

**ADAPTING YOUR PRACTICE:  
TREATMENT AND RECOMMENDATIONS  
FOR PATIENTS WHO ARE HOMELESS  
WITH DIABETES MELLITUS**



**HCH CLINICIANS' NETWORK**

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## **TABLE OF CONTENTS**

Introduction	1
Diagnosis & Evaluation	2
Plan & Management	5
Management of Associated Problems & Complications	12
Case Study	19

## INTRODUCTION

Diabetes occurs at approximately the same rate in the homeless and general populations; however, diagnosis and management of diabetes in individuals experiencing homelessness remains greatly challenging (Lee et al., 2005; Lebrun-Harris et al., 2012; Szerlip & Szerlip, 2002). Homelessness creates additional difficulties when patients are trying to manage diabetes within the constraints of living in a shelter or on the streets. Healthy meals can be hard to find, refrigerating insulin may be impossible, and medications for other illnesses may have a negative impact on metabolism. Clinicians who provide care to these individuals face complex challenges to adapt their practices to address the rigors of diabetes treatment while accommodating for the realities of their patients' lives. Primary care providers who routinely care for those who are homeless recognize the need to take patient living situations and co-occurring disorders into consideration when developing care plans. Coordinated and integrated care between primary, specialized and social service providers has been shown to improve health outcomes in underserved populations with diabetes (Baty, Viviano, Schiller, & Wendling, 2010). Furthermore, services tailored specifically to individuals who are homeless have shown success in managing chronic conditions, such as diabetes (O'Toole et al., 2010).

In 2002, the Health Care for the Homeless Clinicians' Network developed adapted clinical guidelines for the care of adults experiencing homelessness with diabetes. The guidelines were updated once in 2007 and are now being updated once again. The American Diabetes Association's *Standards of Medical Care in Diabetes—2013* is the source document for these current adaptations (American Diabetes Association [ADA], 2013). Recommendations found in the ADA diabetes guidelines are not restated in this document except to specify a particular adaptation. Hopefully, these simple adaptations of established diabetes guidelines can help improve treatment adherence and health outcomes for patients experiencing homelessness.

## **DIAGNOSIS AND EVALUATION**

### **History**

#### *Current Symptoms*

- Ask patients if they have had any symptoms of hypoglycemia or hyperglycemia. Ask questions regarding complications of diabetes (i.e., vision changes, paresthesias, skin changes/ulcers, chest pain).
- Ask patients how long they have known about their diabetes and if they have any known long-term complications (i.e., retinopathy, nephropathy, neuropathy, cardiovascular disease).

#### *Current Health Behaviors and Treatment*

- Ascertain patients' current medications and how they are obtained.
- Assess patient recent adherence to previously recommended treatment advice (i.e., use of medication, missed doses, dietary changes, ability to exercise).
- Ask the patients about eating habits and patterns including nutrition status, weight history, and food sources (e.g., soup kitchens). Ask patients if they are able to follow an appropriate diabetic diet. Many food sources supply only one meal a day so that the homeless person must visit multiple places for food. Some shelters are able to provide alternatives to persons with special dietary needs.
- Determine if/where patients are getting medical help, advice, syringes, and test strips. Home glucose meters can often be obtained at no cost from companies as samples. In addition, many stores carry lancets and test strips at very affordable prices. These options should be researched and recommended as appropriate.
- Assess for medical and mental health comorbidities and associated medications.
- Explore the use of tobacco, alcohol and illicit drugs, and the frequency and route of use.

#### *Past Medical History*

- Ask patients if they have ever had foot sores or ulcers or any problems with their feet.
- Assess and often reassess how much walking patients are doing as well as the condition and fit of footwear.
- Obtain a sexual history including contraception and reproductive history.

### *Social History*

- Assess where patients are living; e.g., shelter, on the street, doubled up. (“Doubled up” is a term that refers to a situation where individuals are unable to maintain their housing situation and are forced to stay with a series of friends and/or extended family members.)
- Ask when patients last had permanent or regular place to live and if they ever had their own apartment or home.
- Ask patients if they have access to food and water when they want or need it (e.g., snacks).
- Assess patient understanding of diabetic illness and how to control it safely.
- Assess patients’ readiness to change behavior.
- Assess patients’ literacy level.

### **Physical exam**

- Obtain vital signs at each visit.
- Perform a full physical exam with particular focus on the cardiovascular, pulmonary, neurologic, and dermatologic systems.
- A comprehensive foot exam, including vibration and monofilament sensation, should be performed at least annually. A visual foot exam to evaluate for ulcers or other worrisome skin changes should be performed at each visit.
- Evaluate any insulin injection sites for signs of infection.

### **Diagnostic Tests**

When available, it is important to review past lab results and their trends over time with patients.

- Perform dipstick urinalysis to test for ketones, glucose, protein and sediment, when indicated.
- The use of portable HbA1c test kits is a valuable tool for point of care information. The results, available in fewer than ten minutes can be used to enhance follow-up and patient education.
- To assess kidney status, the best test for homeless patients is the albumin-to-creatinine ratio (urine for microalbumin) in an early morning collection. If the test is elevated, repeat. Twenty four-hour urine testing is no longer recommended for screening and is not practical for many homeless patients.
- Evaluate patient lipid status. A fasting lipid profile provides more complete information, but patient LDL cholesterol can still be accurately measured if not fasting. Fasting may not be realistic or appropriate for some patients as food acquisition is a challenge for this population. Consider using direct

LDL testing, which does not require patients to fast before having tests drawn. This is especially important for patients who often miss appointments.

- Consider testing for hepatitis B and C, HIV, syphilis, and TB, so as not to miss an opportunity for diagnosing and treating other conditions that may be more prevalent in this high-risk population.

Providers should also identify patients with prediabetes (impaired fasting glucose or impaired glucose tolerance) and attempt to intervene with lifestyle changes so as to prevent the development of diabetes (ADA, 2013). This can be diagnosed with an HbA1c test, which does not require fasting and may be easier to obtain.

## PLAN AND MANAGEMENT

At each visit the clinician should:

- Review the diabetes treatment plan with the patient, including medication access and storage, glucometer use (if available), and warning signs of when to seek care sooner.
- Assess patient current living situation including where they live, how long they have lived there, who lives with them and their relationship to that person.
- Assess the psychological, sociological and economic factors that may affect the management plan. Refer the patient to community resources, as needed, e.g., Department of Social Services.
- Assess food sources.
- Obtain an emergency contact with a phone number.
- Obtain a phone number for the patient if possible. Some patients have cell phones, voice mail numbers or can receive messages at shelters or programs.

□ **Tip:**  
*Patients receiving Supplemental Nutrition Assistance Program (SNAP) benefits or other public entitlements may exhaust their resources by the end of the month.*

### Glycemic goals

In general, the goal for HbA1c is < 7%. Some quality management programs have a target HbA1c of < 8% to reduce the risk of hypoglycemia in particularly vulnerable patient populations (ADA, 2013). Before consideration of more stringent control in patients who are homeless, carefully review food access, regularity, control of diet, physical activity, and hypoglycemic events. Less stringent control may be indicated for some patients who are homeless, including those with ongoing hypoglycemic events, unstable living situation, inconsistent follow up, ongoing substance use, poorly controlled mental illness, or significant cognitive impairment. A focus on more stable housing and stabilization of other health conditions may be needed first.

### Patient Education and Self-Management

- Self-management goal-setting can be a useful method to involve patients in their health care. Allow patients to decide what is important for them in contributing to their health, even if goals are not directly related to a diagnosis of diabetes. This first step can provide patients with confidence to make further changes as needed.

- Providing culturally suitable education involving patients in the learning process is critical. Successful approaches to teaching persons experiencing homelessness include peer interaction and support groups.
- Assess patient basic literacy and health literacy and provide self-management education accordingly.
- Specifically ask patients about their understanding of diabetes and how to best control it. This will allow an opportunity to address possible misconceptions that would otherwise be unrecognized.
- Patients who are dependent on tobacco, alcohol or illicit drugs may not be ready or able to abstain from these substances. Helping the patient move in that direction may be the first goal. Many therapeutic interventions help decrease health risks until they are ready to change their behavior. Motivational interviewing, for example, is a successful technique to reduce risk of complications (Burke, Arkowitz, & Menchola, 2003; Miller & Rollnick, 2002).
- For female patients planning pregnancy, it is important to discuss high risk pregnancy in regards to gestational diabetes and the need to connect with an OBGYN at the earliest opportunity for appropriate prenatal care.

### *Diet and Nutrition*

Homeless persons are usually dependent on soup kitchens or shelters for meals, and it may be difficult to plan meals to coincide with insulin administration (Hwang & Bugeja, 2000). Clinicians should work with shelters and soup kitchens to promote healthy food choices and to provide supplemental snacks to those with diabetes.

The clinician should:

- Assess where and when patients are eating, and the frequency and healthfulness of meals.
- Recognize that patients may choose to eat at local fast food restaurants and provide them with a list of healthier food choices available within these locations.
- Provide suitable documentation for the patient with diabetes to use at food pantries, soup kitchens and shelters to obtain healthful snacks and foods.
- Encourage patients to make the best choices that they can from what is available, for example, taking a smaller portion of macaroni and cheese and a larger portion of vegetables.

**□ Tip:**

*Tight glycemic control may be dangerous for patients on insulin or sulfonylureas who cannot reliably predict the number or timing of meals that they will eat that day.*

- Ask patients to save part of the meal for later when only one or two meals are available per day.
- Provide multivitamins with minerals.
- Acknowledge the patients' limitations given food choices and work to adjust medications to address glucose control.

### *Oral Health*

Access to preventive dental services is often difficult for patients experiencing homelessness. The clinician can:

- Provide toothbrushes, toothpaste and dental floss.
- Teach basic oral health care, e.g., demonstrating proper brushing and flossing.
- Advise patients to rinse mouth with water after eating when brushing is not possible.
- Teach patients the importance of an annual oral examination even if they do not have teeth.
- Refer patients for an annual oral exam when possible.

### *Exercise*

For people who are homeless, walking is their typical exercise and they usually carry their belongings, which increases the exercise effort. Patients with peripheral neuropathy or foot problems should take precautionary measures such as proper footwear. The clinician should:

- Remind patients that regular exercise is part of the diabetes treatment plan.
- Chart how far the client walks daily.
- When appropriate, suggest that the patient take steps instead of elevators.
- Assess the condition of the patient's shoes and socks at every visit.
- Research possibilities for exercise monitors such as pedometers and options such as the YMCA or other local fitness centers that can offer membership at reduced rates.

### *Foot care*

Foot problems often result from prolonged standing and walking. When combined with diabetes, the patient is at high-risk for foot ulcers. The clinician should:

- Encourage patients to keep feet dry and take shoes and socks off at night.
- Instruct patients to wash socks nightly, if possible, and dry thoroughly.

- Teach patients to inspect their feet daily.
- Teach patients how to examine their feet. If they cannot see the bottom of their feet, teach the patient how to use a mirror. Urge patients to visit the clinic immediately if they have open foot sores or areas of redness.
- Encourage patients to ask clinicians to check their feet each time they visit the clinic (Handelsman et al., 2011).
- Identify community resources for free shoes and socks, and refer patients as needed. Maintain a supply of clean socks to give to patients as needed. Provide padded socks when available.
- Consider having foot care products for patients e.g., skin care lotions, corn cushions, mole skin, and lambs wool.
- Instruct patients to elevate legs to a level at or above their heart whenever possible to prevent/alleviate fluid stasis in lower extremities. This is especially important for patients who are sleeping in chairs.
- Refer patients to Respite care if available for relief of diabetic foot conditions.
- Secure a podiatrist for referrals and consultation.

### **Self-monitoring of blood glucose**

Although self-monitoring of blood glucose is indicated when multiple insulin injections or an insulin pump are prescribed, and may be helpful with other therapies, patients who are homeless often have difficulty obtaining or managing glucometers or strips. If self-monitoring is not possible, the clinician should:

- Optimize control using non-insulin therapies or once daily insulin injections.
- Recommend frequent clinic visits to monitor blood glucose and complications.
- Instruct patients to recognize signs and symptoms of hypoglycemia and how to treat if present.

### **Insulin therapy**

Tight glycemic control can increase the risk of hypoglycemic episodes in homeless individuals due to a variety of physiological and adherence factors including excessive caloric expenditures, e.g., extensive walking; uncertain caloric intake, e.g., availability, content and timing of meals; and behavioral factors that may negatively effect adherence e.g., mental illness and substance abuse.

- Whenever possible, teach patients to adjust their own insulin dose based on food availability, blood sugar readings, and anticipated physical activity.
- Recommend decreasing insulin dosage when food is unavailable.
- Consider using basal insulin such as insulin glargine, if available, with insulin lispro, insulin aspart, or regular insulin before meals to accommodate irregular eating patterns.
- Use premixed insulin when needed to minimize complexity of the regimen.
- The use of insulin pens has proven convenient and successful, and may reduce the risk of theft for patients who might otherwise need to carry syringes (Wilk, Mora, Chaney, & Shaw, 2002). Providers should inquire in their area on how to access pens for patient use.
- If they are walking a great deal, encourage patients to inject insulin into the abdomen to avoid erratic absorption.

### *Insulin storage*

Since patients who are homeless usually have little or no access to refrigeration, consider these options:

- Assess whether patients can use a shelter's refrigerator and whether the insulin will be accessible when needed.
- Store patients' insulin at the clinic and dispense one vial at a time.
- Suggest storing insulin in an insulated bag.
- Provide insulated bags for insulin storage.
- Avoid pre-filling syringes and storing them in a communal refrigerator, e.g., in a shelter, where the medication integrity cannot be monitored safely.
- If refrigeration is unavailable, insulin can be safely stored at temperatures between 36 and 86 degrees Fahrenheit for up to one month. Therefore, recommend that patients avoid carrying insulin inside pants or shirt pockets. An alternative such as outer clothing or tote bag may be suggested.

### *Syringe storage/disposal*

- Advise patients against reusing needles.
- Caution patients to store syringes securely since they can be stolen for illicit drug use.
- Advise patients that a pharmacy may provide one or two syringes if needed. Patient will need to show pharmacists their insulin supply.
- Instruct patients on proper syringe disposal emphasizing safety and offer options available in their area.

## **Non-insulin therapy**

People experiencing homelessness have high rates of chronic liver conditions and a high incidence of substance use with associated liver dysfunction (Koegel, Burnam, & Baumohl, 1996; Lebrun-Harris et al., 2012). The clinician should:

- Assess liver function on a regular basis.
- Screen carefully for alcohol abuse before starting metformin.

For the patient taking sulfonylureas, the clinician should:

- Recommend that the patient hold or decrease the dosage when food is unavailable to avoid hypoglycemic episodes.

DPP-4 inhibitors could be useful in homeless patients because they do not cause hypoglycemia or weight gain but should be used with caution in patients with a history of alcohol abuse or high triglycerides (>500) secondary to the risk of pancreatitis. Currently there is no generic available for these medications and patients without insurance may not be able to obtain these medications unless through medication bridge programs because of cost barriers (ADA, 2013; Merck, 2012).

- Depending which medications a patient is taking, a routine basic metabolic panel to evaluate electrolytes, serum creatinine, and liver function tests may be indicated to assess whether a patient can start or stay on a particular medication.

## **Non-insulin injectables**

GLP-1 receptor agonists come in injectable pen form, which requires refrigeration prior to opening. This may be difficult for persons experiencing homelessness who do not have access to refrigeration. The medications are low risk for causing hypoglycemia unless they are used in combination with sulfonylureas or insulin; they may be useful in patients who are obese because of the potential for weight loss. This class of medications should be used with caution in patients with a history of alcohol abuse or high triglycerides (>500) secondary to the risk of pancreatitis (ADA, 2013; Amylin Pharmaceuticals, 2011; Amylin Pharmaceuticals, 2012; Handelsman et al., 2011).

The long lasting formulations of these medications only have to be injected once weekly, creating the potential for increased medication adherence (Amylin Pharmaceuticals, 2012).

Currently, there are no generics available for these medications, and patients without insurance may not be able to obtain these medications unless through medication bridge programs (Amylin Pharmaceuticals, 2011; Amylin Pharmaceuticals, 2012).

### **Hypoglycemia**

Hypoglycemia has been associated with microvascular and macrovascular events and should be closely monitored especially with patients who are more at risk of hypoglycemic episodes (Desouza, Bolli, & Fonseca, 2010; Rodbard et al., 2009). Assist patients to obtain a medic alert bracelet and a form of glucose that is easy to carry.

People who are homeless often do not have family members or friends available to help in an emergency. Clinicians should teach shelter and program (e.g., residential treatment, supportive housing) staff the signs and symptoms of hypoglycemia. This is critical since hypoglycemia may be mistaken for intoxication or a behavioral health issue as some individuals can become aggressive. If the patient is conscious and able to swallow, the staff can give oral glucose, e.g., an orange drink. If the patient is unresponsive or unable to swallow, the staff should immediately call 911 for help.

Work with shelter and program staff to provide diabetic appropriate snacks for patients.

If available, family members or friends should be taught to recognize the signs and symptoms of hypoglycemia; how to administer oral glucose or an injection of glucagon, if prescribed, should the patient be unresponsive or unable to swallow; and to call 911 when indicated.

## **MANAGEMENT OF ASSOCIATED PROBLEMS AND COMPLICATIONS**

Patients who are homeless have been shown to more often have an external locus of control leading to a feeling of whatever happens to them is out of their control (Nickasch & Marnocha, 2009). This can make a disease such as diabetes, which requires patient participation in management, difficult to control, increasing morbidity and mortality related to the disease. This section reviews the macrovascular and microvascular complications of diabetes and provides suggestions on how to identify and minimize risk.

### ***Cardiovascular disease***

Cardiovascular disease is the primary cause of death for persons with diabetes. The plan for decreasing complications should target blood pressure and lipids, primarily focusing on LDL-C reduction in addition to glycemic control (Handelsman et al., 2011; ADA, 2013).

- Smoking cessation is an important component of education on diabetes complications (ADA, 2013).

### ***Hypertension***

The DASH (Dietary Approaches to Stop Hypertension) diet is recommended for persons with diabetes and hypertension (ADA, 2013). Persons who are homeless may have difficulty accessing foods which are not high in sodium.

The first line of therapy is an ACE inhibitor or an ARB and multiple drug therapy is generally required (ADA, 2013). When considering using a diuretic for blood pressure control, the clinician should:

- Assess patient access to bathroom facilities.
- Assess patient access to water and other fluids if the patient is living outside in a hot climate.

### ***Lipid management***

Statin therapy is recommended in patients with cardiovascular disease or those without cardiovascular disease but who are over the age of 40 with one or more other cardiovascular disease risk factors. These risk factors are family history of cardiovascular disease, hypertension, smoking, dyslipidemia or albuminuria (ADA, 2013).

If a patient is using statins for hyperlipidemia and abusing alcohol and other drugs, consider screening liver function more frequently.

### *Aspirin*

Aspirin is recommended for patients at high cardiovascular risk, however it is no longer recommended for those at low risk. The benefit from aspirin must always be balanced with the risk of bleeding (ADA, 2013).

### ***Diabetic nephropathy***

Blood pressure and blood sugar control are important to lowering the risk of nephropathy. In patients who already have albuminuria, the restriction of protein helps slow its progression and decreases the occurrence of end stage renal disease (ADA, 2013). Access to specific renal or low sodium diets may be difficult for homeless persons.

### ***Diabetic retinopathy***

Retinopathy and uncontrolled high blood pressure are closely linked, lowering blood pressure not only lowers the risk of retinopathy it also decreases the progression of retinopathy (ADA, 2013; Handelsman et al., 2011). However, extremely low blood pressure can also have negative health effects. It is recommended to maintain systolic pressure of 140 and diastolic pressure of 80 (ADA, 2013).

- Access to eye exams may be difficult for patients who are homeless due to a lack of insurance. Consider partnering with local ophthalmologists and optometrists to obtain free exams.
- Refer patients for diabetic retinopathy screening annually. Some facilities have access to digital retinal cameras and can be evaluated by an ophthalmologist remotely.

### ***Neuropathy***

Risk for neuropathic complications are most closely related to glycemic control (Handelsman et al., 2011)

- Neuropathy can also be caused by alcohol abuse and may not be related to diabetes (ADA, 2013).

### *Diabetic foot ulcers*

The risk for ulcers and amputations is increased in persons who are homeless secondary to a higher prevalence of risk factors such as poor glycemic control and cigarette smoking (ADA, 2013).

Diabetic foot ulcers can be slow-healing wounds that respond well to basic clean wound care and off-loading of weight. Off-loading of weight can be achieved either through obtaining convalescent care (bed rest) or, if available, outpatient, specialty medical care (podiatric or orthopedic), which can provide boots or casting. It is rare that ulcers alone can qualify for hospital-level care although medical respite or medical rehabilitation facilities can be utilized where available.

Sufficient bed rest may not be possible for the homeless person since many shelters are not open during the day. Clinicians should work with shelter staff and other homeless service providers to ensure that convalescent care is available. Convalescent care may include access to a motel room or 24-hour shelter beds for those needing bed rest.

However, diabetic foot ulcers may also lead to serious and rapidly progressive infections requiring hospital level care. Because of the difficulty of monitoring infections in the homeless context, as well as the short amount of time in which infection can progress in the diabetic patient, referral to a higher level of care should be considered and attempted early.

When referring patients for hospital level care, it may be helpful to emphasize not only key clinical data but also assist the evaluating hospital clinicians to appreciate the context and confounders to what might otherwise be appropriate out-patient care.

- Presence of redness and warmth around the wound, especially if the patient is already getting good daily wound care or taking an antibiotic (if the wound is not progressing after one day, advanced care may be needed)
- Fever (temperature > 100.5 degrees Fahrenheit)
- Diagnosis of diabetes and a recent blood glucose level; also, a general statement about the patient's usual control (e.g. "poorly controlled"), and the need for insulin ("insulin dependent") for daily management
- Context of homelessness is an important consideration in judging the success of out-patient monitoring and patient ability to self care and self-refer upon worsening.

- Ongoing substance abuse is *very high risk* for poor attention to progression of infection and ability to self-refer for care upon worsening.
- Some symptoms of mental illness (e.g. paranoia, apathy, delusion) also can be barriers to self-care and ability to self-refer upon worsening.
- Offering post-hospital care and follow-up can help alleviate non-clinical barriers to homeless patients being admitted to hospital level care.

### *Gastrointestinal Neuropathy*

Many sections of the gastrointestinal tract can be affected, leading to problems such as gastroparesis which can make glucose control erratic (ADA, 2013).

- Clients may experience constipation alternating with diarrhea. Shelter staff may need to be informed so that patients can have access to bathroom facilities (ADA, 2013).

### *Erectile Dysfunction*

Erectile dysfunction has been reported in as many as 46% of men with type 2 diabetes. Erectile dysfunction has been shown to be an early marker of cardiovascular disease and shares the same risk factors, such as smoking, obesity, and dyslipidemia (Ryan & Gajraj, 2012). The clinician should:

- Assess all male patients with diabetes for erectile dysfunction, as well as comorbidities such as smoking and depression
- When treating hypertension, consider the use of ACEs and ARBs which may have a beneficial or neutral effect versus other classes of hypertension medications which can contribute to erectile dysfunction
- The degree of erectile function is inversely related to HbA1c; as HbA1c rises, erectile function declines; teach male clients the importance of glycemic control.
- Testosterone deficiency is also seen in the male with erectile dysfunction; consider testosterone replacement therapy in the presence of symptoms of deficiency and a low testosterone level.
- Cigarette smoking increases the risk of erectile dysfunction; smoking cessation has been shown to decrease the risk of erectile dysfunction (Ryan & Gajraj, 2012)

## **Diabetic Ketoacidosis and Nonketotic Hyperosmolar State**

Diabetic ketoacidosis is a life-threatening condition which requires immediate medical care (ADA, 2013). Patients who are homeless may lack access to

insulin or lack transportation to obtain insulin, which puts them at high risk for hyperglycemic crisis. Recurrent diabetic ketoacidosis is more likely in patients who are homeless, have a history of homelessness or incarceration, or are using drugs or alcohol (Randall et al., 2011).

- Diabetes medications, sick day management, and when to seek care should be reviewed with all patients admitted to the hospital with diabetic ketoacidosis.
- The majority of diabetic ketoacidosis admissions could be prevented by improved access to care, diabetes education, and effective communication with a clinician during an illness (Randall et al., 2011).

## **Comorbid Conditions**

### *Oral health*

Poor oral hygiene is common among people experiencing homelessness. Dental abscesses and periodontal disease contribute to poor glycemic control. The clinician should identify free or discounted dental services available within the community. Dental schools, public health departments and private dentists who volunteer their services can be valuable resources.

### *Substance Use*

The patient who is not ready or able to abstain from alcohol or drug use is at higher risk of hospitalization for diabetes complications (Mai, Holman, Sanfilippo, Emery, & Preen, 2011).

- Stress the importance of eating. Assess the patient's diet and ability to eat consistent meals at consistent times, especially if the patient is taking medications which can cause hypoglycemia (insulin, sulfonylureas).
- If the patient is drinking alcohol, assess amount. Teach the patient caloric content of alcohol and effect on glucose management. Review risk of hypoglycemia, signs and symptoms of hypoglycemia, and how to treat it.
- Encourage the patient to seek shelter on nights when weather is extreme, e.g., cold, hot, or wet.
- Consider using motivational interviewing techniques and risk reduction methods to guide the patient toward abstinence.
- Suggest more frequent office visits to encourage goal setting and closely monitor the diabetes progression.

### *Nicotine dependence*

Almost 60% of patients served by the Health Care for the Homeless program report being current smokers (Lebrun-Harris et al., 2012). For the patient who is dependent on nicotine, the clinician should refer or enroll the patient in a smoking cessation program. Smoking causes vasoconstriction that increases the risk of frostbite. For patients living outside or in poorly heated places, the clinician should:

- Explain the relationship between smoking, vasoconstriction and diabetes.
- Recommend that the patient always wear gloves and carry an extra pair of socks to change into when feet get damp.

Smoking increases risk of pulmonary infection and may contribute to a vitamin C deficiency that can affect wound healing (Ben-Zvi & Tidman, 2012; Gally, Chu, & Bowler, 2013; Martin et al., 2006; Schleicher, Carroll, Ford, & Lacher, 2009; Thun et al., 2013). The clinician should:

- Stress hand washing to decrease the transmission of organisms
- Provide annual influenza vaccines and encourage the administration of the pneumococcal vaccine
- Teach the patient about good food sources of vitamin C
- Consider providing vitamin supplements

Smoking is considered a major risk factor for macrovascular complications, such as cardiovascular disease, and microvascular complications, such as nephropathy, retinopathy, and neuropathy. The clinician should:

- Explain the increase in risk of cardiovascular morbidity and mortality
- Review the link between smoking and development of diabetes complications (ADA, 2013)

### *Mental Illness/Impairment*

Approximately 70% of individuals who are homeless and served by the Health Care for the Homeless program have experienced psychological distress and 25% percent of sheltered individuals who are homeless have a severe mental illness (Lebrun-Harris et al., 2012; U.S. Department of Housing and Urban Development, 2011). Patients with mental health conditions have a higher prevalence of diabetes but fewer recommended laboratory tests for diabetes monitoring and screenings for complications. These patients are at higher risk of hospitalization for diabetes complications and experience not only a higher

diabetes mortality rate but also a higher all-cause mortality rate (Mai et al., 2011). Also, patients with severe depression may be less likely to adhere to medication and dietary treatment regimens (Ciechanowski, Katon, & Russo, 2000).

In addition, patients who are homeless may have developmental delays and impaired cognitive functioning. These patients may experience the following:

- Impaired thinking processes that result in disorientation and a disorganized lifestyle
- Lack of motivation to seek help
- Lack of insight or understanding of their illness, which may result in denial of the need for services
- Negative experiences with mental health institutions
- Unpleasant medication side effects
- A decreased likelihood of HbA1c testing (Banta, Morrato, Lee, & Haviland, 2009)

Patients prescribed atypical antipsychotic medications are at increased risk for the development of obesity, hyperlipidemia, and hyperglycemia. For these patients, providers should carefully monitor weight, lipids, and glucose, and consider typical or atypical antipsychotics which are less likely to cause weight gain (Banta et al., 2009).

For providers not in Health Care for the Homeless projects that offer mental health services, connecting with other agencies that offer counseling and therapy will help greatly in managing the plan for the homeless patient with a mental impairment.

## **DIABETES CASE STUDY**

*Chief concern:* Diabetes follow-up

*History of present illness:* JF is a 48 year old male who has been followed in the homeless primary care clinic for two years. He has been a diabetic for ten years and has required insulin therapy for the past 4 years. He has spent time both on the streets and in shelters. When he first engaged with the clinic, he was not taking any insulin and his underlying schizophrenia and substance abuse were untreated. In addition, he was actively huffing carburetor fluid routinely. He made nearly weekly visits to the emergency department for diabetic ketoacidosis and altered mental status, requiring several inpatient admissions.

Over several months the patient engaged with services and was actively followed by the mental health team. Following several medical complications, including bilateral leg fractures after falling down an icy hill, he finally engaged with substance abuse services and was started on monthly injectable antipsychotic treatment.

During this time, his diabetes was managed on a near daily basis in the clinic, using humulin 70/30 insulin due to availability and twice daily dosing. He would present in the morning and have his glucose measured on a point-of-care machine. He was given a morning dose of 70/30 insulin and a pre-filled syringe to take in the evenings, which he often lost. His morning meals were provided and he received ongoing education regarding his diet, medication, and self-management of his conditions.

As his mental illness and addiction disorder stabilized he became a more active participant in his diabetes care. He started to self-monitor his glucose and consistently administer his own insulin. He was admitted in a mental health respite program where he had access to medication storage and regular healthy meals.

He presents today for a routine follow-up. He admits to some dietary indiscretions (i.e., extra cake and cookies), but overall reports his glucose levels have been in the 110-130mg/dL range. He denies any recent diaphoresis, nausea/vomiting, lightheadedness, palpitations, polyuria or polydipsia, headaches, or chest pain.

*Past Medical History:* Insulin-dependent diabetes, paranoid schizophrenia, traumatic brain injury, bilateral tibial fractures, bacterial pneumonia.

*Past Surgical History:* bilateral tibial open-reduction internal fixation

*Current medications:* Lisinopril 5mg daily, humulin 70/30 14 units subcutaneously qam, 12 units subcutaneously qpm, paliperidone palmitate 117mg intramuscularly monthly

*Social History:* Smoking ½ packs of cigarettes per day, no alcohol or drug use, has remained off carburetor fluid for more than 1 year. Continues to reside at a mental health respite home.

*Physical exam:* Weight stable at 150lb, BP 114/76, HR 76. Overall exam remains unremarkable. Heart and lung exam is within normal limits. Monofilament sensation is intact throughout both feet as is vibration sensation. There are no foot ulcers and the nails appear normal. Distal pulses are intact.

Recent laboratory data shows his Hemoglobin A1c has improved from 9.2% to 6.6%. His LDL cholesterol is 87mg/dL, recent electrolytes and renal function are both normal. He was last screened for tuberculosis with a quantiferon-gold test 2 months ago (negative) and was tested with a point-of-care HIV oral swab test in clinic today (negative).

*Current status:* The patient was congratulated on his improved control. His medications were reviewed and it was determined he was having no adverse side effects. He was given refill prescriptions for all his medications and monitoring supplies. He was provided an influenza vaccine. Nursing staff discussed dietary guidelines with the patient. He was provided a fresh pair of socks and referred for diabetic retinopathy screening. He will be followed-up again in 3 months.

## REFERENCES

- American Diabetes Association. (2013). Standards of Medical Care in Diabetes—2013. *Diabetes Care*, 36: S11-S66.
- Amylin Pharmaceuticals. (2011). Byetta Package Insert. Retrieved from [http://www.accessdata.fda.gov/drugsatfda\\_docs/label/2011/021773s029s0301b1.pdf](http://www.accessdata.fda.gov/drugsatfda_docs/label/2011/021773s029s0301b1.pdf).
- Amylin Pharmaceuticals. (2012). Bydureon Package Insert. Retrieved from [http://www.accessdata.fda.gov/drugsatfda\\_docs/label/2012/022200Orig1s0001bledt.pdf](http://www.accessdata.fda.gov/drugsatfda_docs/label/2012/022200Orig1s0001bledt.pdf).
- Banta, J. E., Morrato, E. H., Lee, S. W., & Haviland, M. G. J. (2009). Retrospective analysis of diabetes care in California Medicaid patients with mental illness. *Journal General Internal Medicine*, 24: 802-808.
- Baty, P. J., Viviano, S. K., Schiller, M. R., Wendling, A. L. (2010). A systematic approach to diabetes mellitus care in underserved populations: improving care of minority and homeless persons. *Family Medicine*, 42(9): 623-627.
- Ben-Zvi, G. T. & Tidman, M. J. (2012). Be vigilant for scurvy in high-risk groups. *Practitioner*, 256(1755): 23-5, 3.
- Burke, B. L., Arkowitz, H., & Menchola, M. (2003). The efficacy of motivational interviewing: A meta-analysis of controlled clinical trials. *Journal of Consulting and Clinical Psychology*, 71(5): 843-861.
- Ciechanowski, P. S., Katon, W. J., & Russo, J. E. (2000). Depression and diabetes: Impact of depressive symptoms on adherence, function, and costs. *Archives of Internal Medicine*, 160(21): 3278-3285.
- Desouza CV, Bolli GB, Fonseca V. (2010). Hypoglycemia, Diabetes, and Cardiovascular Events. *Diabetes Care*, 33.
- Gally, F., Chu, H. W., & Bowler, R. P. (2013). Cigarette Smoke Decreases Airway Epithelial FABP5 Expression and Promotes *Pseudomonas aeruginosa* Infection. *PLoS One*, 8(1): e51784.
- Handelsman, Y., Mechanick, J.I., Blonde, L., Grunberger, G., Bloomgarden, Z.T., Bray, G.A., et al.; AACE Task Force for Developing Diabetes Comprehensive Care Plan. (2011). American Association of Clinical Endocrinologists Medical Guidelines for Clinical Practice for developing a

diabetes mellitus comprehensive care plan. *Endocrine Practice*, 17(Suppl. 2):1-53.

Hwang, S. W. & Bugeja, A. L. (2000). Barriers to appropriate diabetes management among homeless people in Toronto. *Canadian Medical Association Journal*, 163(2): 161-165.

Koegel, P., Burnam, M. A., Baumohl, J. (1996). The causes of homelessness. In J. Baumohl (editor), *Homelessness in America*. Phoenix: Oryx Press, p. 31.

Lebrun-Harris, L. A., Baggett, T. P., Jenkins, D. M., Sripipatana, A., Sharma, R., Hayashi, A. S., et al. (2013). Health status and health care experiences among homeless patients in federally supported health centers: Findings from the 2009 Patient Survey. *Health Services Research*. [Epub ahead of print] doi: 10.1111/1475-6773.12009.

Lee, T. C., Hanlon, J. G., Ben-David, J., Booth, G. L., Cantor, W. J., Connelly, P. W., Hwang, S. W. (2005). Risk factors for cardiovascular disease in homeless adults. *Circulation* 111(20): 2629-2635.

Mai, Q., Holman, C. D. J., Sanfilippo, F. M., Emery, J. D., & Preen, D. B. (2011). Mental illness related disparities in diabetes prevalence, quality of care and outcomes: a population-based longitudinal study. *BMC Medicine*. 9:118.

Martin, R. J., Wexler, R. B., Day, B. J., Harbeck, R. J., Pinkerton, K. E., & Chu, H. W. (2006). Interaction between cigarette smoke and mycoplasma infection: a murine model. *Journal of Chronic Obstructive Pulmonary Disease*, 3(1):3-8.

Merck. (2012). Januvia Package Insert. Retrieved from [http://www.accessdata.fda.gov/drugsatfda\\_docs/label/2012/021995s0251bl.pdf](http://www.accessdata.fda.gov/drugsatfda_docs/label/2012/021995s0251bl.pdf).

Miller, W.R. & Rollnick, S. (2002). *Motivational interviewing: preparing people to change addictive behavior*, second edition. New York: Guildford Press.

Nickasch, B. & Marnocha, S. K. (2009). Healthcare experiences of the homeless. *Journal of the American Academy of Nurse Practitioners*, 21:39-46.

O'Toole, T. P., Buckel, L., Bourgault, C., Blumen, J., Redihan, S.G., Jiang, L., Friedmann, P. (2010). Applying the chronic care model to homeless veterans: effect of a population approach to primary care on utilization and clinical outcomes. *American Journal of Public Health*, 100(12): 2493-2499.

Randall, L., Begovic, J., Hudson, M., Smiley, D., Peng, L., Pitre, N., Umpierrez, D., Umpierrez, G. (2011). Recurrent diabetic ketoacidosis in inner-city minority

patients – behavioral, socioeconomic, and psychosocial factors. *Diabetes Care*, 34:1891–1898.

Rodbard, H. W., Jellinger, P. S., Davidson, J.A., Einhorn, D, Garber, A. J., Grunberger, G., Handelsman, Y., Horton, E. S., Lebovitz, H., Levy, P., Moghissi, E. S., Schwartz, S. S. (2009). Statement by an American Association of Clinical Endocrinologists/American College of Endocrinology consensus panel on type 2 diabetes mellitus: an algorithm for glycemic control. *Endocrine Practice*, 15(6):540-59.

Ryan, J. G. & Gajraj, J. (2012). Erectile dysfunction and its association with metabolic syndrome and endothelial function among patients with type 2 diabetes mellitus. *Journal of Diabetes and its Complications*, 26:141-147.

Schleicher, R. L., Carroll, M. D., Ford, E. S., & Lacher, D. A. (2009). Serum vitamin C and the prevalence of vitamin C deficiency in the United States: 2003-2004 National Health and Nutrition Examination Survey (NHANES). *American Journal of Clinical Nutrition*, 90(5):1252-63.

Szerlip, M. I. & Szerlip, H. M. (2002). Identification of cardiovascular risk factors in homeless adults. *American Journal of the Medical Sciences*, 324(5):243-246.

Thun, M. J., Carter, B. D., Feskanich, D., Freedman, N. D., Prentice, R., Lopez, A. D., Hartge, P., & Gapstur, S. M. (2013). 50-year trends in smoking-related mortality in the United States. *New England Journal of Medicine*, 368(4):351-64.

Uphold, C. R. & Graham, M. V. (2003). Diabetes mellitus. In C. R. Uphold and M. V. Graham (editors). *Clinical guidelines in family practice*. Gainesville, Fla.: Barmarrae Books, pp. 164 - 198.

U.S. Department of Housing and Urban Development. (2011). The 2010 HUD Annual Homeless Assessment Report to Congress. Retrieved from <http://www.hudhre.info/documents/2010HomelessAssessmentReport.pdf>.

Wilk, T., Mora, P. F., Chaney, S., & Shaw, K. (2002). Use of an insulin pen by homeless patients with diabetes mellitus. *Journal of the American Academy of Nurse Practitioners* 14(8):372-379.

## SUGGESTED RESOURCES

McMurray-Avila, M. (2001). *Organizing health services for homeless people* second edition. Nashville: National Health Care for the Homeless Council, Inc.

## WEB SITES

American Diabetes Association	<a href="http://www.diabetes.org">www.diabetes.org</a>
American Academy of Family Physicians	<a href="http://www.aafp.org">www.aafp.org</a>
National Guideline Clearinghouse	<a href="http://www.guideline.gov">www.guideline.gov</a>
National Health Care for the Homeless Council	<a href="http://www.nhchc.org">www.nhchc.org</a>

## ABOUT THE HCH CLINICIANS' NETWORK

Founded in 1994, the Health Care for the Homeless Clinicians' Network is a national membership group that unites hands-on care providers from many disciplines who are committed to improving the health and quality of life of our neighbors experiencing homelessness. The Network is engaged in a broad range of activities including publications, training, research, and peer support. The National Health Care for the Homeless Council, Inc., operates the Network and a Steering Committee that represents diverse community and professional interests governs the Network.

To learn about more clinical resources for providing care to individuals who are homeless, call 615-226-2292 or visit our website at [www.nhchc.org](http://www.nhchc.org).