

# Impact of the clinical pharmacy specialist in telehealth primary care

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**Purpose.** A telehealth-based chronic disease management program including clinical pharmacy specialists (CPSs) and the program's impact on primary care outcomes in a population of veterans are described.

**Summary.** A telehealth program including CPS services was developed to improve healthcare access and quality for veterans in rural areas of the Pacific Northwest. Outcomes of medication management services provided by a CPS team during both clinical video telehealth and telephone encounters with 554 patients from October 2014 to March 2017 were assessed. Patients were targeted for diabetes (DM), hyperlipidemia (HLD), and hypertension (HTN) control and tobacco cessation; the respective primary outcomes were the mean changes from baseline in glycosylated hemoglobin ( $HbA_{1c}$ ) and blood pressure values and rates of guideline-indicated statin therapy and tobacco cessation. Patients in the DM and HTN groups had a mean absolute  $HbA_{1c}$  reduction of 1.61% (95% confidence interval [CI], 1.39–1.83%;  $p < 0.0001$ ) and a mean systolic blood pressure reduction of 26.00 mm Hg (95% CI, 22.99–28.50 mm Hg;  $p < 0.001$ ), respectively. In the HLD group, 93% of patients were discharged on a lipid-lowering medication. Tobacco cessation was achieved in 42% of targeted patients.

**Conclusion.** CPSs providing primary care comprehensive medication management services solely via telehealth improved disease management and access to healthcare in a population of rural veterans. Statistically significant improvements in DM and HTN outcomes were demonstrated along with clinically significant improvements in the areas of lipid management and tobacco cessation.

**Keywords:** clinical video telehealth, disease state management, health services accessibility, pharmacists, primary care, telemedicine

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Approximately 33% of veterans enrolled in the Veteran Affairs (VA) healthcare system live in rural or highly rural areas, as defined by the Rural-Urban Commuting Areas score, a tool for measuring population density, urbanization, and commuting based on 2010 U.S. census data. Veterans living in rural areas may experience disparities in accessing healthcare.<sup>1</sup> Innovative telehealth technology such as clinical video telehealth (CVT) can allow veterans to access healthcare services in communities near their home, thus significantly decreasing the bur-

den of travel. Telehealth can also bring the expertise of highly trained individuals to communities where it was previously in short supply or unavailable.

Within the VA system, the use of CVT has enabled successful deployment of comprehensive medication management services provided by clinical pharmacy specialists (CPSs) to rural veterans. A primary care team operating under the patient-centered medical home model within the VA system is organized as a Patient Aligned Care Team (PACT) on which CPSs serve as integral members and

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experts in medication management. Within a PACT, the ideal ratio is 1 CPS to a maximum of 3,600 primary care patients. CPSs have commonly earned a doctor of pharmacy degree, completed a postgraduate residency in ambulatory care or have equivalent practice experience, and have earned board certification.

Multiple studies have demonstrated the benefits of CPS involvement (without the use of CVT) in direct patient care, with positive clinical and financial returns on investment.<sup>2-6</sup> Intensive chronic disease management by a CPS has resulted in significant decreases in blood pressure and glycosylated hemoglobin (HbA<sub>1c</sub>) values and in improvements in lipid panel results and measures.<sup>5,6</sup> One CPS-led smoking cessation program reported a 16% quit rate, with associated annual savings and a positive net cost benefit to the VA system.<sup>5</sup> More recently, a VA study demonstrated that CPSs can improve primary care access.<sup>6</sup>

To date, a handful of small proof-of-concept studies on CPS involvement using CVT to deliver care, typically focusing on a single disease state, have been published. The first published was an evaluation of CPS pain clinic services provided via CVT.<sup>7</sup> Thirty-nine patients were included in the evaluation, which showed a patient satisfaction rate of 90%, with 8,981 miles of patient travel and over \$2,000 in travel reimbursement averted.<sup>7</sup> The implementation of anticoagulation services via CVT has also been evaluated. Time in the therapeutic range was comparable with the use of in-person versus CVT-based care, while patient satisfaction was maintained among the 38 patients evaluated.<sup>8</sup> Most recently, a pharmacist-led diabetes CVT clinic showed a significant decrease in HbA<sub>1c</sub> values and a significant increase in the percentage of patients at their goal HbA<sub>1c</sub> value among the 26 patients reviewed.<sup>9</sup> To our knowledge, no literature to date has described the outcomes of CPSs delivering comprehensive medication management services via CVT and

## KEY POINTS

- Clinical video telehealth and telephone appointments are effective methods for conducting clinical pharmacy specialist (CPS) medication management appointments.
- CPS chronic disease management services provided via telehealth modalities in a team-based care model can improve outcome measures.
- Telehealth is an effective means of providing clinical pharmacy services to patients in rural regions because it minimizes travel burden and improves access to services.

phone in a team-based model of primary care for patients with multiple disease states.

The Northwest regional Virtual Integrated Multisite Patient Aligned Care Team (V-IMPACT) Hub, based in Boise, Idaho, uses CVT and phone calls to deliver primary care to rural veterans throughout Alaska, Washington, Oregon, Idaho, and western Montana. Onsite V-IMPACT Hub team members include primary care providers (physicians, physician assistants, nurse practitioners), psychologists, licensed clinical social workers, psychiatrists, CPSs, and medical support assistants. Licensed practical nurses and registered nurses are key members of the PACT but are located at the patient site. Providers complete multiple online and hands-on training sessions with telehealth equipment, and service agreements and emergency protocols are in place between patient and provider sites prior to seeing patients. Using this model, primary care services have been deployed to areas experiencing staff shortages and areas without robust services.

The Northwest V-IMPACT Hub recognizes the expertise and role of a CPS in team-based care and currently deploys 6 CPSs within the program to provide comprehensive medication management services on behalf of multiple primary care providers and clinic sites using 2 main models described in a previous publication.<sup>10</sup> Within the V-IMPACT Hub, CPSs practice at the top of their license as providers with prescribing authority under a scope of practice. All CPSs see patients for comprehensive medication management, which includes a variety of chronic disease states. Most patients are seen for diabetes mellitus (DM), hypertension (HTN), hyperlipidemia (HLD), and tobacco cessation. Services for patients with hypothyroidism, gout, gastroesophageal reflux, chronic obstructive pulmonary disease, asthma, nonopioid pain management, and hepatitis C are offered according to clinic and provider need and the assigned CPS's training. In addition to chronic disease management, CPSs are involved in population management and chart review consults and are available to primary care teams for real-time drug information questions. Models of CPS deployment using CVT in a team-based framework have been described previously.<sup>10</sup>

Patients managed by a CPS are formally consulted by any team member or acquired via population management using disease state registries. Patients are eligible for CPS management services if treatment goals for DM, HTN, or HLD have not been met. Any patient using tobacco products is considered "not at goal" and a candidate for referral for CPS-provided tobacco cessation services.

Encounters with patients selected for CPS services last 15–60 minutes and are conducted via CVT or telephone per patient preference. Patients are managed by the same CPS until discharge, with the duration and frequency of follow-up determined at the discretion of the managing CPS and as clinically indicated. Medication changes are made in the CPS's

name, within his or her scope of practice, per clinical judgment rather than a prespecified protocol. Discharge from CPS management occurs when the patient has achieved the prespecified health goal, no further medication changes can safely be made, lack of adherence to recommendations is demonstrated, or the patient is lost to follow-up. Therapeutic goals are individualized on the basis of current national guidelines, with less strict DM treatment goals in patients with advanced disease or short life-expectancy. All patient encounters are documented in a clinical note in the electronic medical record.

This article describes the retrospective quality-improvement evaluation of CPS-provided comprehensive medication management services within the V-IMPACT Hub specific to DM, HTN, HLD, and tobacco cessation as well as their impact on access to care.

## Methods

**Data collection.** The V-IMPACT Hub CPS service had 1 half-time CPS for the first year of data collection, with staffing expanded to 6 full-time CPSs during year 2 of data collection. Data were collected for patients consulted from October 2014 through March 2017 who had been discharged from CPS management. The study was approved as a quality-improvement project and exempted from review by the regional institutional review board.

For purposes of the study, patients consulted for DM or HTN were categorized into 2 groups (those discharged at goal and those discharged for any reason) to enable assessment of the extent of improvements with or without an optimized follow-up schedule. For the first analysis, focusing on patients with DM or HTN discharged at goal, patients were excluded if they were lost to follow-up, discharged due to repeated nonadherence with medications or CPS recommendations, discharged when no further medication changes could be made safely, or transferred to another

service (e.g., endocrinology, home-based primary care) for management. For the second analysis, all patients referred via provider consultation to the CPS for DM or HTN management and seen by a CPS at least once were included. All HLD patients consulted to and seen by a CPS at least once were included for analysis. Patients consulted for tobacco cessation management were included in the analysis if they had at least 2 appointments with the CPS, given that feedback on progress reported at the second visit was needed to determine response to intervention.

**Outcomes.** The primary review outcomes were as follows: change from baseline in HbA<sub>1c</sub> and blood pressure (systolic [SBP] and diastolic [DBP]) values after enrollment to receive CPS-managed services, percentage of patients on goal lipid treatment at discharge, and percentage of patients who quit tobacco products after CPS intervention. All laboratory test values were derived via analysis of laboratory-processed venipuncture samples. Discharge blood pressure values were ideally in-clinic values, but multiple concordant home blood pressure values could be used secondarily if a patient was unable to travel to a clinic. Secondary outcomes included the mean duration of CPS follow-up, the mean number of visits per patient until discharge, and the percentage of patients discharged at goal for each condition assessed. Decisions regarding whether a patient was or was not at goal were made by the CPS at the initial appointment per current national guidelines and clinical judgment.

**Statistical analysis.** Descriptive statistics were used to analyze the HLD and tobacco cessation outcomes. Paired *t* tests were used to evaluate change in HbA<sub>1c</sub> and blood pressure values in all DM and HTN groups.

## Results

During the 29-month evaluation period, 554 unique patients were seen by a CPS at least once and discharged

from CPS management. Some patients were managed for concomitant diseases as indicated; because outcomes were recorded for both diseases in these cases, the total number of patient outcomes analyzed was greater than 554. More than 3,400 CPS visits were completed during the review period. Patients in all outcome groups were predominantly male, with a mean age of 62 years.

**Outcomes in DM group.** In the diabetes group, 242 patients were consulted and completed an initial CPS visit; the mean baseline HbA<sub>1c</sub> value was 9.9%. In this group, the mean absolute reduction from baseline in HbA<sub>1c</sub> values was 1.61% (95% confidence interval [CI], 1.39–1.83%; *p* < 0.0001). Patients were followed by a CPS for a mean of 7 visits, with a mean duration of follow-up of 4.8 months. Of the 242 patients, 132 (55%) were discharged at goal; within this subset of patients, the mean absolute HbA<sub>1c</sub> reduction was 2.42% (95% CI, 2.12–2.72%; *p* < 0.0001), and patients were followed for a mean of 8 visits over a mean of 5.3 months. Figure 1 details reasons patients were discharged prior to achievement of therapeutic goal.

**Outcomes in HTN group.** In the HTN group, 122 patients were consulted and completed an initial CPS visit; the mean baseline blood pressure value was 159/89 mm Hg. At discharge, 84% of patients were at goal, with a mean SBP decrease of 26.00 mm Hg (95% CI, 22.99–28.50 mm Hg; *p* < 0.001) and a mean DBP decrease of 11.00 mm Hg (95% CI, 8.75–12.56 mm Hg; *p* < 0.001). Patients were followed for a mean of 5 visits for a mean duration of 2.9 months.

Among the 103 patients discharged at goal, the mean SBP and DBP reductions from baseline were 28.00 mm Hg (95% CI, 24.95–30.14 mm Hg; *p* < 0.0001) and 11.00 mm Hg (95% CI, 9.41–13.41 mm Hg; *p* < 0.001), respectively. Follow-up for this group involved a mean of 5 visits over a mean of 2.9 months.

**Outcomes in HLD group.** A total of 94 patients were followed for lipid

management for a mean of 4 visits over a mean of 3.2 months. At discharge from CPS management, 77 (82%) were taking the goal-indicated statin dose; 5 (5%) were taking a statin but at a lower-than-indicated dose. Five (5%) patients managed by a CPS were unable to tolerate a statin at any dose but were discharged on alternative lipid-lowering therapy. The remaining 7 (7%) patients were discharged on no lipid-lowering medication. Regardless of lipid medication use or nonuse, all patients were educated about the importance of diet and lifestyle modifications in cholesterol management and offered consultation to various services, including dietitian services and exercise programs.

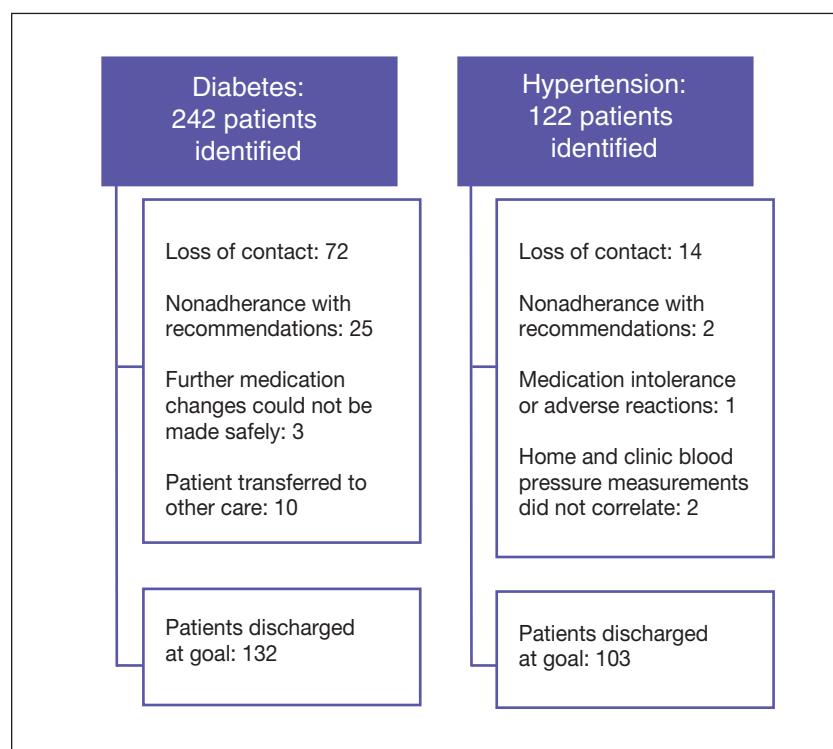
#### Tobacco cessation outcomes.

A total of 140 patients met the criteria for inclusion in the tobacco cessation analysis. The mean number of follow-up visits was 4.4, with those visits conducted over a mean of 3.6 months. At discharge from CPS management, 59 patients (42%) had achieved tobacco cessation, and 55 (39%) had achieved a reduction in tobacco use but not complete cessation. The remaining 26 patients (19%) were lost to follow-up, lost interest in cessation, or were transferred to other care (e.g., primary mental health care for behavioral change, support group) for management of their cessation attempt.

## Discussion

DM, HTN, HLD, and tobacco use are frequent and significant health concerns in the U.S. veteran and general populations. Individuals living in rural areas likely do not receive the same quality of services for these conditions as those in urban areas. The V-IMPACT Hub has used the PACT CPS model to increase access to healthcare for veterans in rural and highly rural areas and has demonstrated improved outcomes in veterans with the aforementioned chronic disease states and tobacco users via the use of telehealth modalities. An increase in healthcare access through provision of phone call appointments was also demonstrated.

**Figure 1.** Reasons for discharge before achievement of therapeutic goal.



DM and HTN control was improved in patients who were followed by a CPS until therapy goals were met. Even when considering patients seen just once by a CPS and those discharged prior to attainment of clinical goals or lost to follow-up, improvements in HbA<sub>1c</sub>, SBP, and DBP values were observed after intervention by a CPS. Patients consulted for CPS management are often those with longstanding disease states, who are difficult to manage due to multiple factors, including but not limited to medication adherence issues, medication intolerance, and refusal to engage in lifestyle interventions. The mean duration of follow-up may have increased due to delays in obtaining a discharge HbA<sub>1c</sub> value in some cases because of limited clinic access and travel capabilities. Improvements in HbA<sub>1c</sub> values and the percentage of patients who reached their goal HbA<sub>1c</sub> value were comparable to those observed in other published studies of CPS interventions.<sup>2,4,9,11</sup>

The results of the HLD and tobacco cessation analyses also showed notable clinical impacts on the primary outcomes. The majority of patients enrolled for HLD management were subsequently treatable with an indicated medication, primarily a statin. In the event of statin intolerance, use of alternative dosing schemes, as opposed to complete avoidance of the medication class, was successful in many cases. Tobacco cessation patients managed by a CPS had an overall quit rate of 42%; reported quit rates in other evaluations of pharmacist-driven tobacco cessation initiatives ranged from 19% to 51%.<sup>12-15</sup>

During the review period, veterans were frequently followed by phone for appointments per patient preference, and the number of phone appointments far exceeded the number of CVT appointments; this was in contrast to previously reported studies in which telehealth appointments were done solely via CVT.<sup>8,9</sup> Telephone appointments allow the patient and pro-



vider greater flexibility for scheduling and minimize travel burden.

Among other study limitations, the population served was relatively specific: primarily male veterans of the armed forces over 60 years of age who live in rural areas—a population that is traditionally difficult to engage in regular healthcare. Rates of loss to follow-up were relatively high in our review; reasons might include the voluntary nature of participation in the CPS management clinic, the high number of patients consulted or enrolled through outreach by providers rather than by patient request, and telecommunication difficulties in rural areas. However, despite those challenges, improvement was still seen for all disease states assessed. Even if not captured during a designated follow-up appointment, it is possible that improvements were made and care was improved; such improvements have been demonstrated in tobacco cessation studies where the sole intervention of discussing quitting led to greater quit rates than were achieved without that intervention.<sup>16</sup>

The review focused on 4 health problems managed by a team of CPSs within the V-IMPACT Hub. A significant emphasis of the program is team-based care; therefore, it would be valuable in the future to investigate outcomes for the team rather than patients managed by a specific group. The CPSs who provided services during the review period provided services to patients and the clinician team in addition to those described, including but not limited to hepatitis C treatment, hypoglycemia and hypotension management, chart review-based recommendations, and pain management. A review of the comprehensive CPS service would be useful to further elucidate CPS contributions to team-based primary care.

## Conclusion

CPSs providing primary care com-

prehensive medication management services solely via telehealth improved disease management and access to healthcare in a population of rural veterans. Statistically significant improvements in DM and HTN outcomes were demonstrated along with clinically significant improvements in the areas of lipid management and tobacco cessation.

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## Disclosures

The authors have declared no potential conflicts of interest.

## Additional information

The views and opinions expressed in this article are those of the authors and do not necessarily reflect the official policy or position of any agency of the U.S. government.

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