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Community Paramedicine Applied in a Rural Community

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Abstract

Research Objective: Abbeville County Emergency Management Services (ACEMS) began a community paramedicine (CP) program to utilize trained paramedics to serve patients who frequently use the emergency department (ED) and have 1 or more of the following diagnoses: hypertension, diabetes, chronic heart failure, asthma, and chronic obstructive pulmonary disease. The objective of this study was to determine if the CP program reduced ED visits in Abbeville while improving patient outcomes.

Design: A pre/posttest with a comparison group study design was used to evaluate the CP program. The study population had 193 patients (68 enrollees and 125 comparisons) who resided in Abbeville County, South Carolina. Frequent users of the ED were recruited and enrolled in the program by Abbeville Area Medical Center (AAMC) staff starting in October 2013. Records from both AAMC and ACEMS were examined to determine the impact of the CP program.

Results: Hypertensive patients decreased an average of 7.2 mmHg ($P < .0001$) in systolic blood pressure and 4.0 mmHg ($p < .0001$) in diastolic blood pressure. Diabetic patients decreased blood glucose by an average of 33.7 mmol/L ($p = .0013$). Following enrollment into the program, CP participants decreased ED visits by 58.7% and inpatient visits by 68.8%. Conversely, the comparison group increased ED visits by 4.0% and inpatient visits by 187.5%.

Conclusions: The CP program demonstrated a meaningful difference in the health of participants while reducing their health care utilization. CP patients reduced their ED and inpatient use, required less intensive care, had better health outcomes, and reduced health expenses to the community.

Key words community paramedicine, emergency services, program evaluation, rural.

Rural communities in the United States are known to struggle with inadequate access to health care, poor health behaviors, and increasingly aging populations. Older populations in particular are at risk due to the complexity of the conditions they have and the financial and physical limitations they face.[1] Communities in the rural South often have the worst outcomes in these areas.[2] Recent changes in health care policy and payment due to the Patient Protection and Affordable Care Act have created opportunities for innovation in the health care system, although not all sectors were equally represented, particularly emergency medical services (EMS).[3-5]

In 1996, the EMS Agenda for the Future[6] suggested that EMS will become "community-based health management" entities that contribute to population health outcomes via direct, and expanded, roles. Similarly, the Rural/Frontier EMS Agenda for the Future carries this position forward while emphasizing the critical role that this new era of EMS will play in sustaining EMS within rural communities.[7] The agenda describes a potential

new role for EMS, community paramedicine (CP), as "... an organized system of services, based on local need, which are provided by EMTs and paramedics integrated into the local or regional health care system and overseen by emergency and primary care physicians." This agenda focuses on utilizing CP to fill gaps in the primary care delivery system, particularly in those areas with low call volumes.[8,9]

Although 20 years have passed since the initial declaration of this vision, much work is still needed to make this concept a reality. The US health care system has been slow to embrace the concept of CP, due in part to a lack of reimbursement by payers for non–transport-related EMS, a lack of evidence of associated outcomes in the peer-reviewed literature, and a lack of overall program oversight.[1,3,4,8-12]

Reimbursement may be the largest barrier to overcome. Currently, payment for EMS occurs only when a patient has requested 911 emergency services and then is subsequently transported to an emergency department (ED).[5,8,12] In order for a CP program to function independently, reforms in reimbursement policy will have to occur to allow EMS reimbursement for CP services without a transport.[12] Current pilots have been created to assess both effectiveness and cost-effectiveness, with some (Minnesota) passing legislation allowing for reimbursement of CP through its state Medicaid program.[8,13]

Demonstrating the effectiveness of CP programs is also a challenge, but rigorous evaluations of such programs are important to discern their value.[10] Several program evaluations from CP and similar programs in Colorado and Texas have reported improved clinical outcomes and cost savings. In Colorado, the rural Eagle County CP program found an overall cost savings of $124,071 to the local health care system during a 2-year period.[14] The MedStar Mobile Health Program in Texas reported, over 15 months, a reduction in hospital readmissions while reducing Medicare charges by $30,343 per participant.[8] Additional findings from demonstration programs in states such as Nevada, California, and New York echo these findings.[3,8,15,16]

What is lacking in these studies, and in other international program evaluations as well, is a uniformity in terms of data collected or intervention type, as well as a lack of a comparison group.[11,15] Overall, more evaluations are needed to determine if CP is a clinically and cost-effective model of health care delivery with appropriate levels of oversight.[8,12] In consideration of these factors, this analysis adds to the evidence base of the clinical effectiveness and cost versus benefit of CP programs by conducting a longitudinal analysis of a CP program in a rural US community, Abbeville County, South Carolina. In addition, this evaluation includes a comparison group of similar patients to better determine the effects of the CP program itself.

Methods

Program Implementation

Abbeville County, South Carolina, is a rural county located on the western border of the state, with a 2010 population of 25,417 people. In comparison to other South Carolinians, Abbeville County residents tend to be less educated, more likely to live in poverty, and more likely to be unemployed. Abbeville County residents have a higher than average utilization of health care, with higher ED discharge rates and more frequent ED visits than the state average.[17] In addition, nearly half (42%) of all Abbeville County Emergency Management Services (ACEMS) calls were for nonurgent issues in 2011.

Seed funding for the training of the ACEMS Community Paramedics was obtained through the South Carolina Medicare Rural Hospital Flexibility Program grant, administered by the South Carolina Office of Rural Health. Paramedics were selected to receive specialized CP training based on their length of time in EMS (at least 10 years) and length of time at the ACEMS (at least 4 years). This training was essential, as topics such as patient education and communication are lacking in current paramedic training.[3] The CP training was based on the North Central EMS Institute's curriculum, and it consisted of approximately 15 weeks (200 hours) of didactic training and 100 hours of local clinical time.[4,8] Specific policies and procedures and standard operating guidelines were also developed for the program and approved by a local medical director as well as a state oversight agency (South Carolina Department of Health and Environmental Control), which granted the project status as a pilot program.

In October 2013, with a grant from the Duke Endowment secured by the Abbeville Area Medical Center (AAMC), ACEMS CP operations began. All services provided by the CP program were based on community needs and were within current SC scope of practice guidelines for paramedics. Services included prevention (home safety assessments and patient education); general assessments (medication reconciliation, fasting blood glucose [BGL], and weight checks); cardiovascular care (blood pressure monitoring and 12-lead electrocardiograms); respiratory care (equipment usage, oxygen saturation checks); postdischarge follow-up (discharge instructions, dressing changes); and social services (connection to local resources, applications for benefits).

Patients were considered eligible for the program if they had visited the local ED more than 2 times in a

1-month period. Patients eligible to receive services were recruited from the local hospital ED, primary care office, or free medical clinic through referral by a clinician or self-referral based on program flyers. They were required to have at least 1 chronic disease and were often frequent users of other health care services in the community. Once patient consent was obtained, the medical director completed an order that set up the first visit between the community paramedic and the patient. A CP liaison nurse assisted with the first visit to write a care plan for the patient for the medical director's approval. Once the care plan was approved, the community paramedic executed the plan via a set number of follow-up visits. Patients were reassessed as needed over the course of the program and "graduated" from the program once adequate management of their condition was achieved.

All visits were conducted in the patient's home or at a preferred meeting place in the community. The community paramedic would meet the patient during a scheduled window of time, to allow for the nature of EMS staffing and unexpected calls in the rural community. The community paramedic would visit the patient in a specially marked EMS vehicle (not an ambulance). Should the need arise for emergency care during the visit, the community paramedic would initiate a 911 call and existing protocols for emergent care would be used. After any visit, the community paramedic would document the visit using the EMS electronic reporting software, providing a copy to the medical director for review and follow-up as needed. All of the visits during this phase of the program were subject to internal quality assurance checks.

Program Evaluation

The Abbeville CP program included both process and outcomes measures. First, the methods used to establish the program, including meeting minutes, achievement of milestones, training of the community paramedics, and the process for patient identification and enrollment were documented. The outcomes assessment is described below.

Data Collection

To assess the impact of the program, data from the period January 2011-August 2015 were utilized. These data were obtained from several sources.

ACEMS Records Regarding CP Patient Visits and 911 Visits

Records from ACEMS were collected for CP patient visits and 911 (emergency) visits. ACEMS used its existing EMS electronic reporting software as the primary means to document CP patient visits. Specific measures obtained from this data included: date of visit, body weight of patient, blood pressure, pulse, respiratory rate, fasting BGL levels, a shortness of breath episode, medication reconciliation, if patient was compliant with his/her care plan, if the patient had kept logs regarding health status, time of visit, and if any program referrals had occurred. The data also included emergency visits, with specific measures including date of visit, length of time for visit, total length of time between ambulance dispatch until the time the ambulance goes back into service, reason for visit, and transport destination.

ACEMS Financial Records

ACEMS financial records from fiscal years 2011-2015 were used to determine cost-effectiveness of the program. Specific measures included program expenses, staff payroll costs, and fringe benefit costs, as well as an attributed proportion of overhead costs.

AAMC Medical Records

AAMC records for both the ED and inpatient service from the years 2011-2015 were obtained from the hospital's electronic medical records system. Measures from these records included length of stay, principal and secondary diagnoses, and amount billed to the patient.

AAMC Financial Records

AAMC annual cost reports for fiscal years 2011-2015 were obtained to determine the financial impact of the CP program on the ED.

BOOST Screening

The CP program used a screening tool developed by the Society of Hospital Medicine, the Better Outcomes by Optimizing Safe Transitions (BOOST) toolkit. Specifically, the community paramedics utilized the 8P screening tool, which examines risk for adverse events along 8 themes: medications, psychological, primary diagnosis, physical limitations, health literacy, support, prior hospitalizations, and palliative care.[18]

Satisfaction Interviews

Phone interviews were conducted by CP program administrative staff and the evaluation team to determine participant satisfaction with the program. The evaluation form was adapted from existing ACEMS evaluation forms for CP program use only (see Appendix A, available online only), and utilized a 12-item, 5-point Likert scale.

The evaluation was split into 2 domains: (1) the participant's satisfaction with CP visits and (2) the participant's satisfaction with the overall CP program. The survey was administered once the participant was enrolled and active in the program for 90 days. CP administrative staff or the evaluation team called the participant and read the questions verbatim to the participant. Each item's overall score was then averaged between all respondents.

Comparison Group

To better determine if the program itself made a difference in the outcome measures, a group of similar, but not enrolled, patients was needed. To identify this comparison group, a matching algorithm was utilized based on gender, age (5-year increments), race, and insurance type. An attempt was made to match by comorbidities, but not enough matches were found to create a statistically significant comparison group. This inability to match by comorbidities was due in large part to the CP program targeting participants with a large number of comorbidities, reducing the pool of available participants with similar characteristics. The goal of the match was to identify 2 comparison individuals for each participant; despite the algorithm, the comparison group did differ in some ways from the enrollee group. This was due to the lack of comparable patients without insurance who used the AAMC ED and were not already enrolled in the program. The final study population comprised 68 CP program enrollees and 125 comparison individuals. In comparison to the CP program patients, the comparison group's average age was 55.4 years (vs 57.6), 47.2% were females (vs 60.3%), 47.5% were minorities (vs 64.7% minorities), 86.4% had hypertension (vs 82.4%), 38.4% had diabetes vs 58.8%, 14.4% had chronic obstructive pulmonary disease (COPD; vs 17.6%), and 3.2% had chronic heart failure (vs 2.9%).

Data Analysis

Time Frame

Regular CP visits began in April 2014; by July 2015, the program had enrolled 68 participants, with varying levels of exposure to the program. Initially, 72 individuals enrolled in the program but due to a lack of participation in the program, 4 were discharged from the program and not included in this analysis. Program impact was measured in 2 ways: changes from baseline for participants, and changes compared to the comparison group. Baseline data for participants were established at their initial CP visit. A retroactive 6-month chart review of AAMC and ACEMS records was performed to identify health care utilization prior to program enrollment. Patient visits were then tracked throughout the entire study period. A similar process was conducted for both the participants and comparison group.

Initial analysis was limited to CP program participants. For health outcome data (body weight, BGL, blood pressure, and number of shortness of breath episodes), baseline data were compared to a combined average of all visits following the third CP visit. The third visit was used due to a short time frame between the first and second visits, which does not allow for changes to take effect.

Next, the number of ambulance runs was calculated, as well as the average ambulance return to service time (the time between ambulance dispatch through to when the ambulance is clear to respond to new calls) to assess impact on ACEMS. ED and inpatient visit counts were also collected, as well as information about these visits (primary diagnosis, length of stay, and charges). Finally, 30-day hospital readmission rates (using AAMC data) were collected.

Paired student *t* tests were performed to test within-group differences in baseline and subsequent measures. To determine the effectiveness of the program, participant and comparison groups' results were compared and tested using independent *t* tests.

Cost Effectiveness

Cost effectiveness was estimated using 2 components: program costs and cost avoidance. Program costs were obtained from the ACEMS records and included program receipts, staff payroll and fringe costs, and an attributed proportion of overhead costs. Cost avoidance was estimated by examining pre-enrollment utilization to postenrollment utilization. Using AAMC cost reports, the average costs for an ED and inpatient day were estimated. Cost avoidance was then calculated as these average costs multiplied by reduction in visits and inpatient days.

Results

Of the 68 participants, 15 had hypertension, 5 had diabetes, 5 had COPD or asthma, 5 had other disease (2 depression, 2 posttraumatic stress disorder, and 1 blind), and 39 had some combination of the above. Participants were 60.3% female, 64.7% non white, with an average age of 57.6 years and were enrolled an average of 355.3 days in the program at the time of analysis (Table 1).

The program activities focused on educating the participants, connecting them to resources for primary care delivery and preventing unnecessary or avoidable health care utilization (Table 2).

Table 1 Abbeville CP Enrollee Characteristics

	N	%
Race		
Caucasian	24	35.3%
African American	43	63.2%
Hispanic	1	1.5%
Sex		
Male	27	39.7%
Female	41	60.3%
Age at enrollment		
17-24	2	2.9%
25-34	2	2.9%
35-44	6	8.8%
45-54	19	28.0%
55-64	29	42.7%
65-74	2	2.9%
75+	5	7.4%
Missing age	3	4.4%
Health insurance at enrollment		
Medicaid	6	8.8%
Medicare	3	4.4%
Private	3	4.4%
Other	1	1.5%
None	55	80.9%
Number of chronic diseases		
1	25	36.7%
2	31	45.6%
3+	12	17.7%

Overall, satisfaction was very high, with 100% of participants reporting a 5 out of 5 rating in terms of satisfaction with the overall program. All participants had a home safety assessment, BOOST screening, or medication reconciliation that occurred while enrolled. In addition, all of those with a primary care encounter during the project period had a preventive screening or intervention addressed during that encounter. These high rates can be attributed to the community paramedics using their visit protocols, and ensuring all components were completed.

Abbeville County has multiple free or reduced fee services available for low-income residents. However, many community members do not use these services for varying reasons such as lack of awareness, transportation, or other barriers to enrollment. The CP program helped to link participants to services available to the participant, with nearly 60% receiving a referral to a community resource. All of those eligible for enrollment in affordability programs or into a health care plan were enrolled, expanding their access to providers. In addition, 100% of participants were referred to a medical home after becoming enrolled into the program. One program goal was not met, however; only 13% of participants saw a primary care provider within 14 days of enrollment. This was due in large part to the financial status of the participants (lacking insurance or a medical home) or difficulties arranging transportation to that medical home.

In contrast to the comparison group, program participants began to use care more appropriately, either through the educational efforts or access to other services and medical homes (Table 3). EMS (911) calls decreased by 48.5%, with those calls made being related to their primary condition less often. These calls also showed a significantly larger decrease in the time spent on scene

Table 2 CP Program Outcome Summary

Objective	Goal	Results
Patient care satisfaction rate	85% with 4 or 5 on patient satisfaction scores	100% with a 4 or 5
BOOST screening	100% of appropriate patients receive BOOST screening	100%
Fall screening rate	90% of patients screened for risk of falls	100% screened
Medication compliance rate	Medication utilization/compliance monitored	100% monitored
Primary care encounter rate	100% of patients have at least 1 primary care encounter where they receive preventive screenings and interventions	100% with preventive care
Enrollment rate for health affordability program	100% of patients eligible for Health Affordability Program enrolled	100% enrolled
Number of referrals to community services/resources	50% of patients are connected to 1 or more community services	58.6%
Patient medical home rate	80% of patients have medical home	100% with a medical home
Rate of appropriate primary care physician utilization	100% of patients see a PCP within 14 days of enrollment into CP program	13% with a visit
Average times for primary ambulances	10% reduction in “return to service” times for primary ambulances	22.1% reduction
In-home health education rate	100% of patients receive in-home health education	100% with education

Table 3 CP Participants and Comparison Group Utilization Differences Summary

Metric	CP Participants	Comparison Group	*P* Values
% with an EMS call	48.5% reduction	56% increase	.0007
Time spent with EMS (in minutes)	36.8 minute decrease	16.8 minute decrease	.0008
Nonemergent EMS calls	100% decrease	225% increase	.5343
% of transports	7.9% increase	38.9% increase	<.0001
% of transports requiring higher level of care after enrollment	25.9% increase	50.7% increase	.0008
Time spent with EMS	25.2% decrease	11.6% decrease	.0008
Return to service time (in minutes)	22.1% decrease	8.2% decrease	.0006
% with an ED visit	58.7% decrease	4.0% increase	<.0001
% with an inpatient stay	68.8% decrease	187.5% increase	.0451
Inpatient days	15.7% decrease	162.5% increase	.0285
30-day readmission rate	41.2% decrease	35.9% increase	.0341

with the patient (mean decrease 36.8 minutes, $P = .01$), with a smaller increase (25.9%, $P = .04$) in those requiring a higher level of care than the comparison group. The proportion of EMS calls for nonemergent issues (ie, routine health issues not requiring transport to a facility) decreased by 100%. In addition, ambulances themselves saw a 22.1% decrease in return to service times (ie, shorter time to availability to answer additional EMS calls), improving their access to other patients in need of emergent care.

ED visits among participants decreased by 58.7%, substantially different from the 4% increase in the comparison group ($P < .0001$). Similarly, inpatient admissions decreased by 68.8% compared to an increase in admissions of 187.5% among the comparison group ($P = .045$). Length of stay decreased by 15.7% for participants, yet increased by 162.5% among the comparison group ($P = .03$). Among the CP program participants with a hospitalization, there was a 41.2% reduction in 30-day readmissions, compared to a 35.9% increase among the comparison group; this reduction was even higher among those with COPD (75% decrease). It should be noted that the 30-day readmissions rate was significantly impacted by 1 participant, who accounted for 16 visits; without that participant's data, there was an 83.1% decrease in 30-day readmissions, significantly higher than the comparison group ($P < .0001$).

Specific clinical measures also saw substantial improvements. Among those with diabetes, fasting BGL was measured at the time of CP visit. Compared to their baseline measures, 85% of participants had a decreased fasting BGL, with an average decrease of 33.7 mmol ($P = .04$). Among those with hypertension, 70% saw both a decreased systolic blood pressure (average decrease 7.2 mmHg [$P < .0001$]) and a decreased diastolic blood pressure (average decrease 4.0 mmHg [$P < .0001$]). Due to the lack of resources, the CP program did not use any standardized equipment to track metrics of COPD participants aside from self-report. COPD participants, however, did record significantly fewer ED admissions during the project period for shortness of breath episodes (91.6% decrease, $P = .01$).

Cost-Benefit Analysis

The Abbeville CP program estimated the cost per visit to be $205.78. This is based upon $4,101.93 in start-up costs; $8,473.20 for equipment purchases; $73,127.56 in personnel costs; and $5,251.55 in travel and maintenance costs, for a total of $90,954.24 for the year of 2015. Since the CP program is part of the existing EMS infrastructure, additional costs for the start-up of the CP program were minimized.

Using data supplied by the AAMC cost report, the estimated cost of an average inpatient day was estimated to be $1,531, an ED visit to be $449, and an EMS call to be $312. Given the annualized reduction in ED visits (124), inpatient days (28), and EMS calls (34), a positive marginal benefit to the local health care system was estimated to be at least $18,198, or a return on investment of more than 20%. This estimate may be further influenced by additional expenses (such as fixed overhead costs and depreciation of equipment), but these expenses were not available at the time of the analysis. In addition, the savings may be higher than estimated; using the average costs may underestimate the actual costs of care, as evidenced by the decreased average charge among the CP program participants who did have an inpatient (-$1,249.00, 28.5% reduction) or ED visit (-$879.06, 33.2% reduction) during the program.

Discussion

The Abbeville CP program demonstrates how such an intervention can be implemented in an effective way in a

small, rural context. Participants enrolled in the program experienced an improved level of care and subsequent improved outcomes, which, if maintained, can produce meaningful improvements in their quality of life. Similarly, the health care system saw a shift in health care utilization, moving care from the ED and inpatient arena to outpatient and medical home-based care. This shift, while maintaining a positive financial margin, will be vital to these smaller communities and health care systems as they transition to value-based care. While the Abbeville CP program results echo those found in other programs, a major strength of this analysis is the inclusion of a comparison group to better substantiate the results, which further indicates successful program implementation and value to the system.[3,8,15] These outcomes are critical additions to the national discussion of the utility of CP and EMS in the overall health care system.

The lessons learned during the implementation of the Abbeville CP program will be instructive to other communities as well. The success of this program was due in large part to the involvement of health care agencies within the area, including not only the hospital and EMS agency, but also home health agencies that serve the area. Including home health in the program was key to ensure that eligible participants were appropriately referred to such care, further improving their experience. Collaboration between community members and increased capacity for community engagement were positive outcomes also identified by a rural Australian paramedicine program.

Also, having a medical home (such as a free clinic, rural health clinic, or federally qualified health center) to continue to serve as the patients' medical home will ensure sustainability of the CP program efforts once participants are discharged from the program. Issues with transportation, however, need to be addressed in these communities for residents to have meaningful long-term access to such a medical home.

A key to the success of the program was having a staff person handle the care coordination; this individual not only identified potential participants, but also aided in the scheduling of visits, connection with medical homes, and enrollment in assistance or other aid programs. This link with the social determinants of health is key for a holistic intervention. A San Diego program that used paramedics to assist with resource acquisition for frequent users of health care services saw demonstrated improvements in utilization, but it noted that the intervention was limited by nonreimbursement to EMS of not only health care services but nonmedical (social) services as well.[19] Advocates continue to endorse direct reimbursement for CP services, as this would ensure the sustainability of such programs.

In addition to barriers created by nonreimbursement, the program faced a few challenges with implementation. Although scheduling of the CP patient visits within the normal shift of the paramedic created personnel efficiencies within the EMS system, it sometimes created difficulties for the paramedics who were forced to constantly switch between emergent and nonemergent patient care scenarios. Furthermore, the small number of CP personnel, who only staffed CP visits for 12 hours each day and patients specifically requesting certain CPs for care, did not lend itself to efficient scheduling of patient visits from a geographic standpoint. One CP visit could conceivably be on the westernmost side of the county, with the next one the furthest point north, depending on the patient need and rotation, creating substantial travel burdens and costs. Last, data coordination among providers for the purposes of patient care was difficult due to the inability to link the EMS and hospital systems electronically. Several proposed solutions were out of reach to the CP program due to legal or financial concerns, so the CP program used paper charting based on its existing EMS system that was designed for acute care, and not the CP program, for its caseload. This slowed the transfer of information and limited the ability of the medical home to incorporate all of the CP visit information into the patient's electronic health record.

There were some unanticipated outcomes from the program. One such outcome was a slight increase in ACEMS calls by those enrolled in the program, despite a decrease in emergency room visits, which was most likely due to participants waiving transport after paramedics arrived at their home. Unfortunately, it is not entirely clear what caused an uptick in participant use of emergency services. However, various factors that may have caused this increase include, but are not limited to, the participants' increased awareness of their conditions; participants' increased comfort level around paramedics due to interactions with the community paramedics; and participants' reliance on ambulance transport due to a lack of other transportation options. However, the time spent with EMS was significantly less than before program enrollment and less than the comparison group. This allowed ambulances to go back into service quickly and respond to other calls. Similar programs may wish to focus upon education for the participants to prevent further use or potential abuse of EMS services.[5] In addition, community paramedics should also have access to (and be trained on implementation of) additional screening tools that would be useful in identifying concurrent issues that may complicate participants' care.

The evaluation of the program also faced several limitations. First, since there was not a true comparison group, a group that was similar to the program participants was

chosen. It is of course possible that the differences between the groups are due solely to some intrinsic or temporal changes separate from the program, but the evidence presented in this analysis would argue a strong causal pathway in favor of improvements due to the CP program. In addition, a larger sample of patients over a longer time period would increase the statistical power of the analysis, adding weight to the findings. Also, as noted above, ample data to determine the relationship between the program and apparent increase in EMS calls and/or utilization were unavailable. This can only be explored using qualitative work, which we were unable to perform. Future evaluations of CP programs should consider this factor in their processes. Finally, the cost-benefit analysis was limited, and a more in-depth analysis of cost avoidance, revenue impacts, and costs of administering the CP program would be beneficial.

With an increasingly aging population in the United States, especially in rural communities, use of emergency care resources in an efficient and effective manner will be critical for mitigating potential overcrowding of EDs and preventing inappropriate care.[5,20] The findings presented here demonstrate that CP programs utilize existing resources in a cost-effective manner while providing patient-centered care. The potential for such programs to be used in other settings to further determine their value for both systems and patients is clear based upon these findings.

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Supporting Information

Additional supporting information may be found in the online version of this article at the publisher's web site.

Appendix A. Community Paramedic Patient Evaluation Form