



Outcomes Measurement American Association of Diabetes Educators (AADE) Position Statement

Introduction

Diabetes self-management education and training (DSME/T) is a collaborative process through which people with or at risk for diabetes gain the knowledge and skills needed to modify their behavior and successfully self-manage the disease and its related chronic conditions.^{1,2} Measurement of outcomes is critical to demonstrating the value and effectiveness of DSME/T for the individual person with diabetes, as well as the program, practice, health system and field. Measurement of outcomes is also critical for evaluating individual practices and benchmarking to ensure that best practices are being adopted nationally.

Outcomes measurement allows the educator to assess behavior change and inform the person with diabetes about improvements in self-management and health status that are achieved over time as a result of DSME/T. Outcomes evaluation also informs the practice about the effectiveness of specific interventions and identifies proportions of people with diabetes who have achieved DSME/T outcomes targets. Finally, outcomes evaluation establishes the unique contribution of DSME/T in the overall context of diabetes care, allows for comparison of performance with established benchmarks, and informs payors of the effectiveness of DSME/T programs.

Unfortunately, to date DSME/T outcomes have not been measured in a standard and systematic manner for a variety of practical reasons, such as lack of clarity on the implementation of outcomes measurement and lack of practical outcomes measurement tools. Since the original publication of this position statement in 2003,³ AADE has been working to overcome barriers to routine outcomes measurement by promoting the AADE7 Self-Care Behaviors™ (Healthy Eating, Being Active, Monitoring, Taking Medication, Problem Solving, Reducing Risks, Healthy Coping),¹ and providing practice documents and resources to facilitate implementation of outcomes measurement.

Evidence has been mounting on the value, effectiveness, and cost-effectiveness of DSME/T.⁴⁻¹⁷ While it has not been universally adopted by diabetes educators, documentation of outcomes will continue to build the evidence base and lead to widespread comparison and benchmarking of best practices and related quality improvement initiatives.

Background

Framework and Goals for Outcomes Measurement of DSME/T

The following underlying assumptions were used to guide the development of the standards for DSME/T outcomes measurement:

- Measurable behavior change is the unique outcome of DSME/T.^{3,18} DSME/T outcomes measurement involves behavioral, learning, clinical, health status, economic and satisfaction measures.
- The AADE7™ provides the programmatic framework for measuring and evaluating behavioral outcomes of DSME/T interventions and programs. (Table 1)
- The delivery of DSME/T is guided by the National Standards for Diabetes Self-Management Education¹⁹ and the Guidelines for the Practice of Diabetes Education² within the AADE7™ framework.¹
- Outcomes measurement supports the National Standards for Diabetes Self-Management Education, especially Standards 6, 7, 9 and 10.¹⁹
- Outcomes measurement and evaluation:
 - Is done in a systematic manner.
 - Occurs at a minimum of pre- and post- intervention at the individual patient level and the population level. The population level would include the aggregate outcomes of people with diabetes in a program, practice, health system or field and would provide indicators for continuous quality improvement (CQI).

AADE7™ Behavioral Areas and Sources of Evidence

AADE has defined a continuum that recognizes the four phases of DSME/T outcomes (Figure 1), including learning (immediate), behavior change (intermediate), clinical improvement (post-intermediate), and improved health status (long-term).^{18,21-22}

Behavior change has been defined as the primary outcome of DSME/T and is accomplished using the framework of the AADE7 Self-Care Behaviors.²³ Learning and behavior change outcomes support clinical improvement and health status outcomes as highlighted in Figure 1. DSME/T outcomes measurement may also include health status, economic and satisfaction measures.

Organizations Impacting Outcomes Measurement

Measurement of DSME/T outcomes has been influenced by mandates from the Centers for Medicare and Medicaid Services (CMS), the Agency for Healthcare Research and Quality (AHRQ), the Joint Commission on Accreditation of Healthcare Organizations, the National Council on Quality Assurance (NCQA) and the provider and education recognition programs.²⁵⁻³⁰

Two of the core accreditation goals, consistent with National Standards for Diabetes Self-Management Education,¹⁹ are to (1) Measure patient goals and outcomes to evaluate effectiveness of educational intervention; and (2) Collectively measure effectiveness of the education process and determine the opportunities for CQI.²⁰

AADE Tools and Resources to Facilitate Outcomes Measurement

AADE and other organizations have been working to develop tools and resources to support diabetes educators in measuring behavioral outcomes.³¹⁻³⁶ These online tools incorporate instruments which measure patient behaviors, self-identified priorities for change, and barriers to those changes, and have been through several rounds of field-testing. These tools allow educators to:

- Collect and track patients' behavior change goals, clinical indicators, and medications.
- Administer online patient self-assessments and follow-up assessments.
- Track information about the educational services provided.
- Generate reports on individual patient progress and the program's progress.
- Gather data that may assist with program accreditation/recognition.
- Assess and measure change in patient behavior.⁶¹

Role of the Diabetes Educator

Diabetes educators have the ability to assist in data collection and participate in outcomes measurement. Therefore, all levels of diabetes educators – from Level 1 (Non-healthcare professional) to Level 5 (Advanced diabetes educator/clinical manager)^{2, 24} should assist in clinical data collection, adhere to established evidence-based practice and guidelines and participate in the evaluation of the program/practice.³⁷⁻⁶¹ The active involvement of diabetes educators in outcomes measurement will facilitate the continued growth of the evidence base supporting the value and effectiveness of DSME/T.

Recommendations for DSME/T Outcomes Measurement

1. All diabetes educators:
 - a. Have a professional responsibility to demonstrate and measure outcomes and include outcomes measurement as a part of their usual routine.
 - b. Should be knowledgeable about available standards, practice guidelines, tools and resources available from AADE and other groups, and those currently available in their setting (e.g., electronic records) that support routine outcomes measurement.
2. The AADE7 Self-Care Behaviors serve as the core behavioral outcomes areas to determine the effectiveness of DSME/T at individual participant and population levels.⁶¹ In addition to measuring behavioral outcomes, diabetes educators should measure other outcomes along the outcomes continuum to demonstrate the impact of DSME/T and the inter-relationship of outcomes in the care of individuals with or at risk for diabetes and comorbid conditions. Additional outcomes include learning areas (e.g., knowledge/skill), clinical improvements (e.g., A1C, lipids, eye exams), and health status (e.g., complications, quality of life), economic and satisfaction.⁶¹
3. DSME/T outcomes should be evaluated at initial contact (baseline) and on an ongoing basis as appropriate. Outcomes measurement should occur at least before (pre) and after (post) DSME/T interventions or programs.

4. Measurement of DSME/T should occur at the individual patient level and at the population level for the purpose of understanding the effectiveness of individual interventions as well as the strength of the DSME/T program, practice or health system, and can be assessed, for example, through CQI projects.

Recommendations for Advancing Outcomes Measurement in Diabetes Education

- Clinicians and researchers should pursue opportunities to measure DSME/T outcomes to continue to gather the evidence to support the impact of DSME/T across the outcomes continuum (Figure 1) as well as other outcomes of interest to payors (e.g., economic), government, people with diabetes, and providers. If followed, the position and recommendations provided in this paper will support this goal.
- Researchers should focus on developing, validating, and evaluating measures and methods for routinely measuring DSME/T outcomes across the continuum. These should be consistent with accepted principles of outcomes analysis, the National Standards for Diabetes Self-Management Education/Training, and guidance produced by other professional panels so as to minimize the effort required for collecting and reporting outcomes.¹⁹
- Research funders and diabetes organizations should support research in the area of DSME/T outcomes measurement.
- The measures for the behavioral (AADE7™) outcomes recommended in this document have not uniformly been standardized. Researchers should continue to evaluate optimal approaches to developing and validating methods of assessing patient behavior.
- Diabetes organizations and payors should work together to develop standards for measuring and assessing outcomes related to DSME/T.

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Criteria for rating evidence and grading recommendations*

Evidence Level: Level-of- Study Design or Information Type

- 1 Large randomized controlled trial (RCT); Multicenter trial; Large meta-analyses with quality rating
- 2 Randomized controlled trial that has some design or methodological flaws; Prospective cohort study; Meta-analyses of cohort study; Case-control study; Quasi-Experimental study (rigorous pre-post with a control group); Systematic review that is well designed
- 3 Methodologically flawed randomized controlled trial; Nonrandomized controlled trial; Observational study; Case series or case report; Review (note Cochrane reviews are systematic reviews that could qualify as Level 2 evidence)
- 4 Expert consensus; Expert opinion based on experience; Theory-driven conclusions; Unproven claims; Experience-based information; Opinion Piece

*This is not an exhaustive list – Reviewers will need to use their own judgment at times.

NOTE: In the References, a rating for each citation appears in parentheses at the end of the citation.

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Figure 1. Outcomes Continuum³²

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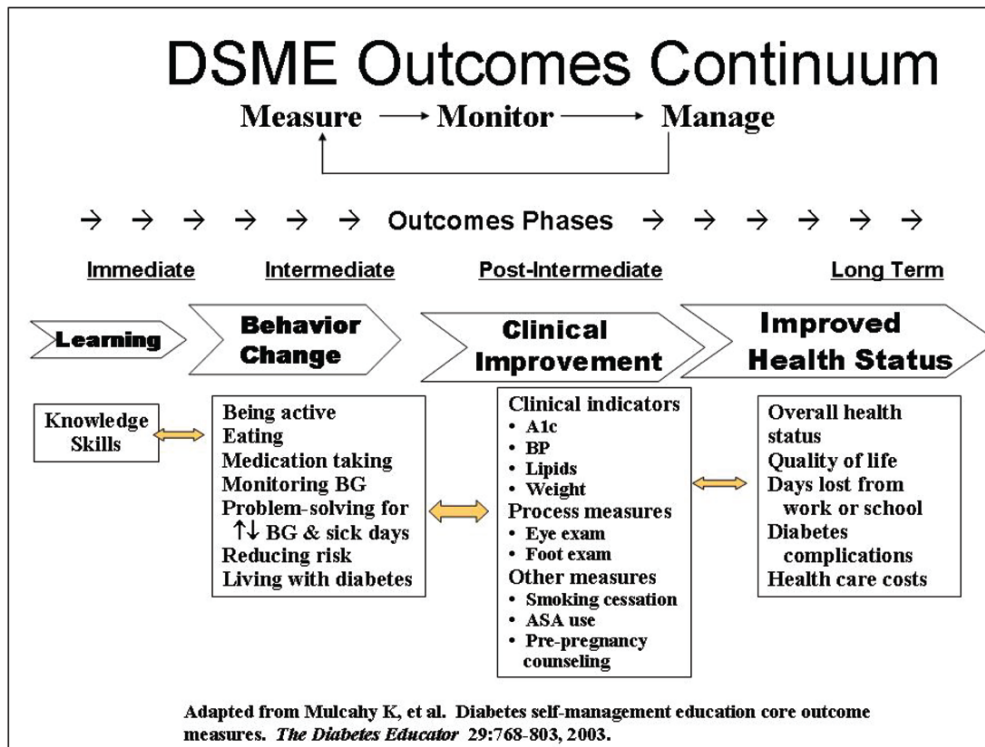


Table1. AADE7 Behavioral Areas and Sources of Evidence

Behavioral Area(Ref)	Description	Evidence Base Source
Healthy Eating	Healthy eating involves a complex set of behaviors that are incorporated into DSMT/E to help people with diabetes gain knowledge about the effect of food on blood glucose, sources of carbohydrates, appropriate meal planning and assists them in making appropriate food choices. Healthy eating focuses on food choices that help maintain or improve the health of the person with diabetes.	Healthy eating by those with diabetes is associated with numerous benefits including improved blood glucose control, lipids, blood pressure and weight loss and maintenance. ³³⁻³⁴ Randomized controlled trials have demonstrated the effectiveness of structured lifestyle interventions, and have highlighted the role of fiber, carbohydrate level, fat intake and glycemic load in a healthy diet. ³⁵ Four specific diet behaviors were identified in the DCCT as having the most relationship with improved control and therefore should be considered as a target of initial behavior change goals: adherence to meal plan, appropriate treatment of hypoglycemia, prompt response to hyperglycemia (more insulin and/or less food) and consistent consumption of prescribed evening snack, if appropriate. ³⁵ Cognitive, behavioral and environmental factors impact diet and health behavior change efforts and are an important component of assessment and intervention efforts. ³⁶
Being Active	Being active (also referred to as physical activity or exercise) is a behavior that is incorporated into DSME/T so that people with diabetes engage in aerobic and anaerobic activity for weight management and/or weight loss, and blood glucose control. Being physically active can help improve overall fitness, reduce body mass index (BMI), help control lipid profile, and blood pressure and reduce stress. It also means that the person with diabetes understands how to safely incorporate physical activity into their self-management regimen.	Longitudinal and controlled studies show that physical activity overall is helpful, with better clinical outcomes with higher levels of intensity. ³⁷ The Diabetes Prevention Program showed that exercise may prevent the development of type 2 diabetes in at-risk individuals. ³⁸ A meta analysis of the effects of exercise on glycemic control and BMI found that structured exercise of at least several months reduces A1C significantly in type 2 diabetes even without significant changes in weight. ³⁹ Thus, the importance of promoting exercise as a vital component of the prevention, as well as management of type 2 diabetes must be viewed as a high priority. ⁴⁰⁻⁴¹
Monitoring	Monitoring is a behavior that is incorporated into DSME/T so that people with diabetes can gain the skills and knowledge to regularly evaluate and respond to biomarkers (e.g., blood glucose and other lab values, blood pressure, and lipids), other metrics (e.g., weight) and lifestyle habits (e.g. eating and being physical activity) to optimize their overall health. Monitoring activities range from the interpretation of results and problem solving to adjusting behaviors in response to the information obtained from the test or monitoring	The most researched monitoring activity in diabetes is self-monitoring of blood glucose levels (SMBG). The DCCT included SMBG as important part of the intensive glycemic control intervention and demonstrated benefits on diabetes complications. ⁴² A systematic review suggests that self-monitoring of blood glucose levels may be effective in controlling blood glucose levels in individuals with type 2 diabetes, ⁴³ however numerous reviews of empirical evidence and trials continue to assess the specific impact. ⁴⁴

	activity.	
Taking Medication	Taking medication is a behavior that is incorporated into DSME/T so that a person with diabetes gains knowledge of and understands why a medication is prescribed by their health care provider and follows the prescribed medication regimen. Taking medication also involves problem solving for sick days and elevated blood glucose levels.	Medication therapy for diabetes can facilitate optimal control, including achievement of blood glucose control goals and management. Despite the benefits, adherence to medications, particularly oral agents, is suboptimal. Systematic reviews have identified specific barriers to taking medication, including patient understanding, provider patient communication, regimen complexity and environmental and psychosocial demands. ⁴⁵ Controlled trials have examined efficacy of specific regimens for medication use for persons with diabetes with related health issues such as hypertension ⁴⁶ and with classes of drugs such as statins for dyslipidemia ⁴⁷ and have added to the evidence base for the benefits of taking medication.
Healthy Coping	Healthy Coping is a complex set of behaviors that are incorporated into DSME/T to enable people with diabetes to manage psychological and social factors to overcome barriers that may affect their health status and quality of life. Healthy coping addresses psychological distress that directly affects health and indirectly influences a person's motivation to keep their diabetes in control.	Diabetes control, complications, psychosocial issues and quality of life are interdependent. ⁴⁸ Multiple psychosocial factors have been linked to reduced ability in efforts to maintain optimal diabetes control. ⁴⁹ Screening and intervention may be integrated into clinical practice to optimize care. ⁵⁰
Reducing Risks	Reducing risk is a set of behaviors that are incorporated into DSME/T that involve implementing behaviors to prevent or slow the progression of diabetes complications. Risk reduction includes learning to understand, seek and regularly obtain an array of preventive services. Risk reduction behaviors reduce diabetes complications and maximize health; these include, but are not limited to smoking cessation, vaccinations and regular eye, foot and dental examinations.	A systematic review of research studies related to reducing risks to help prevent or minimize complications in diabetes indicated that multiple study designs and multiple preventive approaches have been employed. ⁵¹ A large body of evidence is available on reducing risks through behavior change such as smoking cessation. A review of smoking and diabetes has identified the risks and importance of cessation. ⁵² The Early Treatment Diabetic Retinopathy study ⁵³ demonstrated clear benefits for early stage intervention following eye screenings
Problem Solving	Problem-solving is a behavior that is incorporated into DSME/T that involves the development and adoption of strategies and actions for problem resolution. Problem solving involves problem recognition; barrier identification and application of skills, knowledge, and experiential learning to achieve goals. Problem solving underlies and is a prerequisite for decision making that allows a person to consistently engage in the other self-care behaviors.	A systematic review of evidence on problem-solving and diabetes management/control identified definitional issues, assessment approaches and intervention studies conducted with people with diabetes. ⁵⁴ Assessment measures have been developed. ⁵⁵ and problem solving approaches have successfully been implemented in diverse groups of individuals living with diabetes. ⁵⁶ Studies reflect multiple measurement approaches and intervention settings and modalities.