

Assessment and Management of Type 2 Diabetes in Older Adults
with Complex Care Needs

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Background

Of all the chronic diseases effecting older adults, type 2 diabetes affects about 23 percent of those 60 and over according to the latest Centers for Disease Control statistics (Centers for Disease Control, 2008) Currently an estimated 23 million persons have diabetes and nearly 40 percent of those age sixty-five to seventy-five may be affected by

hyperglycemia (Harris, Flegal, Cowie, et al., 1998 [Level IV]). The United States spends an estimated \$132 billion each year on diabetes related medical care (CDC, 2008). Worldwide by 2025, adults over age sixty will comprise two-thirds of the population with diabetes. With a population projection of seventy million individuals over age sixty-five by 2030, the impact of type 2 diabetes will only intensify. The greatest prevalence of type 2 diabetes will be seen in those over age eighty (CDC, 2005: available on line at: www.cdc.gov/diabetes/pubs/factsheet05.htm). . There is no doubt that type 2 diabetes is an important public health problem for all adults, but particularly for older adults over age sixty-five.

The epidemic of type 2 diabetes has advanced the development and utilization of national screening guidelines. While traditionally type 2 diabetes pathogenesis was attributed primarily to aging, current thinking on this has changed. Because diabetes has an insidious onset, the disease is *slowly* recognized. As such older adults often present with the complications of the disease before it is formally diagnosed. Evident in the medical history of these individuals are various problems ranging from infections to peripheral neuropathy, as shown in Table 1. Current evidence supports a claim that among persons with type 2 diabetes, risk for diabetes-related complications results from hyperglycemia over time and not from age alone (American Diabetes Association, 2006: [Level VI]). It is mandatory that all nurses caring for older adults and/or those with complex care needs be vigilant for the presence of type 2 diabetes and stress the need for periodic screening. Risk factors for type 2 diabetes that every nurse should know are listed in Table 2.

As a result of demographic changes and more consistent utilization of the American Diabetes Association (ADA) national criteria, it has been estimated that by 2050 an additional eighteen million people will be diagnosed with type 2 diabetes in the US alone (Gambert & Pinkstaff, 2006 [Level V]). Minorities, a high-risk population will be disproportionately affected (King, Aubert & Herman, 1998 [Level IV]; CDC fact sheet). In 2005, the age-adjusted prevalence of diabetes among various ethnic and minority elderly populations was 9.5 percent among Hispanic/Latino Americans, 13.3 percent among non-Hispanic African Americans and 12.8 percent among Native Americans/Alaskan Natives compared to 8.7 percent among non-Hispanic whites (CDC, 2005). Considering all leading causes of deaths for persons age sixty-five and over, type 2 diabetes is ranked as the *fourth leading* cause for non-Hispanic African Americans, Pacific Islanders and Hispanic persons and as the *third leading* cause for Asian or American Indians, while it ranked as the *seventh leading* cause of all fatalities for white persons (CDC, Aging Trends, 2005).

Diagnostic Criteria for Type 2 Diabetes

While it is becoming more commonplace for older adults to reach age sixty-five with a diagnosis of type 1 diabetes (an autoimmune disease that leads to beta cell destruction—insulin dependency—and affects approximately 5-10 percent of those diagnosed with diabetes), type 2 diabetes is much more common and the type that typically affects older adults. Type 2 diabetes is classified as a progressive insulin secretory defect resulting from insulin resistance that ultimately may lead to requiring insulin for management. Type 2 diabetes affects approximately 85 to 95 percent of all those diagnosed with diabetes (ADA, 2006). A normal fasting blood glucose (FBG) level is less than 100 mg/dl and a two-hour postload glucose level is less than 140 mg/dl.

Diagnostic criteria for diabetes includes symptoms of diabetes and a casual blood glucose level of 200mg/dl or greater, a fasting plasma glucose level of 126 mg/dl or greater, or a two-hour postload glucose level greater than 200 mg/dl (ADA, 2006).

Some individuals may not meet the criteria for diabetes; however, their glucose levels are above normal. These individuals are classified as having “pre-diabetes” and are considered at relatively high risk for the development of both future diabetes and cardiovascular disease. Diagnosis is based on a fasting plasma glucose (FPG) level of 100 to 125 mg/dl, an impaired fasting glucose (IFG) level or a two-hour postload glucose level of 140-199 mg/dl (impaired glucose tolerance [IGT]). Importantly, progression to overt diabetes in individuals with IGT, and in particular older individuals, can be prevented by lifestyle interventions (Diabetes Prevention Program Research Group [DPPR], 2002 [Level II]). In this study, lifestyle intervention reduced the incidence of diabetes by 58 percent, much more effectively than any reductions in the incidence of diabetes from the use of metformin (DPPR, 2002 [Level II]).

Age-Related Changes Influencing the Diagnosis of Type 2 Diabetes

The classic symptoms of diabetes—polyuria, polydyspnea, and polyphagia—are often absent or misdiagnosed in older adults. Polyuria can be attributed to a urinary tract infection in women and benign prostatic hypertrophy in males. Polydyspnea is often missed, as there is a decreased sensation of thirst in the elderly individual. Polyphagia is an atypical presentation in elderly individuals who experience decreases in appetite secondary to GI dysmotilities and depression. Unfortunately, diagnosis is often made when the long-term effects of poor glucose control lead to an acute or long-term complication such as a stroke or myocardial infarction.

Detection of Type 2 Diabetes

Testing for diabetes should be considered in all individuals at age forty-five and above, particularly those with a body mass index (BMI) of more than twenty-five; if abnormal, the test should be repeated at three-year intervals (ADA, clinical practice recommendations). The American Geriatrics Society (AGS) recommends yearly FBG (Fasting Blood Glucose?) over the age of sixty-five (AGS, 2006). Other risk factors to be assessed include serum lipids such as HDL (high-density lipoprotein) cholesterol and triglycerides, body mass index, physical activity and blood pressure determination to detect the presence of high blood pressure (see Table 2 for more detail).

Health Promotion and Risk Reduction

When considering care for older adults with or without type 2 diabetes, several clinical approaches are possible. In older persons with *existing* type 2 diabetes, health promotion and risk reduction strategies focus on *reducing the development of complications related to the disease* through early detection and monitoring. This is vitally important as diabetes ranks as the sixth leading cause of death in the United States (CDC, 2008). Note this focus is *distinctly different* than the care provided to an older adult *at risk* for type 2 diabetes.

The overall goals for older adults with existing type 2 diabetes are to promote states of euglycemia and, avoidance of dyslipidemia's, complications and geriatric syndromes. This approach rests upon lifestyle (such as nutrition and physical activity) and pharmacological interventions. Clearly, both identification of known risks in patients with type 2 diabetes and aggressive management reduce the risk of cardiovascular and

microvascular events by 50 percent (Gaede, P., Vedel, P., Larsen, N., Jensen, G.V., Parving, H.H., & Pedersen, O: 2003 [Level II]).

Recent research has shown that older individuals with type 2 diabetes are at increased risk for certain potentially diabetes-associated conditions. In the Steno-2 study, patients receiving intensive stepwise implementation of behavior modification and pharmacological therapy targeting hyperglycemia, hypertension, dyslipidemia and microalbuminuria along with secondary prevention of cardiovascular disease with aspirin had significantly lower risks of cardiovascular disease, nephropathy, retinopathy and autonomic neuropathy (Gaede, P., Vedel, P., Larsen, N., Jensen, G.V., Parving, H.H. & Pedersen, O. 2003 [Level II]). Given the high incidence of type 2 diabetes among ethnic minorities, these treatments are particularly needed to promote quality of care among minority populations (Kirk, J.J., Bell, R.A., Beroni, A.G., Arcury, T.A., Quandt, S.A., & Goff, D.C. 2005 [Level V]).

Reduction of cardiovascular morbidity and mortality is an important goal in individuals with type 2 diabetes. Recent research has shown that a diagnosis of diabetes hastens heart disease by an estimated eight years (CDC, 2008). In the Botnia study of large family units of persons with type 2 diabetes, cardiovascular mortality was significantly increased in persons with metabolic syndrome, with microalbuminuria conferred as the strongest risk of cardiovascular death (compared to other risks such as obesity, hypertension, dyslipidemia; Isomaa, B., Almgren, P., Tuomi, T., Forsen, B., Lahti, K., & Nissen, M. et al 2001 [Level III]). Therefore testing for microalbuminuria is clinically beneficial in that it may identify individuals not only in need of reno-protective efforts, but those at high risk for developing cardiovascular disease.

Impact of Comorbidities

It is well known that all individuals with diabetes have higher rates of premature, functional disability and coexisting illnesses such as hypertension (HTN), coronary artery disease (CAD), and stroke than those without diabetes. Eighty percent of persons with diabetes die annually due to cardiovascular disease, a combination of hypertension, heart disease and stroke (Zimmer, 1999 [Level VI]). In persons with type 2 diabetes the risk of having an incident myocardial infarction or stroke is increased two- to three-fold and the risk of death is increased two-fold, independent of other known risk factors for cardiovascular diseases (Almdal, Scharling, Jensen, & Vestergaard, 2004 [Level II]). In addition, cardiovascular disease (CAD) is often present in the total absence of symptoms (Wackers, 2006 [Level VI]), with as many as one out of every five older individuals with type 2 diabetes being unaware that they have CAD. Further, when one considers the impact of type 2 diabetes on persons with established cerebrovascular disease, a leading comorbidity in the elderly (i.e., those with prior transient ischemic attack [TIA] or stroke), its presence increased the risk of recurrent stroke by 35 percent (Berthet, K., Neal, B.C., Chalmers, J.P., MacMahon, S.W., Bousser, M.G., & Colman, S.A., et al. 2004 [Level II]). Screening for blood pressure elevations and identification of risks associated with cardiovascular disease are an integral part of the primary care provider's initial evaluation of the older adult with type 2 diabetes.

Older adults, over age sixty-five and, in particular, those of advanced old age, typically experience multiple comorbidities, higher rates of physical disabilities and functional impairment, and/or geriatric syndromes such as depression, cognitive impairment, falls and urinary incontinence than younger cohorts. The impact of these

comorbidities can lead to complications and/or problems in daily living and self-care management by the older individual with diabetes (see Table 3). Screening for functional impairment or disability should occur during history taking and review of systems of the older adult diagnosed with type 2 diabetes (for more detail see Nursing Assessment). Use of standard screening tools for activities of daily living and instrumental activities of daily living (ADL) are readily available. For more information visit www.ConsultGerRN.org and select Geriatric Topic: Function.

Impact of Geriatric Syndromes

Geriatric syndromes can occur from complications of the disease itself, as co-existing comorbidities or as a direct result of diabetes management. Because type 2 diabetes is an all-inclusive, multi-system disease, its presence sets the stage for increased risk of several geriatric syndromes among older adults such as polypharmacy, depression, cognitive impairment, urinary incontinence, injurious fall, and persistent pain. Further, when present, each of these geriatric syndromes can influence the older adult's ability to safely and accurately manage their disease (see Table 3) in order to achieve or maintain normal glycemic levels.

There is increasing epidemiological evidence for an association between increased prevalence of multiple geriatric syndromes and diabetes. Interventions for these same geriatric syndromes have not been assessed in clinical trials restricted to older individuals with diabetes. Expert opinion emphasizes the need to recognize and manage these syndromes. Failure to do so can significantly impair quality of life in the older adult (Olson & Norris, 2004 [Level VI]).

Current knowledge and evidence-based research surrounding six common geriatric syndromes are presented below. Note that these syndromes are included in current screening recommendations for older adults with a diagnosis of type 2 diabetes, either based on expert consensus opinion or from population-based data showing their prevalence in older adults with diabetes (AGS recommendations, 2003). Further screening for these events within three to six months of a new diagnosis should accompany the initial evaluation period (see Table 4b for more detail).

Depression

In a recent two-year study of mortality and the effects of depression and cardiovascular disease in older adults in primary care, depression contributed as much to mortality as did myocardial infarction or diabetes (Gallo, J.J., Bogner, H.R., Morales, K.H., Post, E.P., Ten Have, T., & Bruce, M.L., 2005 [Level II]). It has been estimated that the risk of an older person with diabetes experiencing a major depressive episode is 1.6 times higher (Finkelstein, E.A., Bray, J.W., Chen, H., Larson, M.J., Miller, K., Tompkins, C., Keme, A., Manderscheid, R. 2003 [Level III]) than in older adults without diabetes. Because depression is a treatable condition, its recognition as part of a thorough nursing assessment is paramount in the early detection and management of the older adult with type 2 diabetes. For more information on screening for depression, visit www.ConsultGerRN.org and select Geriatric Topics: Depression.

Should an older adult exhibit a positive screening test score for depression or if they are suspected of having depressive symptomatology then prompt referral to the primary physician or advance practice nurse for treatment is in order. Note that not all older adults with type 2 diabetes and depressive symptoms will readily reveal these symptoms. Research-based evidence discovered that elderly Chinese patients with an

average age of seventy concealed their feelings despite exhibiting depressive symptoms (Cheng, T.Y.L., & Boey, K.W., 2000 [Level IV]). Depression impacts directly on the person's ability to self-manage their diabetes and achieve euglycemia as illustrated in Table 3.

Cognitive Impairment

Older people with diabetes are more likely than the general population of older adults to have cognitive impairment. Hyperglycemia may be causally associated with declining mental function, as demonstrated in a large prospective cohort study (Gregg, E.W., Yaffe, K., Cauley, J.A., Rolka, DB., Blackwell, TL., Narayan, KMV., Cummings, SR, 2000 [Level II]). In a sample of over 2300 elderly women between ages seventy and seventy-eight and spanning the years 1995 to 1999, women with type 2 diabetes scored lower on a battery of cognitive tests than women without diabetes (Grodstein, F., Chen, J., Wilson, R.S., & Manson, J.E., 2001 [Level III]). One underlying mechanism cited in the development of impaired cognitive performance among persons with type 2 diabetes is intermittent acute or chronic hyperglycemia (Sommerfield, A.J., Deary, I.J., & Frier, B.M. 2004 [Level III]). Further, in this investigation, speed of information processing and attention were impaired with acute hyperglycemia with more episodes of dysphoria, sadness and anxiety reported.

This geriatric syndrome can be detected through routine screening for cognitive dysfunction (for more information visit www.ConsultGeriRN.org and select Try This Series: Executive dysfunction). Further, its presence will drive important decisions that need to be made with regard to diabetes assessment and management related to self-care. The emotional response detected by Sommerfield et al. when hyperglycemia occurred suggests that achieving normoglycemic levels may also benefit older adults' affect.

Urinary Incontinence

Older women with type 2 diabetes are at increased risk for urinary incontinence (Brown, Seeley and Fong, 1996 [Level II]) due to chronic hyperglycemia. Physiologically, excess glucose in the serum causes hyperosmolarity and shifts in fluid balance. Chronic hyperglycemia directly affects the genito-urinary system by causing symptoms of frequency, polyuria, nocturia and potentially urinary incontinence. For more information on urinary incontinence, visit www.ConsultGeriRN.org and select Try This Series: Urinary Incontinence. Screening for urinary incontinence begins with its inclusion in history taking and review of systems during the initial evaluation of the older adult with type 2 diabetes.

Falls

Chronic hyperglycemia causes cellular damage and its effects on the neuro-sensory system include symptoms of peripheral loss of sensation in the extremities [peripheral neuropathy], along with orthostatic hypotension as a result of autonomic neuropathy and the decreased cognition previously mentioned (AGS, 2006; [Level VI]; for more information visit www.ConsultGeriRN.org and select Geriatric Topics: Atypical Presentation). The neuropathy of the lower limbs results in reduced sensation of one's feet: when walking, the ability to sense the foot's placement on the floor is decreased. This causes mobility problems related to lifting one's foot up, stair climbing and trips when ambulating. Once recognized, adaptive aides can help the older adult compensate for peripheral neuropathy. In a recent study, older nursing home residents with diabetes were found to be an independent risk factor for falls (Maurer, M.S., Burcham, J., Cheng,

H. 2005 [Level III]). If decreased vision from retinopathy which is common in type 2 diabetes also exists, then the older adult with peripheral neuropathy is at even greater risk of falling.

Autonomic neuropathy, especially when it causes orthostatic hypotension, commonly plagues the type 2 diabetic. If the older type 2 diabetic stands quickly without support, and orthostatic hypotension exists, then falls occur. This problem is accentuated with anti-hypertensive medications and volume deficit. Orthostatic blood pressure screening in all older individuals with type 2 diabetes can detect this problem early, so that interventions can be put into place to minimize its occurrence.

Polypharmacy

Given the frequency of associated comorbidities in the older adults of advanced age with complex illness and the complications associated with type 2 diabetes, often requiring medication therapy (lipid disorders, hypertension, renal disease), it is understandable that a high risk for polypharmacy exists. For more information about inappropriate use of medications, see Module 1 and visit www.ConsultGeriRN.org and select Try This Series: Beers Criteria for Potentially Inappropriate Medication Use in the Elderly.

An important aspect of diabetes management with regard to polypharmacy centers on identifying and validating that the older adult can recognize, respond to and report adverse events from medications should they occur. In a recent study of medication knowledge and self-management of persons with type 2 diabetes, polypharmacy was common, averaging seven or more medications per person for those with two or more diabetic complications or comorbidities (Dunning & Manias, 2005: [Level III]). Among older respondents in this study, only 37 percent were given information about side effects of medications and 20 percent forgot to take medications, often stopping medications or reducing the dose or dose interval due to rising medication costs. Screening for polypharmacy and medication knowledge are important roles for preventing adverse drug reactions) and for minimizing the development of reversible geriatric syndromes.

Pain

Older adults with type 2 diabetes are at increased risk for chronic pain syndromes because of the high prevalence of peripheral neuropathy which occurs in up to 50 percent of persons with diabetes. Neuropathic pain often accompanies peripheral neuropathy of the distal extremities. Because readily identifiable treatment modalities exist, the AGS recommends that all individuals with type 2 diabetes be screened for persistent pain through history and physical examination. Measurement tools available to detect pain should be incorporated into the plan of care. For more information on pain visit www.ConsultGeriRN.org and select Geriatric Topics: Pain. The perception of pain (nociception) is often absent, delayed or altered in older adults. Of note, older adults with peripheral neuropathy and associated decreased sensation in the distal extremities are prone to foot ulcers if they inadvertently step on a sharp object for which they do not experience a pain sensation. Routine foot examination is an important screening intervention and also a routine part of diabetes management.

Age Changes that Further Complicate Management of Type 2 Diabetes in Older Adults

Because diabetes is a systemic, multi-organ disease that causes cellular, tissue, small and large vessel disease when it occurs in an older adult with pre-existing co-

morbidities or age related changes, its impact can be multi-factorial. Minimization of risks for micro and macrovascular complications occur when health promotion and screening activities are carried out in a timely manner and multi-factorial risk factor reduction (optimization of glucose, lipids and blood pressure) is achieved.

Aside from complications from type 2 diabetes directly due to micro and macrovascular end-organ damages, the known comorbidities, and/or geriatric syndromes, older adults experience complications from type 2 diabetes directly due to age changes. Superimposed on the chronic microvascular changes of type 2 diabetes resulting in retinopathy are age-associated diseases such as cataracts and/or macular degeneration. Their added presence creates difficulties in visualization and daily living, increasing the risk for falls, and also in diabetes self-management. Superimposed on the microvascular complications of sensory and motor neuropathy or diabetic polyneuropathy can be the added presence of diseases such as pernicious anemia (B12 deficiency) or alcoholism. When an individual with type 2 diabetes has these diseases, a double burden of illness exists which can have profound effects on functional status and ability to maintain independence in activities of daily living (Jette & Branch, 1985 [Level VI]). Classically both B12 deficiency and alcoholism, in isolation, result in distal peripheral neuropathy causing the person to experience loss of sensation in their lower extremities bilaterally.

Neuropathy in the individual with type 2 diabetes has further been linked to development of oral-mandibular problems. In recent research, both peripheral and autonomic peripheral neuropathies were independent risk factors for tooth loss and temporomandibular dysfunction (Collin, H., Niskanen, L., Uusitupa, M., Toyry, J., Collin, P. & Koivisto, et al, 2000 [Level IV]). In older adults, dental disease can further impact eating and nutrition and other aspects of diabetes management.

Type 2 diabetes affects the vasculature of the kidney (nephropathy) by decreasing the glomerular filtration rate (GFR). The importance of recognizing the effect of type 2 diabetes on GFR cannot be overstated. In fact, recent national kidney foundation guidelines now stage chronic kidney disease from stage one through five (National Kidney Foundation, Primer on Kidney Diseases, 4th edition [Level VI]) based on GFR determinations. Physiologically, age-associated changes in kidney function occur from a reduced renal blood flow, reduced number of functioning nephrons and ultimately decreased GFR. Diabetic nephropathy compounded with the renal changes associated with aging and other causes of renal insufficiency can precipitate kidney failure. Therefore older individuals with diabetes are doubly impacted, and, for those taking potentially nephrotoxic drugs, ongoing dosage considerations and regular surveillance of important key laboratory data become vital.

Macrovascular Damage

A common macrovascular complication associated with type 2 diabetes is large vessel damage, which results in new onset of cardiovascular, peripheral-arterial and cerebrovascular diseases, such as amputation, common in patients over the age of sixty-five. Decreased vision, from age or retinopathy, and peripheral neuropathy, another microvascular complication, compromise self-detection of lower extremity problems, lengthening the time to treatment. The presence of lower extremity ulcerations creates added problems in the elderly individual with type 2 diabetes, as physiological, age-related changes in integument cause thinning of the epidermis and decrease in the epidermal cell turnover rate, leading to lengthier wound healing.

Other large vessel changes include elevated blood pressure or hypertension which co-contributes to stroke, renal failure and myocardial infarction. Additional noted complications stem from congestive heart failure (Kuusisto, Mykkanen, Pyorala&Lasko, 1994 [Level II]). When elders are managed for their hypertensive or heart failure, first-line therapy drugs of choice are diuretics. In the older individual with type 2 diabetes however, this class of medication can result in noxious side effects including orthostatic hypotension, a condition predisposing older adults to falls (see also Cardiac Content Paper, myocardial infarction).

Nursing Assessment of the Older Adult with Type 2 Diabetes

Given the nature, scope and magnitude of type 2 diabetes, compounded frequently by an atypical presentation (as shown in Table 1), keen and timely assessment by the professional nurse is critical to quality management. Not only are the factors presented in Table 1 salient in recognition of the disease, but equally salient, as pointed out by Suhl & Bonsignore (2006 [Level VI]), are recognition of the “clinical and functional heterogeneity” among older adults with type 2 diabetes (see Table 5) as they impact on disease management.

Consideration by the clinician of the older adults’ clinical and functional heterogeneity stresses the *individuality of care* principle underpinning diabetes self-management education for older adults. These factors (as outlined in Table 5) directly influence nursing assessment and management especially when one considers the fact that “older adults have more medical comorbidities, are functionally more heterogeneous, and have more variable life expectancy than their younger counterparts” (Suhl & Bonsignore, 2006 [Level VI]). Clinical and functional heterogeneity among older adults with type 2 diabetes are reflected in the national American Geriatrics Society recommendations on “Guidelines for Improving Care of the Older Person with Diabetes Mellitus” which bases principles of diabetes care and management on individualized goal-setting care (AGS, 2006 [Level VI]).

When an older adult presents to the health provider with a new diagnosis of type 2 diabetes, the nursing assessment includes a detailed history, social and functional assessment and review of multiple systems. Baseline knowledge of the disease and its management allow plans of care to be targeted to the patient’s health care needs.

Past Medical History and Review of Systems

Beginning with a baseline past medical history, information obtained older adults should account for the exact age of onset, its course and progression and management. Overall management of their diabetes in terms of physical activity, weight control, meal planning, glycemic monitoring and use of medications is also paramount. Any recent hospitalizations for medical or surgical complications related to type 2 diabetes should be elicited noting the complication and the outcome. Events such as lower extremity foot ulcers, amputation or circulatory problems such as hypertension or myocardial infarction are common complications.

Information presented in Table 6 constitutes some of the more important questions to ask on a comprehensive review of systems *directed* at learning about potential complications, comorbidities and/or geriatric syndromes. At the conclusion of this focused review of systems, the nurse will learn of the older adult’s presenting problems and their impact in daily living. Pertinent symptoms can be referred to the primary care provider for additional evaluation.

The age of the older adult at the time of the diagnosis and their current age are important as reflective of clinical practice guidelines noting differentiation in acceptable glycosylated hemoglobin (HbA1c) levels depending on age, frailty and life expectancy. The guideline stipulated for healthy older adults with good functional status is a target of HbA1c less than 7 percent (ADA, 2006). However, in frail older adults with a life expectancy of less than five years, 8 percent is reasonable (AGS, 2003). How blood glucose is monitored, along with a review of diary entries is also ascertained.

Social Support

The older adult's social support network includes both primary (such as family caregivers) and secondary (such as friends or neighbors) sources of support. If living alone, information about emergency contacts or checks are important to review. Important questions to ask about social support include: "does the older adult receive support on a regular basis or when needed from family members or friends" and "what is the nature of that support"? In one investigation, evidence suggests that support from friends played a more significant role in the adaptation to diabetes mellitus than support from the family network (Cheng & Boey, 2000 [Level IV]). For more information about social support visit www.ConsultGerRN.org and select Geriatric Topics: Family Care.

Functional Assessment

For older adults with advanced age and/or complex illness with type 2 diabetes, the nurse must elicit information about their ability to carry out activities of daily living related to bathing, dressing, feeding, toileting, ambulation and so forth. This information is critical to determine if additional assistance to perform self-care activities is required (for more information visit www.ConsultGerRN.org and select Try This: Function. Other critical areas to inquire about include meal planning, cooking, shopping, transportation to medical appointments and overall ability to financially afford medications and blood glucose monitors. Because of peripheral neuropathy and potential for associated burns, cooking safety needs to be ascertained.

Management

General Management Principles

Given the associated risks of additional comorbidities and geriatric syndromes from type 2 diabetes, the clinical management of diabetes has become increasingly directed at reducing not only glycemia, but the control of blood pressure and lipids as well. Recommendations for older adults with type 2 diabetes are summarized according to national recommendations drawn from expert opinions and accumulated from the most current evidenced-based research, including randomized controlled trials (see Table 4a and 4b; American Geriatric Society Position Statement, 2003 [Level VI]). The goals for management of the older adult with diabetes are similar to those for younger adults: decrease morbidity and mortality from the acute and chronic complications of diabetes. These goals can be met only through multi-factorial risk reduction efforts, using a combination of lifestyle and pharmacological treatment. Yet despite the recommendations for HbA1c under 7.0 percent, experts conclude, from analysis of the National Health and Nutrition Examination Survey [NHANES], that only 37 percent of adults with diabetes are meeting this goal and only 27 percent of those adults over age sixty-five are on insulin therapy (Cefalu, C., Cefalu, W., 2006 [Level V]). Achievement in physical activity, lipid and blood pressure goals are similarly lacking.

Management Principles for Older Adults with Complex Illness/Frailty

The mechanism for which multiple comorbidities, functional disability and the presence of geriatric syndromes influence the overall management of the older adult with type 2 diabetes is very much individually and situationally (contextually) determined. Nursing care of older adults with advanced old age and /or complex illness requires critical analysis of all confounding factors influencing glycemic control. Because we know of situational contexts related to functional impairment, geriatric syndromes or frailty that jeopardizes the attainment of euglycemia, we must factor into our management, methods for recognizing these problems and reducing their occurrence. The most salient rationale for this approach rests on strong evidence-based research demonstrating that “approximately 8 years are needed before the benefits of glycemic control are reflected in reduction in microvascular complications, such as retinopathy, renal disease, and neuropathy and that two to three years are required to see the benefits from better control of blood pressure and lipids” (American Geriatrics Society, Position Statement, 2003 Level II: RCT supporting recommendations). Importantly, the benefits of early, tight glucose control in the prevention of cardiovascular disease have been demonstrated (Diabetes Control and Complications Trial/Epidemiology of Diabetes Interventions and Complications Study Research Group [DCCT/EDIC], 2005 [Level II]). In adults with established type 2 diabetes at high risk for cardiovascular disease, findings from the ACCORD (Action to Control Cardiovascular Risk in Diabetes) trial demonstrated the negative consequences of tight glucose control. In this randomized controlled trial, participants with myocardial infarction and who concurrently had tight glucose control experienced the greatest mortality (for more information visit the Internet at: <http://www.accordtrial.org>). The ACCORD Study demonstrates the negative consequences of tight glucose control in adults with established type 2 diabetes, *but* this has not been confirmed in other studies....

Comorbidities of type 2 diabetes seen in older adults (such as stroke or myocardial infarction) the presence of functional impairment and/or geriatric syndromes (such as falls, urinary incontinence, depression, cognitive impairment) or frailty *all impact* on achieving normal glycemic control. Some common clinical examples of how symptoms related to comorbid diseases such as functional disability or cognitive impairment are presented in Table 3. The presence of these symptoms or syndromes creates an added dimension of diabetes management, which must be addressed in older adults with complex illness so that appropriate screening and risk reduction interventions can be part of the plan of care.

Older adults themselves indicate quality of life as the most important outcome of their health care. Weighing the risks versus the benefits becomes important in considering diabetes treatment, and more aggressive treatments may not be desirable or achievable. Aggressive attempts to establish glycemic control do not necessarily benefit persons with low levels of function, defined as having three or more limitations in instrumental activities of daily living (IADLS) or activities of daily living (ADLs) (Blaum, Ofsteddal, Langa, et al., 2003 [Level IV]). On the other hand, older persons with diabetes and higher levels of function have worse morbidity and mortality than age matched higher functioning persons without diabetes. Thus, better control of diabetes should improve the health of higher functioning older persons with diabetes (Blaum, Ofstedal, Langa, et al, 2003).

The two established goals for HbA1c levels for adults with diabetes (less than 7.0 percent and 6.5 percent) (American Diabetic Association, 2006 Level of Evidence: Level VI: Expert opinion) should be applied to higher functioning older persons with diabetes. There are no data to support different targets in older adults; however, the AGS guidelines recommend that for frail older adults with functional impairment and limited life expectancy, a more modest goal of HbA1c 8 percent is acceptable. Overall treatment goals need to be individualized. Of concern is the potential for hypoglycemia to occur from *over aggressive* treatment or from undesired adverse effects of medications or inadequate meal plans. In the case of frail older adults, where the risk of hypoglycemia exceed the benefit of tight control, the HbA1c value can be used as a means of monitoring treatment without a target goal.

Overall, the mainstays of diabetes management include medical nutrition therapy, physical activity, medications and self-monitoring of blood glucose. Each area with respect to care for older adults with complex illness is presented below.

Medical Nutrition Therapy

Achievement of optimal glycemic control rests upon intake of adequate calories and protein, carbohydrate, fat and nutrient substances. Meal planning is contingent upon the person's basal metabolic rate, activity level, weight/height determinations and other factors. Meal planning takes into consideration the issue of "timing" so that there are continual steady states of euglycemia whenever possible. A delicate balance exists when nutritionist or primary care providers calculate meal plans on an individualized basis. Factors such as stress and/or an acute illness, all co-contribute to alter the normal steady state of euglycemia. Hospitalization and/or institutionalization, events for which older adults with complex illness are at higher risk, carry extra risks for iatrogenic infections, which can lead to hyperglycemia. Among older adults of advanced old age with complex illness and/or geriatric syndromes, a failure to thrive pattern of decline may occur and will alter nutritional intake, again jeopardizing the delicate balance needed to maintain euglycemia (for discussion of frailty, see Module 1). A failure to thrive pattern of decline among older adults is generally due to a combination of malnutrition, decreased physical function, depression and cognitive impairment. (Markson, 1997 [Level V]). These symptoms that constitute such a pattern can be recognized by a comprehensive review of systems (see Table 6). Should these signs as well as additional symptoms exist, plans of care can be developed to treat or minimize their occurrence.

For the older adult with type 2 diabetes with complex illness, adequate nutrition becomes the primary goal of meal planning. The risks and benefits of weight loss for the older adult need to be assessed on an individual basis. Typical geriatric syndromes seen in older persons with complex illness and type 2 diabetes include depression and polypharmacy. Depression can cause irregular or unpredictable eating habits that lead to erratic swings in glucose; likewise, polypharmacy can result directly in adverse drug effects causing decreased or loss of appetite, nausea or constipation.

The social history can reveal other elements impacting on nutritious food choices such as changes in living arrangements resulting from retirement and widowhood. Living alone and lacking a support system make access to nutritious meals a concern. Important questions to pose include: "does the older adult food shop" and "do they prepare their meals," "do they meet the income eligibility for home delivered meals" and "can they attend social daycare centers or senior centers for congregate meals"?

Review of the gastrointestinal system can reveal some important disorders of the mouth, esophagus, stomach or intestine influencing food intake. For example, changes in dentition from lost or broken teeth and ill-fitting dentures can cause difficulty with mastication of food. One study of diabetic neuropathy found that 56 percent of diabetic patients suffered from dry mouth, and 27 percent experienced temporomandibular joint dysfunction, compared to lower rates observed among control groups (Collin, H., Niskanen, L., Uusitupa, M., Toyry, J., Collin, P., & Koivisto, A. et al, 2000 [Level IV]). Other symptoms that can be elicited on the review of systems presented are presented in Table 6.

Gastric disorders due to gastroparesis from type 2 diabetes can lead to nausea, vomiting and /or decreased appetite and constipation. Chronic constipation that can plague the older adult with complex illness, occurs secondary to medications, decreased fluids, fiber intake or from reduced mobility. Digestive problems can preclude the use of some high fiber foods among older diabetics (Kelly, Marrero, Gallivan, et al., 2004 [Level VI]).

Thus, consideration of medical nutrition therapy in the older adult with complex illness requires a comprehensive look at all of the important parameters influencing the ingestion of adequate nutritious meals.

Physical Activity

Exercise has been shown to prevent and reverse some microvascular/muscle changes in older individuals (Caruso, Silliman, Demissie, et al, 2000 [Level VI]). Exercise is important as a means to achieve improved Hvalues. In one controlled clinical trial of sedentary, overweight older men and women with type 2 diabetes, high-intensity progressive resistance training, in combination with moderate weight loss, significantly improved glycemic control (Dunstan, D.W., Daly, R.M., Owen, N., Jolley, D., DeCourten, M & Shaw, J. et al, 2002 [Level II]). Among older adults with complex illness or advanced old age, comorbid medical problems such as coronary artery disease, arthritis, balance problems and decreased mobility may prevent some types of physical exercise. Individual recommendations for methods of physical activity usually include stationary bicycling, swimming, water aerobics, walking or chair exercises for ten minutes three times daily and are usually appropriate and achievable. Encouragement to exercise with others provides not only safety but also opportunities for socialization.

Medications

The goal of medication therapy is to achieve and maintain a physiological balance that includes the reduction of insulin resistance and promotion of insulin secretion. Understanding where the individual is along the disease progression/treatment continuum can be a challenge. The older adult and/or caregiver must understand the progressive nature of diabetes and the ongoing need for periodic changes in the treatment plan that could include the use of insulin to avoid hyperglycemia and prevent complications.

The same medications used to treat younger individuals with diabetes may be used with an elderly population. Special care needs to be taken when prescribing and monitoring these same drugs, however, due to issues of complex illness, comorbidities and polypharmacy. Altered motor skills secondary to arthritis or neuropathy and cognitive ability need to be considered when considering this regimen. Table 4a and 4b illustrate some of the national guidelines for medication monitoring of drugs used in older adults with type 2 diabetes.

Self Monitoring of Blood Glucose (SMBG)

The use of the HbA1c measurements for assessing overall control does not address the extremes of hypo and hyperglycemia occurring on a daily basis. Use of a diary or written log on a daily basis provides immediate feedback and documentation of glucose levels so that the older adult can act appropriately, as instructed by their primary care provider. When the elderly person with diabetes has the functional ability to perform SMBG it is very useful to determine overall treatment efficacy and encourage diabetes self-management. A study done in a population of veterans (mean age sixty-five) showed that increased SMBG lead to improved HbA1c with no reported adverse outcomes (Murata, Shah, Hoffman, et al, 2003: Level of Evidence [Level III]). SMBG can be useful in preventing hypoglycemia especially in cases of hypoglycemic unawareness, a more frequent acute complication in older adults (Leese, Wang, Broomhall, et al., 2003: Level of Evidence: Level III: Non-Experimental Study) Older adults who perform SMBG are more aware of glucose fluctuation that leads to hyperglycemia. This hyperglycemia can cause polyuria, blurred vision, abnormal sensations and dehydration. These changes greatly contribute to the risk of the geriatric syndromes falls, urinary incontinence and possible cognitive decline.

Self-management Education

Self-care management of diabetes is the cornerstone of quality health care and is contingent upon adequate knowledge. In one study of diabetes self-care management adults younger than sixty-five with more diabetes knowledge had greater self-care agency (one's ability to perform self-care actions) and self-efficacy (an individual belief in his/her capability to perform self-care actions; Sousa, V.D., Zauszniewski, J.A., Musil, C.M., McDonald, P., & Milligan, S.E.; 2004 [Level IV]), although in general it is known that self-management is complex and knowledge alone will not necessarily lead to improved self-care (Chyun, D., Lacey, KO., Katten, DM., Talley, S., Price, WJ., Davey, JA., and Melkus, GD. 2006 [Level IV]). In one study describing attainment of glucose and coronary artery disease risk factor goals by type 2 diabetics, individual factors such as regular exercise, testing glucose, checking one's feet and physical activity were consistently related only to lipid and weight control (Chyun, et al., 2006 [Level IV]), suggesting that a one size fits all approach to multiple risk factor reduction efforts may not result in goal attainment.

Strong evidence exists as to the added value of geriatric-focused patient education and patient-oriented interventions on positive health outcomes for the older adult (Renders, C.M., Valk, G.D., Griffin, S., Wagner, E.H., Eijk, JThM & Assendelft, W.J.; 2006 [Level I]). Older adults with diabetes have special educational needs secondary to sensory and other deficits related to the aging process. The educational plan should include an assessment of the individual's priorities. Discussion should focus on content that matches specific goals. Education sessions need to use easily read or heard messages and proceed at a slower pace utilizing significant others and caregivers in instruction (Meneilly & Tessier, 1995 [Level VI]). Web-based educational programs are available to person with diabetes, such as DiabetesPro (available on the Internet). Elderly persons with diabetes need assistance with organization of information so they can slowly adapt it to their activities of daily living. The topic for discussion needs to be defined at the beginning of each teaching/learning session with the summary of key points at the end.

Constant reinforcement of content needs to occur during each individual session, especially when hyperglycemia or sensory or cognitive deficits are present.

Special Considerations

Management of diabetes involves avoidance of hyperglycemia while also avoiding hypoglycemia. Hypoglycemia can be disastrous especially among older adults—resulting in falls, injuries, syncope or seizures. The question then arises: what are the appropriate targets for treatment of diabetes in the elderly population? How does one effectively manage the older adult's care, with these targets in mind, while also clinically managing the geriatric syndromes most commonly seen in the elderly person with diabetes? Available data suggests that the risks of tight glyceic control exceed the benefits in many of the elderly (Wallace, 1999 [Level VI]). The greatest risk is hypoglycemia. Several factors have been identified that predispose these elderly individuals to hypoglycemia: poor or erratic nutritional intake, changes in mental status that impair perception of or response to hypoglycemia, polypharmacy, dependence or isolation that limit the perception of early treatment of hypoglycemia, impaired renal or hepatic metabolism and presence of comorbid conditions that can mask hypoglycemia (dementia, depression, cerebral vascular accident) (Schwartz & Abrass, 1998 [Level VI]). Older adults should know the classic warning signs of hypoglycemia, how to use fast acting glucose and should be encouraged to wear appropriate identification, such as the Medic Alert bracelet. Home bound, isolated older diabetics living alone can benefit from a life line worn around their neck and accessible for help through the emergency medical response system.

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Table 1: Atypical Presentation of Clinical Conditions in Older Adults with Type 2 Diabetes

Integument

Skin infections (examples: non-healing venous stasis ulcers; non-healing traumatic wounds)

Cardiovascular

Chest pain (examples: acute coronary syndromes; de novo cardiac ischemia)

Neurological

Altered level of consciousness with non-focal neurological signs (examples: stupor associated with non-focal neurological deficits and hyperglycemic, hyperosmolar, non-ketotic coma)

Paresthesia of distal extremities (diabetic peripheral neuropathy)

Gento-urinary

Erectile dysfunction

Vaginitis

Reference: Adapted from American Association of Diabetes Educators, A Core Curriculum for Diabetes Edition, 5th edition

Table 2: Risk Factors for Development of Diabetes and Predictors of Type 2 Diabetes in Older Adults

Risk Factors for Development of Diabetes*

Family history of diabetes

Low activity level

Obesity: excess body weight,
especially around waist

High blood pressure

High triglycerides

HDL cholesterol < 35

FBG = or > than 126 mg/dl

Risk Factors Predicting Type 2 Diabetes in Older Adults

Family history of diabetes

Higher body mass index and waist-hip ratio

HTN with higher diastolic blood pressure

High triglycerides

Low HDL

Higher levels of FBG and 2 hour plasma glucose

Previously identified impaired glucose tolerance (IGT) Impaired IGT (highest risk factor examined)

Ethnicities: African American, Hispanic-American
and Native Americans at high risk

*References: ADAM. About: Healthcare Center: Diabetes risk factors. Available on the Internet at

<http://adam.about.com/encyclopedia/002072.htm>

Mykkanen, L., Kuusisto, J., Pyorala, K., and Laakso, M. “Cardiovascular disease risk factors as predictors of type 2 (non-insulin dependent) diabetes mellitus in elderly subjects.” *Diabetologia* 36 (6): 553-9.

Table 3: Impact and Potential Complications Related to the Presence of Geriatric Syndromes in an Older Adult with Type 2 Diabetes

<u>Geriatric Syndrome</u>	<u>Impact/Potential Complications</u>
Urinary Incontinence	Psychological and social impact on daily living (confinement indoors, avoidance of social events)
	Falls due to accidentally slipping in urine
	Chronic perineal skin infections
Cognitive dysfunction	Inability to safely administer/recall medications resulting in omissions or errors in medication administration
	Inability to recall/execute bathing resulting in potential for skin infections, skin maceration/ulceration and poor hygiene
Depression	Loss of interest in self-care; loss of interest in eating/drinking; or taking medications following meal planning

Falls	Reduced mobility and/or loss of confidence in mobility resulting in potential for further gait, balance and functional impairment due to disuse
Functional disability	Difficulty or inability to bathe, feed self, ambulate, prepare meals or manage medications; impaired access to nutritional meals

Table 5. A Practical Approach to Eliciting Clinical and Functional Heterogeneity among Older Adults with Type 2 Diabetes.

<u>Parameters Related to Clinical Heterogeneity *</u>	<u>Corresponding Questions to Elicit</u>	<u>Helpful Resources</u>
Duration of disease (recent or longstanding?)	How long has it been since a health professional told you that you have type 2 diabetes?	
Presence of complications (none, few, multiple) or comorbidities	Since your diagnosis of type 2 diabetes, have you developed any visual problems, sensory loss or disease of the heart, circulation, or kidney? Have you had a stroke or problems with cholesterol?	
Variable life expectancy		
<u>Parameters Related to Functional Heterogeneity *</u>		
Physical status (active or frail)	Describe a typical day in terms of rest & activity	ConsultGerIRN Try This: Function Try This: Executive Dysfunction Geriatric Topics: Depression
Cognitive status (intact versus impaired)	Is there cognitive impairment?	
Psychological status (healthy versus depressed)	Is there depression?	

Social status (support versus isolated)

Is there support from family or friends?

Geriatric Topics:
Family Care

* Adapted from Suhl & Bonsignore (2006) as cited from AGS, AADE

Table 6: Review of Systems Related to Type 2 Diabetes in Older Adults with Complex Illness

Directions: When eliciting response, code as “yes” or “no.”

<u>General:</u>	<p>Do you experience any fever, chills or night sweats?</p> <p>Do you experience fatigue?</p> <p>Do you experience general weakness?</p> <p>What was your last fasting blood glucose? HGAIC?</p> <p>On a good day, what are your blood sugars?</p> <p>On a bad day, what are your blood sugars?</p>
<u>Skin:</u>	<p>Do you have any poorly healing sores or ulcers?</p> <p>Are your extremities dry, cracked or chapped?</p> <p>How frequently do you bathe? (daily, weekly)</p> <p>Do you use emollients or lotions?</p> <p>When was your last foot examination?</p> <p>Do you inspect your feet daily?</p>
<u>Vision:</u>	<p>Do you have any visual difficulty?</p> <p>When was your last dilated eye examination?</p> <p>Do you have blurred vision?</p> <p>Do you have any loss of central vision?</p> <p>Do you have any loss of peripheral vision?</p> <p>Do you wear corrective lenses?</p>
<u>Oral:</u>	<p>Do you have dry mouth?</p> <p>Do you have oral ulcers or lesions?</p> <p>Do you have temporomandibular joint dysfunction?</p> <p>When was your last dental examination?</p> <p>Do you have difficulty chewing your food?</p> <p>Do you have dentures? If yes, do they fit well?</p>
<u>Cardiovascular:</u>	<p>Do you experience lightheadedness with sitting or standing?</p> <p>Have you blacked out?</p> <p>Do you experience chest pain with exertion? With rest?</p> <p>Have you had your blood pressure checked within the past 3 months? Was it elevated?</p> <p>Do you experience calf pains with walking?</p> <p>Do you experience your heart racing?</p>
<u>Gastro-intestinal:</u>	<p>How is your appetite? (good, fair, poor)</p> <p>Has your weight been stable in the past 6 months?</p> <p>Have you been told by your primary provider that you are overweight or over your ideal body weight?</p> <p>What meal plan/diet do you follow?</p> <p>How many meals per day do you consume?</p> <p>Do you take snacks regularly?</p>

Do you carry fast acting glucose?
 Do you have difficulty swallowing your food?
 Do you experience nausea?
 Do you experience vomiting?
 Do you experience heart burn?
 Do you experience abdominal pain?
 Are you constipated? (hard or infrequent stools)
 Do you experience diarrhea? (loose or watery stools)
 Do you experience loss of bowel? (bowel incontinence)

Gento-urinary:

Do you experience loss of control of urine?
 Do you have urinary frequency?
 Do you have pain with urination?
 During the day, how often do you urinate?
 During sleep, do you awaken to urinate?
 Have you had any accident falls en route to the bathroom?

Musculoskeletal:

Do you have lower or upper extremity joint pain?
 Do you have arthritis?
 Have you experienced a fall in the past 3 months while walking?
 Do you use any assistive devices to help with walking?
 Do you experience any focal weakness in your lower legs?

Neurological:

Do you have any loss of sensation in your feet, lower legs?
 Do you have any loss of sensation in your hands, fingers?
 Do you have any burning sensation in your feet or lower legs?
 Do you have any burning sensation in your hands or fingers?
 Are you bothered by pain in your legs?
 Are you bothered by pain in your hands or arms?
 In the past 3 months, have you felt sad, down or blue?
 Do you experience any difficulty staying asleep?
 In the past 3 months, have you experienced any memory loss or forgetfulness?

Table 4a: Some Examples of Recommendations for Medical Management of Older Adults with Type 2 Diabetes.

Component of Treatment	Special Considerations
<u>Medication Management:</u>	
Aspirin	Aspirin (81-325 mg) daily unless on anti-coagulants or contraindicated Goal: to reduce risk and cardiovascular mortality due to acute myocardial infarction and other cardiovascular events
Anti-hyperglycemic:	
Oral anti-diabetic agent	Avoid use of Chlorpropamide due to strong association with hypoglycemia
Insulin	Weigh risk versus benefits, consider potential for hypoglycemia
Hypertension Management	Use of angiotensive receptor blockers (ARB) has cardiovascular and renal benefits. Use of angiotensive-converting enzyme inhibitor (ACE) is associated with reduced renal function. Goal: normalize blood pressure; monitor renal function and serum potassium within 1 to 2 weeks if taking an ARB or ACE inhibitor and at least yearly; monitor electrolytes within 1 to 2 weeks if taking loop
Lipid Management	Follow closely ADA guidelines for various LDL levels monitoring frequency

Reference: “Guidelines for Improving the Care of Older Persons with Diabetes Mellitus.” *JAGS* 51: S265-S280.

Table 4a continued: Some Examples of Recommendations for Medical Management of Older Adults with Type 2 Diabetes

Component of Treatment	Special Considerations
<u>Screening for Geriatric Syndromes:</u>	
Depression	Use validated instruments such as the Geriatric Depression Scale
Cognitive Impairment	Use validated instruments such as the mini-mental state examination
Polypharmacy	Use Beers criteria for inappropriate medication use in the elderly
Persistent Pain	For more information visit www.ConsultGeriRN.org and select Geriatric Topics: Pain
Urinary Incontinence	For more information visit www.ConsultGeriRN.org and select Geriatric

Falls	Topics: Incontinence
Pressure Sores	Use validated instruments for risk assessment and post fall assessment
	Use validated tools such as the Braden Scale

Health Maintenance Screening:

Eye care	Initial screening with dilated fundoscopic examination
Foot care	Annual foot inspections
Diabetes education	Give older adult and caregiver information about hypo and hyperglycemia and information about precipitating factors, prevention, symptoms, treatment, notification of health care provider
Smoking	Assess willingness to quit and offer counseling or medication if needed

Reference: “Guidelines for Improving the Care of Older Persons with Diabetes Mellitus.” *JAGS* 51: S265-S280.

Appendix A: Levels of Evidence Cited

Level I:

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 Sousa, V.D., Zauszniewski, J.A., Musil, C.M., McDonald, P., & Milligan, S.E. 2004

Level V:

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Appendix B: Web Resources

For more information visit www.ConsultGerRN.org and select *Try This Series*:

Function
Pain
Confusion Assessment Method
Urinary Incontinence Assessment
Fall Assessment

Or select *Geriatric Topics*:

Delirium
Depression
Dementia
Nutrition
Medication

American Diabetes Association, www.ada.org

Appendix C: Examples of Teaching Pedagogies for Care of Older Adults with Type 2 Diabetes

Topic Area: Content

Pedagogical Approach

Assessment of older adults knowledge of diabetes

1. Select from a clinical practice site, an older adult with a new onset of type 2 diabetes and ready for discharge home.
2. Interview the older adult to determine their knowledge of high risk situations in the home that can lead to burns, cuts, falls or medication errors.
3. Ask the older adult to review situations which can lead to hypoglycemia; what is their definition of hypoglycemia?
4. Ask the older adult to identify ways they can avoid hypoglycemic episodes.
5. Ask the older adult to develop a list of emergency contacts and resources they can access on a regular basis.
6. Review with the older adult guidelines for health checks such as doctor visits, foot exam and ophthalmology visits.
6. Present the older adult with a diabetic diary and review principles of blood glucose monitoring. Refer older adults with complex management issues to a diabetic educator for further follow-up and instruction.