Type 2 diabetes is a chronic, progressive metabolic disorder associated with obesity and physical inactivity. Currently, 10.6 percent of people ages 20 and older in the United States have diabetes, but a recent report from the Centers for Disease Control and Prevention (CDC) predicted that by 2050, up to 1 in 3 Americans would have diabetes, most of them type 2. As the authors of that study wrote, this is a “sobering picture of the future growth of diabetes.” Even a best-case scenario showed 1 in 5 Americans with the disease, a prevalence “significantly worse” than the 1 in 10 Americans previously suggested. Given the staggering high costs of diabetes—more than $174 billion in 2007—and its high morbidity and mortality rates, these projections are, quite simply, frightening.

Currently, the American Diabetes Association (ADA) and European Association for the Study of Diabetes (EASD) recommend that patients with Type 2 Diabetes Mellitus (T2DM) be treated with a combination of lifestyle changes and medications, including early initiation of insulin therapy, to attain and maintain an HbA1c of <7 percent. The American Association of Clinical Endocrinologists (AACE) and the American College of Endocrinology (ACE) recommend treating to an HbA1c of ≤6.5 percent, using as many as three oral and/or injectable drugs before moving to insulin. Unfortunately, there are no well-controlled randomized trials that rigorously establish which approach, if any, is preferable.

Although the professional societies have tried to develop guidelines and treatment algorithms that are as simple as possible, and while all are based on extensive clinical evidence, it is clear that patients in the United States and elsewhere with T2DM often do not receive guideline-recommended care.

Although glycemic levels in people with diabetes living in the United States have improved slightly since 1999, they are far from ideal. An analysis of data from the 2003–2004 National Health and Nutrition Examination Survey (NHANES) found that mean HbA1c levels were 7.18 percent, which is significantly higher than recommended levels. A more recent study using data from the 2005–2006 NHANES found that even as the prevalence of diabetes (Type 1 Diabetes Mellitus [T1DM] and T2DM) significantly increased, just 57.1 percent of patients achieved glycemic goals.
Thus, as the AACE noted in its 2007 guidelines for diabetes management, “Clearly, earlier and more aggressive application of available treatments and technologies is needed.”

Part of that aggressive approach to diabetes management involves initiating insulin therapy early. It is clear that early and maintained management of glucose levels can reduce the risk for microvascular and neuropathic complications in patients with T2DM. Additionally, when initiated early in the disease state, glucose control may have some benefit in preventing macrovascular complications.

Patients who switched to insulin therapy from oral therapy, or for whom insulin is added to oral therapy, demonstrate significant improvements in quality of life and fewer physical complaints than prior to insulin initiation, primarily because of improvements in metabolic control.

There is also evidence that initiating insulin immediately upon diagnosis significantly improves glycemic control. In other words, the traditional step-based management algorithm increases the risk of complications in patients with T2DM. When low doses of insulin are added to sulfonylurea therapy before such therapy fails completely, the combination can maintain lower HbA1c levels than insulin alone and lead to more patients reaching target with no increased risk of weight gain or major hypoglycemia.

Numerous studies also suggest that a short course of insulin therapy upon diagnosis may induce remission for up to two years in some patients while improving long-term glycemic control in others.

There are also nonglycemic benefits to insulin therapy, including reduced inflammation and possible antiatherogenic effects that may potentially decrease morbidity and mortality following cardiovascular events. This has not been definitively established, however.

Yet whether in the short term or long term, primary care physicians in this country wait too long to start their patients on insulin, contributing to an increased risk for complications as well as increased economic costs. They tend to believe that insulin therapy should be delayed as long as possible.

The reason is clinical inertia.

**Clinical Inertia Defined**

Clinical inertia occurs when clinicians do not initiate or intensify therapy appropriately, even when the goals for managing a particular condition are well defined, effective therapies are widely available, and practice guidelines for each of these diseases has been disseminated extensively. As Phillips et al noted in their 2005 seminal article on the topic, clinical inertia is “recognition of the problem, but failure to act.”

Phillips et al suggest that clinical inertia is a problem of the healthcare professional and the healthcare system, and is unrelated to issues of patient access and adherence. It is not related to a lack of knowledge on the part of physicians, at least when it comes to diabetes. They suggest that clinical inertia results from overestimating the quality of care the physicians provide; the perception that the disease is controlled or that patient nonadherence is the reason for the lack of control; and a lack of education and training on implementing evidence-based medicine in daily practice. They also note that physicians have little education in treating to target. There may be a willingness to defer pharmacologic intervention based on the patient’s stated intent to improve adherence to diet or exercise. Unfortunately this continues indefinitely as promised improvements never come to fruition.

There is significant evidence for clinical inertia in diabetes, particularly in the primary care setting, where most diabetes is managed. Among the evidence:

- When researchers evaluated clinical decision making over three years in a hospital-based diabetes clinic in Atlanta, they found that therapy was intensified just 36 percent of the time in patients for whom more intensive therapy was justified.
- Ziemer et al compared glycemic control in patients attending a specialized diabetes clinic versus a primary care clinic, settings in which clinicians at both clinics had access to exactly the same medications: sulfonylureas, metformin, and insulin. Regardless of the type of therapy used, patients

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7.18%

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in the primary care clinic had higher glycemic levels. A ma-
ajor factor in the glycemic control difference was that fewer
patients in the primary care clinic were receiving insulin.27

Physicians in the primary care clinic were significantly
less likely to intensify therapy when random glucose levels
were greater than 50 mg/dL above target (32 vs. 65 percent,
P<0.0001), regardless of which therapy the patient was receiv-
ing. Of particular note is that patients already using insulin had
their therapy intensified just 28 percent of the time, compared
with 75 percent of the time for those seen in the specialty
clinic.28 Yet physicians who were more willing to intensify
their patients’ therapy had patients with lower HbA1c levels
(P<0.0001). A single episode of therapy intensification was as-
associated with an average 0.7 percent reduction in HbA1c levels.

Berlowitz et al evaluated glycemic status and medications
in 23,291 patients with diabetes in 13 Department of
Veterans Affairs hospitals between 1997 and 1999. They
found patient therapy was intensified just 9.8 percent of
the time, despite the fact that 39 percent of patients had
HbA1c levels >8 percent. Even after an average of 11 visits
per patient over 16 months of care, glycemic control among
patients remained virtually unchanged. Yet, as expected,
patients who received therapy intensification had the greatest
improvement in control.29

The need to intensify therapy in patients with diabetes
and uncontrolled HbA1c levels is simple: If the HbA1c level,
a marker of glycemic control over several months, is not at
goal, therapy should be changed. As Berlowitz et al noted:
“... Overcoming clinical inertia is not likely to be easy, but
it is essential if we are to substantially improve health out-
comes for patients with diabetes.”

**Overcoming clinical inertia is not likely to be easy, but
it is essential if we are to substantially improve health
outcomes for patients with diabetes.” —Berlowitz et al**
Overcoming Clinical Inertia

It is possible to overcome clinical inertia. First, highlighting the benefits of today’s newer insulins, including simpler dosing algorithms, reduced risk of hypoglycemia and weight gain, and nearly painless delivery devices such as pens, is essential. If primary care clinicians understand that these newer regimens can reduce the time required to educate patients and manage potential problems, they may be more willing to discuss the options with their patients. This is important, since the attitude of the physician directly impacts patient attitudes about therapy.

It is also important to address physician misconceptions about insulin therapy. Among 550 primary care physicians in the United States surveyed about initiating insulin therapy in their patients, 40 percent said their patients wouldn’t need insulin if they were more adherent to treatment recommendations, and a third thought that increased plasma insulin levels would increase cardiovascular risk.

Practice-based interventions such as electronic or paper reminders to regularly check HbA1c levels, flow charts, and face-to-face academic detailing have all demonstrated improved adherence to guideline-recommended care.

Ziemer et al found that internal medicine residents who received personalized feedback on their performance every two weeks with or without computerized reminders on patient-specific recommendations were more likely to intensify therapy in patients with diabetes than a control group (P<0.001). After three years, physicians who had received personalized feedback with or without computerized reminders demonstrated sustained improvement compared with control and the computerized reminder group only (P<0.001).

Conclusion

As the obesity epidemic continues to grow in the United States, it is imperative from a public health and medical economics perspective that, if diabetes cannot be prevented, it be managed as well as possible to reduce the risk for complications.

Knowing when patients should begin insulin therapy is an important component of appropriate management, and one in which there is significant room for improvement in the primary care setting. Managed care organizations, by virtue of their focus on quality as well as cost, are in an optimal position to institute evidence-based interventions designed to improve glycemic control in their members with diabetes.

Current Guidelines for Glycemic Control in Patients with Type 2 Diabetes

- Perform the HbA1c test at least two times a year in patients who meet treatment goals and have stable glycemic control and quarterly in patients who are not meeting glycemic goals.
- The goal to prevent microvascular complications is an HbA1c <7 percent for most patients.
- Intervene at time of diagnosis with metformin and lifestyle changes.
- Continue augmenting therapy with additional agents, including early initiation of insulin therapy, to achieve and maintain recommended levels of glycemic control (HbA1c <7 percent).

American Diabetes Association

AACE/ACE Consensus Statement on the Treatment of Type 2 Diabetes Mellitus

- Achieve HbA1c of 6.5 percent as primary goal, but customize according to individual patient considerations.
- Evaluate effectiveness of therapy every two to three months, including assessing HbA1c.
- Rapid-acting insulin analogues are superior to regular human insulin and provide a better, safer alternative.
- Neutral protamine hagedorn (NPH) insulin is not recommended.

Stratify therapy by HbA1c level:
- HbA1c ≤7.5 percent, monotherapy may be sufficient.
- HbA1c 7.6 to 9 percent, dual therapy required.
- HbA1c >9 percent, triple therapy may be used in asymptomatic patients; initiate insulin therapy with or without oral agents in patients who are symptomatic or failed triple therapy.

American Association of Clinical Endocrinologists/ American College of Endocrinology
ADA AND EASD CONSENSUS ALGORITHM FOR INITIATION AND ADJUSTMENT OF THERAPY IN T2DM

**TIER 1: Well-validated core therapies**

- **AT DIAGNOSTICS:**
  - LIFESTYLE + METFORMIN

  **STEP 1**
  - Lifestyle + Metformin
  - Basal insulin

  **STEP 2**
  - Lifestyle + Metformin
  - Sulfonylurea

  **STEP 3**
  - LIFESTYLE + METFORMIN + INTENSIVE INSULIN

**TIER 2: Less well-validated therapies**

- Lifestyle + Metformin
  - Pioglitazone

- Lifestyle + Metformin
  - GLP-1 agonist

- Lifestyle + Metformin
  - Basal insulin

- Lifestyle + Metformin
  - Pioglitazone
  - Sulfonylurea

References


