



## AADE POSITION STATEMENT

### Continuous Subcutaneous Insulin Therapy Using a Pump

#### Introduction

Diabetes is characterized by above normal blood glucose levels that cause damage to the microvascular and renal systems.<sup>1,2</sup> Control of blood glucose levels can be achieved with self-management and treatment interventions such as insulin therapy. The Diabetes Control and Complications Trial (DCCT) completed in 1993 and followed up by the Epidemiology of Diabetes Interventions and Complications EDIC study determined that intensive insulin therapy in patients with type 1 diabetes, three or more injections of insulin per day or continuous subcutaneous insulin (CSII) infusion delayed the onset and slowed the progression of diabetes complications.<sup>1-3</sup>

Continuous subcutaneous insulin therapy using a pump is also referred to as continuous subcutaneous insulin infusion. The use of pumps was introduced as a form of delivery for insulin therapy in the late 1970s. Since that time, insulin pump technology has advanced to include continuous glucose monitoring systems integrated into some insulin pumps.<sup>4,5</sup> Patients with both type 1 and type 2 diabetes are using pumps to deliver insulin as the evidence mounts that early and intensive management of glycemia significantly decreases the development and progression of microvascular and macrovascular complications of diabetes.<sup>1-3,7,8</sup>

Successful continuous subcutaneous insulin therapy using a pump requires initial and ongoing education on the technical components of the insulin pump as well as on the enhancement of self-management skills.<sup>9</sup> Behavioral goal setting is an effective strategy to support self-care behaviors.<sup>10</sup> Long-term use should be carefully monitored for technical skills, self-management decisions, and medical care follow up.<sup>11</sup>

#### Background/Definitions

Insulin therapy using a pump is a treatment option for patients with type 1 and type 2 diabetes that offers increased lifestyle flexibility and improved glucose control, especially for individuals with suboptimal glucose control, wide glucose fluctuations, and/or day-to-day schedule variations.<sup>3</sup> Patient selection for CSII is not based on improved glycemic control over multiple daily injections (MDI). Hemoglobin A1C level is determined by appropriate insulin dose and not insulin delivery, the literature demonstrating superiority is variable. The data favoring patient selection for CSII over MDI are supported by improved quality of life, decreased hypoglycemia, improved flexibility, and other

outcomes.<sup>12</sup> Furthermore, CSII may not be appropriate for all patients receiving insulin, but it has been shown to be very useful for specific populations.<sup>4,11-13</sup>

Blood glucose monitoring is most effective when patients receive instruction on their glucose goals, how to relate blood glucose levels to events, food and beverage, and physical activity, and how to respond appropriately to achieve targeted glucose level goals. The main risks of CSII are diabetic ketoacidosis and hypoglycemia. Recent studies involving patients with type 1 and type 2 diabetes demonstrate that use of a pump to deliver insulin with rapid-acting insulin analogs in comparison to MDI not only improves glucose control but also reduces the rate of severe hypoglycemia.<sup>3, 8,14,-18</sup>

Some individuals may also integrate continuous glucose monitoring systems (CGMS) with CSII. This will require additional education by a diabetes educator familiar with CGMS.<sup>5</sup>

The educator adapts education plans that incorporate the AADE7™ Self-Care Behaviors (healthy eating, being active, taking medication, monitoring, healthy coping, problem solving, and reducing risk) to accommodate the use of insulin pumps and maximize the health of the patient.<sup>4,12,14,19-28</sup> Patients, family members and others providing support, should be, at a minimum, educated regarding the causes, symptoms, prevention, and treatment of hypoglycemia; the use of glucagon; and the prevention and treatment of hyperglycemia.

### **Role of the Diabetes Educator**

The diabetes educator can play a key role in educating patients as they consider, initiate, and live with a pump to deliver insulin. The diabetes educator also can be a key resource for other health care professionals who provide support to individuals using a pump to deliver insulin therapy. Additional training and experience are necessary to be considered an insulin pump expert. Diabetes educators who are certified as insulin pump trainers have advanced knowledge in insulin therapy and pump use, carbohydrate counting, and the evaluation of self-care data.<sup>29</sup> The educator integrates insulin therapy and pump use into diabetes self-management education and training (DSME/T). Educators develop personalized diabetes education plans that incorporate the AADE7™ and include regular assessments and collaborative goal setting.

### **AADE Maintains the Following Positions**

- Diabetes educators, appropriately trained in the use of pumps for delivering insulin, should be involved in the assessment, education, and management of patients on insulin therapy who use pumps.
- An educational assessment with planned initial and ongoing education is necessary for initiating and sustaining insulin therapy and pump use.<sup>29</sup>
- All patients should receive pre-pump counseling and self-management education prior to insulin pump initiation and should have an ongoing plan for medical follow up with continuing education.<sup>5,26</sup> The following factors should be considered when assessing patients interested in initiating insulin therapy and pump use:<sup>18,30,34</sup>

- motivation to achieve individualized target goals for glycemia using self-management skills
- evidence that the individual has accepted self-care responsibilities associated with diabetes and does not have unrealistic expectations of insulin therapy using pumps.
- technical ability to accurately perform self-monitoring of blood glucose and to operate the insulin pump
- intellectual ability to learn and retain information
- effective coping patterns
- available support systems
- financial resources to cover the cost of the pump and related supplies for delivering insulin therapy
- ability to problem solve diabetes management issues
- Each person using a pump to deliver insulin should receive personalized education to include.<sup>6,24,27,29</sup>
  - monitoring and managing blood glucose levels (including hypoglycemia and hyperglycemia prevention and treatment)
  - principles of basal/bolus insulin therapy
  - carbohydrate counting
  - insulin adjustments for exercise
  - sick-day management
  - record keeping
  - glucagon administration
  - site preparation and care to help prevent infection
- Training services by insulin pump manufacturers should be augmented by diabetes education self-management education/training for long-term use of pumps for delivery of insulin therapy.
- The frequency of blood glucose monitoring should be individualized for all patients using pumps for delivery of insulin therapy, per clinical guidelines for targets and testing frequency.
- The diabetes educator should facilitate the safe management of insulin therapy using a pump in the home and community as well as in special settings such as the hospital, school, or day care.<sup>7,15,31-33</sup>
  - To ensure safety in the hospital setting, research is needed and protocols should be developed and available for coordination of care with patients using insulin pump. These protocols should clearly delineate roles of health care providers and the patient/family.
  - To ensure safety in the school setting, an individualized diabetes medical management plan needs to be developed for the child using insulin pump.

## Summary

Diabetes educators with specialized training in the use of insulin therapy using a pump are essential in both identifying patients who are candidates for pump use and providing basic, advanced, and ongoing education to these individuals. Diabetes educators also ensure that support systems are in place to facilitate coping with the new technology. Prior to initiating pump training, a nutrition assessment is recommended and the patient

should have a basic understanding of food and beverage (e.g., carbohydrate content) and the impact of exercise and other medications on blood glucose levels. Referrals to other team members such as psychologists or social workers may help with the evaluation and support of patients using a pump to deliver insulin therapy. Diabetes educators evaluate the patient's self-management of pump use with insulin therapy and provide strategies to support self-care behaviors and ongoing education.

### **Acknowledgement**

2009 Professional Practice Members; Belinda P. Childs, ARNP, MN, CDE, BC-ADM; Claudia Shwide-Slavin, MS, RD, CDE, BC-ADM; Mary Sullivan, RN, MSN, ANP-C, CDE; Terry Compton, MS, APRN, RN, CDE; Evan Sisson, PharmD, MHA, CDE; Terry Lumber, RN, CNS, MSN, CDE, BC-ADM; Annette Lenzi Martin

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