Automated Telephone Self-Management Support System

Category	*Description*
Title of intervention	Automated Telephone Self-Management Support System
Objectives	**Objectives IROHLA taxonomy** ✓ To inform and educate older adults and/or professionals ✓ Improving skills of older adults and/ or professionals ✓ To support behaviour change and maintenance ✓ To facilitate involvement of individuals at the system level **Short description of the objectives of the intervention** To provide surveillance, health education, follow up and support, access to community resources and continuity of care, patient activation and self-care management via weekly, rotating automated (pre-recorded) telephone calls in the target groups native language during 9 months (39 weeks). The system-level health technology intervention also aims to promote collaborative goal setting in the form of behavioural 'action plans', wherein patients set, and hopefully achieve, short-term goals to improve their self-management.
Target groups	**Short description of the target group(s)** Adult patients with type 2 diabetes, in the Community Health Network of San Francisco, who spoke English, Spanish or Cantonese. The specific information on the Automated Telephone Self-Management Support System (ATSM) group: • Mean age: 55.9 • Gender: 58.0% women • Health literacy: 51.0 % limited Health literacy, 49.0% adequate literacy, based on S-TOHFLA, • Income: 26.9% below $5,000, 31.5 between $5,000 and $10,000, 18.0% between $10,000 and $20,000, 14.6% between $20,000 and $30,000, 9.0% more than $30,000 • Culture: Ethnic Group: Asian: 26.8%, African American: 14.3%, White/Latino: 46.4%, White/non-Latino: 9.8%, Other/Unknown: 2.7% • Language: English: 46.4%, Spanish: 42.0%, Cantonese: 11.6%. • Health problems/ Health Risks: Diabetes duration in years: mean duration: 9.1 +- 7.3; more detailed info on health status of target group is available in the attached papers • Education: Up to high school: 51.8%, High school Graduate/ GED: 14.3%, College or more: 33.9%
Problem of focus	**Scope of the problem**

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	Diabetes affects over 3 million Californians, meaning that 1 out of 10 adult Californians has diabetes. From 1998 to 2007, the prevalence of diagnosed diabetes in California rose from 5.5 to 7.6 percent, representing a 38 percent increase in one decade. **Consequences for individual and/or society** Diabetes is a chronic illness that, if poorly controlled, significantly impairs quality of life and leads to premature death. Diabetes costs California over $24.5 billion in health care and related costs. Trends throughout the US are similar. **Distribution of the problem** There are striking differences in diabetes rates by ethnicity and education level. Diabetes is much more common among those with less than a ninth-grade education (14 percent) compared with those with a college degree or higher (5 percent). Those with less education are much more likely to have limited literacy skills (over one-third have limited literacy), which makes diabetes management at home more challenging. Diabetes is also more common among ethnic minorities. Among Californians ages 50-64 years, 8 percent of non-Latino Whites have diagnosed diabetes, compared to 22 percent of Latinos, 18 percent of African Americans, 14 percent of American Indian/Alaskan Natives, and 13 percent of Asians. The rise of diabetes, coupled with the diverse representation of ethnicities and education levels within California, creates an urgent need for linguistically appropriate and cost-effective diabetes management tools accessible to individuals with limited literacy. Diabetes prevalence is higher among those with a family income below the federal poverty level and who lack health insurance. More than 205,000 Californians with diabetes do not have insurance, and another 245,000 have Medi-Cal (California's Medicaid program). Uninterrupted health insurance coverage, which provides access to health services, and a regular health care provider, who provides a connection to sources of health care, are key factors affecting whether people receive recommended diabetes-specific care. Diabetes requires patients to follow complex and expensive care regimens, communicate with providers, and manage the disease outside of the clinical environment.
Short description of the modifiable determinants of older adults with respect to this intervention.	Modifiable determinants of older adults in this intervention are: collaborative goal-setting, self-efficacy, knowledge, action planning, problem solving skills, self-management skills, coping skills, engagement, motivation
Short description of the modifiable determinants of	Modifiable determinants of professionals in this intervention are: cultural competencies, supportive attitudes

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professionals.	
Components of the intervention	**Components** ✓ Individual counselling/coaching by professionals ✓ E-learning modules ✓ E-health technology **Description of components** Patients randomised to ATDM receive weekly, rotating automated (pre-recorded) telephone calls in their native language for 9 months (39 weeks). Each call takes between 6 to 12 minutes to complete. Patients selected call times at enrolment and could alter preferred times or call the system toll free. The weekly calls are in their preferred language with rotating queries and response-triggered education about self-care, medication adherence, safety concerns, psychological issues, and preventive services. The health education messages are in the form of narratives. Responses also contain motivational elements (see under miscellaneous information). Patients answering 'out of range' on items, based on predetermined clinical thresholds, receive a call back from a nurse care manager, who helps patients problem-solve the issue identified in the report or any other concerns, with a focus on collaborative goal setting and action plans. All care manager-patient interactions, including action plans created and achieved, are documented via a standardised ATDM record linked to the Community Health Network of San Francisco -record. As ATDM is an adjunct to care, this record also serves to communicate with the patient's physician. Enrolled participants received no incentives to respond to ATDM calls.
Approach	**Theoretical models used** • Self-efficacy theory and recognised characteristics of successful Self-Management Strategy (Fisher et al., 2005; Lorig & Holman, 2003). • The Self-Management Strategy programs employ distinct communication methods but share common objectives, including behavioural action plans **Didactics used** Developed systematic diabetes Self-Management Strategy by selecting strategies with different approaches to engage patients and adapt it to the needs of the practices and diverse patient populations. First strategy was automated telephone disease management (ATDM) which employs technology to provide surveillance, education,

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	and care management and has been shown to reveal improvements in satisfaction, functional status, and metabolic control (Piette, Weinberger, & McPhee, 2000; Piette, Weinberger, McPhee, Mah, et al., 2000). Second strategy was group medical visits (GMV), which employs interpersonal and collective approaches with roots in adult educational theory and practice and has been shown in efficacy studies to improve functional status and reduce hospitalisations among patients with chronic disease (Clancy, Cope, Magruder, Huang, & Wolfman, 2003; Lorig et al.,2001; Sadur et al., 1999; Trento et al., 2001). It is an increasingly common SMS strategy (Chin et al., 2004). Both approaches are consistent with self-efficacy theory and share objectives characteristic of successful Self- Management Strategy (Fisher et al., 2005; Lorig & Holman, 2003). Both are system-level interventions that promote collaborative goal setting in the form of behavioural 'action plans' wherein patients set, and hopefully achieve, short-term goals to improve their self-management (Estabrooks et al., 2005; Handley, MacGregor, et al., 2006, Lorig, 2006). Collaborative goal setting and action planning represent a core element of Self- Management Strategy (Fisheret al., 2005; Glasgow, Nutting, et al., 2005). Both models also provide individualised assessment, skills enhancement, health education, follow-up and support, access to community resources, and continuity of clinical care (Fisher et al., 2005) and were delivered in English, Spanish, and Cantonese, the most common languages in the Community Health Network of San Francisco. **Techniques used** English, Spanish, and Cantonese-speaking diabetes patients were randomised appointed to weekly automated telephone disease management (ATDM) or monthly group medical visits. **Inclusion/Recruitment strategy ATSM** English, Spanish & Cantonese speaking diabetic patients. A very specific clinical context with the following recruitment strategy: 1. Patient registry of Community Health Network of San Francisco including patients who were older than age 17; had ICD-9 codes consistent with type 2 diabetes; spoke English, Spanish, or Cantonese; made ≥1 primary care visit in the prior year; and had ≥1 haemoglobin A1c value (HbA1c).

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	2. Nine CHNSF clinics with largest numbers of potentially eligible patients and targeted these clinics for recruitment. 3. A registry of potentially eligible patients for clinicians at recruited clinics, for their confirmation and review of eligibility, as required by the Institutional Review Board (IRB). 4. Additional eligibility criterion related to suboptimal glycaemic control, defined as having a most recent HbA1c of ≥8%, obtained by periodically updating the Community Health Network of San Francisco- database. 5. A merged this list of clinician- and database eligible patients with appointment databases so that patients could be approached prior to their appointments by language-concordant research assistants to explore potential interest in participation and further assess for eligibility. **Stakeholders involved** Patients and nurses **Type of professionals involved** Nurses
Resources and qualifications	**Duration of the intervention** The intervention itself takes 9 months, during these months participants receive weekly automated telephone calls. **Financial costs for the implementing organisation** 'Intervention costs included messages; translation and recording of messages in 3 languages; programming setup costs for ATSM; patient recruitment and follow-up time; fixed monthly ATSM maintenance; costs associated with outgoing weekly ATSM calls; and direct nurse telephone care management with patients. These costs were divided into start-up costs (e.g., costs associated with setting up ATSM, staff training, and personnel time for developing messages and protocols) and ongoing implementation costs (e.g., cost of the active nurse care management activities, patient recruitment and retention, and monthly ATSM service costs). On an annual basis, the per-patient start-up costs for the ATSM intervention were $394, and the ongoing costs were $388 (Table 2). The total cost of this intervention per patient was therefore $782. Many of the costs associated with the program are fixed in nature, which makes the per-patient costs artificially high due to the small number of participants. **Financial costs for the target groups** Zero; 'there were no transportation costs for ATSM. We did not include indirect costs of patient time, because the small amount of time (approximately 5 minutes) spent answering the weekly automated calls was unlikely to burden patients, and the time spent

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	talking with the nurse care manager was perceived as a direct patient benefit.' NOTE: Cost utility was examined using quality-adjusted life-years (QALYs) derived from changes in scores on the 12-Item Short Form Health Survey. We also examined cost-effectiveness for costs associated with a 10% increase in the proportion of patients meeting diabetes-specific public health goals for increasing exercise, as recommended by Healthy People 2010 and the American Diabetes Association. RESULTS The annual cost of the ATSM intervention per QALY gained, relative to usual care, was $65,167 for start-up and ongoing implementation costs combined, and $32,333 for ongoing implementation costs alone. In sensitivity analyses, costs per QALY ranged from $29,402 to $72,407. The per-patient cost to achieve a 10% increase in the proportion of intervention patients meeting American Diabetes Association exercise guidelines was estimated to be $558 when all costs were considered and $277 when only ongoing costs were considered. CONCLUSIONS: The ATSM intervention for diverse patients with diabetes had a cost utility for functional outcomes similar to that of many other accepted interventions targeted at diabetes prevention and treatment, and achieved public health physical activity objectives at modest costs. Because a considerable proportion of costs were fixed, cost-utility and cost-effectiveness estimates would likely be substantially improved in a scaled-up ATSM program. **Required competencies of professionals** • Training: Nurse care managers received 2 hours of formal training in motivational interviewing and interpretation of computerised Automated Telephone Diabetes Management results. • Developing telephone scripts: Researchers at the University's Center for Vulnerable Populations spent close to 1 year developing the program's automated telephone scripts, conducting extensive piloting, and eliciting feedback from Community Health Network patients.
Implementation	**Implementation strategy** <u>Getting Started with this innovation.</u> • *Obtain buy-in from management:* Executive-level buy-in is essential to support the cost and effort involved in such a project. • *Establish a clinical champion:* Appoint a trusted team member to champion the project, motivating staff participation and promoting accountability. • *Ensure adequate technology:* Make sure the project site has the technological capacity to support the intervention, including interactive voice response or automated calling. • *Train and support nurse response team:* As the primary contact with patients in this intervention is through nurse care managers, ensure that all nurses delivering and responding to patient calls are appropriately trained and provided with

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	ongoing support and education. <u>Sustaining this innovation.</u> • *Explore cost-cutting measures:* Seek ways to reduce per-patient costs. For example, multiple clinics could collaborate on the project or could implement it in conjunction with a health plan. In addition, properly trained medical assistants (who are less expensive than nurse managers) could potentially make callbacks to patients. • *Add program components for wider impact:* Consider linking this program to a strategy designed to increase medication intensification, which has greater potential for a positive impact on metabolic measures (e.g., blood glucose and lipid levels). **Conditions for effective implementation/Resources Used and Skills Needed** Staffing: Staffing for the pilot project included a project leader, two nurse care managers, and 1.5 to 2 full-time equivalent research associates (administrators and evaluators) to do the following: prepare, record, and translate messages; set up and maintain the system (an outside vendor can do this as well); and recruit and orient patients. **Stakeholders involved** Nurses and patients
Transferability	Transferability is moderate – good: there is a protocol available for the ATSM. However, the telephone scripts might need to be translated to European languages and context. Furthermore, training is needed for nurse care managers. On the other hand, there is a lot of information available on the intervention, which enhances transferability. Finally, it might be interesting to study the possibility of including other technologies.
Evaluation	**Methods used** They applied evaluations of: • *patient engagement*, e.g., participation in calls, participation in nurse call backs, and generation of action plans in response to call backs; • *self-management behaviour and health outcomes*: One year post-intervention, participants who received automated calls reported significant increases in self-management behaviour, including improved foot care and increased physical activity, over those patients who received group medical visits or usual care. In addition, automated call participants reported significant decreases in days restricted to bed and were less likely to report that diabetes prevented them from carrying out daily activities; • *detection of potential problems*: The system enhanced the clinic's ability to identify adverse (e.g., an injury) and potentially

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	adverse (an unsafe state likely to lead to injury if it persists without intervention) situations. Among the patients participating in the intervention, 11 percent of all automated calls identified an adverse or potentially adverse situation, with a total of 111 adverse and 153 potentially adverse situations detected. This detection allowed for quick intervention to minimise harm to the patient. • *structure:* Patient Assessment of Chronic Illness Care (PACIC), communication processes (Interpersonal Processes of Care (IPC)). Compared with the usual care group, the ATSM (and GMV) groups showed improvements in PACIC, with effect sizes of 0.48 and 0.50, respectively (P<0.01). Only the ATSM group showed improvements in IPC (effect size 0.40, p<0.05). • *cost-effectiveness:* Cost utility was examined using quality-adjusted life-years (QALYs) derived from changes in scores on the 12-Item Short Form Health Survey. We also examined cost-effectiveness for costs associated with a 10% increase in the proportion of patients meeting diabetes-specific public health goals for increasing exercise, as recommended by Healthy People 2010 and the American Diabetes Association.

Effectiveness	**Main results**
	• Higher levels of participation compared to group medical visits, especially among those with Limited English proficiency and limited literacy. Over 90% of participants actively engaged with the ATSM system.
	• Better communication with providers compared to usual care and group medical visits.
	• Significant increases in diabetes-related behaviour, including physical activity (2 more hours per week related to physical activity) compared to usual care and group medical visits.
	• Greater improvements in functional status (degree to which an individual can carry out his or her daily activities) compared to usual care and group medical visits.
	• Fewer days spent in bed due to illness compared to usual care and group medical visits, reducing the burden of the disease on patient and family caregivers. Participants in ATSM, on average, spent 2 fewer sick days per month in bed due to diabetes compared to usual care and group medical visits participants.
	• The ATSM technology also promoted patient safety through its surveillance function (4):
	  ○ The ATSM system identified and mitigated one or more unsafe events (e.g. hypoglycaemia, medication problems, and urgent symptoms) in the majority of participants.
	  ○ Primary care physicians were unaware of the occurrence of these events, and most of these events were deemed preventable and ameliorable.
	• ATSM was found to be as cost-effective as other widely accepted diabetes interventions (e.g. cholesterol or glucose control and screening eye exams) targeted at preventing complications of diabetes. The investigators also calculated cost-effectiveness would further increase in a scaled-

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What are the key elements/components of the intervention that must stay intact in order to have an effective intervention?	**Key elements** Weekly calls in their preferred language with rotating queries and response-triggered education about self-care, medication adherence, safety concerns, psychological issues, and preventive services. Health coaches from the health plan called patients with out-of-range responses for collaborative goal setting and action planning.
Level of evidence	✓ Randomised clinical trials
Miscellaneous	**Relevant information that is not covered through the other categories** *The first question on week one, for example, asks "In the last seven days, how many days did you test your blood sugar by pricking your finger?" If a patient enters "0," they will receive a call back from a care manager or health educator within 24 to 48 hours after the patient's daily report is obtained. Those entering "0 to 2" are told that, "Testing your blood sugar lets you know if your blood sugar is too high or too low. You should write these numbers down and talk to your doctor about them. A good time to test your blood sugar is before meals. At least check your blood sugar every morning. It's never too late to start!" Those entering "3 to 6" are told "Keep up the good work! Testing your blood sugar helps you control your diabetes. A good time to test your sugar is before meals. At least, check your blood sugar every morning. If you can, write down your numbers and show them to your doctor at your next visit." An entry of "7" or more results in a simple "Great".* *Some of the challenges for maintaining this program are:* *(1) providing health coaching, tailored to language, within a healthcare system where telephone counselling is not reimbursed. Some changes have been made to take the intervention to the health plan level, not clinic level, where health coaches can conduct the coaching call backs as part of on-going population health programs. However, the level of coaching skill is difficult to maintain, without on-going training, especially since there can be high turnover in healthcare settings;* *(2) setting up a telemedicine version that is not based on a company owning the programs, which need to be paid, for each clinic that is interested in the program. This we have done by working to centralise the intervention content via a University-based telemedicine project, funded by UCSF-CTSI. The enables adaptations and new versions to be created and tested at lower cost;* *(3) a third challenge is to keep the content interesting for patients, so that they can stay in the intervention for long enough to develop skills to change self-care for diabetes, without growing tired of the content. We have shortened our original intervention to 24 weeks (from 39) to reduce redundancies.* *Margaret Handley, Monday, December 17, 2012 7:01 pm| University; Researcher*
Sector	Health sector
Country of development	USA

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Provider	*Contact name / PI:* Dean Schillinger *Organisation:* Center for Vulnerable Populations (CVP) at San Francisco General Hospital/ California Diabetes Prevention and Control Program *Type of organisation:* Hospital / Health Organisation *Post address:* UCSF/ San Francisco General Hospital Building/ Building 10, 3rd Floor, 1001 Portrero Ave., San Francisco, CA 94110. *E-mail:* dschillinger@medsfgh.ucf.edu *Telephone number:* +1 415 206-8940 (and USA number)
Relevant documents/links	**Fact sheet** • IDEALL FACT SHEET: How Can Public Health Systems Best Support People with Diabetes? Findings from the UCSF IDEALL Study **Outline** • Navigating the Terrain between Research and Practice: A Collaborative Research Network (CRN) Case Study in Diabetes Research. Margaret A. Handley, PhD, MPH, Hali Hammer, MD, and Dean Schillinger, MD. (J Am Board Fam Med 2006;19:85–92.) • Outlines the IDEALL (Improving Diabetes Efforts Across Language and Literacy) • Project, a study of self-management support strategies for diabetes. **Evaluation reports** • Seeing in 3-D: Examining the Reach of Diabetes Self-Management Support Strategies in a Public Health Care System. Dean Schillinger, Hali Hammer, Frances Wang, Jorge Palacios, Ivonne McLean, Audrey Tang, Sharon Youmans and Margaret Handley. Health Educ Behav 2008 35: 664 originally published online 18 May 2007. • Effects of Self-Management Support on Structure, Process, and Outcomes Among Vulnerable Patients With Diabetes. A three-arm clinical trial. DEAN SCHILLINGER, MD, MARGARET HANDLEY, PHD, FRANCES WANG, MS, HALI HAMMER, MD. Diabetes Care 32:559–566, 2009 • Cost-Effectiveness of Automated Telephone Self-Management Support With Nurse Care Management Among Patients With Diabetes. Margaret A. Handley, PhD, MPH, Martha Shumway, PhD, Dean Schillinger, MD. Ann Fam Med 2008;6:512-518. DOI: 10.1370/afm.889. **ATDM Protocol** • Automated Telephone Disease Management Protocol. I. McLean, M. Schneiderman, J. Palacios, V. Bhandari, M. Handley &

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	D. Schillinger. **Training Manual for Group Medical Visits** • Group Visit Facilitators Training Manual and Protocol. Ivonne McLean, Hali Hammer, Leslie Lin, Jorge Palacios, Margaret Handley, Dean Schillinger. **Relevant links** • Healthcare 411: News Series From AHRQ. Podcast: Addressing Low Health Literacy at the Community Level. December 12, 2012. Available at: http://healthcare411.ahrq.gov/radiocastseg.aspx?id=1338&type=seg • McLean I, Schneiderman M, Palacios J, et al. Automated Telephone Disease Management (ATDM) Protocol, 2004. Available at: http://www.commonwealthfund.org/usr_doc/ATDM_protocol_102404.pdf?section=4057 (If you don't have the software to open this PDF,download free Adobe Acrobat Reader® software.(copy link to open) • McLean I, Hammer H, Lin L, et al. Group Visit Facilitators Training Manual and Protocol. Available at:http://www.commonwealthfund.org/usr_doc/CWF_TrainingGuide-Protocol_4-28-06.pdf?section=4057 (copy link to open)

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