# Evaluation of California's Community Paramedicine Pilot Project

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# **Executive Summary**

Community paramedicine (CP), also known as mobile integrated health, is an innovative model of care that is being implemented throughout the United States. This model of care utilizes the unique abilities of paramedics and emergency medical services (EMS) systems to meet local health care needs through partnerships between EMS agencies and other health care providers. Community paramedicine also aligns with the triple aim of improving patient experience, improving community health status, and decreasing the cost of care. Community paramedics receive additional training beyond that required for paramedic licensure and provide care outside of their traditional role, which in California is restricted to responding to 911 calls, transporting patients to an acute care hospital emergency department (ED), and performing interfacility transfers.

In 1972, California established the Health Workforce Pilot Project (HWPP) program (California Health and Safety Code Sections 128125-128195), a farsighted program administered by the California Office of Statewide Health Planning and Development (OSHPD) that waives scope of practice laws to test and evaluate new and innovative models of care. On November 14, 2014, OSHPD approved HWPP #173, a project sponsored by the California Emergency Medical Services Authority (EMSA), which encompasses 13 projects that are testing six community paramedicine concepts. (Appendix A shows a map of the sites.)

- **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 decrease hospital readmissions within 30 days.
- **Frequent EMS Users**: Provide case management services to frequent 911 callers and frequent visitors to EDs to reduce their use of the EMS system by connecting them with primary care, behavioral health, housing, and social services.
- **Directly Observed Therapy for Tuberculosis**: Collaborate with local public health department to provide directly observed therapy to people with tuberculosis (i.e., dispense medications and

observe patients taking them to assure effective treatment) to prevent the spread of tuberculosis.

- **Hospice**: In response to 911 calls, collaborate with hospice agency nurses, patients, and family members to treat patients in their homes, according to their wishes, instead of transporting the patient to an ED.
- Alternate Destination Behavioral Health: In response to 911 calls, offer people who have behavioral health needs but no emergent medical needs transport to a mental health crisis center instead of an ED.
- Alternate Destination Urgent Care: In response to 911 calls, offer people with low-acuity medical conditions transport to an urgent care center instead of an ED.

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) the University of California, San Francisco, serves as the independent evaluator for the HWPP #173. This report summarizes the evaluators' findings for 12-16 months of operation, depending on the time the projects first began enrolling patients (June to October 2015) through September 2016.

#### **Methods**

Information presented in this report was

obtained from multiple sources:

• Baseline data reported by the CP pilot sites on cost and utilization of care among eligible persons prior to the launch of the pilot projects.

- Data reported quarterly by the CP pilot sites on the provision of patient care and care coordination and the cost of providing CP services and ambulance transports.
- Data from existing sources on the cost of ED visits and inpatient hospital admissions, two important indicators of the ability of the pilot projects to generate savings for payers and other parts of the health care system.
- Interviews with EMS agency leaders, project managers, community paramedics, and representatives of hospitals and other partner agencies to provide context for the quantitative data the projects reported.
- Conference calls with EMSA's project manager for the HWPP and the site-level project managers regarding patient safety, challenges encountered by the pilot projects, and their accomplishments.

## **Results**

Through September 2016, the 13 community paramedicine pilot projects enrolled a total of 1,462 people. The post-discharge projects enrolled the largest number of people (922), and the tuberculosis project had the smallest number of enrollees (29). The majority of people enrolled in most pilot projects were non-Hispanic whites, except for San Bernardino's post-discharge project and Ventura's tuberculosis project, which had large proportions of Hispanic enrollees. Payer mix varied substantially across projects and concepts. Across all sites and concepts, 43% of patients enrolled were Medicare beneficiaries, 28% were Medi-Cal beneficiaries, 14% had private health insurance, and 15% were uninsured. Medicare beneficiaries constituted the majority of patients enrolled in the post-discharge and hospice projects, whereas Medi-Cal beneficiaries accounted for over 80% of patients served by the alternate destination – behavioral health project and half of the patients enrolled in the tuberculosis project.

Findings regarding the safety, effectiveness, and cost and savings associated with each community paramedicine concept are described below. Costs are those incurred by EMS agencies to operate community paramedic programs. Savings accrue to other parts of the health care system due to reduction in ambulance transports, ED visits, and hospital admissions. Most of these savings accrue to payers, primarily Medicare and Medi-Cal, but savings also accrue to hospitals and health systems that have capitated (i.e., "full risk") contracts, have high rates of readmissions, and/or provide uncompensated care. None of the projects realized savings for EMS transport providers, because they operate on a feefor-service basis and are reimbursed only for transport. These agencies had to provide in-kind contributions of resources and labor to operate the pilot projects.

# Post-Discharge Short-term Follow-up Projects

- Hospital readmissions within 30 days of discharge decreased for all sites and diagnoses except for heart failure patients enrolled in one project that provided less intensive services than other post-discharge projects.
- Community paramedics identified 129 patients (14%) who misunderstood how to take their medications or had duplicate medications and were at risk for adverse effects. Community paramedics explained to patients how to take their medications and identified incidences where they were given duplicate prescriptions. They also assisted patients in obtaining refills, if needed.
- Four of the five post-discharge projects achieved cost savings for payers, primarily Medicare and Medi-Cal, due to reductions in inpatient readmissions within 30 days of discharge.
  Participating hospitals realized additional savings by lowering their risk of being penalized by Medicare for having excess readmissions. The fifth project reduced 30-day readmissions but the reduction was too small to offset the cost of operating the project.

# Frequent EMS User Projects

- These projects achieved reductions in numbers of 911 calls, ambulance transports, and ED visits among enrolled patients.
- Community paramedics assisted patients in obtaining housing and other nonemergency services that met the physical, psychological, and social needs that led to their frequent EMS use.
- Both the projects achieved cost savings for payers but only one realized sufficient savings to offset the cost of operating the program. These projects also decreased the amount of uncompensated care furnished by ambulance providers and hospitals because 35% of enrolled patients were uninsured.

# Directly Observed Therapy for Tuberculosis Project

- Community paramedics dispensed appropriate doses of tuberculosis (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. Receiving all doses prescribed by the TB clinic physician increases the likelihood that a patient will be cured and will not spread TB to others or develop a drug-resistant strain of TB that would be more difficult to treat and to control in the community.
- No additional cost to the health care system because community paramedics who provide DOT at the pilot site did so while already on duty to respond to traditional 911 calls.

#### **Hospice Project**

- Community paramedics mainly provided hospice patients and their families with psychosocial support and administered medications from the hospice patients' "comfort care" packs when necessary, in consultation with a hospice nurse.
- The hospice project enhanced the EMS and hospice agencies' ability to honor patients' wishes to receive care at home by reducing rates of ambulance transports to an ED from 80% to 36%.
- The project also achieved savings for Medicare and other payers by reducing unnecessary ambulance transports, ED visits, and hospitalizations.

#### Alternate Destination – Behavioral Health Care Project

- Paramedics performed medical screening of patients to determine whether they could be safely transported directly to a mental health crisis center.
- Ninety-five percent of patients were evaluated at the behavioral health crisis center without the delay of a preliminary emergency department visit. Only 5% of patients required subsequent transfer to the ED, and there were no adverse outcomes. After refining the field medical evaluation protocols, the rate of transfer to an ED fell to zero.
- The project yielded savings for payers, primarily Medi-Cal, because screening behavioral health patients in the field for medical needs and transporting them directly to the mental health crisis center obviated the need for an ED visit with subsequent transfer from an ED to a behavioral health facility. For uninsured persons, the amount of uncompensated care provided by ambulance providers and hospitals also decreased.
- Enhanced community safety because it reduced the amount of time that law enforcement devotes to behavioral health calls.

#### Alternate Destination – Urgent Care Projects

- More data are needed to make firm conclusions about the alternate destination – medical care projects due to the limited number of patients enrolled and the number of patients rerouted or transferred to an ED.
- Among the limited number of patients who were enrolled, paramedics were able to identify patients for whom transport to an urgent care center was an appropriate option.
- No patients experienced an adverse outcome, although two patients were transferred to an ED following admission to an urgent care center and nine patients 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.

## 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. These projects are improving 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 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 (43%). Savings also accrue to the Medi-Cal program and providers that serve Medi-Cal beneficiaries because Medi-Cal beneficiaries constitute 28% of enrollees. In addition, the pilot projects provide new options to persons who call 911 that enable them to obtain the care they need more efficiently and in the settings they prefer.

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. These projects were designed to integrate with existing health care resources and utilize the unique skills of paramedics and their availability 24 hours per day, 7 days per week. No adverse outcome is attributable to any of these pilot projects. No other health professionals were displaced; in fact, these pilot projects demonstrated that community paramedicine programs can collaborate with physicians, nurses, behavioral health professionals, and social workers to fill gaps in the health and social services safety net.

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. Findings from this research suggest that the benefits of CP 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 five of the six community paramedicine concepts tested: post-discharge, frequent 911 users, DOT for TB, hospice, and alternate destination - behavioral health. Projects testing these five concepts have fulfilled the criteria for a successful HWPP. They have improved patients' well-being and, in most cases, have yielded savings for payers and other parts of the health care system. The sixth concept, alternate destination – medical 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 wellsuited 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

The US health care "system" often functions less like a system and more like a disjointed collection of entities. When people need care, they are often left to their own devices to navigate a complex array of providers that often do not communicate with one another. Navigating this system is especially challenging for persons who have multiple chronic conditions or who have mental health conditions or substance use disorders that affect their ability to manage their health. As a consequence, our emergency departments (EDs) are often overburdened by people who seek care in EDs that could be provided more effectively and more efficiently in other settings, or who need extra support to navigate the health care system and manage their health care needs. Overcrowding in EDs leads to delays in transfer of patients from Emergency Medical Services (EMS) personnel to ED personnel which can sometimes last as long as two to four hours in some urban areas of California.<sup>1</sup> These delays increase the cost of EMS services because EMS agencies must utilize more personnel and equipment to respond to 911 calls in a timely manner.

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 with transport to EDs or with inter-facility transfers.<sup>2</sup> They are supervised by physicians and nurses who work for their EMS agencies and the health care and community 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 in 33 states and the District of Columbia had implemented one or more MIH-CP initiatives.<sup>3</sup>

The ability of EMS agencies to implement community paramedicine initiatives depends on their state's scope of practice laws. Some states have broad scope of practice laws that give state regulators or local EMS agencies substantial discretion to determine what services paramedics provide and where they provide them. Other states' scope of practice laws are narrower. In California, 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.

In 1972, California established the Health Workforce Pilot Project (HWPP) program (HSC §§ 128125-128195), which was originally called the Health Manpower Pilot Projects program. This farsighted program, administered by the California Office of Statewide Health Planning and Development (OSHPD), enables health care organizations to test and evaluate innovative models of care that utilize health professionals in new roles. Health professionals participating in an HWPP can provide services outside of their standard scope of practice in accordance with protocols for training and care delivery that are approved by OSHPD. Since 1972, OSHPD has approved 123 HWPPs, 117 of which were implemented. Seventy-seven HWPPs have resulted in changes in law or regulation.<sup>4</sup> On December 19, 2013, the California Emergency Medical Services Authority (EMSA) submitted an application to OSHPD for an HWPP to evaluate community paramedicine. OSHPD approved HWPP #173 on November 14, 2014, for one year and renewed approval for additional one-year periods in 2015 and 2016.

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

Project #	Lead Agency	Community Paramedicine Concept	Date Implemented	Total Number of Patients Enrolled
CP001	UCLA Center for Prehospital Care	Alternate Destination	Sept. 8, 2015	12
CP002	UCLA Center for Prehospital Care	Post-Discharge	Sept. 1, 2015	154
CP003	Orange County	Alternate Destination	Sept. 14, 2015	25
CP004	Butte County EMS	Post-Discharge	July 1, 2015	500
CP005	Ventura County EMS	Tuberculosis	June 1, 2015	29
CP006	Ventura County EMS	Hospice	Aug. 1, 2015	226
CP007A	Alameda County EMS	Frequent 911 Callers	July 1,2015	40
CP007B	Alameda City EMS	Post-Discharge	June 1, 2015	64
CP008	San Bernardino County Fire Dept.	Post-Discharge	Aug. 13, 2015	133
CP009	Carlsbad Fire Dept.	Alternate Destination	Oct. 9, 2015	2
CP010	San Diego County	Frequent 911 Callers	Oct. 12, 2015	37
CP012	AMR Stanislaus	Alternate Destination	Sept. 25, 2015	169
CP013	Medic Ambulance Solano	Post-Discharge	Sept. 15, 2015	71
All Projects				1,462

Table 1. Pilot Sites and Community Paramedicine Concepts Included in This Report

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 summarizes the evaluators' findings regarding implementation from the time the first projects began enrolling patients in June 2015 through September 2016. It does not include a new project in San Francisco under which eligible patients will be medically screened and offered transport to a sobering center; this project was approved as part of the annual renewal in 2016 but has not enrolled any patients yet. Funding for the evaluation is provided by the California Health Care Foundation.

# Overview of California Community Paramedicine Pilot Projects

Thirteen community paramedicine projects have been launched in 10 geographic areas across California under the auspices of HWPP #173. These projects are testing six different concepts for the practice of community paramedicine. Each concept was developed by a local EMS agency to meet the needs of the local community, and implementation was customized based on local circumstances.

The six 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 services to address nonmedical needs, such as food, housing, and substance use disorder treatment. If patients have medical needs, help them obtain clinicor office-based primary care.
- 3. Directly Observed Therapy for Tuberculosis: Provide DOT to people with tuberculosis (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 the patient to an ED.
- 5. Alternate Destination Behavioral Health: In response to 911 calls, offer people who have behavioral 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.

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 and the sites testing the concept are contained in the respective sections of this report. Table 1 lists the lead agencies for each HWPP #173 project, the concept tested, the date on which the project began enrolling patients, and the total number of patients enrolled from the time the project began through September 30, 2016. Collectively, the projects enrolled a total of 1,462 people over this time period.

#### **Training of Community Paramedics**

Paramedics were eligible to be trained to perform new roles as CPs if they had at least four years of experience, volunteered to participate in the pilot, and were sponsored by their local EMS authority. A core curriculum was developed by the State of California Community Paramedic Educational Taskforce, adapted from the Paramedic Foundation's National Community Paramedic Curriculum, to more accurately meet the standards and requirements of practice in California. The curriculum was approved by the HWPP prior to initiating training of the community paramedics. The core curriculum taught paramedics to address patient care and management from a whole-patient perspective, including psychological and social aspects of the patient's wellbeing, in addition to medical needs. Assignments included preparing a manual of community health and social services resources that could be useful to people eligible for their projects. The curriculum also included additional clinical evaluation skills.

The core curriculum was a delivered over a six-week period. During the same six-week period, each site participating in the HWPP provided clinical instruction on topics related to the community paramedicine concept it was testing. 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. CP 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 – Medical projects were required to complete the core curriculum because this concept focuses on clinical decision-making in the field around the most appropriate site of care to which to transport the patient. Clinical decision-making about the most appropriate site of care 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 facility. At these pilot sites all other paramedics in the system received training focused on screening patients according to a protocol to determine if they would be eligible to enroll in the pilot and the procedures for enrolling them.

A total of 79 community paramedic trainees enrolled in the core curriculum and site-specific coursework. Two 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.

#### **Patient Safety**

Multiple procedures to ensure patient safety are incorporated into all levels of the pilot projects. Every program 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 approved protocols and reviewed data on project outcomes. A statewide steering committee has oversight over all the projects and reviews quarterly reports from the sites. 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. Data on numbers of people enrolled, characteristics of enrollees, and outcomes of community paramedic services were reported by each of the sites using a standardized, online data collection tool. Sites also reported information on people who were eligible for their projects but not enrolled. Baseline data on cost and utilization of care among eligible people prior to the launch of the pilot projects were also collected. Estimates of the cost and savings were derived from data that each site reported on the costs of their community paramedic projects and EMS transports, and from existing sources of data on the cost of ED visits and inpatient hospital admissions. These estimates focus on the incremental costs associated with operating community paramedic programs in addition to other services that the sponsoring EMS agencies provide and on savings that accrue to other parts of the health care system, such as health plans and hospitals.. Details about the methods used to estimate costs and savings are presented in Appendix B.

The safety and performance of the projects was assessed by both quantitative and qualitative means. Sites reported data to the independent evaluator on a quarterly basis on multiple metrics. For the alternate destination projects, one measure of patient safety assessed was transport to an ED within six hours of transport to the alternate destination (mental health crisis center or urgent care center). For the tuberculosis and hospice projects, the key metrics concerned dispensing correct doses of medications. In addition, the evaluation team was notified by EMSA's project manager if a site reported an "unusual occurrence" and was provided with all documentation regarding the event, including summaries of reviews conducted by the steering committee overseeing the project and the director of EMSA.

The evaluation team conducted site visits to 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 than could be gleaned solely from quantitative data. In addition, the site visits provided the evaluation team an opportunity to learn about the perspectives of multiple stakeholders on the projects' accomplishments and the challenges they face. The site visits were augmented with conference calls with the manager of the HWPP and the site-level project managers. The evaluation team also reviewed minutes of local steering committee meetings.

## **POST-DISCHARGE SHORT-TERM FOLLOW-UP**

#### **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. Some people with these conditions are readmitted in less than 30 days following discharge because they have difficulty following through with their physicians' instructions for managing their conditions. A major impetus for the post-discharge projects is the Medicare Readmission Reduction Program, under which Medicare payments to hospitals are reduced if rates of readmission are deemed excessive. By providing telephone or home visits within 72 hours of discharge, the projects aim to give patients the tools to manage their conditions more effectively so that they can avoid readmission.

Each post-discharge project identified one or more chronic conditions to address in collaboration with its partner hospital and enrolled patients discharged from the partner hospital for treatment of that condition(s). Once a patient is enrolled, 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 are designed to provide short-term assistance and not to replace home health care or any other services available to patients. Some partner hospitals focus on enrolling uninsured

Table 2. Staffing Models and Numbers of Calls/Visits Provided by Post-Discharge Projects

Project #	Lead Agency	Staffing Model	Typical Number of Community Paramedic Calls or Visits per Patient
CP002	UCLA Center for Prehospital Care and Glendale Fire Dept	One dedicated full-time position	One in-person visit
CP004	Butte County EMS	Three community paramedics provide CP services on an overtime basis in addition to their regular duties; three others assist on a part-time basis	One call and more if needed
CP007B	Alameda County EMS Agency and City of Alameda Fire Dept	Two dedicated, full-time positions staffed on a rotating basis among trained community paramedics	One in-person visit and more if needed
CP008	San Bernardino County Fire Department	Some paramedics provide CP services as part of their regular duties and others do so on an overtime basis	One in-person visit
CP013	Medic Ambulance Solano	Paramedics provide CP services as part of their regular duties.	Two in-person visits and more if needed

Project #	Lead Agency	Congestive Heart Failure	Acute Myocardial Infarction	Chronic Obstructive Pulmonary Disease	Diabetes	Pneumonia	Sepsis	Total Enrollees
CP002	UCLA	154						154
CP004	Butte	275	225					500
CP007B	Alameda	21	7	11	13	10	2	64
CP008	San Bernardino	133						133
CP013	Solano	39		32				71
Total		622	232	43	13	10	2	922

#### Table 3. Number of Enrollees in Post-Discharge Projects by Diagnosis

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 learned that a patient had home health services, they coordinated with home health agency staff.

Table 2 describes the staffing models and typical numbers of calls and visits provided by each of the five post-discharge projects. Two projects have fulltime community paramedics (Alameda and UCLA) and three projects have part-time paramedics (Butte, San Bernardino, and Solano). Alameda San Bernardino, 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.

#### Results

#### Number of Patients Enrolled and Characteristics

The post-discharge sites enrolled a total of 922 patients through September 30, 2016. Table 3 lists the number of patients enrolled by each of the postdischarge sites by diagnosis. A blank cell indicates that the project protocol did not include patients with that diagnosis. All projects addressed patients hospitalized for heart failure, who accounted for twothirds of persons enrolled (622 persons). Three of the five programs included patients hospitalized for acute myocardial infarction (heart attack), who accounted for 25% of enrolled patients (232 persons). Two projects included patients hospitalized for chronic obstructive pulmonary disease, and one included patients with diabetes, pneumonia, or sepsis.

Table 4 describes the demographic characteristics of people enrolled in the post-discharge projects and their health insurance status. Men constituted 56% of patients, and women constituted 44%. Across all five sites most patients were non-Hispanic whites who speak English, with the exception of San Bernardino, which had a large percentage of Hispanic patients. The majority of patients (61%) were Medicare beneficiaries but payer mix varied substantially across projects. The vast majority of UCLA's patients were Medicare beneficiaries. In contrast, the majority of Solano's patients and a large

Number	Percentage
516	56%
406	44%
129	14%
682	74%
111	12%
738	80%
55	6%
46	5%
83	9%
830	90%
92	10%
52	1070
563	61%
211	23%
125	14%
	Number 516 406 129 682 1111 738 55 46 83 83 830 92 92 563 211 125

# Table 4. Demographic and Health InsuranceCharacteristics of Post-Discharge Patients

percentage of San Bernardino's patients were Medi-Cal beneficiaries.

#### **Eligible but Not Enrolled Patients**

An additional 2,975 people were eligible for the postdischarge projects but were not enrolled. A total of 823 were offered enrollment but did not consent. The remaining people were not enrolled for various reasons. Some people lived outside the geographic area served by the pilot site. In other cases the site did not have sufficient community paramedic staffing to serve all eligible people or the partner hospital failed to notify the site about all eligible persons. People who were eligible but not enrolled were more likely to be Hispanic or African-American, to prefer to receive health information in a language other than English, and to be Medi-Cal beneficiaries.

#### 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 the patients' prescribed 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 129 instances in which patients did not understand how to take their medications correctly or did not know the correct dosage.

Some patients had multiple prescriptions for the same medication and assumed they were supposed to take all of them. For example, one patient with heart failure had three prescriptions for Lasix, a powerful diuretic medication used to reduce retention of fluid in the body, and was taking all three. Taking too much Lasix can result in dehydration with increased risk of fainting, loss of critical electrolytes, or kidney damage. Without being corrected by the CP, this excessive dosage would lead to an ED visit or hospitalization, and unless the patient brought all medication bottles to the ED, the duplication still might not be discovered.

Community paramedics also assisted patients in obtaining refills for medications they needed to treat their chronic conditions. Some patients were discharged from the hospital with only a 30-day supply of medication. 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. Rates of readmission within 30 days for patients enrolled in the projects were compared to historical readmission rates for patients with the same diagnoses at the projects' partner hospitals. Table 5 shows the historical readmission rates and the 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 30day readmission than historical rates for their partner hospitals for one or more diagnoses. Butte's heart failure patients were the only group whose 30day readmission rate was not 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 conduct initial contact with patients by telephone and conduct home visits only if the telephone conversation suggests it 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.

Community paramedics also referred patients to providers of other services to improve the patients' well-being. Through September 30, 2016, they made

Diagnosis	Project Number	Sponsoring Agency	Patients Enrolled	Historical 30-Day Rate of Readmission for Any Reason*	% of Enrollees Readmitted for Any Reason (#)
Congestive Heart Failure	CP002	UCLA	154	24.4%	6.5% (10)**
	CP004	Butte	275	22.5%	25.8% (71)
	CP007B	Alameda	20	23.1%	14.3% (3)**
	CP008	San Bernardino	133	23.1%	9.0% (12)**
	CP013	Solano	39	22.1%	12.8% (5)**
Acute Myocardial Infarction	CP004	Butte	225	17.2%	10.7% (24)**
	CP007B	Alameda	7	16.8%	0% (0)**
Chronic Obstructive Pulmonary Disease	CP007B	Alameda	11	19.4%	0% (0)**
	CP013	Solano	32	18.9%	9.4% (3)**
Proumonia	000070	Alamada	10	20.1%	10.096 (1)**

Table 5. Readmissions within 30 Days for Post-Discharge Project Enrollees versus Partner Hospitals' 30-Day Readmission Rates, 2012–2015

\*Historical rate of readmission obtained from Medicare Hospital Compare and reflects the rates of readmission for each disease at the project's partner hospital from 2012 through 2015.

\*\*Indicates that there was a statistically significant difference between the readmission rate for enrolled patients and the partner hospitals' historical readmission rates (i.e., p value < 0.05). 127 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 would assist the patient in obtaining these services. The total number of referrals may have been higher because some post-discharge projects provided more than one visit or call and community paramedics may have made additional referrals during those visits or calls.

#### **Cost and Savings**

As Table 6 shows, four of the five post-discharge projects yielded net savings ranging from \$5,097 to \$15,916 per month (\$188 to \$1,230 per patient per month). The amount of net savings generated by the five post-discharge projects varied due to four factors. First, reported monthly costs for community paramedic labor and supplies varied substantially across projects, ranging from \$2,183 to \$22,649. The differences in labor costs reflect differences in staffing models. The three projects in which community paramedics provided services as needed in addition to performing other duties had substantially lower labor costs than projects that utilized full-time community paramedics. Second, the average cost of readmissions varied across the five projects because diagnosis mix varied across the projects. Estimates of mean costs per diagnosis ranged from \$11,562 for chronic obstructive pulmonary disease to \$26,621 for acute myocardial infarction. As a consequence, average cost per readmission avoided was greater for projects that enrolled persons with acute myocardial infarction

than for sites that did not enroll patients with this condition. Third, differences between historical 30day readmission rates and 30-day readmission rates for patients enrolled in the projects varied substantially, ranging from 1% for Butte to 18% for UCLA. Greater differences in readmission rates are associated with greater savings. Fourth, average monthly enrollment differed across projects, ranging from 5 patients for Alameda to 42 for Butte. Having larger enrollment resulted in greater savings because the difference in readmission rates was multiplied across a larger number of patients. Some of these variations would diminish as a program matures and utilization increases.

#### 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, patients have been referred to providers of medical, behavioral health, and social services that can improve their ability to manage their conditions and their overall well-being. In addition, four of the five post-discharge projects have generated net savings for the health care system. The majority of savings are accruing to Medicare because 61% of patients enrolled are Medicare beneficiaries. Medi-Cal is also realizing savings because 23% of enrollees are Medi-Cal beneficiaries. Hospitals also benefit if reductions in readmissions are sufficient to lower the risk that they will be penalized by Medicare for excessive readmissions.

able 6. Average Monthly Cost and Savings for Post-Discharge Projects							
	Average Monthly Costs						
	UCLA	Butte	Alameda	San Bernardino	Solano		
Labor Costs (incl. CPs and mgmt. staff)	\$14,163	\$684	\$21,912*	\$5,333	\$1,234		
Recurring Supply Costs	\$473	\$8,764	\$737	\$396	\$950		
Total Cost	\$14,637	\$9,448	\$22,649	\$5,729	\$2,183		
		Average Monthl	y Savings				
	UCLA	Butte	Alameda	San Bernardino	Solano		
Average Monthly Enrollment	13	42	5	11	6		
Average Cost of Readmission**	\$14,403.43	\$19,901.24	\$15,325.59	\$14,403.43	\$13,122.92		
Difference in Readmission Rates***	18%	1%	2%	14%	9%		
Savings from Readmissions Avoided****	\$30,552.99	\$17,326.30	\$2,816.26	\$19,262.53	\$7,280.66		
Net Savings (savings less costs)	\$15,916.47	\$7,878.30	(\$19,832)	\$13,533.08	\$5,097.25		
Net Savings per Patient Enrolled	\$1,224.34	\$187.58	(\$3,966)	\$1,230.28	\$849.54		

Note: Net impact of readmissions related to sepsis and diabetes is not captured in these data because baseline rates of 30-day readmissions were not available for comparison. Only one of the sites (Alameda) enrolled patients for sepsis or diabetes.

\*Alameda operates both a post-discharge project and a frequent 911 user project. Costs for community paramedic labor and supplies were allocated to the two projects based on the percentage of total patients enrolled in each project. 62% of costs for labor and supplies were allocated to the post-discharge project because it enrolled 62% of the patients.

\*\*This cost varies by site because the cost of readmission varies across diagnoses and because the diagnosis mix is not identical at all sites (e.g., some sites enrolled only persons with congestive heart failure whereas others enrolled persons with two to six diagnoses).

\*\*\*Derived using (expected readmission rate from hospital-reported Medicare Compare data) – (actual readmission rate reported by pilot site). For projects that enrolled patients with more than one diagnosis, this estimate is weighted by enrollment across all diagnoses.

\*\*\*\* Based on following calculation: (# of readmissions avoided) \* (cost per readmission) / (# of months for which the pilot has been active). Cost per readmission is a weighted average of the costs for readmission as a result of each site's diagnosis mix. These calculations generated the number of readmissions avoided using this formula: (expected readmissions given rate of readmission reported by hospital for Medicare Compare) – (actual readmissions given rate of readmission in enrolled population). This follows the logic of a "pre-post" analysis.

### **FREQUENT EMS USERS**

#### **Description**

The two frequent EMS users projects enroll people who call 911 and/or who have ED visits far more frequently than most people and whose use of emergency services is not warranted by their medical condition. The goal of the projects is to identify the reasons why these people frequently call 911 for transport to an ED and to provide case management to link them with nonemergency services that can reduce their dependence on EMS agencies and EDs for care. Many of these people have mental health conditions or substance use disorders that affect their ability to access medical care and other services appropriately.

To ascertain the needs of individual frequent EMS users, community paramedics assess their physical, psychological, and social needs. For patients with a stable home, a home safety assessment is also conducted. Medication reconciliation is provided for patients who take any prescription medications. These assessments are performed at an initial inperson meeting with a patient and as needed for the duration of the patient's tenure with the project. 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.

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)<sup>5</sup>, 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 community paramedics provide frequent EMS user services exclusively. Alameda's community paramedics alternate between working full-time as community paramedics for their agencies frequent EMS user and

# Table 7. Number of Enrollees in Frequent 911 UserProjects

Project #	Lead Agency	Enrollees
CP007A	Alameda County EMS Agency	40
	and City of Alameda Fire Dept	
CP010	City of San Diego Fire Dept	37
Total		77

post-discharge projects and full-time as traditional firefighter paramedics.

#### **Results**

#### **Number of Patients Enrolled and Characteristics**

The two frequent EMS user projects enrolled a total of 77 patients through September 30, 2016, as indicated in Table 7.

Table 8 describes the demographic characteristics of persons enrolled in the frequent EMS user projects and their health insurance status. Fifty-four percent of patients were male. Across the two sites, most patients were non-Hispanic whites who prefer to receive health information in English. Thirty-five percent of patients were uninsured, 25% were Medicare beneficiaries, 23% were Medi-Cal beneficiaries, and the remainder had private health insurance.

#### **Eligible but Not Enrolled Patients**

Both frequent EMS user projects had large numbers of persons who were eligible but not enrolled. Eighty-

# Table 8. Demographic and Health InsuranceCharacteristics of Persons Enrolled in Frequent 911User Projects

Characteristics	Number	Percentage
Gender		
Male	42	54%
Female	35	46%
Ethnicity		
Hispanic	7	9%
Non-Hispanic	69	90%
Unknown	1	1%
Race		
White	59	76%
African-American	13	17%
Asian-Pacific Islander	2	3%
Other or Unknown	3	4%
Language		
Prefer to Receive Health Info in English	75	98%
Prefer to Receive Health Info in Other	2	204
Language	2	2 70
Payer		
Medicare	19	25%
Medi-Cal	18	23%
Private/Commercial Insurance	13	17%
Uninsured	27	35%

three persons were offered enrollment but did not consent. The sites were unable to provide the unique number of persons who were eligible but not enrolled for reasons other than not giving consent to participate. San Diego had a large numbers of persons who were eligible but not enrolled because community paramedic staffing was not sufficient to offer enrollment to all eligible persons. Alameda's community paramedics were unable to locate several eligible persons, who may have lived elsewhere in the county. The characteristics of persons who were eligible but not enrolled were similar to those of persons enrolled by the sites except that they were much more likely to be uninsured (62% vs. 35%). This finding largely reflects the experience of San Diego, which identified a larger number of persons who were eligible but not enrolled in the pilot than Alameda.

#### 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 times that enrolled patients visited EDs. Data from the San Diego project since the project's launch indicate that 911 calls and ED visits decreased for most patients following enrollment. Across 35 patients for whom data was gathered on 911 calls in the six months prior to and following enrollment in the pilot project, the number of 911 calls decreased from 1,070 to 513, a reduction of 52%. For some patients, the reductions in 911 calls were immediate. Others were enrolled in the program for several months before their use of 911 changed. Reductions in 911 calls were highly correlated with reductions in ED visits because most 911 calls for frequent 911 callers result in transport to an ED. Aggregate data from Alameda indicate that among the 33 persons enrolled in the project from July 2015 through June 2016, the number of ED visits decreased from 198 prior to the start of the pilot project to 124 during the first 12 months of the pilot project, a 37% reduction.

The frequent EMS user projects also achieved their goal of linking patients to services that address the needs that are leading them to make frequent ED visits. Community paramedics in Alameda and San Diego reported making 45 referrals to other service providers during their first visits with patients and may have made additional referrals during subsequent visits. Patients were referred 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. In addition, community paramedics transported patients to some of these providers on 38 occasions to ensure that they obtained services. For example, community paramedics in Alameda took several patients who did not have photo identification cards to the Department of Motor Vehicles to obtain IDs. In addition, community paramedics have helped four patients obtain permanent housing. Providing assistance with housing is an important component of frequent EMS user projects because many frequent 911 users are homeless. Among the 45 patients enrolled in San Diego's frequent EMS user project from November 2015 through December 2016, 32 patients (71%) 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.

In some cases, community paramedics had to collaborate with staff of multiple service providers to go above and beyond routine care to meet patients' complex needs. For example, one patient in San Diego was homeless and had a cognitive disability, alcoholism, and chronic diarrhea. An inpatient alcohol treatment center was unwilling to accept the patient due to concern that the diarrhea indicated that he was medically unstable. The community paramedics facilitated his access to medical tests he needed to be cleared to enter detox and worked with his medical providers to formalize his disability so that he could obtain housing in a skilled nursing facility.<sup>6</sup>

#### **Cost and Savings**

As indicated in Table 9, San Diego's frequent EMS user project has yielded net savings of \$45,607 per month (\$1,754 per patient per month). An estimated 33 ambulance transports to an ED and 33 ED visits were avoided per month based on data obtained from the San Diego project on patients enrolled for at least six months. Alameda's frequent 911 user project also achieved reductions in ambulance transports and ED visits, but the savings were not sufficient to offset the cost of the project at the current enrollment levels. The methods that were used to estimate costs and savings are discussed in Appendix B.

#### Conclusion

The frequent 911 user projects have achieved substantial reductions in 911 calls and ED visits among the patients they have enrolled, often by linking patients with needed primary care, behavioral health, housing, and social services. These reductions in 911 calls and ED visits result in substantial savings to the health care system. Large proportions of these savings have accrued to Medicare and Medi-Cal, because 25% of patients enrolled are Medicare beneficiaries and 23% are Medi-Cal beneficiaries. Hospitals and health systems also realize savings on uncompensated care because 35% of patients were uninsured.

#### Alameda San Diego abor Costs (incl. CPs and \$13,430 mgmt. staff) Recurring Supply Costs \$451 Total Cost \$13,881 \$9,300\* Average Monthly Savings Alameda San Diego Average Monthly Enrollmen q 26 Average Number of Transports 33 6 and ED Admissions Avoided Average Cost of Transports \$603 \$923 Avoided Average Cost of ED Visit \$749 \$749 Avoided Savings from ED Transport \$3.618 \$30.305 Avoided (monthly) Savings from ED Visits Avoided \$4,496 \$24,602 (monthly) \$8,114 \$54,907 Total Savings per Month

\* Costs for Alameda's project were divided between thepostdischarge and frequent 911 user projects based on the percentage of total enrollees in each of the two projects. 28% of costs were allocated to the frequent 911 user project because it enrolled 28% of total patients enrolled.

(\$5768)

(\$641)

\$45.607

\$1,754

Net Savings per Month

(savings less costs) Net Savings per Person per

Month

\*\* Due to the reporting method used by this site, the cost information available to the analysis team is inclusive of all program-related costs (e.g. paramedic labor, vehicle and fuel costs, etc.) and does not allow for a breakout by labor vs. supply costs.

# Average Monthly Costs

## **Tuberculosis**

#### **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.<sup>7</sup> 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 partner 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. The TB clinic also utilizes community health workers (CHWs) to administer DOT, 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, and have to drive as long as 60 minutes to reach some patients because Ventura County covers a large geographic area. In contrast, the community paramedics are available 24 hours per day seven days per week and are stationed throughout the county and can often reach patients within 15 minutes.

### Results

#### Number of Patients Enrolled and Characteristics

Ventura's TB project enrolled a total of 29 patients through September 30, 2016. Because the management of tuberculosis often spans six to nine months<sup>7</sup>, 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 7.5 patients per month.

# n reach patients within 15 minutes.

Characteristics of Tuberculosis Patients					
Characteristics	Number	Percenta			
Gender					
Male	24	82%			
Female	5	18%			
Ethnicity					

Table 10. Demographic and Health Insurance

Ethnicity		
Hispanic	18	63%
Non-Hispanic	11	37%
Unknown	0	0%
Race		
White	4	14%
African-American	0	0%
Asian-Pacific Islander	7	23%
Other or Unknown	18	63%
Language		
Prefer to Receive Health Info in English	17	59%
Prefer to Receive Health Info in Other	12	41%
Language		
Payer		
Medicare	3	9%
Medi-Cal	14	50%
Private/Commercial Insurance	6	20%
Uninsured	6	21%

Table 10 presents information on the demographic characteristics and health insurance status of persons enrolled in the TB pilot project. Most patients were male (82%), and the majority were Hispanic (63%). Fifty-nine percent preferred to receive health information in English. Fifty percent were Medi-Cal beneficiaries, 21% were uninsured, 20% had private health insurance, and 9% were Medicare beneficiaries.

#### **Eligible but Not Enrolled Patients**

In addition to the 29 persons with TB treated by community paramedics, 60 persons with TB were treated by the TB clinic's CHWs. Compared to patients treated by the CHWs, patients treated by community paramedics were more likely to be male (82% vs. 51%), white (14% vs. 8%), or Asian-Pacific Islander (23% vs. 18%), and less likely to be Hispanic (63% vs. 71%). Payer mix also differed between persons who received DOT from community paramedics and those who received it from TB clinic staff. Persons served by community paramedics were less likely to be Medi-Cal beneficiaries (50% vs. 64%) and more likely to have Medicare or private insurance or to be uninsured. 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. Community paramedics are more likely to be assigned patients who resist treatment or who were verbally abusive or sexually inappropriate because community paramedics have more experience and training in managing persons with such behaviors. 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.

#### 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 0.1% of DOT treatments prescribed by the TB clinic physician. In contrast, the CHWs were unable to dispense 6.0% of prescribed DOTs. 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. While most patients complied readily, the community paramedics were willing to go to great lengths to get patients to take medications if necessary. 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.

#### **Cost and Savings**

There was a small increase in adherence to the prescribed TB medication schedule when DOT was administered by community paramedics 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 who were treated successfully for TB and thus reduced medical and public health expenditures associated with public health investigation of close contacts and the cost of treating additional people infected by a noncompliant patient.

The project had no monetary cost because DOT was provided by community paramedics who were on duty in the field and provided DOT when they were not responding to 911 calls. The project also helped the TB clinic use the CHWs more efficiently because community paramedics were dispersed throughout the county. They could provide DOT to patients located in parts of the county that are distant from the TB clinic in Oxnard, reducing the need to dispatch CHWs to these locations. Reducing travel time for CHWs reduces the number of "nonproductive" hours during which they were not dispensing DOT or performing other duties for the TB clinic.

#### Conclusion

Community paramedics can safely administer DOT for TB under the direction of a physician who specializes in treatment of TB and monitor patients for side effects that may necessitate a change in medication. 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 a barrier to TB treatment.

## Hospice

#### **Description**

The goal of hospice care is to provide medical, psychological, and spiritual support to persons dying from a terminal illness. Care is provided by a multidisciplinary team of health professionals and volunteers 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, because they are anxious about the patient's condition, the patient decides that he or she no longer wishes to receive hospice care, or family members disagree with the patient's decision to obtain hospice care. In other cases, patients or families may turn to 911 if they do not receive a prompt response when they contact a hospice agency.

The standard response to a 911 call made on behalf of a hospice patient is to transport the patient to an ED. Being transported to an ED may be upsetting and uncomfortable for hospice patients, and 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. Hospice patients who are transported to an ED also risk losing their hospice benefits because insurers may revoke hospice benefits if the patient receives treatment or hospitalization that is incompatible with the hospice approach of comfort care. If this happens, the patient must apply for reinstatement of their hospice benefits.

Ventura County's hospice project seeks to prevent unnecessary transport of hospice patients to an ED. The community paramedics are supervisors who can respond to hospice calls while other paramedics respond to other 911 calls. 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 in a private residence, residential care or skilled nursing facility.

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 works with the community paramedic to determine 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 a 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.

#### Results

#### Number of Patients Enrolled and Characteristics

Ventura's hospice pilot project responded to 911 calls on behalf of 226 persons through September 30, 2016. These persons were patients of hospice agencies that partnered with Ventura County's EMS provider and were enrolled prior to a 911 call. Most 911 calls for hospice patients were initiated by a hospice patient or family member, but in some cases a hospice nurse called 911 during a visit with a patient. 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.

22

Characteristics	Number	Percentage
Gender		
Male	98	44%
Female	125	55%
Unknown	3	1%
Ethnicity		
Hispanic	44	20%
Non-Hispanic	170	75%
Unknown	12	5%
Race		
White	191	85%
African-American	10	4%
Asian-Pacific Islander	2	1%
Other or Unknown	23	10%
Language		
Prefer to Receive Health Info in English	187	83%
Prefer to Receive Health Info in Other	22	10%
Language		
Unknown	17	7%
Payer*		
Medicare	71	52%
Medi-Cal	2	2%
Private/Commercial Insurance	17	12%
Uninsured	47	34%

# Table 11. Demographic and Health InsuranceCharacteristics of Hospice Patients

\* Complete data on payers were available for only 137 of the 226 patients enrolled in the hospice project from August 2015 through September 2016.

Table 11 presents information on the demographic characteristics and health insurance status of persons enrolled in the hospice project. Over half (55%) of patients were female and most were non-Hispanic whites. Almost all patients preferred to receive health information in English. Just over half of persons enrolled were Medicare beneficiaries (52%), and one-third (34%) were uninsured.

## Eligible but Not Enrolled Patients

Ventura's community paramedics responded to 911 calls initiated by or for an additional 79 persons who were patients of hospices that did not participate in Ventura's pilot project. Most of these patients were transported to an ED in response to a 911 call unless it was a simple problem like needing a lift assist with no new injury. These patients were less likely to be females, non-Hispanic whites, and Medicare beneficiaries than hospice patients who were enrolled in the pilot project and were also less likely to prefer to receive health information in English.

## Safety

The evaluation found no evidence that the hospice project harmed patients. After it was determined 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 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. The project provides an alternative for patients who prefer to remain at home, enabling them to avoid undergoing unpleasant evaluations and procedures that they do not want to receive. There was no attempt to avoid ED care where it was indicated and consistent with the patient's wishes.

## Effectiveness

The project achieved its goal of honoring patients' wishes to remain in their homes by integrating EMS and hospice protocols. Figure 1 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. After the pilot was implemented, among patients of partner hospices, the percentage of patients transported decreased to 36%. 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.

#### **Figure 1. Percentage of 911 Calls for Hospice Patients That Result in Transport to an ED**



Community paramedics also alerted hospices and family members to patients' unmet needs. The project's very first hospice call involved a patient who lived alone and had fallen during the night while walking to the bathroom. The patient was not injured but was too weak to get back into bed. She had a paid caregiver during the day but not at night. The community paramedic confirmed that the patient was not injured and assisted the patient back to bed. The community paramedic spoke with the davtime caregiver and learned that the caregiver had attempted to give the patient enough medication to sleep through the night, which was not medically appropriate. With the patient's permission, the community paramedic also contacted a family member who arranged for the patient to have a paid caregiver 24 hours per day until the patient died at home as she wished.8

#### **Cost and Savings**

As indicated in Table 12, the hospice project achieved an estimated \$7,194 in net savings per month (\$719 per patient per month). The hospice project saved an estimated \$7,713 per month which was offset by a total monthly cost of \$519 for labor (community paramedic salary and benefits) and supplies. The methods used to generate these estimates are described in Appendix B.

Total net savings are higher than these estimates because some hospice patients who were transported to an ED were admitted to a hospital for inpatient care. These savings could not be estimated precisely because the pilot project was unable to obtain data from hospitals in Ventura County on the number of patients transported to their EDs who were admitted to their hospitals. Similarly, data were not available to quantitatively 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.

#### 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.

#### Table 12. Hospice Pilot Project Costs and Savings

Average Monthly Costs			
Labor Costs (incl. CPs and mgmt. staff)	\$376		
Recurring Supply Costs	\$143		
Total Cost	\$519		
Average Monthly Savi	ngs		
Average Monthly Enrollment	10		
Average Number of ED Treatments Avoided	5		
Average Cost of ED Transport Avoided	\$520		
Average Cost of ED Visits Avoided	\$989		
Savings from ED Visits Avoided	\$5,044		
Savings from Transports Avoided	\$2,669		
Total Savings	\$7,713		
Net Savings (savings less costs)	\$7,194		
Net Savings per Patient	\$719		

# Alternate Destination – Behavioral Health

#### **Description**

Many EDs in California are overcrowded, and some of the persons they serve could 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 than if they were transported to an ED. People with behavioral health heeds are often transported to an ED for medical clearance or when there is no capacity to evaluate them at a crisis center. One of the sites participating in California's HWPP provides medical clearance for people with behavioral health needs and transports them directly to a county-operated mental health crisis center.

Delays in receipt of psychiatric care are a major problem in California. Since 1995, the number of beds in inpatient psychiatric facilities in California has decreased by nearly 30%.<sup>9</sup> Patients with behavioral health needs routinely spend hours in an ED waiting for medical clearance, and in some cases they spend days in an ED waiting for a bed to become available in an inpatient psychiatric facility, without getting definitive behavioral health care during their ED stay.<sup>10</sup> 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.<sup>11</sup>

In Stanislaus County, community paramedics are dispatched in response to 911 calls that a dispatcher believes involve a behavioral health emergency or when another paramedic or a law enforcement officer identifies a patient with behavioral health needs. They are also dispatched to the mental health crisis center to assess persons who arrive on their own and need to be medically cleared before being admitted to the county's inpatient psychiatric facility. The community paramedics provide these services 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 either to the mental health crisis center or to an ED. After a patient arrives at the crisis center, mental health professionals on the crisis center staff evaluate them further to determine the most appropriate level of care for their condition. Eligibility is limited to nonelderly 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.

#### Results

#### **Number of Patients Enrolled and Characteristics**

Stanislaus' alternate destination – behavioral health project enrolled a total of 169 persons through September 30, 2016. Table 13 presents information on the demographic characteristics and health insurance status of persons enrolled in this project. The majority of patients were non-Hispanic white males. All patients preferred to receive health information in English. The vast majority of patients were Medi-Cal beneficiaries (83%).

#### **Eligible but Not Enrolled Patients**

Stanislaus' community paramedics assessed an additional 153 persons who they determined were eligible for transport to the county mental health crisis center. Eleven of these patients did not consent to be transported to the crisis center. The crisis center declined to serve 52 of these patients either because the inpatient psychiatric facility did not have any open beds or because they had treated the patient previously and felt the patient was not appropriate for their facility due to a substance use disorder or aggressive behavior. (The crisis center

Table 13. Demographic and Health Insurance	
<b>Characteristics of Alternate Destination – Behavioral</b>	
Health Patients	

Characteristics	Number	Percentage
Gender		
Male	106	63%
Female	63	37%
Ethnicity		
Hispanic	28	16%
Non-Hispanic	135	80%
Unknown	6	4%
Race		
White	115	68%
African-American	16	10%
Asian-Pacific Islander	4	2%
Other or Unknown	34	20%
Language		
Prefer to Receive Info in English	169	100%
Prefer to Receive Health Info in Other	0	0%
Language		
Payer		
Medicare	1	1%
Medi-Cal	140	83%
Private/Commercial Insurance	0	0%
Uninsured	28	16%

does not provide substance abuse treatment, and its security personnel are not trained to restrain patients.) Ninety patients were eligible but not enrolled due to other reasons, including age and not being uninsured or a Medi-

Cal beneficiary. Community paramedics also assessed over 200 patients who they deemed ineligible for transport to the county behavioral health facility because they had medical needs, were intoxicated, or were violent.

#### Safety

The evaluation team found no evidence of patient harm caused by the alternate destination – behavioral 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 5% of patients enrolled in the project (n = 9) were transferred to an ED within six hours of arrival at the crisis center. None of the nine transfers to an ED involved life-threatening conditions, and none of the patients were admitted for inpatient medical care. All transfers occurred during the project's first six months of operation. Most of the patients (78%) who





were transferred to an ED within six hours were subsequently transferred to an inpatient psychiatric facility. The remaining 22% were discharged from an ED without transfer. (See Figure 2.)

Table 14 lists the reasons why patients were transferred to an ED. To reduce the number of unnecessary transfers, the medical director of Mountain Valley EMS worked with the medical director of the county behavioral health facility to refine the protocol the community paramedics used to determine whether a patient's blood pressure was low enough for transport to the crisis center. He also trained community paramedics to use breathalyzers to identify patients whose blood alcohol levels were above the crisis center's threshold. Figure 2 indicates that these protocol changes resulted in the number of transfers going from a range of 1 to 3 during the first six months to zero in each of the subsequent six months.

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. Although law enforcement officers have authority to involuntarily commit persons for psychiatric care for 72 hours, their training in behavioral health is limited. In addition, community paramedics can arrange for an ambulance to transport a behavioral health patient. This allows law enforcement officers to perform law

Reason for Transfer to ED	Number of Patients
Blood pressure above the mental health crisis center's threshold	3
Agitation	2
Urinary incontinence	1
Patient had sleep apnea, and the county inpatient psychiatric facility did not have a continuous positive airway pressure (CPAP) machine	1
New clinician at the crisis center was unfamiliar with the pilot project	1
Not a resident of Stanislaus County	1
Total	9

# Table 14. Reasons for Transfers from Mental Health Crisis Center to an ED within Six Hours of Admission

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 patients with behavioral health needs were transported to an ED. Prior to the launch of the pilot project, nearly all 911 calls involving patients with behavioral health needs resulted in a transport to an ED for medical screening. After the pilot project was implemented, approximately one-third of behavioral health patients were transported to the mental health crisis center instead of an ED, and more could have been transported there if beds had been available in the county's inpatient psychiatric facility.

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

#### **Cost and Savings**

As indicated in Table 15, the alternate destination behavioral health project achieved an estimated \$8,913 in net savings per month (\$637 per patient per month) because transporting a behavioral health patient to the crisis center avoids an ED visit and a secondary transport of the patient from an ED to an inpatient behavioral health facility. Most of these savings benefitted the Medi-Cal program because 83% of patients enrolled in the project were Medi-Cal beneficiaries. Average monthly savings are estimated to be \$15,361 per month. These savings were offset by costs for community paramedic salaries and benefits and supplies of \$6,448. The estimated cost of community paramedic labor is based on the average number of 911 calls for persons with behavioral health needs for which community paramedics are dispatched each month. These include 911 calls for persons with behavioral health needs that resulted in transport to the mental health crisis center or in transport to an ED because the patient does not meet eligibility criteria for transport to the crisis center (e.g., has a medical need, intoxicated, violent) or because the county inpatient psychiatric facility did not have beds available. Additional details about the methods used to

# Table 15. Alternate Destination Behavioral HealthProject Costs and Savings

Average Monthly Costs	
Labor Costs (incl. CPs and mgmt. staff)	\$5,973
· • ·	
Recurring Supply Costs	\$475
ricedining oupply costs	Q415
	10.000
Total Cost	\$6,448
Average Monthly Savings	
Average Number of ED Visits and Transports Avoided	14
Average Number of ED Visits and Transports Avoided	/4
	4
Average Cost of ED Visit	\$546
Average Cost of Transport	\$554
Souings from ED Visite Avaided	¢7 651
Savings from ED visits Avoided	\$7,651
Savings from Transports Avoided	\$7,710
Total Savings	\$15.361
Total Gavings	\$15,551
Not Octobergy (Octobergy Inc. Octobergy	<u> </u>
Net Savings (Savings less Costs)	\$8,913
Net Savings per Patient	\$637
• ·	

estimate costs and savings are contained in Appendix B.

#### Conclusion

The alternate destination – behavioral health project demonstrates that community paramedics can perform medical screening on behavioral health patients and determine which patients 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 83% of patients in this project were Medi-Cal beneficiaries.

# Alternate Destination – Urgent Care

#### Description

Three pilot projects offer patients who have minor injuries or minor medical conditions transport 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 need timely evaluation and treatment but may not require treatment in an ED. Urgent care centers are typically staffed by physicians and other health professionals, such as physician assistants, nurse practitioners, and registered nurses. Some urgent care centers are independent whereas others are operated by or affiliated with hospital systems or medical groups. 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.<sup>12</sup> This means that there are no requirements for operating hours, equipment, or urgent care services.

All three alternate destination – medical 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 who serve as EMS medical directors to determine whether transport to an urgent care center is an appropriate option. If the paramedic concludes that a patient could be treated safely at an urgent care center, the paramedic offers transport to an urgent care center approved by the jurisdiction's local emergency medical services agency (LEMSA). Patients who declined to be transported to an urgent care center are transported to an ED.

All urgent care centers involved in the alternate destination – medical care projects were approved by LEMSAs following site visits to determine whether they provided minimum basic services for participation in the HWPP. To be involved in the pilot project, urgent care centers were 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. In addition, paramedics must call the urgent care center, give a brief report on a patient's condition, and receive confirmation that the urgent care center was willing to accept the patient before transporting the patient to that facility. The paramedics used protocols for screening patients that excluded patients with medical conditions too emergent, complex, or inappropriate for transport to an urgent care center. For example, in Orange County, persons with lacerations who had an exposed bone, tendon, or joint were automatically transported to an ED and not offered the option of transport to an urgent care center. Other persons were not offered transport to an urgent care center due to intoxication, altered mental state, or history of dementia.<sup>13</sup> Paramedics were available to reroute a patient to an ED for further diagnosis or treatment if the urgent care center provider requested it.

#### Results

#### Number of Patients Enrolled and Characteristics

A total of 39 patients were enrolled in the three alternate destination – medical care projects through September 30, 2016. Table 16 presents information on the demographic characteristics and health insurance status of persons enrolled in the alternate destination – medical care projects. The majority of patients were white females. All preferred to receive health information in English. Forty-one percent were Medicare beneficiaries, 28% had private health

#### Table 16. Demographic and Health Insurance Characteristics of Alternate Destination - Urgent Care Patients

Characteristics	Number	Percentage
Gender		
Male	18	46%
Female	21	54%
Ethnicity		
Hispanic	7	18%
Non-Hispanic	19	49%
Unknown	13	33%
Race		
White	25	64%
African-American	0	0%
Asian-Pacific Islander	1	3%
Other or Unknown	13	33%
Language		
Prefer to Receive Health Info in English	39	100%
Prefer to Receive Health Info in Other	0	0%
Language		
Payer		
Medicare	16	41%
Medi-Cal	2	5%
Private/Commercial Insurance	11	28%
Uninsured	10	26%

insurance, 65% were Medi-Cal beneficiaries, and 26% were uninsured.'

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 17.

#### **Eligible but Not Enrolled Patients**

The three alternate destination – medical care sites identified 202 people who were eligible for transport to an urgent care center but not enrolled. People who were eligible but not enrolled were more likely to be male and less likely to be Medicare beneficiaries than people enrolled in the project. Twenty-one persons declined transport to an urgent care center. An additional 181 persons were not enrolled for a variety of reasons. One of the most common reasons was that eligible people were identified at times of the day at which none of the partner urgent care centers were open. For example, 39 of the 76 people that Orange County paramedics deemed eligible for transport to an urgent care center called 911 at times of the day at which the urgent care centers were not open.14 In addition, Orange initially trained insufficient numbers of paramedics to provide the urgent care center transport option on all shifts. (Orange later trained a second cohort of paramedics.) Eligibility for Carlsbad's program was limited to nonelderly adults insured by Kaiser Permanente, which meant that the option could not be offered to senior citizens or to nonelderly adults who had other sources of health insurance. The number of patients enrolled in all three alternate destination - medical care projects was further limited by very restrictive protocols and a lengthy consent process.

#### Safety

The alternate destination – medical care projects did not harm patients. Findings from the Orange County project indicate that paramedics trained to screen patients for suitability for transport to an urgent care center can identify per protocol persons for whom transport to an urgent care center is an appropriate

Project #	Lead Agency	Total Enrollees	Closed Extremity	Laceration	Soft Tissue	Fever or Cough	Other Minor Injury	Generalized Weakness
CP001	UCLA	12	5				7	
CP003	Orange	25	15	9	0	0	1	0
CP009	Carlsbad	2	0	0	0	0	0	2
Total		39	20	9			8	2

#### Table 17. Number of Enrollees in Alternate Destination – Urgent Care Projects

option. Orange County paramedics participating in the pilot project screened 659 people who had conditions targeted by the pilot project and deemed 115 eligible for transport to an urgent care center.<sup>13</sup> Thirty-nine of these people called 911 during the hours in which partner urgent care centers were open, and 25 were transported to an urgent care center. The paramedics transported the remaining 544 people to an ED based on the project's protocol and on their clinical judgment that took into consideration a person's functional status and home environment as well as their medical condition. (Similar information was not available for the other alternate destination – medical care sites.) It is important to note that these projects did not involve evaluation and release of patients by paramedics; in all cases patients were transported to a facility where they could be evaluated by a physician.

Among the 39 patients enrolled in the alternate destination – medical care projects, two patients (5%) were subsequently transferred to an ED within six hours of arrival at an urgent care center. In addition, nine patients (23%) were transported to an urgent care center and then rerouted to an ED because the urgent care center staff declined to treat the patient despite indicating prior to transport that they would accept 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.

Four of the nine reroutes concerned a musculoskeletal injury that an urgent care physician believed needed further evaluation. Five of the nine reroutes involved lack of availability of medication or equipment at the urgent care center. Three patients requested opioid pain medications that the urgent care center does not provide, and two patients had to be transferred because equipment needed to diagnose the injury was broken or unavailable.

One patient who was transferred to an ED after admission to an urgent care center needed surgery for a musculoskeletal injury. The patient did not appear to have a fracture when the paramedics assessed the patient in the field because the patient could put weight on the affected limb. Only after an x-ray was taken at the urgent care center could it be determined that the patients had a significant injury that needed orthopedic management.

One case that involved the transfer of a patient to an ED following admission to an urgent care center resulted in an in-depth safety evaluation. The case involved a patient enrolled in the UCLA project who called 911 due to nausea and vomiting without abdominal pain.<sup>15</sup> The patient displayed no other symptoms in the field and accepted transport to an urgent care center. After arrival at the urgent care

# Table 18. Reasons Transfers from Urgent Care Centersto EDs within Six Hours of Admission

Reason for Transfer to 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	
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

center, the patient's heart rate slowed, and he experienced shortness of breath. The urgent care center physician was concerned that the patient needed diagnostic tests that the urgent care center does not provide. The patient was transferred to an ED, where he again experienced shortness of breath and for the first time complained of chest pain. An electrocardiogram showed nonspecific abnormalities. A cardiologist took the patient to the cardiac catheterization lab for further evaluation and identified partial coronary blockage that was treated with stenting, and he was discharged the following day. The patient's ultimate diagnosis was angina without myocardial infarction (heart attack). The case was reviewed by the Local Pilot Project Steering Committee, the HWPP #173 pilot project manager, and the director of EMSA. The reviewers concluded that the paramedics' decision to offer the patient transport to an urgent care center was appropriate according to the project's protocols for screening patients. To prevent a similar situation from occurring again, the director of EMSA requested that all alternate destination - medical care projects revise their protocols to exclude persons who have nausea without abdominal pain. (Persons with nausea and abdominal pain were already excluded.)

#### 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 in an ambulatory setting, 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

# Table 19. Savings Associated with Alternate Destination – Urgent Care Projects UCLA Orange

	UCLA	Orange
Average Monthly Enrollment	2	3
Average Savings per ED Visit Avoided	\$104	\$104
Savings from ED Visits Avoided	\$217	\$300
Total Savings	\$217	\$300

dehydration and other conditions that could be treated safely outside of an ED.

#### **Cost and Savings**

Table 19 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 September 2016.

These projects saved \$217 to \$300 per month. 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. (See Appendix B for details.) This analysis does not include an estimate of costs because the alternate destination - medical care projects had no recurring costs. The paramedics who offer transports to urgent care centers are part of 911 response crews that the participating fire departments would have on duty regardless of whether the pilot project had been implemented. Thus, the fire departments do not incur any recurring costs for labor, supplies, or equipment beyond what they would otherwise incur for responses to 911 calls.

#### Conclusion

More data are needed to draw firm conclusions about the alternate destination – medical care model. Paramedics participating in the alternate destination – medical care projects have demonstrated capacity to evaluate patients according to triage protocols to determine whether patients can be transported to an urgent care center. No patients experienced adverse outcomes. However, only 39 patients were enrolled across the three sites over a one-year period, in large

part because many people with eligible conditions called 911 at times at which urgent care centers were not open. In addition, 2 of the 39 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 – medical 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 projects have generated some savings by transporting patients with minor injuries and illnesses to this less costly setting and could potential generate additional savings if more patients were enrolled.

# 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. These projects are improving 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 because Medicare beneficiaries accounted for the largest share of persons enrolled in the pilot projects (43%). Savings also accrue to the Medi-Cal program and providers that serve Medi-Cal beneficiaries because Medi-Cal beneficiaries constitute 28% of enrollees. In addition, the pilot projects provide new options to persons who call 911 that enable them to obtain the care they need more efficiently and in the settings they prefer. Specifically, the sites testing the six concepts have demonstrated the following.

## Post-Discharge Short-term Follow-up Projects

- Decreased hospital readmissions within 30 days of discharge for all sites and diagnoses except among persons enrolled for heart failure in one project that provided less intensive services than other post-discharge pilot sites.
- Improved patients' knowledge of their medications and their ability to take medications as prescribed by their physicians.
- Four of the five post-discharge projects 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 having excess readmissions.

### Frequent EMS User Projects

- These projects achieved 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 but only one realized sufficient savings to offset the cost of operating the project. These projects also decreased the amount of uncompensated care furnished by ambulance providers and hospitals because 35% of enrolled patients were uninsured.

#### **Directly Observed Therapy for Tuberculosis Project**

- 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 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 CHWs. Receiving all doses prescribed by the TB clinic physician increases the likelihood that a patient will be successfully treated and will not spread TB to others or develop a drugresistant strain of TB that would be much harder to treat and to control in the community.
- No additional cost to the health care system because community paramedics who provide DOT at the pilot site did so while already on duty to respond to traditional 911 calls.

#### **Hospice Project**

• Community paramedics mainly provided hospice patients and their families with psychosocial support and administered medications from the hospice patients' "comfort care" packs when necessary, in consultation with a hospice nurse.

- 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, which likely reduced the number of patients whose hospice benefits were revoked.
- The project also yielded savings for Medicare and other payers due to reduction in unnecessary transport and visits to an ED. Payers' expenditures for inpatient care were also reduced because some ED visits for hospice patients result in an inpatient admission.

# Alternate Destination – Behavioral Health Care Project

- Paramedics performed medical screening on behavioral health patients to determine whether they could be transported directly to a mental health crisis center.
- Ninety-five percent of patients were evaluated at the behavioral health crisis center without the delay of a preliminary emergency department visit. Only 5% of patients required subsequent transfer to the ED, and there were no adverse outcomes. After refining the field medical evaluation protocols, the rate of transfer to an ED fell to zero.
- Yielded 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.
- Enhanced community safety because it reduced the amount of time that law enforcement devotes to behavioral health calls.

# Alternate Destination – Urgent Care Projects

• More data are needed to make firm conclusions about the alternate destination – medical care projects due to the limited number of patients enrolled and the number of patients rerouted to transferred to an ED.

- Among the limited number of patients who were enrolled, paramedics were able to screen patients according to protocol for whom transport to an urgent care center was an appropriate option.
- No patients experienced an adverse outcome, although two patients were transferred to an ED following admission to an urgent care center, and nine patients 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.

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 adverse outcome is attributable to any of these pilot projects. No other health professionals were displaced; in fact, these pilot projects demonstrated that community paramedicine programs can partner with physicians, nurses, behavioral health professionals, and social workers to fill gaps in the health and social services safety net. These projects were designed to integrate with existing health care resources and utilize the unique skills of paramedics and their round-theclock availability.

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. 16,17,18 These findings suggest that the benefits of CP programs grow as they mature, solidify partnerships, and find their optimal structure and niche. The evaluation of HWPP #173 yields consistent findings for five of the six community paramedicine concepts tested: post-discharge, frequent 911 users, DOT for TB, hospice, and alternate destination – behavioral health. Projects testing these five concepts have fulfilled the criteria for a successful HWPP. They have improved patients' well-being and, in most cases, have yielded savings for payers and other parts of the health care system. The sixth concept, alternate destination – medical 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 twotiered 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 the Community Paramedicine Pilot Projects



# Appendix B. Methods for Estimating Cost and Savings

This appendix describes the methods used to estimate costs and savings associated with each of the six community paramedicine concepts that are being tested as part of HWPP #173. Estimates of savings associated with the six 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.

All supply and labor costs included in the analysis are recurring costs that would be required to operate similarly designed CP programs. Costs associated with the initial implementation of the programs as well as costs unique to these programs due to their designation as "pilot projects" were not included, such as costs associated with training the community paramedics and reporting data on implementation of the project to the evaluator. The specific details of cost estimates vary across programs due to differences in staffing and use of supplies.

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 quantitative analysis of savings 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. Directional statements were also made about effects of the post-discharge projects on the amount of uncompensated care provided by hospitals.

Net savings (i.e., savings to insurers and others, minus costs to EMS agencies) were calculated to estimate the value added by the pilot projects. A finding of net savings indicates that sites that tested a community paramedicine concept generated savings for other parts of the health care system that exceeded the costs of providing the services. Achieving savings for health insurers, hospitals, and other health care providers that exceed the cost of providing community paramedic services creates an opportunity for EMS providers to negotiate contracts with these entities to provide community paramedic services.

## Post-Discharge Short-term Follow-up Cost

The average monthly costs for post-discharge projects were estimated based on information provided by sites regarding labor costs and recurring costs for supplies. Labor costs varied across the five discharge projects due to differences in staffing

models. Two projects (Alameda and UCLA) utilized full-time paramedics, whereas three projects (Butte, San Bernardino, and Solano) deployed community paramedics as needed. For UCLA's project, which employed one full-time community paramedic, the full monthly cost of the community paramedic's salary and benefits were included. For Alameda's project, costs for the two full-time community paramedics were allocated across the two projects it administers (post-discharge and frequent 911 users) based on the percentage of total patients enrolled in each project (62% post-discharge, 38% frequent 911 users). For the three projects that utilized community paramedics as needed, costs for salaries and benefits were based on the proportion of work hours that paramedics devoted to community paramedic work. Hours spent providing traditional 911 response services were not included because the sponsoring agencies would have incurred these costs regardless of whether they operated pilot projects.

#### Savings

To generate estimates of average monthly 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 30day readmission rates for partner hospitals were calculated. Historical readmission rates were obtained from Medicare Hospital Compare,19 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.<sup>20</sup> These data were used to assess the projects' impact on 30day 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 postdischarge projects.

The difference in the rate readmissions was multiplied by the average number of people enrolled in each pilot project to generate an estimate of the number of readmissions avoided, which was then 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 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 target diagnoses with weights assigned based on the proportion of total readmissions that occurred among persons with each diagnosis for which patients were enrolled.

#### Frequent EMS User

#### Cost

The average monthly costs for Alameda and San Diego's frequent EMS user projects were estimated based on information provided by sites regarding labor costs and recurring costs for supplies. Because Alameda uses the same paramedics to operate both a frequent EMS user project and a post-discharge project costs for labor and supplies were allocated to the two projects based on the percentage of total patients enrolled. The two projects in Alameda enrolled a total of 104 persons through September 2016, 38% of which were enrolled in the frequent EMS user project and 62% in the post-discharge project. Since San Diego only has a frequent 911 user project, all labor and supply costs for the project were included in the cost estimate.

#### Savings

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 managers of the frequent 911 user projects, it was assumed that every 911 call avoided resulted in avoidance of an ambulance transport and an ED visit.

For San Diego, the number of ambulance transports and ED visits avoided was estimated by comparing the number of 911 calls made by enrolled patients during the six months prior to their enrollment to the number of 911 calls made during the six 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 45 enrollees in San Diego's frequent EMS user project from November 2015 through December 2016. The reduction in 911 calls over the six months post-enrollment was divided by six to estimate the numbers of 911 calls, ambulance transports, and ED visits avoided per month (33).

The estimate of savings associated with Alameda's frequent 911 user project is less precise than the estimate for San Diego's because only aggregate data are available. The number of 911 calls among persons enrolled in Alameda's project during the 12 months prior to the implementation of the project was compared to the number of 911 calls that these patients had following the project's implementation. The difference in 911 calls was divided by 12 to estimate the average number of 911 calls 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. 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. Medicare reimbursement rates were used because Medicare is the payer whose reimbursement is widely considered to be closest to the cost of care. The cost-to-charge ratio method used to estimate the cost of inpatient readmissions avoided could not be used because OSHPD does not collect complete data on charges for ED visits.

For the frequent 911 user projects, patients were categorized using available evaluation and management codes in order to produce a comparable set of patients, based on disease and acuity. Diagnosis codes were not used because they were not among of the criteria used to identify persons eligible for the project.

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 mean reimbursement 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.

**Directly Observed Therapy for Tuberculosis** 

A quantitative analysis of costs and 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 a small increase in adherence to the prescribed medication schedule when administered by a community paramedic instead of a community health worker (99% vs. 94%). However, we found no research that addressed the impact of a difference in adherence between groups of people with adherence rates of over 90% in a US population. 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, treating people infected by a noncompliant patient, and the impact of the use of community paramedics on the TB clinic's use of community health workers.

#### **Hospice**

#### Cost

The estimated cost of community paramedic labor and supplies for Ventura's hospice project is based on the average amount of time community paramedics spend per month on responses to 911 calls for hospice patients. It does not reflect full salaries and benefits paid to community paramedics each month because the community paramedics are supervisors who serve hospice patients for only a small part of the time that they are on duty.

#### Savings

Average monthly savings were estimated by multiplying the average numbers of transports and ED visits avoided per month 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 through September of 2016. The estimates represented actual "cash collected" by the agency from insurers and other payers.

As indicated above in the description of the estimates of savings for the frequent 911 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 – Behavioral Health Cost

The estimated monthly cost of community paramedic labor for Stanislaus County's alternate destination – behavioral health project is based on the average number of unit hours that community paramedics spend per month on responses to 911 calls for persons with behavioral health needs. They do not reflect full salaries and benefits paid to community paramedics each month because the community paramedics only serve behavioral health patients part of the time that they are on duty. Costs for supplies reflect estimates of monthly expenditures that Stanislaus' EMS provider incurs for supplies used to care for alternate destination – behavioral health patients.

#### Savings

Average monthly savings were estimated by multiplying the numbers of ambulance transports and ED visits avoided per month 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, every time a patient is enrolled, an ED visit is avoided 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 911 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 which the only diagnoses reported are behavioral health diagnoses. These diagnoses were chosen because the alternate destination – behavioral health project serves persons who only have acute behavioral health needs.

#### Alternate Destination – Urgent Care Cost

As indicated in the main text of the report, the analysis of savings associated with alternate destination – medical care projects does not include an estimate of costs because the paramedics who offer transports to urgent care centers are part of 911 response crews that the participating fire departments would have on duty regardless of whether the pilot project had been implemented.

#### Savings

Savings 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.<sup>21</sup> The difference between reimbursement for ED visits and urgent care center visits was multiplied by the average number of persons enrolled in the alternate destination – medical care projects per month to estimate total savings per month. 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 - medical care projects did not reduce ambulance transports because all enrolled patients were transported to an urgent care center.

As indicated above in the description of the estimates of savings for the frequent 911 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 documented care provided to patients. For the alternate destination – medical care projects, Medicare reimbursement rates level 1 or 2 visits were used because these projects enrolled people with minor illnesses or injuries.

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