Update of Evaluation of California's Community Paramedicine Pilot Program

by Janet M. Coffman, PhD, MPP, Cynthia Wides, MA, and Matthew Niedzwiecki, PhD, Healthforce Center at UCSF

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Abstract / Overview

Community paramedicine, also known as mobile integrated health (MIH-CP) is an innovative model of care that seeks to improve the effectiveness and efficiency of health care delivery by using specially trained paramedics in partnership with other health care providers to address the needs of local health care systems. In November 2014, the California Office of Statewide Health Planning and Development approved an application from the California Emergency Medical Services Authority to establish a Health Workforce Pilot Project that encompasses 14 projects in 11 areas of the state that are testing seven different community paramedicine concepts. The Philip R. Lee Institute for Health Policy Studies and the Healthforce Center (formerly the Center for the Health Professions) at the University of California, San Francisco, are conducting an evaluation of these projects. This report updates findings from the evaluation presented in a report issued in January 2017. It covers the time period from the launch of each of the 14 projects through June 30, 2017. The evaluators conclude that Californians benefit from these innovative models of health care that leverage an existing workforce that operates at all times under medical control — either directly or by protocols developed by physicians experienced in EMS and emergency care. The projects have improved coordination among providers of medical, behavioral health, and social services; reduced preventable ambulance transports, emergency department visits, and hospital readmissions; and have not resulted in any adverse outcomes for patients.

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Key Findings

Community paramedicine, also known as mobile integrated health (MIH-CP) is an innovative model of care that seeks to improve the effectiveness and efficiency of health care delivery by using specially trained paramedics in partnership with other health care providers to address the needs of local health care systems. On November 14, 2014, the California Office of Statewide Health Planning and Development approved an application from the California Emergency Medical Services Authority to establish a Health Workforce Pilot Project (HWPP) to test multiple community paramedicine concepts. OSHPD has since been renewed the HWPP for one-year periods in 2015, 2016, and 2017. The HWPP encompasses 14 projects in 11 areas of the state that are testing seven different CP concepts.

The HWPP regulations require organizations that sponsor pilot projects to retain an independent evaluator to assess trainee performance, patient acceptance, and cost effectiveness. The Philip R. Lee Institute for Health Policy Studies and the Healthforce Center (formerly the Center for the Health Professions) at the University of California, San Francisco, are conducting the evaluation funded by the California Health Care Foundation. This report updates findings from a report issued in January 2017, which summarized the evaluators' findings regarding implementation from June 2015, the month in which projects began enrolling patients, through September 2016.[iii] This update presents findings from the evaluation through June 2017. A subsequent update will present findings through September 2017.

Key findings are as follows.

General

- Thirteen pilot projects were launched from June through October of 2015.
- A new project, San Francisco's alternate destination – sobering center project, began enrolling patients in February 2017.
- Two projects, the UCLA Center for Pre-Hospital Care's post-discharge project and the UCLA Center for Pre-Hospital Care's alternate destination – urgent care project, have closed due to lack of resources and low enrollment, respectively.
- Between September 30, 2016, and June 30, 2017, enrollment in the community paramedicine pilot projects increased by 33%, from 1,462 to 2,185 persons.

Post-Discharge

- Enrollment in the five post-discharge projects increased from 922 to 1,327 patients from September 30, 2016, through June 30, 2017. Butte had the largest enrollment (748 patients) and Alameda had the smallest (102 patients).
- The post-discharge projects are improving patient safety by performing home visits within several days of a patient's hospital discharge to ensure that patients are taking medications as prescribed, have sufficient refills to manage their conditions, have scheduled follow-up visits with their physicians, and are adhering to any dietary restrictions pertinent to management of their condition.
- All five post-discharge projects have reduced the all-cause 30-day readmission rate for persons with one or more of the chronic conditions they target. The only project that did not achieve 30-day readmission rates for all chronic conditions targeted that was as good or better than the partner hospital's historical average did not provide home visits to all patients, which may have limited the project's impact on readmissions.

- The five post-discharge projects generated approximately $1.4 million in potential savings, the majority of which (60%) accrued to Medicare.

Frequent EMS User

- Enrollment in the two frequent EMS user projects increased from 77 persons to 95 persons between September 30, 2016, and June 30, 2017.
- Since December 2016, San Diego's frequent EMS user project have found it challenging to meet patients' needs because two community paramedics working on the project were reassigned to traditional 911 response crews.
- The frequent EMS user projects have achieved large reductions in the number of times enrolled patients called 911 and were transported to an emergency department (ED).
- Frequent EMS user projects also linked patients to organizations that provide primary care, mental health services, substance abuse treatment, food, housing assistance, transportation assistance and other services that can address their needs more effectively than the EMS system.
- From October 2015 through June 2017, San Diego's frequent EMS user projects generated approximately $543,400 in savings for payers. It also reduced the amount of uncompensated care provided by ambulance services and hospitals because 46% of the patients enrolled in the project were uninsured.
- From July 2015 through September 2016, Alameda's frequent EMS user project generated approximately $100,048 in savings for payers.

Directly Observed Therapy for Tuberculosis

- Enrollment in the directly observed therapy for tuberculosis (TB) project increased from 29 persons to 37 persons between September 30, 2016, and June 30, 2017.
- Most persons are enrolled for multiple months because treatment for TB typically spans six to nine months.
- Community paramedics dispensed appropriate doses of TB medications and their TB patients did not experience side effects any more frequently than typically associated with TB treatment.
- Ten patients were admitted to a hospital but only patient was hospitalized for TB. This patient needed intravenous medication to treat TB meningitis, which was diagnosed prior to enrollment in the program.
- People with TB who received directly observed therapy from community paramedics were more likely to receive all doses of TB medication prescribed by the TB clinic physician than people who received directly observed therapy from the TB clinic's staff because community paramedics were available 24 hours per day, 7 days per week.

Hospice

- Enrollment in the hospice project increased from 137 persons to 225 persons between September 30, 2016, and June 30, 2017.
- The hospice project reduced harm by reducing the likelihood that patients who did not want to go to an ED would be transported and risk losing their hospice benefits. However, patients were not denied transport to an ED where it was indicated and consistent with the patient's preference.
- The percentage of 911 calls for hospice patients enrolled in the project that resulted in transport to an ED decreased from 80% to 31%.
- The hospice project achieved an estimated $165,990 in savings by reducing ambulance transports and ED visits.

Alternate Destination – Mental Health

- Enrollment in the alternate destination – mental health project increased from 169 persons to 227 persons between September 30, 2016, and June 30, 2017.
- The pace of enrollment slowed in 2017 because several community paramedics left the agency or were promoted to other positions. Additional community paramedics have been trained and the project's leaders expect that enrollment will increase because there will be more capacity to screen persons who are potentially eligible.
- Twenty-five percent of persons screened by the community paramedics were transported to the mental health crisis center and more could have been transported to the crisis center if the county had more inpatient psychiatric beds or if the crisis center accepted persons with private health insurance or Medicare. (Some persons the community paramedics screened were not eligible for transport to the mental health crisis center because they had a medical need, were intoxicated, or were violent.)
- In addition to responding to 911 calls regarding mental health emergencies, the community paramedics screen people who come to the mental health crisis center for care to determine whether they have any medical conditions that might necessitate transport to an ED instead of admission to the crisis center.
- Only 4% of patients enrolled in the project (n = 9) were transferred from the mental health crisis center to an ED within six hours of admission. None of the transfers involved a life threatening condition and none of the patients transferred to an ED were admitted for inpatient medical care.
- The project also improved public safety because in cases in which law enforcement responded to a 911 call involving a person with mental health needs, community paramedics could take responsibility for the person. This allowed law enforcement officers to return to law enforcement duties instead of transporting the person to an ED and waiting to transfer responsibility for the patient to clinicians in the ED.
- The project saved an estimated $238,700 by reducing the number of 911 calls that resulted in an ED visit and transport of a patient from an ED to an inpatient psychiatric facility.

Alternate Destination – Urgent Care

- Enrollment in the three alternate destination – urgent care projects increased from 39 persons to 48 persons between September 30, 2016, and June 30, 2017.
- Most patients enrolled had a laceration or an isolated closed extremity injury.
- Enrollment in these projects has been substantially lower than anticipated because all three projects had fewer 911 calls that involved people who met the inclusion criteria than expected and because many 911 calls occurred at times of the day during which urgent care centers are closed. In addition, clinicians at urgent care centers were reluctant to treat some conditions, such as a dislocated shoulder, that could be treated safety and effectively in that setting.
- Two patients (4%) were transferred from an urgent care center to an ED within six hours of arrival at the urgent care center. Nine patients (19%) were transported to an urgent care center and then rerouted to an ED because clinicians at the urgent care center declined to treat the patient.

Alternate Destination – Sobering Center

- The alternate destination - sobering center project enrolled 226 persons of which 27 (12%) were repeat users of the sobering center.
- Ninety-seven percent of patients enrolled in the alternate destination – sobering project were treated safely and effectively at the sobering center. Only five patients (2%) were transferred to an ED within six hours of admission to the sobering center and only one (1%) was rerouted from the sobering center to an ED. None of these patients were admitted to a hospital for inpatient care.
- In addition, community paramedics participating in the project provided feedback to paramedics on 911 crews on how to screen acutely intoxicated persons to determine if they are candidates for transfer to the sobering center. They are also collaborating with homeless outreach workers to encourage people who use the sobering center frequently to seek treatment for chronic alcoholism, housing, and other services.
- During its first five months of operation, the project generated an estimated $142,780 in savings. The majority of savings accrued to Medi-Cal because the majority of patients enrolled in the project are Medi-Cal beneficiaries.

Conclusion

The community paramedicine pilot projects have demonstrated that specially trained paramedics can provide services beyond their traditional and current statutory scope of practice in California. No adverse outcome is attributable to any of these pilot projects. The projects are enhancing patients' well-being by improving the coordination of medical, behavioral health, and social services, and are decreasing health care costs by reducing ambulance transports, ED visits, and hospital readmissions. The majority of savings achieved by these pilot projects accrue to Medicare and hospitals serving Medicare patients because Medicare beneficiaries accounted for the largest share of persons enrolled in the pilot projects. Savings also accrue to the Medi-Cal program and providers that serve Medi-Cal beneficiaries because Medi-Cal beneficiaries constitute a substantial percentage of enrollees.

These pilot projects integrate with existing health care resources and utilize the unique skills of paramedics and their availability 24 hours per day, 7 days per week. The community paramedics operate at all times under medical control, either directly or by protocols developed by physicians experienced in EMS and emergency care. The pilot projects have not displaced any other health professionals. Instead, they have demonstrated that community paramedics can collaborate with physicians, nurses, behavioral health professionals, and social workers to fill gaps in the health and social services safety net.

Research conducted to date indicates that community paramedicine programs are improving the efficiency and effectiveness of the health care system. Findings from this research also suggest that the benefits of community paramedicine programs grow as they mature, solidify partnerships, and find their optimal structure and niche within a community. The evaluation of HWPP #173 yields consistent findings for six of the seven community paramedicine concepts tested. All of the post-discharge, frequent 911 users, DOT for TB, hospice, and alternate destination – mental health projects have been in operation for 21 or more months and have improved patients' well-being and, in most cases, have yielded savings for payers and other parts of the health care system. Preliminary findings regarding the sixth concept, alternate destination – sobering center, suggest that this project is also benefitting patients and the health care system. The seventh concept, alternate destination – urgent care, shows potential but further research involving a larger volume of patients is needed to draw definitive conclusions.

If community paramedicine is enabled on a broader scale, California's current EMS system design is well-suited to utilize the results of these pilot programs to optimize the design and implementation of proposed programs and assure patient safety. The two-tiered system of local control with state oversight and regulation enables cities and counties to tailor community paramedicine programs to meet local needs while both local and state oversight and regulation ensure patient safety.

Introduction

Community paramedicine (CP), also known as mobile integrated health (MIH-CP) is an innovative model of care that seeks to improve the effectiveness and efficiency of health care delivery by using specially trained paramedics in partnership with other health care providers to address identified patient needs in local health care systems. Community paramedics receive additional training beyond that required for licensure and provide care beyond their traditional role, which in California is restricted to responding to 911 calls, treating patients at the scene of an emergency, transporting patients to EDs, and inter-facility transfers.[1] They are supervised by physicians and nurses who work for the EMS agencies that employ them and by staff of the health care and community service agencies with which their EMS agencies partner. According to a survey conducted by the National Association of Emergency Medical Technicians, by 2014 more than 100 EMS agencies 33 states and the District of Columbia had implemented one or more MIH-CP initiatives.[2]

On December 19, 2013, the California Emergency Medical Services Authority (EMSA) submitted an application to the California Office of Statewide Health Planning and Development (OSHPD) for a Health Workforce Pilot Project (HWPP) to evaluate community paramedicine. California established the HWPP program (HSC §§ 128125-128195), which was originally called the Health Manpower Pilot Projects program, in 1972 to enable health care organizations to test and evaluate innovative models of care that utilize health professionals in new roles. A HWPP is necessary to establish community paramedicine initiatives in California because the sections of the Health and Safety Code that govern paramedic scope of practice (HSC §§ 1797.52, 1797.218) specify the limited emergency settings where paramedics can provide services and the settings to which they can transport patients. OSHPD approved HWPP #173 on November 14, 2014, for one year and renewed approval for additional one-year periods in 2015, 2016, and 2017.

The HWPP regulations require organizations that sponsor pilot projects to retain an independent evaluator to assess trainee performance, patient acceptance, and cost effectiveness. A team of evaluators at the Philip R. Lee Institute for Health Policy Studies and the Healthforce Center (formerly the Center for the Health Professions) at the University of California, San Francisco, serves as the independent evaluator for HWPP #173. This report updates a report issued in January 2017, which summarized the evaluators' findings regarding implementation from June 2015, the month in which projects began enrolling patients, through September 2016.[3] This update includes findings from the evaluation through June 2017. It also includes findings regarding a new project that was launched in San Francisco in February 2017 under which eligible patients are screened and offered transport to a sobering center if sobering is their only need. The California Health Care Foundation is funding the evaluation.

Overview of California Community Paramedicine Pilot Projects

Fourteen community paramedicine projects have been launched in 11 geographic areas across California under the auspices of HWPP #173. Thirteen projects began enrolling patients in 2015. A fourteenth project began enrolling patients in 2017. A map that displays the projects' locations can be found in Appendix A.

These projects are testing seven different concepts for the practice of community paramedicine.

The seven concepts are:

1. **Post-Discharge, Short-term Follow-Up:** Provide short-term, home-based follow-up care to people recently discharged from a hospital due to a chronic condition (e.g., heart failure) to reduce their risk of readmission and improve their ability to manage their condition.

2. **Frequent EMS Users:** Provide case management services to people who are frequent 911 callers and frequent visitors to EDs to identify needs that could be met more effectively outside of an ED and assist

patients in accessing primary care and obtaining services to address non-medical needs, such as food, housing, and substance use disorder treatment.

3. **Directly Observed Therapy for Tuberculosis:** Provide directly observed therapy (DOT) to people with tuberculosis (i.e., dispense medications and observe patients taking them) to assure effective treatment of tuberculosis and prevent its spread.

4. **Hospice:** In response to 911 calls made by or on behalf of hospice patients, collaborate with hospice agency nurses, patients, and family members to treat patients in their homes according to their wishes instead of transporting them to an ED.

5. **Alternate Destination – Mental Health:** In response to 911 calls, offer people who have mental health needs, but no emergent medical needs, transport directly to a mental health crisis center instead of to an ED with subsequent transfer to a mental health facility.

6. **Alternate Destination – Urgent Care:** In response to 911 calls, offer people with low-acuity medical conditions transport to an urgent care center for evaluation by a physician, instead of to an ED.

7. **Alternate Destination – Sobering Center:** In response to 911 calls, offer people who are acutely intoxicated but do not have an acute medical or mental health need transport to directly to a Sobering Center for treatment instead of to an ED.

All sites obtained approval from an institutional review board (IRB) and enrolled patients following consent procedures stipulated by the IRB. Additional information about each concept is contained in the original evaluation report.

Training of Community Paramedics

Paramedics were eligible to be trained to perform new roles as community paramedics if they had at least four years of experience, volunteered to participate in the pilot, and were sponsored by their local Emergency Medical Services (EMS) authority. The State of California Community Paramedic Educational Taskforce developed a core curriculum that OSHPD reviewed and approved. The curriculum was adapted from the Paramedic Foundation's National Community Paramedic Curriculum to better align with the standards and requirements of practice in California. The curriculum included 48 hours of didactic, classroom-based instruction and 48 hours of clinical, hands-on training, for a total of 96 hours of instruction. Community paramedic trainees were additionally required to complete 56 hours of study outside the classroom, which included required readings and other assignments.

Only the site supervisors from Alternate Destination – Urgent Care projects and paramedics recruited to coordinate the Alternate Destination – Sobering project were required to complete the core curriculum because these concepts focus on clinical decision-making in the field regarding where to transport a patient. This is routine practice for paramedics, who must identify which patients to take to specialty care centers, such as stroke centers, that may not be the closest ED. At these pilot sites all other paramedics in the system received training focused on (1) screening patients according to a protocol to determine if they would be eligible to enroll in the pilot, and (2) the procedures for enrolling patients who agree to be transported to an urgent care center or a sobering center.

The first cohort of community paramedics, which consisted of 79 paramedics, were enrolled in the core curriculum and site-specific coursework during the first quarter of 2015. Two of the 79 paramedics were unable to complete the training for nonacademic reasons. All of the 77 paramedics who completed the core curriculum passed a written final examination, a simulated patient scenario examination, and an oral examination by the pilot site's medical director. Since then, three sites (Solano, Stanislaus, and Ventura) have trained 12 additional community

paramedics to expand their programs or replace paramedics who have left their agencies or been promoted to other positions. San Francisco trained 10 community paramedics prior to the launch of its pilot project in February 2017.

Patient Safety

Multiple procedures to ensure patient safety are incorporated into all levels of the pilot projects. Every project has a project manager, a medical director who is an emergency medicine physician, and a quality assurance officer who is most often a registered nurse with specialty in emergency medicine. Community paramedics have real-time access to physicians and registered nurses for consultation. Each project conducts a retrospective review of all patient encounters. In addition, each project has a local steering committee that approves protocols and reviews data on project outcomes. A statewide steering committee has oversight over all the projects and reviews quarterly reports from the sites. Sites are also required to report unusual occurrences to EMSA's project manager. The independent evaluator reviews data provided by sites for the evaluation and raises any concerns about patient safety that emerge from the data reported. Finally, OSHPD staff review the protocols and performance of the pilot sites and raise any patient safety issues they identify.

Methods

Information presented in this report was obtained from multiple sources. Each of the pilot sites used a standardized, online data collection tool to report data to the independent evaluator on a quarterly basis. Metrics for which data were collected included numbers of people enrolled, characteristics of enrollees, and outcomes of community paramedic services. Sites also reported information about people who were eligible for their projects but not enrolled. Estimates of savings were derived from data that each site reported on the cost of EMS transports, and from existing sources of data on the cost of ED visits and inpatient hospital admissions.

The safety and performance of the projects was assessed by both quantitative and qualitative means. Sites reported data to the independent evaluator on multiple metrics. In addition, EMSA's project manager notified the evaluation team if a site reported an "unusual occurrence" and provided the evaluation team with all documentation regarding the event.

Evaluation team members conducted site visits at all project sites, where they interviewed EMS agency leaders, project managers, community paramedics, and representatives of hospitals and other partner agencies. The purpose of the site visits was to obtain a better understanding of how the projects operated and to hear the perspectives of multiple stakeholders. The site visits were augmented with conference calls with EMSA's project manager and the site-level project managers. The evaluation team also reviewed minutes of local steering committee meetings.

Results

The results section begins with a summary of major findings that concern all seven community paramedicine concepts. The summary is followed by a discussion of major findings regarding key metrics relevant to individual community paramedicine concepts.

General

Developments since September 2016

- Enrollment in the pilot projects increased by 37% between September 2016 and June 2017, rising from 1,373 to 2,185 persons.
- The post-discharge projects continue to enroll the largest number of persons and the tuberculosis project continues to have the smallest enrollment
- Two projects have closed
  - UCLA's post-discharge project
  - UCLA's alternate destination – urgent care project
- One new project has opened
  - San Francisco's alternate destination – sobering center project

Table 1 lists the lead agencies for each pilot project operated under the auspices of HWPP #173, the concept tested, the date on which the project began enrolling patients, and the total number of patients enrolled from the time each project began through June 30, 2017. The longest running projects, Alameda's post-discharge project and Ventura's tuberculosis project, began enrolling patients in June 2015. The newest project, San Francisco's alternate destination – sobering center project, began enrolling patients in February 2017. Collectively, the projects enrolled 2,185 people from June 2015 through June 2017. The number of people enrolled per project ranged from two for the City of Carlsbad's Alternate Destination – Urgent Care project to 748 for Butte County's Post-discharge --project.

Two projects have curtailed operations. The UCLA Center for Pre-Hospital Care's Post-discharge project closed on August 31, 2016, because the Glendale Fire Department could no longer support the project financially. The UCLA Center for Pre-Hospital Care's Alternate Destination – Urgent Care project closed on May 31, 2017, due to low enrollment.

Consistent with findings from the original evaluation report, the distribution of patients by health insurance status varied substantially across the 14 projects, in large part due to differences in the characteristics of the patients served. Medicare beneficiaries accounted for most of the patients enrolled by two of the five post-discharge projects (UCLA – Glendale and Butte). For two of the post-discharge projects, Medi-Cal beneficiaries constituted the largest share of enrollees (45%) and Medicare beneficiaries accounted for the second largest share (San Bernardino and Solano). These projects are located in communities with high rates of methamphetamine use, which is associated with early onset of heart failure. The majority of patients enrolled in Ventura's tuberculosis project, San Diego's frequent EMS user project, Stanislaus' alternate destination – mental health project, and San Francisco's alternate destination – sobering center project were Medi-Cal beneficiaries or were uninsured. Many of the people these projects serve have mental illness, substance use disorders, or other conditions that limit their access to employer-sponsored health insurance. Persons who are dually eligible for Medicare and Medi-Cal are classified as Medicare beneficiaries because Medicare is responsible for paying the majority of costs associated with their hospitalizations, ED visits, and office visits.

Table 1. Pilot Sites, Community Paramedicine Concepts, and Enrollment, Second Quarter, 2017

Project Number	Lead Agency	Community Paramedicine Concept	Date Implemented	Total Patients Enrolled
CP001*	UCLA Center for Prehospital Care	Alternate Destination – Urgent Care	September 8, 2015	12
CP002**	UCLA Center for Prehospital Care	Post-Discharge	September 1, 2015	154
CP003	Orange County	Alternate Destination – Urgent Care	September 14, 2015	34
CP004	Butte County EMS	Post-Discharge	July 1, 2015	748
CP005	Ventura County EMS	Tuberculosis	June 1, 2015	37
CP006	Ventura County EMS	Hospice	August 1, 2015	225
CP007A	Alameda City EMS	Frequent EMS User	July 1, 2015	49
CP007B	Alameda City EMS	Post-Discharge	June 1, 2015	102
CP008	San Bernardino County and Rialto Fire Depts.	Post-Discharge	August 13, 2015	188
CP009	Carlsbad Fire Dept.	Alternate Destination – Urgent Care	October 9, 2015	2
CP010	San Diego County	Frequent EMS User	October 12, 2015	46
CP012	AMR Stanislaus	Alternate Destination – Mental Health	September 25, 2015	227
CP013	Medic Ambulance Solano	Post-Discharge	September 15, 2015	135
CP014	San Francisco Fire Dept.	Alternate Destination – Sobering	February 1, 2017	226
All Projects				2,185

* Ceased enrolling patients on May 31, 2017.
** Ceased enrolling patients on August 31, 2017.

Table 2. Health Insurance Status of Enrolled Patients (Average Percent per Month)

Project Number	Community Paramedicine Concept	% Private/ Commercial Insurance	% Medicare	% Medicaid	% Uninsured or Pay Out of Pocket	% Unknown
CP001	Alternate Destination – Urgent Care	0%	8%	0%	0%	92%
CP002	Post-Discharge	7%	81%	11%	1%	0%
CP003	Alternate Destination – Urgent Care	15%	32%	6%	15%	32%
CP004	Post-Discharge	15%	66%	18%	0%	0%
CP005	Tuberculosis	17%	6%	46%	30%	0%
CP006	Hospice	14%	52%	2%	32%	0%
CP007A	Frequent EMS User	16%	59%	21%	4%	0%
CP007B	Post-Discharge	14%	50%	26%	9%	0%
CP008	Post-Discharge	8%	39%	45%	8%	0%
CP009	Alternate Destination – Urgent Care	100%	0%	0%	0%	0%
CP010	Frequent EMS User	16%	13%	26%	46%	0%
CP012	Alternate Destination – Mental Health	0%	0%	85%	15%	0%
CP013	Post-Discharge	8%	44%	45%	2%	0%
CP014	Alternate Destination – Sobering	7%	24%	60%	8%	0%

Post-Discharge

Post-Discharge Projects: Developments since September 2016

- Enrollment in the post-discharge projects increased by 31% between September 2016 and June 2017, rising from 922 to 1,327 persons.
- One of the post-discharge projects closed in August 2016 because the partner fire department was unwilling to continue funding the project.
- All of the post-discharge projects reduced the rate of 30-day admission for any cause for at least one of the diagnoses targeted.
- Post-discharge projects that provided at least one home visit to all patients continued to outperform the project that relied primarily on telephone calls.
- Community paramedics identified an additional 62 patients who needed instruction on how to use their medications correctly.

Description

The goal of the five post-discharge projects is to reduce hospital readmissions for people discharged from a hospital for treatment of a chronic condition. A major impetus for the post-discharge projects is the Medicare Readmission Reduction Program, under which Medicare reduces payments to hospitals if they have rates of readmission that are deemed excessive. The projects aim to give patients the tools to manage their conditions more effectively so that they can avoid readmission. In collaboration with its partner hospital, each project identified one or more chronic conditions to address. Once a project enrolls a patient, a telephone call or home visit with a community paramedic is scheduled. During the call or visit, the community paramedic performs a clinical assessment and reviews the patient's discharge instructions per the site's protocols. Some projects also provide home safety inspections during home visits.

The post-discharge projects worked with their partner hospitals to determine which conditions to target. UCLA – Glendale and San Bernardino-Rialto only enroll people with heart failure. Butte enrolls people with heart failure or myocardial infarction, and Solano enrolls people with heart failure or chronic obstructive pulmonary disease. Alameda enrolls people with heart failure, acute myocardial infarction, chronic obstructive pulmonary disease, diabetes, pneumonia, or sepsis.

The post-discharge projects provide short-term assistance and do not to replace home health care or any other services available to patients. The sites protocols call for community paramedics to complete phone calls or visits within the first several days of hospital discharge. Some partner hospitals focus on enrolling uninsured persons and Medi-Cal beneficiaries in the pilot projects because these persons do not have insurance coverage for home health. In other cases, community paramedics served a stop-gap role by providing calls or home visits while patients waited to obtain home health services. Interviewees at partner hospitals consistently indicated that home health agencies in their communities often cannot schedule a home visit until at least one week after a patient is discharged from the hospital. Having contact with a health professional during the first week after discharge is important because many readmissions occur during this time period. Where community paramedics learns that a patient had home health services, they coordinate with home health agency staff.

Two projects have full-time community paramedics (Alameda and UCLA-Glendale) and three projects have part-time paramedics (Butte, San Bernardino-Rialto, and Solano). Alameda San Bernardino-Rialto, Solano, and UCLA provide at least one home visit to all patients. Butte paramedics perform an initial assessment by telephone for all patients and use an algorithm to determine whether the patient needs additional assistance. If a Butte community paramedic determines that a patient would benefit from a home visit, the community paramedic will request the patient's permission to do so.

Findings

Enrollment in the post-discharge projects increased from 922 to 1,327 patients between September 30, 2016, and June 30, 2017. Butte had the largest enrollment (748 patients) and Alameda had the smallest (102 patients).

Safety

The evaluation team found no evidence of any harm to patients enrolled in the post-discharge projects. On the contrary, there is substantial evidence that the projects reduced the risk of harm. The most compelling evidence of reduced harm concerns prescription medications. Community paramedics performed medication reconciliation for all patients, which involved examining all prescription drugs in a patient's possession and reconciling them with the instructions given to the patient when he or she was discharged from the hospital. The community paramedics identified 216 instances in which a patient needed additional instructions about how to take their medications as directed. Some patients had multiple prescriptions for the same medication and assumed they were supposed to take all of them. Other patients were discharged from the hospital with only a 30-day supply of medication and did not understand that they needed to obtain refills to control their condition. If a patient had a personal physician, the community paramedic worked with the patient to contact the physician to obtain refills. If a patient did not have a physician, the community paramedic helped the patient find one.

Effectiveness

The post-discharge pilot projects achieved their primary goal of reducing inpatient readmissions within 30 days of discharge. Table 3 shows the historical 30-day readmission rates at the projects' partner hospitals and the 30-day readmission rates for patients enrolled in the post-discharge projects who had heart failure, myocardial infarction, congestive heart failure, or pneumonia. Patients with diabetes or sepsis are not included because historical data on readmission rates for persons with these diseases were not available.

Patients enrolled by all sites had lower rates of 30-day readmission than historical rates for their partner hospitals for one or more diagnoses except Butte's heart failure patients and Alameda's chronic obstructive pulmonary disease patients. A notable difference from the original evaluation report is that the 30-day readmission rate for persons with chronic obstructive pulmonary disease who are enrolled in Alameda's post-discharge project is no longer lower than the partner hospital's historical average. Butte's heart failure patients were the only group whose 30-day readmission rate was not at or below the partner hospital's historical rate. This difference may be due to a difference between Butte's protocol and those of the other post-discharge projects. Under Butte's protocol, community paramedics initially contact patients by telephone and conduct home visits only if the telephone conversation suggests a home visit is warranted. It is possible that patients who talk to Butte's community paramedics on the telephone understate the severity of any symptoms they are experiencing and overstate their understanding of how to manage their conditions.

Table 3. Readmissions within 30 Days for Post-Discharge Project Enrollees versus Partner Hospitals' 30-Day Readmission Rates, 2012–2015 (Cumulative)

Diagnosis	Project Number	Sponsoring Agency	Number of Patients Enrolled	Number Readmitted	Historical 30-day Readmission Rate*	% Enrollees Readmitted*
Heart Failure	CP002	UCLA	154	10	24.4%	6.5%**
	CP004	Butte	418	114	22.5%	27.3%***
	CP007B	Alameda	23	3	23.1%	17.4%**
	CP008	San Bernardino and Rialto	188	17	23.1%	9.8%**
	C013	Solano	67	6	22.1%	9.0%**
Acute Myocardial Infarction	CP004	Butte	330	35	17.2%	10.6%**
	CP007B	Alameda	7	0	16.8%	0%**
Chronic Obstructive Pulmonary Disease	CP007B	Alameda	27	5	19.4%	18.5%
	C013	Solano	68	5	18.9%	7.4%**
Pneumonia	CP007B	Alameda	23	3	20.1%	13.0%**

* Includes readmissions for any reason.
** 30-day readmission rate for enrolled patients was *lower* than the historical 30-day readmission rate.
*** 30-day readmission rate for enrolled patients was *higher* than the historical 30-day readmission rate.

Another important indicator of the effectiveness of post-discharge projects is referral of patients to providers of other services to improve the patients' well-being. Through June 30, 2017, community paramedics made at least 179 referrals to a wide range of service providers, using manuals of local resources that they had prepared as part of their training. These services included primary care physicians, specialist physicians, pharmacists, mental health services, public health departments, home health providers, drug and alcohol treatment programs, senior home safety equipment programs, food assistance agencies, housing assistance providers, transportation assistance providers, and domestic violence resources. At least one community paramedic helped a patient enroll in Covered California to obtain health insurance. If a community paramedic perceived the need as urgent and was concerned that a patient might not follow through on their own, they assisted the patient in obtaining these services.

Savings

All of the post-discharge projects have generated savings for insurers by reducing 30-day all cause readmissions among the patients they enrolled. Estimates of savings were based on differences between rates of readmission among enrolled patients and historical rates obtained from Medicare Hospital Compare and on estimates of the cost of admissions for targeted diagnoses derived from OSHPD's public hospital inpatient discharge dataset. The evaluators estimate that the five post-discharge projects generated total savings of approximately $1.4 million through June 30, 2017. The amount of savings ranged from a low of $70,351 for Alameda's project to $397,189

for UCLA – Glendale's project. Differences in savings across sites reflect the total number of 30-day readmissions avoided and the cost of readmissions. Butte's project generated savings despite having an al 30-day readmission rate for heart failure that is higher than the partner hospital's historical rate, because it reduced 30-day readmissions for acute myocardial infarction, a diagnosis with a much higher average cost than heart failure ($26,621 vs. $14,403). Actual savings generated by Alameda's project may have been greater because savings associated with reductions in admissions for diabetes and sepsis could not be estimated because Medicare Hospital Compare does not report data on historical rates of readmission for these conditions.

The majority of savings from the post-discharge projects accrued to Medicare because 60% of patients enrolled are Medicare beneficiaries. Medi-Cal is also realizing savings because 24% of enrollees are Medi-Cal beneficiaries. Partner hospitals also benefitted if reductions in readmissions were sufficient to lower the risk that they would be penalized by Medicare for excessive readmissions.

Table 4. Savings for Post-discharge Projects

	CP002 – UCLA - Glendale	CP004 – Butte	CP007B – Alameda*	CP008 – San Bernardino and Rialto	CP013 - Solano
Total Enrollment	154	748	102	188	135
Difference in Readmission Rates (percentage points)	-18	-0.2	-5	-13	-12
Number of Readmissions Avoided	Heart failure = 28	Heart failure = -20 AMI = 22	Heart failure = 2 AMI = 1 COPD = 0 Pneumonia = 2	Heart failure = 26	Heart failure = 9 COPD = 8
Average Cost of Readmission	Heart failure = $14,403	Heart failure = $14,403 AMI = $26,621	Heart failure = $14,403 AMI = $26,621 COPD = $11,562 Pneumonia = $14,923	Heart failure = $14,403	Heart failure = $14,403 COPD = $11,562
Total Savings from Readmissions Avoided	$403,284	$292,265	$85,273	$374,478	$222,123
Savings per Enrollee	$2,619	$391	$836	$1,992	$1,645

* Does not include Alameda patients with diabetes or sepsis because Medicare Hospital Compare does not

Conclusion

The post-discharge projects have demonstrated capability to reduce hospital readmissions within 30 days among persons with the chronic conditions they target. The projects also increased the likelihood that patients will take medications for these conditions as directed, by reconciling their prescriptions, reviewing the instructions for taking the medications, and assisting patients with medication refills, if needed. Moreover, community paramedics have referred patients to providers of other services that can improve their ability to manage their conditions and their overall well-being. The projects have generated savings, primarily for the Medicare and Medi-Cal programs.

Frequent EMS User

Frequent EMS User Projects: Developments since September 2016

- The two frequent EMS user projects enrolled 18 additional patients, increasing enrollment from 77 to 95 persons.
- The San Diego project has had difficulty meeting patients' needs because the two community paramedics were reassigned to traditional 911 response crews.

Description

The two frequent EMS user projects enroll people who call 911 and/or who have ED visits frequently and whose use of emergency services is not routinely warranted by their medical condition. The goal of these projects is to reduce frequent EMS users' dependence on EMS agencies and EDs for care. Community paramedics assess patients' physical, psychological, and social needs and provide individualized case management to link them with nonemergency services. Patients remain enrolled in the projects until community paramedics believe that the patients no longer need the project's services. Criteria for determining that a patient no longer needs services emphasize reaching important individual milestones, such as obtaining housing or maintaining sobriety.

Findings

The two Frequent EMS User projects enrolled 95 patients through June 30, 2017. The two projects enroll different populations of frequent EMS users. San Diego's project primarily enrolls persons with 20 or more ED visits per year. Alameda's project, which serve a city whose population is much smaller than San Diego's (79,227 vs. 1,391,676),[4] is open to all persons identified by staff of the EMS agency or the partner hospital as frequent 911 or ED users. San Diego's enrollees are younger than Alameda's enrollees and are more likely to be uninsured or enrolled in Medi-Cal.

San Diego's project has encountered challenges have constrained its ability to meet patients' needs. In December 2016, the two community paramedics working on San Diego's project were reassigned to traditional 911 response crews. The project manager and an emergency medicine fellow have operated the program to the best of their ability but they have not been able to manage clients as intensively as the two community paramedics had. One consequence has been that ED use did not decrease among enrollees who need more than referrals to providers of other services. Concerned about this situation, the project manager has shifted her time to focus exclusively on reducing ED usage among persons enrolled in the program who have the largest numbers of ED visits.

Safety

The evaluation team found no evidence of any harm to patients enrolled in the frequent EMS user projects. On the contrary, there is substantial evidence that patients benefitted from the projects. The community paramedics visited patients multiple times to assess their physical, psychological, and social needs and assist them in obtaining nonemergency services to meet their needs, as discussed below in the section on effectiveness.

Effectiveness

The frequent EMS user projects achieved large reductions in the number of 911 calls and ED visits among enrolled patients. Reductions in 911 calls were highly correlated with reductions in ED visits because most 911 calls for these persons result in transport to an ED. Data on 911 calls and ED visits by persons enrolled in San Diego's frequent EMS user project were available from the time the project began in October 2015 through June 2017. Among persons enrolled in San Diego's frequent EMS user project for whom data are available for 12

months prior to enrollment and 12 months following enrollment (n =35) the total number of 911 calls decreased from 581 to 906, a decrease of 36%. The average number of 911 calls per person decreased from 26 per year to 17 per year and some enrollees experienced larger than average decreases in 911 calls.

Data on 911 calls and ED visits by persons enrolled in Alameda's frequent EMS user project were available from the time the project began in July 2015 through September 2016. Among these persons (n = 33), the number of 911 calls decreased from 198 to 124, a decrease of 37%. The average number of 911 calls per person decreased from six per year to four per year.

The frequent EMS user projects also succeeded in linking patients to services that address the needs that are leading them to make frequent ED visits. During their first visits with patients, community paramedics in Alameda and San Diego reported making 54 referrals to medical care providers, mental health providers, drug and alcohol treatment programs, food assistance programs, housing assistance programs, transportation assistance programs, domestic violence resources, and other social services. They may have made additional referrals during subsequent visits because some patients were not interested in referrals initially. In addition, community paramedics transported patients to these types of providers on 47 occasions to ensure that they obtained services. In some cases, community paramedics collaborated with staff of multiple service providers to go beyond routine care to meet patients' complex needs.[5]

Providing assistance with housing is an important component of frequent EMS user projects because many frequent EMS users are homeless. Among the 46 patients enrolled in San Diego's frequent EMS user project from November 2015 through June 2017, 33 patients (72%) were homeless. Community paramedics are uniquely positioned to assist homeless persons because the paramedics are mobile, familiar with the sites at which homeless persons congregate, and can meet patients at any location.

Savings

Among persons enrolled in San Diego's project through June 2017 for whom 12 months of data on 911 calls pre- and post-enrollment were available, the project reduced the number of 911 calls and ED visits by 325, generating an estimated $543,400 in savings. (See Table 5.) A substantial percentage of savings from the reduction in ED visits accrued to ambulance transport providers and hospitals because 46% of San Diego's enrollees were uninsured. Reducing EMS transports and ED visits among these enrollees decreased the amount of uncompensated care furnished by transport providers and hospitals.

From July 2015 through September 2016, Alameda's frequent EMS user project generated $100,048 in savings. The majority of the savings generated by Alameda's project accrued to Medicare because the majority of its patients are Medicare beneficiaries.

Table 5. Savings for Frequent EMS User Projects

	Variable	Amount
	CP007A – Alameda (through Sept. 2016)	CP010 – San Diego (through June 2017)
Total Enrollment	33	46
Number of Enrollees with 12 Months of Data on 911 Calls Pre and Post Enrollment	33	35
Number of Transports and ED Visits Avoided	74	325
Average Cost of Ambulance Transport	$603	$923
Average Cost of ED Visit	$749	$749
Savings from Ambulance Transports Avoided (patients with 12 months pre-post data)	$44,622	$299,975
Savings from ED Visits Avoided (patients with 12 months pre-post data)	$55,426	$243,425
Total Savings (patients with 12 months pre-post data)	$100,048	$543,400
Savings per Patient Enrolled (patients with 12 months pre-post data)	$3,032	$15,526

Conclusion

The frequent 911 user projects have achieved substantial reductions in 911 calls, transports, and ED visits among the patients they have enrolled, often by linking patients with primary care, behavioral health, food, housing, and social services. These reductions in 911 calls, transports, and ED visits yielded substantial savings for public health insurance programs (i.e., Medicare and Medi-Cal) and health care providers.

Directly Observed Therapy for Tuberculosis

Tuberculosis Project: Developments since September 2016

- The directly observed therapy for tuberculosis project enrolled eight additional patients, increasing enrollment from 29 to 37 persons.
- The community paramedics dispenses all doses of TB medications prescribed by the TB clinic's physician.
- One patient was hospitalized twice for intravenous treatment of TB meningitis that was diagnosed prior to enrollment in the pilot project.

Description

Tuberculosis (TB) is a highly contagious disease that is treated with special antibiotic medications. The number of medications and frequency of dosing are determined by a physician with expertise in TB treatment. People with TB must take their medication as directed, because stopping treatment too soon or missing doses of medication could lead to development of a drug-resistant strain of TB, which poses a major public health risk to a community.[6] To ensure that people with TB take their medication as directed, TB treatment clinics often provide directly observed therapy (DOT). Under DOT, a health care worker gives a patient medication, observes the patient taking the medication, and monitors the patient for side effects.

In Ventura County, public health officials asked the county's EMS provider to collaborate with the TB clinic to provide DOT, because the TB clinic does not have sufficient staff to provide DOT to all TB patients in the county. Ventura covers a large geographic area and it is not feasible for some patients to travel to the TB clinic for DOT. The TB clinic utilizes community health workers (CHWs) to administer DOT at remote locations, but the CHWs only work Mondays through Fridays and thus do not provide DOT on weekends. In addition, the CHWs are based in Oxnard, where the TB clinic is located, and have to drive as long as 60 minutes to reach some patients. In contrast, the community paramedics are available 24 hours per day seven days per week and are stationed throughout the county, so they usually can reach patients within 15 minutes.

Findings

Ventura's TB project enrolled 37 patients through June 30, 2017. Because the management of tuberculosis often spans six to nine months,[6] the community paramedics usually carry a caseload of patients whom they treat for multiple months. Over the course of the pilot project, the community paramedics' caseload averaged seven patients per month.

TB clinic leaders indicated that there were conscious decisions to assign patients to either community paramedics or CHWs based on the likelihood that patients would comply with treatment. TB clinic leaders often assigned community paramedics patients who resist treatment or who were verbally abusive or sexually inappropriate because paramedics have more experience and training than the CHWs in managing persons with challenging behavior. They were also more likely to be assigned homeless persons and other patients who are difficult to locate.

Safety

The evaluation team found no evidence that the TB project harmed patients. Community paramedics dispensed appropriate doses of TB medications, and their TB patients did not experience any greater frequency of side effects or symptoms beyond those typically associated with taking TB medications.

Ten patients enrolled in the pilot project have been hospitalized. One patient was hospitalized twice for TB meningitis, which had been diagnosed prior to enrollment in the program. In both instances, the TB clinic physician admitted the patient to the hospital for intravenous treatment based in part on information provided by the community paramedics who provided the patient's DOT treatments. The other nine patients were hospitalized one time for a reason other than their TB diagnosis; one hospitalization was for a scheduled surgical procedure.

Effectiveness

People with TB who received DOT from community paramedics were more likely to receive all doses of TB medication prescribed by the TB clinic physician than people who received DOT from the TB clinic's CHWs. Since the project was launched in June 2015, the community paramedics were unable to dispense only two (0.07%) DOT treatments prescribed by the TB clinic physician as Table 6 indicates. In contrast, the CHWs were unable to dispense 667 (6.8%) prescribed DOT treatments. This difference is due primarily to the availability of community paramedics on nights and weekends. Availability on weekends ensures that patients have DOT seven days per week if needed, and availability in evenings improves compliance among patients who travel outside of Ventura County for work during business hours. Taking all recommended doses of TB medications as prescribed increases the likelihood that a patient will be cured and will not spread TB to others due to lack of treatment. It also decreases the risk that the patient could develop a drug-resistant strain of TB that would be much harder to treat and to control in the community.

Community paramedics also helped patients address health care needs other than TB. For example, some TB patients also have diabetes, which is associated with worse outcomes of TB treatment, especially if it is not well controlled. One TB patient treated by community paramedics had severely impaired vision and had difficulty filling syringes with the prescribed amount of insulin. The community paramedics found a local pharmacy that would prefill syringes for the patient to ensure that he would receive the correct dose.

Table 6. Instances of Non-Completion of Directly Observed Therapy among Patients Treated by Community Paramedics (Cumulative)

	Community Paramedic Patients	TB Clinic Patients
Number of Times Community Paramedic Could Not Complete Scheduled DOT	2 (0.07%)	667 (6.8%)
Reasons Why Patient Did Not Complete Treatment	One patient went out of town without making prior arrangements for the DOT. The other was not home at the scheduled time and did not respond to phone calls in a timely manner.	Most missed doses occur on holidays and weekends when the TB clinic is closed and CHWs are not available to treat patients outside the clinic.

Savings

There was a small increase in adherence to the prescribed TB medication schedule when community paramedics administered DOT instead of CHWs, but we cannot estimate the effect of increased adherence in this range in the United States. If the project substantially increased adherence among hard-to-reach patients, the project may have increased the number of patients in Ventura treated successfully for TB and, thus, reduced medical and public health expenditures associated with public health investigation of close contacts and treating additional people infected by a patient who did not complete treatment. The project also reducing the need for CHWs to travel long distances to provide DOT, increasing their availability to complete other tasks.

Conclusion

Community paramedics can safely administer DOT for TB and monitor patients for side effects, under the direction of a physician who specializes in treatment of TB. Due to their unique schedule and mobility, they can achieve a very high rate of adherence to TB treatment, which reduces the risk that patients will develop a drug-resistant strain of TB and transmit it to other persons. They can also assist with patients' other social and medical needs that might create barriers to TB treatment.

Hospice

Hospice Project:
Developments since September 2016

- The hospice project enrolled 88 additional patients between September 30, 2016, and June 30, 2017, increasing enrollment from 137 to 225 persons.
- Community paramedics continued to collaborate successfully with nurses on the staffs of partner hospices to provide care consistent with patients' wishes.
- The percentage of patients of partner hospices transported to an ED decreased from 36% to 31%.

Description

The goal of hospice care is to provide medical, psychological, and spiritual support to persons dying from a terminal illness in a patient's home, a residential care facility, a nursing home, or an inpatient hospice facility. Hospice staff members tell hospice patients, their family members, and other caregivers to contact the hospice instead of 911 if they believe there is a medical need or if they become concerned about the patient's comfort. Despite this instruction, some hospice patients and their families call 911 instead of the hospice.

The standard response to a 911 call made on behalf of a hospice patient is to transport the patient to an ED, which may be upsetting and uncomfortable for hospice patients. In addition, clinicians in EDs may perform medical interventions that the hospice patient would prefer not to receive and may admit the hospice patient for inpatient care. Moreover, insurers may revoke hospice benefits if the patient receives treatment or hospitalization for their terminal illness that is incompatible with the hospice approach of comfort care.

Ventura County's hospice project seeks to prevent unnecessary transport of hospice patients to an ED. If a 911 dispatcher or a first responder on scene determines that a person is under the care of a hospice agency, a community paramedic is dispatched to the patient's home, which may be in a private residence, residential care or skilled nursing facility. The community paramedics are supervisors who can respond to hospice calls while other paramedics respond to different 911 calls.

Once on scene, the community paramedic assesses the patient, talks with family members and caregivers, and contacts a registered nurse employed by the hospice agency. The hospice nurse directs the community paramedic regarding what care to provide. Depending on the circumstances, the hospice nurse may ask the community paramedic to wait with the patient and family members and/or caregivers until the nurse can arrive on scene. The hospice nurse may also ask the community paramedic to administer pain medications to the patient that the hospice has provided in a "comfort care" pack. ***No hospice patient who requests transport to an ED is denied transportation.*** The purpose of the project is to prevent transports that are not consistent with the patient's wishes. This is especially important for hospice patients who reside in a residential care or skilled nursing facility. In those facilities, staff may call 911 without discussing the decision with the patient or family members.

Findings

Ventura's hospice pilot project responded to 225 calls made on behalf of patients of hospice agencies that partnered with Ventura County's EMS provider. Hospice patients, family members, or staff of residential or skilled nursing facilities in which hospice patients resided initiated most 911 calls, but hospice nurses made some 911 calls during visits with patients. The reasons for 911 calls to which Ventura's community paramedics responded varied and included altered level of consciousness, cardiac arrest, constipation, fall, seizure, shortness of breath, syncope, lift assistance, and family concern about hospice care.

Safety

The evaluation found no evidence that the hospice project harmed patients. After an assessment to determine that the patient could remain at home under hospice care, the paramedics' work consisted primarily of providing emotional support to hospice patients and their families and administering medications in patients' "comfort care" packs as directed by a hospice nurse until the hospice nurse could arrive and further evaluate the situation with the paramedic.

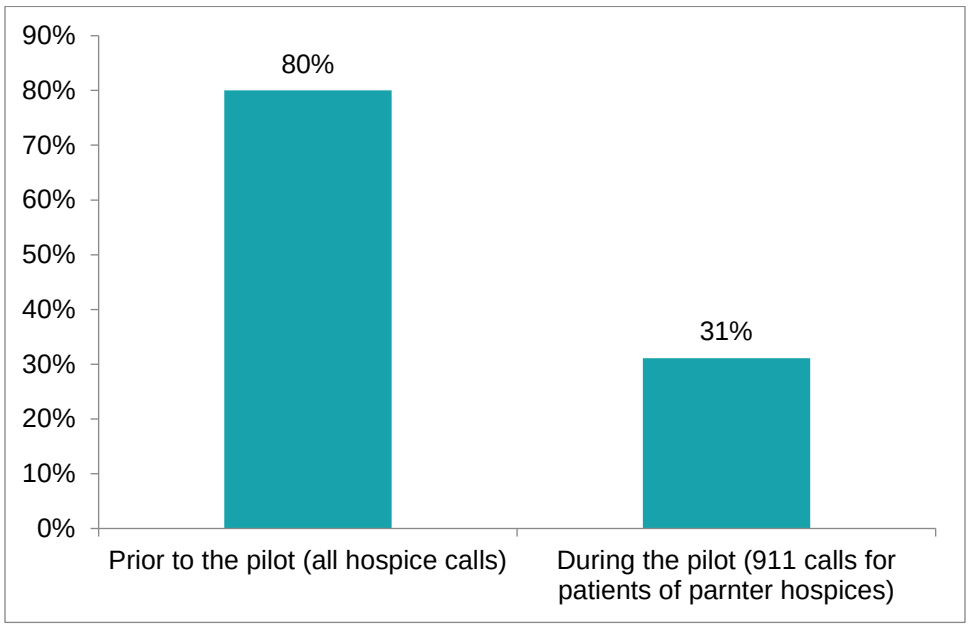
The hospice project reduced harm by honoring patients' wishes and reducing the likelihood that they would experience an undesired and uncomfortable trip to the ED and potentially lose hospice benefits. Community paramedics worked with patients, families, and hospice nurses to avoid ED transports, unless a patient requested transport or had a medical need that could not be met in the patient's home, such as a fracture. No patient was denied ED care where it was indicated and consistent with his or her wishes.

Effectiveness

The project achieved its goal of honoring patients' wishes to remain in their homes by integrating EMS and hospice protocols. Figure 2 shows the impact of the pilot project on the percentage of 911 calls for hospice patients that resulted in transport of the patient to an ED. Prior to the launch of the pilot project, 80% of 911 calls for hospice patients resulted in the transport of a patient to an ED. Among patients of partner hospices, the percentage of patients transported decreased to 31% after the pilot project was implemented. Although data on hospice revocation rates prior to the pilot project are not available, it is very likely that the large reduction in ED transports also led to a reduction in the percentage of patients of partner hospices whose benefits were revoked.

Community paramedics also alerted hospices and family members to patients' unmet needs for additional assistance. For example, the project's very first hospice call involved a patient who had fallen during the night while walking to the bathroom. With the patient's permission, the community paramedic who responded to the call contacted a family member who arranged for the patient to have a caregiver at night as well as during the day to assist her with toileting and other needs.[7]

Figure 1. Percentage of 911 Calls for Hospice Patients That Result in Transport to an ED (Cumulative)



Savings

As indicated in Table 7, the hospice project achieved an estimated $165,990 in savings ($738 per patient enrolled) because the percentage of patients transported decreased from 80% to 31%. Actual savings are higher than these estimates because some hospice patients who were transported to an ED were admitted to a hospital for inpatient care. Savings associated with inpatient admissions could not be estimated because the pilot project was unable to obtain data from hospitals in Ventura County on the number of enrolled patients who were transported to their EDs that were subsequently admitted to their hospitals. Similarly, data were not available to estimate the impact of the hospice pilot project on revocation of hospice benefits but it is likely that the project reduced costs to hospices that are associated with hospice revocations.

Table 7. Savings Associated with the Hospice Community Paramedicine Project

Variable	Amount
Total Number of Patients Enrolled	225
Total Number of ED Visits Avoided	110
Average Cost of ED Transport Avoided	$520
Average Cost of ED Visit Avoided	$989
Savings from ED Transports Avoided	$57,200
Savings from ED Visits Avoided	$108,790
Total Savings	**$165,990**
Savings per Patient Enrolled	**$738**

Conclusion

The hospice project demonstrates that community paramedics can partner with hospice nurses to safely reduce the number of hospice patients unnecessarily transported to an ED. Reducing ED transports increases the health care system's ability to honor the wishes of hospice patients, reduces the risk that they will lose their hospice benefits, and reduces health care costs.

Alternate Destination – Mental Health

Alternate Destination – Mental Health Project: Developments since September 2016

- The alternate destination – mental health project enrolled 58 additional patients between September 30, 2016, and June 30, 2017, increasing enrollment from 169 to 227 persons.
- Only one person was transferred to an ED within six hours of transport to the mental health crisis center.
- In addition to 911 calls involving patients with mental health needs, the community paramedics have begun performing medical screening examinations for persons who come to the mental health crisis center for care.

Description

Many EDs in California are overcrowded, and some of the people they serve can be treated safely and effectively in other settings, including some who arrive at EDs via ambulance. Alternate destination pilot projects focus on transporting such patients to settings in which they can obtain appropriate care more efficiently. In California, the need for alternatives is particularly critical for people with mental health needs. Since 1995, the number of beds in inpatient psychiatric facilities in California has decreased by nearly 30%.[8] Patients with mental health needs routinely spend hours in an ED waiting for medical clearance. In some cases, they spend days in an ED waiting for a bed to become available in an inpatient psychiatric facility, without getting definitive mental health care.[9] Nationwide, the mean length of ED visits is longer for psychiatric patients than medical patients (194 minutes vs. 138 minutes), and psychiatric patients are more likely to have stays in an ED lasting greater than 24 hours.[10]

The Stanislaus County pilot project provides medical clearance for people with mental health needs and transports them directly to a county-operated mental health crisis center. Community paramedics are dispatched in response to 911 calls that a dispatcher believes involve a mental health emergency, or when another paramedic or a law enforcement officer identifies a patient as having mental health needs. The community paramedics respond to these calls as needed in addition to responding to traditional 911 calls.

Once on scene, a community paramedic assesses the patient to determine whether he or she has any medical needs or is intoxicated due to alcohol or drug consumption. If the patient has no emergent medical needs, is not intoxicated, and is not violent, the community paramedic contacts the mental health crisis center to determine whether the county inpatient psychiatric facility located next door to the crisis center has beds available. If the inpatient psychiatric facility has the capacity to accept the patient through the crisis center, the community paramedic gives the patient the option of being transported by ambulance to the mental health crisis center instead of an ED. After a patient arrives at the crisis center, mental health professionals on the crisis center staff evaluate the patient further to determine what mental health services he or she needs. Eligibility for the pilot project is limited to adults who are uninsured or enrolled in Medi-Cal because the county inpatient psychiatric facility does not accept patients with other types of health insurance.

In recent months, the mental health crisis center staff have asked community paramedics to assist them with "walk in" clients (i.e., persons who are not transported by ambulance). These persons need to screened to determine if they have any medical needs before they can be admitted to the crisis center. In the past, the crisis center had relatively few walk-in clients and these clients were sent to a nearby ED for medical clearance. When the volume of walk-in clients increased, the mental health crisis center staff requested that the community paramedics come to the crisis center to screen clients. This has enabled clients to obtain medical screening more quickly and begin mental health treatment more quickly if they do not have any acute medical needs.

Findings

Stanislaus's alternate destination – mental health project enrolled 227 persons through June 30, 2017. The pace of enrollment slowed in 2017 because several community paramedics left the agency or were promoted to other positions. Most patients enrolled in recent months are "walk in" clients who come to the mental health crisis center for care and need to be screened for acute medical needs before the crisis center can admit them. The project's leadership expect that enrollment will increase in the near future because the project recently trained additional community paramedics.

Safety

The evaluation team found no evidence of patient harm caused by the alternate destination – mental health project. The community paramedics accurately screened patients to determine which of them could be safely transported directly to the mental health crisis center. Only nine of patients enrolled in the project (4%) were transferred to an ED within six hours of arrival at the crisis center. Seven of the nine patients who were transferred to an ED within six hours were subsequently transferred to an inpatient psychiatric facility. The other two patients were discharged from an ED without transfer.

Table 8 lists the reasons why the ten patients were transferred to an ED. None of the transfers to an ED involved life-threatening conditions and none of the patients transferred was admitted for inpatient medical care. Nine of the ten transfers occurred during the project's first six months of operation. (See Figure 3.) The sharp decrease in transfers reflects the efforts of the project's medical director to develop protocols and screening methods that maximized the likelihood that the mental health crisis center would accept patients who were offered transport to the crisis center.

Table 8. Reasons for Transfer to an ED within Six Hours of Admission to Mental Health Crisis Center (9 of 227 Patients)

Reason for Transfer to an ED	Number of Patients
Blood pressure above the mental health crisis center's threshold	2
Agitation	2
Urinary incontinence	2
Patient had sleep apnea, and the county inpatient psychiatric facility did not have a continuous positive airway pressure (CPAP) machine	1
Change in patient condition	1
No capacity at psychiatric hospital	**1**
Total	**9**

The alternate destination – behavioral health project has also improved public safety. Law enforcement officers interviewed by the evaluation team stated that having community paramedics available enhanced their ability to respond effectively to persons with behavioral health needs because community paramedics are better trained to address mental health needs and can arrange ambulance transports for mental health patients. This allows law enforcement officers to perform law enforcement duties instead of transporting patients to an ED in their squad cars and waiting in the ED to transfer responsibility for the patient to a clinician.

Effectiveness

The pilot project substantially reduced the rate at which 911 calls involving patients with mental health needs resulted in a transport to an ED for medical screening. After the pilot project was implemented, 25% of behavioral health patients (n = 227) were transported to the mental health crisis center instead of an ED. An additional 27% (n = 239) met the eligibility criteria and could have been transported to the crisis center if additional beds were available in the county's inpatient psychiatric facility or if the crisis center accepted patients who have a form of health insurance other than Medi-Cal. The community paramedics also assessed 362 people (41% of people assessed) who were not eligible for transport to the mental health crisis center because they had a medical need, were intoxicated, violent, agitated, or over age 65 years. Five percent (n = 47) met the medical criteria for admission to the mental health crisis center but were not admitted due to a history of disruptive behavior during previous admissions to the crisis center. Only two percent of eligible patients (n = 20) did not consent to be transported to the mental health crisis center.

The pilot project also reduced the time to treatment by a mental health professional, which improved patients' well-being. A mental health professional assessed people transported directly to the mental health crisis center within minutes of arriving at the center. In contrast, people transported to an ED had to wait for a medical professional to determine whether they had any medical needs and were then transported to an inpatient psychiatric facility to be assessed by a mental health professional.

Savings

As indicated in Table 9, the alternate destination – mental health project achieved an estimated $239,800 in savings ($1,052 per patient) because transporting a mental health patient to the crisis center avoids an ED visit and a secondary transport of the patient from an ED to an inpatient mental health facility. Most of these savings benefitted the Medi-Cal program because 85% of patients enrolled in the project were Medi-Cal beneficiaries.

Table 9. Savings Associated with the Alternate Destination – Mental Health Project

Variable	Amount
Total Number of Patients Enrolled	227
Total Number of ED Visits Avoided	218
Average Cost of ED Transport Avoided	$554
Average Cost of ED Visit Avoided	$546
Savings from ED Transports Avoided	$120,772
Savings from ED Visits Avoided	$119,028
Total Savings	**$239,800**
Savings per Patient Enrolled	**$1,057**

Conclusion

The alternate destination – mental health project demonstrates that community paramedics can perform medical screening on persons with mental health needs and determine which of them can be transported directly to a mental health crisis center. Transporting these persons directly to a crisis center enables them to obtain mental health services more quickly, which is likely to improve their well-being. The project also reduces health care

costs by reducing the numbers of persons transported to and assessed in an ED. Most of these savings accrue to Medi-Cal because most persons participating in this project are Medi-Cal beneficiaries.

Alternate Destination – Urgent Care

Alternate Destination – Urgent Care Projects: Developments since September 2016

- One of the three alternate destination – urgent care projects enrolled nine additional patients between September 30, 2016 and June 30, 2017, increasing total enrollment in the three projects from 39 to 48 persons
- One of the alternate destination – urgent care projects closed in May 2017 due to low enrollment.
- No patients were rerouted to an ED or transferred from an urgent care center to an ED within six hours of admission.

Description

Three pilot projects offer patients who have minor injuries or minor medical conditions the option to be transported to an urgent care center instead of to an ED for evaluation by a physician. Urgent care centers are walk-in clinics that treat persons with illnesses or injuries that can be safely evaluated and treated without the full range of resources available in an ED. California does not license urgent care centers as a distinct category of health care provider; they operate under the licenses of hospitals or of the physicians who operate them.[11] This means that there are no requirements regarding operating hours, equipment, or the types of medical services provided.

All three alternate destination – urgent care projects enroll patients who have any of the following five conditions: isolated closed extremity injury, laceration with controlled bleeding, soft tissue injury, isolated fever or cough, and other minor injury. One site, Carlsbad, also enrolls patients who have generalized weakness. Patients are screened by paramedics on 911 response crews who have received training on a screening protocol that was developed by emergency physicians to determine whether transport to an urgent care center is an appropriate option. The protocols excludes patients with medical conditions that are emergent, complex, or inappropriate for transport to an urgent care center.

If the paramedics conclude that a patient could be treated safely at an urgent care center, the paramedics offer transport to an urgent care center approved by the jurisdiction's local emergency medical services agency (LEMSA). Urgent care centers approved by the LEMSAs are required to provide respiratory therapy treatments, x-rays, and point of care laboratory testing for blood and urine and to have an automated external defibrillator. ***Patients who decline to be transported to an urgent care center are transported to an ED.*** After transporting a patient to an urgent care center, paramedics are available to reroute the patient to an ED if a clinician at the urgent care center determines that the urgent care center cannot treat the patient safely and appropriately. ***It is important to note that these projects do not involve evaluation and release of patients by paramedics. All patients were transported to a facility where they are evaluated by a physician.***

Findings

Forty-eight persons were enrolled in the three alternate destination – urgent care projects through June 30, 2017. Orange County's project had the largest enrollment (34 patients) and Carlsbad's project had the smallest enrollment (2 patients). Only nine additional patients were enrolled since September 30, 2016, the end date for the time period covered by the initial public report on the community paramedicine pilot project.[3] There are multiple reasons why enrollment in the alternate destination – urgent care projects is substantially lower than

anticipated. All three sites had fewer patients than expected who met all of the criteria for inclusion in the pilot project. In addition, many 911 calls occur at times of the day during which urgent care centers are closed. In the case of Carlsbad's project, enrollment was limited to non-elderly adults who have insurance coverage through a single health plan.

Most of the patients for whom information on type of injury or illness was reported had a laceration or an isolated closed extremity injury, such as a dislocation, sprain, or fracture, as indicated in Table 10.

Table 10. Number of Enrollees in Alternate Destination – Urgent Care Projects by Condition (Cumulative)

Lead Agency	Total Enrollees	Closed Extremity	Laceration	Soft Tissue	Fever or Cough	Other Minor Injury	Generalized Weakness
CP002 – UCLA – Glendale and Santa Monica	12	5	0	0	0	7	0
CP003 – Orange	34	17	15	0	1	1	0
CP009 - Carlsbad	2	0	0	0	0	0	2
Total	**48**	**22**	**15**	**0**	**1**	**8**	**2**

Safety

The alternate destination – urgent care projects did not harm patients. Among the 48 patients enrolled in the alternate destination – urgent care projects, two patients (4%) were subsequently transferred to an ED within six hours of arrival at an urgent care center. In addition, nine patients (19%) were transported to an urgent care center and then rerouted to an ED because clinicians at the urgent care center staff declined to treat the patient. None of these patients had life-threatening conditions and there were no adverse outcomes. The reasons for transport from an urgent care center to an ED are listed in the table below. Additional detail about the two secondary transfers can be found in the initial public report on the community paramedicine pilot projects.[3]

Table 11. Reasons for Transfer or Rerouting to an ED within Six Hours of Admission to an Urgent Care Center (11 of 48 Patients)

Reason for Transfer to an ED	Number of Patients
Secondary Transfers	
Patient experienced shortness of breath and heart rate slowed after transport to an urgent care center for treatment of nausea without abdominal pain	1
Patient required surgery for injury	1
Rerouted Transfers (aka Continuous Transfers)	
Patient requested opioid pain medication	3
Diagnostic equipment broken or unavailable	2
Urgent care physician believed shoulder injury needed further evaluation	2
Urgent care center physician believed patient needed to be examined by an orthopedist	2
Total	**11**

Effectiveness

While paramedics participating in the pilot projects are able to triage patients according to protocol effectively, it has been challenging for the paramedics and project leaders to determine which patients the urgent care centers would accept. Urgent care centers have sometimes rejected patients who have minor conditions that are often safely treated outside an ED, such as a dislocated shoulder. Interviews with project managers and paramedics suggest that urgent care centers may be hesitant to accept patients transported by an ambulance since that is a new practice for them. In addition, the range of services offered by urgent care centers varies substantially. For example, some urgent care centers do not have the capacity to administer intravenous fluids, which limits their ability to treat persons with dehydration and other conditions that could be treated safely outside of an ED.

Savings

Table 12 displays estimates of the savings associated with two of the three alternate destination – medical care projects. Data for the third site are not included because it had only enrolled two patients as of June 30, 2017. These projects saved $3,640. The estimates of savings are based on estimates of the difference between the amounts insurers pay for treatment of the same condition in an ED and an urgent care center. Costs for ambulance transports were not reduced because no transports were avoided.

Table 12. Savings Associated with the Alternate Destination – Urgent Care Projects

	Variable	Amount
	CP002 – UCLA – Glendale and Santa Monica	**CP003 - Orange**
Total Enrollment	12	34
Total Patients Treated in an Urgent Care Center and Released	6	29
Estimated Savings per ED Visit Avoided	$104	$104
Total Savings	**$624**	**$3,016**
Savings per Patient Enrolled	**$52**	**$89**

Conclusion

More data are needed to draw firm conclusions about the alternate destination – urgent care model. Paramedics participating in the alternate destination – urgent care projects have demonstrated capacity to evaluate patients according to triage protocols to determine whether they are candidates for treatment at an urgent care center. No patients experienced adverse outcomes. However, only 48 patients were enrolled across the three sites over 21 months, in large part because many people with eligible conditions called 911 at times at which urgent care centers were not open. The only concept for which fewer people were enrolled – Directly Observed Therapy for Tuberculosis – is being tested at only one site and involves people who have a rare condition. In addition, two of the 48 patients enrolled were transferred to an ED following admission to an urgent care center and nine were rerouted to an ED because the urgent care center declined to accept the patient. These findings suggest that for alternate destination – urgent care projects to offer a viable alternative to EDs, screening protocols will need to be more closely aligned with the capabilities of urgent care centers and the illnesses and injuries they are willing to treat. The savings generated were modest due to the low enrollment and the design of the project, which only changed the location to which patients were transported and did not reduce the number of transports.

Alternate Destination – Sobering Center

Description

Acutely intoxicated persons are another population for whom alternatives to transports to an ED are needed. Nationwide an estimated 9.7% of ED visits are due to inebriation.[12] In busy EDs, clinicians have little time to assist intoxicated patients unless they also have an acute medical need. They may not provide them counseling about their drinking or information about detoxification programs, case management, or other resources.

Cities around the US have established sobering centers to care for these patients.[13] Sobering centers are much less expensive to operate than EDs and their staff are able to focus on the needs of intoxicated persons.[14] In February 2017, the City and County of San Francisco began a pilot project under which eligible patients are transported by paramedics directly to its sobering center. The sobering center has cared for over 14,000 persons since it opened in 2003.[15] It serves people who are acutely intoxicated but do not have other urgent health care needs. The sobering center is open 24 hours per day, 7 days per week and staffed by registered nurses who monitor patients throughout their stay. There are also social workers on its staff who help patients obtain treatment for alcoholism, housing, Medi-Cal, Supplemental Social Security, and General Assistance. Most patients stay for 4 to 12 hours. Approximately 33% of patients are treated at the sobering center multiple times per year and approximately 90% of patients are homeless at the time that services are provided.[15]

San Francisco has trained all paramedics on 911 response crews to screen intoxicated patients to determine if they are eligible to enroll in the pilot project. Patients are deemed eligible for transport to the sobering center if they are have acute alcohol intoxication but do not have any medical or mental health needs and are not intoxicated due to consuming a substance other than alcohol. If a patient meets all eligibility criteria, the paramedics offer the patient a choice of transport to the sobering center or an ED. If a patient requests to be transported to an ED instead of the sobering center, he or she is transported to an ED. Patients who do not meet all eligibility criteria are transported directly to an ED.

Ten experienced paramedics who have completed the full community paramedic training augment the paramedics on 911 response crews. The community paramedics work with the sobering center's staff to perform quality assurance reviews for patients transported to the sobering center. They are also available to paramedics by telephone or in person if they are unsure whether a patient is eligible for transport to the sobering center. In addition, the community paramedics collaborate with San Francisco's Homeless Outreach Team (HOT) outreach workers to engage sobering center patients who are high utilizers of county health care services. Community paramedics and HOT team outreach workers travel as teams of two in an SUV equipped with advanced life support equipment to visit high utilizers and to encourage them accept treatment for their alcohol use disorder, housing, and other services.

Findings

The alternate destination – sobering project enrolled 226 patients during its first five months of operation (February 1, 2017 through June 30, 2017). Enrollment has fluctuated during this time period, rising from six patients in February to 2017 to 81 in April 2017 and then falling to 34 in June 2017. Twenty-six of the 226 patients (12%) enrolled in the project have visited the sobering center more than once. Most patients are white, non-Hispanic males.

Safety

The community paramedics and the staff of the sobering center review the records of all patients transported to the sobering center by ambulance. Cases that involve a secondary transport of a patient to an ED are also reviewed by a committee that consists of the sobering center's deputy director, the San Francisco Emergency Medical Services agency's medical director, and the San Francisco Fire Department's Medical Director.

The most common risk to sobering center patients is an unforeseen need for medical detoxification. Among chronic alcoholics, the need for medical detoxification is sometimes difficult to predict initially. A patient may also have taken another drug that the paramedic cannot detect when he or she examines the patient in the field.

Among the 226 patients enrolled in the alternate destination – sobering project, five patients (2%) were transferred to an ED within six hours of admission to the sobering center. These secondary transfers were due to agitation with chest pain, alcohol withdrawal, confusion, tachypnea (i.e., rapid shallow breathing), and a suspected suicide attempt. (See Table 13.) In four cases, the transfer to the ED could not have been avoided because the need for transfer was not evident when the paramedics assessed the patient in the field. When the community paramedics reviewed records for the patient with tachypnea, they concluded that the patient's respiration rate in the field had been outside the range for admission to the sobering center and that the paramedics on the 911 crew that transported the patient to the sobering center had not relayed this information to the registered nurse on duty. The community paramedics coached the 911 response crew and their supervisor on how to use a patient's respiration rate in the field to determine if a patient is eligible for transport to the sobering center. One patient (1%) was rerouted from the sobering center to an ED due to hypothermia and bradycardia; his temperature was below the threshold for admission to the sobering center and he could not be rewarmed within 15 minutes. Among the six patients transferred or rerouted to an ED, three were treated and released. Two patients were medically cleared in the ED and transferred to a psychiatric ED. One left an ED's waiting room without being seen.

Table 13. Reasons for Transfer to an ED within Six Hours of Admission to Sobering Center (6 of 226 Patients)

Reason for Transfer to an ED	Number of Patients
Secondary Transfers	
Agitation with chest pain	1
Alcohol withdrawal	1
Confusion	1
Suspected suicide attempt	1
Tachypnea	1
Rerouted Transfers (aka Continuous Transfers)	
Hypothermic/bradycardia	1
Total	**6**

Effectiveness

The alternate destination – sobering center project has reduced the number of intoxicated persons transported to an ED. Interviews with project leaders indicate that one of the greatest benefits of treating these patients in the sobering center is that the sobering center staff have greater ability to connect patients with medical detoxification, social work, and case management services. EDs have social workers but they are not able to focus exclusively on intoxicated patients. In addition, the sobering center is equipped to provide withdrawal management for patients if a bed is available in a medical detoxification center, which helps patients cope with withdrawal and increases their willingness to complete detoxification.

Another strength of the alternate destination – sobering center project is the project's leveraging of paramedics in two complementary roles. Paramedics on 911 response crews can contact community paramedics for guidance if they are uncertain whether a patient meets the criteria for transport to the sobering center. Community paramedics review transports of patients to the sobering center and give 911 crews feedback on their use of the protocol for screening patients. In addition, the community paramedics' partnership with the HOT outreach workers extends the project beyond alternate destination transport to encompass outreach to high utilizers of the sobering center to encourage them to seek treatment for their alcohol use disorder. According to the project's leaders, this outreach is important because San Francisco has substantial services for homeless people with alcohol use disorders but people often do not know how to access these services or will not seek help on their own. Pairing community paramedics with homeless outreach workers leverages the strengths of both groups of workers. Community paramedics contribute medical knowledge, ability to access medical records, and relationships with ambulance crews. Homeless outreach workers, many of whom are formerly homeless and or in recovery from substance us disorders, can form closer relationships with clients due to their lived experience.

Savings

Table 14 displays estimates of savings associated with the alternate destination – sobering center project. For this project, savings were due to the difference in the cost of caring for intoxicated persons in the sobering center versus in an ED. During its first five months of operation, the project generated an estimated $142,780 in savings due to the reduction in ED visits. Actual savings realized by insurers may differ because the data used to estimate costs are not used for billing purposes.[16] The majority of savings accrued to Medi-Cal because sobering center staff estimate that 60% of the patients enrolled in the project are Medi-Cal beneficiaries. Costs for ambulance transports were not reduced because no transports were avoided.

Table 14. Savings Associated with the Alternate Destination – Sobering Center Project

Variable	Amount
Total Number of Patients Enrolled	226
Total Number of ED Visits Avoided	220
Average Cost of ED Visit Avoided	$649
Total Savings	**$142,780**
Savings per Patient Enrolled	**$632**

Conclusion

Preliminary findings suggest that paramedics participating in the alternate destination – sobering center project can accurately screen intoxicated patients to identify those who can be treated safely and effectively in a sobering center. To date the project has resulted in the transport of 220 fewer persons to an ED. Only two patients were transported to the sobering center who did not meet the eligibility criteria. Only five patients (2%) were transferred to an ED subsequent to admission to the sobering center and four of the five transfers were due to conditions that patients developed subsequent to arrival at the sobering center. There were no adverse outcomes from secondary transfers. In addition, the community paramedics participating in the project are providing valuable feedback to paramedics on 911 response crews and are partnering effectively with homeless outreach workers to encourage persons with chronic alcoholism to seek treatment.

Summary and Conclusion

The community paramedicine pilot projects have demonstrated that specially trained paramedics can provide services beyond their traditional and current statutory scope of practice in California. No adverse outcome is attributable to any of these pilot projects. These projects are enhancing patients' well-being, improving the integration and efficiency of health services in the community, and decreasing health care costs by reducing ambulance transports, ED visits, and hospital readmissions. The majority of savings achieved by these pilots accrue to Medicare and hospitals serving Medicare patients and to the Medi-Cal program and providers that serve Medi-Cal beneficiaries. Specifically, the sites testing the seven concepts have demonstrated the following.

Post-Discharge

- All five projects decreased hospital readmissions within 30 days of discharge for at least one of the diagnoses targeted. The only site that did not achieve 30-day readmission rates for all targeted diagnoses that were at least as good as the partner hospital's historical readmission rate provided only telephone calls to most patients. In contrast, the other four post-discharge projects provided one or more home visits to all patients.
- Improved patients' knowledge of their medications and their ability to take medications as prescribed by their physicians.
- Achieved savings for payers (primarily Medicare and Medi-Cal) and hospitals due to reductions in readmissions within 30 days of discharge. Participating hospitals realized additional savings by lowering their risk of being penalized by Medicare for excess readmissions.

Frequent EMS User

- These projects achieved substantial reductions in the number of 911 calls, ambulance transports, and ED visits among enrolled patients.
- Community paramedics assisted patients in obtaining housing and other nonemergency services that address the physical, psychological, and social needs that led to their frequent EMS use.
- Both projects achieved savings for payers by reducing 911 calls, ambulance transports, and ED visits. San Diego's project also decreased the amount of uncompensated care furnished by ambulance providers and hospitals because 46% of the patients it enrolled were uninsured.

Directly Observed Therapy for Tuberculosis

- Community paramedics dispensed appropriate doses of TB medications and monitored side effects and symptoms that could necessitate a change in treatment regimen.
- Persons with TB who received directly observed therapy (DOT) from community paramedics were more likely to receive all doses of TB medication prescribed by the TB clinic physician than patients who received DOT from the TB clinic's community health workers who only worked on weekdays during business hours. Receiving all doses prescribed by the TB clinic physician increased the likelihood that a patient would be successfully treated and would not spread TB to others or develop a drug-resistant strain of TB that would be much harder to treat and to control in the community.

Hospice

- The hospice project enhanced ability to honor patients' wishes to receive hospice services at home by markedly reducing rates of ambulance transports to an ED and ED visits. Reducing ED visits likely also reduced the number of patients whose hospice benefits were revoked.
- Community paramedics mainly assessed hospice patients, provided psychosocial support, and administered medications from the hospice patients' "comfort care" packs when necessary, in consultation with a hospice nurse.
- The project also yielded savings for Medicare and other insurers due to reduction in unnecessary transport and visits to an ED. Insurers' expenditures for inpatient care were also reduced because some ED visits for hospice patients result in an inpatient admission.

Alternate Destination – Mental Health

- Twenty-five percent of persons screened by the community paramedics were transported to the mental health crisis center and more could have been transported to the crisis center if the county had more inpatient psychiatric beds or if the crisis center accepted people with private insurance or Medicare. (Some persons were not eligible for transport to the mental health crisis center because they had a medical need, were intoxicated, or were violent.)
- Ninety-six percent of patients who participated in the project were treated safely and effectively at the mental health crisis center without the delay of a preliminary emergency department visit. Only 4% of patients (n = 9 patients) required subsequent transfer to the ED, and there were no adverse outcomes.
- The project also improved public safety because community paramedics could take responsibility for a person with mental health needs, which allowed law enforcement officers to return to law enforcement duties instead of transporting the person to an ED and waiting to transfer responsibility for the patient to clinicians in the ED.
- The project generated savings for payers, primarily Medi-Cal, by reducing ED visits and transfers of patients from EDs to psychiatric facilities. For uninsured persons, the amount of uncompensated care provided by ambulance providers and hospitals also decreased.

Alternate Destination – Urgent Care

- More data are needed to make firm conclusions about the alternate destination – urgent care projects due to the limited number of patients enrolled and the percentage of patients rerouted or transferred to an ED.
- Among patients who were enrolled, paramedics were able to screen patients according to protocol and identify those for whom transport to an urgent care center was an appropriate option.
- No patients experienced an adverse outcome, although two patients (4%) were transferred to an ED following admission to an urgent care center, and nine patients (19%) were rerouted to an ED because the urgent care center declined to accept the patient.
- To operate safely and efficiently, these projects need to closely match field screening protocols with the capabilities of urgent care centers and the illnesses and injuries they are willing to treat.
- The projects yielded modest savings because insurers pay less for treatment provided in urgent care centers than in EDs for the same illnesses and injuries.

Alternate Destination – Sobering Center

- Ninety-seven percent of patients enrolled in the alternate destination – sobering project (220 of 226) were treated safely and effectively at the sobering center. Only five patients (2%) were transferred to an ED within six hours of admission to the sobering center and only one (1%) was rerouted from the sobering center to an ED. None of these patients were admitted to a hospital for inpatient care.

- In addition, community paramedics participating in the project provided feedback to paramedics on 911 crews on how to screen intoxicated persons to determine if they are candidates for transfer to the sobering center. They also partnered effectively with homeless outreach workers to encourage people who use the sobering center frequently to seek treatment for chronic alcoholism, housing, and other services.

- During its first five months of operation, the project generated an estimated $142,780 in savings. The majority of savings accrued to Medi-Cal because the majority of patients enrolled in the project are Medi-Cal beneficiaries.

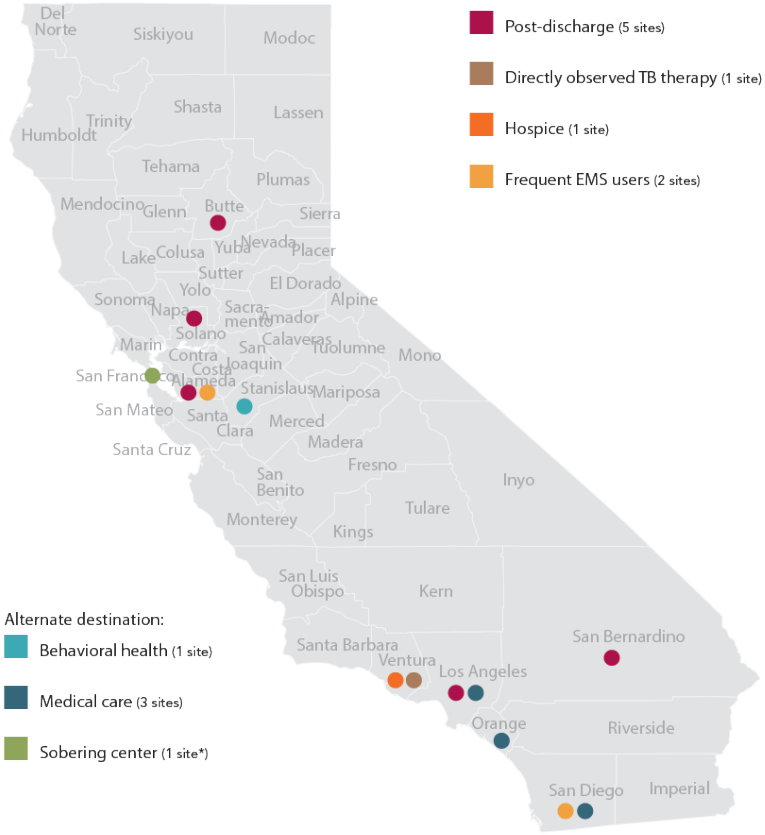
Conclusion

The California community paramedicine pilot projects were designed to integrate with existing health care resources and utilize the unique skills of paramedics and their round-the-clock availability. Findings from the evaluation indicate that Californians benefit from these innovative models of health care that leverage an existing workforce that operates at all times under medical control — either directly or by protocols developed by physicians experienced in EMS and emergency care. No other health professionals were displaced. Instead, these pilot projects have demonstrated that community paramedics can partner with physicians, nurses, behavioral health professionals, and social workers to fill gaps in the health and social services safety net. No adverse outcome is attributable to any of these pilot projects.

At least 33 states are operating community paramedicine programs, and research conducted to date indicates that they are improving the efficiency and effectiveness of the health care system.[17,18,19,20] These findings suggest that the benefits of community paramedicine programs grow as they mature, solidify partnerships, and find their optimal structure and niche. The evaluation of HWPP #173 yields consistent findings for six of the seven community paramedicine concepts tested. All of the post-discharge, frequent 911 users, DOT for TB, hospice, alternate destination – mental health projects have been in operation for 21 or more months and have improved patients' well-being and, in most cases, have yielded savings for payers and other parts of the health care system. Preliminary findings regarding the sixth concept, alternate destination – sobering center, suggest that this project is also benefitting patients and the health care system. The seventh concept, alternate destination – urgent care, shows potential but further research involving a larger volume of patients is needed to draw definitive conclusions.

If community paramedicine is enabled on a broader scale, the current EMS system design is well suited to utilize the results of these pilot programs to optimize the design and implementation of proposed programs and to assure patient safety. The two-tiered system of local control with state oversight and regulation enables cities and counties to tailor community paramedicine programs to meet local needs while both local and state oversight and regulation ensure patient safety.

Appendix A. Map of California Community Paramedicine Pilot Projects



Appendix B. Methods for Estimating Savings

This appendix describes the methods used to estimate savings associated with each of the seven community paramedicine concepts that are being tested as part of HWPP #173. Estimates of savings associated with the seven community paramedicine concepts reflect savings that accrue to parts of the health care system other than EMS transport providers, such as health insurers and hospitals. None of the projects realized savings for the EMS transport provider because they operate on fee-for-service basis and are reimbursed only for transport. These agencies had to provide in-kind contribution of supplies and labor to operate the pilot projects.

Different methods were used to estimate the savings associated with each concept due to the differences in the services provided and the types of outcomes each concept seeks to improve. For concepts that strive to reduce unnecessary ambulance transports, ED visits, and hospitalizations, the analysis focused on estimating the impact of these reductions on health insurers' expenditures because insurers typically pay for these services. Effects on hospitals' ability to manage "full risk" contracts with health insurers and avoid Medicare readmission penalties for excessive readmissions were addressed but could not be estimated quantitatively.

Post-Discharge

To generate estimates of savings, the differences between (1) the rates of readmission within 30 days of discharge among persons enrolled in the post-discharge projects, and (2) historical 30-day readmission rates for partner hospitals were calculated. Historical readmission rates were obtained from Medicare Hospital Compare.[21] a system for reporting and publicly releasing data on the quality of care provided by Medicare-certified hospitals. Medicare Compare collects data on readmissions for persons with four of the six conditions targeted by the post-discharge projects: heart failure, acute myocardial infarction, chronic obstructive pulmonary disease, and pneumonia. A dataset containing data on readmission rates of partner hospitals between July 2012 and June 2015 was downloaded from Data.Medicare.gov.[22] These data were used to assess the projects' impact on 30-day readmission rates because all partner hospitals used similar methods to report the data to Medicare and because there was minimal overlap between the time period for which Hospital Compare data were collected and the implementation of the post-discharge projects.

The difference in the rate readmission was multiplied by the number of people enrolled in each pilot project to generate an estimate of the number of readmissions avoided for each of the targeted diagnoses. The number of readmissions avoided was multiplied by an estimate of the average cost of admissions for patients with diagnoses targeted by the projects. Estimates of the cost of admissions for targeted diagnoses were derived from OSHPD's public hospital inpatient discharge dataset. Costs per admission were calculated by multiplying the hospital's average charges for a diagnosis by the hospital's cost-to-charge ratio. This is a widely used method for estimating the cost of inpatient care. Using this method, costs per admission varied substantially across diagnoses targeted by the pilot projects, ranging from $11,562 for chronic obstructive pulmonary disease to $26,621 for acute myocardial infarction. For each project, the average cost per readmission was calculated as a weighted average of the costs of admissions of persons with targeted diagnoses with weights assigned based on the proportion of total readmissions that occurred among persons with each targeted diagnosis.

Frequent EMS User

Savings were estimated by multiplying the numbers of ambulance transports and ED visits avoided by (1) the average cost per transport to an ED, and (2) the mean Medicare reimbursement for ED visits. Based on interviews with manager of San Diego's frequent 911 user projects, we assumed that every 911 call prevented resulted in avoidance of an ambulance transport and an ED visit.

For San Diego's project, the number of ambulance transports and ED visits avoided was estimated by comparing the number of 911 calls made by enrolled patients during the 12 months prior to their enrollment to the number of

911 calls made during the 12 months following enrollment. Calls made during the month of enrollment were excluded in recognition that the month of enrollment is a time of transition for patients. Data on 911 calls pre- and post-enrollment were available for 35 of the 46 enrollees from November 2015 through June 2017. The reduction in 911 calls over the 12 months post-enrollment was divided by 12 to estimate the numbers of 911 calls, ambulance transports, and ED visits avoided per month.

Estimates of the cost of ambulance transports avoided were obtained from the sites. Data for ED cost estimates were obtained from the University of California Research Exchange (UC ReX) and reflect visits to EDs at University of California medical centers in 2015. Hospitals bill insurers for ED visits at one of five levels based on the amount of equipment and supplies needed to care for a patient. Level 1 is the lowest level and level 5 is the highest. For the frequent EMS user projects, we used the national average Medicare reimbursement rate for all five levels of ED visits because information was not available to enable us to determine the most common reasons why frequent EMS users visit EDs or the severity and complexity of their needs. Medicare reimbursement rates were used because Medicare is the payer whose reimbursement is widely considered to be closest to the cost of care. The analysis was not limited to ED visits for any particular diagnoses because diagnosis is not a criterion for enrolling in the Frequent EMS User projects. We could not use the cost-to-charge ratio method used to estimate the cost of inpatient readmissions avoided, because OSHPD does not collect complete data on charges for ED visits.

Tuberculosis

A quantitative analysis of savings associated with the project that provides directly observed therapy (DOT) for tuberculosis (TB) was not conducted due to challenges associated with estimating the impact of the project. As discussed in the main body of the report, the project found that community paramedics missed a smaller percentage of prescribed DOT treatments than community health workers (0.07% vs. 6.8%). However, we found no research that addressed the impact of a difference in adherence in a US population that compared groups of people with adherence rates of over 90%. In the absence of such research, we concluded that the most we could do would be to make directional statements about the potential impact of the increase in adherence on public health expenditures associated with investigation of close contacts of persons with TB and treating people infected by a noncompliant patient. We also make a directional statement about the impact of the use of community paramedics on the TB clinic's use of community health workers.

Hospice

Savings for the Hospice project were estimated by multiplying the number of transports and ED visits avoided by (1) the average cost per ambulance transport to an ED and (2) the average Medicare reimbursement for an ED visit for a high-acuity patient. The estimate of costs per transport reflects data reported by the pilot site for June 2015 through September of 2016. The estimates represented actual "cash collected" by the agency from insurers and other payers. The number of transports avoided equals the difference between the number of transports that would have occurred if the percentage of hospice 911 calls that resulted in a transport to an ED remained at the level observed prior to the pilot project (80%) and the number of transports that occurred among hospice patients enrolled in the pilot project.

As indicated above in the description of the estimates of savings for the Frequent EMS User projects, data for ED cost estimates were obtained from the University of California Research Exchange (UC ReX) and reflect visits to EDs at University of California medical centers in 2015. To estimate the cost of ED visits that do not result in a hospital admission, we applied national average Medicare reimbursement rates for all care provided to patients. For the hospice project, the median reimbursement for level 4 and 5 visits was used because terminally ill patients are likely to have acute needs. Mean reimbursement for level 4 and 5 visits across all diagnoses were used in lieu

of the costs related to specific diagnoses because information was not available to determine the diagnoses for which hospice patients were transported to an ED.

Alternate Destination – Mental Health

Savings for the Alternate Destination – Mental Health project were estimated by multiplying the numbers of ambulance transports and ED visits avoided by (1) the average cost per transport and (2) the average Medicare reimbursement for an ED visit for persons who only have behavioral health diagnoses. Because patients enrolled in the project are transported directly to the mental health crisis center, an ED visit is avoided every time a patient is enrolled as well as a secondary transport from an ED to a behavioral health facility.

The estimate of the average cost per ambulance transport was based on information provided by Stanislaus' EMS provider.

As indicated above in the description of the estimates of savings for the Frequent EMS User projects, data for estimates of the cost of ED visits were obtained from the University of California Research Exchange (UC ReX) and reflect visits to EDs at University of California medical centers in 2015. To estimate the cost of ED visits that do not result in a hospital admission, we applied national average Medicare reimbursement rates for all care provided to patients for which the only diagnoses reported are mental health health diagnoses. These diagnoses were chosen because the alternate destination – mental health project serves persons who only have acute mental health needs.

Alternate Destination – Urgent Care

Savings for the Alternate Destination – Urgent Care project were calculated based on an estimate from the literature of the difference in the cost of treating minor illnesses and injuries in an ED versus an urgent care center. Estimates published in the literature suggest that insurers pay urgent care centers 45% of what they pay hospitals for ED visits for the same minor illnesses and injuries.[23] The difference between reimbursement for ED visits and urgent care center visits was multiplied by the number of persons enrolled in the alternate destination – medical care projects to obtain an estimate of total savings.

No estimate of savings associated with reduction in ambulance transports is included because, unlike other community paramedicine concepts that reduce ED visits, the Alternate Destination – Urgent Care projects did not reduce ambulance transports. Transport costs do not change because all enrolled patients are transported to an urgent care center.

As indicated above in the description of the estimates of savings for the Frequent EMS User projects, data for estimates of ED costs were obtained from the University of California Research Exchange (UC ReX) and reflect visits to EDs at University of California medical centers in 2015. To estimate the cost of ED visits that do not result in a hospital admission, we applied national average Medicare reimbursement rates for level 1 and level 2 ED visits. These levels were used because these projects enrolled people with minor illnesses or injuries. This rate was multiplied to estimate the average cost of treating people with minor illnesses or injuries in an urgent care center.

Alternate Destination – Sobering Center

Savings for the Alternate Destination – Sobering Center project were estimated by multiplying the numbers of ambulance transports and ED visits avoided per month by the cost of treating an intoxicated person with no co-morbidities in an ED. Costs for ambulance transports were not included in the calculation because this project did not decrease the number of ambulance transports. No offset for the cost of providing care in the sobering center was included because the sobering center does not bill insurers for its services.

The estimate of the average cost of treating an intoxicated person with no co-morbidities in an ED was based on an estimate generated by the San Francisco Department of Public Health.[16] This estimate represents average total costs for a patient to be served at Zuckerberg San Francisco General Hospital, the county's public hospital, by dividing total operational and facility expenses by the number of patients served. These costs are not used for billing purposes and, thus, may not reflect what the hospital charges insurers for treating these patients.

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