Challenges and Strategies for Managing Diabetes in the Elderly in Long-Term Care Settings

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Diabetes affects a large number of patients in the long-term care (LTC) setting, and their care is often complicated because of multimorbidity, diabetes-related complications, disability, dependency on caregivers, and geriatric syndromes, including frailty and cognitive impairment. This population includes patients receiving short-term rehabilitation in skilled nursing facilities, those who are residents in LTC facilities, and those receiving palliative or end-of-life care. An individualized approach to care based on clinical complexity, diabetes trajectory, and patients' preferences and goals is required. Such patients may experience one or more transitions of care and decline in condition. They are also prone to adverse drug events, cardiovascular events, and hypoglycemia. Facility-related challenges include varying staff competencies and practitioner preferences, inconsistent interdisciplinary communication, overly complex medication regimens, and poorly implemented care transitions.

Type 2 diabetes is a noncommunicable disease that has reached pandemic proportions. As of 2019, 463 million individuals have been diagnosed with type 2 diabetes worldwide (1). It is more common in older adults >65 years of age, with a current prevalence of >25% in the United States (2). In U.S. long-term care (LTC) facilities, the prevalence of type 2 diabetes is estimated to be as high as 30%, although it may be even higher in some regions (3). This high prevalence of diabetes is, in part, the result of normal physiological changes associated with aging, such as low-grade chronic inflammation, increased abdominal fat, and sarcopenia, all of which can lead to impaired pancreatic function and insulin resistance (4).

The clinical and economic burden of diabetes in LTC settings is high. Nationally, nursing home expenditures attributable to diabetes have been estimated to be $18.6 billion (5).

Individuals living in LTC environments comprise heterogeneous groups in terms of comorbidity burden, functionality, and socialization, so diabetes care in these settings needs to be individualized and focused on maximizing quality of life (3). Health care practitioners must pay close attention to patients' comorbidities, existing diabetes complications, and medication management when selecting glucose-lowering medications to avoid adverse drug events and drug interactions.

Avoidance or minimization of hypoglycemia is also crucial because of its association with increased morbidity and mortality (6). Hypoglycemia tends to be more common in older adults, most likely because of lack of hypoglycemia awareness, impaired counterregulation, lowered symptom threshold, or ineffective glucose monitoring (7,8). Patients with diabetes residing in LTC facilities tend to have higher rates of falls, dementia, cardiovascular disease (CVD), kidney disease, and visual impairment (9–12). Moreover, LTC patients with diabetes have more frequent infections, emergency room visits, and hospital transfers than their counterparts without diabetes (13).

In this review, the authors discuss the challenges faced by practitioners caring for patients with diabetes throughout the LTC continuum. They suggest practical strategies to mitigate clinical problems arising from inconsistent practices, patient complexity, and medication management issues.

Challenges of Caring for Patients With Diabetes in LTC Settings

Caring for patients with diabetes throughout the LTC continuum poses special challenges to health care providers. These challenges can be divided roughly into three categories: *1*) those that arise from the incidence and

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progression of diabetes and its complications, 2) those that stem from coexisting geriatric syndromes, and 3) those that are logistically unique to LTC because of facility settings and processes. These factors can be additive, can mask one another, and, alone or combined, can most definitely make the management of diabetes complex. A thorough, evidence-based, and systematic approach is needed to providing care for these patients. Recent research and expert clinical guidance have begun to focus more on this subset of the population with diabetes, creating a framework for the appropriate intensity of care.

Progression of Diabetes and Its Complications

The progression of diabetes and related complications in older adults in the LTC environment can lead to numerous problems and increase the medical complexity of these patients. Aging and diabetes are both independent risk factors for functional decline; after controlling for age, studies have shown that people with diabetes are less active and more functionally impaired than their counterparts without diabetes (14). Macro- and microvascular complications of diabetes can lead to problems with dexterity for self-care, mobility, cognitive function, and functional independence, all of which predict poor outcomes (14).

Geriatric Syndromes

Geriatric syndromes are common, multifactorial health conditions such as cognitive impairment, polypharmacy, frailty, falls, and depression. Such syndromes arise from accumulated effects of impairments in multiple systems and present significant challenges for LTC patients with diabetes. Geriatric syndromes increase patients' vulnerability to medical and situational challenges and can lead to poor outcomes (15,16).

Diabetes has been shown to increase the risks of geriatric syndromes, and many studies have shown that older adults with diabetes have a more rapid decline in mobility, more sensory impairment, a faster rate of cognitive decline, and more falls than those without diabetes (3,17,18).

Patients in the LTC continuum often have multiple medical comorbidities and one or more geriatric syndromes in addition to physiologic age-related changes in function, cognition, and sensory perception. These clinical factors can complicate diabetes care in this fragile patient population, and proactive, creative management strategies are needed (3,19). The 2016 American Diabetes Association (ADA) position statement on managing diabetes in LTC and skilled nursing facilities (SNFs) (3), the American Medical Directors Association's 2015 clinical practice guideline on diabetes management in post-acute and LTC settings (19), and the chapter on the care of older adults in the ADA's *Standards of Medical Care in Diabetes—2020* (20) all identify clinical challenges unique to the LTC population with diabetes. These guidelines recommend an approach that involves improving glycemic control, optimizing cardiovascular risk factors, focusing on patients' goals for care and quality of life, reducing adverse drug events, avoiding hypoglycemia, and preventing diabetes complications (3,19,20). Table 1, adapted from the 2016 ADA position statement, summarizes some of the common clinical presentations associated with geriatric syndromes that create challenges in diabetes care, as well as some strategies for managing these issues.

Challenges Related to Facility Setting and Processes of Care

Problems related to specific types of LTC settings and their care processes may present barriers to diabetes management and thus must be identified and overcome to optimize patient care. People residing in or transitioning through assisted living facilities (ALFs), SNFs, and LTC facilities have some generalizable characteristics based on their living situation, available support system, and locational challenges.

Within the broad concept of institutional LTC, people may reside in ALFs, SNFs/subacute rehabilitation facilities, or LTC facilities based on their level of dependency and specific care needs. In most facilities, SNFs and LTC units coexist, and patients may often transfer from one to the other depending on their care needs and their need for rehabilitation after a hospital admission. In addition, many facilities provide palliative care, as well as hospice care, by collaborating with geriatricians and hospice organizations. Table 2 summarizes the characteristics, diabetes-related care needs, and unique challenges in ALFs, SNFs, and LTC settings (21).

Caring for Patients With Diabetes at the End of Life

The concepts of palliative, terminal, and end-of-life care for people with diabetes and strategies to improve such care are discussed in more detail elsewhere in this issue (p. 246).

The goals for diabetes management near the end of life in LTC facilities, as in any care setting, should focus on managing symptoms and providing comfort. These areas of focus should include limiting hyperglycemia, hypoglycemia, pain, and dehydration; reducing unnecessary hospitalizations; and preserving remaining quality of life and patient autonomy (3). Accordingly, treatment and monitoring regimens should be simplified. The frequency of glucose monitoring and insulin administration may be

TABLE 1 Clinical Challenges and Strategies for Diabetes Care in LTC Settings (3)

Comorbidity/Geriatric Syndrome	Consequences	Management Strategies
Delirium or progressive cognitive decline	• Irregular meal intake • Refusal of glucose monitoring • Refusal of medications or injections	• Simplified medication regimen • Block glucose testing • Deintensification of treatment • Avoidance of hypoglycemia • Regular diet, preferred foods
Frailty and/or decreased mobility	• Deconditioning • Pressure ulcers • Required assistance with feeding and toileting • Falls	• Optimized activity (seated, pedaling) • Repositioning if mobility is impaired, to avoid pressure ulcers • Assessment and treatment of pressure ulcers • Nutrition consultation • Physical and occupational therapy
Depression	• Weight loss or gain • Refusal of activities and glucose monitoring	• Physical and social activities • Psychological counseling • Assess and treat depression
Skin infections, foot problems, nonhealing ulcers	• Hyperglycemia • Poor intake, weight loss • Impaired mobility	• Increased glucose monitoring • Increased diabetes medications • Nutrition consultation • Regular skin checks and foot exams

reduced, and blood glucose levels may remain in the range of 200–300 mg/dL.

There should be consistent and regular communication between LTC staff and other providers. Among these other providers may be team members of a hospice organization, who often comanage patients with the primary medical team in these facilities (3).

The current literature on the topic of palliative diabetes care in LTC settings consists largely of caregiver surveys and consensus views. Evidence-informed guidelines for treating frail older adults with type 2 diabetes from the Diabetes Care Program of Nova Scotia and the Palliative and Therapeutic Harmonization program (22) emphasize the need for:

- Timely identification of patients with diabetes who need palliative care
- Treatment decisions that consider increased risks of hyperglycemia and hypoglycemia
- Consideration of coexisting geriatric syndromes
- Frequent re-examination of life expectancy and discussion of treatment goals
- Respect for patients' right to refuse treatment

As previously mentioned, treatment strategies should be simplified and therapies deintensified for patients nearing the end of life. Practitioners are sometimes reluctant to do this because of discomfort they may feel about discussing such matters with patients, as well as concerns on the part of patients and caregivers about potential mild hyperglycemia (3). Patients with diabetes who are receiving palliative care should be stratified into one of three categories to better guide the approach to managing diabetes: *1*) for stable patients, discuss and begin deintensification of glycemic control; *2*) for patients with organ failure, focus on preventing hypoglycemia; and *3*) for dying patients with type 2 diabetes, withdraw oral agents and insulin. For patients with type 1 diabetes who are dying, there is no consensus on medications, but the focus should be on comfort care (3).

Strategies to Improve Diabetes Management in LTC Settings

The medical complexity and clinical, functional, and cognitive heterogeneity of LTC patients with diabetes require thoughtful, individualized, and sometimes "out-of-the-box" strategies. Practitioners in these settings also work with multiple consultants (e.g., in the areas of wound care, psychiatry, and cardiology), and patients may have gastrostomies or require hemodialysis, advanced wound care treatments, or prolonged courses of intravenous antibiotics (3). For these reasons, it is important to define and document each patient's overall care goals, as well as their glycemic goals.

This process requires a thorough clinical assessment of the patient, review of existing records, and discussion with the patient (if possible), nursing staff, and family caregivers to formulate an ongoing, acceptable plan of care (19). The following are some important considerations to bear in mind:

- Quality of life
- Preferences and values (e.g., meals, injections, glucose checks, and acute-care transfers)

TABLE 2 Characteristics of and Challenges Facing Older Adults With Diabetes in Institutional LTC Settings (3,19)

	ALFs	SNFs	LTC Facilities
General characteristics	• Moderate comorbidities	• Variable comorbidities • Focus on rehabilitation • Probable home discharge	• Extensive comorbidities • Acute illness and instability
Care needs	• Partially dependent for ADL/iADL and medication management • Diabetes self-care assistance for some	• Full or partial support of ADLs • Possible intravenous medications, wound care, respiratory and renal support • Education for diabetes self-care	• Full or partial ADL dependence • Unable to perform diabetes self-care
Medical services	• Practitioners may visit the site or require patients to be transported to offices • Laboratory and radiology services (from contracted vendors) • Specialist consultations require office visits	• Practitioners make regular visits (shared by physician, ARNP, or PA) • Laboratory and radiology services • Specialists may provide in-house consultation • Infusion services and wound care available	• Practitioners make regular visits (shared by physician, ARNP, or PA) • Laboratory and radiology services • Specialists may provide in-house consultation • Infusion services and wound care available
Major challenges	• Inability to provide regular glucose monitoring and insulin injections • Inadequate staff education • Acute-care transfers if medically unstable • Visits to specialists may lead to fragmentation of care and poor communication	• New or complicated medication regimens might be too difficult for home management • Acute-care transfers if medically unstable • Need for some self-care by time of discharge, depending on home support • Suboptimal care transitions	• Irregular meal intake • Insulin and meal timing mismatches because of high workload • Inadequate staff education • Prolonged use of sliding-scale insulin • Higher risk of hypoglycemia in dementia population • High staff turnover • Practitioners vary in their management of diabetes

ADL, activities of daily living (e.g., walking, feeding, dressing and grooming, toileting, bathing, and transferring); ARNP, advanced practice nurse practitioner; iADL, instrumental ADL (e.g., cooking, taking medications, traveling, using the telephone, shopping, housework, and managing finances); PA, physician's assistant.

- Risk of hypoglycemia and hypoglycemia unawareness
- Comorbidities (e.g., cancer, HIV, sleep apnea, and periodontal disease)
- Disease severity and presence of complications
- Risk or presence of CVD
- Cognitive impairment or psychiatric disorders
- Presence of other geriatric syndromes
- Presence of undernutrition or impaired swallowing
- Functional ability or frailty
- Remaining life expectancy

Optimize Nutrition and Function

Diabetes is an independent risk factor for frailty and is also associated with sarcopenia (23). A multimodal approach using a structured exercise program and a diabetes and nutrition education program in 964 older adults (mean age 78.4 years) showed an improvement in the Short Physical Performance Battery score (24).

Meals that are consistent in carbohydrates, with a variety of food choices to accommodate food and mealtime preferences, are beneficial in promoting adequate caloric and nutrient needs, as well as a better living experience (25). Most LTC facilities no longer offer therapeutic diets such as no concentrated sweets or low-fat options for patients with diabetes to avoid unintentional weight loss and undernutrition. Diabetes-specific enteral nutrition formulas (e.g., Glucerna, Glytrol, and Diabetisource AC) are often prescribed to maintain caloric intake and weight. Although trial data have shown improvement in blood glucose control, recommending such products generally in place of standard formulas remains controversial (26).

Avoid Hypoglycemia

LTC patients are prone to hypoglycemia because of comorbidities, complications, anorexia, erratic meal consumption, suboptimal hydration, slow hormonal regulation and counterregulation, and gastrointestinal problems affecting absorption (27). Risk factors identified in studies of severe hypoglycemia in community-dwelling elderly people include age, black race, insulin therapy, oral medication, renal insufficiency, glucose variability, and cognitive and functional impairment (28).

The DIMORA (DIabete MellitO in RsA [Diabetes Mellitus in the Nursing Home]) study (29) of 2,258 patients in nursing homes across Italy showed that the prevalence of severe hypoglycemia was higher in patients with dementia

compared with those without dementia (18 vs. 8%). Those treated with sulfonylureas or a metformin-plus-sulfonylurea combination were at higher risk than those treated with rapid- and long-acting insulin analogs. A study of 236 nursing home patients in France (30) reported that 59% had tight glycemic control, and hypoglycemia, noted in 18% of patients, occurred in all categories of glycemic control.

The relationship between cognitive impairment and hypoglycemia is bidirectional in that cognitive impairment has been associated with hypoglycemia, and severe and frequent episodes of hypoglycemia have been associated with cognitive impairment (31). Moreover, neuroglycopenic symptoms of hypoglycemia in patients with dementia may be mistaken for delirium or with the psychological and behavioral symptoms of dementia. In such patients who have a high risk of hypoglycemia, an oral regimen may be reasonable. In one nursing home study of 150 patients (average age 79.8 years), the use of oral agents such as metformin, insulin secretagogues, thiazolidinediones, and dipeptidyl peptidase 4 inhibitors was shown to achieve comparable glycemic control to basal insulin (32).

Avoid Extreme Hyperglycemia

Persistent hyperglycemia is also associated with dehydration, mental status changes, new or worsening incontinence, electrolyte disturbances, falls, and hyperglycemic hyperosmolar syndrome. The consensus recommendation is that glycemic goals should incorporate avoidance of blood glucose levels >200 mg/dL, if possible (3). It is not clear whether there is an average glucose or A1C value above which clinical outcomes worsen in LTC patients or in those receiving palliative care.

The ADA has recommended the following diabetes management goals for the three distinct populations residing in LTC facilities (3,20). Blood glucose monitoring frequency should be based on the complexity of the regimen.

- For SNF patients receiving short-term rehabilitation and planning for home discharge, avoid relying on A1C because of recent acute illness, and follow patients' current glucose trends. The fasting and premeal glucose target should be 100–200 mg/dL.
- For patients residing in LTC facilities who have limited life expectancy or expected benefit from intensive control, the focus should be on quality of life. An A1C <8.5% is a reasonable goal, but use caution when interpreting A1C results given the potential presence of many conditions that are known to raise or lower A1C levels. The fasting and premeal glucose target should be 100–200 mg/dL.
- For patients at the end of life, in whom the goals are to avoid symptomatic hyperglycemia or severe hypoglycemia and to maintain comfort and dignity, A1C plays no role. Blood glucose monitoring is recommended only periodically to avoid symptomatic hyperglycemia.

Optimize Care for Patients With Type 1 Diabetes

Patients with type 1 diabetes are living longer and may also require care in LTC settings. The same principles of comprehensive geriatric assessment and individualization of goals and treatment regimens used in type 2 diabetes also apply to type 1 diabetes. However, several other challenges may be encountered in the provision of LTC for patients with type 1 diabetes. Patients' medical records may not correctly identify a diagnosis of type 1 diabetes, and for those with cognitive impairment and poor social support, clarification about this may not be available. Practitioners may be unaware of patients' absolute requirement for insulin (even basal insulin alone, if they are unable to consume meals) and high risk of hypoglycemia (33), or they may be unfamiliar with insulin pumps or continuous glucose monitoring, which can be important in reducing hypoglycemia and glycemic variability (34). Diabetic ketoacidosis may not be recognized in a timely manner and may be mistaken for, or occur concurrently with, sepsis, organ failure, or medication-related acidosis. Hence, more intensive diabetes education of first-line caregivers and nursing staff is recommended and becomes particularly relevant in patients who have cognitive impairment and multiple complications.

Manage Medications With a Focus on Safety and Simplicity

LTC patients are exposed to potentially detrimental consequences of polypharmacy resulting from inappropriate medication choices, as well as multiple comorbidities and diabetes-related complications, all of which may require specific treatments. An additional challenge is that most facilities have an open staff model, and each medical group may include several practitioners who may have differing prescribing preferences and levels of familiarity with diabetes treatment options. Medication regimens may be altered prematurely by on-call practitioners and not re-evaluated until the next scheduled visit. Moreover, only a few studies evaluating or comparing

medication regimens have been conducted in older and frail LTC patients.

An optimal approach to diabetes treatment and the best sequence of medication selection in the ALF, hospital, rehabilitation, and LTC settings have not been identified. There are often frequent changes to the treatment regimen in an effort to improve glycemic control. However, it is more important to address persistently abnormal trends in blood glucose than to attempt to adjust the treatment regimen in response to a few isolated abnormal values. The following suggestions regarding medication choices and treatment regimens for LTC patients are intended to reduce the risk of hypoglycemia, simplify treatment, be appropriate for patients with renal insufficiency, and possibly improve cardiovascular outcomes.

- Administer basal insulin in the morning instead of at night (35).
- The use of oral agents has been shown to achieve comparable glycemic control to basal insulin (32). For example, linagliptin showed comparable glycemic control with lower rates of hypoglycemia compared with basal insulin (36) and does not require renal dose adjustment.
- If a sulfonylurea is used, avoid glyburide. Use glimepiride or glipizide, which is primarily eliminated by the liver (37).
- Consider linagliptin as an add-on to other oral agents and basal insulin, especially in those with renal insufficiency (38).
- Consider a sodium–glucose cotransporter 2 inhibitor (e.g., canagliflozin or dapagliflozin) as an add-on medication if heart failure predominates and if the patient can drink adequately, does not have urinary tract infections or incontinence (39,40), and has an estimated glomerular filtration rate >45 mL/min/1.73 m² (for canagliflozin) or >60 mL/min/1.73 m² (for dapagliflozin).
- Consider adding a glucagon-like peptide 1 (GLP-1) receptor agonist if glycemic control is not achieved with oral agents, especially in those with or at high risk for cardiovascular complications (40–42).
- Replace sliding-scale insulin (SSI) with a basal insulin or GLP-1 receptor agonist if the patient is stable (Table 3) (43).
- Simplify the insulin regimen. Titrate the basal dose to a blood glucose goal of 90–150 mg/dL. If the mealtime dose is <10 units, discontinue mealtime insulin and add a noninsulin agent. If the mealtime dose is >10 units, decrease the dose by 50% and add a noninsulin agent (and if eGFR is >45 mL/min/1.73 m², start metformin at 500 mg/dL) (35).
- Consider using a second-generation basal insulin (degludec 200 units/mL or glargine 300 units/mL) in those requiring high doses of basal insulin or with wide fluctuations in glucose levels. These provide similar overall glycemic control but lower rates of severe hypoglycemia (44,45).

Improve Interdisciplinary Communication and Facility Care Processes

A major difference in the provision of medical services in LTC facilities versus other inpatient settings is that physicians do not visit patients daily. Federal regulations require that patients be seen every 30 days for the first 90 days and every 60 days thereafter, unless additional visits are medically necessary. This schedule can result in patients having wide glucose fluctuations, and in some cases, hypoglycemia, without their practitioner being notified (3,20).

Developing facility protocols for glucose monitoring and practitioner notification would allow for timely adjustment of patients' treatment regimen and detection of acute changes of condition such as infections or other medical emergencies, which may be heralded by sudden changes in blood glucose (Table 4). Treatment and monitoring can be adjusted by telephone or fax order or by remote entry into the patient's electronic health record (3,19).

There may be considerable variation among nursing home corporations in different geographic regions and among individual facilities with regard to basic care processes for LTC patients. These variations may include differences in the rigorousness of admission evaluations, practitioner notification policies, hypoglycemia management, use of SSI, frequency of glucose monitoring, timeliness of assessment of foot and skin problems, medication errors, management of acute illness, and clinical thresholds for transferring patients to a hospital setting. Concerns related to these differences are outlined in Table 3, with suggested strategies for improvement.

It is recommended that leadership of LTC facilities (i.e., the medical director, director of nursing, and other leaders such as staff development personnel and dietitians) should continuously collect in-house quality improvement data to create and improve process and outcome measures related to diabetes care (21). Collaboration with the facility's consultant pharmacists, nursing administration, and nursing assistants is recommended. Sample outcome indicators could include the incidence of hypoglycemic episodes, severe hyperglycemia requiring an emergency room

TABLE 3 Suggested Strategies to Improve LTC Facility Care Processes (3,19,43,45–47)

Concern	Suggested Strategy
Inadequate evaluation on admission	• Attempt to get complete medical records from referring sites, as well as from patients' family. • Ascertain whether patients have type 1 diabetes. • Discuss and document goals of care with patients and/or family caregivers. • Document any prior adverse events with medications and hypoglycemia unawareness. • Assess patients' cognition, mental health disorders, and support system. • Review interdisciplinary care plan within 1 week of admission.
Inconsistent practitioner notification	• Have standing facility orders or protocols for glucose monitoring and parameters for practitioner notification.
Hypoglycemia	• Train all staff to recognize hypoglycemia. • Institute nurse-driven treatment protocols, including use of nasal glucagon. • Institute protocol for practitioner notification and prompt evaluation. • Perform medication review and simplification or deintensification of the treatment regimen. • Avoid sulfonylureas, if possible. • Administer prandial insulin 15 minutes before or after meals, according to product recommendations. • Stop prandial insulin if the mealtime dose is $<$10 units. • Rotate insulin injection sites. • Use shorter needle lengths (3–5 mm).
Persistence of SSI as the sole therapy regimen or for correction doses	• Replace SSI with basal insulin (50–75% of the average daily requirement). • Add 50–75% of the average insulin requirement used as SSI to existing dose of basal insulin. • Use noninsulin agents or fixed-dose mealtime insulin for postprandial hyperglycemia. • Increase the basal insulin dose by the average correction dose given at breakfast. • Short-term SSI may still be needed for acute illness or irregular meal intake. • Reduce the frequency of glucose checks. • Use a simple scale such as "4 units of mealtime insulin if glucose is $>$300 mg/dL" if dementia or persistent irregular meal intake is a concern. • Stop SSI as glucose levels stabilize.
High frequency of glucose monitoring in type 2 diabetes	• Use oral agents when possible. • Consider a weekly GLP-1 receptor agonist. • Simplified the insulin regimen (basal insulin). • Monitor twice daily to every 3 days depending on medical stability. (Increase monitoring if a patient is on steroids or has a severe infection.)
Foot and skin problems	• Train first-line caregivers to perform foot assessment and report concerns to nursing. • Perform foot inspections at scheduled visits and a comprehensive foot exam on admission and readmission. • Promote weekly skin checks and reporting of concerns.
Unplanned transfers to acute care	• Educate staff on the identification and treatment of hypoglycemia. • Educate staff on the early detection of changes of condition (e.g., use of INTERACT tools). • Perform clinical evaluation of patients if glucose levels increase or decrease acutely.
Medication errors	• Perform appropriate reconciliation of medications on admission and after any care transition. • Deprescribe or deintensify treatment regimens if patients' A1C is below goal or if hypoglycemia occurs. • Educate staff regarding medication brands, name confusion, and correct dosing and timing of medications.

Use caution in interpreting A1C; it can be falsely decreased in acute and chronic blood loss, hemolytic anemias, hemoglobin variants, and splenomegaly and falsely increased in iron, vitamin B12, and folate deficiency anemias, severe hypertriglyceridemia, and chronic alcohol and opioid consumption (18). INTERACT, Interventions to Reduce Acute Care Transfers (47).

transfer, and rates of diabetes-related amputations, infections, and ulcers (19). Process indicators could include recognition and diagnosis of diabetes, appropriate diet orders, limited use of SSI, appropriate monitoring and assessment (e.g., of A1C, lipids, pain, and depression), and frequency of foot inspections and evaluations (19).

Improving Transitions of Care

Transitions from hospital or home to an LTC setting and across care settings within LTC facilities, as well as changes in providers, and discharge to the community setting are all high-risk situations for patients with diabetes. Poor coordination and continuity of care without a feasible comprehensive care plan can lead to unnecessary rehospitalizations, inconsistent patient monitoring, duplicative tests, medication errors, delays in diagnoses, and lack of follow-through on referrals.

Whenever possible, the interprofessional care team should follow the recommended checklists shown below of information to provide or review at the time of admission for patients transferring from a hospital to an LTC facility or transfer from LTC to an ALF or home.

Transferring From Hospital to LTC

- History and physical exam, progress notes, and consultation reports
- Accurate diagnosis list
- Laboratory test results and key imaging studies
- Current medication list, reconciled before hospital discharge
- Time of last basal insulin dose
- Hypoglycemia episodes
- Approximate meal consumption

Transferring From LTC to ALF or Home

- Treatment goals and suggested blood glucose target range
- Medication reconciliation with written reason for each medication
- Instructions on how and when to take diabetes medications
- Instructions on how often to monitor blood glucose
- Education on treating hypoglycemia (training of caregivers on the use of glucagon)
- Basic meal plan guidance
- Advice on when to call the LTC facility and primary care practitioner, with contact phone numbers
- Requests for home health services
- Details of follow-up appointments with primary care practitioner or specialists

Facility medical directors and directors of nursing or other nursing leaders are well positioned to develop and implement basic policies to improve care transitions. For patients who have a planned discharge, it is suggested that teaching and supervision of blood glucose self-monitoring and insulin self-administration be carried out a few days before discharge if possible. Developing standardized transfer forms is also recommended. In many health systems, LTC patients are transferred to only a few hospitals and vice versa. Medical directors and facility leaders could build working relationships with referring and accepting hospitals and engage with various hospital personnel and departments to develop seamless processes for transitioning patients from LTC facilities and hospitals. Such engagement should include the hospital's emergency department lead physician, director of nursing staff, case management department, diabetes educator, and relevant specialists, including those providing palliative care, wound care, and physical therapy.

Gaps in Knowledge and Further Research Questions

Few studies are available of frail older adults with diabetes in post-acute and LTC settings. The setting of A1C goals, frequency of glucose monitoring, and selection of therapeutic agents, especially for patients with cardiovascular complications, are guided by extrapolation from large trials conducted in community-dwelling subjects. Moreover, the best approaches for individualizing glycemic goals and measuring glycemic control for patients receiving palliative care remain unclear. For example, it is not known whether there is an average glucose or A1C level beyond which clinical outcomes may worsen for patients receiving palliative care. Additional research is needed to address these issues.

Conclusion

The rate of diabetes has been projected to increase 4.5-fold in patients >65 years of age between 2005 and 2050. Thus, the impetus falls on health providers to become well educated in and well versed on relevant patient-centered treatment methods to improve quality of life and outcomes for older people with diabetes and to mitigate some of the clinical and economic burden associated with this disease. Interprofessional care teams that continuously identify and address challenges can make significant progress toward optimizing diabetes care for patients who fall within the LTC continuum.

TABLE 4 Clinical Situations Requiring Prompt Notification and Intervention (3,19)

Circumstance	Recommendations
Glucometer reading is <70 mg/dL and patient is unresponsive.	• Treat hypoglycemia per protocol without delay. • **Call the practitioner immediately.**
Consecutive glucose readings are <70 mg/dL.	• Evaluate the patient's nutritional intake. • Consider increasing the frequency of glucose monitoring for 24 hours. • Adjust the patient's diabetes regimen as needed.
Glucose readings are 70–100 mg/dL.	• **Call the practitioner as soon as possible.** • Increase the frequency of glucose monitoring.
Glucose readings are >250 mg/dL two or more times within 24 hours.	• Evaluate changes in nutritional intake. • Adjust the diabetes regimen as needed. • Check for omitted medication doses or administration errors.
Glucose readings are >300 mg/dL during all or part of 2 consecutive days.	• If glucose levels are still persistently high after changes in the regimen, perform a clinical evaluation for other causes (e.g., infection).
Any glucose reading is too high to be measured with the glucose meter.	• Confirm high blood glucose by laboratory test.
A patient is not eating, is vomiting, or is unable to take oral glucose-lowering medications.	• **Call the practitioner as soon as possible.** • Consider insulin therapy, and adjust the dose accordingly based on nutritional status.

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AUTHOR CONTRIBUTIONS

N.P. researched the data, wrote the sections on strategies to improve diabetes management, and formulated and edited the manuscript. E.H. researched the data and wrote the sections on challenges of care in LTC settings. S.S. researched the data and wrote the introductory section. N.P. is the guarantor for this work and, as such, had full access to all the data and source material and takes full responsibility for the integrity and accuracy of this review.

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