



### Pharmacist Update: Best Practices in the Management of Type 2 Diabetes

A continuing pharmacy education (CPE) activity entitled *Best Practices in the Management of Type 2 Diabetes: Improving Glycemic Control* was presented as one of four CE in the Mornings topics in early December 2009 at the 44th ASHP Midyear Clinical Meeting and Exhibition in Las Vegas, Nevada. Attendees submitted questions about unresolved issues and controversies and emerging research in the management of type 2 diabetes that were later addressed by the faculty in a live webinar conducted on February 11, 2010. The highlights of this webinar are described in this and another e-newsletter to be released in April 2010.

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### Reconsidering the Optimal Goal A1C

The benefits of reducing A1C to below or around 7% in reducing the risk for microvascular complications in patients with type 2 diabetes was demonstrated in landmark studies, including the Diabetes Control and Complications Trial (DCCT), Kumamoto study, and UK Prospective Diabetes Study (UKPDS).<sup>1-4</sup> A reduction in macrovascular complications was observed by reducing A1C below 7% in newly-diagnosed patients in the DCCT and UKPDS, but the benefit of reducing A1C to below or near 7% is less well established for macrovascular complications than for microvascular complications.<sup>5</sup> The goal A1C recommended for patients with type 2 diabetes by the American Diabetes Association (ADA) and the American Association of Clinical Endocrinologists is less than 7% and less than 6.5%, respectively.<sup>6</sup> Whether this "tight" glycemic control is appropriate for all patients with diabetes is controversial. Currently available data suggest that intensive (i.e., aggressive) glucose-lowering therapy and an A1C less than 7% may be beneficial for people with newly-diagnosed type 2 diabetes or a relatively short duration of the disease (i.e., 8-10 years or less) if they have a long life expectancy and no substantial cardiovascular disease (Table 1).<sup>5</sup> Patients should be monitored for hypoglycemia and other adverse effects during intensive therapy to achieve low A1C values. By contrast, less intensive glucose-lowering therapy and a goal A1C close to but not lower than 7% may be suitable for other patients who do not meet these criteria (Table 1).

**Table 1. Considerations in A1C Goal Setting in Type 2 Diabetes<sup>5</sup>***Intensive Glucose-Lowering Therapy and A1C < 7%*

- Patients with newly-diagnosed type 2 diabetes
- Patients with a relatively short duration of type 2 disease (i.e., 8-10 years or less)

*Less Intensive Glucose-Lowering Therapy and A1C near but not < 7%*

- Patients with long-standing diabetes (e.g., > 15 years)
- Patients with a history of severe hypoglycemia
- Patients with advanced diabetes complications
- Patients with a short life expectancy

“ Pharmacists and other clinicians need to keep in mind that it is important to treat the patient as well as the numbers. ”

— Susan Cornell, Pharm.D., CDE, FAPhA, FADE

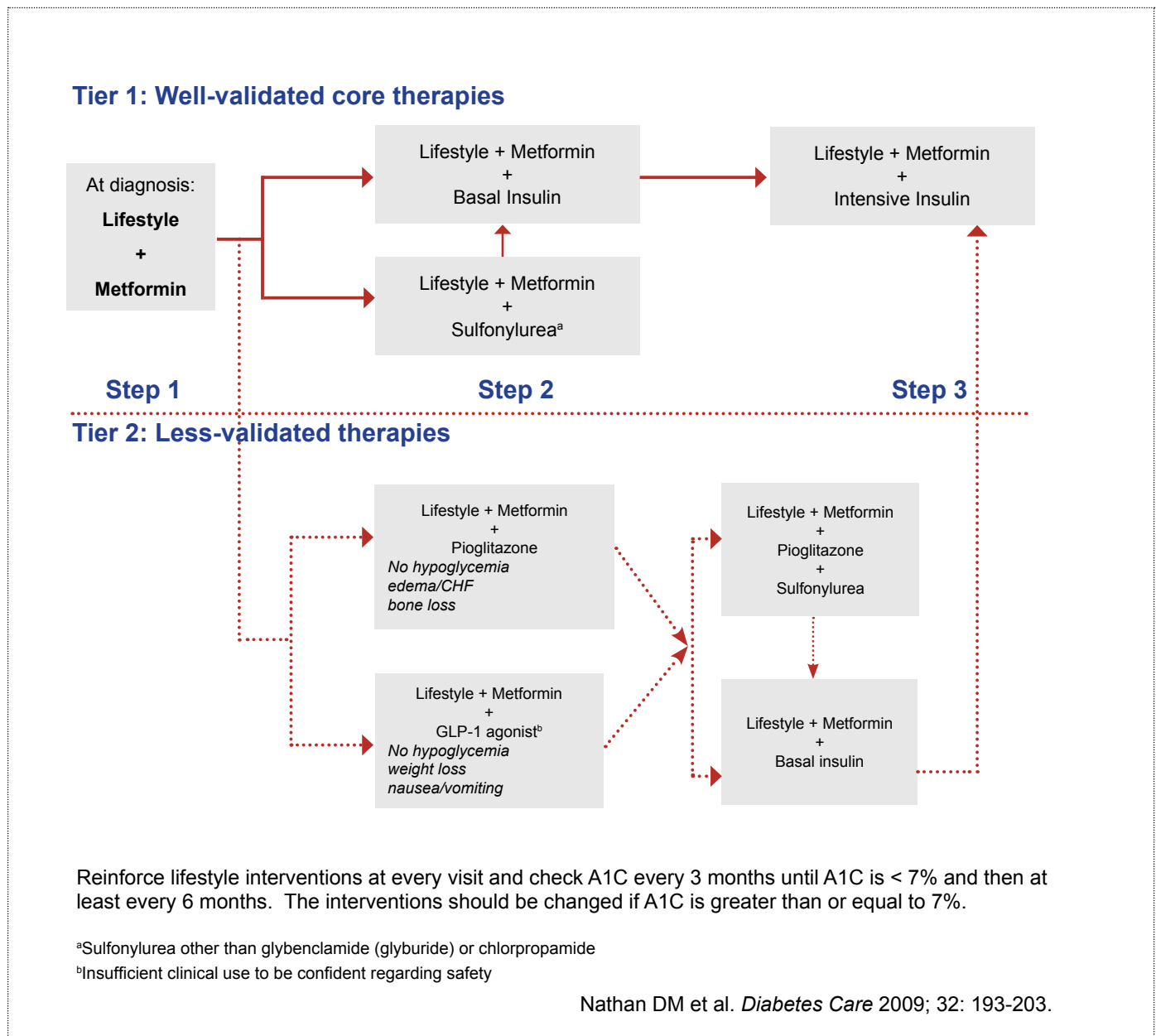
## Therapeutic Approach

The optimal therapeutic approach to achieving glycemic control in patients with type 2 diabetes is controversial. A consensus statement from the ADA and the European Association for the Study of Diabetes (EASD), for example, outlines well-validated core therapies and less well-validated therapies (Figure 1).<sup>7</sup> This consensus statement and other guidelines do not reflect the role of emerging glucose-lowering agents because of the limited clinical experience to date with these agents.

A wide variety of oral and injectable blood glucose-lowering agents are available for the management of type 2 diabetes mellitus. These agents vary in their mechanism of action, primary target organ, effects on fasting and postprandial blood glucose, A1C-lowering effect, and common adverse effects. Table 2 (Diabetes Pharmacotherapy Exercise) lists these agents and is left blank for you to insert the appropriate characteristics. **Test your knowledge** by adding the missing information to the table. Score your pharmacotherapy exercise in April when the completed resource is featured in the next e-newsletter.

According to the ADA/EASD consensus statement, therapy should be adjusted if the goal A1C is not achieved within 3 months.<sup>7</sup> Combination pharmacotherapy that targets the different dysfunctional organs (e.g., pancreas, liver) in type 2 diabetes often is required.

**Figure 1. ADA/EASD Treatment Algorithm for Type 2 Diabetes<sup>7</sup>**



**Table 2. Diabetes Pharmacotherapy Exercise**

Drug Class	Mechanism of Action	Primary Target Organ	Blood Glucose Affected (fasting, postprandial, or both)	COMMON Adverse Drug Effects
Example(s)			A1C-lowering effect	
<b>α-glucosidase Inhibitors</b>				
Acarbose Miglitol				
<b>Biguanide</b>				
Metformin				
<b>Dipeptidyl peptidase-4 Inhibitors (Gliptins)</b>				
Sitagliptin Saxagliptin				
<b>Glitinides</b>				
Repaglinide Nateglinide				
<b>Sulfonylureas (second-generation)</b>				
Glyburide Glipizide Glimepiride				
<b>Thiazolidinediones</b>				
Rosiglitazone Pioglitazone				
<b>Dopamine agonist</b>				
Bromocriptine				
<b>Glucagon-like peptide-1 Analogs</b>				
Exenatide Exenatide long-acting release form  Liraglutide				
<b>Amylinomimetic</b>				
Pramlintide				
<b>Insulin: Basal</b>				
Glargine Detemir NPH				
<b>Insulin: Bolus</b>				
Aspart Lispro Glulisine Regular				

## Early Insulin Replacement

There is evidence that early, intensive use of insulin therapy in patients with newly-diagnosed type 2 diabetes may preserve pancreatic  $\beta$ -cell function by allowing these cells to “rest”, with a variety of potential benefits, including a delay in or reversal of disease progression (Table 3).<sup>8,9</sup> Prolonged periods of remission characterized by near-normal glycemic control using diet alone without the need for pharmacologic therapy have been achieved with early insulin replacement in such patients. In a study of 126 patients with newly-diagnosed type 2 diabetes who were treated with continuous subcutaneous insulin infusions for 2 weeks followed by diet alone for 2 years, the rate of remission (i.e., near normal glycemic control) was 73%, 67%, 47%, and 42% after 3 months, 6 months, 12 months, and 24 months, respectively.<sup>10</sup>

Table 4 lists potential barriers to the use of insulin in patients with type 2 diabetes. Patients may be reluctant to initiate insulin therapy because they view the need for insulin as an ominous sign of poor health. Clinical inertia among providers (i.e., failure to act to resolve an identified problem) has been attributed to a variety of unfounded concerns.<sup>11</sup>

### **Table 3. Potential Benefits of Early Insulin Replacement in Patients with Newly-Diagnosed Type 2 Diabetes<sup>8,9</sup>**

- Provision of  $\beta$ -cell “rest”
- Preserved  $\beta$ -cell function
- Improved blood glucose control
- Reduced risk for diabetes complications
- Reduced risk for cardiovascular disease
- Interrupted, delayed, or reversed disease progression

### **Table 4. Potential Barriers to Insulin Use<sup>11</sup>**

#### *Patient resistance*

- Perceived significance of needing insulin
- Fear of painful injections
- Feelings of failure and guilt
- Complexity of regimen
- Cost

#### *Provider resistance*

- Lack of time and resources to supervise treatment
- Fear of losing patient to another provider
- Fear of patient “noncompliance”
- Concerns about hypoglycemia
- Concerns about weight gain

## Self-Care Behavior

Taking diabetes medication is a self-care behavior that requires knowledge, motivation, and assumption of responsibility by the patient. The need to take multiple medications at various times throughout the day can lead to nonadherence. Pharmacists can improve self-care behavior and promote adherence to prescribed drug therapy by educating patients about their medications.

- “ Knowledge is power, so pharmacists should educate their patients about each medication that they take—the reasons for use of the agent and the best times of day to take the medication—to maximize benefit and minimize side effects. ”

— Susan Cornell, Pharm.D., CDE, FAPhA, FADE

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## Home-study CPE Available March 2010

If you missed the CE activity “Best Practices in the Management of Type 2 Diabetes: Improving Glycemic Control” at the 2009 ASHP Midyear Clinical Meeting and Exhibition and want to learn more about this topic, the web-based activity is now available as an e-symposium or podcast. One hour (0.1 CEUs) of continuing pharmacy education credit will be offered. Go to [www.ashpadvantage.com/cemornings](http://www.ashpadvantage.com/cemornings) to find complete information.

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## References

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