Insulin Replacement Therapy for Type 2 Diabetes: Patient-Centered Management of Hyperglycemia in Primary Care

September 19, 2013

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Boston, Massachusetts

Education Partner:
Integritas Communications, LLC
Session 4: Insulin Replacement Therapy for Type 2 Diabetes: Patient-Centered Management of Hyperglycemia in Primary Care

Learning Objectives
1. Discuss the multisystem consequences of type 2 diabetes mellitus (T2DM) and the rationale for appropriate screening, early diagnosis, and prompt treatment.
2. Establish individualized treatment goals for patients with T2DM according to disease duration, age, comorbidities, and ongoing evaluations of hemoglobin A1C, blood glucose profiles, and therapeutic responses.
3. Employ evidence-based frameworks and new treatment approaches to individualize basal and mealtime insulin therapies across diverse T2DM patient populations.
4. Integrate patient-specific clinical and psychosocial factors into comprehensive treatment plans that include lifestyle modifications and pharmacologic interventions for T2DM.
5. Educate patients with T2DM about the importance of treatment adherence and the risks of insulin-related hypoglycemia.

Faculty

Derek LeRoith, MD, PhD
Professor of Medicine
Director of Research
Division of Endocrinology, Diabetes and Bone Disease
Director of the Metabolism Institute
Mount Sinai Medical Center
New York, New York

Dr LeRoith is the director of research in the division of endocrinology, diabetes and bone diseases at Mount Sinai School of Medicine, New York.

Dr LeRoith started working at the National Institutes of Health (NIH) in 1979 in the field of endocrinology and diabetes. He was promoted to diabetes branch chief at the NIH in Bethesda, Maryland, a position he held until 2005. From 2005 to 2010, he was director of the division of endocrinology and director of the Metabolism Institute at Mount Sinai School of Medicine.

Dr LeRoith’s research has focused on the role of insulin and insulin-like growth factors in normal physiology and disease states, including obesity, T2DM, and cancer. He has utilized genetic manipulation of mouse genes to create mouse models of T2DM to study metabolism, complications, and therapies.

More recently, Dr LeRoith has been studying the mechanisms involved in the increased risk for and poor outcomes of cancer in patients with obesity and diabetes. Dr LeRoith has published over 600 original research and review articles on these topics, and edited textbooks in the field, including a textbook on diabetes that is currently in its third edition.

Dr LeRoith is also editor-in-chief of 2 journals, Growth Hormone & IGF Research and Endocrinology & Metabolism Clinics of North America, and associate editor of Diabetes Care and Hormone and Metabolic Research.

Mark W. Stolar, MD
Associate Professor of Clinical Medicine
Northwestern University School of Medicine
Chicago, Illinois

Dr Stolar is associate professor of clinical medicine, general internal medicine, and geriatrics at Northwestern University Feinberg School of Medicine in Chicago, Illinois. Dr Stolar received his medical degree from the University of Illinois, Chicago. He completed his fellowship at the Northwestern McGaw/Northwestern Memorial Hospital, and his residency in internal medicine at Lutheran General Hospital. Dr Stolar is board certified in endocrinology, diabetes, and metabolism, as well as in internal medicine.
Dr Stolar's medical interests include diabetes, lipid disorders, and thyroid disease. He is actively involved in physician education in the areas of diabetes and cardiovascular disease and has both written and presented widely in those areas. As president of the Endocrine Fellows Foundation, he is actively involved in enhancing career opportunities for trainees in endocrinology.

Jeffrey R. Unger, MD  
Assistant Professor of Family Medicine  
Loma Linda University School of Medicine  
Director of Metabolic Studies  
Catalina Research Institute  
Chino, California

Dr Unger is the director of metabolic studies at the Catalina Research Institute in Chino, California, and president of Unger Primary Care Medical Center. The cooperative care center uniquely incorporates primary care with clinical research in areas related to diabetes, sexual dysfunction, hyperlipidemia, hypertension, pain, obesity, and mental illness.

Dr Unger has published over 160 peer-reviewed articles, Medscape publications, and book chapters on diabetes, mental illness, and pain management. He discussed the use of incretin therapies on ReachMD satellite radio several times in 2009. Over the past 6 years, Dr Unger has spoken internationally on topics linking mental illness with metabolic dysfunction, as well as on chronic pain disorders, diabetic neuropathy, and ways in which primary care physicians may assist their diabetic patients to successfully achieve their metabolic targets. His medical textbook entitled Diabetes Management in Primary Care (Lippincott, Williams & Wilkins) was published in April 2007. He co-edited another book on diabetes that was published by Elsevier in 2008. Dr Unger also published a textbook on migraine management in 2007. Diabetes Management in Primary Care, 2nd ed., was published by Lippincott, Williams & Wilkins in December 2012.

The recipient of the National Headache Foundation Speaker of the Year Award and the “Father of the Year” award from the American Diabetes Association, Dr Unger is board certified in family medicine.

Faculty Financial Disclosure Statements
The presenting faculty reports the following:

Derek LeRoith, MD, PhD, receives consulting fees from AstraZeneca Pharmaceuticals LP, Merck & Co., Inc., and sanofi-aventis US; receives grant and research support from Merck & Co., Inc.; and serves on the advisory board for sanofi-aventis US.

Mark W. Stolar, MD, receives honoraria from and serves on the speakers bureau for Takeda Pharmaceutical Company Ltd. and Vivus, Inc., and serves on the advisory board for Takeda Pharmaceutical Company Ltd.

Jeffrey R. Unger, MD, serves on the advisory board for and receives honoraria from Abbott Laboratories and Halozyme Therapeutics, Inc.

Education Partner Financial Disclosure Statement
The content collaborators at Integritas Communications have reported the following:

James Kappler, PhD, has no financial relationships to disclose.

Suggested Reading List


Presenters Disclosure Information

Off-Label/Investigational Discussion

- In accordance with pmiCME policy, faculty have been asked to disclose discussion of unlabeled or unapproved use(s) of drugs or devices during the course of their presentations.

Scientific and Clinical Insights in T2DM

Key Points

- T2DM is a progressive disease associated with pathologic processes in numerous tissues
  - Increased blood glucose levels, reduced insulin sensitivity, and early β-cell degeneration can occur years before patients meet diagnostic criteria for T2DM
  - The progressive nature of T2DM highlights the need for early diagnosis and prompt treatment
- A1C levels appear to correlate with macrovascular and microvascular risk
- Studies of intensive vs conventional therapy have not clearly supported or refuted the benefits of intensive therapy
  - Younger patients with no apparent cardiovascular disease and shorter disease duration may benefit most from intensive treatment

A1C, glycated hemoglobin; T2DM, type 2 diabetes mellitus.
**Case Study**

**Roberta**

- 42-year-old Mexican-American woman
- Saleswoman and single mother of 10-year-old twins
  - Mother had T2DM
- Hypertension and dyslipidemia
- Visits PCP for annual checkup
  - Missed last 2 years’ appointments
- Poor diet
  - High-fat foods and excessive soda intake
- Smokes between 5 and 10 cigarettes daily
- Rarely exercises
  - Reports feeling very fatigued lately
  - Complains of increased urination

**Screening Asymptomatic Persons for Diabetes**

- Screen ≥45 years of age, at least every 3 years
- Screen at any age and more frequently if BMI ≥25 and 1 additional risk factor is present
  - Family history of diabetes (first-degree relative)
  - High-risk race or ethnic group (eg, Black, Hispanic)
  - Previous A1C ≥5.7%, impaired FPG, or IGT
  - History of gestational diabetes or delivery of baby >9 pounds
  - Polycystic ovary syndrome
  - Hypertension (BP ≥140/90 mm Hg, or hypertension therapy)
  - HDL-C level <35 mg/dL and/or TG level >250 mg/dL
  - History of cardiovascular disease
  - Physical inactivity
- Other clinical conditions associated with insulin resistance

**Acanthosis Nigricans**

**Sign of Insulin Resistance**

- Velvety, light-brown-to-black discoloration, usually on the neck, back, axilla, groin, dorsum of hands
- May point to PCOS in females
- Insulin sensitivity decreases by 30% at puberty with compensatory increase in insulin secretion

**Screening At-Risk Patients**

<table>
<thead>
<tr>
<th>At-risk patient</th>
<th>Check FPG, A1C, or both every 1-3 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>IFG or IGT</td>
</tr>
<tr>
<td>Prediabetes</td>
<td>Confirm</td>
</tr>
<tr>
<td>Diabetes</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Improved glycaemia</th>
<th>Stable glycaemia</th>
<th>Progressive hyperglycaemia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continue lifestyle changes</td>
<td>Check FPG, A1C, or both in 12 months</td>
<td>Intensely efforts Consider metformin</td>
</tr>
<tr>
<td>Continue lifestyle changes</td>
<td>Check FPG, A1C, or both in 6 months</td>
<td>Treatment dependent on degree of hyperglycaemia. Will begin with lifestyle change with or without metformin</td>
</tr>
</tbody>
</table>

**Roberta**

**Clinical Profile**

- BMI, 33
- A1C, 9.0%
- Current medications
  - Ramipril, 10 mg once daily
  - Pitavastatin, 4 mg once daily
  - States that she occasionally forgets to take medications
- FPG, 231 mg/dL
  - eGFR, 91 mL/min/1.73 m²
  - ACR, 25 μg/g
  - Peripheral pulses normal

- BP, 130/85 mm Hg
- Lipids
  - TC, 235 mg/dL
  - HDL-C, 45 mg/dL
  - Non-HDL-C, 190 mg/dL
  - LDL-C, 131 mg/dL
  - vLDL-C, 57 mg/dL
  - TG, 250 mg/dL
  - ApoB, 118 mg/dL

**Diagnosis**

- Receives a diagnosis of T2DM
- Educated on disease and expectations of treatment
  - Cared for mother with T2DM
  - Aware of dangers of poor disease management
  - Well versed in detecting and addressing hypoglycemic episodes
- Evaluated for appropriate A1C target
### ADA/EASD Position Statement

**Setting Glycemic Goals in T2DM**

<table>
<thead>
<tr>
<th>More Stringent</th>
<th>Less Stringent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient attitude and expected treatment efforts</td>
<td>High motivation, excellent self-care capacity</td>
</tr>
<tr>
<td>Risks potentially associated with hypoglycemia, other adverse events</td>
<td>Long</td>
</tr>
<tr>
<td>Disease duration</td>
<td>Long</td>
</tr>
<tr>
<td>Life expectancy</td>
<td>Long</td>
</tr>
<tr>
<td>Important comorbidities</td>
<td>None</td>
</tr>
<tr>
<td>Established vascular complications</td>
<td>None</td>
</tr>
<tr>
<td>Resources, support system</td>
<td>Readily available</td>
</tr>
</tbody>
</table>


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### Roberta

**Setting Glycemic Targets**

<table>
<thead>
<tr>
<th>Age, 42 years</th>
<th>BMI, 33</th>
<th>A1C, 9.0%</th>
<th>Cared for diabetic mother, including hypoglycemic episodes</th>
</tr>
</thead>
<tbody>
<tr>
<td>No exercise</td>
<td>Normal renal function</td>
<td>Missed previous PCP visits and medications</td>
<td></td>
</tr>
</tbody>
</table>

Hypertension, Dystipidemia (Not well controlled)

**What would you set as an A1C target for Roberta?**


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### Roberta

**Education and Lifestyle Changes**

- **A1C target set at <7.0%**
- **Diabetes education**
  - Discusses long-term, multiorgan consequences
  - Explains monitoring blood glucose and emphasizes treatment adherence and weight loss
- **Diet and lifestyle**
  - Limitation or elimination of alcohol and soda
  - Recommends aspects of a Mediterranean diet
  - Readdresses the need to quit smoking
- **Physical Therapy**
  - Low-intensity warm-up and cool-down periods (5–10 min each)
  - Muscle stretching (5–10 min)
  - Physical activity session based on patient's overall health status


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### Nutrition Guidelines

- **MNT provided by RD familiar with components of diabetes MNT**
- **In overweight and obese insulin-resistant individuals, aim for modest weight loss (7%) to reduce insulin resistance**
- **Refer patients to RD for individualized meal plan**
- **For an average-size adult**
  - Calorie intake/day: 1400-2000 calories
  - Carbs: ~45 g or 3-4 servings per meal
  - Saturated fat: <7% of total calories
  - Minimize trans fat intake
- **Encourage implementation of the Mediterranean Diet Plan**


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### Physical Activity Recommendations

- **Advise adults with T2DM to perform ≥150 min/week of moderate-intense aerobic activity (50–70% of maximum HR) spread over 3 days with no more than 2 consecutive days without exercising**
- **Recommend resistance training at least twice weekly (in the absence of contraindications)**
- **Use “clinical judgment” about whether to screen asymptomatic patients for silent CAD**
- **Encourage high-risk patients to start with short periods of low intensity exercise and progress slowly**

HR, heart rate; CAD, coronary heart disease. ADA Clinical Practice Recommendations 2013. *Diabetes Care*. 36 (suppl 1);S25.

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### Look AHEAD

**Diabetes Remission With Intensive Lifestyle Interventions**

<table>
<thead>
<tr>
<th>Remission Prevalence</th>
<th>Years of Continuous Remission (Partial or Complete)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5</td>
<td>16 years</td>
</tr>
<tr>
<td>1.5</td>
<td>13 years</td>
</tr>
<tr>
<td>2.5</td>
<td>12 years</td>
</tr>
<tr>
<td>3.5</td>
<td>11 years</td>
</tr>
<tr>
<td>4.5</td>
<td>10 years</td>
</tr>
</tbody>
</table>

Roberta
Selecting Initial Therapy

<table>
<thead>
<tr>
<th>Age, 42 Years</th>
<th>BMI, 33</th>
<th>Starting exercise program</th>
<th>A1C, 9.0%</th>
<th>Target A1C, 7.0%</th>
<th>Cared for diabetic mother, including hypoglycemic episodes</th>
</tr>
</thead>
</table>

Hypertension
Controlled with ramipril

Dyslipidemia
Lipid profile not optimal

Normal renal function
91 mL/min/1.73 m²

Missed previous PCP visits and medications

What would you use as an initial antihyperglycemic regimen?


Roberta
Treatment

• PCP prescribes metformin 500 mg twice daily and linagliptin 5 mg once daily
  – After 3 months, A1C reduced to 8.1% from previous 9.0%
  – Remains symptomatic with fatigue and polyuria at follow-up
• PCP prescribes insulin glargine 0.2 units/kg body weight
  – Injection of 16 units in the evening
  – Continues with metformin and linagliptin
• Patient education
  – Blood glucose monitoring
  – Insulin injection and storage
  – Self-titration
  – Increase dose by 1–2 units once or twice weekly to reach A1C target
  – Recognition and treatment of hypoglycemic episodes

ORIGIN Trial for Dysglycemia
Early Basal Insulin and Health Outcomes

• Long-term international clinical trial conducted in 40 countries, over a period of 7 years to examine effects of early basal insulin treatment in patients with dysglycemiaa

  • Long-acting basal insulin analog vs standard care
    – No significant difference in incidence of cardiovascular events
    – No significant difference in cancers or cancer-related death
    – 28% reduction in new diabetes development in people without disease at baseline
    – Severe hypoglycemia was 0.7% more frequent in basal insulin–treated group (1% vs 0.3% per year)
    – 1.6 kg weight gain with long-acting basal insulin vs 0.5 kg weight loss with standard care over 6-year period

aT2DM, IFG, or IGT; drug naïve or taking 1 antihyperglycemic drug and additional cardiovascular risk factors.


Roberta
Follow-up

• 4 months after starting insulin therapy, no episodes of hypoglycemia
• A1C, 7.2% (previous value, 8.1%)
  – Insulin glargine 52 units divided between morning and evening injections
• BMI, 33.1 (previous value, 33)
• Glucose blood monitoring suggests marked postprandial hyperglycemia

ADA/EASD Position Statement
Approaches to Insulin Therapy

Number of Injections
Regimen Complexity
1
Low
2
Moderate
3+
High

Flexibility
More Flexible
Less Flexible

Intensifying Insulin Therapy

Basal-Bolus

- If A1C >7% or basal insulin dose >60 U, add rapid-acting insulin 0.1 U/kg/meal at largest meal
- If A1C not at target after 3 months, add second rapid-acting injection at next largest meal
- If still not at target after 3 more months, add third mealtime rapid-acting insulin

Basal-Bolus and Premixed Insulin

General Considerations

- Basal-bolus regimens
  - Most flexible approach to intensive insulin therapy
  - Injections can reflect variable meal timing
  - Dose adjustment based on meal carbohydrate content
  - Requires multiple daily injections
- Premixed insulin analogs
  - Can benefit patients who eat on regular schedules or have problems with adherence
  - Larger A1C decreases compared with basal insulin alone
  - Slightly higher risk for hypoglycemia and weight gain
  - Lack component dosage flexibility


Roberta

Intensification of Insulin Therapy

- Roberta is initiated on a basal-bolus insulin regimen
  - In addition to insulin glargine (52 units), Roberta is prescribed a fast-acting insulin (4 units)
    - Injected 15 min before dinner (largest meal of the day)

Should both metformin and linagliptin be continued with the more complex insulin regimen?

Roberta

Treatment Response

- A1C level reduced to 6.8%
- Roberta reports adherence to therapy and no episodes of hypoglycemia
- Diet has improved and Roberta is participating in a regular exercise program

And Finally

5 Keys Of Successful Diabetes Management

- Know your metabolic targets (A1C, lipids, BP)
- Understand how to achieve your metabolic targets
- Stop smoking
- Take your medicines
- Make sure your doctor/provider understands the complexities of diabetes management

Marty

- Retired 75-year-old African American widower
- Lives with daughter and teenaged grandson
- Active social life with many friends
  - Takes daily walks and plays occasional game of tennis
- Non-smoker
- Drinks wine with dinner every evening
- 20-year history of T2DM
  - Some symptoms 2 years prior to diagnosis
- Visits PCP to discuss recent weight gain and fatigue


Unger J. Diabetes Management in Primary Care 2nd Ed. Lippincott 2013
Marty
Clinical and Medical Profile

• BMI, 34 (31 at visit 6 months ago)
• T2DM
  – Current treatment
    • Metformin 1000 mg twice daily and glimepiride 2 mg
    • Current A1C, 8.5%
  – Previous test at 7.2% with target of <7.0%
• Myocardial infarction 3 years ago
  – PCI, aspirin, and 12 months of prasugrel therapy
  – Currently taking atorvastatin 5 mg daily and metoprolol ER 100 mg twice daily
• eGFR, 61 mL/min/1.73 m²
  – No other evidence of kidney disease
• Daughter reports witnessing 1 hypoglycemic episode since last PCP visit
  – After Marty finished playing tennis

ER, extended release; PCI, percutaneous coronary intervention.

Hypoglycemia in Older Adults
Risk Factors and Consequences

• Risk factors
  – Decreased or slowed glucose metabolism
  – Decreased food intake
  – Renal impairment
  – Reduced awareness of symptoms
  – Polypharmacy
• Consequences
  – Increased risk of falls and associated morbidity
  – Significant healthcare costs associated with severe hypoglycemia episode
  – Recurrent hypoglycemic events may result in hypoglycemia-associated autonomic failure
• Education of patients and caregivers required

Factors affecting glycemic thresholds are poorly controlled T1DM and T2DM, tight glycemic control in T1DM, and older age.

Studies in Asia and Europe have shown similar prevalence of self-reported hypoglycemia in patients with T2DM treated with oral agents.

Symptoms of Hypoglycemia

Neurogenic
• Adrenergic
  – Palpitations
  – Tremor
  – Anxiety/Arousal
• Cholinergic
  – Sweating
  – Hunger
  – Paresthesia

Neuroglycopenic
• Cognitive impairments
• Behavioral changes
• Psychomotor abnormalities
• Seizure
• Coma

Symptomatic Severe Hypoglycemia
Tip of the Iceberg?

Asymptomatic Nonsevere
Asymptomatic Severe
Coronary Artery Disease
Arrhythmias
Autonomic Neuropathy
Myocardial Ischemia
Oxidative Stress
Vasoactive Cytokines

Frequency of Hypoglycemia Among Patients With T2DM

Unreported Asymptomatic Episodes of Hypoglycemia

• >45% of patients with T2DM had asymptomatic (unrecognized) hypoglycemia, identified via continuous glucose monitoring
• Similar findings in other studies
### Relative Risk of Hypoglycemia Among Glucose-Lowering Agents

<table>
<thead>
<tr>
<th>Glucose-lowering agent</th>
<th>Relative risk of hypoglycemia</th>
</tr>
</thead>
<tbody>
<tr>
<td>α-Glucosidase inhibitor</td>
<td>+</td>
</tr>
<tr>
<td>Bromospermine</td>
<td>+</td>
</tr>
<tr>
<td>Colesevelam</td>
<td>+</td>
</tr>
<tr>
<td>DPP-4 inhibitor</td>
<td>+</td>
</tr>
<tr>
<td>GLP-1 receptor agonist</td>
<td>+</td>
</tr>
<tr>
<td>Insulin</td>
<td>+++</td>
</tr>
<tr>
<td>Meglitinide</td>
<td>++</td>
</tr>
<tr>
<td>Metformin</td>
<td>+</td>
</tr>
<tr>
<td>Pramlintide</td>
<td>+</td>
</tr>
<tr>
<td>Sulfonylurea</td>
<td>+++</td>
</tr>
<tr>
<td>Thiazolidinedione</td>
<td>+</td>
</tr>
</tbody>
</table>

*DRP-4, dipeptidyl peptidase-4; GLP-1, glucagon-like peptide-1.*

| +, no hypoglycemia; ++, infrequent hypoglycemia; +++, occasional hypoglycemia; ++++, frequent hypoglycemia.

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### Marty

#### Glycemic Targets in Older Patients

<table>
<thead>
<tr>
<th>Age, 75 years</th>
<th>BMI, 34</th>
<th>A1C, 8.5% Current target</th>
<th>History of myocardial infarction</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Up from 31</td>
<td>&lt;7.0%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Active lifestyle</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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### Aging and Commonly Used Medications in Diabetes

<table>
<thead>
<tr>
<th>Age-Specific Change</th>
<th>Effect</th>
<th>Medications Requiring Caution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pharmacokinetic</td>
<td>Longer exposure in the gastrointestinal tract</td>
<td>GLP-1 receptor agonist, Metformin, Acarbose</td>
</tr>
<tr>
<td>Slowed peristalsis</td>
<td>Increased risk of interactions if medication deteriorates intestinal lining</td>
<td>Aspirin</td>
</tr>
<tr>
<td></td>
<td>Decreased rate of elimination of drugs that bind other medications and patients must be switched to avoid interactions</td>
<td>Colesevelam, Cholestyramine</td>
</tr>
<tr>
<td>Decreased hepatic metabolism and blood flow</td>
<td>Slowed elimination of drugs metabolized in the liver</td>
<td>Nateglinide, Acarbose</td>
</tr>
<tr>
<td>Decreased renal blood flow</td>
<td>Increased duration of action and potential toxicities for renally eliminated medications</td>
<td>Sulfonylureas, Insulin, Metformin</td>
</tr>
<tr>
<td>Pharmacodynamic</td>
<td>Increased effects of blood thinners</td>
<td>Aspirin</td>
</tr>
</tbody>
</table>

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### Marty

#### Treatment Tailoring

- PCP discusses liberalizing the A1C target to <8.0%:
  - Older patient
  - Long disease duration
  - Established cardiovascular disease
- Discusses approaches to tailoring treatment

**Which antihyperglycemic medications should be avoided in a patient with a history of myocardial infarction and/or progressive heart failure?**

---

### Marty

#### Treating T2DM in Older Patients

<table>
<thead>
<tr>
<th>Age, 75 years</th>
<th>BMI, 34</th>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

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### Marty

#### Key Points

- Most patients with diabetes will eventually require individualized insulin-based therapy
- Patients’ anxieties about insulin therapy can be eased by:
  - Supervising initial injections
  - Initiating therapy at low doses
  - Encouraging glucose self-monitoring
- Adverse effects of repeated hypoglycemic events demand patient and caregiver education on health consequences and situations that increase risks (eg, during or after exercise and during sleep)
Build-a-Case

Susan: Background

- 51-year-old woman
- Recently moved to a new city
- Check-out clerk
- Married
  - 2 children and 3 grandchildren
  - Living with son

Build-a-Case

Susan: PCP visit

- Significant fatigue
- BMI, 32
- Does not drink alcohol or smoke
- Medical history
  - Prediabetes
- Family history
  - Father
    - Type 2 diabetes
    - Coronary artery disease

How does the fact that Susan emigrated from China 15 years ago affect your approach to patient assessment and treatment?

Additional Considerations in T2DM

Chinese Immigrants

- Significant language barriers may necessitate professional translators rather than family members
- Patients may focus on social aspects of glucose control
- Diabetes implies that the body is out of balance
  - “Hot” vs “cold” foods, illnesses, treatments in traditional Chinese medicine
- Asian-American Diabetes Initiative

How does the fact that Susan is from a traditionally observant Jewish community affect your approach to patient assessment and treatment?
Additional Considerations in T2DM

Traditionally Observant Jewish Patients

• Patients often believe bodies are shrines on loan from God
  – Medical treatment is a necessity
  – Patients must keep themselves healthy
• Modesty during clinician examinations

How does the fact that Susan is African American affect your approach to patient assessment and treatment?

Additional Considerations in T2DM

African Americans

• A1C levels in African Americans vs Caucasians
  – Data not conclusive
• African Americans may be less likely than Caucasians to see PCP or have usual source of care
• Examine roles of prayer, religion, and spirituality in general health, disease adjustment, and coping
• Build trust with patients
• Consider community-based screening programs


Build-a-Case

Susan: Primary Care Work-Up

• A1C, 8.4%
• Advised to lose weight
  – Dietary changes and increased exercise
• Metformin 500 mg twice daily
• Support system
  – Husband working double shifts
  – Son dedicated to helping her

Build-a-Case

Susan: Follow-Up

• Walking to work
• Improved diet
• A1C, 8.3%

How does the presence of comorbid nonalcoholic steatohepatitis affect your treatment choices for Susan?
**Additional Considerations in T2DM**

**Nonalcoholic Steatohepatitis**

- Avoid pioglitazone in individuals with active liver disease
- Sulfonylureas rarely cause liver test abnormalities
- Liver dysfunction affects glucose monitoring


**How does the presence of poor sleep and excessive snoring affect your treatment choices for Susan?**

**Additional Considerations in T2DM**

**Excessive Sleepiness and Snoring**

- Subjective excessive daytime sleepiness and snoring are markers for OSA
  - Patients with OSA are at elevated risk for glycemic disturbances


**Risk Factor For Obesity And Diabetes**

<table>
<thead>
<tr>
<th>Mallapati Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Entire tonsil visible</td>
</tr>
<tr>
<td>2</td>
<td>Upper ½ of tonsil visible</td>
</tr>
<tr>
<td>3</td>
<td>Soft and hard palate clearly visible</td>
</tr>
<tr>
<td>4</td>
<td>Only hard palate visible</td>
</tr>
</tbody>
</table>


**How does the presence of comorbid moderate chronic kidney disease affect your treatment choices for Susan?**

**Additional Considerations in T2DM**

**Chronic Kidney Disease**

- US vs European guidelines on the use of metformin
- Certain antihyperglycemic medications increase hypoglycemia risks with chronic kidney disease
  - For example, consider elimination pathways of DPP-4 inhibitors and GLP-1 receptor agonists

**Build-a-Case**  
*Susan: Treatment Tailoring*

- Tested for renal function
- Saxagliptin 2.5 mg once daily
- Metformin 500 mg twice daily
- Exercise and modified diet regimens

**Build-a-Case**  
*Susan: Follow-Up*

- BMI, 30
- A1C, 8.2%

**ASK THE EXPERTS:**  
**QUESTION & ANSWER SESSION**