Diabetes Management

A Systems Approach
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Diabetes is a Big Deal

- Nearly one third of elderly SNF residents have diabetes
- These patients, compared with SNF residents without diabetes, had a greater comorbid burden, were prescribed more medications to treat these conditions, and had more hospitalizations

Source: Prevalence of Diabetes and the Burden of Comorbid Conditions Among Elderly Nursing Home
Journal of the American Medical Directors Association
Vol 12 Issue 4 Aug 2011 212-223
“Update on Diabetes in the Elderly and Nursing Home Resident”

- More than 20% of adults aged 65 to 75 years and 40% of adults older than 80 years suffer from diabetes
- Physiological changes in elderly individuals, such as decreased physical activity, abdominal obesity, and increased inflammatory state, increase insulin resistance in peripheral tissue and reduce glucose-dependent insulin release, leading to carbohydrate intolerance and diabetes
- The clinical presentation in the elderly and nursing home residents is frequently guided by the high rate of comorbidities such as hypertension, depression, and cardiovascular diseases

“Update on Diabetes in the Elderly and Nursing Home Resident”

- Treatment goals must be individualized in patients with impaired cognitive and physical ability, reduced life expectancy, and heavy burden of comorbid disease
- A conservative and stepwise approach to the treatment of the elderly patient with diabetes is suggested
- Treatment may be initiated with dietary and physical activity modification and with a single oral agent, followed by a combination of oral agents and insulin therapy if needed
- Evidence from clinical trials indicates that improving glycemic control, as well as cardiovascular risk factors, reduces morbidity and mortality in older individuals with diabetes
The Cost of Diabetes

- The annual costs of care for persons with DM in the NH setting are estimated to be $56 billion annually, representing significant patient needs and financial burden.


Diabetes in the Elderly

- http://www.joslin.org/docs/Guideline_For_Care_Of_Older_Adults_with_Diabetes.pdf
- The Joslin Guideline for the Care of the Older Adult with Diabetes is designed to assist in individualizing the care of, and setting medical goals for older adults with diabetes.
  - This guideline focuses on the unique needs of the older person with diabetes.
  - In order to assure that the high clinical practice standards endorsed and adhered to by Joslin Diabetes Center and its Joslin Clinic are easily accessible to practitioners worldwide who rely on Joslin to set the benchmark for diabetes care and treatment, Joslin Diabetes Center has developed and published a series of clinical care Guidelines. The primary objective of each Guideline is to support clinical practice and influence clinical behavior so that outcomes are improved and patient expectations are informed and reasonable.
  - NOTICE: Joslin's Clinical Guidelines are reviewed at least annually but are revised as current evidence and clinical practice require. Please check back frequently to ensure that you have the most recent version of each Guideline.
Diabetes in the Elderly

- US Department of Health and Human Services

- Guideline Objective(s)
  - To improve the quality of care delivered to patients with diabetes in long-term care settings
  - To offer care providers and practitioners in long-term care facilities a systematic approach to recognizing, assessing, treating, and monitoring patients with type 2 diabetes mellitus

Diabetes in the Elderly

- The primary goal of diabetes management in older adults is to achieve optimal glycemic control and prevent and/or slow the onset and progression of acute and chronic complications associated with this chronic disease
  - Unique challenges
    - Clinical and functional diversity
    - Multiple co-existing medical conditions and variable life expectancies
Diabetes in the Elderly

Treatment Goals

- In determining treatment goals, individual patient assessment is required, being cognizant of the following:
  - Chronological age vs. actual health status
  - Duration of disease and age of onset
  - Presence of complications and co-morbidities
  - Variable life expectancy
  - Social support system
- Treatment regimen should be simplified to prevent medication errors
- Treatment goals should be re-assessed at frequent intervals as health status can change quickly in older adults

Oral Agents

- Review of the various oral agents: Treatment of Diabetes in Long Term Care Facilities: A Primary Care Approach
  - [http://clinical.diabetesjournals.org/content/26/4/352.full](http://clinical.diabetesjournals.org/content/26/4/352.full)
  - Limited application due to
    - Comorbid factors that include hepatic function
    - GI distress
    - Fluid retention and edema
    - Poor beta cell functioning
Oral Agents

- Hypoglycemia with monotherapy is very rare
- Generally, these are well-tolerated medications; additionally, guidelines exist for dosing in those with renal insufficiency

Insulin

- Lowers blood glucose
- Several types of insulin
- Each type of insulin has a certain time period in which it works
  - Onset refers to when the insulin starts to work.
  - Peak refers to when the insulin works hardest.
  - Duration refers to how long the insulin works
<table>
<thead>
<tr>
<th>Type</th>
<th>Insulin</th>
<th>When to Take</th>
<th>Onset</th>
<th>Peak</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rapid-Acting</td>
<td>Lispro (Humalog)</td>
<td>5-15 min before meal</td>
<td>30-60 min</td>
<td>30-60 min - 4 hours</td>
<td>1-5 hours</td>
</tr>
<tr>
<td></td>
<td>Aspart (Novolog)</td>
<td></td>
<td></td>
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<td></td>
<td>Glulisine (Apidra)</td>
<td></td>
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</tr>
<tr>
<td>Short-Acting</td>
<td>Regular (R)</td>
<td>30 min before meal</td>
<td>30-60 min</td>
<td>2-5 hours</td>
<td>Up to 12 hours</td>
</tr>
<tr>
<td>Intermediate-Acting</td>
<td>NPH (N) Human</td>
<td>Does not need to be given with meal</td>
<td>30 min - 4 hours</td>
<td>4-12 hours</td>
<td>Up to 24 hours</td>
</tr>
<tr>
<td>Long-Acting</td>
<td>Glargine (Lantus)</td>
<td>Does not need to be given with meal</td>
<td>45 min - 4 hours</td>
<td>Minimal</td>
<td>Up to 24 hours</td>
</tr>
<tr>
<td></td>
<td>Detemir (Levemir)</td>
<td></td>
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</tbody>
</table>

**Diabetes in the Elderly**

- Safety is critical in frail older adult
- Weighing the benefit of tight diabetes control versus the risk of hypoglycemia is essential in this population

Hypoglycemia

- Safety is critical in frail older adult
- Weighing the benefit of tight diabetes control versus the risk of hypoglycemia is essential in this population
Diabetes in the Elderly: Glycemic Control

- A1C reflects the average blood sugar levels over the past 3 months
- The recommended A1C goal in older adults has a target set to achieve optimal control without hypoglycemic episodes. A higher A1C (7-8) goal and higher blood glucose goals are acceptable for:
  - Frail older adults
  - Persons with a life expectancy of less than 5 years
  - Patients in whom the risk of severe hypoglycemia is pronounced
  - Patients with advanced co-morbidities
- A1C goal should be set to achieve optimal control without hypoglycemic episodes

Diabetes in the Elderly: Glycemic Control

- Chronically ill, institutionalized patients with a short life expectancy do not require aggressive glucose control, but do require adequate control to facilitate healing and prevent:
  - Dehydration
  - Symptoms of hyperglycemia or hypoglycemia
  - Weight loss
Diabetes in the Elderly: Hypoglycemia

• If glucose levels become too low, as occurs with hypoglycemia, it can have these effects on the brain:
  • Confusion, abnormal behavior or both, such as the inability to complete routine tasks
  • Visual disturbances, such as double vision and blurred vision
  • Seizures, though uncommon
  • Loss of consciousness, though uncommon

Diabetes in the Elderly: Hypoglycemia

• Hypoglycemia may also cause these other signs and symptoms:
  • Heart palpitations
  • Shakiness
  • Anxiety
  • Sweating
  • Hunger
  • Tingling sensation around the mouth

http://www.mayoclinic.com/health/hypoglycemia/DS00198/DSECTION=symptoms
Diabetes In the Elderly: Hypoglycemia

- In the older adult who takes insulin or certain antihyperglycemic agents, hypoglycemia symptoms
  - Occur at lower blood glucose levels
  - Are harder to recognize
  - Result in poorer outcomes when compared to younger adults
    - Symptoms of hypoglycemia in older adult patients may be subtle and may go undiagnosed by both patients and providers

Diabetes in the Elderly: Hypoglycemia

- Older adult residents commonly exhibit neuroglycopenic manifestations of hypoglycemia that include
  - Confusion, delirium, dizziness, weakness or falls
- It is important that caregivers recognize these symptoms as hypoglycemia and treat appropriately
Diabetes in the Elderly: Hypoglycemia

- Frail older adult patients may have poor outcomes from even mild hypoglycemia
  - For example, injurious falls that lead to unintended consequences such as hospitalization
- In addition, hypoglycemia can exacerbate existing conditions (e.g., coronary artery disease or cerebrovascular disease)

The frequency of hypoglycemia among the elderly population is not fully understood

- Evidence suggests that hypoglycemia occurs much more often than is captured by capillary glucose testing or by the recognition of its signs and symptoms
- This lack of hypoglycemia awareness can result in unrecognized, untreated, and more severe hypoglycemia in NH residents using insulin

Source: Resident-Focused and Evidence-Based Management of Diabetes Mellitus in the Nursing Home Setting. Annals of Long Term Care. 2013; 21(10)
Best Practice Tips: Support Structures

- Enhancing policies and procedures related to:
  - Physician orders
  - Transcription of physician orders
  - Diets
  - Insulin administration
  - Physician notification
  - Blood glucose finger sticks
  - Medication error reporting

Best Practice Tips: Support Structures

- Define hyper/hypoglycemia protocols that are easy to remember and use
Best Practice Tips: Support Structures

- Treatment of hypoglycemia protocol reflects ease of implementation
  - Carbohydrate or glucose 15 g or equivalents (e.g., ½ cup juice, 1 tube glucose gel, 3 glucose tablets)
  - Intramuscular glucagon

Source: US Department of Health and Human Service

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Best Practice Tips: Support Structures

- Coordinate rapid acting insulin administration with food availability
  - Meal delivery
  - Meal serving
  - Snack
Best Practice Tips: Support Structures

- Pharmacy consultant
  - Recommendations that consider the patient's clinical profile and functional status
  - Balanced with evidence-based practice to include the resident safety and reducing the potential of hypoglycemia
  - Participate in defining formulary for insulin

Best Practice Tips: Support Structures

- Ensure MAR (or other documentation tool) layout
  - Groups medications together
  - Provides adequate space for clear documentation of blood glucose finger sticks
  - Provides adequate space to document what has been administered if a scale is used
Best Practice Tips: Physician Orders and Care Management

- Define and implement standardized order sets
  - Reduce variation and increase safety
- Consider basal or basal-bolus insulin whenever possible
  - Bolus at main meal
- Minimize blood glucose finger sticks
  - With bolus

“Evidence-Informed Guidelines for Treating Frail Older Adults with Type 2 Diabetes: From the Diabetes Care Program of Nova Scotia (DCPNS) and the Palliative and Therapeutic Harmonization (PATH) Program”

- Clinical practice guidelines specific to the medical care of frail older adults
- Because of the complex conditions associated with frailty, guidelines for frail older patients were based on careful consideration of the characteristics of this population, balanced against the benefits and harms associated with treatment
- The DCPNS/PATH guidelines are unique in that they recommend the following:
  - Maintain HbA1c at or above 8% rather than below a specific level, in keeping with the conclusion that lower HbA1c levels are associated with increased hypoglycemic events without accruing meaningful benefit for frail older adults with type 2 diabetes
  - The guideline supports a wide range of acceptable HbA1c targets so that treatment decisions can focus on whether to aim for HbA1c levels between 6% and 7% or within a higher range (i.e., >7% and <12%) based on individual circumstances and symptoms
  - Simplify treatment by administering basal insulin alone and avoiding administration of regular and rapid-acting insulin when feasible
  - This recommendation takes into account the variations in oral intake that are commonly associated with frailty.
  - Use neutral protamine Hagedorn (NPH) insulin instead of long-acting insulin analogues, such as insulin glargine (Lantus) or insulin detemir (Levemir), as insulin analogues do not appear to provide clinically meaningful benefit but are significantly more costly
  - With acceptance of more liberalized blood glucose targets, there is no need for routine blood glucose testing when oral hypoglycemic medications or well-established doses of basal insulin (used alone) are not routinely changed as a result of blood glucose testing.
- Although these recommendations may appear radical, they are based on careful review of research findings

Journal of the American Medical Directors Association Vol 14 Issue 11 Nov 2013 801-808
"The Prevalence and Persistence of Sliding Scale Insulin Use Among Newly Admitted Elderly Nursing Home Residents With Diabetes Mellitus"

Objective
- To evaluate the initiation and persistence of sliding scale insulin (SSI) therapy in elderly nursing home (NH) residents.

Design and Participants
- A longitudinal study of NH residents (N = 3844) with diabetes aged 65 years and older who were admitted between 2002 and 2003 and resided for ≥1 month or longer in long-term care facilities associated with a for-profit nursing home chain.

Results
- Rates of SSI use were high among patients who were started on insulin during their stay in nursing homes (32%), and 32% of the total number of orders for insulin were for SSI. After insulin initiation, 86% of residents who were started on SSI remained on it by the end of the study. Of those who had not started on SSI, 33% were later switched to SSI.

Discussion
- This study demonstrated that SSI regimens were highly prevalent and, once initiated, tended to be continued in the treatment of elderly patients with diabetes newly admitted to nursing homes. Multiple factors were found to be significantly associated with initiation and persistence of SSI.

Conclusion
- The high prevalence and persistent use of SSI is inconsistent with the American Medical Directors Association guideline as well as current recommendations. Additional studies are needed to evaluate outcomes associated with prolonged SSI use in long-term care facilities.

"Resident-Focused and Evidence-Based Management of Diabetes Mellitus in the Nursing Home Setting"

Annals of Long Term Care, Volume 21 - Issue 10 - October 2013

- The evidence-based American Association of Clinical Endocrinologists (AACE) and American Diabetes Association (ADA) Consensus Statement on Inpatient Glycemic Control single out SSI insulin as an ineffective means of managing hyperglycemia in patients with type 2 DM

- The consensus statement recommends BB insulin regimen as the evidence-based method for the control of hyperglycemia in inpatients

- AMDA's population-specific DM clinical practice guidelines encourage a patient-centered approach to DM management with an individualized plan of care

- AMDA recommends that SS regimens be converted to safer medications and insulin regimens; however, it states that SS can, in fact, be useful for new admissions, for newly diagnosed DM when a patient's insulin needs are not known, when there is a change of condition, and when new therapies, such as tube feeding, are added

- AMDA recommends that SS orders be reevaluated within 1 week of initiation
Best Practice Tips: Physician Orders and Care Management

- Best Practice Tips
  - Telephone order read back
    - Develop and implement a policy and/or procedure for verbal and telephone orders that includes the writing down, legibly (or entering into a computer), the complete order by the receiver of the information; the receiver reading back the order; and the confirmation that what has been written down and read back is accurate” (International Patient Safety Goals, Updated 9, February 2012).

Best Practice Tips: Nursing Competency

- Medication pass audit
  - 5 rights and 3 checks
- Understanding of insulin action including onset and duration (reference standardized order sets)
- Competency assessment related to hypoglycemia
  - Knowledge
  - Implementation
  - Hypoglycemia drills!!
- Competency assessment related to insulin management including blood glucose finger sticks
**Best Practice Tips: Nursing Competency**

- Competency assessment related to independent double check for insulin administration should include:
  - Understands insulin requires an independent double check
  - Demonstrates 5 rights, 3 checks
  - Verifies with other nurse that the elements considered in the double check are the same
  - Independent double check is documented
  - Resident/Family education provided
  - SC injection procedure is followed including rotation of site
  - Documentation is completed

**Best Practice Tips: Insulin Product Management**

- Acquisition process
  - Individual
  - Floor stock
- Storage
- Expiration date management
  - Insulin with different expiration timeframes
- Multi-dose vials
- Formulary
Best Practice Tips: Care Planning

- Development of an individualized care plan and definition of treatment goals including
  - achieving appropriate nutritional status
  - controlling pain
  - educating patient and family about diabetes and its management
  - setting target ranges for blood pressure and blood glucose
  - reducing risks of diabetic complications
  - reducing progression of diabetic complications

- Interdisciplinary approach is critical in achieving positive outcomes
Best Practice Tips: Care Planning

• Dining Standard Recommendations
  • Diet liberalization
  • Honoring choices
  • Self-determination

Best Practice Tips: Care Planning

• CMS Dining Standard
  • [http://surveyor.vo.llnwd.net/o45/data/1102/NewDiningPracticeStandards.pdf](http://surveyor.vo.llnwd.net/o45/data/1102/NewDiningPracticeStandards.pdf)

• National interdisciplinary task force
• Focused on improving the quality of life in long term care and liberalizing standards
**Best Practice Tips: Care Planning**

- Exercise
  - Glycemic control
  - Cardiovascular condition

**Best Practice Tips: Care Planning**

- Foot care
  - **At-risk foot** -- routine podiatric care; daily foot care and inspection by caregivers; regular assessment
  - **Current mild infection or ulcer** -- local dressings; baseline X-ray for bone integrity or osteomyelitis; podiatry or wound care referral as needed
  - **Limb-threatening ulcer or infection** -- hospitalization or intravenous antibiotics; referral to podiatry, orthopedic or vascular surgery
Best Practice Tips: Care Planning

- Eye care
  - Assessment for eye infections and eye pain
  - Comprehensive dilated eye examination if appropriate
  - Control of blood glucose, hypertension, and proteinuria

- Oral care
  - Assessment for mouth infection, mouth pain, or eating difficulties
  - Dental services if indicated
  - Dietitian consultation if needed
  - Prophylactic antibiotics if needed
Best Practice Tips: Care Planning

- Control of hypertension
  - Angiotensin-converting enzyme (ACE) inhibitors
  - Angiotensin receptor blockers (ARBs)
- Monitoring and reporting

Best Practice Tips: Care Planning

- Management of diabetic nephropathy
  - Protein-restricted diet if needed
  - Control of blood glucose and hypertension
  - Angiotensin-converting enzyme inhibitors, angiotensin receptor blockers
  - Nephrologist consultation if needed
Best Practice Tips: Care Planning

- Management of diabetic neuropathy with analgesics, anticonvulsants, antioxidants, selective serotonin- and norepinephrine-reuptake inhibitors, or other medications

Best Practice Tips: Care Planning

- Management of dyslipidemia and cardiovascular disease
  - Control of blood glucose
  - Lipid-lowering medication if appropriate
  - Enteric-coated aspirin
  - Beta-blockers
Best Practice Tips: Care Planning

- Influenza vaccine
- Pneumococcal vaccine

Best Practice Tips: Care Planning

- Clearly identified goals
  - A1C
  - Blood glucose finger stick
  - Blood pressure
Insulin is a high alert medication

High-alert (or high-hazard) medications are medications that are most likely to cause significant harm to the patient, even when used as intended

The Institute for Safe Medication Practices (ISMP) reports that, although mistakes may not be more common in the use of these medications, when errors do occur, the impact on the patient can be significant.

Best Practice Tips: High Alert Medication

Independent double check

According to the Institute for Safe Medication Practices, an independent double-check of a high-alert medication is a procedure in which two clinicians separately check (alone and apart from each other, then compare results) each verifying the high-alert medication before administering it to the patient.

Independent double checks serve two purposes: to prevent a serious error from reaching a patient and to bring attention to the systems that allow the introduction of human error. Manual redundancies such as independent double checks still play an important role in error detection. Studies show that manual redundancies detect about 95% of errors.
Best Practice Tips: High Alert Medication

• Coordinate meal and insulin times and consider administering rapidly-acting insulin with or immediately after the meal

• Recommended by the Institute for Healthcare Improvement (How-to Guide: Prevent Harm from High-Alert Medications. Cambridge, MA: Institute for Healthcare Improvement; 2012)

Best Practice Tips: High Alert Medication

• Eliminate the use of sliding insulin dosage scales when possible; convert to basal or basal/bolus insulin dosing

• If a sliding scale is used, standardize it through the use of a protocol and preprinted order form (with standardized formulary) that clearly designates the specific increments of insulin coverage (How-to Guide: Prevent Harm from High-Alert Medications. Cambridge, MA: Institute for Healthcare Improvement; 2012)
Best Practice Tips: High Alert Medication

- Insulin pen use
- NYS DOH Health Advisory March 2013
- Infection prevention
- Institute for Safe Medication Practices 2013

Best Practice Tips: Monitoring Compliance

- Audits/Monitoring/Observations
  - Integrate outcome measures into quality assessment
  - Individual occurrence review
  - Identify patterns/trends
Triggers to Signal a Problem

- Observing practice to ensure compliance with policy and procedure
- Auditing of the medication administration records
- Review of the nurse notes
- Medication error reports
- Disciplinary actions
- Clinical indicator examples
  - Weight loss
  - Dehydration
  - Infections
  - Hospitalization

Triggers to Signal a Problem

- The voice of the customer
  - Resident/Family concerns
  - Physician concerns
Example of Problems

- **Failure to ensure**
  - An adequate diabetic management program was developed and implemented
  - Physician orders were complete and transcribed accurately
  - Daily insulin was administered as ordered
  - Orders were obtained as needed in a timely manner
  - Protocols for hypo/hyperglycemia were written and nurses were knowledgeable
  - Medication errors were identified and reported
  - BGFS were completed as ordered
  - The physician was notified in a timely manner of a critical lab value
  - Documentation of blood glucose finger stick results and sliding scale insulin was complete

Possible Regulation Problems

- **Self-Determination and Participation (F242)**
  - Includes choosing schedules and health care consistent with his or her interests, assessments and plans of care
- **Notification of Changes (F157)**
  - Typically noted with “consult the resident’s physician”
- **Quality Assessment and Assurance (F520)**
- **Administration (F490)**
Possible Regulation Problems

• The services provided or arranged by the facility must meet professional standards of quality (F281)
  • Services that are provided are provided according to accepted standards of clinical practice
  • May be published by a professional organization, licensing board, accrediting body or other regulatory agency
    • Professional journal articles
    • Clinical practice guidelines
    • Professional organization publications
    • Manuals or textbooks

Source: State Operations Manual

Possible Regulation Problems

• Provide Care/Services for Highest Well Being (F309)
  • Each resident must receive and the facility must provide the necessary care and services to attain or maintain the highest practical physical, mental, and psychosocial well-being, in accordance with the comprehensive assessment and plan of care

Source: State Operations Manual
Possible Regulation Problems

• Significant Medication Errors (F333)
  • The Facility must ensure that residents are free of any significant medication errors
  
  Source: State Operations Manual

Possible Regulatory Problems

• Significant Medication Error
  • One which causes the resident discomfort or jeopardizes health and safety

  Source: State Operations Manual
Diabetes Management
Questions and Discussion
Support Structures
- Policies and Procedures
  - Protocol
  - Hypo/Hyperglycemia
- MAR Layout and Documentation
- Meal Delivery/Serving and Timing of Insulin
- Consulting Pharmacist
- Acquisition
- Storage
- Expiration Date Management
- Insulin types

Physician Orders & Management
- Read Back on T.O.
  - Standardized Order Sets
  - Basal or Basal-Bolus
  - Minimal FS (once daily)

Nurse Competency
- Understanding of Insulin including Onset
- Med Pass Audit
- Competency Assessment: Insulin Administration and Independent Double Check
- Competency Assessment: Hypoglycemia
- Independent Double Check Process

Care Planning
- Diet Liberalization
  - Exercise
  - Complications
  - Blood Glucose Goals/A1C and/or FS
  - Blood Pressure Goal

Insulin Product Management
- Insulin types

High Alert Medication: Insulin

Diabetes Management

Safe and Effective Diabetes Care

Diagram # 1
FISHBONE DIAGRAM

Diagram illustrates the various components and processes involved in diabetes management, emphasizing support structures, physician orders & management, nurse competency, care planning, and insulin product management. The diagram highlights key areas such as protocols, meal deliveries, consulting pharmacists, acquisition, storage, and expiration date management, along with specific strategies for insulin administration, monitoring, and complication management. The goal is to ensure safe and effective diabetes care through structured and coordinated efforts.