

Adult Onset Diabetes Mellitus

What Does it Mean to Our Patients?

Type 2 diabetes mellitus (T2DM) is the most common type of diabetes. **Over 29 million Americans were diagnosed** with T2DM as of 2012. Given the aging population, the prevalence is expected to increase to 21-33% of the US adult population by 2050. The quality of life for the millions affected can be predicted to decline each year following a diabetes diagnosis. As physical and mental health suffers, patient activation and empowerment for disease self-management are key to meeting the needs of patients living with diabetes. The following summary of recent peer-reviewed articles describes expectations and challenges of this population that may positively affect outcomes.

Attributes that impact clinical outcomes for this patient population:

- Diet: Cultural and habitual obstacles challenge adherence
- Impaired quality of life
- Mental health: Comorbidities increase as anxiety, depression, and diabetes distress increase
- Neuropathic pain
- Preoccupation with disease, infection, skin ulcers, and a perpetual state of illness
- Vision loss
- Weight: Overweight patients have higher complication rates

Aspects that cause anxiety in this patient population:

- Are my doctors talking to each other?
- Will I have a hypoglycemic reaction when I am out or when I am alone?
- Will my doctor be angry because my blood sugars are high?
- Will I lose a limb? Will my kidneys fail?

Activities this population will benefit from:

- Telemedicine health care services for health coaching and symptom management
 - Review blood sugar trends, blood pressures, and other monitored data
 - Provide education and problem solving assistance
- Mobile Health technology for remote patient monitoring and clinical feedback
 - Remotely monitor individualized concerns (e.g., blood sugars, pain, diet, and blood pressure)
 - Provide clinical decision support for insulin dosing
- Pharmacist engagement with medication management
- Involving family and/or non-medical caregivers on calls with providers and educators
- Systems that create referrals and secure reimbursement for support programs
 - Provide ongoing support to sustain lifestyle changes and coping
- Screening for mental health comorbidities
- Prescribing lifestyle changes for prediabetes

References

Study	Objective	Conclusion
<p>Alvarado, M. M., Kum, H. C., Gonzalez Coronado, K., Foster, M. J., Ortega, P., & Lawley, M. A. (2017). Barriers to remote health interventions for type 2 diabetes: A systematic review and proposed classification scheme. <i>Journal of Medical Internet Research</i>, 19(2), e28.</p>	<p>To identify and classify barriers to adoption of remote health for the management of type 2 diabetes through a review of the literature.</p>	<ul style="list-style-type: none"> ■ Barriers to telemonitoring, telemedicine, telehealth, eHealth, and mHealth effectiveness that impede patient engagement include: <ul style="list-style-type: none"> – Technology illiteracy, accessibility, and affordability especially in low-income populations – Inaccurate data entry by patients – Poor integration of remote health technology and provider workflow – Insufficient training of health care personnel ■ Where successfully implemented, studies have found high levels of patient satisfaction, positive behavioral changes, and better health outcomes using remote health management options.
<p>Kitsiou, S., Paré, G., Jaana, M., & Gerber, B. (2017). Effectiveness of mHealth interventions for patients with diabetes: An overview of systematic reviews. <i>PLoS One</i>, 12(3), e0173160.</p>	<p>To determine the effectiveness of mobile health (mHealth) interventions for patients with diabetes through a review of the literature.</p>	<ul style="list-style-type: none"> ■ mHealth interventions—described as the use of mobile devices and applications for remote patient monitoring and delivery of clinical feedback— improve glycemic control (HbA1c) compared to non-mHealth approaches by as much as 0.8% for patients with type 2 diabetes.
<p>Academy of Managed Care Pharmacy (2016). AMCP Partnership Forum: Navigating innovations in diabetes care. <i>Journal of Managed Care and Specialty Pharmacy</i>, 22(12), 1369-1375.</p>	<p>To discuss how to leverage innovations in diabetes care to improve coordination of care and patient outcomes.</p>	<ul style="list-style-type: none"> ■ Patient self-management empowers patients to sustain lifestyle changes around diet, weight management, physical activity, blood glucose monitoring, and medication adherence. ■ A key barrier to optimizing diabetes outcomes is poor adherence to treatment regimens. ■ Health literacy, distrust, depression, costs of health care and medications, and treatment complexity all factor into non-adherence. ■ Beneficial strategies include: <ul style="list-style-type: none"> – Increased pharmacist engagement – Diabetic quality and outcomes measures – Telemedicine – mHealth—mobile apps that provide decision support for insulin dosing and allow patients to track food intake and activity.

Study	Objective	Conclusion
<p>Powers, M. A., Bardsley, J., Cypress, M., Duker, P., Funnell, M. M., Fischl, A. H., ... Vivian, E. (2016). Diabetes self-management education and support in type 2 Diabetes: A joint position statement of the American Diabetes Association, the American Association of Diabetes Educators, and the Academy of Nutrition and Dietetics. <i>Clinical Diabetes : A Publication of the American Diabetes Association</i>, 34(2), 70–80.</p>	<p>To describe the value and the barriers to diabetes self-management education and support (DSME/S) in the medical practice setting.</p>	<ul style="list-style-type: none"> ▪ The American Diabetes Association recommends that all individuals with diabetes receive structured DSME/S at diagnosis, yet, less than 7% of patients participate in DSME/S programs. ▪ DSME/S helps diabetics make daily self-management decisions, perform complex care activities, and cope with the disease. ▪ Implementing technology that directly connects with primary care improves clinical, psychosocial, and behavioral outcomes. ▪ Patients with direct access to an educator report higher confidence in provider communication and satisfaction. ▪ Formal processes must support referrals and reimbursement to ensure that patients with type 2 diabetes receive DSME and DSMS consistently. ▪ Barriers include a lack of understanding of the necessity and effectiveness of DSME/S, confusion regarding when and how to make referrals, lack of access to DSME/S services, and patient psychosocial and behavioral factors.
<p>Chen, Y., Sloan, F. A., & Yashkin, A. P. (2015). Adherence to diabetes guidelines for screening, physical activity and medication and onset of complications and death. <i>Journal of Diabetes and its Complications</i>, 29(8), 1228-1233.</p>	<p>To analyze relationships between adherence to guidelines for diabetes care—regular screening, physical activity, and medication—and diabetes complications.</p>	<ul style="list-style-type: none"> ▪ The American Diabetes Association estimates that diabetes led to \$245 billion in health care costs in 2012. ▪ Adherence to screening, physical activity, and medication guidelines is associated with lower risks of diabetes complications—including congestive heart failure, stroke, renal failure, lower limb amputation, blindness, and death.
<p>Polansky, W. H., Fisher, L., Hessler, D., & Edelman, S. V. (2015). Identifying the worries and concerns about hypoglycemia in adults with type 2 diabetes. <i>Journal of Diabetes and its Complications</i>, 29(8), 1171-1176.</p>	<p>To identify the hypoglycemic concerns of adults with type 2 diabetes (T2D) and examine how these concerns are associated with key patient characteristics.</p>	<ul style="list-style-type: none"> ▪ Among insulin users, anxiety is associated with greater emotional distress—including fear and depression— and more hypoglycemia, while confidence is linked to less emotional distress and improved glycemic control (i.e., lower A1C). ▪ Hypoglycemic concerns are significant in T2D adults, are linked to emotional distress and poor glycemic control, and merit attention in clinical practice.
<p>Powell, P. W.,</p>	<p>To discuss the</p>	<ul style="list-style-type: none"> ▪ The emerging model for diabetes care includes

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<p>Corathers, S. D., Raymond, J., & Streisand, R. (2015). New approaches to providing individualized diabetes care in the 21st century. <i>Current Diabetes Reviews</i>, 11(4), 222-230.</p>	<p>evolving clinical care delivery system for diabetic patients.</p>	<p>shared decision making, motivational interviewing, shared medical appointments, and multidisciplinary collaboration.</p> <ul style="list-style-type: none"> ▪ Barriers that may prevent multidisciplinary services include: <ul style="list-style-type: none"> – Conflicting recommendations – A perceived lack of diabetes expertise – Lack of communication systems – Lack of networking opportunities ▪ Patient preferences include: <ul style="list-style-type: none"> – Joint consultations – Accessibility to specialists via email or phone ▪ Obstacles to patient-centered care include: <ul style="list-style-type: none"> – Physicians' desire for autonomy – Absence of a commonly accepted framework for care delivery – Lack of expertise or leadership – Reimbursement and regulation models
<p>Skinner, J. S., Poe, B., Hopper, R., Boyer, A., & Wilkins, C. H. (2015). Assessing the effectiveness of pharmacist-directed medication therapy management in improving diabetes outcomes in patients with poorly controlled diabetes. <i>Diabetes Education</i>, 41(4), 459-465.</p>	<p>To assess the effectiveness of pharmacist-directed medication therapy management (MTM) on medication adherence and health comes in type 2 diabetes mellitus (T2DM) patients.</p>	<ul style="list-style-type: none"> ▪ There is a positive association between pharmacist-directed MTM, medication adherence, and glycemic control. ▪ Pharmacist-directed MTM may be particularly helpful in a community setting where vulnerable and high-risk populations receive care.
<p>Wayne, N., Perez, D. F., Kaplan, D. M., & Ritvo, P. (2015). Health coaching reduces HbA1c in type 2 diabetic patients from a lower socioeconomic status community: A randomized controlled trial. <i>Journal of Medical Internet Research</i>, 17(10), e224.</p>	<p>To evaluate a health coach intervention with and without the use of mobile phones to support health behavior change in patients with type 2 diabetes.</p>	<ul style="list-style-type: none"> ▪ Health coaching with and without mobile technology accelerated HbA1c and weight reduction in populations with lower socioeconomic status. ▪ Using mobile phones to connect patients to health coaches and monitor health behaviors can lead to improved glycemic control with faster reductions in HbA1c levels.

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<p>Aikens, J. E, Zivin, K., Trivedi, R., & Piette, J. D. (2014). Diabetes self-management support using mHealth and enhanced informal caregiving. <i>Journal of Diabetes and its Complications</i>, 28(2), 171-176.</p>	<p>To characterize diabetes patient engagement and clinician notifications for an mHealth interactive voice response (IVR) service.</p>	<ul style="list-style-type: none"> ▪ Weekly IVR calls can increase patient engagement and compliance with care. ▪ Age and physical impairment are correlated to higher rates of patient-reported problems requiring physician notification through mHealth. ▪ Involving non-medical caregivers on the calls increases the reporting of high blood sugar trends and routine blood pressure checks. ▪ Single status, diabetes-related distress, medication non-adherence, and patients with low health literacy were less engaged with the mHealth service.
<p>Brummel, A., Lustig, A., Westrich, K., Evans, M. A., Plank, G. S., Penso, J., & Dubois, R. W. (2014). Best practices: Improving patient outcomes and costs in an ACO through comprehensive medication therapy management. <i>Journal of Managed care and Specialty Pharmacy</i>, 20(12), 1152-1158.</p>	<p>To identify best practices and a business case fo Medication Therapy Management (MTM) programs.</p>	<ul style="list-style-type: none"> ▪ MTM contributes to optimal care in complex patients with diabetes. ▪ Design clear communication protocols between providers, pharmacists, and the other care providers within the organization prior to initiating an MTM program. ▪ Provide pharmacists with the autonomy to schedule face-to-face interactions with patients and to change prescriptions as necessary. ▪ Investigate required technologies and startup costs prior to committing to any MTM program. ▪ A strong and visionary leader is critical to ensure success.
<p>Ducat, L., Philipson, L. H., & Anderson, B. J. (2014). The mental health comorbidities of diabetes. <i>Journal of the American Medical Association</i>, 312, 691–692.</p>	<p>To summarize the prevalence and consequences of mental health problems for patients with diabetes.</p>	<ul style="list-style-type: none"> ▪ Mental health comorbidities include anxiety, depression, and diabetes distress—the struggle to balance complex therapies and lifestyle changes. ▪ Mental health comorbidities are associated with poor adherence to treatment, poor glycemic control, higher complication rates, and impaired quality of life. ▪ Only about one third of diabetics are screened for mental health comorbidities. ▪ Disease burden includes feeling overwhelmed with the diabetes regimen, being concerned about the future and complications, and feeling guilty when disease management is going poorly. ▪ The collaborative care model improves depression and glucose control as well as medical cost savings.

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<p>Maez, L., Erickson, L., & Naumuk, L. (2014). Diabetic education in rural areas. <i>Rural and Remote Health</i>, 14(2), 2742.</p>	<p>To evaluate best evidence-based strategies directed at improving diabetic outcomes of rural populations through Hemoglobin A1C (HbA1c) reductions.</p>	<ul style="list-style-type: none"> ▪ Nutritional education, motivational counseling, and a combination of written, verbal, and video education for lifestyle modifications are most effective for improving health outcomes in adult diabetics. ▪ Nutritional education should include portion sizes, cooking methods, using the diabetes food pyramid, and practical strategies for reducing fats. ▪ Nurse-led diabetes self-management education showed a significant reduction in HbA1c levels. ▪ Motivational interviewing—including reflection on experiences, engaging in problem solving, and answering clinical questions—reduced HbA1c levels over a 6-month period.
<p>Shawn McFarland, M., Wallace, J. P., Parra, J., & Baker, J. (2014). Evaluation of patient satisfaction with diabetes management provided by clinical pharmacists in the patient-centered medical home. <i>The Patient</i>, 7(1), 115-121.</p>	<p>To evaluate patient satisfaction of care received in pharmacist-managed primary care clinics among patients with diabetes mellitus within the PCMH.</p>	<ul style="list-style-type: none"> ▪ Patients with diabetes seen by a clinical pharmacy specialist within the patient-centered medical home model were very satisfied with the care they received overall.
<p>Siminerio, L., Ruppert, K., Huber, K., & Toledo, F. G. (2014). Telemedicine for Reach, Education, Access, and Treatment (TREAT): Linking telemedicine with diabetes self-management education to improve care in rural communities. <i>The Diabetes Educator</i>, 40(6), 797-805.</p>	<p>To examine diabetes-related behavioral and psychosocial outcomes as well as patient satisfaction with the Telemedicine for Reach, Education, Access, and Treatment (TREAT) model.</p>	<ul style="list-style-type: none"> ▪ The TREAT model—telemedicine services provided by an endocrinologist at an urban location in partnership with rural physicians and diabetes educators—improves behavioral and psychosocial outcomes, and patient satisfaction. ▪ TREAT resulted in significant improvements in empowerment, self-care (adherence to diet and monitoring), and reduction in diabetes distress.

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<p>Adams, S. R., Goler, N. C., Sanna, R. S., Boccio, M., Bellamy, D. J., Brown, S. D., ... Schmittiel, J. A. (2013). Patient satisfaction and perceived success with a telephonic health coaching program: The Natural Experiments for Translation in Diabetes (NEXT-D) study. <i>Preventing Chronic Disease</i>, 10, E179.</p>	<p>To examine patient satisfaction and patient's perceived success in achieving program goals with a telephonic coaching program in a large integrated health system.</p>	<ul style="list-style-type: none"> ▪ 71% of program participants would recommend health coaching. ▪ Healthy weight, healthy eating, and physical activity were the most common topics discussed. ▪ Patients report a high level of satisfaction with telephonic health coaching. ▪ Levels of satisfaction, and perceived success with telephonic health coaching provided by a health plan were positively correlated with the number of sessions completed and patient activation.
<p>Brummel, A. R., Soliman, A. M., Carlson, A. M., & de Oliveira, D. R. (2013). Optimal diabetes care outcomes following face-to-face medication therapy management services. <i>Population Health Management</i>, 16(1), 28-34.</p>	<p>To examine the relationship between a pharmacist-led and delivered medication therapy management (MTM) program and achievement of Optimal Diabetes Care benchmarks.</p>	<ul style="list-style-type: none"> ▪ The percentage of diabetes patients optimally managed—defined as glycosylated hemoglobin (HbA1c) <7%, low-density lipoprotein <100 mg/dl, blood pressure <130/80, tobacco free, and daily aspirin use—was significantly higher for MTM patients as compared to non-MTM patients. ▪ A mean reduction in HbA1c of 0.54% was realized following a year of MTM.
<p>Gregg, E. W., Boyle, J. P., Thompson, T. J., Barker, L. E., Albright, A. L., & Williamson, D. F. (2013). Modeling the impact of prevention policies on future diabetes prevalence in the United States: 2010-2030. <i>Population Health Metrics</i>, 11(1), 18.</p>	<p>To project the effect of hypothetical prevention policies on future US diabetes rates.</p>	<ul style="list-style-type: none"> ▪ Offering adults with impaired fasting glucose (IFG) structured lifestyle interventions would lessen the increase in diabetes prevalence by 12%. ▪ Offering adults with pre-diabetes—IFG and impaired glucose tolerance—structured lifestyle interventions would lessen the increase in diabetes prevalence by 5%. ▪ Exposing the entire U.S. population to risk reduction policies (e.g., taxing sugary foods, menu labeling mandates, and pedestrian-friendly urban designs) would lessen the increase in diabetes prevalence by 3%. ▪ A “combined” strategy, involving strategies for prevention for adults with IFG and population-wide strategies would lessen the increase in diabetes prevalence by 14%. ▪ While diabetes prevention strategies may slow the rate of increase, the diabetes prevalence rate is likely to increase dramatically over the next 20 years.

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<p>Rasmussen, N. H., Smith, S. A., Maxson, J. A., Bernard, M. E., Cha, S. S., Agerter, D. C., & Shah, N. D. (2013). Association of HbA1c with emotion regulation, intolerance of uncertainty, and purpose in life in type 2 diabetes mellitus. <i>Primary Care Diabetes</i>, 7(3), 213-221.</p>	<p>To investigate differences in purpose in life satisfaction between type 2 diabetes mellitus adults with high HbA1c and those with acceptable HbA1c levels.</p>	<ul style="list-style-type: none"> ▪ Lower purpose in life satisfaction is associated with higher glucose intolerance (HbA1c levels). ▪ Primary care clinicians are encouraged to screen for purpose in life satisfaction by asking a single question, such as, "Do the things you do in your life seem important and worthwhile?" ▪ If purpose in life distress is interfering with diabetes self-care, there may be value in offering behavioral and emotional health counseling.
<p>Rosland, A. M., Heisler, M., Janevic, M. R., Connell, C. M., Langa, K. M., Kerr, E. A., & Piette, J. D. (2013). Current and potential support for chronic disease management in the United States: The perspective of family and friends of chronically ill adults. <i>Families, Systems and Health</i>, 31(2), 119-131.</p>	<p>To characterize the "disease management supporters" for people with chronic illness, the help that supporters could provide, and barriers to increasing support.</p>	<ul style="list-style-type: none"> ▪ A majority of U.S. adults are helping family or friends with chronic disease management—including coordinating appointments and health insurance, and direct personal care assistance. ▪ Engaging family members and non-medical supporters in patient education sessions improves outcomes. ▪ When patients are accompanied to outpatient visits they have better information recall and are more satisfied with their medical encounter. ▪ Encourage family attendance at medical appointments; provide supporting tools to prepare for visits and record visit information; and train physicians in techniques to effectively communicate with supporters during visits.
<p>Seibert, P. S., Valerio, J., & DeHaas, C. (2013). The concomitant relationship shared by sleep disturbances and type 2 diabetes: Developing telemedicine as a viable treatment option. <i>Journal of Diabetes Science and Technology</i>, 7(6), 1607-1615.</p>	<p>To discuss the potential for telemedicine to enhance treatment and foster patient empowerment in diabetics with sleep disturbances.</p>	<ul style="list-style-type: none"> ▪ Telemedicine reduces costs associated with office visits and inpatient care, and allows convenient and consistent interactions between patients and medical providers. ▪ Telemedicine promotes consistent follow-ups, review of monitoring data, adherence to practice guidelines, and patient satisfaction. ▪ Patients who utilized telemedicine technology reported that it enhanced the ability to make good health care choices, allowed them to work more closely with a physician, and enhanced education about healthy diet and lifestyle choices. ▪ To be successful, telemedicine should be offered in addition to routine patient-provider in person interactions.

Study	Objective	Conclusion
<p>Thorpe, C. T., Fahey, L. E., Johnson, H., Deshpande, M., Thorpe, J. M., & Fisher, E. B. (2013). Facilitating healthy coping in patients with diabetes: A systematic review. <i>Diabetes Education</i>, 39(1), 33-52.</p>	<p>To summarize recent literature on approaches to supporting healthy coping in diabetes.</p>	<ul style="list-style-type: none"> ■ Healthy coping interventions in diverse populations, include: <ul style="list-style-type: none"> – Diabetes self-management education, support groups, problem-solving approaches, and coping skills interventions – Cognitive Behavior Therapy to reduce diabetes-related depression – Family therapy for improving coping in youths ■ Treatment intensification in response to poor metabolic control improves clinical and quality-of-life outcomes. ■ Adherence is compromised by complex treatment regimens. Support programs improve adherence.
<p>Trief, P. M., Izquierdo, R., Eimicke, J. P., Teresi, J. A., Goland, R., Palmas, W., ... Weinstock, R. S. (2013). Adherence to diabetes self-care for white, African-American and Hispanic American telemedicine participants: 5 year results from the IDEATel project. <i>Ethnicity and Health</i>, 18(1), 83-96.</p>	<p>To examine the change in treatment adherence in response to a telemedicine intervention for elderly diabetes patients in various ethnic groups.</p>	<ul style="list-style-type: none"> ■ Higher self-reported adherence is associated with televideo educator visits and individualized goal-setting/problem-solving assistance. ■ Greater comorbidity and diabetes symptoms predicted poorer adherence with treatment. ■ Greater duration of diabetes and more years of education predicted better adherence with treatment. ■ African American and Hispanic American participants are less compliant than white participants despite individualized and accessible interventions; unique interventions for minority groups may be needed to overcome this disparity.
<p>Beverly, E. A., Ganda, O. P., Ritholz, M. D., Lee, Y., Brooks, K. M., Lewis-Schroeder, N. F., ... Weinger, K. (2012). Look who's (not) talking: Diabetic patients' willingness to discuss self-care with physicians. <i>Diabetes Care</i>, 35(7), 1466-1472.</p>	<p>To assess communication gaps may prevent patients from discussing self-care problems with providers.</p>	<ul style="list-style-type: none"> ■ Lower quality of life, more diabetes-related distress, and more depression and anxiety are related to a reluctance to discuss diabetes self-care with primary care physicians—including diet, exercise, medication use, blood glucose levels, and skin or vision problems. ■ The most common reasons for not discussing self-care were “not wanting to disappoint their doctor or not wanting to feel judged by their doctor” and “shame, guilt, and embarrassment.” ■ Older patients and those who use more self-controlled coping styles were more likely to discuss self-care with their doctors.

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<p>Grandy, S., & Fox, K. M. (2012). Change in health status (EQ-5D) over 5 years among individuals with and without type 2 diabetes mellitus in the SHIELD longitudinal study. <i>Health and Quality of Life Outcomes</i>, 10, 99.</p>	<p>To assess the change in health status and health-related quality of life (HRQoL) over five years among individuals with and without type 2 diabetes (T2DM).</p>	<ul style="list-style-type: none"> ■ T2DM respondents were older, had a higher body mass index, lower education levels (high school or less), and lower household incomes. ■ Over a five-year period, health status—consisting of mobility, self-care, usual activities, pain/discomfort, and anxiety/depression ratings—of respondents with T2DM declined significantly, compared with adults with no diabetes. ■ Additional disease burden was associated with reports of the following diabetic complications: <ul style="list-style-type: none"> – Neuropathy—including pain, tingling, or numbness in hands or feet; foot ulcers; or amputation—was the most frequent complication reported. – Neuropathy and retinopathy (including eye disease and blindness) were associated with the greatest declines in health status scores. – Nephropathy—including chronic kidney disease, dialysis, end-stage kidney disease, kidney transplant, or protein in the urine—was associated with the greatest decline in quality of life scores.
<p>Hunger, M., Schunk, M., Meisinger, C., Peters, A., & Holle, R. (2012). Estimation of the relationship between body mass index and EQ-5D health utilities in individuals with type 2 diabetes: Evidence from the population-based KORA studies. <i>Journal of Diabetes and Its Complications</i>, 26(5), 413-418.</p>	<p>To estimate the association between body mass index (BMI) and health-related quality of life in individuals with type 2 diabetes.</p>	<ul style="list-style-type: none"> ■ BMI is strongly associated with health status in persons with type 2 diabetes. ■ Optimal health is experienced around a 26 kg/m² BMI. ■ Lifestyle measures to reduce obesity can markedly improve patients' health-related quality of life. ■ The potential negative effect of weight gain should be taken into account when determining patient preferences for treatment.

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<p>McFarland, M., Davis, K., Wallace, J., Wan, J., Cassidy, R., Morgan, T., & Venugopal, D. (2012). Use of home Telehealth monitoring with active medication therapy management by clinical pharmacists in veterans with poorly controlled type 2 diabetes mellitus. <i>Pharmacotherapy</i>, 32(5), 420-426.</p>	<p>To assess the effect of the Coordination Home Telehealth (CCHT) program in a cohort of patients with poorly controlled type 2 diabetes mellitus.</p>	<ul style="list-style-type: none"> ▪ Management of patients with diabetes who are receiving insulin may be optimized by clinical pharmacy specialist use of the CCHT program. ▪ CCHT program participation resulted in accelerated HbA1c reduction and increased the likelihood of attaining the American Diabetes Association's HbA1c goals. ▪ More time was spent and more antidiabetic drug changes were made in the CCHT group.
<p>Ovbiosa-Akinbosoye, O. E., & Long, D. A. (2012). Wellness program satisfaction, sustained coaching participation, and achievement of health goals. <i>Journal of Occupational and Environmental Medicine</i>, 54(5), 592-597.</p>	<p>To examine the association between demographics, program satisfaction, sustained coaching participation, and odds of meeting health goals.</p>	<ul style="list-style-type: none"> ▪ Wellness program participant satisfaction is positively associated with sustained coaching participation and achievement of health goals. ▪ There are positive associations between participant satisfaction and sustained coaching. ▪ Older patients and female participants experienced the highest levels of satisfaction. ▪ Higher participation through telephonic coaching modality improved outcomes among participants.
<p>Peyrot, M., Barnett, A. H., Meneghini, L. F., & Schumm-Draeger, P. M. (2012). Factors associated with injection omission/non-adherence in the Global Attitudes of Patients and Physicians in Insulin Therapy study. <i>Diabetes, Obesity and Metabolism</i>, 14(12), 1081-1087</p>	<p>To examine factors associated with insulin injection omission/non-adherence on a global basis.</p>	<ul style="list-style-type: none"> ▪ Insulin omission/non-adherence is common and associated with several modifiable risk factors including practical barriers, injection difficulties, lifestyle burden, and regimen inflexibility. ▪ Additional efforts to address these risk factors might reduce the frequency of insulin omission/non-adherence and lead to improved clinical outcomes.

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<p>Wermeling, P. R., Gorter, K. J., van Stel, H. F., & Rutten, G. E. (2012). Both cardiovascular and non-cardiovascular comorbidity are related to health status in well-controlled type 2 diabetes patients: a cross-sectional analysis. <i>Cardiovascular Diabetology</i>, 11, 121.</p>	<p>To assess associations between the number and type of comorbidities and health status in well-controlled type 2 diabetes patients.</p>	<ul style="list-style-type: none"> ▪ Well-controlled type 2 diabetes patients with comorbidities had a much lower health status compared to those without. ▪ Physicians may take into account patient's health status and integrate the impact of comorbidities into diabetes care.
<p>Boyle, J. P., Thompson, T. J., Gregg, E. W., Barker, L. E., & Williamson, D. F. (2010). Projection of the year 2050 burden of diabetes in the US adult population: Dynamic modeling of incidence, mortality, and prediabetes prevalence. <i>Population Health Metrics</i>, 8, 29.</p>	<p>To project the future burden of diabetes among US adults.</p>	<ul style="list-style-type: none"> ▪ The annual diabetes incidence (new cases) is projected to increase from about eight cases per 1,000 in 2008 to about 15 in 2050. ▪ Total diabetes prevalence is projected to increase from 14% in 2010 to 21-33% of the US adult population by 2050. ▪ Due to an aging population, intervention can reduce but not eliminate increases in diabetes prevalence.
<p>Taub, L. F., & Redeker, N. S. (2008). Sleep disorders, glucose regulation, and type 2 diabetes. <i>Biological Research for Nursing</i>, 9(3), 231-243.</p>	<p>To examine the scientific basis for the associations between diabetes and sleep.</p>	<ul style="list-style-type: none"> ▪ Sleep deprivation contributes to elevations of hemoglobin A1C (i.e., poor glycemic control). ▪ Nocturia and neuropathic pain associated with diabetes may contribute to sleep disturbance and exacerbate sleep deprivation.

For additional resources, please see [The Medicare Diabetes Prevention Program](#), [The Centers for Disease Control National Diabetes Statistics Report, 2014](#), and [The American Diabetes Association](#).