

Diabetes Self-Management Education Core Outcomes Measures

Kathryn Mulcahy,
RN, MSN, CDE

Melinda Maryniuk,
RD, MEd, CDE

Malinda Peeples,
RN, MS, CDE

Mark Peyrot, PhD

Donna Tomky,
RN, MS, C-ANP, CDE

Todd Weaver, MPH, PhD

Peggy Yarborough,
RPh, MS, BC-ADM, CDE

The American Association of Diabetes Educators (AADE) recently adopted behavior change as the outcome of diabetes self-management education (DSME). Seven diabetes self-care behaviors were identified as key behaviors to diabetes self-management (Table 1). These self-care behaviors and their measurements have been defined as the *AADE 7 core measures of outcomes performance*.¹ In response to the recent adoption of these core outcomes measures, the need emerged for an extensive review of the literature regarding these behaviors. This technical review provides the published

evidence to support the application in practice of the 7 core measures of outcomes performance. Diabetes educators can use the core measures to determine their effectiveness with individuals and populations, compare their performance with established benchmarks, and establish the unique contribution of DSME in the overall context of diabetes care. In addition, the new AADE position statement, "Standards for Outcome Measures for Diabetes Self-Management Education," provides a framework for educators and DSME stakeholders to use as a guide in supporting the value of

technical review

From Inova Diabetes Center, Fairfax, Virginia (Ms Mulcahy); Joslin Diabetes Center, Boston, Massachusetts (Ms Maryniuk); Johns Hopkins School of Medicine, Boston, Massachusetts (Ms Peeples); Center for Social and Community Research, Loyola College (Dr Peyrot); Lovelace Health Systems, Albuquerque, New Mexico (Ms Tomky); American Association of Diabetes Educators, Chicago, Illinois (Dr Weaver); and Wilson Community Health Center (Ms Yarborough).

Correspondence to Kathy Mulcahy, Inova Diabetes Center, 2832 Juniper Street, Fairfax, VA 33031 (e-mail: Kathy.mulcahy@inova.com).

Reprint requests may be sent to *The Diabetes Educator*, 367 West Chicago Avenue, Chicago, IL 60610-3025.

Table 1.

Diabetes Self-Care Behaviors¹

1. Being active: physical activity (exercise)
2. Eating
3. Medication taking
4. Monitoring of blood glucose
5. Problem solving especially for blood glucose: high and low levels, and sick days
6. Reducing risks of diabetes complications
7. Living with diabetes (psychosocial adaptation)

DSME. This position statement is published elsewhere in this issue of *The Diabetes Educator*.

BACKGROUND

For more than 4 decades, diabetes education has been considered the cornerstone of effective diabetes care. As the science of diabetes self-management education evolved, it became widely accepted that the primary purpose (goal) of diabetes education is to provide knowledge and skill training, help individuals identify barriers, and facilitate problem-solving and coping skills to achieve effective self-care behavior. In 1986, the National Standards for Diabetes Education quantified the processes and structure that comprise quality diabetes education programs. The importance of evaluating DSME has been addressed in all versions of the National Standards by defining the process by which to conduct an evaluation, advisory committee, and annual review of program objectives, and to establish patient-focused behavioral objectives. However, specific indicators for diabetes education outcomes were not defined. Without specificity, it has been left to the discretion and experience of each educator to determine what to measure, which has resulted in great variation in defining and reporting specific attributes of effective diabetes education.² In 1999, a pivotal question was posed at the AADE Research Summit: "Is diabetes education effective and what methods are the best?" Answers such as "It depends" resulted in additional questions concerning what treatment, for what

population, delivered by whom, under what set of conditions, and, ultimately, for what outcome.³

With the most recent publication of the revised 2000 National Standards for Diabetes Self-Management Education,⁴ the evolution toward addressing the importance of measuring aggregate outcomes was expanded through the introduction of a new standard. Standard 10 addresses the need to apply continuous quality improvement (CQI) in DSME program evaluation.⁴ Now that specific outcomes of DSME have been defined, the outcomes can be measured consistently at specific time intervals and used to guide or support interventions at an individual level. With adoption of the 7 core measures, educators are now able to aggregate data and begin to build an evidence base for best practices in diabetes education. The aggregation of outcomes involves pooling, collating, and analyzing outcomes from multiple individuals. Subpopulations are formed at every level of aggregation that can, in turn, be pooled into larger populations. For example, population-based outcomes may exist for a specific program service, a specific DSME site, or a multisite DSME program. As with using outcomes measurement to guide an intervention on an individual level, population-based outcomes measurement can be used to monitor and improve DSME at a program level.

REGULATORY INFLUENCE ON OUTCOMES

The need to examine outcomes in diabetes care has been influenced by mandates from the Centers for Medicare and Medicaid Services (CMS) and the Agency for Health Care Policy and Research (AHCPR), as well as accrediting bodies such as the Joint Commission on Accreditation of Health Care Organizations (JCAHO), the National Council on Quality Assurance (NCQA), and the Provider and Education Recognition programs.⁵⁻⁹ Unfortunately, specific outcomes measures of DSME are still not addressed. For the most part, the accountability standards from these agencies only reference DSME as a process measure of whether it was performed. In many cases, DSME is not even mentioned (Table 2). To evaluate performance, we must not only evaluate what the diabetes education service delivers (process), but what it is able to achieve (outcomes). Therefore, it was incumbent upon the AADE to clearly define new standards of outcomes measurement for diabetes education that are practical, feasible, informative, and consistent across DSME programs (Table 3).¹

DEFINING OUTCOMES

According to Donebedian,¹⁰ *outcomes* are defined as "a measurable product and . . . the changed state or condition of an individual as a consequence of health care over time." Patient health outcomes have been measured for years, with increasing use by researchers and providers for evaluating the best way to improve the performance of providing health

Table 2.

Mapping of Diabetes Outcomes Measurement Sets

Measurement Sets	Measures																
	A1C*	A1C Control	Lipid*	Lipid Control	Urine Protein	Eye Exam*	Foot Exam*	Flu Vaccine*	Blood Pressure	Smoking	DSME*	Patient Behavior	Office Visit*	Patient Satisfaction	MNT*	SMBG*	Height, Weight
Core Set (AMA/JCAHO/NCQA) [†]	X	X	X	X	X	X	X	X	X				X	X			
DQIP	X	X	X	X	X	X	X		X								
ADA PRP	X	X	X	X	X	X	X	X	X	X	X			X	X	X	
NCQA	X	X	X	X	X	X			X								
NSDSME											X	X					
ADA ERP											X	X					
Ca DCP	X	X	X	X	X	X	X	X	X	X	X				X	X	X
HCFA (CMS)	X	X	X	X	X	X			X		X						X
AADE [‡]	†	†	†	†	†	†	†	†	†	†	X	X		†	X	X	BMI [‡]

DSME=diabetes self-management education, MNT=medical nutrition therapy, SMBG=self-monitoring of blood glucose, BMI=body mass index.
 AMA/JCAHO/NCQA=American Medical Association/Joint Commission on Accreditation of Healthcare Organizations/National Council on Quality Assurance, DQIP=Diabetes Quality Improvement Project, ADA PRP=American Diabetes Association Provider Recognition Program, NCQA=National Committee for Quality Assurance, NSDSME=National Standards for Diabetes Self-Management Education, ADA ERP=American Diabetes Association Education Recognition Program, Ca DCP=California Diabetes Control Project, HCFA (CMS)=Health Care Financing Administration (Center for Medicaid/Medicare Services), AADE=American Association of Diabetes Educators.
 *Process measures.
 †New NQF will soon replace these.
 ‡AADE measures recommended when feasible.

Table 3.

Standards for Outcomes Measurement of Diabetes Self-Management Education¹

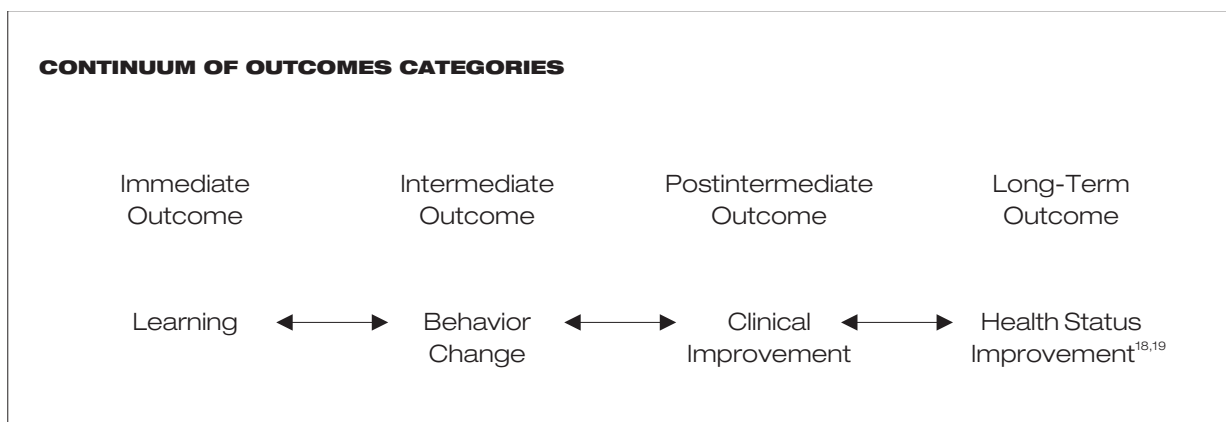
1. Behavior change is the unique outcome measurement for diabetes self-management education.
2. Seven diabetes self-care behavior measures determine the effectiveness of diabetes self-management education at individual, participant, and population levels (see Table 1).
3. Diabetes self-care behaviors should be evaluated at baseline and then at regular intervals after the education program.
4. The continuum of outcomes, including learning, behavioral, clinical, and health status, should be assessed to demonstrate the interrelationship between DSME and behavior change in the care of individuals with diabetes.
5. Individual patient outcomes are used to guide the intervention and improve care for that patient. Aggregate population outcomes are used to guide programmatic services and for continuous quality improvement activities for the DSME and the population it serves.

DSME=diabetes self-management education.

care.¹¹ Two distinct categories of outcome measures have emerged over the past few decades, health and economic. Health outcomes have traditionally included the longitudinal measurement of both clinical indicators and patient-centered outcomes of satisfaction and

well-being. In contrast, economic outcomes are cost factors associated with the health outcome of interest and include such ratio measures as cost effectiveness and cost benefit.^{12,13} The success of DSME programs will be based on

a process of consistently measuring specific indicators (outcomes measurement), the frequency and interval of measuring these indicators (outcomes monitoring), and how these outcomes are used for educational and clinical decision making (outcomes management).



All of these outcomes must be achieved in a cost-effective manner for both the individual and the population. Through this systematic and scientific process, the evidence base for DSME practice will evolve.

Population Outcomes Measurement

Population-based evaluation is critical to the future of DSME programs. The effectiveness of interventions must be documented to have a better understanding of which interventions are most appropriate for a given population. Some advantages of measuring outcomes include the following¹⁴:

- Informs the practice about the effectiveness of a specific intervention
- Informs patients about their health status
- Identifies processes or practice guidelines that will improve patient care
- Provides economic information for the health system
- Identifies high-risk patients
- Informs the payer of the effectiveness of a program

Because of these benefits, outcomes or performance measurement has become somewhat of a buzz word in health care since the 1980s and the era of accountability for healthcare services. Yet, there still remains a significant

misunderstanding of what outcomes really are and the process by which outcomes are measured and used to influence the delivery of services.

OUTCOMES CONTINUUM

There are multiple types and levels of outcomes for DSME. When the system of diabetes education and care is evaluated incrementally, a continuum of outcomes categories emerges. The Figure illustrates a simple model of this continuum with feedback loops.¹⁵⁻¹⁷

Immediate outcomes are those that can be measured at the time of the intervention. Learning can be assessed by testing or direct observation after the DSME intervention. Intermediate and postintermediate outcomes result over time, require more than a single measurement, are sensitive to change, and may show a statistical change. Behavior changes result from participant self-management activities and the DSME process, and can be measured through self-report. Clinical improvement results from the interaction of DSME, participant self-management, and clinical management, and can be measured with laboratory and procedural testing. Long-term outcomes result from multiple variables over an extended time. The educator works collaboratively with the participant

to maintain healthy self-management behaviors, which influence quality of life and health status improvement.^{18,19}

Learning Outcomes

One of the goals of diabetes education is to improve overall health status by empowering the person with diabetes to

- Acquire knowledge (*what to do*)
- Acquire skills (*how to do it*)
- Develop confidence and motivation to perform the appropriate self-care behaviors (*want to do it*)
- Develop the problem-solving and coping skills to overcome any barriers to self-care behavior (*can do it*)

A central purpose of DSME is to help patients make informed decisions and to facilitate their self-care behavior. However, there are several more immediate objectives that contribute to the behavior changes. The immediate objective of DSME is to help participants develop self-care knowledge and skills to achieve self-care behavior and, in turn, enhance well-being. Yet, all of these factors are important only to the degree that they facilitate individuals in achieving their diabetes self-care goals. Teaching knowledge for its own sake is not consistent with the fundamental goal of DSME.

Moreover, failure to address the other essential elements of behavior change results in incomplete and ineffective DSME (Table 4).

Clinical Outcomes

In the overall context of diabetes care, self-care behaviors, along with appropriate therapeutic regimens, can enhance clinical status, reduce diabetes complications, and improve health status. Educators play an important role in monitoring the patient's clinical status and recommending or referring for appropriate clinical tests or interventions. Some examples of clinical measures are hemoglobin A1c (A1C), blood pressure, body mass index, lipids, dilated eye exam, and foot exam.

Health Status Outcomes

The goal of all diabetes care is improved overall health status. This improvement can result in quality-of-life and economic benefits for people with diabetes as well as for society as a whole.²⁰ Central to measuring quality improvement is having variables related to quality that are measured consistently, longitudinally, and at appropriate intervals. These quality indicators must also promote changes in practice.

The unit of measurement, the purpose of measurement, and the consumer of the information largely drive outcomes measurement for accountability. Performance measurement for accountability is driven by what is measurable and accessible. Thus, accountability measures are generally guided by larger accreditation agencies that serve provider

organizations or health plans, such as the NCQA and the JCAHO. Recommended diabetes measures to evaluate and benchmark performance have often been laboratory measurements that monitor processes and that are widely documented and obtainable, as well as process measures such as whether an annual eye exam occurred. In some instances, these same accountability measurements are used for assessing quality but may not influence quality performance or clinical improvement.

CONTINUOUS QUALITY IMPROVEMENT

Standard 10 of the 2000 National Standards for DSME explains that "the DSME entity will utilize a continuous quality improvement (CQI) process to evaluate the effectiveness of the education experience provided, and determine opportunities for improvement."⁴ Applying CQI to daily operations is an important organizational decision because all of the staff, not just the manager, are accountable for the ongoing and continuous quality improvement of a DSME program. Implementing a CQI program for DSME is not only one of the National Standards for DSME but has been adopted by the American Diabetes Association (ADA) Education Recognition Program and the IHS Education Recognition program.²¹ Setting targets for educational, behavioral, and clinical outcomes is an important function of quality programs.

There are varied CQI methodologies, one of which is shown in the following example and detailed in Table 5.

1. Identify the problem/opportunity.
2. Collect the data (needed to determine the measures/indicators).
3. Analyze the data.
4. Identify alternative solutions.
5. Develop an implementation plan.
6. Implement the plan.
7. Evaluate the actions.
8. Maintain improvement.

SELF-CARE BEHAVIOR—BEING ACTIVE: PHYSICAL ACTIVITY (EXERCISE)

Definition of the Behavior

Physical activity is the act of expending energy. There are 2 types of exercise: aerobic and anaerobic. Aerobic exercise involves repetitive, submaximal contracting of major muscle groups used in activities such as swimming, cycling, walking, mowing the lawn, and vacuuming, and requires oxygen to sustain the muscular effort.^{22,23} Anaerobic exercise is defined as exercise that does not require sustained oxygen to meet the energy demands and generally does not induce the same health benefits as aerobic exercise. Studies have shown that properly designed resistance programs may improve cardiovascular function, glucose function, strength, and body composition.^{24,25}

The intensity of exercise and the duration of the activity significantly influence its effect. It is considered beneficial to increase general activity through daily activities that increase overall mobility.

Table 4.

AADE Diabetes Education Core Outcomes Measures for Diabetes Self-Care Behaviors

DSME Core Outcome Measures (Diabetes Self-Care Behaviors)	Outcomes Measurement Process (Individual Patient)	
	1. Measurement / Assessment	
	Immediate Outcome Learning and Barrier Resolution	Intermediate Outcome Behavior
Being active—physical activity (exercise)	<p>Knowledge</p> <ul style="list-style-type: none"> Type Duration Intensity Safety precautions, special considerations <p>Skill</p> <ul style="list-style-type: none"> Develops appropriate activity plan Balance with food, medication <p>Barriers</p> <ul style="list-style-type: none"> Physical limitations Time Environment Fear 	<p>Measures</p> <ul style="list-style-type: none"> Type Frequency Duration Intensity <p>Methods of measurement</p> <ul style="list-style-type: none"> Patient self-report* Observation Pedometer
Eating	<p>Knowledge</p> <ul style="list-style-type: none"> Effect of food on blood glucose (BG) Sources of carbohydrates Meal plan (what to eat, when to eat, how much to eat) Resources to assist in food choices <p>Skill</p> <ul style="list-style-type: none"> Meal planning Weighing and measuring food Carb counting Label reading <p>Barrier resolution</p> <ul style="list-style-type: none"> Environmental triggers Emotional Cultural Financial 	<p>Measures</p> <ul style="list-style-type: none"> Type of food choices Amount of food eaten Timing of meals Alcohol intake Effect of food on glucose Special situations and problem solving <p>Methods of measurement</p> <ul style="list-style-type: none"> Patient self-report* Observation Food and BG records 24 hr recall, food frequency questionnaires
Medication taking	<p>Knowledge</p> <ul style="list-style-type: none"> Name, dose, frequency Medication action Action for missed dose Side effects, toxicity Action for side effect Storage, travel, safety Recognition of efficacy <p>Skill</p> <ul style="list-style-type: none"> Preparation, technique, administration Safe handling, disposal of equipment Dose adjustment Recognition, treatment, prevention of low BG <p>Barriers</p> <ul style="list-style-type: none"> Vision or dexterity Financial Fear of needles Cognitive, math skills Embarrassment 	<p>Measures</p> <ul style="list-style-type: none"> Adherence to medication regimen Dose accuracy <p>Methods of measurement</p> <ul style="list-style-type: none"> Pill count Review of pharmacy refill record Demonstration Self-report* BG and medication records Observation, role playing

Table 4.

AADE Diabetes Education Core Outcomes Measures for Diabetes Self-Care Behaviors (cont.)

Outcomes Measurement Process (Individual Patient)		
2. Monitoring	3. Management	Relationship to National Standards for DSME Education Content Areas
Recommended Interval Between Measurement†	Outcomes Information Used to Drive Decision Making and the Delivery of Care	
<p>Learning outcomes[‡]</p> <ul style="list-style-type: none"> • Evaluated with each instructional session <p>Behavioral outcomes</p> <ul style="list-style-type: none"> • Baseline • 2 to 4 weeks • Every 3 to 6 months 	<p>Behavior (lack of physical activity) Little success in increasing physical activity over the last 6 weeks</p> <p>Barrier identification (environment) Patient had belonged to a health club for many years but didn't feel comfortable attending due to her physical appearance (30 lb overweight)</p> <p>Behavior resolution (environment changed) Through discussion and problem solving, patient identified a women's-only club near work that was convenient and nonthreatening (due to present body image)</p> <p>Behavior change (increased activity) At 1-month follow-up patient was exercising 3 to 5 days per week and had also lost 5 pounds</p>	<p>Standard 7</p> <p>Incorporating physical activity into lifestyle</p>
<p>Learning outcomes</p> <ul style="list-style-type: none"> • Evaluated with each instructional session <p>Behavioral outcomes</p> <ul style="list-style-type: none"> • Baseline • 2 to 4 weeks • Every 3 to 6 months 	<p>Behavior (inconsistent food intake) Review of oral food history, food and BG diaries reveals inconsistent carb intake and portion sizes from meal to meal</p> <p>Barrier identification (knowledge deficit) Patient buys lunch each day at work either at cafeteria or in fast-food court at nearby mall; carb content varies greatly; patient not aware of carb content of different food choices</p> <p>Barrier resolution (increased knowledge regarding carbs and eating out) Patient described several different meals she could buy that each had 3 carb servings (45 g); patient also plans to bring lunch 2 to 3 days/week</p> <p>Behavior change (consistent food intake, improved blood glucose) Patient now eating 3 to 4 carb servings at each lunch meal and at dinner (per food history); BG records also show more consistent results</p>	<p>Standard 7</p> <p>Incorporating appropriate nutritional management into lifestyle</p>
<p>Learning outcomes</p> <ul style="list-style-type: none"> • Evaluated with each instructional session <p>Behavioral outcomes</p> <ul style="list-style-type: none"> • Baseline • 2 to 4 weeks (earlier if warranted, as for patients new to insulin therapy) • Every 3 to 6 months, or if medication concerns (errors) are suspected 	<p>Behavior Patient does not take prescribed alphaglucoasidase inhibitor on certain days</p> <p>Barrier identification Embarrassment of flatulence</p> <p>Barrier resolution Set goals for very gradual titration of dose</p> <p>Behavior change Patient reaches optimal dose without embarrassment</p>	<p>Standard 7</p> <p>Using medications (if applicable) for therapeutic effectiveness</p>

Table 4.

AADE Diabetes Education Core Outcomes Measures for Diabetes Self-Care Behaviors (cont.)

DSME Core Outcome Measures (Diabetes Self-Care Behavior)	Outcomes Measurement Process (Individual Patient)	
	1. Measurement / Assessment	
	Immediate Outcome Learning and Barrier Resolution	Intermediate Outcome Behavior
Monitoring of blood glucose	<p>Knowledge</p> <ul style="list-style-type: none"> • Testing schedule • Target values • Proper disposal of sharps • Interpretation, use of results <p>Skill</p> <ul style="list-style-type: none"> • SMBG technique • Recording BG values • Equipment use, care <p>Barriers</p> <ul style="list-style-type: none"> • Physical • Financial • Cognitive • Time • Inconvenient • Emotional 	<p>Measures</p> <ul style="list-style-type: none"> • Frequency of missed tests • Frequency and schedule of monitoring (eg, times/day, days/wk) • Planned, unplanned testing • Review of pharmacy refill record <p>Methods of measurement</p> <ul style="list-style-type: none"> • Review of log book • Meter memory review or printout • Self-report* • Demonstration of technique
Problem solving <i>especially</i> for blood glucose: high and low levels, and sick days	<p>Knowledge</p> <ul style="list-style-type: none"> • Signs, symptoms, causes • Treatment, guidelines, prevention strategies • Sick-day rules • Safety concerns (eg, driving, operating equipment) <p>Skill</p> <ul style="list-style-type: none"> • Hypoglycemia treatment • Glucagon administration (if applicable) • Use of BG data to determine appropriate actions related to food, exercise, medication <p>Barriers</p> <ul style="list-style-type: none"> • Cognitive • Financial • Coping strategies • Emotional • Physical 	<p>Measures</p> <ul style="list-style-type: none"> • BG testing • Adjusting food, medication, activity • Contact with healthcare provider for problem resolution • Checking meter and strips for function • No. of BG tests/month that require assistance • No. of times that ketones are tested (when appropriate) • Missed days from work, school, or related activities <p>Methods of measurement</p> <ul style="list-style-type: none"> • Patient self-report[†] • Review of log book (unreliable) • Meter memory review or printout • Medical chart review • Frequency of medication adjustment

Table 4.

AADE Diabetes Education Core Outcomes Measures for Diabetes Self-Care Behaviors (cont.)

Outcomes Measurement Process (Individual Patient)		
2. Monitoring	3. Management	Relationship to National Standards for DSME Education Content Areas
Recommended Interval Between Measurement†	Outcomes Information Used to Drive Decision Making and the Delivery of Care	
<p>Learning outcomes[‡]</p> <ul style="list-style-type: none"> • Evaluated with each instructional session <p>Behavioral outcomes</p> <ul style="list-style-type: none"> • Baseline • 2 to 4 weeks • Every 3 to 6 months 	<p>Behavior (SMBG less than desired) Patient reports doing SMBG 4 times a day, though meter data record shows monitoring 2 to 3 times a day</p> <p>Barrier identification (inconvenience) Meter is too big and bulky to carry to work</p> <p>Barrier resolution (more convenient equipment) Educator helps patient identify smaller and more discrete meter that patient is willing to use</p> <p>Behavior change (SMBG as desired) Next measurement of behavior reveals patient is monitoring as recommended</p>	<p>Standard 7</p> <p>Monitoring blood glucose and urine ketones (when appropriate) and using results to improve control</p>
<p>Learning outcomes</p> <ul style="list-style-type: none"> • Evaluated with each instructional session <p>Behavioral outcomes</p> <ul style="list-style-type: none"> • Baseline • 2 to 4 weeks • Every 3 to 6 months 	<p>Behavior (ineffective problem solving) A 43-year-old man with type 1 diabetes reports 5 episodes of hypoglycemia in the last month, all at work</p> <p>Barrier identification (coping) Educator assessment determines that man is skipping lunch due to workload</p> <p>Barrier resolution (problem solving) Educator and patient together identify how to</p> <ul style="list-style-type: none"> • Approach boss to discuss options for scheduling lunch break • Contact provider to discuss medication adjustment if above is not an option <p>Behavior change (decrease in hypoglycemia) At the next visit, patient reports 1 hypoglycemic episode that was related to activity; none at work</p>	<p>Standard 7</p> <p>Preventing, detecting, and treating acute complications</p>

Table 4.

AADE Diabetes Education Core Outcomes Measures for Diabetes Self-Care Behaviors (cont.)

DSME Core Outcome Measures (Diabetes Self-Care Behaviors)	Outcomes Measurement Process (Individual Patient)	
	1. Measurement / Assessment	
	Immediate Outcome Learning and Barrier Resolution	Intermediate Outcome Behavior
Reducing risks of diabetes complications	<p>Knowledge</p> <ul style="list-style-type: none"> Standards of care Therapeutic goals How to decrease risks (through preventive care services) <p>Skill</p> <ul style="list-style-type: none"> Foot exam BP (self) SMBG Maintaining personal care record <p>Barriers</p> <ul style="list-style-type: none"> Financial Time Unaware of disease process or seriousness Lacking rapport with provider Travel Physical disabilities 	<p>Measures (per Standards of Care)</p> <ul style="list-style-type: none"> Smoking status Frequency of foot self-exam Aspirin therapy Eye exam MD visit Diabetes educator visit RD visit Lipids checked BP checked Flu vaccine, pneumonia vaccine Urine check for protein Prepregnancy counseling <p>Methods of measurement</p> <ul style="list-style-type: none"> Patient self-report Chart or exam code audit demonstration of self-care activities
Living with diabetes (psychosocial adaptation)	<p>Knowledge</p> <ul style="list-style-type: none"> Recognizing that everyone has problems (not mentioned in core measures) Benefits of treatment and self-care Motivation is internal function <p>Skill</p> <ul style="list-style-type: none"> Goal setting Problem solving Coping strategies Self-efficacy <p>Barriers</p> <ul style="list-style-type: none"> Lack of awareness Financial Lack of support Physical Psychosocial distress 	<p>Measures</p> <ul style="list-style-type: none"> Depression score Stress Quality of life Functional measurement Treatment self-efficacy Patient empowerment Self-report <p>Methods of measurement (recommend validated instruments)</p> <ul style="list-style-type: none"> SF-36/SF-12 P.A.I.D. Zung/Beck Depression Scale D-SMART

Table 4.

AADE Diabetes Education Core Outcomes Measures for Diabetes Self-Care Behaviors (cont.)

Outcomes Measurement Process (Individual Patient)		
2. Monitoring	3. Management	Relationship to National Standards for DSME Education Content Areas
Recommended Interval Between Measurement [†]	Outcomes Information Used to Drive Decision Making and the Delivery of Care	
<p>Learning outcomes[‡]</p> <ul style="list-style-type: none"> • Evaluated with each instructional session <p>Behavioral outcomes</p> <ul style="list-style-type: none"> • Baseline • 2 to 4 weeks • Every 3 to 6 months 	<p>Behavior (no eye exam) Patient reports last dilated eye exam was 3 years ago</p> <p>Barrier identification (knowledge deficit) Patient does not understand need for exam since he does not have visual disturbances</p> <p>Barrier resolution (knowledge of importance provided) Discussed the rational and recommended frequency for dilated eye exams</p> <p>Behavior change (eye exam done) At follow-up visit, patient was evaluated and treated for proliferative diabetic retinopathy since last visit</p>	<p>Standard 7</p> <p>Preventing (through risk reduction behavior), detecting, and treating chronic complications and acute infections</p> <p>Promoting preconception care, management during pregnancy, and gestational diabetes management (if applicable)</p>
<p>Learning outcomes</p> <ul style="list-style-type: none"> • Evaluated with each instructional session <p>Behavioral outcomes</p> <ul style="list-style-type: none"> • Baseline • 2 to 4 weeks • Every 3 to 6 months 	<p>Behavior (suboptimal SMBG) Patient not performing SMBG on optimal schedule</p> <p>Barrier identification (depression, feeling overwhelmed) Patient explains feeling overwhelmed and depressed most of the time; educator administers Zung Depression Scale, assesses patient to be mild to moderately depressed</p> <p>Barrier resolution (follow-up for depression recommended) Patient learns results from Zung Depression Scale, was encouraged to speak with physician about treatment</p> <p>Behavior change (optimal monitoring) Patient returns 3 months after starting antidepressant, behavior therapy; patient now monitoring blood glucose, getting medication on time</p>	<p>Standard 7</p> <p>Integrating psychosocial adjustment into daily life</p>

DSME content areas per the 2000 National Standards for Diabetes Self-Management Education (Mensing C, Boucher J, Cypress M, et al. National standards for diabetes self-management education. *Diabetes Care*. 2000;23:682-689). Note: Diabetes disease process and treatment options, goal setting, and behavior change strategies are not specifically listed as a self-care behavior but are to be addressed as needed with each behavior.

DSME content areas per Standard 7 of the National Standards for DSME.

*The patient's priority for behavior change should be assessed for each behavior area; barriers and facilitators for change should be identified for the chosen target behavior.

[†]Frequency of measurement for patient level may be different from program level.

[‡]Learning outcomes should be tracked for each behavior area with each instructional session.

Table 5.

Example of Using Aggregate Population Outcomes Data for CQI

Continuous Quality Improvement Aggregate/Population Data						
Opportunity for Improvement	Measurement Indicators, Data Collection	Monitoring Data Analysis	Management			
			Identify Solution(s)	Implement Plan	Evaluate Actions	Maintain Improvement
Although increasing physical activity is chosen as a priority goal by many of the program participants, most express discouragement in achieving their goals.	<ul style="list-style-type: none"> • Priority goal—76% • Goal achievement—44% • Frequency—<2 days/week • Type—walking, 30% • Duration—<30 min • Barriers—time, environment • A1C—7.8% 	CQI team reviewed the data, determined that many participants worked long hours, had long commutes, and typically led sedentary lifestyles	<ul style="list-style-type: none"> • Developed a walking program based on “10 000 Steps Per Day Program” • Provided each participant with a pedometer • Set up a walking club Web site on their organizational Web site 	Implemented a pilot program with 20 participants and followed them for 6 months	At 6 months: average self-reported achievement was 79%; pedometer records indicated that average steps per day per patient were 640; A1C was 6.4%	Program was implemented for all patients; data 1 year later: <ul style="list-style-type: none"> • Goal—74% • Achievement—68% • Frequency—>3x/wk • Type—walking • Duration—<30 minutes • Steps—690/day • Population mean A1C—6.2%

CQI=Continuous quality improvement.

Why the Behavior is Important to Health Outcomes

Physical activity improves glycemic control, reduces stress, improves the body mass index, enhances weight loss and helps control lipids and blood pressure.^{26,27} The risk of developing type 2 diabetes is reduced through lifestyle intervention consisting of moderate physical activity and modest weight loss.²⁷

Behavioral and Educational Goals

A primary goal of DSME is to increase the physical activity of an individual with diabetes; even small changes are considered beneficial. The optimum goal is to engage in moderate aerobic activity for 20 to 30 minutes, 3 to 5 times per week.²⁸ It is important for individuals with diabetes to establish their own personal goals, which may or may not be consistent with optimum physical activity that results in the greatest metabolic benefit.

Recommendations for Practice (Individual)

The duration of physical activity/exercise depends on individual goals and objectives. For blood glucose control, exercise should last 20 to 40 minutes and be done 3 to 4 times weekly; for weight control, exercise should last 45 to 60 minutes and be done 4 to 5 times weekly. Duration and frequency of activity sessions often depend on age, time available for exercise, and level of fitness endurance. When a person is seeking to start an exercise program, it is generally recommended to aim for 3 sessions per week (on nonconsecutive days), 20 to 30 minutes per session, and to achieve 50% to 55% of aerobic capacity, or approximately 70% of age-adjusted maximal heart rate (220 minus age in years).²⁹ The duration of exercise needed to meet the required weekly energy expenditure is between 20 and 60 minutes per session.³⁰ Studies have shown similar

cardiovascular gains when physical activity is done for shorter duration of approximately 10 minutes, accumulated throughout the day, although 30 minutes of continuous exercise seems to have a greater impact on weight loss.^{31,32} The National Standards for DSME curriculum includes provision of an educational intervention that teaches participants the knowledge and skill to incorporate physical activity into their daily lives.⁴

Standard Data Elements for Outcomes/Performance Measurement

Baseline knowledge (safety and relationship to food and medications), as well as current physical activity behavior, which includes type, duration, frequency, and intensity, should be measured initially and remeasured at 2 to 4 weeks, and then every 3 to 6 months. The individual's goal for desired

change and barriers to the potential degree of success they may experience should be identified. It is also important to measure participants' knowledge of anticipatory behavior, such as appropriate pre-exercise food intake, and adjusting self-monitoring of blood glucose (SMBG) frequency to the duration and intensity of activity planned. Data can be collected through the self-report method, observation, or physical activity measurement instruments such as a pedometer.

SELF-CARE BEHAVIOR— EATING

Definition of the Behavior

Eating involves a complex set of behaviors. Decisions are made many times a day regarding what to eat, when to eat, and how much to eat. Many factors affect these decisions, including food availability, family eating patterns, habits, emotions, food preferences, blood glucose control, and knowledge regarding how food affects diabetes control and overall health. Skills involved with eating behavior for persons with diabetes can include carbohydrate and fat gram counting, label reading, and measuring foods for portion control.

Why the Behavior is Important to Health Outcomes

Four specific diet behaviors were identified in the Diabetes Control and Complications Trial (DCCT) as having the most influence on improved glycemic control³³; these behaviors should therefore be considered as a target of initial behavior change goals. These 4 diet behaviors were (1) adherence to meal plan, (2) appropriate treatment of hypoglycemia, (3) prompt

response to hyperglycemia (more insulin and/or less food), and (4) consistent consumption of a prescribed evening snack, if appropriate. Eating is not a behavior unique to diabetes care that must be taught for the first time, unlike some of the diabetes self-management behaviors (eg, monitoring medication taking). There is ample evidence demonstrating the importance and effectiveness of medical nutrition therapy in diabetes management.^{34,35} Following appropriate meal plans can result in a 1% to 2% decline in A1C,³⁶⁻³⁸ a 15 to 25 mg drop in LDL cholesterol,³⁹ a decrease in blood pressure, and a 1 to 2 pound weight loss per week.⁴⁰

Behavioral and Educational Goals

The goal of the nutrition intervention is to assist and facilitate individual lifestyle and eating behavior changes that will lead to improved metabolic control, a reduced risk for complications, and improved health. Medical nutrition therapy should be a part of the care plan of every person with diabetes, regardless of their medication regimen. Depending on one's usual eating style, new eating behaviors may or may not have to be learned as part of diabetes treatment and education. Each food plan is uniquely designed with the person with diabetes and is based on individual eating patterns, treatment objectives, or needs. Some plans may be focused on regulating carbohydrate intake, adjusting the timing or spacing of meals and snacks, reducing the saturated fat content, reducing overall calories, or increasing fiber

intake. Nutrition outcomes, therefore, depend on individualized meal plan goals. To effectively individualize the meal plan, educational and behavioral goals must consider barriers or facilitators of environmental triggers, and emotional, cultural, and financial concerns.

Recommendations for Practice (Individual)

Medical nutrition therapy (MNT) is both a form of treatment and a component of a comprehensive self-management education program. Nutrition practice guidelines (NPGs), which are evidenced based and support the ADA nutrition recommendations,⁴¹ outline the process or system by which the "best" care is provided.⁴² Extensive field testing has demonstrated that when MNT is delivered according to NPGs, positive health outcomes result.⁴⁰ The NPGs outline specific clinical outcomes as well as therapeutic lifestyle changes for individuals with type 1 and type 2 diabetes and gestational diabetes mellitus. The NPGs also recommend frequency and length of contact as well as time between encounters. The registered dietitian (RD) is the health professional with the greatest expertise in providing MNT, as demonstrated in the research studies that have achieved positive outcomes.⁴⁰ However, it is essential for all team members involved in diabetes treatment and management to be able to apply the principles of MNT and use the same core set of behaviors to measure outcomes.

Standard Data Elements for Outcomes / Performance Measurement

Evaluation of eating behavior is done most often by patient self-report through standard assessment questions (eg, 24-hour recall and food frequency questionnaire), review of blood glucose and food records, and skill checks by the educator (using labels, restaurant menus, food models, etc). An individual's type of food choices (including alcohol), the amount of food (or a particular nutrient such as carbohydrate) eaten, the timing of meals, and the effect of food on blood glucose should be measured at baseline, 2 to 4 weeks, and then every 3 to 6 months. It is also important to assess the participant's knowledge of anticipatory behavior, such as how to apply the meal plan in special situations (eg, sick days, traveling, schedule changes, and dining out), and how to use eating behavior for compensatory situations (eg, problem solving for changes in a routine, preventing low blood sugar, and balancing exercise and food). Role playing and discussing a variety of real-life scenarios are methods that are used to assess problem-solving behavior.

SELF-CARE BEHAVIOR—MONITORING OF BLOOD GLUCOSE^{43,44}**Definition of the Behavior**

Monitoring of blood glucose requires a combination of technical skills and cognitive skills, including the ability to interpret results that allow patients and their healthcare team to evaluate individual response to therapy to assess if glycemic targets are being achieved.

Why the Behavior is Important to Health Outcomes

SMBG has transformed the management of diabetes and is considered a supporting behavior in diabetes care.⁴⁵ Monitoring of blood glucose has been shown to reduce acute complications of diabetes, such as diabetic ketoacidosis and severe hypoglycemia (associated with an increased risk of motor vehicle accidents).^{46,47} Self-monitoring makes patients feel less dependent on professionals. However, it requires them to become involved in self-management of their diabetes and connects them to the outcomes of their measurement activities—their own blood glucose levels. Yet, controversy exists about the role of self-monitoring in stable, diet-treated individuals with diabetes; the optimal frequency of monitoring for individuals with type 2 diabetes is not known.^{48,49}

Behavioral and Educational Goals

DSME can include teaching accurate and reliable skills for self-monitoring of blood glucose, proper interpretation of results, and how to use the results to adjust MNT, exercise, or pharmacological therapy to achieve specific glycemic goals.⁵⁰⁻⁵² The optimum frequency goal for SMBG for type 1 diabetes is 3 or more times daily.⁵³ It is important for individuals with diabetes to establish their own personal glycemic goals, which may or may not be consistent with optimum monitoring of blood glucose that results in the greatest metabolic benefit.⁴⁵ Efforts should be made to increase the individual's understanding of

glycemic goals for appropriate use of SMBG results.⁴⁵ Identifying and resolving blood glucose monitoring barriers are important for achieving optimum SMBG behavioral goals.^{28,53,54}

Recommendations for Practice (Individual)

The National Standards for DSME recommend providing an educational intervention that helps individuals with diabetes incorporate monitoring of blood glucose into their daily lives and use the results to improve glycemic control.⁴ Daily SMBG is especially important for individuals taking insulin or sulfonylureas to monitor for and prevent asymptomatic hypoglycemia. Frequency and timing of glucose monitoring should be dictated by the needs and goals of the individual to facilitate achieving their individualized glucose goal.^{28,54}

Standard Data Elements for Outcomes/Performance Measurement

Baseline assessment of blood glucose monitoring behavior includes method and technique, frequency and schedule of monitoring, and number of recommended blood glucose checks not done. Individual monitoring behavior should be reassessed within 2 to 4 weeks and every 3 to 6 months thereafter. The individual's goal for desired change also should be assessed, as well as barriers to change including cost, inadequate understanding about health benefits and proper use of results, psychological and physical discomfort, time requirements, physical setting, and complexity of the monitoring procedure. Data can be collected through self-report

methods including records or logs, and may be supported by data management glucose meters.

SELF-CARE BEHAVIOR— MEDICATION TAKING

Definition of the Behavior

Medication-taking behavior combines cognitive and technical skills associated with taking oral, topical, and/or injected medications. Appropriate medication-taking behaviors include administration at recommended time(s) of day and frequency of doses; correct dose preparation, selection, or calculation; administration technique and skills; and consistency over time. Cognitive and decision-making behaviors concerning medication taking include adjustment for delayed or missed doses, management or recognition of adverse effects, or recognition of drug failure (lack of efficacy) by interpreting SMBG results or symptoms. Resources such as the *United States Pharmacopoeia (USP) Medication Counseling Behaviors Guidelines*⁵⁵ should be consulted for additional aspects of medication education and counseling outcomes.

Why the Behavior is Important to Health Outcomes

Medications are important to diabetes health outcomes for 3 major reasons. First, pharmacotherapy is either imperative or eventually needed to achieve desired glucose treatment goals for most individuals with diabetes. In type 1 diabetes, drug therapy is imperative to sustain life as well as to attain

glycemic control. In type 2 diabetes, the progression of pathophysiologic defects (insulin resistance and relative or absolute insulin secretory deficiency) eventually necessitates the addition of medication(s) to the diabetes management plan.⁵⁶ In gestational diabetes, the need for medication during the course of pregnancy is not predictable. In all instances, pharmacotherapy is intended to augment nonpharmacologic (lifestyle) interventions.

Second, MNT and physical activity, although important, are difficult to sustain or may be insufficient to manage blood glucose levels. Aggressive (intensive) pharmacotherapy in combination with lifestyle interventions has been shown to lower blood glucose levels and result in clinical benefits, including reduced risk for diabetes complications.⁵⁶⁻⁵⁹

Third, medication-taking behaviors are particularly important in terms of diabetes health outcomes. Not taking the prescribed medications or taking them incorrectly can interfere with achieving the expected or desired outcome.⁶⁰ Compliance with chronic medications has been estimated to be approximately 50%.^{61,62} The health-care literature is replete with studies documenting inappropriate patient medication-taking behaviors and the associated negative effects on therapeutic outcomes.^{63,64}

Behavioral and Educational Goals

The primary goal of the medication outcomes of DSME is an assessment of, and improvement in,

medication knowledge, adherence, and skills. These outcomes do not focus on whether the optimal dose has been prescribed, although the 2 are intertwined. Medication efficacy cannot be clinically assessed if a medication is not being taken consistently and as prescribed (eg, increasing the dose of a drug that is not being taken will not improve efficacy). Similarly, the correct drug regimen will fail if it is not being administered correctly, consistently, and as prescribed.

Recommendations for Practice (Individual)

Assessment of medication-taking behaviors should be a component of the initial patient evaluation. Disparities between the prescribed and actual medication-taking behaviors should be noted and addressed with the patient, with goals being collaboratively established. Ongoing assessment should be performed at least annually, or at intervals deemed appropriate to reinforce or confirm the appropriate behaviors. The diabetes educator has an obligation to recommend appropriate medication delivery systems (eg, pens, pumps, and accessory items), drug regimen aids (eg, drug calendars, daily pill boxes, and pill splitters), or innovative techniques specific to the patient to optimize medication-taking behaviors before problems arise.

Standard Data Elements for Outcomes/Performance Measurement

Behavioral changes or outcomes generally expected from DSME for medication taking include acquisition of or improvement in

knowledge to assure competent, confident, and safe drug use. For example, patients and caregivers must be confident and competent in recognizing side effects or drug toxicity, and be prepared to take corrective or preventive actions. These actions may be as simple as being able to report a drug regimen to a rescue squad or as complex as making insulin adjustments based upon a prescribed supplemental, retroactive, or prospective algorithm. Comparing the patient's blood glucose records (manually recorded or by meter memory printouts) with the dietary, exercise, and medication log is a useful way to assess the patient's application of the dosing scheme as well as the appropriateness of an algorithm or treatment plan. Other important changes or outcomes require a specific level of skill in the technical aspects of medication administration, coupled with consistency of medication administration. For many such skills, the best assessment tool is observing the patient or caregiver perform the procedures. For other skills, the use of role-playing or "what if" scenarios may best reveal the patient or caregiver's ability to respond to unusual or adverse situations requiring administration, manipulation, or omission of a medication. Another critical aspect of medication-taking behavior is the consistency with which a medication is taken and how well the patient administration pattern matches the prescribed pattern. Reviewing patient self-report diaries, measuring the amount of drug used/unused (eg, pill counting), or checking refill profiles may all be helpful in determining the percentage of

medication taken as well as the consistency and timing of doses per day. Medication nonadherence is understandably difficult for patients to acknowledge. Therefore, the diabetes educator needs to have good collaboration skills to work with patients in identifying and resolving barriers to optimal medication-taking behaviors.

**SELF-CARE BEHAVIOR—
PROBLEM SOLVING
ESPECIALLY FOR BLOOD
GLUCOSE: HIGH AND LOW
LEVELS, AND SICK DAYS**

Definition of the Behavior

Problem solving is a learned behavior that includes generating a set of potential strategies for problem resolution, selecting the most appropriate strategy, applying the strategy, and evaluating the effectiveness of the strategy. Problem solving is an essential skill for effectively self-managing diabetes and involves more than knowledge or skill acquisition.^{65,66} As a behavior to be tracked and measured by diabetes programs, the primary focus is on the diabetes problem-solving behavior of recognizing and responding to unanticipated situations of hypoglycemia, hyperglycemia, and sick days.

**Why the Behavior is
Important to Health
Outcomes**

Problem-solving measures have been shown to be effective predictors of dietary, exercise, and medication self-care.⁶⁷ For managing fluctuations in blood glucose levels, individuals must often make decisions about food, activity, and medication adjustment. Individuals with chronic disease typically

progress from total reliance on a prescribed regimen to making modifications that are tailored to unique lifestyle needs and that continue to evolve over time. It may take as much as 15 years for some individuals to encounter all common problems associated with having diabetes. People move from a novice to an expert role in their own self-management in no specific time frame; but they can progress along the continuum with effective support of their critical thinking skills.⁶⁸ Recent research also suggests that excessively high or low blood glucose levels may influence problem-solving skills, yet at those times the individual with diabetes or their support person must respond appropriately to avoid serious consequences.⁶⁹ Researchers have indicated that problem-solving skills are critical for helping individuals manage chronic illness treatment regimens.⁷⁰

**Behavioral and Educational
Goals**

Immediate educational goals include individually defined blood glucose levels, physical signs and symptoms, and appropriate treatment for high and low blood glucose levels and sick days, all of which comprise the foundation for living with diabetes. Behavioral goals focus on developing appropriate problem-solving skills for responding to each blood glucose reading and for sick days. These goals progress from immediate safety issues to improving overall glycemic control and well-being as the individual becomes more accomplished with the self-management of the disease. Applying problem-solving activities

to all of the diabetes self-care behaviors is an effective way to prevent, detect, and treat acute fluctuations in glucose control and acute complications. Minimizing the frequency of acute blood glucose fluctuation remains an ongoing and challenging task.

Recommendations for Practice (Individual)

Diabetes educators work collaboratively with participants in DSME using situational problem solving to develop strategies to anticipate and overcome barriers to effective diabetes self-care.⁷¹ Situational problem solving focuses on concrete, real-life scenarios rather than on comprehensive case studies (eg, My husband eats ice cream in front of me, or I have to carpool my kids to soccer from 5 to 7 pm, 4 days a week). Actively involving participants in identifying strategies and solutions acknowledges that they are experts on their own problems and provides support for solving the problems. Participants who are treated with medications must be educated on hypoglycemia recognition, prevention, and treatment. All participants and/or support persons should be aware of sick-day self-management and when to access the healthcare system.

Proactive problem resolution may be more straightforward for acute complications than for more complex issues such as when to follow up with the healthcare provider for an adjustment in treatment or the introduction of more complex treatment regimens. In addition, not all participants seek to be the primary decision makers for their self-care, so

more active caretaker or educator participation in the problem-solving process may be appropriate. Diabetes programs must focus on identifying and helping individuals with low levels of problem-solving skills to improve their health outcomes.⁷²

Standard Data Elements for Outcomes/Performance Measurement

The detailed reasoning involved in decision making is difficult to assess apart from experience.⁶⁸ Assessment tools that measure the participant's intent to respond to proposed situations and observational measures are helpful in the educator's assessment.⁶⁷ Problem-solving scenarios provide a measure of behavioral intent but not the actual behavior. Participant self-report about problem management with blood glucose monitoring data may provide objective information regarding the use of food, activity, medication, or ketone testing for resolving problems. Reviewing a log book and meter memory may provide data regarding treatment of high or low blood glucose levels. Medical charts and patient self-report for hospital admissions or emergency room visits for hyperglycemic and hypoglycemic events reveal the frequency or seriousness of those episodes. Other health status measures such as patient self-report of days missed from work, school, or other activities due to diabetes-related issues, especially for out-of-control blood glucose, can be tracked and may provide an indication of problem-solving ability. It is important to understand the financial, cognitive,

emotional, and physical barriers that prevent optimal problem solving in some situations.

SELF-CARE BEHAVIOR—REDUCING RISKS OF DIABETES COMPLICATIONS

Definition of the Behavior

Reducing risk-factor behaviors for diabetes self-management involves understanding, seeking, and maintaining several preventive health-care services on a periodic basis, such as annual eye examinations, routine medical follow-up, and dental examinations. In addition, other self-initiated activities such as foot inspection,⁷³ appropriate aspirin use,^{74,75} and smoking cessation⁷⁶ are critical behaviors that need greater emphasis during the educational process. Barriers to risk-reduction behavior are primarily related to financial constraints, mobility, lack of awareness, or perceptions of susceptibility to complications, and especially social-environmental influences. Reducing these barriers through educational strategies and interactive instruction is paramount to increasing self-promoted risk-reduction behaviors.

Why the Behavior is Important to Health Outcomes

Reducing risk factors in the context of the effective delivery of diabetes education and care has been described in detail by various accreditation agencies, including the American Medical Association, the JCAHO, and the NCQA. In 1998, these 3 organizations formed the Performance Measurement Coordinating Council to

develop an evidence-based consensus statement on performance measurements for adults with diabetes, with the goal of improving the health of individuals with diabetes and reducing complications.⁷⁷ In 2002, the National Quality Forum Measures Review Committee was appointed to form a recommendation regarding this measure or a similar set of measures for adult with diabetes mellitus. A single collaboration has since been formed that is now called the National Diabetes Quality Improvement Alliance. A single performance measurement set for adult diabetes has been endorsed and is currently being reviewed by the participating organizations. The recommended measures outlined by this expert panel were consistent with the pioneering work of the Diabetes Quality Improvement Program (DQIP), which released their initial measurement set in 1998. The DQIP was a working coalition that included members from the American Diabetes Association, the Foundation for Accountability, the Health Care Finance Administration (HCFA, now known as CMS), the NCQA, the American Academy of Family Physicians, the American College of Physicians, and the Veterans Administration. The representatives of these stakeholders participated in defining a measurement set and performing a comprehensive review of the scientific literature to develop these evidence-based performance measures, thus ensuring a strong foundation for the future of what diabetes services are delivered and how often they are delivered.

Behavioral and Educational Goals

The initial step in DSME as it is related to risk-reduction activities is to inform the individual with diabetes about the various preventive care services that can reduce complications. Once these activities are understood, providing a schedule of the frequency of performing these activities gives the individual a self-directed goal and an expectation about their diabetes care team. Once these behavioral goals are initially accomplished, it is critical to reinforce the long-term maintenance of these behaviors in reducing complications.

Recommendations for Practice (Individual)

The recommended preventive healthcare services for diabetes are well documented. When the patient, educator, and provider work as a team to follow these scheduled services, self-management behavior is improved and maintained. Empowered individuals with self-directed goals can perform these activities at home, including foot exams, appropriate aspirin utilization, and reducing or quitting smoking. Successfully increasing risk-reduction behaviors in individuals with diabetes is achieved through identifying the behaviors, interactively discussing how these behaviors reduce specific complications, and helping individuals to develop a maintenance schedule that can be monitored by themselves, the educator, and the provider.

Standard Data Elements for Outcomes/Performance Measurement

Short-term collection of outcomes related to risk-reduction behaviors can be achieved through self-report via oral communication, questionnaires, or written maintenance schedules. Data collected through self-report methods may be validated by having individuals demonstrate these activities, and further validated by laboratory or claims data from healthcare organizations.

SELF-CARE BEHAVIOR—LIVING WITH DIABETES (PSYCHOSOCIAL ADAPTATION)

Definition of the Behavior

Psychosocial adaptation includes all aspects of living with diabetes: what people do to cope with their disease, how they perceive their situations, and how they relate to others involved in their lives.

Why the Behavior is Important in Health Outcomes

Psychosocial factors are outcomes. It has been argued that the subjective quality of life is the ultimate outcome and that health status is important because it affects quality of life.⁷⁸ Psychosocial factors also are important because they can affect health outcomes both directly (through psychophysiological pathways) and indirectly (through behavioral pathways). Numerous studies have suggested that psychosocial distress has direct, psychophysiological effects on health.⁷⁹⁻⁸² Research indicates that these linkages remain even when controlling for the levels of risk factors that may be

influenced by psychological distress (eg, diet and exercise).⁸³ Psychosocial factors also affect health indirectly by influencing other self-care behaviors. In addition to the effects of coping and distress, self-care behavior is a function of a person's behavioral intentions, motivations, and ability to resolve barriers to self-care.^{84,85} Individuals who are not motivated to engage in effective self-care will not make the necessary commitment to do so, and even the best of intentions will prove fruitless if the individual cannot figure out how to overcome barriers to following through on their intentions.

Behavioral and Educational Goals

Implementing effective self-management requires individuals to be motivated to change their behavior; have specific, achievable behavioral goals; and overcome barriers (eg, environmental, social, and psychological) to implementation. Improving the quality of life requires patients to balance clinical goals with psychological well-being, deal with their emotional distress, and manage their relationships with others.

Recommendations for Practice (Individual)

Education requires more than simply giving information and teaching self-care skills. Educators can help elicit and reinforce individuals' motivation to make behavior change, including discussing the benefits of changing their behavior. However, it is important to realize that motivation is an internal

function of the individual. Educators are most successful when they work with patients' issues rather than substituting their own goals for those of the patient. Educators need to work with individual participants to collaboratively define specific goals for behavior change and help them build self-efficacy. Goals should be established that are consistent with the participants' unique circumstances, that they feel comfortable with, and that do not require an unrealistic burden or sacrifice. Educators also must collaborate in a problem-solving process to help individuals find ways to overcome barriers to behavior change. Many persons may not be able to achieve the goals they set for themselves. Educators must help them identify strategies to actually change what they do, not simply give medical advice about what they should do. Some individuals may be so debilitated by psychological distress or illness that referral for medication or mental health counseling is required before the educator can work effectively with them on behavioral counseling.

To improve the quality of life, one must go beyond factors that are related to clinical outcomes. When working with participants, the educator must consider potential impacts on quality of life, such as the psychological costs to the individual of a course of action. It is important to think through these issues with each individual participant so that alternative courses of action (with

lower psychological costs) can be considered. When individuals have diabetes problems that cause distress and problem solving cannot alleviate these problems, it is important to help them identify ways of coping with the problems. Often, individual participants will have effective coping techniques that they can employ; sometimes new coping techniques may need to be devised. Sometimes the problems to be dealt with involve other people in their lives. When this occurs, the educator can help patients develop strategies for dealing with these other people. Sometimes it may be helpful to bring these others into a collaborative process with the individual and educator.

Standard Data Elements for Outcomes/Performance Measurement

Psychosocial factors are quite diverse. Psychological distress, especially depression, is quite common and should be assessed.⁸⁶ There are numerous brief screening questionnaires that a participant can complete independently and that can be scored quickly.⁸⁷⁻⁸⁹ There is also a diabetes-specific measure of distress.⁹⁰ Diagnostic interviews permit diagnosis of psychological disorders but generally are more elaborate and require training in administration.⁹¹

Quality of life can also be measured by a variety of paper-and-pencil questionnaires.^{92,93} Several investigators have developed

diabetes-specific measures of quality of life.^{94,95} Understanding factors that are measured by these instruments (eg, functional limitations, disease burden, and satisfaction with treatment) can be very useful in formulating behavior change plans and assessing the impact that changes have on individuals' lives.

Peoples' psychological adjustment and success in dealing with the challenges of living with diabetes are strongly influenced by their coping skills and the social support they receive from others. Coping skill measures can be generic or diabetes specific.^{84,96} Social support measures also may be generic or diabetes specific.^{97,98}

Another essential psychosocial dimension is health-related beliefs and perceptions related to behavior change (eg, treatment self-efficacy, readiness/intention to change, and barriers to treatment).^{99,100} These factors are domain specific to a significant degree.¹⁰¹ Individuals may be interested in changing one behavior but not others; barriers may inhibit change in one behavior but not

another. Measuring these factors as they relate to specific self-care behaviors represents an important step in identifying targets for educational interventions and assessing outcomes. A measurement instrument that captures many of these dimensions is the Diabetes Self-Management Assessment Report Tool (D-SMART™).

CONCLUSIONS

In this day of evidenced-based medicine, diabetes educators must gather the evidence to support their practices and modify their interventions in response to the evidence. Application of the 7 core outcomes/performance measures to evaluate effectiveness provides the educator and the clinician with the ability to understand what is working and what is not. As the profession of diabetes educators matures, the establishment of a unique core of knowledge about specific patient-focused interventions will emerge. It is only with the clear understanding and adoption of standards and core measures for DSME outcome measurement that the profession will progress to a level of maturity that establishes it as an essential therapeutic intervention in the care of people with diabetes.

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GLOSSARY OF TERMS

Accountability The level of adherence to healthcare standards that can influence accreditation and reimbursement; the state of being accountable; liability to be called on to render an account

Cost-benefit A ratio measure of the costs to administer or deliver an intervention, medication, or service (measured in dollars) to the long-term savings that delivery will provide (measured in dollars)

Cost-effectiveness A ratio measure of the costs to administer or deliver an intervention, medication, or service (measured in dollars) to the impact on a health outcome (ie, clinical indicator, quality of life)

Concurrent validity A type of validity measurement that is accomplished by simultaneously collecting data from a sample population on both the scale of interest and criteria, hypothesized to relate to the scale of interest

Cost outcomes Economic factors associated with a health outcome of interest; generally reported as ratio measures of cost-effectiveness and cost-benefit

Criterion validity A type of validity measurement used to evaluate the degree to which one measurement agrees with other approaches for measuring the same characteristic; the 3 types of criterion validity are called concurrent, predictive, and known groups

Face validity A type of validity measurement that requires subjective judgment of whether a scale is actually measuring the construct it is intended to measure

Functional status The evaluation of how individuals perform typical behaviors without limitations due to health problems

Health outcomes Includes the measurement of learning, behavioral, clinical, and functional status as well as patient-centered outcomes of satisfaction and well-being

Health-related quality of life A broad term covering 5 concepts, including duration of life, impairments, functional states, perceptions, and social opportunities; these are health related to the extent that disease, injury, treatment, or policy influences them

Intrarater reliability A type of reliability measurement that is used to evaluate whether the same observer can obtain similar responses over time when the scale is administered 2 or more times

Interrater reliability A type of reliability measurement that is used to evaluate the ability of obtaining similar responses on the same sample population when 2 or more observers are completing the scale

Internal consistency reliability A type of reliability measurement that is used to evaluate the correlation of multiple items measuring the same characteristic within the same scale; this measurement is typically described by Cronbach's alpha

Measurement The process of evaluation and quantification of a healthcare indicator

Outcomes End results, or that which results from the delivery of healthcare services

Outcomes measurement The assessment of indicators of health status, satisfaction, survival, and costs as associated with the delivery of healthcare services

Outcomes monitoring The frequency and interval of measuring outcomes

Outcomes management The systematic feedback of outcomes measurement and monitoring that helps drive decision making as related to the delivery of an intervention or service

Performance An evaluation of what a healthcare service delivers (process) as well as achieves (outcomes)

Performance measurement An objective evaluation and quantification of a healthcare indicator such as quality; the first step in the process of performance measurement, assessment, and improvement; similar to the outcomes measurement process involving measurement, monitoring, and management

Process measures The description of what a healthcare service performs or delivers

Quality assurance Describes and evaluates the level of adherence to quality indicators and healthcare standards

Quality improvement A continuous process that identifies problems in healthcare delivery, examines solutions to those problems, regularly monitors the solutions to those problems, and regularly monitors the solutions for improvement

Reliability The repeatability, reproducibility, or internal consistency of a scale or survey instrument

Test-retest reliability A type of reliability measurement that is used to evaluate the ability of a scale to reproduce the same results consistently over time when administered to the same population, assuming no intervention affecting the scale has occurred

Validity The accuracy or ability of a scale or survey instrument to measure the construct of interest

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