Use of Internet Technology to Support Nutrition and Diabetes Self-Management Care

Margaret A. Powers, PhD, RD, CDE; Susan Burke March, MS, RD, LD/N, CDE; and Alison Evert, MS, RD, CDE

Medical nutrition therapy (MNT) includes determining individuals' specific nutritional needs based on their medical status and disseminating this information to them in a manner that enables understanding and adherence to the goals they set with their health care providers. The great challenge to this is that MNT requires patients to make behavioral decisions in environments that may or may not support the planning and execution of these recommendations. Thus, MNT needs to take into consideration the variety of situations in which food decisions are made and determine whether patients are confident and comfortable implementing the nutrition recommendations. As health professionals, it is important to anticipate and provide support and resources to each individual to maximally implement the MNT recommendations.

For some patients, the Internet can be a valuable resource to provide ongoing information and support outside of the health care organization (Table 1). A variety of websites are available that can enhance and reinforce nutrition information, provide behavioral and motivational support, and track events. The use of websites can be a thoughtful, planned component of the health care intervention. The purpose of this article is to describe and categorize currently available options and provide guidelines that are useful for evaluating websites.

Access to Websites
Although many people have ready access to the Internet in their home or place of employment, some patients may not have access, may have limited computer skills, or may not be able to use their work computer for personal tasks. To facilitate the use of the websites presented in this article and other recommendations, it may be helpful to provide a list of resources available to patients for accessing the Internet. Some common helpful resources are the local public library, community centers, community colleges, and technical schools. Also, friends and family who own computers may be willing to help patients gain Internet access.

Categories of Nutrition Websites
There are three basic categories of nutrition/health websites that can be used to support diabetes MNT. These include those providing 1) content information, 2) behavioral and motivational support, and 3) a means of tracking data.

Content information sites
The vast array of websites makes it challenging for health professionals to know to which content and concepts patients have been exposed. Many patients access the Internet to gather facts to better understand what diabetes is, how it is treated, and what they can or should eat. With this information, patients may come armed to their first medical or education visit with the information...
they have gathered and appear ready to prescribe their own treatment. Other patients need help deciphering the information they have gleaned or may feel overwhelmed with the amount of information available or what they have discovered. Providing patients with a few key, high-quality websites can facilitate “content management,” as will discussing the content they obtained so clarifications can be provided as needed.

Behavioral and motivational support sites
As patients explore the content of various websites, they may feel motivated to take steps to follow therapy recommendations. The content information may list behaviors that could be followed to achieve desired outcomes. The presentation of these behaviors may stimulate a positive behavior change in a way that could not be achieved in a health office or clinic visit. Additionally, there are websites that specifically focus on the support aspect of diabetes self-management and guide patients in making and maintaining choices that promote positive outcomes. These sites may provide daily or weekly newsletters or short reminders that can be personally motivating. Some websites offer online support groups specifically targeting behavioral goals, including weight loss, fitness, and improving clinical indicators, such as blood glucose and blood pressure.

Data tracking sites
Diabetes decisions are driven by data, and the Internet has much to offer in supporting data collection. There are websites that allow patients to enter their food intake and physical activity to assess their carbohydrate and/or caloric balance. Other websites allow patients to download data from their blood glucose meters. There is also the personal side of diabetes data, which includes feelings, quality of life, and willingness and ability to carry out recommendations. Some websites touch on this type of data through assessing readiness to change and then personalize recommendations and provide a means of tracking progress.

Evaluating Websites
There are literally millions of websites that address the topics of health, nutrition, or diabetes. A Google search offers > 3 million websites on the topic of nutrition and diabetes and > 200 million on the topic of nutrition alone. Such sites are sponsored by health care facilities, health organizations, food companies, pharmaceutical companies, health device companies, specialty companies, and individuals with diabetes, and there are also bulletin boards, e-communities, and blogs on the topic. This great array of choices offers both opportunities and challenges.

Decision-point: how can a given website help patients?
To help patients sort through this maze, health professionals may want to become familiar with a handful of websites they can offer as specific examples of what might be valuable

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**Table 1. Reactions of Patients With Chronic Medical Conditions to the Internet**

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<tr>
<th>How e-patients with chronic conditions use information found on the web:</th>
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<tr>
<td>• 75% say the information affected a decision about how to treat an illness or condition.</td>
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<td>• 69% say the information led them to ask a doctor new questions or to get a second opinion.</td>
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<tr>
<td>• 61% say the information changed their overall approach to maintaining their health or the health of someone they help take care of.</td>
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<tr>
<td>• 57% say the information changed the way they cope with a chronic condition.</td>
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<tr>
<td>• 56% say the information changed the way they think about diet, exercise, or stress management.</td>
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<tr>
<td>• 36% say the information affected a decision about whether to see a doctor.</td>
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**Table 2. Examples of Internet Search Topics for People With Diabetes**

| Menu planning |
| Quick recipes |
| Recipes modified for carbohydrate, fat, protein, calories |
| Recipes and food sources for select medical conditions such as celiac disease |
| Healthful eating guidelines |
| Shopping tips and coupons |
| Carbohydrate and diabetes |
| Weight management |
| Physical activity |
| Record keeping (activity, blood glucose monitoring, weight, food records, caloric intake, medications) |
| Emotional support/networking/chat groups |

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Table 3. Guide to Evaluating Health-Related Websites

Author
• Is it clear who writes or is responsible for the material on the site?
• Are the author’s credentials provided?
• Is there a sponsoring institution and, if so, how credible and well known is it?
• Is a third-party supporting or sponsoring the site?
• Is contact information given for the author or sponsoring institution?

Purpose
• Is the purpose or mission of the website or sponsoring organization stated?
• Is the purpose to inform, persuade, sell, present a viewpoint, or create or change an attitude or belief?
• Is there advertising on the site, and, if so, is it clearly differentiated from the informational content?

Date
• Is it clear when the site was last updated? Health and medical information changes rapidly, and ongoing research leads to new insights. Look for the most recent information you can find.

Content
• Does the site exhibit good grammar, spelling, and literary composition?
• Does the information consist of documented facts or personal opinion?
• Are the sources of factual information provided so they can be verified?
• Is there comprehensive coverage of the subject matter?
• Are there external links to other sources of information?
• Does an editorial board or health care professional review the content? What criteria are used for selecting information displayed on the site?

Reasons to be skeptical about health information on a website:
• No author or date
• Vague or sweeping generalizations
• Overstated significance
• Extreme tone or language
• Absence of source documentation, especially for numbers or statistics
• Personal testimonials as the only source of information
• Purported miracle cures recommended in lieu of prescribed medicine


and what might be detrimental to advancing therapy adherence. A Pew Internet Project found that, of patients who seek health information online, 81% seek information because of a family member’s or friend’s illness, 58% seek information for themselves, 46% use online information to influence their treatment decisions, and 34% say their overall approach to health care changed as a result of online information.

The first decision point in recommending a website is to determine

Decision-point: how can you judge a website’s quality?

A variety of evaluation tools have been developed for evaluating health websites and can be found by doing an Internet search using the terms “evaluate health websites” or other similar words of your choice. The evaluation criteria typically include credibility of the author/sponsor, purpose, objectivity, quality of information, graphics and design, and ease of use. One evaluation tool can be found in Table 3.

An easy cue to identify a reputable site is to look for those with URLs that end in “.gov.” These are government-sponsored sites, such as those maintained by the National Institutes of Health (www.niddk.nih.gov/http://medlineplus.gov), the U.S. Department of Health and Human Services (www.healthfinder.gov), and the Centers for Disease Control and Prevention (www.cdc.gov/diabetes). Another easy cue is to go to sites sponsored by national health organizations, such as the American Diabetes Association (www.diabetes.org) or educational sites with URLs that end in “.edu,” which means they are maintained by educational institutions. Reasons to be skeptical about a particular website are included in Table 3.

Review of Websites

We reviewed a number of websites, databases, and online diabetes handouts and have provided a summary of their content in Tables 4 and 5. These sites were selected because they were created with expert supervision, do not advocate quick weight loss, and have tracking capabilities. There are many other sites that meet these basic criteria; these were selected to provide a glimpse of what you can expect from a website. We suggest that you review what we have done and then browse the web to check out sites your patients mention to you and explore others that may have potential to meet the goals of your patients.

Looking to the Future

Reliance on technology is one of the things that young people, Baby Boomers, and even many senior citizens in the United States have in
<table>
<thead>
<tr>
<th>Name and Web Address</th>
<th>Program Description, Focus, Primary Contributors, User Involvement</th>
<th>Nutrition and Activity Guides</th>
<th>Additional Knowledge Resources</th>
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<td><strong>Weight Management: Free</strong></td>
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| **SparkPeople.com** | - Self-help and directed. A phased-approach, including community, planning, tracking, self-awareness, and fitness planning  
- Contributors: include registered dietitians (RDs), certified fitness experts, and behaviorists  
- Presents information in an entertaining manner promoting increased usage; videos, blogs, boards, and chat rooms are incentives to log in and participate  
- Redeemable “SparkPoints” awarded for desired behaviors | - Defined or user-chosen menus; recipe analyzer; ability to add recipes to personal program; shopping lists  
- Fitness plan with videos and demonstrations  
- Superior nutrition and activity trackers | - Peer-supported type 2 diabetes condition center  
- Extensive library of diabetes information written by RDs |
| **Calorie Count Plus (from About.com)**  
[caloriecount.about.com](http://caloriecount.about.com) | - Self-help  
- Contributors: RDs, physicians, certified fitness experts, and behaviorists  
- Participants use a tracker to enter foods from a nutrition database. Program assigns grades to foods and lists suggested lower-fat or lower-calorie substitutes to reinforce more healthful choices | - No defined menus or shopping list  
- Recipe builder allows users to enter their own recipe ingredients, analyze nutrition, and save recipes as favorites  
- Personalized fitness plan: 12-week exercise plan with ability to set up a complete exercise program of cardiovascular, strength training, and flexibility exercises | - Links to About.com for health, behavior, and food content |
| **FitDay.com** | - Self-help. A tracking site, with tools including a comprehensive food database, meal tracking, nutritional analyses, and exercise calculators  
- Users customize goals and reports and can log weight, activities, and calories eaten and compare their nutrient intake to recommendations based on unique user profile (self-entered data) | | |
| **Nutrition and Diabetes Management: Free** |
| **Diabetes Care Plan from ChangingDiabetes-us.com (from NovoNordisk)**  
[www.changingdiabetes-us.com](http://www.changingdiabetes-us.com) | - Self-help and directed program  
- Systematically guides user to address coping with and learning about diabetes; developing a care plan; and tracking progress  
- Contributors: include RDs, RD/certified diabetes educators (CDEs), certified fitness experts, and behaviorists | - Offers recipes to serve 1 or 4 people; defined menus with ability to substitute foods, shopping lists, a nutrition tracker, commenting/logging tools, and a blood glucose diary  
- General fitness guidelines | - Comprehensive diabetes information via articles, videos, and podcasts  
- Reviews diabetes signs and symptoms, medications, healthy living, eating and physical activity, and coping issues  
- Bulletin boards link to expert advice columns |

*Continued on p. 95*
<table>
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<td><strong>Diabetes Control for Life</strong>&lt;br&gt;(from Abbott Labs and Glucerna.com)&lt;br&gt;www.diabetescontrolforlife.com</td>
<td>• Self-help and directed program. 24-week plan with content to encourage behavioral modification&lt;br&gt;• Survey to assess readiness to change&lt;br&gt;• Goal guidance&lt;br&gt;• Emphasizes diabetes control with food, fitness, and behavioral modification&lt;br&gt;• Contributors include RDs, certified fitness experts, and behaviorists (no CDEs at time of review)&lt;br&gt;• Users read three articles weekly pertaining to healthy living with diabetes; targeted e-mail reminders encourage users to log in and stay on track</td>
<td>• Pre-planned meal plans (recommends Glucerna products but users may substitute from foods database and print updated shopping lists&lt;br&gt;• Fitness plan&lt;br&gt;• Comprehensive tracking and reporting tools for weight, meals, activities, blood glucose, and medications</td>
<td>• Live RD support via instant messenger during normal business hours&lt;br&gt;• Comprehensive library on diabetes, including signs and symptoms, medications, healthy living, eating and activity, and coping</td>
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**Weight Management: Subscription**

| MyFoodDiary.com<br>$9/month: no minimum commitment | • Self-help. Allows users to track food and activities and compare to recommendations<br>• Tools track daily intake and activities and offer instant reports showing how to make small changes to improve<br>• Contributors include licensed nutritionists and certified fitness experts | • No preplanned meal plans<br>• Users manually add items to “fridge” and analyze. Program notes nutrient balance and offers sample meal plans<br>• Comprehensive foods database and recipe analyzer<br>• Ability to save to personal database | • Expert-written articles on nutrition, exercise, and lifestyle issues |

| CalorieKing.com<br>$7/month or $45/year: cancel within 7 days and no penalty<br>(free trackers, recipes, articles) | • Self-help and directed<br>• Offers CalorieKing University, a 4-week opt-in program of four lessons per week covering nutrition, activity, behavioral change, and balancing lifestyle<br>• Users can track calories and compare to goals<br>• Excellent nutrition tracking tools and diabetes content; a downloadable tool bar is offered in partnership with the Joslin Diabetes Center<br>• Program director is an RD/CDE. Contributors also include a certified fitness expert and behaviorist | • Suggested meal plans; no shopping lists<br>• Excellent recipe search function by calories, nutrients, or type of recipe<br>• Users can also track meals and save favorites<br>• Activity tools include core fitness, videos, and activities calculators, as well as a walking program with a step counter | • Support includes forums, blogs, study groups, and live chat with peers |

*Continued on p. 96*
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| **Diet.com**
$64.80/3 months (including $19.95 nonrefundable sign-up fee; basic tools are free with registration) | • Self-help and directed  
• Members complete a personality-type diet quiz developed by Robert Kushner, MD. Quiz results determine eating, coping, and exercise personality. The resulting individualized program and content reflects the profile  
• Opt-in for four-phased approach with weekly messaging, tips, and activities  
• Contributors include RDs, certified fitness experts, and behaviorists who produce content for a site blog and videos  
• Site links to podcasts on youtube.com | • No preplanned menus  
• Users track meals and save favorites  
• Menu suggestions are offered  
• Tracking tools for food, exercise, weight, and blood glucose  
• Users can customize fitness plan by choosing exercises | • Many opportunities to communicate with peers  
• Members can communicate directly with lead RD and Dr. Kushner |
| **eDiets.com**
$53.88/3 months minimum: $25 early termination fee (register for free nutrition tracker) | • Self-help  
• People with type 2 diabetes can choose one of 22 different calorie-controlled plans with preplanned menus  
• Users may customize shopping lists  
• Tools include nutrition and activity trackers and calculators. Users can graph weight, blood pressure, cholesterol, and blood glucose  
• Contributors: include RD/CDEs | • Preplanned menus offer approximately 40% carbohydrate, 30% protein, and 30% fat with a minimum of three meals and two snacks | • Live support 7 days a week from RDs and dietetic technicians  
• RD/CDE holds weekly online moderated chat about diabetes |
| **Weight Watchers.com**
$65 for the first 3 months, $16.95 for each additional month | • Self-help and directed  
• Users take online assessment to find BMI and caloric needs and define fitness activities necessary to achieve weight loss  
• Content and targeted e-mail to promote health behaviors including eating and activity  
• Online program options include Core plan with defined menus, or Flex plan to track food points  
• Ability to track weight and points and to generate reports  
• Contributors include RDs | • Many recipes to choose from or users can use a tool to build and analyze their own recipes  
• Fitness recommendations are based on individual’s level and offer demonstration videos | • New monthly pass offers unlimited monthly face-to-face meetings plus online tools. A study posted on the website shows that face-to-face meetings plus online tools produced more weight loss than meetings alone |
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<td>VTrim <a href="http://www.uvm.edu/~vtrim/">www.uvm.edu/~vtrim/</a> $595/6 months $120/6 months maintenance</td>
<td>• Directed program: 24-week research-proven behavioral modification program to promote healthy eating and consistent activity (published data at 6 and 12 months) • RD-led program. RD-developed and tested at the University of Vermont’s Obesity Research Center • 20-member group starts together and works with their team expert to set daily calorie and activity goals; team expert leads online weekly meetings • Participants receive weekly lessons before online meeting, complete homework, and submit their work to move to next lesson • Participants record food and activity in online journal and receive personalized feedback from team facilitator through targeted e-mail</td>
<td>• Nutrition and activity trackers • Walking program • Meal planning and activity discussed in classes; varies by participants’ questions and needs</td>
<td>• Online support board • Maintenance plan after 6 months</td>
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**Nutrition and Diabetes Management: Subscription**

| Nutrihand.com Premium (Nutrihand Basic has free online tools.) www.nutrihand.com $9.95/month Nutrihand Pro; $85.95/year unlimited clients | • Premium service is self-help • Contributors to program and content include RDs and fitness and behavior experts • Program tracks medical indicators, including blood glucose, A1C, blood pressure and cholesterol. Users may download from their glucose meters and share information with a clinician • Specific tools and trackers available for insulin pump users • “Nutrihand Pro” allows health care providers to sign up for privacy-protected platform and privately communicate with their participant clients as they view journals, blood glucose data, and other medical indicators. Aids in managing patient care. | • Offers menus and allows users to build their own meals from foods database • Customized fitness plans for all levels | • Bulletin boards |

*Continued on p. 98*
common. Innovative diabetes self-management education and diabetes MNT strategies are key to engaging today’s technology-savvy population. The interactive format of the Internet and its availability 24 hours a day make it an appealing mode of communication for many people. As health professionals trying to facilitate behavior change among consumers of online health care advice, we must become knowledgeable and skilled in the use of technology in diabetes care. An important aspect of that is keeping abreast of the services available on the Internet.

Lifestyle behaviors and choices of both young people and adults in the United States have resulted in the twin epidemics of obesity and diabetes, sometimes called “diabesity.” Weight concerns are not limited to only those with type 2 diabetes; many individuals with type 1 diabetes also are struggling with the consequences of inactivity and poor food choices. Many are turning to the Internet to find help in their weight loss efforts.

Although many of the websites evaluated in this article are not exclusively designed for people with diabetes who are trying to lose weight, some can be used successfully to increase physical activity or initiate or monitor other health care behavior changes. The small sampling of websites shared here reveals the variety of information available to patients. It includes sites devoted specifically to nutrition information; those offering personalized meal plans and fitness regimens; online shopping lists; recipe sites; online record-keeping tools; secure platforms to share personal health information with health professionals; and convenient access to online support.

However, technology must be used with caution, especially for individuals with a chronic condition, such as diabetes. It is well known that not all websites provide safe and reliable health information. Health professionals should try to stay informed about their patients’ use of Internet technology because it may affect their care. For example, if patients are able to successfully initiate health behavior changes that result in weight loss or increased levels of physical activity, their diabetes medications may need to be adjusted. Information provided in this article can serve as a template for health professionals to use to evaluate available nutrition and lifestyle behavior websites.

What is the future of diabetes and nutrition technology? Be assured, technology will continue to move forward at a rapid rate. The future might well include devices that can be worn by individuals to electronically record actual food intake, medications, physical activity, blood glucose levels, and other health information that can be uploaded in a secure platform and shared in real time with health professionals. Unfortunately, as technology evolves, health professionals will surely continue to struggle with the challenge of integrating new resources into clinical practice. Many health professionals are enhancing their practices with web-based nutrition and fitness platforms and are saving time and improving communication with their patients. Among the unanswered questions remaining is the issue of how health professionals will be compensated for evaluating increasing amounts of electronically gathered and disseminated health data (especially if their evaluations

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| **Spanish Language Weight Management: Subscription**      | • Self-help and weekly phone consultation  
• Contributors include RDs  
• Includes complete evaluation to ascertain usual foods, fitness, and attitudes about eating and activity  
• Program reflects entered data  
• Opt-in for 12-week educational plan for healthy behavior change  
• Opt-in for weekly phone consultation with an RD  
• Log on to English or Spanish website | • Offers healthy eating plan with calories for weight loss or maintenance  
  
• Bulletin boards                                                                                       |                                                                                          |
| MiDieta.com (MyDiet.com)  
www.midieta.com  
Weight management $35/3 months or $54/3 months includes weekly consult with dietitian (bilingual) |                                                                                       |                                                                                              |                                                     |
| **WeightWatchers.com**  
www.weightwatchers.com/es  
$65 for first 3 months  
$16.95 for each additional month | • Same features as English language version described above  
• Online program reflects diverse Hispanic community |                                                                                              |                                                     |
| **Spanish Language Nutrition and Diabetes Management: Free** |                                                                                       |                                                                                              |                                                     |
| Diabetes Care Plan from ChangingDiabetes-us.com  
(from NovoNordisk)  
www.changingdiabetes-us.com/enEspano | • Same features as English language version described above |                                                                                              |                                                     |
occur outside of traditional medical offices) and how various state laws may affect health professionals who try to incorporate telemedicine.

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**Note of disclosure:** Dr. Powers has served on an advisory panel for Eli Lilly and Co. and has received research support from Abbott Diabetes Care. Ms. Evert has served as a consultant to Eli Lilly and Co. Both companies have Internet websites mentioned in this article.

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| Nutritiondata.com www.nutritiondata.com | • Nutrition analysis of thousands of individual foods and beverages, including fruits, vegetables, grains, dairy foods, animal products, meat alternatives, fats, alcohol, packaged and processed foods, meal replacements, and nutrition formulas  
• Food composition data from a variety of published and unpublished sources, with the largest provider of data being the U.S. Department of Agriculture. Nutritiondata.com cannot guarantee 100% accuracy but attempts to check or verify all data entries. The data source for each food is identified in the footnotes section of every analysis. |
| Calorie King www.calorieking.com | • Nutrition analysis of thousands of foods and beverages, including national chain restaurants, packaged and processed foods, and meal replacements  
• Database updated annually  
• Database can be uploaded to PDA for a fee  
• Pocket-sized book available at local and online bookstores for a fee  
• Industry-sponsored |
| American Dietetic Association Diabetes Care & Education Dietetic Practice Group www.dce.org/publications/slicks.htm | • Diabetes nutrition and self-care management patient education handouts  
• Handouts created by RD/CDEs |
| National Diabetes Education Program www.ndep.nih.gov | • Diabetes nutrition and self-care management patient education handouts  
• English and Spanish languages  
• Handouts available for children, teens, and adults  
• Handouts created by CDEs and field-tested |
| BD Diabetes: health care professional website www.bddiabetes.com/us/hcp | • Diabetes nutrition and self-care management patient education handouts  
• English and Spanish languages  
• Handouts created by health professionals including CDEs  
• Industry-sponsored |
| Humalog Insulin: health care professional website www.humalog.com/patient/insulin_educational_materials.jsp | • Diabetes nutrition and self-care management patient education handouts  
• Languages include Chinese, Creole, English, Korean, Portuguese, Russian, Spanish, Tagalog, and Vietnamese  
• Handouts created by health professionals including CDEs  
• Industry-sponsored |