rates. The expert panel found no "magic bullet" in Ohio's arsenal that alone will annihilate the 79% higher age-adjusted diabetes mortality rate for Blacks in Ohio. Nor were we successful in identifying any singular genetic, psychological, physiological, or socioeconomic evidence unique to Ohio that places our residents with diabetes more at risk for adverse outcomes. Ohio must prioritize efforts to achieve the Healthy People 2020 objectives for diabetes and obesity.

However, the White paper attempts to educate the reader about possible solutions to the problem, by identifying known mortality risk factors and clinical outcome statistics within our racial and ethnic populations. Furthermore, we acknowledge the prevalence of disparities in diabetes mortality and health inequity within and among Ohio's communities. We conclude this document with recommendations for the reader(s) to consider.

Ohioans who have untreated, undiagnosed or uncontrolled diabetes, or are classified as obese have a higher probability of adverse mortality outcomes. Individuals who reside in "food deserts," where fresh nutritional choices are a limited commodity, are also most certainly residing in a community that is lacking in educational, employment, and life enhancing opportunities.

In order to achieve the published Healthy People 2020 objectives cited in this paper it will take the collective efforts of our legislative leaders and policy makers to provide the appropriate funding and rational legislation to clear unintentional administrative roadblocks that restrict access to quality diabetic healthcare. This must include payment for evidence-based diabetes self-management programs to reduce emergency room use and avoidable hospital readmissions. Hospitals can use their communications network and ambulatory care affiliates to educate their communities about obesity and diabetes and provide access to prevention and disease self-management programs that are proven to reduce the probability of diabetes mortality. Medical professionals, who provide obesity and diabetes care must know how to identify at risk individuals and, using accepted medical community standards, provide consistent quality care for these individuals regardless of their socioeconomic status.

The consumers with diabetes must educate themselves of the value of maintaining good health. Community and faith-based organizations must also lend their voices to the choir that speaks to educates community members about healthy lifestyles, physical activity, and the value of disease management programs. Government agencies and insurers need to detect potential gaps in access to healthcare, effective medications, and access to diabetes self-management programs. State and local leaders along with business leaders must address food insufficiency and reduce food deserts. Limited access to essential services can result in adverse outcomes and increased investment of resources (i.e. protracted hospitalizations, and inappropriate use of emergency room care, etc.). With all of these partnerships in tow, Ohio can create a sustainable obesity and diabetes reduction campaign and make a sizeable and palpable impact in the quality of life for all of its citizens.

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Appendix A

Healthy People 2020: Diabetes Objectives

D-1 Reduce the annual number of new cases of diagnosed diabetes in the population

Baseline:	8.0 new cases of diabetes per 1,000 population aged 18 to 84 years occurred in the past 12 months, as reported in 2006–08 (age adjusted to the year 2000 standard population)
Target:	7.2 new cases per 1,000 population aged 18 to 84 years
Target-Setting Method:	10 percent improvement
Data Sources:	National Health Interview Survey (NHIS), CDC/NCHS
Data:	HP2020 data for this objective Spotlight on Disparities: • Disparities by sex • Disparities by education • Disparities by income • Disparities by disability Details about the methodology and measurement of this HP2020 objective The HP2010 objective with the same definition was 05-02. Search data for all HP2010 objectives
More Information:	Related research articles on PubMed

D-2 (Developmental) Reduce the death rate among persons with diabetes

D-2.1 (Developmental) Reduce the rate of all-cause mortality among persons with diabetes

Potential Data Sources:	National Death Index (NDI), CDC/NCHS; National Health Interview Survey (NHIS), CDC/NCHS
More Information:	Related research articles on PubMed

D-2.2 (Developmental) Reduce the rate of cardiovascular disease deaths in persons with diagnosed diabetes

Potential Data Sources:	National Death Index (NDI), CDC/NCHS; National Health Interview Survey (NHIS), CDC/NCHS
More Information:	Related research articles on PubMed

D-3 Reduce the diabetes death rate Revised

Baseline:	74.0 deaths per 100,000 population were related to diabetes in 2007 (age adjusted to the year 2000 standard population)
Target:	66.6 deaths per 100,000 population
Target-Setting Method:	10 percent improvement
Data Sources:	National Vital Statistics System-Mortality (NVSS-M), CDC/NCHS; Bridged-Race Population Estimates, CDC/NCHS and Census
Data:	HP2020 data for this objective Map of state-level data for this objective Details about the methodology and measurement of this HP2020 objective The HP2010 objective with the same definition was 05-05. Search data for all HP2010 objectives
Revision History:	This objective was revised. Read more about the revision history.
More Information:	Related research articles on PubMed

D-4 Reduce the rate of lower extremity amputations in persons with diagnosed diabetes

Baseline:	3.5 lower extremity amputations per 1,000 persons with diagnosed diabetes occurred in 2005–07 (age adjusted to the year 2000 standard population)
Target:	Not applicable
Target-Setting Method:	This measure is being tracked for informational purposes. If warranted, a target will be set during the decade.
Data Sources:	National Hospital Discharge Survey (NHDS), CDC/NCHS; National Health Interview Survey (NHIS), CDC/NCHS
Data:	HP2020 data for this objective Spotlight on Disparities: • Disparities by sex Details about the methodology and measurement of this HP2020 objective The HP2010 objective with the same definition was 05-10. Search data for all HP2010 objectives
More Information:	Related research articles on PubMed

D-5 Improve glycemic control among persons with diabetes

D-5.1 Reduce the proportion of persons with diabetes with an A1c value greater than 9 percent LHI Revised

Baseline:	18.0 percent of adults aged 18 years and older with diagnosed diabetes had an A1c value greater than 9 percent in 2005–08 (age adjusted to the year 2000 standard population)
Target:	16.2 percent
Target-Setting Method:	10 percent improvement
Data Sources:	National Health and Nutrition Examination Survey (NHANES), CDC/NCHS
Data:	HP2020 data for this objective Spotlight on Disparities: • Disparities by sex • Disparities by education • Disparities by disability Details about the methodology and measurement of this HP2020 objective
Revision History:	This objective was revised. Read more about the revision history.
More Information:	Related research articles on PubMed Related Leading Health Indicator (LHI) information

D-5.2 Proportion of the diabetic population with an A1c value less than 7 percent Revised

Baseline:	53.1 percent of adults aged 18 years and older with diagnosed diabetes had an A1c value less than 7 percent in 2005–08 (age adjusted to the year 2000 standard population)
Target:	Not applicable
Target-Setting Method:	This measure is being tracked for informational purposes. If warranted, a target will be set during the decade.
Data Sources:	National Health and Nutrition Examination Survey (NHANES), CDC/NCHS
Data:	HP2020 data for this objective Spotlight on Disparities: • Disparities by race and ethnicity • Disparities by education • Disparities by income • Disparities by disability Details about the methodology and measurement of this HP2020 objective
Revision History:	This objective was revised. Read more about the revision history.
More Information:	Related research articles on PubMed

D-6 Improve lipid control among persons with diagnosed diabetes Revised

Baseline:	53.0 percent of adults aged 18 years and older with doctor diagnosed diabetes had an LDL cholesterol value <100 mg/dl in 2005–08 (age adjusted to the year 2000 standard population)
Target:	58.3 percent
Target-Setting Method:	10 percent improvement
Data Sources:	National Health and Nutrition Examination Survey (NHANES), CDC/NCHS
Data:	HP2020 data for this objective Spotlight on Disparities: • Disparities by sex • Disparities by race and ethnicity • Disparities by education • Disparities by income • Disparities by disability Details about the methodology and measurement of this HP2020 objective
Revision History:	This objective was revised. Read more about the revision history.
More Information:	Related research articles on PubMed

D-7 Increase the proportion of persons with diagnosed diabetes whose blood pressure is under control

Baseline:	51.8 percent of adults aged 18 years and older with diagnosed diabetes had their blood pressure under control in 2005–08 (age adjusted to the year 2000 standard population)
Target:	57.0 percent
Target-Setting Method:	10 percent improvement
Data Sources:	National Health and Nutrition Examination Survey (NHANES), CDC/NCHS
Data:	HP2020 data for this objective Spotlight on Disparities: • Disparities by sex • Disparities by race and ethnicity • Disparities by income • Disparities by disability Details about the methodology and measurement of this HP2020 objective
More Information:	Related research articles on PubMed

D-8 Increase the proportion of persons with diagnosed diabetes who have at least an annual dental examination

Baseline:	55.6 percent of the population aged 2 years and older with diagnosed diabetes had been to the dentist in the past year, as reported in 2008 (age adjusted to the year 2000 standard population)
Target:	61.2 percent
Target-Setting Method:	10 percent improvement
Data Sources:	National Health Interview Survey (NHIS), CDC/NCHS
Data:	HP2020 data for this objective Spotlight on Disparities: • Disparities by location • Disparities by sex Details about the methodology and measurement of this HP2020 objective The HP2010 objective with the same definition was 05-15. Search data for all HP2010 objectives
More Information:	Related research articles on PubMed

D-9 Increase the proportion of adults with diabetes who have at least an annual foot examination

Baseline:	68.0 percent of adults aged 18 years and older with diagnosed diabetes had at least one foot examination by a health professional in the past 12 months, as reported in 2008 (age adjusted to the year 2000 standard population)
Target:	74.8 percent
Target-Setting Method:	10 percent improvement
Data Sources:	Behavioral Risk Factor Surveillance System (BRFSS), CDC/PHSIPO
Data:	HP2020 data for this objective Details about the methodology and measurement of this HP2020 objective The HP2010 objective with the same definition was 05-14. Search data for all HP2010 objectives
More Information:	Related research articles on PubMed

D-10 Increase the proportion of adults with diabetes who have an annual dilated eye examination

Baseline:	53.4 percent of adults aged 18 years and older with diagnosed diabetes had a dilated eye examination in the past year, as reported in 2008 (age adjusted to the year 2000 standard population)
Target:	58.7 percent
Target-Setting Method:	10 percent improvement
Data Sources:	National Health Interview Survey (NHIS), CDC/NCHS
Data:	HP2020 data for this objective Spotlight on Disparities: • Disparities by location • Disparities by sex • Disparities by race and ethnicity • Disparities by income Details about the methodology and measurement of this HP2020 objective The HP2010 objective with the same definition was 05-13. Search data for all HP2010 objectives
More Information:	Related research articles on PubMed

D-11 Increase the proportion of adults with diabetes who have a glycosylated hemoglobin measurement at least twice a year

Baseline:	64.6 percent of adults aged 18 years and older with diagnosed diabetes had a glycosylated hemoglobin measurement at least twice in the past 12 months, as reported in 2008 (age adjusted to the year 2000 standard population)
Target:	71.1 percent
Target-Setting Method:	10 percent improvement
Data Sources:	Behavioral Risk Factor Surveillance System (BRFSS), CDC/PHSIPO
Data:	HP2020 data for this objective Details about the methodology and measurement of this HP2020 objective The HP2010 objective with the same definition was 05-12. Search data for all HP2010 objectives
More Information:	Related research articles on PubMed

D-12 Increase the proportion of persons with diagnosed diabetes who obtain an annual urinary microalbumin measurement

Revised

Baseline:	33.3 percent of Medicare beneficiaries with diabetes obtained an annual urinary microalbumin measurement in 2007
Target:	36.6 percent
Target-Setting Method:	10 percent improvement
Data Sources:	United States Renal Data System (USRDS), NIH/NIDDK
Data:	HP2020 data for this objective Spotlight on Disparities: • Disparities by sex Details about the methodology and measurement of this HP2020 objective The HP2010 objective with the same definition was 05-11. Search data for all HP2010 objectives
Revision History:	This objective was revised. Read more about the revision history.
More Information:	Related research articles on PubMed

D-13 Increase the proportion of adults with diabetes who perform self-blood glucose-monitoring at least once daily

Baseline:	64.0 percent of adults aged 18 years and older with diagnosed diabetes performed self-blood glucose-monitoring at least once daily in 2008 (age adjusted to the year 2000 standard population)
Target:	70.4 percent
Target-Setting Method:	10 percent improvement
Data Sources:	Behavioral Risk Factor Surveillance System (BRFSS), CDC/PHSIPO
Data:	HP2020 data for this objective Details about the methodology and measurement of this HP2020 objective The HP2010 objective with the same definition was 05-17. Search data for all HP2010 objectives
More Information:	Related research articles on PubMed

D-14 Increase the proportion of persons with diagnosed diabetes who receive formal diabetes education

Baseline:	56.8 percent of adults aged 18 years and older with diagnosed diabetes reported they ever received formal diabetes education in 2008 (age adjusted to the year 2000 standard population)
Target:	62.5 percent
Target-Setting Method:	10 percent improvement
Data Sources:	Behavioral Risk Factor Surveillance System (BRFSS), CDC/PHSIPO
Data:	HP2020 data for this objective Details about the methodology and measurement of this HP2020 objective The HP2010 objective with the same definition was 05-01. Search data for all HP2010 objectives
More Information:	Related research articles on PubMed

D-15 Increase the proportion of persons with diabetes whose condition has been diagnosed Revised

Baseline:	72.5 percent of adults aged 20 years and older with diabetes had been diagnosed, as reported in 2005–08 (age adjusted to the year 2000 standard population)
Target:	79.8 percent
Target-Setting Method:	10 percent improvement
Data Sources:	National Health and Nutrition Examination Survey (NHANES), CDC/NCHS
Data:	HP2020 data for this objective Spotlight on Disparities: • Disparities by sex • Disparities by race and ethnicity • Disparities by education • Disparities by income Details about the methodology and measurement of this HP2020 objective The HP2010 objective with the same definition was 05-04. Search data for all HP2010 objectives
Revision History:	This objective was revised. Read more about the revision history.
More Information:	Related research articles on PubMed

D-16 Increase prevention behaviors in persons at high risk for diabetes with prediabetes

D-16.1 Increase the proportion of persons at high risk for diabetes with prediabetes who report increasing their levels of physical activity

Baseline:	44.6 percent of adults aged 18 years and older who were at high risk for diabetes with prediabetes reported increasing their levels of physical activity in 2005–08 (age adjusted to the year 2000 standard population)
Target:	49.1 percent
Target-Setting Method:	10 percent improvement
Data Sources:	National Health and Nutrition Examination Survey (NHANES), CDC/NCHS
Data:	HP2020 data for this objective Spotlight on Disparities: • Disparities by race and ethnicity • Disparities by income • Disparities by disability Details about the methodology and measurement of this HP2020 objective
More Information:	Related research articles on PubMed

D-16 Increase prevention behaviors in persons at high risk for diabetes with prediabetes

D-16.1 Increase the proportion of persons at high risk for diabetes with prediabetes who report increasing their levels of physical activity

Baseline:	44.6 percent of adults aged 18 years and older who were at high risk for diabetes with prediabetes reported increasing their levels of physical activity in 2005–08 (age adjusted to the year 2000 standard population)
Target:	49.1 percent
Target-Setting Method:	10 percent improvement
Data Sources:	National Health and Nutrition Examination Survey (NHANES), CDC/NCHS
Data:	HP2020 data for this objective Spotlight on Disparities: • Disparities by race and ethnicity • Disparities by income • Disparities by disability Details about the methodology and measurement of this HP2020 objective
More Information:	Related research articles on PubMed

D-16.2 Increase the proportion of persons at high risk for diabetes with prediabetes who report trying to lose weight

Baseline:	50.0 percent of adults aged 18 years and older who were at high risk for diabetes with prediabetes reported controlling or trying to lose weight in 2005–08 (age adjusted to the year 2000 standard population)
Target:	55.0 percent
Target-Setting Method:	10 percent improvement
Data Sources:	National Health and Nutrition Examination Survey (NHANES), CDC/NCHS
Data:	HP2020 data for this objective Spotlight on Disparities: • Disparities by race and ethnicity • Disparities by income Details about the methodology and measurement of this HP2020 objective
More Information:	Related research articles on PubMed

D-16.3 Increase the proportion of persons at high risk for diabetes with prediabetes who report reducing the amount of fat or calories in their diet

Baseline:	48.5 percent of adults aged 18 years and older who were at high risk for diabetes with prediabetes reported reducing the amount of fat or calories in their diet in 2005–08 (age adjusted to the year 2000 standard population)
Target:	53.4 percent
Target-Setting Method:	10 percent improvement
Data Sources:	National Health and Nutrition Examination Survey (NHANES), CDC/NCHS
Data:	HP2020 data for this objective Spotlight on Disparities: • Disparities by race and ethnicity • Disparities by education • Disparities by income Details about the methodology and measurement of this HP2020 objective
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