

Project Title: Enabling Sleep Apnea Patient-Centered Care Via an Internet Intervention
Principal Investigator: Stepnowsky, Carl, Ph.D.
Organization: Veterans Medical Research Foundation
Mechanism: RFA: HS07-007: Ambulatory Safety and Quality Program: Enabling Patient-Centered Care through Health Information Technology (PCC)
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Strategic Goal: Develop and disseminate health IT evidence and evidence-based tools to support patient-centered care, the coordination of care across transitions in care settings, and the use of electronic exchange of health information to improve quality of care.

Business Goal: Implementation and Use

Summary: The project develops and evaluates an integrated remote monitoring device and Internet-based portal for patients with Obstructive Sleep Apnea (OSA) syndrome who are prescribed continuous positive airway pressure (CPAP) treatment. This project, approximately mid-way through its progress, evaluates the intervention's effect on patients' experience of care, CPAP adherence, and OSA outcomes.

OSA is a common sleep apnea caused by obstruction of the airway that is treated with a CPAP flow generator, a machine that blows air at a prescribed pressure, determined by a physician, into a facemask or nasal pillow. The team is using the ResMed developed ReStraxx Data Center (RDC), a wireless monitoring module that affixes to and transmits data from the CPAP flow generator. The objectively measured adherence data from the RDC will be transmitted to both patient and provider and used as the central outcome measure to evaluate the intervention. The provider portal contains information such as: 1) adherence, 2) amount of air leaking out, and 3) number of apneas/hypopneas per hour. With this information, the provider can monitor the patient's progress, as well as make a decision to contact the patient and/or alter their treatment plans.

The team organizes the data provided by the RDC into user-friendly pieces of information provided to the patient through the Internet Positive Airway Pressure (i-PAP) patient portal. In addition, to monitor the automatically generated indicators, the portal also contains tailored measures that the patients can observe over time as well as the capability to add self-defined measures. The i-PAP patient portal contains a learning center with information on sleep apnea and the CPAP device; charts indicating adherence, efficiency data, and changes in weight, sleepiness, and physical activity over time; a troubleshooting instruction guide regarding the CPAP device; self-assessment materials, including research surveys; a journal for self-documentation; a message board for users to interact with a support network of other CPAP users; and links to external sources of additional information on sleep apnea.

The project is conducting a randomized, controlled clinical trial to evaluate the effects of the interactive portion of the CPAP treatment. Both the usual care group and the i-PAP patients will be provided with the CPAP devices and education materials on OSA. The trial will evaluate the effect of having the Internet-based portal to facilitate the free flow of information and communication between providers and patients in addition to the CPAP device. The team will evaluate whether the i-PAP intervention has an effect on OSA-related outcomes, CPAP adherence, the patient-centeredness of care, patient assessment of and satisfaction with care, patient activation, and other measures. In addition, the team will evaluate the

possible mechanisms that account for those impacts, through indicators such as use of the Web site and frequencies/nature of clinical contacts.

Specific Aims

- Examine the effect of the i-PAP intervention compared to usual care on the patient's experience of the quality of patient-centered, collaborative care. **(Ongoing)**
- Examine the effect of the i-PAP Internet intervention compared to usual care on the level of CPAP adherence. **(Ongoing)**
- Examine the effect of i-PAP compared to usual care on obstructive sleep apnea outcomes. **(Ongoing)**
- Perform a basic cost analysis of the i-PAP intervention compared to usual care, applying a micro-cost methodology of measuring the quantity of inputs used in the production of care and the unit cost of each. **(Ongoing)**

2008 Activities: The project team conducted a thorough environmental scan of existing interactive materials on sleep apnea and CPAP. The team has selected assessment instruments and study procedures based on their findings as well as interactions with software programmers and experts in the field. The online assessments have been created and undergone extensive validation and quality improvement procedures, including: development of the user interface; determination of the navigation process through the i-PAP; and development of the i-PAP portal functionalities. This has included moving from a text-based to a more user-friendly Web site, simplifying the Web portal's layout, and automating some of CPAP troubleshooting process. The team developed a speaking virtual assistant to provide additional support to patients using the Web site, in addition to a series of instruction guides. The project team worked with ResMed to finalize the procedures for automated CPAP adherence and efficient data transmission. Specific data management procedures undertaken include quality assurance measures, pilot tests of completion and transmission of online surveys, and building the tracking components for the project team.

Beginning in September 2008, the project team has been actively recruiting and enrolling study participants. As of April 13, 2009, the project has enrolled 59 participants into the study.

Preliminary Impact and Findings: Preliminary findings from the team's review of sleep apnea and CPAP Web sites identified over 90 websites and coded 49 of them for descriptive and evaluative variables. The project team is reviewing the information for type of interactivity. Preliminary findings suggest that less than five Web sites had any interactive content, and only one had graphical interactive content. No data analyses have been performed on the main study.

Selected Outputs

Overview of "Web 2.0" as Applied to Healthcare. Veteran's Health Administration (VA) San Diego Healthcare System's Health Services Research & Development Service Monthly Scholarly Conference; 2008 March; San Diego.

Grantee's Most Recent Self-Reported Quarterly Status: About 65-80 percent of the project's milestones are being met, but there is a viable plan for achieving the others. The project is behind in their recruiting targets, as unplanned additional time was spent in the development and refinement of the patient portal. The study is now recruiting at the planned rate of 12 new participants per month. The project does plan to enroll at a higher rate to make up for a later-than-planned enrollment start date. The project's budget was under spent at one point. The bulk of this was due to the lagging of actual payments for personnel agreements, which leads to actual expenses paid being recorded at a lesser value than they

should. The project team anticipates that the current year's budget is an appropriate projection of aggregate actual spending.

Milestones: Progress is on track in some respects but not others.

Budget: Spending is roughly on target.