APPENDIX 1
Details of Database Search and Results

**PubMed**
www.ncbi.nlm.nih.gov/pubmed


1373 CITATIONS RETRIEVED


57 CITATIONS RETRIEVED

**ClinicalTrials.gov**
clinicaltrials.gov

“fitness tracker” OR “remote patient monitoring” OR “patient generated health data”OR “smart clothing” OR “mobile application” OR “personal connected health” OR “telemedicine” OR “mhealth” | Studies With Results | Studies received from 01/01/2013 to 04/08/2017

21 CITATIONS RETRIEVED

**Cochrane Reviews**
www.cochranelibrary.com

(“fitness tracker” OR “remote patient monitoring” OR “patient generated health data”OR “smart clothing” OR “mobile application” OR “personal connected health” OR “telemedicine” OR “mhealth”) AND evidence AND health in Title, Abstract, Keywords in Cochrane Reviews’

11 CITATIONS RETRIEVED

**Commonwealth Fund**
www.commonwealthfund.org/publications/view-all-publications

(“fitness tracker” OR “remote patient monitoring” OR “patient generated health data”OR “smart clothing” OR “mobile application” OR “personal connected health” OR “telemedicine” OR “mhealth”) AND evidence AND health

5 CITATIONS RETRIEVED
### TABLE 1
Criteria for Article Selection

<table>
<thead>
<tr>
<th>SELECTION</th>
<th>EXCLUSION</th>
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<tr>
<td>• Peer-reviewed journal</td>
<td>• Editorials or policy statements</td>
</tr>
<tr>
<td>• Published after 01/01/2013</td>
<td>• Validation or usability of a new technology</td>
</tr>
<tr>
<td>• Measurement health outcomes as part of the study</td>
<td>• Technology designed to enhance communication or performance for health care providers (no patient involvement)</td>
</tr>
<tr>
<td>• Published in peer-reviewed journal</td>
<td>• Cost analysis with no health outcomes</td>
</tr>
<tr>
<td></td>
<td>• Process evaluation</td>
</tr>
<tr>
<td></td>
<td>• Review or meta-analysis</td>
</tr>
<tr>
<td></td>
<td>• Design and testing of new technology</td>
</tr>
<tr>
<td></td>
<td>• Study protocols (no results)</td>
</tr>
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<td></td>
<td>• Sample size less than 100 individuals</td>
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FIGURE 1
Citation Review and Selection Process

Initial Search of Online Databases: n = 1467

Duplicates Removed: n = 24

Unique Citations: n = 1443

Initial Title and Abstract Review: n = 1167

Citations for In-depth Review: n = 276

Review Articles: n = 74
Other Selection Criteria: n = 74

Citations for Further Review: n = 103

Sample Size: < 100 n = 38
Other Selection Criteria: n = 9

Final Selection of Eligible Citations: n = 56
### TABLE 2
Summary of Systematic Review Results

<table>
<thead>
<tr>
<th>FUNCTIONAL THEME</th>
<th>DESCRIPTION</th>
<th>NUMBER OF STUDIES</th>
<th>NUMBER OF PUBLICATIONS</th>
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<tr>
<td>Remote Patient Monitoring</td>
<td>Quantitative data collection on patient health indicators, such as blood pressure, weight, or blood sugar</td>
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<td>Behavior Change/Self-Care</td>
<td>Interventions intended to encourage behavior change and motivation to make healthy choices</td>
<td>34</td>
<td>35</td>
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<tr>
<td>Remote Counseling and Mental Health</td>
<td>Interventions providing advice, guidance or qualitative monitoring by health professionals through technology in the patient's home (telemedicine, video conferencing)</td>
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<td>12</td>
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<tr>
<td><strong>TOTAL</strong></td>
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<td><strong>53</strong></td>
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<tr>
<td>Akar, J. G.</td>
<td>2015</td>
<td>Use of Remote Monitoring is Associated with Lower Risk of Adverse Outcomes Among Patients with Implanted Cardiac Defibrillators</td>
<td>North America</td>
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<td>Albini, F.</td>
<td>2016</td>
<td>An ICT and Mobile Health Integrated Approach to Optimize Patients’ Education on Hypertension and its Management by Physicians: The Patients Optimal Strategy of Treatment (POST) Pilot Study</td>
<td>Europe</td>
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<tr>
<td>Ishani, A.</td>
<td>2016</td>
<td>Telehealth by an Interprofessional Team in Patients with CKD: A Randomized Controlled Trial</td>
<td>North America</td>
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<tr>
<td>Kim, Y. N.</td>
<td>2015</td>
<td>RCT to Assess the Effectiveness of Remote Patient Monitoring and Physician Care in Reducing Office Blood Pressure</td>
<td>Asia</td>
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<tr>
<td>Moffet, H.</td>
<td>2015</td>
<td>In-Home Telerehabilitation Compared with Face-to-Face Rehabilitation After Total Knee Arthroplasty: A Noninferiority Randomized Controlled Trial</td>
<td>North America</td>
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<tr>
<td>Ong, M. K.</td>
<td>2016</td>
<td>Effectiveness of Remote Patient Monitoring After Discharge of Hospitalized Patients With Heart Failure: The Better Effectiveness After Transition — Heart Failure (BEAT-HF) Randomized Clinical Trial</td>
<td>North America</td>
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<tr>
<td>Shea, S.</td>
<td>2013</td>
<td>Social Impact Analysis of the Effects of a Telemedicine Intervention to Improve Diabetes Outcomes in an Ethnically Diverse, Medically Underserved Population</td>
<td>North America</td>
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<td>Upatising, B.</td>
<td>2013</td>
<td>Effects of Home Telemonitoring on Transitions Between Frailty States and Death for Older Adults: A Randomized Controlled Trial</td>
<td>North America</td>
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TABLE 4
Summary of Behavior Change/Self-Care Publications

<table>
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<tr>
<th>FIRST AUTHOR</th>
<th>PUB YEAR</th>
<th>TITLE</th>
<th>LOCATION</th>
<th>POPULATION</th>
<th>OUTCOME MEASUREMENTS</th>
<th>SAMPLE SIZE</th>
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<tr>
<td>Allman-Farinelli, M.</td>
<td>2016</td>
<td>A Mobile Health Lifestyle Program for Prevention of Weight Gain in Young Adults (TXT2BFiT): Nine-Month Outcomes of a Randomized Controlled Trial</td>
<td>Australia</td>
<td>Over-weight 18–35 year olds</td>
<td>Change in weight</td>
<td>250</td>
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<td>Ambeba, E. J.</td>
<td>2015</td>
<td>The Use of mHealth to Deliver Tailored Messages Reduces Reported Energy and Fat Intake</td>
<td>North America</td>
<td>Obese adults</td>
<td>Changes in dietary intake (recall)</td>
<td>210</td>
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<tr>
<td>Bobrow, K.</td>
<td>2016</td>
<td>Mobile Phone Text Messages to Support Treatment Adherence in Adults with High Blood Pressure (SMS-Text Adherence Support [StAR]): A Single-Blind, Randomized Trial</td>
<td>Sub Saharan Africa</td>
<td>Patients with hypertension</td>
<td>Change in blood pressure</td>
<td>1372</td>
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<tr>
<td>Bolier, L.</td>
<td>2013</td>
<td>An Internet-Based Intervention to Promote Mental Fitness for Mildly Depressed Adults: Randomized Controlled Trial</td>
<td>Europe</td>
<td>Adults with depression</td>
<td>Mental health and well-being scores</td>
<td>284</td>
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<tr>
<td>Buller, D. B.</td>
<td>2015</td>
<td>Evaluation of Immediate and 12-Week Effects of a Smartphone Sun-Safety Mobile Application: A Randomized Clinical Trial</td>
<td>North America</td>
<td>Adults with smartphones</td>
<td>Self reported sun-exposure behavior change and time in the sun</td>
<td>202</td>
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<td>Buller, D. B.</td>
<td>2015</td>
<td>Smartphone Mobile Application Delivering Personalized, Real-Time Sun Protection Advice: A Randomized Clinical Trial</td>
<td>North America</td>
<td>Adults with smartphones</td>
<td>Self reported sun-exposure behavior change and time in the sun</td>
<td>604</td>
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<td>Buller, D. B.</td>
<td>2014</td>
<td>Randomized Trial of a Smartphone Mobile Application Compared to Text Messaging to Support Smoking Cessation</td>
<td>North America</td>
<td>Adult smokers 19–30 years old</td>
<td>Smoking cessation or quitting behavior</td>
<td>102</td>
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<tr>
<td>Carter, M. C.</td>
<td>2013</td>
<td>Adherence to a Smartphone Application for Weight Loss Compared to Website and Paper Diary: Pilot Randomized Controlled Trial</td>
<td>Europe</td>
<td>Overweight adults</td>
<td>Change in weight</td>
<td>128</td>
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<td>Coleman, J.</td>
<td>2017</td>
<td>Effectiveness of an SMS-Based Maternal mHealth Intervention to Improve Clinical Outcomes of HIV-Positive Pregnant Women</td>
<td>Sub Saharan Africa</td>
<td>Pregnant HIV-pos women</td>
<td>Antenatal care visits, birth outcomes, infant HIV status</td>
<td>235</td>
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<td>FIRST AUTHOR</td>
<td>PUB YEAR</td>
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<td>Corbett, A.</td>
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<td>The Effect of an Online Cognitive Training Package in Healthy Older Adults: An Online Randomized Controlled Trial</td>
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<td>Adults over 50</td>
<td>Activities of daily living score</td>
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<td>DiClemente, R. J.</td>
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<td>Efficacy of a Telephone-Delivered Sexually Transmitted Infection/ Human Immunodeficiency Virus Prevention Maintenance Intervention for Adolescents: A Randomized Clinical Trial</td>
<td>North America</td>
<td>African-American girls ages 14–20</td>
<td>STI infection rate</td>
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<td>Domek, G. J.</td>
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<td>SMS Text Message Reminders to Improve Infant Vaccination Coverage in Guatemala: A Pilot Randomized Controlled Trial</td>
<td>Latin America</td>
<td>Parents of infants 1–14 weeks old</td>
<td>Child vaccination rate</td>
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<td>Ebert, D. D.</td>
<td>2016</td>
<td>Self-Guided Internet-Based and Mobile-Based Stress Management for Employees: Results of a Randomised Controlled Trial</td>
<td>Europe</td>
<td>Adult workers with elevated levels of stress</td>
<td>Levels of perceived stress</td>
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<td>Evans, W.</td>
<td>2015</td>
<td>Dose-response Effects of the text4baby Mobile Health Program: Randomized Controlled Trial</td>
<td>North America</td>
<td>Pregnant military health beneficiaries</td>
<td>Health behavior change</td>
<td>943</td>
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<td>Fjeldsoe, B. S.</td>
<td>2016</td>
<td>Evaluating the Maintenance of Lifestyle Changes in a Randomized Controlled Trial of the ‘Get Healthy, Stay Healthy’ Program</td>
<td>Australia</td>
<td>Adults motivated to lose weight</td>
<td>Self-reported weight, dietary and physical activity behaviors</td>
<td>228</td>
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<tr>
<td>Kamal, A. K.</td>
<td>2015</td>
<td>A Randomized Controlled Behavioral Intervention Trial to Improve Medication Adherence in Adult Stroke Patients with Prescription Tailored Short Messaging Service (SMS) — SMS4Stroke Study</td>
<td>South Asia</td>
<td>Patients recovering from stroke</td>
<td>Medication adherence</td>
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<td>Kim, H.</td>
<td>2017</td>
<td>Mobile But Connected: Harnessing the Power of Self-Efficacy and Group Support for Weight Loss Success through mHealth Intervention</td>
<td>North America</td>
<td>Adults motivated to lose weight</td>
<td>Self-efficacy score, weight</td>
<td>384</td>
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<td>King, A. C.</td>
<td>2014</td>
<td>Exercise Advice by Humans Versus Computers: Maintenance Effects at 18 months</td>
<td>North America</td>
<td>Adults over 50</td>
<td>Physical activity score</td>
<td>148</td>
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<td>FIRST AUTHOR</td>
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<td>Kinney, A. Y. L.</td>
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<td>Telehealth Personalized Cancer Risk Communication to Motivate Colonoscopy in Relatives of Patients with Colorectal Cancer: The Family Care Randomized Controlled Trial</td>
<td>North America</td>
<td>Relatives of colorectal cancer patients</td>
<td>Colorectal cancer screening rate</td>
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<td>Lau, A. Y.</td>
<td>2015</td>
<td>Why Didn't it Work? Lessons From a Randomized Controlled Trial of a Web-based Personally Controlled Health Management System for Adults with Asthma</td>
<td>Australia</td>
<td>Adults with asthma</td>
<td>Asthma symptoms and creation of an asthma action plan</td>
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<td>Ledford, C. J.</td>
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<td>Mobile Application as a Prenatal Education and Engagement Tool: A Randomized Controlled Pilot</td>
<td>North America</td>
<td>Pregnant women</td>
<td>Gestational age, birthweight</td>
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<td>Liu, W.</td>
<td>2016</td>
<td>Endocrinology Telehealth Consultation Improved Glycemic Control Similar to Face-to-Face Visits in Veterans</td>
<td>North America</td>
<td>Veterans with diabetes</td>
<td>Glycated hemoglobin levels</td>
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<td>Lund, S.</td>
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<td>Mobile Phone Intervention Reduces Perinatal Mortality in Zanzibar: Secondary Outcomes of a Cluster Randomized Controlled Trial</td>
<td>Sub Saharan Africa</td>
<td>Pregnant women</td>
<td>Perinatal mortality</td>
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<td>Manicavasagar, V.</td>
<td>2014</td>
<td>Feasibility and Effectiveness of a Web-Based Positive Psychology Program for Youth Mental Health: Randomized Controlled Trial</td>
<td>Australia</td>
<td>Youth ages 12–18</td>
<td>Depression and well-being scores</td>
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<td>Naughton, F.</td>
<td>2017</td>
<td>Large Multicentre Pilot Randomised Controlled Trial Testing a Low-Cost, Tailored, Self-Help Smoking Cessation Text Message Intervention for Pregnant Smokers (MiQuit)</td>
<td>Europe</td>
<td>Pregnant women smokers</td>
<td>Smoking cessation or quitting behavior</td>
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<td>Nevedal, D. C.</td>
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<td>Effects of an Individually Tailored Web-Based Chronic Pain Management Program on Pain Severity, Psychological Health, and Functioning</td>
<td>North America</td>
<td>Adults with chronic pain</td>
<td>Pain score</td>
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<td>Palermo, T. M.</td>
<td>2016</td>
<td>Internet-Delivered Cognitive-Behavioral Treatment for Adolescents with Chronic Pain and Their Parents: A Randomized Controlled Multicenter Trial</td>
<td>North America</td>
<td>Adolescents 11–17 years old with chronic pain</td>
<td>Daily activity scores</td>
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<td>mHealth Intervention to Improve Diabetes Risk Behaviors in India: A Prospective, Parallel Group Cohort Study</td>
<td>South Asia</td>
<td>Adults with diabetes</td>
<td>Changes in diet and exercise</td>
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<td>Rini, C.</td>
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<td>Automated Internet-Based Pain Coping Skills Training to Manage Osteoarthritis Pain: A Randomized Controlled Trial</td>
<td>North America</td>
<td>Patients with Osteoarthritis</td>
<td>Pain score</td>
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<td>Sepah, S. C.</td>
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<td>Long-Term Outcomes of a Web-Based Diabetes Prevention Program: 2-Year Results of a Single-Arm Longitudinal Study</td>
<td>North America</td>
<td>Patients with pre-diabetes</td>
<td>Self-reported weight</td>
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<td>Shaw, R. J.</td>
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<td>Mobile Health Messages Help Sustain Recent Weight Loss</td>
<td>North America</td>
<td>Adults motivated to lose weight</td>
<td>Change in weight</td>
<td>120</td>
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<td>ter Huurne, E. D.</td>
<td>2013</td>
<td>Web-Based Treatment Program Using Intensive Therapeutic Contact for Patients with Eating Disorders: Before-After Study</td>
<td>Europe</td>
<td>Adults with eating disorder</td>
<td>Eating disorder scores</td>
<td>165</td>
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<td>Umapathy, H.</td>
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<td>The Web-Based Osteoarthritis Management Resource My Joint Pain Improves Quality of Care: A Quasi-Experimental Study</td>
<td>Australia</td>
<td>Adults over 50 with osteoarthritis</td>
<td>Osteoarthritis scores</td>
<td>195</td>
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<td>van Drongelen, A.</td>
<td>2014</td>
<td>Evaluation of an mHealth Intervention Aiming to Improve Health-Related Behavior and Sleep, and Reduce Fatigue Among Airline Pilots</td>
<td>Europe</td>
<td>Airline pilots</td>
<td>Fatigue scores</td>
<td>502</td>
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<td>Van Reijen, M.</td>
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<td>The &quot;Strengthen Your Ankle&quot; Program to Prevent Recurrent Injuries: A Randomized Controlled Trial Aimed at Long-Term Effectiveness</td>
<td>Europe</td>
<td>Athletes with ankle sprain</td>
<td>Ankle injury incidence rates</td>
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<td>Aburizik, A.</td>
<td>2013</td>
<td>A pilot randomized controlled trial of a depression and disease management program delivered by phone</td>
<td>North America</td>
<td>Veterans with diabetes/hypertension, chronic pain and depressive symptoms</td>
<td>Change in depression score</td>
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<td>Acierno, R.</td>
<td>2016</td>
<td>Behavioral Activation and Therapeutic Exposure for Posttraumatic Stress Disorder: a Noninferiority Trial of Treatment Delivered in Person Versus Home-Based Telehealth</td>
<td>North America</td>
<td>Combat veterans with PTSD</td>
<td>Clinical PTSD score</td>
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<td>Bannink, R.</td>
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<td>Effectiveness of a Web-based tailored intervention (E-health4Uth) and consultation to promote adolescents' health: randomized controlled trial</td>
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<td>Secondary school students</td>
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<td>Choi, N. G.</td>
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<td>Six-month Post-Intervention Depression and Disability Outcomes of In-Home Telehealth Problem-Solving Therapy for Depressed, Low-Income Homebound Older Adults</td>
<td>North America</td>
<td>Low-income homebound adults over 50 years old with depression</td>
<td>Depression score</td>
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<td>Crisp, D.</td>
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<td>An Online Intervention for Reducing Depressive Symptoms: Secondary Benefits for Self-esteem, Empowerment and Quality of Life</td>
<td>Australia</td>
<td>Adults with signs of psychological distress</td>
<td>Depressive symptoms, loneliness, quality of life</td>
<td>298</td>
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<tr>
<td>Egede, L. E.</td>
<td>2015</td>
<td>Psychotherapy for Depression in Older Veterans via Telemedicine: a Randomised, Open-Label, Non-Inferiority Trial</td>
<td>North America</td>
<td>Veterans over 58 years with major depression</td>
<td>Depression score</td>
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<td>Egede, L. E.</td>
<td>2016</td>
<td>Psychotherapy for Depression in Older Veterans via Telemedicine: Effect on Quality of Life, Satisfaction, Treatment Credibility, and Service Delivery Perception</td>
<td>North America</td>
<td>Veterans over 58 years with major depression</td>
<td>Quality of life score</td>
<td>241</td>
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<td>Egede, L. E.</td>
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<td>Trajectory of Cost Overtime After Psychotherapy for Depression in Older Veterans via Telemedicine</td>
<td>North America</td>
<td>Veterans over 58 years with major depression</td>
<td>Overall cost</td>
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<td>Hungerbuehler, I.</td>
<td>2016</td>
<td>Home-Based Psychiatric Outpatient Care Through Videoconferencing for Depression: A Randomized Controlled Follow-Up Trial</td>
<td>Latin America</td>
<td>Adults with mild depression</td>
<td>Depression score</td>
<td>107</td>
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<td>O'Neil, A.</td>
<td>2015</td>
<td>Long-Term Efficacy of a Tele-Health Intervention for Acute Coronary Syndrome Patients with Depression: 12-Month Results of the MoodCare Randomized Controlled Trial</td>
<td>Australia</td>
<td>Cardiac patients with depression</td>
<td>Depression score</td>
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<td>Parks, M. J.</td>
<td>2016</td>
<td>Interpersonal Communication and Smoking Cessation in the Context of an Incentive-Based Program: Survey Evidence from a Telehealth Intervention in a Low-Income Population</td>
<td>North America</td>
<td>Adult smokers</td>
<td>Smoking cessation or quitting behavior</td>
<td>970</td>
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</table>
APPENDIX 2
References Cited


APPENDIX 2
References Cited (continued)


APPENDIX 2
References Cited (continued)


APPENDIX 3
Annotated Bibliography for Evidence Review

Full-text links are provided when available.

Remote Patient Monitoring

Study to improve self-management for patients with heart failure. Retrospective study comparing patients receiving usual hospital care with patients enrolled in the Connected Cardiac Care Program (CCCP) remote patient monitoring and education program. CCCP patients received bi-weekly telephone-based education sessions combined with remote data collected by in-home blood-pressure monitor, weight scale, blood pressure cuff, pulse oximeter device. Hospitalization rate and mortality were significantly lower in the CCCP patients during but not after program enrollment (4 months).
www.ncbi.nlm.nih.gov/pmc/articles/PMC4422937

A retrospective study on remote patient monitoring of patients with implantable cardioverter defibrillators. All patient data included in the study had implantable cardioverter defibrillators, separated into patients who used the remote patient monitoring system and those who never transmitted any remote data from their implantable device. Patients who used the remote patient monitoring function had significantly lower 1- and 3-year mortality and all-cause re-hospitalization compared to non-users. However patients who use their remote patient monitoring device may be more engaged their health care in other ways.

Patients in Italy with uncontrolled hypertension were assigned to routine management with repeated office visits or to an integrated technology strategy involving home blood pressure monitoring remote transmission, use of a web-based patient management system and a smartphone app. The app included alarm reminders and educational modules. Users of the technology showed significantly lower blood pressure and greater control of blood pressure at 6 months.

Patients with chronic kidney disease in the US received care from an interprofessional team delivered by touchscreen computer and monitored with associated blood pressure cuff, scale, glucometer, pulse oximeter, stethoscope, and web camera. Control patients received usual in-person care at the facility. There was no difference in health outcomes between the two groups.

Patients with hypertension in Korea were assigned to control group receiving usual clinical care with home blood pressure monitoring, a treatment group with remote blood pressure monitoring and in-person office follow-up, or a treatment group for patients to receive remote monitoring with physician follow-up via remote communication device. Final blood pressure showed no difference between the three groups, but the remote monitoring/in-person follow up group had greater success in achieving target blood pressure than control. (no full-text available: abstract)

Patients recovering from total knee arthroplasty in Canada received 16 sessions of rehabilitation from a trained physical therapist either through a personal visit in their home or via internet-delivered video and audio sessions. There was no significant or clinical difference in the resulting recovery of the patients between the in-person and video rehabilitation groups.


Patients over 50 recovering from heart failure in California received health coaching telephone calls and telemonitoring. Telemonitoring used electronic equipment included a wireless transmission pod, a weight scale, and a blood pressure and heart rate monitor integrated with a device that could display text questions and send simple text responses. Devices automatically transmitted data back to central servers for telemonitoring review by telephone call center study nurses based at the primary study site that collected daily information about blood pressure, heart rate, symptoms, and weight. Centralized registered nurses conducted telemonitoring reviews, protocolized actions, and telephone calls. There was no significant difference in hospitalization rates among the intervention group and control group receiving regular care.


Diabetes patients in New York received a home telemedicine unit consisting of a computer, web camera, home glucose meter, blood pressure cuff, access to patients’ own clinical data and access to a special educational Web page created for the project by the American Diabetes Association. The control group received usual care with some printed diabetes education materials. Results show that the patients in the telemedicine group and in the lowest-income level had the greatest reduction in A1c compared to usual care controls. Further analysis in older publication on the same intervention showed significant overall improvements in the treatment groups at 1 and 5 years.


Older adults were managed in-home with a telemedicine program aimed to prevent transition to frail state. A control group received usual care with periodic phone monitoring. A home health care group received regular visits from home health nurses and therapists. A telemedicine group included telemonitoring case management with peripheral equipment in a patient’s home: blood pressure, pulse, oxygen saturation, blood glucose level, and weight were measured based on their medical condition. There was no difference in the rate of transition to frail state in the home-visit versus the telemonitoring groups.
Behavior Change/Self-Care

A study for over-weight 18-35 year olds in Australia using a combination of coaching phone calls by a dietician, personalized text messages, emails, apps, and downloadable resources to encourage healthy eating, exercise and weight loss. Control group participants received only one coaching call and four text messages over 12-weeks while treatment group received higher intensity interaction over 6-months. Treatment group had statistically significant lower weight than controls at 12-weeks and 9-months.

www.ncbi.nlm.nih.gov/pmc/articles/PMC4935797

Obese adults enrolled in weekly in-person group weight management sessions were assigned to either a paper food dairy, the use of a personal digital assistant food diary, or PDA plus daily customized feedback text messages to promote healthy eating for weight management. The intervention group received tailored text messages showed statistically significant reductions in daily saturated fat and energy intake compared to other groups.

www.ncbi.nlm.nih.gov/pmc/articles/PMC5027143

Patients in South Africa with high blood pressure received text messages to their mobile phones with messages about healthy lifestyle and diet choices. One group received usual care from their providers, a second group received reminder messages about medication and appointments and some education messages, while the third group received the same reminder and education messages with the option to respond to messages to change text message options or appointments. At 12 months mean blood pressure was lower for all groups but only marginally significant for the information-only compared to usual care group — no statistical significance was found for the text-response group.

www.ncbi.nlm.nih.gov/pmc/articles/PMC4750295

The study uses a fully automated self-help intervention to improve well-being based on positive psychology for adult patients with depression. At two months the intervention group showed some difference from the wait-listed controls in one measure of well-being but not other well-being scores. They differed significantly in depressive symptoms as well. Adherence was not high and there was no “dose-response” relationship between number of modules completed and well-being score improvement.

www.ncbi.nlm.nih.gov/pmc/articles/pmid/24041479
APPENDIX 3
Annotated Bibliography for Evidence Review (continued)

A smartphone app delivered messages aimed to improve sun-exposure behaviors in adults. Messages included reminders to engage in sun-protection behaviors and hourly UV index values. No statistically significant differences were measure between users and non-users.
www.ncbi.nlm.nih.gov/pmc/articles/pmid/25629819

The first study of the same smartphone app (discussed above) to promote sun-exposure behavior change. No significant differences in sun-protection behavior were measure after use of the app.
www.ncbi.nlm.nih.gov/pmc/articles/pmid/25629710

A study aimed at adult smokers assigned participants to a text message group that sent text messages with guidance and information aimed to promote smoking cessation behavior. The second group used a smartphone app that included smoking cessation messages along with features to set goals, utilize coping techniques and interact with the web-interface. Most participants in both groups reported smoking cessation attempts but at 6 weeks the text message-only group showed more success than the mobile app in maintaining cessation.
www.ncbi.nlm.nih.gov/pmc/articles/PMC3934597

A smartphone weight loss app was compared to a paper-based calorie-counting booklet and a web-based weight loss interface for overweight adults in England. The app provides weight loss advice and options for self-monitoring of weight, food intake and exercise. Tailored text messages provided positive support. All three groups had access to a web-based social-support forum. The small sample sizes did not show statistically significant differences between the groups.
www.ncbi.nlm.nih.gov/pmc/articles/PMC3636323

A text message system sent messages to HIV-positive pregnant women in South Africa with twice-weekly maternal health information timed to pregnancy stage. Messages were aimed to improve women’s self-monitoring during pregnancy and to understand their rights and available services regarding their HIV status. A control group received no text messages. The group that received the messages attended significantly more antenatal care visits.

A web-based training program for improving cognitive function in older adults was tested in the UK. One version of the on-line system delivered evidence-based reasoning and problem-solving cognitive training and a second version delivered general cognitive training. A control group participated in an internet-based cognition game. Both of the cognitive training groups had statistically significant improvements in self-reported activities of daily living scores compared to the control group.
APPENDIX 3
Annotated Bibliography for Evidence Review (continued)


African American girls 14–20 years old received a group training in STI/HIV prevention behaviors. One group of the participants also received follow-up phone calls providing short tailored sexual health counseling by a trained health educator every eight weeks for 36 months. The second group received phone calls covering general health promotion messages. Participants receiving more telephone calls, regardless of content, had fewer chlamydial infections. A small reduction in STI rates was measured in the group receiving the tailored sexual health counseling calls.

www.ncbi.nlm.nih.gov/pmc/articles/PMC4496945


An automated text message system to remind parents of infants to attend infant vaccination appointments was tested in Guatemala. All parents received written reminders for their child’s next vaccination appointment. Parents in the intervention group also received text messages with specific name, date, and location information for their upcoming child vaccination appointment. Both groups showed high child vaccination rates at the end of the study and no statistical significance was observed between the groups.

www.ncbi.nlm.nih.gov/pmc/articles/PMC4859823


Work-related stress reduction through a self-guided internet-based stress management program. Participants could also choose to receive related text-messages with tips and suggestions for reducing stress. Participants showed statistically significant reduction in perceived stress compared to the wait-listed control group.


A large-scale text messaging program for pregnant women (txt4baby) is tested for behavior change effects. Women enrolled in the treatment group received usual prenatal care plus three text messages per week tailored to the date of enrollment and gestational age. Control group received usual care from their health care provider. Results show a dose-response effect of the text messages, with higher levels of text message exposure predicting lower self-reported alcohol consumption.

www.ncbi.nlm.nih.gov/pmc/articles/PMC4327187


All participants completed a 6-month lifestyle telephone coaching program in Australia. Participants in the intervention group received automated follow-up tailored text messages aimed to promote weight loss. Control group did not receive text messages. The text message group had statistically significant reduction in weight compared to controls but no difference in dietary behaviors.

www.ncbi.nlm.nih.gov/pmc/articles/PMC4327187

Patients recovering from stroke in Pakistan received tailored prescription medication text reminders in addition to usual care. Participants were asked to respond to the text message to confirm that they took their medicine. Biweekly health education messages were also received. Control group receive usual care. The intervention group showed a statistically significant increase in medication adherence, however other factors such as high number of daily pills, cost of medicine and depression were associated with lower medication adherence regardless of treatment.

www.ncbi.nlm.nih.gov/pmc/articles/PMC4618367


An app for promoting weight loss was studied for the specific app-related user activities that were associated with reduced weight outcomes. The app includes social support and food logging for dietary behavior change. A self-efficacy score was calculated based on user responses to an online survey and compared to the user’s app profile and change in weight. Individual food logging and mobile group participation in the app significantly promoted weight loss during a six-month period.


Adults over 50 in the US were assigned to a 12-month home-based physical activity promotion program delivered via a trained telephone counselor or a similar program delivered via an automated, computer-controlled interactive telephone system, or a general health education control. Both of the telephone counseling groups also received a pedometer. This study examined health outcomes six months after the study period. There was no difference in physical activity levels between the automated vs. live counseling groups and both treatment groups maintained improved average activity levels 6-months after the end of the program.


Relatives of colorectal cancer patients who are at-risk for the disease were provided counseling over the phone to promote colorectal cancer screening. The low-intervention group received printed brochures in the mail. The high-intervention group received printed material tailored with relevant messages as well as a phone call with a certified genetic counselor and printed personalized reminders. A statistically significant portion of the high-intervention group received colorectal screening in the 9-months after the study compared to the low-intervention group.

www.ncbi.nlm.nih.gov/pmc/articles/PMC3927734
APPENDIX 3
Annotated Bibliography for Evidence Review (continued)


Adults with asthma in Australia were assigned to a control group to use a general website or the intervention group using a web-based personally controlled health management system with tailored modules on asthma management education and reminders. There were no significant differences in asthma indicators or asthma action plans between the two groups. Low use of the web-based program were noted.

www.ncbi.nlm.nih.gov/pmc/articles/PMC4704895


Pregnant women were encouraged to use a mobile app patient for record-keeping and monitoring versus a spiral-notebook. No difference was measured in pregnancy health outcomes between the two groups but the mobile-app users rated a higher satisfaction with their care.

www.ncbi.nlm.nih.gov/pmc/articles/PMC4114456


A comparison of diabetes counseling delivered to patients face-to-face or via telehealth technology. There was no difference in the glycated hemoglobin levels between the two groups. (no full-text available)


Pregnant women in Zanzibar, Tanzania were provided with a mobile phone text message system that sent automated short message service and a mobile phone system that provided the opportunity of direct two-way communication with their primary health care providers. Intervention group showed a significant reduction in perinatal mortality compared to control.

www.ncbi.nlm.nih.gov/pmc/articles/PMC4071231


An online positive psychology website for adolescents was presented to a general youth population in Australia. A control group used media and entertainment websites. Users of the website reported significantly lower depression and stress scores compared to controls; high frequency users (>3x week) also showed significant increase in well-being scores.

www.ncbi.nlm.nih.gov/pmc/articles/PMC4071231


All participants received a smoking cessation brochure, while intervention participants also received a 12-week program of individually-tailored, automated, interactive, self-help smoking cessation text messages. Smoking cessation and quitting behavior was not significantly different in the text-message group compared to the control group.
**APPENDIX 3**
Annotated Bibliography for Evidence Review (continued)


Participants were exposed to a tailored web-based chronic pain management program provided by a health insurance plan. The program promotes pain self-management. Users reported statistically significant improvements in pain scores compared to control.

[www.ncbi.nlm.nih.gov/pmc/articles/PMC3785999](www.ncbi.nlm.nih.gov/pmc/articles/PMC3785999)


A web-based pain management education and counseling program for pediatric patients (and their parents) with chronic pain was tested. One group of participants used an education-only web-based program to learn how to manage chronic pain. A second group used a web-based program that included cognitive behavioral therapy and opportunities to communicate with a study coach. There was a small but significant difference in daily activity score improvements in the comprehensive group at the 6-month follow-up but not at the assessment at the end of the study period.

[www.ncbi.nlm.nih.gov/pmc/articles/PMC4852469](www.ncbi.nlm.nih.gov/pmc/articles/PMC4852469)


Adult with diabetes in India received text messages on healthy lifestyle choices and diabetes management. Participants in the text message group reported significantly greater improvements in healthy eating and lifestyle than control.

[www.ncbi.nlm.nih.gov/pmc/articles/PMC4992169](www.ncbi.nlm.nih.gov/pmc/articles/PMC4992169)


Patients with osteoarthritis were provided access to online pain management training modules. Control patients did not use the program. There were significant sex-treatment interactions, with women in the treatment group showing small but significant reductions in pain scores.

[www.ncbi.nlm.nih.gov/pmc/articles/PMC4402249](www.ncbi.nlm.nih.gov/pmc/articles/PMC4402249)


An internet-based diabetes prevention and support program was provided for patients with pre-diabetes in the US. The on-line platform included social support components, education modules, weight tracking, and options to call a live coach. Participants who only completed four or fewer lessons were separate from those who completed more than nine. Program starters and completers both showed significant reduction in weight loss and maintenance one year after the study period.

[www.ncbi.nlm.nih.gov/pmc/articles/PMC4409647](www.ncbi.nlm.nih.gov/pmc/articles/PMC4409647)


Adults in the US who completed a self-management class were randomized to receive one of three types of text messages: messages promoting physical activity, weight management and diet; messages promoting success and self-reward, or messages about preventing failure and avoiding temptation. A control group received general health messages. There was no significant difference in weight loss measure for participants in the three groups. There was a slight but significant difference in weight maintenance in the prevention-message group compared to the control.

[www.ncbi.nlm.nih.gov/pmc/articles/PMC3820279](www.ncbi.nlm.nih.gov/pmc/articles/PMC3820279)

Adults with eating disorder were given access to a web-based education and therapy program with support from a live therapist. Participants showed significant improvement in eating disorder scores and behaviors upon completion and at 6-week and 6-month follow-ups.


Athletes who suffered ankle sprain were randomized to a control group receiving a print booklet on ankle strengthening or an intervention group provided with a mobile smartphone app with interactive schedule, tracking, education and training suggestions. Both groups received a balance board for home-based exercises. There was no measured reduction in subsequent ankle sprain rate between app users and brochure groups and no improved compliance with exercises.

Remote Counseling and Mental Health


Weekly phone visits for management of depression in patients with other chronic conditions. Treatments included weekly phone calls with trained counselors (“Illness Management”) or combined with psychotherapy (“Combined”). Both treatment arms showed improved depression scores compared to Usual Care controls.


Home-based telehealth counseling sessions compared to in-office face-to-face treatment for returned combat veterans with PTSD. Weekly counseling was provided by trained counselors either in-office or via internet-based video communication technology. Both groups achieved similar reductions in PTSD scored symptoms showing that the video-delivered in-home counseling was as effective as in-person counseling.
APPENDIX 3
Annotated Bibliography for Evidence Review (continued)


Delivery of web-based tailored messages to adolescent students in the Netherlands to promote healthy behavior change. The standard intervention included self-referral to health care providers, social media use. Treatment group also included nurse consultation for students at risk of mental health problems. Students in the standard intervention but not the intervention plus counseling showed improved condom use behaviors. The added counseling group showed improved mental health scores but a negative effect on drug use in boys. Overall effects were small and different for ethnic groups.

www.ncbi.nlm.nih.gov/pmc/articles/PMC4060146


Problem-solving therapy targeting older adults with depression was delivered to two groups of homebound adults over 50 in Texas. One group received in-person sessions from a therapist and a second group received sessions delivered through internet-based video with a live therapist. A third group received non-specific support phone calls. Both the in-person and internet-video therapy groups showed significant improvements in depression scores compared to the non-specific support call group.

www.ncbi.nlm.nih.gov/pmc/articles/PMC4122624


The study compares the effect of an Internet Support Group, an automated internet-based training program for depression and a combination of these programs with use of a control website for adults showing signs of psychological distress in Australia. The group using both the support group and the training program showed a significant increase in self-esteem and quality of life scores.

www.ncbi.nlm.nih.gov/pmc/articles/PMC4060146


Depression counseling was delivered to veterans in the US by traditional in-person sessions or in-home video conferencing. Changes in depression score outcomes did not differ between groups. (full-text not available)

www.ncbi.nlm.nih.gov/pmc/articles/PMC4122624


Depression counseling was delivered to veterans in the US by traditional in-person sessions or in-home video conferencing. There was no difference in quality of life scores or satisfaction between the two groups. See two other Egede et al citations relating to the same trial.


Depression counseling was delivered to veterans in the US by traditional in-person sessions or in-home video conferencing. Mode of delivery of counseling had no effect on overall cost of the treatment.

Adults with mild depression in Sao Paulo, Brazil received in-person monthly psychiatric consultations or in-home consultations delivered via video conferencing. Medication was also delivered to the patient’s home for the intervention group. Both groups showed statistically significant improvements in mental health and depression scores at the end of the study period. Participants in the in-person group spent on average 3 hours traveling to and from their appointments and had a greater rate of dropout and missed appointments.

www.ncbi.nlm.nih.gov/pmc/articles/PMC4989121


Women with PTSD in the US received evidence-based treatment counseling therapy either in-person traditional delivery or via video conferencing. Patients in both groups saw reductions in PTSD symptoms with no significant difference between the two delivery methods.


Cardiac patients with depression in Australia were provided with 10-sessions of counseling by a trained psychologist via internet-based video. Control group patients received normal in-person care from their health care provider. Results show a significant improvement in depression scores for patients who had major depression but not for patients with mild depression as compared to the control group.

www.ncbi.nlm.nih.gov/pmc/articles/PMC4989121


A retrospective analysis of data from adult smokers in the US who received live telephone counseling to promote smoking cessation. Nicotine replacement therapy was available free of charge and some monetary incentives. There was no control group. There was no significant relationship between smoking cessation behaviors and the monetary incentives.

www.ncbi.nlm.nih.gov/pmc/articles/PMC4765727
Make health and wellness an effortless part of daily life.