

APPENDIX 3. CHAPTER 3 LITERATURE REVIEW SUMMARY

| Table Reference Number/Authors/Text Section | Sample | Health Topic Area/Locus of Use/Technology | Description of the Tool | Overview | Measures | Outcomes |
|--|--|---|--|--|---|--|
| Randomized Controlled Trials | | | | | | |
| 1. Anderson ES, Winett RA, Wojcik JR, Winett SG, Bowden T. A computerized social cognitive intervention for nutrition behavior: direct and mediated effects on fat, fiber, fruits, and vegetables, self-efficacy, and outcome expectations among food shoppers. <i>Annals of Behavioral Medicine</i> 2001;23:88-100. [Overview, Applicability] | 277 adult supermarket shoppers; 96% female, 92% Caucasian, median income \$35,000, mean education 14.78 +/- 2.11 years | Nutrition: supermarket computer kiosk | Nutrition for a Lifetime System (NLS): a self-administered, computer-based intervention providing personalized information, behavior strategies, incentives for change, goal-setting, and feedback on specific nutrition behaviors. Contains 15 weekly segments. | Control group: no intervention. Intervention group: interaction with NLS in supermarket | System usage; intake of fat, fiber, fruits, and vegetables; self-efficacy; physical outcome expectations; social outcome expectations | Mean of 10 segments viewed per participant. Intervention group: improved levels of fat, fiber, fruits, and vegetables; higher nutrition-related self-efficacy; physical outcome expectations; and social outcome expectations. More likely to attain goals for fat, fiber, and fruits and vegetables at posttest. Fat goal maintained at followup. |
| 2. Barrera M, Glasgow RE, McKay HG, Boles SM, Feil EG. Do Internet-based support interventions change perceptions of social support? An experimental trial of approaches for supporting diabetes self-management. <i>American Journal of Community Psychology</i> 2002;30:637-54. [Overview, Applicability, Key Findings] | 160 men and women with type 2 diabetes; recruited from physician offices. Sample restricted to those who did not have Internet access at home or work; mean age 59, 53.1% women. | Diabetes: home computer with Internet | Diabetes Web site: All had online articles about diabetes. Coach group also had a coach who gave dietary advice and help with goal-setting. Social support group could exchange information, coping, and support through a peer-directed forum, message boards, and real-time chat. Combined group had all of the above. | Participants randomized into four groups: Information Only, Personal Coach, Social Support, Combined Social Support and Coach. Participants were provided with computers and training. Access was restricted to just the resources in the condition to which they were assigned. | Social support | Participants in the Social Support Only condition had the greatest increase in perceived social support, followed by the Combined conditions, then the Coach. Only conditions, and finally the Control condition. Only the contrast between the two support conditions and the control condition were significant. |

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| 3. Bernhardt JM. Tailoring messages and design in a Web-based skin cancer prevention intervention. <i>International Electronic Journal of Health Education</i> 2001;4:290-7. [Appropriateness, Applicability] | 83 college students; mean age 21.6, 59% female; 86% Caucasian, 8% African American, 2% Asian or Pacific Islander, 1% Hispanic, and 2% other | Cancer prevention: home computer with Internet | Tailored Web page containing messages about outcome expectations of using sunscreen, perceived self-efficacy to use sunscreen, skin cancer risk, high-risk behaviors, barriers, perceived risk, and personal involvement with skin cancer. These derived from more than 30 pieces of data from each participant. Users chose message source, font, and font color. | Control group viewed a generic Web site about skin cancer prevention; Intervention group viewed a Web site that is tailored in both content and design. | Attitudes, risk behaviors, self-efficacy, expected outcomes, barriers, behaviors | More in intervention group reported reading the Web page. Intervention group had trend toward liking the source better. Intervention group followed more links. Control group found their Web page more relevant, while intervention group found Web page more personalized. No difference in self-efficacy to wear sunscreen or expected outcomes of wearing/not wearing sunscreen. No difference at followup to sunscreen-wearing behaviors. Treatment group showed a reduction in two of five barriers. |
| 4. Campbell MK, Honess-Morreale L, Farrell D, Carbone E, Brasure M. A tailored multimedia nutrition education pilot program for low-income women receiving food assistance. <i>Health Education Research</i> 1999;14:257-67. [Appropriateness, Acceptability, Applicability, Key Findings] | 378 low-income women, primarily African American women enrolled in the Food Stamp program in Durham, NC | Nutrition: clinic-based computer with interactive multimedia program | Sisters at Heart: Tailored multimedia program using tailored soap opera and interactive "info-mercials" that provide tailored feedback about dietary fat, knowledge, strategies for lowering fat that are based on stage of change, modeling through the soap opera story | Control group: no intervention; Intervention group: one session of Sisters at Heart | Usability, knowledge, stage of change, eating behaviors | 79% rated program as very helpful, 66% would use it again, and 55% said none of the information was new. Intervention group significantly increased knowledge, stage of change, and certain eating behaviors (baking meat and eating low-fat snacks). Both groups lowered their fat intake at followup but did not differ from each other. |

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| 5. Celio AA, Winzelberg AJ, Wilfley DE, Eppstein-Herald D, Springer EA, Dev P, et al. Reducing risk factors for eating disorders: comparison of an Internet- and a classroom-delivered psycho-educational program. <i>Journal of Consulting and Clinical Psychology</i> 2000;68:650-7. [Acceptability, Applicability] | 76 female university students, 67% Caucasian, 11% African American, 9% Asian, 7% Hispanic, Latina, 6% multiethnic or other | Eating disorder prevention: home computer with Internet | Student Bodies: an 8-week program designed to reduce body dissatisfaction and excessive weight concerns. It consists of readings, exercises, online journals, and a moderated online discussion group. | Control group: wait-list control; Intervention group 1: Student Bodies in-person sessions and other readings; Intervention group 2: Classroom education using Body Traps, a classroom intervention with a more traditional academic focus. This study attempted to increase adherence through use of motivators, specifically pass/fail grading based on completion of activities. | Compliance measures, body image, and eating attitudes and behaviors | 68% compliance in computer group vs. 57% in classroom group. Greater compliance in Student Bodies group using incentive than in previous studies. Found evidence of dose-response relationship. Computer group had significant reductions in weight/shape concerns compared to controls; at followup, disordered behaviors reduced. No significant effects were found between the Body Traps and wait-list control conditions. |
| 6. Chewning B, Mosena P, Wilson D, Erdman H, Potthoff S, Murphy A, et al. Evaluation of a computerized contraceptive decision aid for adolescent patients. <i>Patient Education and Counseling</i> 1999;38:227-39. [Acceptability, Applicability] | 949 adolescent patients in Chicago (96% African American) and Madison (94% white) family planning clinics | Contraceptive decision-making: clinic-based computer program | Aid for "Contraceptive Decision-making Program": user can choose a contraceptive method from a menu of choices, learn how method is used, graphical presentation of effectiveness, assess personal situation for appropriateness of method, method benefits and costs, feedback about barriers, and patient printout to facilitate discussion with clinician. | Control group: has standard clinic visit. Intervention group: interacts with computer program before clinic visit. | Reactions to computer use, contraceptive knowledge, outcome expectations re: birth control effectiveness, adoption of oral contraceptive (OC), discontinuation of OC, pregnancies | All Madison participants and 98% of Chicago participants liked the computer program. Significant increase in knowledge, greater immediate impact on outcome expectations, no effect of computer on length of usage of OC, trend toward reduced pregnancy in Madison but not in Chicago. |

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| 7. Clarke G, Reid E, Eubanks D, O'Connor E, DeBar LL, Kelleher C, et al. Overcoming Depression on the Internet (ODIN): a randomized controlled trial of an Internet depression skills intervention program. <i>Journal of Medical Internet Research</i> 2002;4:e14. [Acceptability] | 299 adults with and without depression recruited from a large HMO, matched by age and gender | Depression: home computer with Internet | Overcoming Depression on the Internet (ODIN): a self-paced, skills training program focusing on the acquisition and use of cognitive restructuring techniques | Control group: received a link to the Kaiser Permanente Online home page where they could receive information and were free to receive other treatment as needed. Intervention group received a link to the intervention. | Site usage, depression | Infrequent patient use of the site; found that their population was more seriously depressed than that for which the intervention was designed. No effect of Internet program across entire sample; post hoc analysis showed modest effect among those with lower level depression. Analyses showed no dose-response relationship but limited dose overall. |
| 8. D'Alessandro D, Kreiter C, Kinzer S, Peterson M. A randomized controlled trial of an information prescription for pediatric patient education on the Internet. <i>Archives of Pediatric and Adolescent Medicine</i> 2004;158:857-62. [Appropriateness] | 197 parents recruited from a pediatric practice with the majority white, female, and college-educated; 68% had used computer for health information | Health information: home computer with Internet | Specific Web sites on the World Wide Web | Control group: had standard clinic visit. Intervention group: offered computer training and information prescriptions (IPs) of recommended Web sites. Surveyed 2-3 weeks after clinic visit. | Use of IPs | Intervention group used the Internet more for general and child health information. 32% of those in intervention group used the IP. 66.2% of the Internet information resources used by the intervention group were prescribed by the physicians. Compared with nonusers, IP users were more likely to state they would use the IP again in the future and had already recommended the IP to family or friends. |

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| 9. Delichatsios HK, Friedman RH, Glanz K, Tennstedt S, Smigelski C, Pinto BM, et al. Randomized trial of a "talking computer" to improve adults' eating habits. <i>American Journal of Health Promotion</i> 2001;15:215-24. [Overview, Acceptability, Applicability] | 298 adults from a large medical practice. Mean age 45.9; 72.1% women; 44.9% Caucasian, 44.6% African Americans, 24.2% educated beyond college | Nutrition: home telephone-linked communication (TLC) system | TLC-Eat: an interactive, computer-based system. Uses computer-mediated digitized human speech over the telephone to ask questions to monitor the patients' behaviors; patient uses keypad to enter answers. This program focuses on improving dietary behaviors. | Control group: received TLC-PA (see Pinto et al., 2002). Intervention group: the TLC-Eat, enter answers to questions, TLC provides information, suggestions, help with goal setting, etc. | Food intake, stage of change, self-rated diet, intent to change, and confidence in making changes | Intervention group increased by 1.1 serving of fruit, other food groups showed positive trends. Dose-response relationship seen with higher users eating less fat, more fruit and fiber. More subjects in intervention group moved forward in stage of readiness to change for eating fruits and whole grains, but no difference for vegetables, red meat, and whole fat dairy products. |
| 10. Feil EG, Noell J, Lichtenstein E, Boles SM, McKay HG. Evaluation of an internet-based smoking cessation program: lessons learned from a pilot study. <i>Nicotine and Tobacco Research</i> 2003;5:189-94. [Overview, Acceptability] | 370 adult smokers, 72% female, 81% white, 80% at least some college | Smoking cessation: home computer with Internet | Quit-Smoking Network: Internet-based smoking cessation program using structured quit plan, interpersonal support with peers and professionals, anti-tobacco entertainment, library of information | Study used several different Internet and non-Internet recruitment strategies, randomized into one of four incentive and reminder conditions (\$10/e-mail, \$10/U.S. mail, \$20/e-mail, \$20/U.S. mail). | Satisfaction with program; how they found the Web site; smoking behavior, cessation, support, cessation self-efficacy, past use of other cessation aids | Most successful recruitment strategy made use of internet search engines and user groups, with search engines yielding the most participants. Cessation rate at 3 months was 18%. Participants recruited via Internet had higher cessation rates. No difference in response to questionnaires with \$10 or \$20 incentives. No difference in response to mail or e-mail followup reminders. |
| 11. Finkelstein L, O'Connor G, Friedman RH. Development and implementation of the home asthma telemonitoring (HAT) system to facilitate asthma self-care. <i>Medical Informatics</i> 2001;810-14. [Overview, Applicability, Cost Savings] | Asthma patients (did not describe further or provide N) | Asthma: home asthma telemonitoring (HAT) system | HAT system lets user enter data (peak flow, etc.), provides analysis, and points user to care plan, educational components; sends reports to providers. | Describes HAT system, reports on preliminary findings from a randomized controlled trial. | Compliance, test results | Preliminary findings show higher patient compliance to asthma action plans in comparison to control. Lung function test results collected at home were comparable to those collected under the supervision of trained professionals. |

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| 12. Glasgow RE, Toobert DJ. Brief, computer-assisted diabetes dietary self-management counseling: effects on behavior, physiologic outcomes, and quality of life. <i>Medical Care</i> 2000;38:1062-73. [Applicability] | 320 adult type 2 diabetes patients, mean age 60; 56% female, >89% white, more than one-half had attended at least some college | Diabetes; clinic-based computer program | Computer program designed to assess dietary patterns, barriers, and supports; then provide tailored feedback and a dietary fat reduction goal | All received one computer interaction at baseline and at 3 months. At 3 months, divided into four groups: basic condition (above). Telephone Followup (TF) also received three to four telephone support/problem-solving calls between 3 to 6 months. Community Resources (CR) received information about community resources and newsletters between 3 to 6 months. Combined received all. | Used RE-AIM (Reach, Efficacy/Effectiveness, Adoption, Implementation, and Maintenance) framework to evaluate. Other measures: dietary behavioral outcomes, physiological measures, quality of life, patient satisfaction measures, self-efficacy for dietary change, and use of community resources | The basic intervention allowed showed improvements in eating habits, especially in reducing fat intake; modest improvements in cholesterol and lipid ratios, and small reduction in HbA1c levels. No changes in quality of life or satisfaction scales. Reach=76% of eligible participated. Possible that the TF and CR interventions not strong enough to produce greater change. Adoption=100% of clinics approached adopted this technology. |

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| 13. Glasgow RE, Boles S, McKay G, Feil E, Barrera M. The D-Net diabetes self-management program: long-term implementation, outcomes, and generalization results. <i>Preventive Medicine</i> 2003;36:410-419. [Overview, Acceptability, Applicability] | 320 adult type 2 diabetes patients; mean age 59, mostly novice computer users, recruited from medical practices, 83% limited or no Internet experience | Diabetes: home computer with Internet | Diabetes Web site: All groups had online access to articles about diabetes information. The Peer Support (PS) group also had access to peer support, professionally monitored forum, and electronic newsletters. The Tailored Self-Management (TSM) group also had access to online professional for advice and support two times per week, feedback on intake and collaborative goal setting, tailored strategies to overcome barriers, dietitian question and answer conferences, and blood glucose and dietary databases and graphical feedback. | These results were a 10-month followup study. All received home computers for 10 months and were randomized into one of the three groups. | Dietary, behavioral, and biological, and psychosocial outcomes; implementation and process measures | Significant improvements from baseline in all groups on the majority of outcomes; significant changes in fat and fiber intake, psychosocial outcomes, modest for biological outcomes; PS condition showed greater increase in support measure. No differential effect of TSM condition. Decline in usage of site over study period. PS group showed most logins, followed by TSM, the basic condition. Reach=62% eligibles. Adoption=100% of clinics, 88% of doctors |

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| 14. Green M, Peterson S, Baker M, Harper G, Friedman L, Rubinstein W, et al. Effect of a computer-based decision aid on knowledge, perceptions, and intentions about genetic testing for breast cancer susceptibility: a randomized controlled trial. <i>Journal of the American Medical Association</i> 2004;292:442-52. [Acceptability, Applicability] | 211 women with personal or family histories of breast cancer from six U.S. medical centers; 74% <50 years old, 56% college educated, 93% white, >63% used computer sometimes or often | Cancer: clinic-based computer program | Breast Cancer Risk and Genetic Testing Program: interactive CD-ROM designed to help women make informed decisions about genetic testing. Contains information about who is at risk, how genes affect risk, and pros and cons of testing. Program is self-paced and user-driven. | Control group: has standard genetic counseling appointment. Intervention group: interacts with computer program before genetic counseling appointment. | Knowledge, perceived risk, intention to undergo genetic testing, satisfaction with decision, state of anxiety, satisfaction with intervention | Both groups increased knowledge from baseline level with significant increase in knowledge seen in low-risk women in intervention group as compared to low-risk controls. Greater benefit in women with less education. Overall absolute risk perception high at baseline and reduced in both groups after intervention with greatest reduction in low-risk women in control group. Significant reduction in intention to get testing in low-risk women in both groups. Actual testing did not differ by group. Both groups satisfied with decision. Mean anxiety within normal limits in both groups. Both groups liked interventions; more in computer group felt it made good use of their time. |

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| 15. Gustafson D, Hawkin R, Pingree S, McTavish F, Arora N, Mendenhall J, et al. Effect of computer support on younger women with breast cancer. <i>Journal of General Internal Medicine</i> 2001;16:435-45. [Overview, Applicability, Key Findings] | 246 newly diagnosed breast cancer patients under age 60; 74% white, 22.4% African American, 3.6% other persons of color | Cancer: home computer connected to central server | Comprehensive Health Enhancement Support System (CHES): contains 11 tools that provide information, decisionmaking tools, and support services | Control group: received a breast cancer book. Intervention group: received CHES. | System usage, patient outcomes, social support, information needs, participation in health care, quality of life | Used CHES 155 times/26 weeks of study. Caucasian women spent more time using discussion group, women of color spent more time using the decision services. Outcomes at 2 months: CHES group higher on information competence, level of comfort with participation in health care, confidence in their doctor. No change in quality-of-life measures. After 5 months, CHES group higher on social support, information competence. Participation in healthcare measures no longer significant. No change in quality-of-life measures at either point. Interaction effects show greater benefits for women of color, uninsured, less educated. |
| 16. Harvey-Berino J, Pintauro SJ, Gold EC. The feasibility of using internet support for the maintenance of weight loss. <i>Behavior Modification</i> 2002;26:103-16. [Acceptability, Applicability] | 46 overweight adults recruited from newspaper ads; 80.4% female, mean age 46.3, 91% at least some college, predominately white | Weight loss: home computer with Internet | The Internet-based maintenance condition consisted of biweekly chats, self-monitoring records, video clips of the therapist introducing topic for discussion in chats, e-mail contact from therapist, message boards, and unstructured chats | All participated in 15-week in-person behavioral weight control intervention and then randomized into three maintenance conditions: in-person therapist-led, internet therapist-led, and no treatment control. Both conditions met biweekly for 22 weeks using same content. | Satisfaction, attendance, weight loss | In-person therapist-led participants were more satisfied and more likely to attend meetings, but no difference between attrition, submission of self-monitoring data, or peer support contacts between intervention groups. No difference in weight loss between intervention groups (may be due to small sample size, inadequate computer systems that did not allow users to access all features). |

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| 17. Irvine AB, Ary DV, Grove DA, Giffillan-Morton L. The effectiveness of an interactive multimedia program to influence eating habits. <i>Health Education Research</i> 2004;19:290-305. [Acceptability, Applicability] | 229 subjects recruited from a hospital system in Colorado and 288 subjects from an international corporation in Illinois; 85% Caucasian, 73% female, mean age 43, almost 90% college educated | Nutrition: work site computer with interactive multimedia program | This program focused on improving nutrition behaviors. It used video narrators targeted to the users' demographic to provide guidance and support and videos of role models and testimonials to encourage positive behavior change and increase self-efficacy. Program was tailored by gender, content interests, race, and age. Main menu choices included eating strategies, recipes, barriers to healthy eating, assessment of eating habits, information center, and quick tips. | Participants from both sites matched on demographics. Pair then randomized into intervention or wait-list control. Data collected from both groups after intervention and then after wait-list control group used the intervention. | Fat eating habits and behaviors; fruit and vegetable consumption, healthy eating behaviors, stage of change, attitude toward healthy eating, intention, and self-efficacy | Spent an average of 35.75 and 32.09 minutes during the first session. Only 14.7% and 12.07% returned for a second visit, and only 7.5 and 1.7 returned a third time. Most users viewed adding fruit, vegetables, and fiber, then making low-fat food choices. Statistically significant differences found in fat eating habits, fruit and vegetable consumption, program behaviors, self-efficacy, attitude, intent to decrease fat, and stage of change between control and intervention at 1 month, between wait-list control after intervention. Changes in intervention group maintained 1 month after. |

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| 18. Krishna S, Francisco B, Balas A, Konig P, Graff G, Madsen R. Internet-enabled interactive multimedia asthma education program: a randomized trial. <i>Pediatrics</i> 2003;111:503-10. [Applicability, Cost Savings] | 228 children with asthma and their caregivers, younger than age 18, with asthma diagnosis seen in a pediatric pulmonary clinic. Caregivers—88% females, 90% white, 6% African Americans, 4% of other ethnic origins. 44% had high school education, 37% had 1 or more years of college, 9% had junior high school or less | Asthma: clinic-based computer program | IMPACT Asthma Kids CD consists of vignettes about asthma, environmental triggers, quick-relief and control medicines, and strategies to control and manage asthma. It has animated lessons, real-life scenarios, graphic templates. The program tracked educational progress of each child and generated reports re symptom level and medication use. | Control group: traditional asthma education group. Intervention group: received traditional and additional education through computer. Implemented more than three clinic visits. | Knowledge, health outcomes, healthcare use | The IMPACT program significantly increased asthma knowledge of children and caregivers, decreased asthma symptom days, and decreased the number of ER visits. The intervention group used a significantly lower average dose of inhaled corticosteroids at visit three. Asthma knowledge of all 7- to 17-year-olds correlated with fewer urgent doctor visits and less frequent use of quick-relief medications. ER visit savings: \$907.10 per child in the intervention group; \$291.40 per control group; reduced school absences—indirect savings realized by working parents and employers; reduction in medication. |
| 19. Lieberman D. Management of chronic pediatric diseases with interactive health games: theory and research findings. <i>Journal of Ambulatory Care Management</i> 2001;24:26-38. [Applicability] | 14 children age 8-13 with asthma | Asthma: clinic-based computer program | Bronkie the Bronchiasaurus computer game | Control group: watched a video about asthma; intervention group: played Bronkie. | Self-efficacy | Self-efficacy for asthma self-management increased for game group, decreased for video group. |

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| 20. Lieberman D. Management of chronic pediatric diseases with interactive health games: theory and research findings. <i>Journal of Ambulatory Care Management</i> 2001;24:26-38. [Applicability, Cost Savings] | 59 children age 8-16 with diabetes | Diabetes: home computer with interactive multimedia program | Packy and Marlon, an interactive computer game for diabetes self-care and disease management. Players learn about self-care and social situations. They help character monitor blood glucose, take insulin, eat balanced meals, etc. | Control group: given entertainment pinball video game with no health content. Intervention group: given Packy and Marlon. Both groups told they could play as much or as little as they wished. | Satisfaction, self-efficacy, communication, self-care, health care utilization | Intervention group liked the game as well as the control group liked theirs. Increased diabetes-related self-efficacy, in communication with parents about diabetes, and in daily diabetes self-care. By the end of 6 months, intervention group experienced a 77% drop in diabetes-related urgent care and ER visits, an annualized decrease of two urgent visits per patient per year. No decline in control group who remained at 2.4 urgent visits per year. |
| 21. McKay H, Glasgow R, Feil E, Barrera M. Internet-based diabetes self-management and support: initial outcomes from the Diabetes Network Project. <i>Rehabilitation Psychology</i> 2002;47:31-48. [Acceptability, Applicability] | 160 type 2 diabetes patients from 16 primary care offices; 75 men and 85 women; mean age 59, 25% with college degree | Diabetes: home computer with Internet | All received baseline program of access to information about diabetes. The Personal Self-Management (PSM) group had coach to work on dietary goals, online blood glucose tracking and graphing system with real-time feedback. The Peer Support Condition (PSC) had peer-directed forums for communication and support; information exchange. The Combined Condition (CC) had access to all of the above. | All received home computers for 10 months and were randomized into one of four groups: information only, PSM coach condition, PSC, or CC. | Web site activity, physiologic, diet and eating behavior, and mental health status | Little change in physiological measures; general improvement in dietary practices, substantial reduction in fat intake. PSC and CC had larger reductions in cholesterol; PSC and PSM had greater improvement in quality of life; PSM and CC had more logins than other conditions. |

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| 22. McKay HG, King D, Eakin EG, Seeley JR, Glasgow RE. The Diabetes Network Internet-based physical activity intervention: a randomized pilot study. <i>Diabetes Care</i> 2001;24:1328-34. [Acceptability, Applicability] | 78 adults with type 2 diabetes; recruited by postings to diabetes-specific usenet groups, listservs, Web sites, and online communities; mean age 53; 53% female; 82% Caucasian; 50% college grads; 62% employed full time | Diabetes: home computer with Internet | D-NET Active Lives Program: Internet-based supplement to usual care that focuses on providing support for (PA) including goal-setting, personalized feedback, identification and strategies to overcome barriers, online "personal" coach, peer support and online chat; online database for personal PA. | Control group: Internet-based information-only condition; Intervention group: access to intervention Web site | Process measures, minutes of PA per week, depressive symptomatology | No significant change in depressive symptoms. Overall moderate improvement in PA levels in both groups, no significant between-group differences in PA. Further analyses showed that more frequent site users in intervention group derived greater benefits in PA that were not seen in control group. Steep decline in usage in both groups during the course of study. Those in intervention group more satisfied than control. |
| 23. Napolitano MA, Fotheringham M, Tate D, Sciamanna C, Leslie E, Owen N, et al. Evaluation of an Internet-based physical activity intervention: a preliminary investigation. <i>Annals of Behavioral Medicine</i> 2003;25:92-9. [Overview, Acceptability, Applicability] | 65 sedentary adult hospital employees; 86% female, 14% male; 91% Caucasian; 92% skilled and confident using the Internet | Physical activity: home or work computer with Internet | Web site tailored by stage of change for physical activity and includes Activity Quiz, Safety Tips, Becoming Active, Physical Activity and Health, Overcoming Barriers, Planning Activity, Benefits of Activity, links to other sites, plus 12 weekly e-mail tip sheets. | Control group: wait-list control; Intervention group: used Web site plus 12 weekly e-mail tip sheets | Physical activity stage of change, physical activity, computer use | At 1-month follow-up, intervention group had progressed stage of readiness, had significant increases in moderate minutes and walking minutes vs. control. At 3-month followup, difference in moderate activity not significant, walking minutes still significant. |

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| 24. Neighbors C, Larimer ME, Lewis MA. Targeting misperceptions of descriptive drinking norms: efficacy of a computer-delivered personalized normative feedback intervention. <i>Journal of Consulting and Clinical Psychology</i> 2004;72: 443-7. [Overview, Applicability] | 252 heavy drinkers (four to five drinks in one sitting in previous month), college students. 104 men, 148 women, mean age 18.5, 79.5% Caucasian, 7% Asian American, 6.8% other | Alcohol: lab-based computer program | Intervention provided personalized normative feedback on alcohol consumption delivered by computer. Once baseline assessment completed, user received feedback on screen and print copy. Feedback contained information about how much they drank, how much they thought others drank, and how much typical students actually drank. | Control group: no intervention. Intervention group: interacted with computer program. | Perceived drinking norms, drinking behavior, social reasons for drinking | Intervention had small effects on drinking and medium effects on misperceptions in drinking norms at both 3- and 6-month followup. Changes in perceived norms were responsible for reduced drinking behavior. Social norm interventions appear to be more effective for those who drink for social reasons. |
| 25. Oenema A, Brug J. Feedback strategies to raise awareness of personal dietary intake: results of a randomized controlled trial. <i>Preventive Medicine</i> 2003;36:429-39. [Appropriateness, Applicability, Key Findings] | 304 adults who were students and employees of adult education centers in the Netherlands; mean age 44; 60% female; 47% had university degree or higher professional training | Nutrition: classroom and office-based computer with Internet | Web-based computer-tailored nutrition education session on personal awareness and intentions related to intake of fat, fruit, and vegetables. Program contained four sections: fat, vegetables, fruit, and recipes. In each section, relevant questions appeared, then user received feedback that included how user's computed scores compared to recommended levels. | Control group: received printed nontailored nutrition letter and brochures. Self-test group: used print self-assessments; Intervention group: used the computer-tailored intervention for one session. | Food intake, awareness of personal intake levels, attitudes, self-efficacy, usability | Those in the tailored group had more realistic self-rated fruit intake and self-rated fat intake, greater intention to decrease fat intake and increase vegetable intake than other groups. Those with less education in tailored intervention had more realistic self-rated fat intake than others. Those in tailored group more significantly reported that they had changed their opinions about their dietary habits and intention to change their diets. Tailored program was more likely to be used again than other interventions. |

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| 26. Oenema A, Brug J, Lechner L. Web-based tailored nutrition education: results of a randomized controlled trial. <i>Health Education Research</i> 2001;16:647-60. [Appropriateness, Acceptability, Applicability] | 200 adults recruited from adult education institutions in the Netherlands; mean age 44; 62% female; 47% had college degree | Nutrition: classroom and office-based computer with Internet | Web-based computer-tailored nutrition education session on personal awareness and intentions related to intake of fat, fruit, and vegetables. Program contains four sections: fat, vegetables, fruit, and recipes. In each section, relevant questions appear, then user receives feedback that includes how user's computed scores compare to recommended levels. | Control group: received general nutrition information letter. Intervention group: interacted with the computer program for one session. | Food intake, awareness of personal intake levels, attitudes, self-efficacy and stage of change, usability | Significant differences in awareness of self-rated fat intake compared to others and intention to change were found between intervention and control at posttest. Tailored intervention was better appreciated, rated as more personally relevant, and had more subjective impact on opinion and intention to change than general nutrition information. Both groups read most of information and rated them attractive to read. Tailored program was more likely to be used again and rated information as more personally relevant and newer to them. No effect of computer literacy on perceived attractiveness of computer program; however, those with lower computer literacy also reported that the program was more difficult to use. |

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| 27. Pinto BN, Friedman R, Marcus BH, Kelley H, Tennstedt S, Gillman MW. Effects of a computer-based, telephone-counseling system on physical activity. <i>American Journal of Preventive Medicine</i> 2002;23:113-20. [Overview, Acceptability, Applicability] | 298 adults from a large medical practice. Mean age 45.9; 72.1% women; 44.9% Caucasian, 44.6% African Americans, 24.2% educated beyond college (same sample as Delichatsos et al., 2001) | Physical activity: home telephone-linked communication (TLC) system | TLC-PA: a program designed to increase physical activity in adults. System inquires about current levels of activity, intentions, and whether they have met goals then tailors feedback to stage of motivational readiness. System asks users to set a task for themselves. Users call system each week. | Control group: received TLC-Eat. Intervention group: received TLC-PA. | Physical activity, stage of motivational readiness for physical activity | Intervention group had greater percentage of individuals meeting recommended levels of moderate or vigorous physical activity at 3 months, but not significant at 6 months. At 3 months, a significantly greater number of intervention group in action, but results were not maintained at 6 months. Fewer calls to TLC-PA as compared to TLC-Eat. Usage declined over the intervention period. Number of calls to the system did not predict outcome—no dose-response. |
| 28. Proudfoot J, Goldberg D, Mann A, Everitt B, Marks I, Gray JA. Computerized, interactive, multimedia cognitive-behavioural program for anxiety and depression in general practice. <i>Psychological Medicine</i> 2003;33:217-27. [Overview, Applicability] | 167 Adults recruited from general medical practices in England with anxiety, depression, or mixed anxiety/depression; mean age 44; 88% Caucasian | Depression and anxiety: clinic-based computer with interactive multimedia program | Beating the Blues: interactive multimedia program of cognitive-behavioral techniques; also includes homework projects. Has one introductory and eight 50-minute treatment sessions; expected to be used weekly. | Control group: received treatment as usual. Intervention group: received treatment as usual with exception of no face-to-face counseling or psychological intervention and interaction with computer program. | Depression, anxiety, work, and social adjustment | Intervention group showed significantly greater improvement in depression and anxiety compared to treatment as usual by the end of treatment and at 6 months' followup. Mean scores of depression and anxiety fell to almost near-normal levels. Also showed improvement in work and social adjustment. |

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| 29. Reis J, Riley W, Lokman L, Baer J. Interactive multimedia preventive alcohol education: a technology application in higher education. <i>Journal of Drug Education</i> 2000;30:399-421. [Applicability] | 643 undergraduates; 39% male, 61% female; 64% Caucasian, 15% African American, 11% Asian, 7% Hispanic | Alcohol: classroom computer- based program | CD-ROM with video, music, text, graphics, animations; simulations allow user to practice making choices; also addresses erroneous perceptions, communication skills and assertiveness, and physiological and behavioral consequences of alcohol. | Control group: no treatment. Traditional education group: received classroom education or classroom exercises. Intervention group: interacted with program. | Expectations, efficacy, peer norms, satisfaction | Intervention group significantly more knowledgeable about the symptoms of alcohol overdose; what to do on behalf of a friend in this condition; how to intervene with a friend who has been drinking too much; interplay of blood alcohol concentration, time, and amount; effects of alcohol on judgment and control. Greater intention to try to change their behavior to become more safe and in control in situations involving alcohol. The intervention group rated their educational experience more favorably than the traditional education. |
| 30. Ross S, Moore L, Earnest M, Wittevrongel L, Lin C. Providing a Web-based online medical record with electronic communication capabilities to patients with congestive heart failure: a randomized trial. <i>Journal of Medical Internet Research</i> 2004;6:e12. [Applicability, Cost Savings] | 107 patients with heart failure in a specialty practice; needed to have Internet experience, but were not required to have Internet access | Heart disease: home computer with Internet | SPPARO (System Providing Access to Records Online): Web-based electronic medical record, educational guide, messaging system enabling e-communication between the patient and staff | Control group: treatment as usual. Intervention group: treatment as usual and SPPARO | Satisfaction, health status, and self-reported compliance were done at baseline, 6 months, and 1 year; system usage, message volume, utilization of clinical services, and mortality | Trend for better satisfaction with doctor-patient communication. No difference in self-efficacy. Significant improvement in general adherence to medical advice. Increased emergency department visits in intervention group, but did not seem to be related to use of SPPARO; no difference in hospitalizations or mortality; no adverse effects reported. Use of SPPARO was highest in first 3 months, then leveled off. Electronic messages appeared to supplement rather than replace telephone messages. |

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| 31. Sciamanna CN, Clark MA. Effects of a fingerprint reader on survey responses of primary care patients. <i>Journal of Health Psychology</i> 2003;8:187-92. [Overview, Acceptability] | 76 adults; mean age 36.2, 80.3% female, 42.5% greater than high school education, 35.5% nonwhite, 5.3% Hispanic | Health information: clinic-based computer program with fingerprint reader | The fingerprint reader can be used to authenticate a user. It does not require use of standard identifying data, passwords, or ID cards. | Control group: did not have fingerprint scanned before using computer-based health screening. Intervention group: had fingerprint scanned, then used computer-based health screening. | Attitudes about the fingerprint reader, general health screening | Those who used the fingerprint screener reported poorer health status and lower levels of fruit and vegetable intake as compared to controls; therefore, did not seem to be underreporting as a result of fingerprint screener. No differences between groups in reports of other medical conditions, body mass index, physical activity, current smoking or drinking. No difference in groups in comfort using a computer. The intervention group reported fewer concerns about the fingerprint reader. |
| 32. Smith L, Weinert C. Telecommunication support for rural women with diabetes. <i>Diabetes Educator</i> 2000;26:645-55. [Applicability] | 30 women with diabetes living in rural Montana; mean age 46.7 years, 60% employed; only 2 had computers that could load the software, and the rest were loaned computers. | Depression: home computer with Internet | The program consisted of four components: conversation (open chat), mailbox (private exchange between two members or member and educator), health chat (chat with a diabetes educator), and resource rack (information about diabetes). All communication was asynchronous. | Control group: wait-list control. Intervention group: received computers and access to online community for 5 months. | Usage and satisfaction, social support, quality of life, life stresses, adaptation to illness | Group averaged 63.8 minutes/month; most time in first month and then usage decreased. Conversation area most widely used. No difference in psychosocial adjustment to illness or quality of life. 77% said project provided a great deal of support; 12 said it gave them a significant sense of connectedness. |

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| 33. Tate DF, Jackvony EH, Wing RR. Effects of Internet behavioral counseling on weight loss in adults at risk for type 2 diabetes: a randomized trial. <i>Journal of the American Medical Association</i> 2003;289:1833-6. [Overview, Acceptability, Applicability] | 92 overweight adults at risk for diabetes; recruited from newspaper ads or from clinic; mean age 48.5; 90% women; 89% white | Weight loss: home computer with Internet | Basic Internet program provided tutorial on weight loss; new tip and link each week; directory of selected Internet weight loss resources; message board; e-mail reminder to submit weight and weight loss information. The intervention group received counseling and feedback via e-mail that was based on submitted food and exercise diaries. | Control: basic Internet program. Intervention: basic Internet program plus e-mail counseling | Web site usage, body weight, waist circumference, physical activity, and food intake | Login frequency decreased for all groups over the course of the intervention. Intervention group used site more at all time periods than control. Significantly more weight loss and waist circumference decrease in the intervention group. 4.4 kg lost after 1 year in intervention group. |
| 34. Tate DF, Wing RR, Winnett RA. Using Internet technology to deliver a behavioral weight loss program. <i>Journal of the American Medical Association</i> 2001;285:1172-7. [Overview, Acceptability, Applicability] | 91 overweight adults recruited through an employer's Intranet Web site; 81 women, 10 men; mean age 40; 78% control group and 89% intervention group Caucasian | Weight loss: work site computer with Intranet | Web site reviews basic information related to weight loss and includes resources about diet, exercise, self-monitoring, and other behavioral resources. | All received initial session with a psychologist. Control group: Internet education/resources Web site. Intervention group: Internet education, 24 behavioral lessons via e-mail, weekly online submission of self-monitoring diaries with individualized feedback from a therapist, and an online bulletin board. | Web site usage, body weight, waist circumference, physical activity, and food intake | Login frequency significantly correlated with weight loss. Intervention group logged in more frequently than control group throughout the study, although both groups showed attrition after month 3. Behavior therapy group lost more weight than control group. More in the intervention group achieved 5% of total weight loss goal. Greater decrease in waist circumference in intervention group. |

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| 35. Valdez A, Banerjee K, Ackerson L, Fernandez M. A multimedia breast cancer education intervention for low-income Latinas. <i>Journal of Community Health</i> 2002;27:33-51. [Overview, Applicability] | 1,197 low-income, low-education Latinas recruited from three community health clinics, two medical centers, and one community-based organization | Cancer: clinic-based touch screen computers in free-standing kiosks | Multimedia Breast Cancer Educational Kiosk: a multimedia tool designed to teach low-income, low-education Latinas about breast cancer screening. It contains 10 modules about breast cancer, including risk, early detection, screening concerns, mammogram, breast self-exam, options for those without insurance, etc. Multimedia format includes video, animation, stills, music, and narrative. | Control group: recorded baseline data and then used program. Intervention group: used program and then completed study measures. | Knowledge, attitude, intent | Effective in increasing knowledge about breast cancer and the likelihood of asking their doctors about mammograms. Greatest knowledge differences seen in those who had not had mammography before. No significant effects on attitude because most were favorable before the intervention. Greater intention to ask a doctor about getting a mammogram in intervention group, with greater difference in women who had never had a mammogram or had not had a recent mammogram, and with 8 years of education. |
| 36. Walther J, Wang Z, Loh T. The effect of top-level domains and advertisements on health Web-site credibility. <i>Journal of Medical Internet Research</i> 2004;6:e24. [Appropriateness] | 111 participants recruited through intercept in shopping mall (median age 32, 53% female), 45 recruited through snowball sampling (median age 50, 68% female) | Health information: lab computer with Internet | Mock-ups of Web sites | Respondents examined 1 of 12 randomly assigned Web site mock-ups that varied in either topic area, domain name, or presence of advertising. Then they completed credibility survey. | Credibility | Interaction effects: found a trend for advertisements having deleterious effects on the credibility of sites with .org domain, but positive effects on sites with .com or .edu domains. |

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| 37. Winzelberg AJ, Classen C, Alpers GW, Roberts H, Koopman C, Adams RE, et al. Evaluation of an Internet support group for women with primary breast cancer. <i>Cancer</i> 2003;97:1164-73. [Applicability] | 72 women with breast cancer, recruited from ads on radio and in newspapers, and flyers distributed to oncology offices in California. 80% Caucasian, 4% African American, 4% Asian, 6% Hispanic/Latino, 6% other. 64% college graduates or higher, 28% some college. If they did not have a computer, they were loaned a Web-TV for the study. | Cancer: home computer with Internet or Web-TV | Bosom Buddies: a structured facilitated support group. New topic each week, moderator facilitated discussion on the topic and related concerns; could also read survivor stories, share their own experiences, keep a Web journal, group format asynchronous | Control group: wait-list control. Intervention group: used Bosom Buddies | Depression, stress, coping and adjustment to cancer, group experience, usage | Participants logged onto site mean of 34 times, posted an average of 36 support messages. Personal journal was not used regularly. Improvements in intervention group in depression, stress, and cancer-related trauma measures. No change in anxiety or coping. Intervention group participants reported that they used the group to provide/receive support, form new friendships, understand that their problems were not unique, and to confront difficult problems and fears. |

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| 38. Womble LG, Wadden TA, McGuckin BG, Sargent SL, Rothman RA, Krauthamer-Ewing ES. A randomized controlled trial of a commercial Internet weight loss program. <i>Obesity Research</i> 2004;12:1011-8. [Applicability] | 47 women with mean age 43.7 | Weight loss: home computer with Internet | e-Diets.com: a commercial Internet site in which membership allows user access to a virtual visit with a dietitian; a diet that is matched to needs, likes, and lifestyles; meal plans and grocery lists; social support; message boards; animated fitness instructor; 24-hour help desk; e-mail reminders; e-mail newsletter; buddy program | Control group: received weight loss manuals, LEARN program for weight management, and weight maintenance survival guide. Intervention group: used e-Diets.com. Both groups received 11 brief clinic visits to obtain weight and blood pressure measures. | Body weight; eating habits; depression and quality of life; physiological measures | Participants in e-Diets lost significantly less weight at week 16 and week 52 than those who used manual when last measurement was used for drop-outs. (When baseline measures were used for drop-outs for analysis, results were not significant.) Those who attended more clinic visits in either group lost more weight. Those who used food diaries in either group lost more weight. Participants who logged onto e-Diets more, lost more weight as compared to the weight gain in those who logged on less frequently. No differences between groups in eating behaviors or quality-of-life measures. Both groups reported increased cognitive restraint; improvements in physical function and vitality; and decreased depression, dietary disinhibition, and hunger. No differences in blood pressure, glucose, and lipids at 52 weeks. |

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| Quasi-Experimental Designs | | | | | | |
| 39. Baranowski T, Baranowski J, Cullen KW, Marsh T, Islam N, Zakeri I, et al. Squire's Quest! Dietary outcome evaluation of a multimedia game. <i>American Journal of Preventive Medicine</i> 2003;24:52-61. [Overview, Applicability] | 1578 children—fourth grade students; 690 Caucasian, 268 African American, 476 Hispanic, 105 other; 736 boys, 803 girls | Nutrition: school-based computer with CD-ROM | Squire's Quest: a 10-session, interactive multimedia game that allows user to engage in challenges requiring skills and goals related to increasing fruit and vegetable consumption | Control group: nutrition education as usual. Intervention group: interacted with the game for 10 sessions over 5 weeks. | Fruit, 100% juice, and vegetable consumption | Intervention group increased by one serving per day, but not enough to meet five per day requirements. |
| 40. DiNoia J, Schinke SP, Pena JB, Schwinn TM. Evaluation of a brief computer-mediated intervention to reduce HIV risk among early adolescent females. <i>Journal of Adolescent Health</i> 2004;35:62-4. [Applicability] | 205 early adolescent females age 11-14. Recruited from social services agencies in New York State. 43% black, 46% Hispanic, 11% white; mean age 13.1 | HIV/AIDS prevention: clinic-based computer with CD-ROM | Keeping It Safe: program uses didactic information along with an interactive game to reinforce the information and a video of woman who contracted HIV as an adolescent who discusses prevention, attitudes, etc. Shown epidemiological data related to incidence and prevalence among young women; interact with scenarios and simulations to learn a four-step model of assertive responding | Control group: wait-list control. Intervention group: interacted with Keeping It Safe. | AIDS knowledge, protective attitudes (peer norms, partner norms, attitudes toward sexually active youth), risk reduction self-efficacy | Those in the intervention group had higher posttest knowledge and self-efficacy than the controls. Within-group analyses showed that intervention group showed improvements in knowledge and peer norms with trend toward improvement in partner norms, attitudes, and self-efficacy, while control group self-efficacy significantly decreased. |
| 41. Duncan TE, Duncan SC, Beauchamp N, Wells J, Ary DV. Development and evaluation of an interactive CD-ROM refusal skills program to prevent youth substance use: "refuse to use." <i>Journal of Behavioral Medicine</i> 2000;23:59-72. [Appropriateness, Applicability] | 74 high school students; 61% male, 39% female; mean age 15.2 | Substance abuse prevention: school-based computer with CD-ROM | Refuse to Use Program: designed to provide socially acceptable refusal skills needed to deal with offers of marijuana. Includes six refusal skill vignettes | Control group: no treatment. Intervention group: used computer-based intervention as a group in a classroom setting. | Self-efficacy for marijuana refusal, intention, social norms, recall of refusal strategies | Intervention group showed greater refusal self-efficacy, greater intent to refuse. Intervention group more likely to agree that pressuring someone who says no is not good (social norms) and recalled 50% of the strategies. |

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| 42. Frenn M, Malin S, Bansal N, Delgado M, Greer Y, Havice M, et al. Addressing health disparities in middle school students' nutrition and exercise. <i>Journal of Community Health Nursing</i> 2003;20:1-14. [Acceptability, Applicability, Key Findings] | 130 urban low- to middle-income middle school students; 58 African American, 47 Caucasian, 4 Hispanic, 9 Asian, 4 Native American | Nutrition and physical activity: school-based computer with CD-ROM | Internet and video sessions for those in precontemplation and contemplation focused on raising awareness of current eating and exercise, identifying benefits, and overcoming barriers to consuming low-fat diets and exercise. Those in preparation, action, and maintenance were trained as "peer models" and co-led healthy labs. All students received online feedback. | Control group: traditional classroom sessions. Four-session Internet and video intervention with snack lab and, in one school, a gym lab | Access to low-fat foods and physical activity, food habits, physical activity log, level of participation | Fat in diet decreased with each Internet session in which students participated. Effects of the intervention varied by gender and race. Percentage of fat reduced significantly (p=.018) for black, white, and black/Native American, and Hispanic girls (but not Asian) in intervention group. Boys in the control group decreased fat more than boys in intervention group, but most of the intervention boys reported less access to low-fat foods. Intervention group boys increased physical activity for all races except Native American. No difference by sex for physical activity. No effect of peer-led food lab. Students with gym lab and Internet increased physical activity. Internet and control had decrease in exercise with less decrease in intervention than control group. <i>HP2010</i> goal of 30% or less calories from fat was not reached. |

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| 43. Hornung RL, Lennon PA, Garrett JM, DeVellis RG, Weinberg PD, Strecher VJ. Interactive computer technology for skin cancer prevention targeting children. <i>American Journal of Preventive Medicine</i> 2000;18:69-76. [Applicability] | 192 elementary school students (98% third and fourth grade); 44% girls, 56% boys | Cancer: school-based computer with CD-ROM | CD-ROM using animated cartoon characters and video clips of a dermatologist providing information; interactivity involved choosing which segments to view in which order. | Randomized by classrooms into three groups: no-treatment control, computer intervention, and standard didactic. | Knowledge about the sun, attitudes re tanning, behavioral practices | Significant changes in knowledge for CD-ROM group as compared to both groups at posttest and followup. Significant differences in attitude for CD-ROM group as compared to the other groups at posttest, but the difference between computer group and standard group no longer significant at followup. No differences on behavior measures at either point. |

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| 44. Houston TK, Cooper LA, Ford DE. Internet support groups for depression: a 1-year prospective cohort study. <i>American Journal of Psychiatry</i> 2002;159:2062-8. [Applicability] | 103 adults recruited from online depression support groups and message boards. 79% female, 42% unemployed, 82% at least some college, 101 formally diagnosed with depression | Depression: home computer with Internet | Internet support groups available in the public domain | Identified cohort group from online sites, administered baseline and followup surveys at 6 months and 12 months. Additionally, compared findings to participants in another large study of depression. | Depression, social support | Over one-half reported more than 5 hours of Internet depression support group use in the prior 2 weeks. 95% agreed that chatting on the Internet helped their symptoms; one-third preferred online support; 81% still received face-to-face treatment; 72% reported their providers knew of their online support. At 1-year followup, 72.6% still participating in the traditional treatment as well. 62% said online experience influenced them to ask their provider a question, and 26% had influenced them to make a change in medications. This cohort had lower levels of tangible, emotional, affectionate support and positive social interactions compared with participants from another large depression study. Social support scores did not change over time between more frequent users of the Internet support groups, indicating that face-to-face support did not decline over time. Depression resolved in 42.9% of frequent users compared to 20.7% of less frequent users. |

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| 45. Jantz C, Anderson J, Gould SM. Using computer-based assessments to evaluate interactive multimedia nutrition education among low-income predominantly Hispanic participants. <i>Journal of Nutrition Education and Behavior</i> 2002;34:252-60. [Appropriateness, Applicability, Key Findings] | 70 adults recruited from nutrition, health, and ESL programs in Colorado; "primarily Hispanic and low income (<\$15,000 per year)" | Nutrition: clinic-based computer with interactive multimedia program | Make a Great Start: one of six modules in the La Cocina Saludable Interactive Multimedia (IMM) program, which targets Hispanic adults. This module provides knowledge about the importance of breakfast, includes information about benefits and barriers, emotional arousal/dramatic relief by emphasizing family, self-efficacy by including practice activities. | Control group: interacted with computer program about budgeting. Intervention group: interacted with computer program about importance of breakfast. | Knowledge, attitude, stage of change | Intervention group significantly increased knowledge and attitudes. No real change in stage of change due to short nature of intervention. Use of IMM was faster than actual educator delivering same materials. |