# Update of Evaluation of California's Community Paramedicine Pilot Program

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**Abstract / Overview**

Community paramedicine, also known as mobile integrated health (MIH-CP), is an innovative model of care that seeks to improve the effectiveness and efficiency of health care delivery by using specially trained paramedics in partnership with other health care providers to address the needs of local health care systems. In November 2014, the California Office of Statewide Health Planning and Development (OSHPD) approved a Health Workforce Pilot Project sponsored by the California Emergency Medical Services Authority, which has encompassed 20 projects in 14 communities across California testing seven different community paramedicine concepts. Fourteen projects are currently enrolling patients.

The Philip R. Lee Institute for Health Policy Studies and Healthforce Center at UC San Francisco are conducting an independent evaluation of these projects. This report presents findings through March 31, 2020, for projects currently enrolling patients and projects that have closed. The evaluators conclude that Californians benefit from these innovative models of health care that leverage an existing workforce operating at all times under medical control – either directly or by protocols developed by physicians experienced in emergency care. The projects have improved coordination among providers of medical, behavioral health and social services and reduced preventable ambulance transports, emergency department visits and hospital readmissions. They have not resulted in any adverse outcomes for patients. This report presents a summary of major findings from the evaluation for policymakers. All data submitted by project sites are reported to OSHPD on a quarterly basis.

This update to the public report also contains information regarding the pilot projects' response to the COVID-19 pandemic. Several projects have expanded their services whereas others have curtailed them.

## Acknowledgements

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# Contents



The mission of Healthforce Center is to equip health care organizations with the workforce knowledge and leadership skills to effect positive change.

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## Executive Summary

Community paramedicine, also known as mobile integrated health (MIH-CP), is an innovative model of care that seeks to improve the effectiveness and efficiency of health care delivery by using specially trained paramedics in partnership with other health care providers to address the needs of local health care systems.

On November 14, 2014, the California Office of Statewide Health Planning and Development (OSHPD) approved a Health Workforce Pilot Project (HWPP #173) sponsored by the California Emergency Medical Services Authority to test multiple community paramedicine concepts. OSHPD has since renewed the HWPP for one-year periods in 2015, 2016, 2017, 2018, and 2019. The community paramedicine HWPP has encompassed 20 projects in 14 communities across California, testing seven different community paramedicine concepts. Fourteen projects are currently enrolling patients, including seven projects launched in 2015, one launched in 2017, four launched in 2018 and two launched in 2019. Five of the projects launched in 2015 have closed for various reasons and one has suspended operations.

The HWPP regulations require organizations that sponsor pilot projects to retain an independent evaluator to assess trainee performance, patient acceptance, and cost-effectiveness. The Philip R. Lee Institute for Health Policy Studies and Healthforce Center at UC San Francisco are conducting the evaluation, which is funded by the California Health Care Foundation.

This report presents a summary of major findings from the evaluation for policymakers. All data submitted by project sites are reported to OSHPD on a quarterly basis. The report presents findings from the time the initial group of pilot projects began enrolling patients (June 2015 to October 2015) through March 2020.

The seven community paramedicine concepts that sites are testing are described below:

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 Emergency Medical Services (EMS) User:** Provide case management services to people who are frequent 911 callers and frequent visitors to emergency departments (EDs) to identify needs that could be met more effectively outside of an ED, and assist patients in accessing primary care, mental health services, substance use disorder treatment and other services, such as housing and food.

3. **Directly Observed Therapy for Tuberculosis:** In collaboration with a public health agency, provide directly observed therapy (DOT) to people with tuberculosis (i.e., dispense medications and observe patients taking them) to ensure effective treatment of tuberculosis and prevent its spread.

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

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

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

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

Key findings are as follows.

### Status of Pilot Projects

- Thirteen pilot projects were launched from June through October of 2015.
- Seven more projects began enrolling patients in 2017, 2018, and 2019.
- Five projects have closed, and one has suspended operations. Two Post-Discharge – Short-Term Follow-Up projects closed due to lack of local resources and one has suspended operations. The three Alternate Destination – Urgent Care projects closed due to low enrollment.
- The pilot projects enrolled 9,482 persons through March 31, 2020.

## Impact of the COVID-19 Pandemic

The COVID-19 pandemic started in the first quarter of 2020 and is affecting all of the active community paramedicine pilot projects in various ways. Most changes occurred in March or later and have had more impact on the projects during the second quarter of 2020, which will be addressed in the next update to this report.

- The number of new patients enrolled in 8 of the 14 pilot projects has decreased.
- Most projects (11 of 14) are still serving patients in person. Seven of these projects have changed their infection control protocols to reduce the risk of COVID-19 transmission.
- San Francisco's Frequent EMS Users project and Stanislaus' Alternate Destination – Mental Health project have expanded the range of services they offer.
- The COVID-19 pandemic has increased the availability of housing resources (i.e., FEMA trailers, hotel rooms) in Alameda County, which has enabled Alameda's Frequent EMS User project to obtain temporary housing for 21 clients.
- CPs working with San Diego's Frequent EMS Users project have been diverted to staff a shelter for homeless people at San Diego's convention center, where they monitor clients' health and provides them with access to medical and behavioral health services.
- Two of the Alternate Destination – Sobering Center projects are on hiatus because they have been converted to a COVID-positive homeless isolation center (Los Angeles) or closed due to a patient who tested positive (San Francisco).
- Ventura's Tuberculosis project is no longer dispensing directly observed therapy in person because the Ventura Public Health Department decided shortly after the statewide shelter in place order was issued that all patients with tuberculosis would be monitored via telemedicine.

### Post-Discharge – Short-Term Follow-Up

- From June 2015 through March 2020, the five Post-Discharge – Short-term Follow-Up projects have enrolled 1,801 patients. Butte's project had the largest enrollment (1,001 patients), and Alameda's had the smallest (139 patients).

- The Post-Discharge – Short-term Follow-Up projects have improved patient safety by performing home visits within a few days of a patient's hospital discharge to ensure that patients understand their discharge instructions, are taking medications as prescribed, have sufficient refills to manage their conditions, have scheduled follow-up visits with their physicians and are adhering to any dietary restrictions pertinent to management of their condition.

- All five Post-Discharge – Short-term Follow-Up projects have had all-cause 30-day readmission rates for persons with one or more of the chronic conditions they target that are below the partner hospital's historical readmission rate for that condition. Butte's heart failure patients were the only group whose all-cause 30-day readmission rate was higher than the historical rate. In response to these findings, Butte changed its protocol in November 2017 to provide at least one home visit to every patient, but its readmission rate for patients with heart failure did not decrease.

- Through March 2020, the five Post-Discharge – Short-term Follow-Up projects avoided potential costs of approximately $1.4 million, the majority of which (61%) would accrue to Medicare. Participating hospitals also reduced their risk of incurring Medicare penalties for excessive readmissions.

### Frequent EMS User

- The three Frequent EMS User projects have enrolled 398 people from July 2015 through March 2020.

- The three Frequent EMS User projects have achieved large reductions in the number of 911 calls made on behalf of their clients and the number of transports to EDs.

- Frequent EMS User projects have linked patients to organizations that provide primary care, dental care, mental health services, substance abuse treatment, food, housing, transportation and other services that can address their needs more effectively than the EMS system.

- Alameda, San Diego, and San Francisco's Frequent EMS User projects have avoided potential costs of approximately $966,140 by reducing 911 calls, ambulance transports and ED visits. San Diego and San Francisco's projects also potentially reduced the amount of uncompensated care provided by ambulance services and EDs because large percentages of the patients enrolled in these projects were uninsured.

### Directly Observed Therapy for Tuberculosis

- The tuberculosis (TB) project enrolled 52 persons from June 2015 through March 2020. Most patients are enrolled for multiple months because treatment for TB typically spans six to nine months.

- Community paramedics dispensed appropriate doses of TB medications, and their TB patients did not experience side effects any more frequently than typically associated with TB treatment.

- Twelve patients were admitted to a hospital in the period during which the project has been in operation, but only one patient was hospitalized for TB. This patient needed intravenous medication to treat TB meningitis, which had been diagnosed prior to enrollment in the program.

- People with TB who received DOT from community paramedics were more likely to receive all doses of TB medications prescribed by the TB clinic physician than people who received DOT from the TB clinic's staff, probably because community paramedics operated throughout the county and were available 24 hours per day, 7 days per week.

### Hospice

- The Hospice project enrolled 401 persons between August 2015 and March 2020.

- The Hospice project reduced the likelihood that patients who preferred treatment at home were transported to an ED, which could result in loss of hospice benefits. No patients were denied transport to an ED when it was indicated and consistent with the patient's preference.

- Among hospice patients enrolled in the pilot project, the percentage of 911 calls that resulted in transport to an ED decreased from 80% to 27%.

- The Hospice project avoided potential costs of $318,097 by reducing ambulance transports and ED visits.

### Alternate Destination – Mental Health

- The four Alternate Destination – Mental Health projects enrolled 4,017 persons between September 2015 and March 2020.

- Across the four Alternate Destination – Mental Health projects, 27% to 44% of patients screened were transported to the mental health crisis center rather than an ED. In Stanislaus County, an additional 28% could have been transported to the crisis center if the county had more inpatient psychiatric beds or if the crisis center accepted people with private insurance or Medicare.

- Transport of patients directly to a mental health crisis center has reduced the number of persons in EDs who only need mental health services, which can help reduce ED overcrowding.

- Only 2.1% of patients enrolled in the three Alternate Destination – Mental Health projects (n = 86) were transferred from the mental health crisis center to an ED within six hours of admission. None of the transfers involved a life-threatening condition, and only nine of the patients transferred to an ED were admitted for inpatient medical care. Only 1.7% of patients (n = 59) were rerouted to an ED because a mental health crisis center declined to accept them because they did not meet criteria for admission.

- In addition to responding to 911 calls regarding mental health emergencies, the community paramedics in Stanislaus County screen "walk-in" clients who come to the mental health crisis center on their own or who are brought by friends or family to determine whether they have any medical conditions that might necessitate transport to an ED instead of direct admission to the crisis center.

- Law enforcement officers report that having community paramedics available enhances their ability to respond effectively to persons with mental illness.

- The four Alternate Destination – Mental Health projects avoided potential costs of $4.3 million by reducing the number of 911 calls that resulted in an ED visit and subsequent transport of a patient from an ED to an inpatient psychiatric facility.

### Alternate Destination – Urgent Care

- The three Alternate Destination – Urgent Care projects enrolled 48 persons from September 2015 through November 2017.
- One of the Alternate Destination – Urgent Care projects closed in May 2017, and the other two projects closed in November 2017.
- Enrollment in the Alternate Destination – Urgent Care projects was substantially lower than anticipated because fewer 911 calls than expected met the strict inclusion criteria and many calls for eligible patients occurred at times of the day during which urgent care centers were closed. In addition, clinicians at urgent care centers were reluctant to treat some conditions, such as a dislocated shoulder, that could be treated safety and effectively in that setting.
- Most patients enrolled had a laceration or an isolated closed extremity injury.
- During the time period in which the Alternate Destination – Urgent Care projects enrolled patients, two patients (4%) were transferred from an urgent care center to an ED within six hours of arrival at the urgent care center. Nine patients (19%) were transported to an urgent care center and then rerouted to an ED because clinicians at the urgent care center declined to treat the patient.

### Alternate Destination – Sobering Center

- The three Alternate Destination – Sobering Center projects enrolled 2,765 persons from February 2017 through March 2020. Three hundred and eighty-seven patients (14%) were treated at the sobering center more than once.
- Most patients (2,674) were enrolled in San Francisco's Alternate Destination – Sobering Center project. Los Angeles' project has enrolled 91 people since it launched in late June of 2019. The Santa Clara County EMS Agency and the Gilroy Fire Department's Alternate Destination – Sobering Center project has not enrolled any patients as of March 2020.
- 98.2% of patients enrolled in San Francisco's Alternate Destination – Sobering Center project were treated safely and effectively at the sobering center. Only 46 patients (1.7%) were transferred to an ED within six hours of admission to the sobering center, and only two (0.1%) were rerouted from the sobering center to an ED because registered nurses at the sobering center declined to accept them. Only five patients were admitted to a hospital for inpatient medical care.
- None of the patients enrolled in Los Angeles' Alternate Destination – Sobering Center project were transferred to an ED within six hours of admission.
- Community paramedics participating in San Francisco's project provide feedback to paramedics on 911 crews on how to screen acutely intoxicated persons to determine if they are candidates for transfer to the sobering center.

They are also collaborating with homeless outreach workers to encourage people who use the sobering center frequently to seek treatment for chronic alcoholism, housing, and other services.

- Los Angeles and San Francisco's Alternate Destination – Sobering Center projects avoided potential costs of $956,851 by replacing ED visits with sobering center services. The majority of potential savings accrued to Medi-Cal because the majority of patients enrolled in the project are Medi-Cal beneficiaries.

## Conclusion

The community paramedicine pilot projects have demonstrated that specially trained paramedics can provide services beyond their traditional and current statutory scope of practice in California. No adverse outcome is attributable to any of these pilot projects. The projects are enhancing patients' well-being by improving the coordination of medical, behavioral health and social services, and reducing ambulance transports, ED visits and hospital readmissions. The majority of potential savings associated with these pilot projects accrued to Medicare and Medi-Cal and hospitals that care for Medicare and Medi-Cal beneficiaries because Medicare and Medi-Cal beneficiaries accounted for the largest share of persons enrolled in the pilot projects.

These pilot projects integrate with existing health care resources and utilize the unique skills of paramedics and their availability 24 hours per day, 7 days per week. The pilot projects have not displaced any other health professionals. Instead, they have demonstrated that community paramedics can collaborate with physicians, nurses, behavioral health professionals, and social services workers to fill gaps in the health and social services safety net. Several projects are playing important roles in their communities' response to the COVID-19 pandemic by expanding their services or pivoting to serve different populations. The community paramedics operate at all times under medical control – either directly or by protocols developed by physicians experienced in EMS and emergency care.

Research conducted to date indicates that community paramedicine programs are improving the effectiveness and efficiency of the health care system. Findings from this research also suggest that the benefits of community paramedicine programs grow as they mature, solidify partnerships, and find their optimal structure and niche within a community. The evaluation of HWPP #173 yields consistent findings for six of the seven community paramedicine concepts tested. The Post-Discharge – Short-term Follow-Up, Frequent EMS User, Directly Observed Therapy for Tuberculosis, Hospice, Alternate Destination – Mental Health and Alternate Destination – Sobering Center projects have improved patients' well-being and, in most cases, have potentially increased health care value by yielding potential savings for payers and other parts of the health care system. The seventh concept, Alternate Destination – Urgent Care, shows potential, but further research involving a larger volume of patients transported to urgent care centers with wider ranges of services and expanded hours is needed to draw definitive conclusions.

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

## Introduction

Community paramedicine (CP), also known as mobile integrated health (MIH-CP), is an innovative model of care that seeks to improve the effectiveness and efficiency of health care delivery by using specially trained paramedics in partnership with other health care providers to address identified patient needs in local health care systems. Community paramedics receive additional training beyond that required for licensure and provide care outside of their traditional role, which in California is restricted to responding to 911 calls, treating patients at the scene of an emergency, transporting patients to emergency departments (EDs), and inter-facility transfers.[1] They are supervised by physicians and nurses who work for the emergency medical services (EMS) agencies that employ them and by staff of the health care and community service agencies with which their EMS agencies partner. According to a survey conducted by the National Association of Emergency Medical Technicians, in 2017 there were 129 MIH-CP programs in 34 states and the District of Columbia.[2]

On December 19, 2013, the California Emergency Medical Services Authority (EMSA) submitted an application to the California Office of Statewide Health Planning and Development (OSHPD) for a Health Workforce Pilot Project (HWPP) to evaluate community paramedicine. In 1972, California established the HWPP program (HSC §§ 128125-128195), which was originally called the Health Manpower Pilot Projects program, to enable health care organizations to test and evaluate innovative models of care that utilize health professionals in new roles. An HWPP is necessary to establish community paramedicine initiatives in California because the sections of the Health and Safety Code that govern paramedic scope of practice (HSC §§ 1797.52, 1797.218) limit the settings where paramedics can provide services and the destinations to which they can transport patients. OSHPD approved HWPP #173 on November 14, 2014, for one year and renewed approval for additional one-year periods in 2015, 2016, 2017, 2018, and 2019.

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 Healthforce Center at UC San Francisco serves as the independent evaluator for HWPP #173. The California Health Care Foundation funds the evaluation.

This report presents a summary of major findings from the evaluation for policymakers. All data submitted by the project sites are reported to OSHPD on a quarterly basis.

### Overview of California Community Paramedicine Pilot Projects

The community paramedicine HWPP has encompassed 20 projects in 14 communities across California. Fourteen projects are currently enrolling patients. Five of the original projects have closed and one has suspended operations. One project suspended operations in December 2017 but relaunched in June 2019. A map that displays the locations of projects that are currently enrolling patients can be found in Appendix A.

This report addresses the 14 projects that were enrolling patients as of March 2020 plus the five projects that have closed and the project that has suspended operations. It covers all projects from the time they launched. Launch dates for individual projects can be found in Table 1 on page 16.

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

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

patients in accessing primary care, mental health services, substance use disorder services and other services.

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7. **Alternate Destination – Sobering Center:** In response to 911 calls, offer people who are acutely intoxicated but do not have acute medical or mental health needs transport directly to a sobering center for monitoring 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.

### Training of Community Paramedics

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

All paramedics who participate in the Post-Discharge – Short-Term Follow-Up, Frequent EMS User, Directly Observed Therapy for Tuberculosis, and Hospice projects and Stanislaus' Alternate Destination – Mental Health project completed this core curriculum. The site supervisors from Alternate Destination – Urgent Care projects and paramedics recruited to coordinate the Alternate Destination – Sobering Center projects and Fresno, Gilroy/Santa Clara and Los Angeles' Alternate Destination – Mental Health projects were required to complete the core curriculum. At these pilot sites, all other paramedics participating in the projects received training focused on (1) screening patients according to a protocol to determine if they would be eligible to enroll in the pilot and (2) the procedures for enrolling patients who agree to be transported to a mental health crisis center, a sobering center or an urgent care center. This approach was pursued because these concepts focus on clinical decision-making in the field regarding where to transport a patient. This is routine practice for paramedics, who must identify which patients to take to specialty care centers, such as stroke and trauma centers, that may not be the closest ED.

The first cohort of community paramedics consisted of 79 paramedics who were enrolled in the core curriculum and site-specific coursework during the first quarter of 2015. Two of the 79 paramedics were unable to complete the training for nonacademic reasons. All of the 77 paramedics who completed the core curriculum passed a written final examination, a simulated patient scenario examination, and an oral examination by the pilot site's

medical director. Since then, Solano, Stanislaus, and Ventura have trained 12 additional community paramedics to expand their programs or replace paramedics who have left their agencies or were promoted to other positions. San Francisco trained 10 community paramedics prior to the launch of its Alternate Destination – Sobering Center pilot project in February 2017. These same 10 community paramedics serve patients enrolled in San Francisco's Frequent EMS User project, which launched in September 2018. San Francisco trained 10 additional paramedics in early 2020. Fresno and Santa Clara each trained 10 community paramedics prior to launching their pilot projects in 2018. The City of Los Angeles Fire Department trained 14 community paramedics prior to launching its two pilot projects in June 2019.

### Patient Safety

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

### Funding

Funding for the pilot sites is provided primarily through in-kind services or funds from fire departments or approved operating budgets of private providers of EMS services. Two sites – Orange County's Alternate Destination – Urgent Care project and Solano's post-discharge project – received grants from health care systems that participated in their pilot projects. In 2020, the CARESTAR Foundation provided each of the 14 active pilot sites with an unrestricted grant of $30,000 to sustain their work.

## Methods

Information presented in this report was obtained from multiple sources. Each of the pilot sites used a standardized, online data collection tool to report data to the independent evaluator on a quarterly basis. Metrics for which data were collected included numbers of people enrolled, characteristics of enrollees and outcomes of community paramedic services, including patient safety outcomes. Sites also reported information about people who were eligible for their projects but not enrolled.

Estimates of potential savings for payers were derived from data that each site reported on the cost of ambulance transports, and from existing sources of data on the cost of ED visits and inpatient hospital admissions. Appendix B contains details about the methods the evaluation team used to estimate potential savings. It is important to note that the evaluation was not designed to be a cost-effectiveness analysis that compares the costs and effects of community paramedics to other alternatives. With the exception of the Directly Observed Therapy for Tuberculosis concept, the services that community paramedics provide under the pilots differ from services furnished by other health care providers in their communities. Thus, the evaluation team concluded that an analysis of potential savings associated with the projects would be more informative.

The team collected data on the cost of operating the community paramedicine pilot projects. These data were reported in the initial public report and are not included in this update to the public report for two reasons. First, standardizing cost data across sites proved difficult due to differences in how projects were staffed (e.g., full-time community paramedics vs. paramedics who both provide community paramedicine services and respond to 911 calls), the generosity of employee benefits (e.g., pension vs. 401[k] plan), and the allocation of costs for vehicles and medical supplies. Second, the community paramedicine pilot projects are not authorized to bill for the services they provided. All costs for paramedic salaries, benefits, vehicles and medical supplies are borne by the agencies that operate the pilot projects. Thus, at present payers do not bear any of the costs associated with these projects, although that could change in the future if private payers choose to pay for community paramedicine services or legislation is enacted that authorizes private payers, Medi-Cal or Medicare to pay for these services.

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

In May 2020, the evaluation team administered an additional online survey to the project managers of the 14 projects currently in operation to assess the impact of COVID-19 on their work. The survey included questions about the effects of COVID-19 on the number of patients enrolled, infection control protocols, the range of services provided, and the populations served.

This evaluation focuses solely on the community paramedicine pilot projects and does not consider other changes in health care delivery that may have affected the outcomes observed. This caveat is particularly important for the post-discharge projects. Since Medicare began imposing penalties on hospitals with "excessive" 30-day readmission rates in federal fiscal year 2013,* hospitals have deployed multiple strategies to reduce readmissions.

*Medicare penalizes hospitals that have 30-day readmission rates that exceed the national average adjusted for characteristics of patients who were readmitted and characteristics of the entire population of patients that a hospital serves. Hospitals that exceed this benchmark receive a 3% penalty across all Medicare admissions regardless of whether they resulted in a readmission within 30 days. Boccuti, C., and G. Casillas. Aiming for Fewer Hospital U-Turns: The Medicare Hospital Readmission Reduction Program. Menlo Park, CA: Kaiser Family Foundation, March 2017. http://files.kff.org/attachment/Issue-Brief-Fewer-Hospital-U-turns-The-Medicare-Hospital-Readmission-Reduction-Program.

These strategies include utilizing registered nurses to provide intensive discharge planning, patient education, and telephone support to patients following hospital discharge.[3] Hospitals may also respond by treating patients in an ED and discharging them or readmitting them for observation instead of inpatient care. Research by the Medicare Payment Advisory Commission (MedPAC) suggests that hospitals nationwide are not responding to the Medicare penalties by treating patients in EDs or admitting them for observation instead of readmitting them for inpatient care, because increases in observation stays and ED visits have been smaller than the decrease in readmissions and have not differed between patients who were recently admitted and patients who were not recently admitted.[4] To the extent that hospitals participating in the post-discharge pilot projects utilize other strategies to reduce readmissions, it is possible that the findings of the evaluation are due to those strategies and not the post-discharge community paramedicine pilot projects.

## Results

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

**Highlights**

- Collectively, the community paramedicine pilot projects enrolled 9,482 people from June 2015 through March 2020.
- The Alternate Destination – Mental Health projects have enrolled the largest number of persons, and the Alternate Destination – Urgent Care projects had the smallest enrollment.
- Five projects have closed and one project has suspended operations.
- The majority of patients enrolled in the projects were Medicare or Medi-Cal beneficiaries.

### General Project Status

Table 1 lists the lead agency for each pilot project operated under the auspices of HWPP #173, the concept tested, the date on which the project began enrolling patients, and the total number of patients enrolled from the time each project began through March 31, 2020. The longest-running projects began enrolling patients in June 2015. Three Alternate Destination – Urgent Care and two Post-discharge projects have closed for various reasons and one Post-discharge project suspended operations in September 2019. San Diego's project suspended operations in December 2017 due to lack of funding but was relaunched in June 2019.

Collectively, the projects enrolled 9,482 people from June 2015 through March 2020. The number of people enrolled per project ranged from a low of two for the City of Carlsbad's Alternate Destination – Urgent Care project to a high of 3,404 for Fresno's Alternate Destination – Mental Health project. Projects testing the Alternate Destination – Mental Health concept enrolled the largest number of patients (4,017 patients). The Alternate Destination – Urgent Care projects enrolled the smallest numbers of patients (48 patients).

**Impact of COVID-19**

- The number of new patients enrolled in 8 of the 14 pilot projects has decreased since the COVID-19 pandemic began.
- Most projects (11 of 14) are still serving patients in person. Seven of these projects have changed their infection control protocols to reduce the risk of transmission of COVID-19.

**Table 1. Pilot Sites, Community Paramedicine Concepts, and Enrollment through First Quarter 2020**

| Community Paramedicine Concept | Lead Agency | Date Implemented | Total Patients Enrolled |
|---|---|---|---|
| Post-Discharge – Short-Term Follow-Up | Alameda City EMS | June 1, 2015 | 139 |
| Post-Discharge – Short-Term Follow-Up | Butte County EMS | July 1, 2015* | 1,001 |
| Post-Discharge – Short-Term Follow-Up | San Bernardino County and Rialto Fire Depts. | August 13, 2015† | 228 |
| Post-Discharge – Short-Term Follow-Up | UCLA Center for Prehospital Care | September 1, 2015‡ | 154 |
| Post-Discharge – Short-Term Follow-Up | Medic Ambulance Solano | September 15, 2015 | 279 |
| **All Post-Discharge –Follow-Up Projects** | | | **1,801** |
| | | | |
| Frequent EMS User | Alameda City EMS | July 1, 2015 | 82 |
| Frequent EMS User | City of San Diego | October 12, 2015 | 65 |
| Frequent EMS User | San Francisco Fire Dept. | September 12, 2018 | 251 |
| **All Frequent EMS User Projects** | | | **398** |
| | | | |
| **Directly Observed Therapy for Tuberculosis** | Ventura County EMS | June 1, 2015 | **52** |
| | | | |
| **Hospice** | Ventura County EMS | August 1, 2015 | **401** |
| | | | |
| Alternate Destination – Mental Health | Mountain Valley – Stanislaus EMS | September 25, 2015 | 450 |
| Alternate Destination – Mental Health | Santa Clara County EMS | June 6, 2018 | 95 |
| Alternate Destination – Mental Health | Central California EMS | July 30, 2018 | 3,404 |
| Alternate Destination – Mental Health | Los Angeles Fire Dept. | June 21, 2019 | 68 |
| **All Alternate Dest. – Mental Health Projects** | | | **4,017** |
| | | | |
| Alternate Destination – Urgent Care | UCLA Center for Prehospital Care | September 8, 2015§ | 12 |
| Alternate Destination – Urgent Care | Orange County Fire Chiefs | September 14, 2015‖ | 34 |
| Alternate Destination – Urgent Care | Carlsbad Fire Dept. | October 9, 2015‖ | 2 |
| **All Alternate Dest. – Urgent Care Projects** | | | **48** |
| | | | |
| Alternate Destination – Sobering Center | San Francisco Fire Dept. | February 1, 2017 | 2,674 |
| Alternate Destination – Sobering Center | Santa Clara County EMS | June 6, 2018 | 0 |
| Alternate Destination – Sobering Center | Los Angeles Fire Dept. | June 21, 2019 | 91 |
| **All Alternate Dest. – Sobering Center Projects** | | | **2,765** |
| | | | |
| **All Projects** | | | **9,482** |

*Ceased enrolling patients on November 14, 2018.
†Suspended operations on September 30, 2019, due to lack of referrals from partner hospital.
‡Ceased enrolling patients on August 31, 2017.
§Ceased enrolling patients on May 31, 2017.
‖Ceased enrolling patients on November 13, 2017.

Consistent with findings from the original evaluation report, the distribution of patients by health insurance status varied substantially across the 20 projects, in large part due to differences in the characteristics of the patients served. Table 2 displays these findings in tabular form by project, and Figure 1 displays them graphically by concept. Medicare beneficiaries accounted for the largest percentage of patients enrolled by four of the five post-discharge projects (Alameda, Butte, Solano, and UCLA – Glendale), one of the Frequent EMS User projects (Alameda), and the Hospice project. Persons who are dually eligible for Medicare and Medi-Cal are classified as Medicare beneficiaries because Medicare is responsible for paying the majority of costs associated with their hospitalizations, ED visits, and office visits. For one of the post-discharge projects (San Bernardino), Medi-Cal beneficiaries constituted the largest share of enrollees, and Medicare beneficiaries accounted for the second-largest share. Medi-Cal beneficiaries and uninsured persons comprised the majority of patients enrolled in Ventura's Directly Observed Therapy for Tuberculosis project, San Diego's and San Francisco's Frequent EMS User projects, Stanislaus', Santa Clara's, and Los Angeles' Alternate Destination – Mental Health projects, and San Francisco's and Los Angeles' Alternate Destination – Sobering Center project. Many of the people whom these projects serve have mental illness, substance use disorders, or other conditions that limit their access to employer-sponsored health insurance.

**Figure 1. Enrollees by Insurance Status through First Quarter 2020 (n = 9,482)**

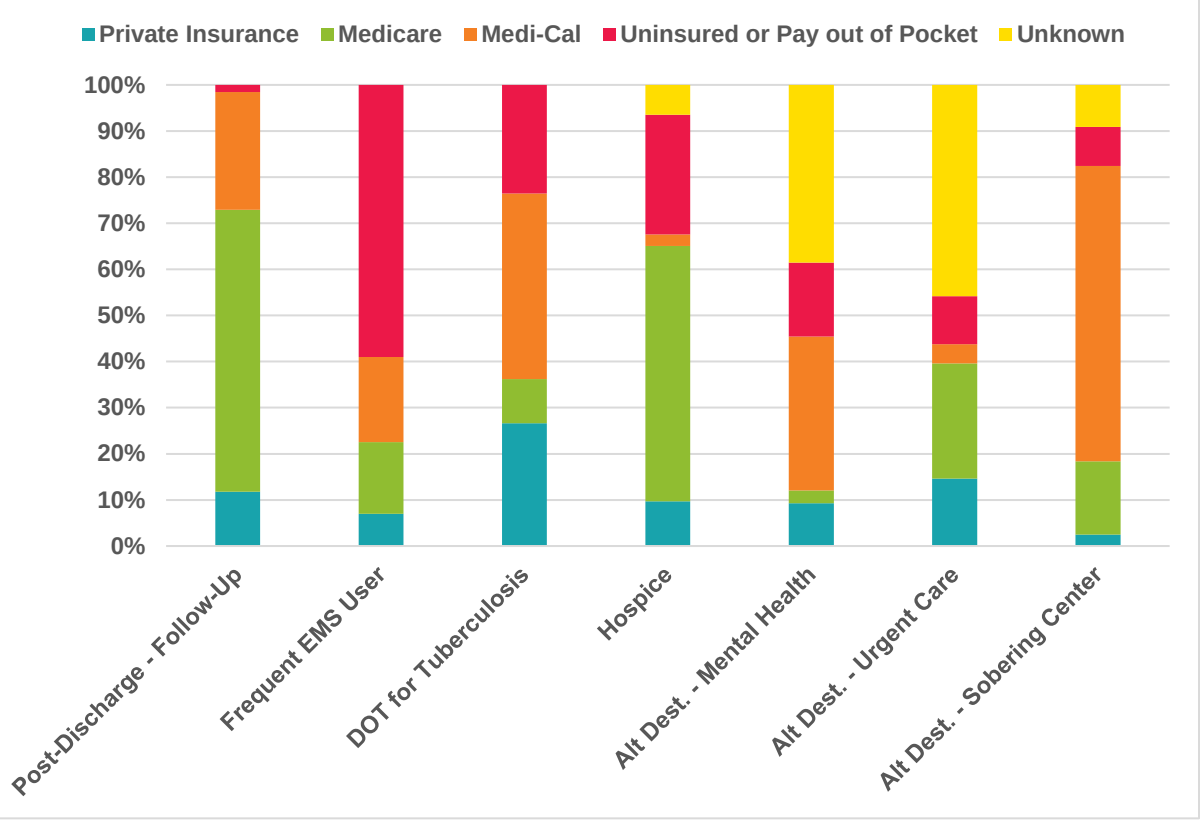


**Table 2. Health Insurance Status of Enrolled Patients through Second Quarter of 2020 (n = 9,482)**

| Community Paramedicine Concept | Lead Agency | % Private/ Commercial Insurance | % Medicare | % Medi-Cal | % Uninsured or Pay Out of Pocket | % Unknown | Total Persons Enrolled |
|---|---|---|---|---|---|---|---|
| Post-Discharge | Alameda City EMS | 18% | 56% | 26% | 0% | 0% | 139 |
| Post-Discharge | Butte County EMS | 13% | 67% | 20% | 0% | 0% | 1,001 |
| Post-Discharge | San Bernardino County and Rialto Fire Depts. | 8% | 39% | 46% | 7% | 0% | 228 |
| Post-Discharge | UCLA Center for Prehospital Care | 7% | 81% | 11% | 1% | 0% | 154 |
| Post-Discharge | Medic Ambulance Solano* | 10% | 50% | 37% | 2% | 0% | 279 |
| Frequent EMS User | Alameda City EMS* | 12% | 61% | 24% | 4% | 0% | 82 |
| Frequent EMS User | City of San Diego* | 15% | 14% | 28% | 42% | 0% | 65 |
| Frequent EMS User | San Francisco Fire Dept. | 3% | 1% | 14% | 82% | 0% | 251 |
| Tuberculosis | Ventura County EMS* | 27% | 10% | 40% | 24% | 0% | 52 |
| Hospice | Ventura County EMS* | 10% | 55% | 2% | 0% | 32% | 401 |
| Alternate Destination – Mental Health | Mountain Valley – Stanislaus EMS* | 1% | 1% | 79% | 20% | 0% | 450 |
| Alternate Destination – Mental Health | Santa Clara County EMS* | 23% | 5% | 8% | 64% | 0% | 95 |
| Alternate Destination – Mental Health | Central California EMS* | 9% | 3% | 33% | 16% | 39% | 3,404 |
| Alternate Destination – Mental Health | Los Angeles Fire Department* | 1% | 6% | 63% | 29% | 0% | 68 |
| Alternate Destination – Urgent Care | UCLA Center for Prehospital Care | 0% | 8% | 0% | 0% | 92% | 12 |
| Alternate Destination – Urgent Care | Orange County Fire Chiefs | 15% | 32% | 6% | 15% | 32% | 34 |
| Alternate Destination – Urgent Care | Carlsbad Fire Dept. | 100% | 0% | 0% | 0% | 0% | 2 |
| Alternate Destination – Sobering Center | San Francisco Fire Dept. | 3% | 16% | 64% | 8% | 9% | 2,674 |
| Alternate Destination – Sobering Center | Santa Clara County EMS | No patients enrolled | | | | | |
| Alternate Destination – Sobering Center | Los Angeles Fire Department | 0% | 11% | 57% | 32% | 0% | 91 |

* Percentages do not sum to 100% due to rounding.

## Post-Discharge, Short-Term Follow-Up

### Highlights

- The Post-Discharge, Short-Term Follow-Up projects enrolled 1,801 persons from June 2015 through March 2020.
- Two of the post-discharge projects (Butte and UCLA – Glendale) have closed and one (San Bernardino) has suspended operations.
- All of the post-discharge projects reduced the rate of 30-day readmission for any cause for at least one of the diagnoses targeted.
- The four post-discharge projects that provided at least one home visit to all patients outperformed the project that initially relied primarily on telephone calls.
- Community paramedics identified 316 patients who needed instruction on how to use their medications correctly.
- The post-discharge projects potentially avoided $1.4 million in costs by reducing hospital readmissions; most potential savings would have accrued to Medicare and Medi-Cal.

### Description

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

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

Since launching their projects, Alameda and Solano (and formerly San Bernardino-Rialto and UCLA-Glendale) have provided at least one home visit to all patients. Initially, Butte's protocol called for paramedics to assess all patients by telephone and to use an algorithm to determine whether the patient needed additional assistance. If a Butte community paramedic determined that a patient would benefit from a home visit, the community paramedic requested the patient's permission to do so. Butte's protocol changed effective November 2017. Its community paramedics provided at least one home visit to all patients from that time until the project closed in November 2018.

The post-discharge projects provide short-term assistance during the immediate post-hospital period and do not replace home health care or any other services available to patients. The sites' protocols call for community paramedics to complete visits within the first few days of hospital discharge. Some partner hospitals focus on enrolling uninsured persons and Medi-Cal beneficiaries who do not have insurance coverage for home health. In other cases, community paramedics serve a stopgap role by providing home visits while patients wait 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 one week after a patient is discharged from the hospital

despite the fact that people are at the greatest risk of readmission during the first week after discharge. When community paramedics learn that a patient is receiving home health services, they coordinate with home health agency staff.

Two projects have had full-time community paramedics (Alameda's project and the now closed UCLA – Glendale project) and three projects have had part-time paramedics (Solano and the now closed Butte and San Bernardino-Rialto projects).

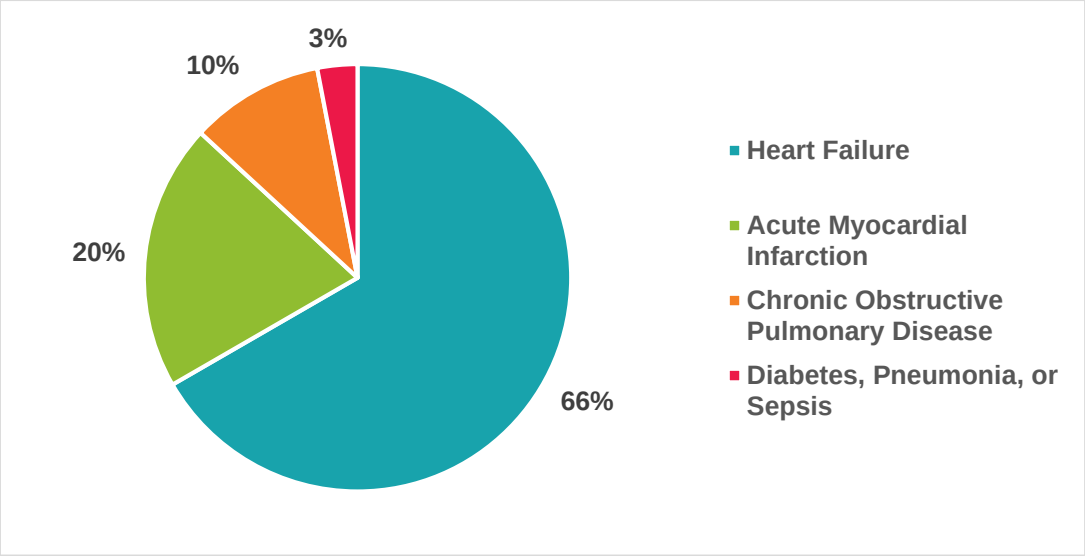
**Findings**

The post-discharge projects enrolled 1,801 patients between June 2015 and March 2020. Butte had the largest enrollment (1,001 patients) and Alameda had the smallest (139 patients). Across the five projects, 66% of patients enrolled had heart failure, 20% had acute myocardial infarction, 10% had chronic obstructive pulmonary disease and 3% had pneumonia, diabetes, or sepsis (Figure 2).

**Impact of COVID-19**

- Enrollment in Alameda's Post-Discharge, Short-Term Follow-Up project has decreased since the COVID-19 pandemic began.
- Alameda's project no longer provides in-person visits to patients.

**Figure 2. Post-Discharge, Short-Term Follow-Up Project Enrollees by Condition through First Quarter 2020 (n = 1,801)**




***Safety***

The evaluation team found substantial evidence that the post-discharge projects reduced the risk of harm. The most compelling evidence of reduced harm concerns prescription medications. Community paramedics performed medication reconciliation for all patients, which involved examining all prescription drugs in a patient's possession and reconciling them with the instructions given to the patient when he or she was discharged from the hospital. The community paramedics identified 316 instances in which a patient needed additional instructions about how to take his or her medications as directed (18% of patients enrolled). Some patients had multiple prescriptions for the same medication and assumed they were supposed to take all of them. Other patients were discharged from

the hospital with only a 30-day supply of medication and did not understand that they needed to obtain refills to control their condition. If a patient had a personal physician, the community paramedic worked with the patient to contact the physician to obtain refills. If a patient did not have a physician, the community paramedic helped the patient find one.

### *Effectiveness*

The post-discharge pilot projects achieved their primary goal of reducing inpatient readmissions within 30 days of discharge. Table 3 shows the historical 30-day readmission rates at the projects' partner hospitals and the 30-day readmission rates of patients enrolled in the post-discharge projects who had heart failure, AMI, COPD, or pneumonia. Patients with diabetes or sepsis are not included because historical data on readmission rates for persons with these diseases were not available; hence 35 patients in Alameda's program are not reflected in the table below. Figure 3 displays the data in a graphical format.

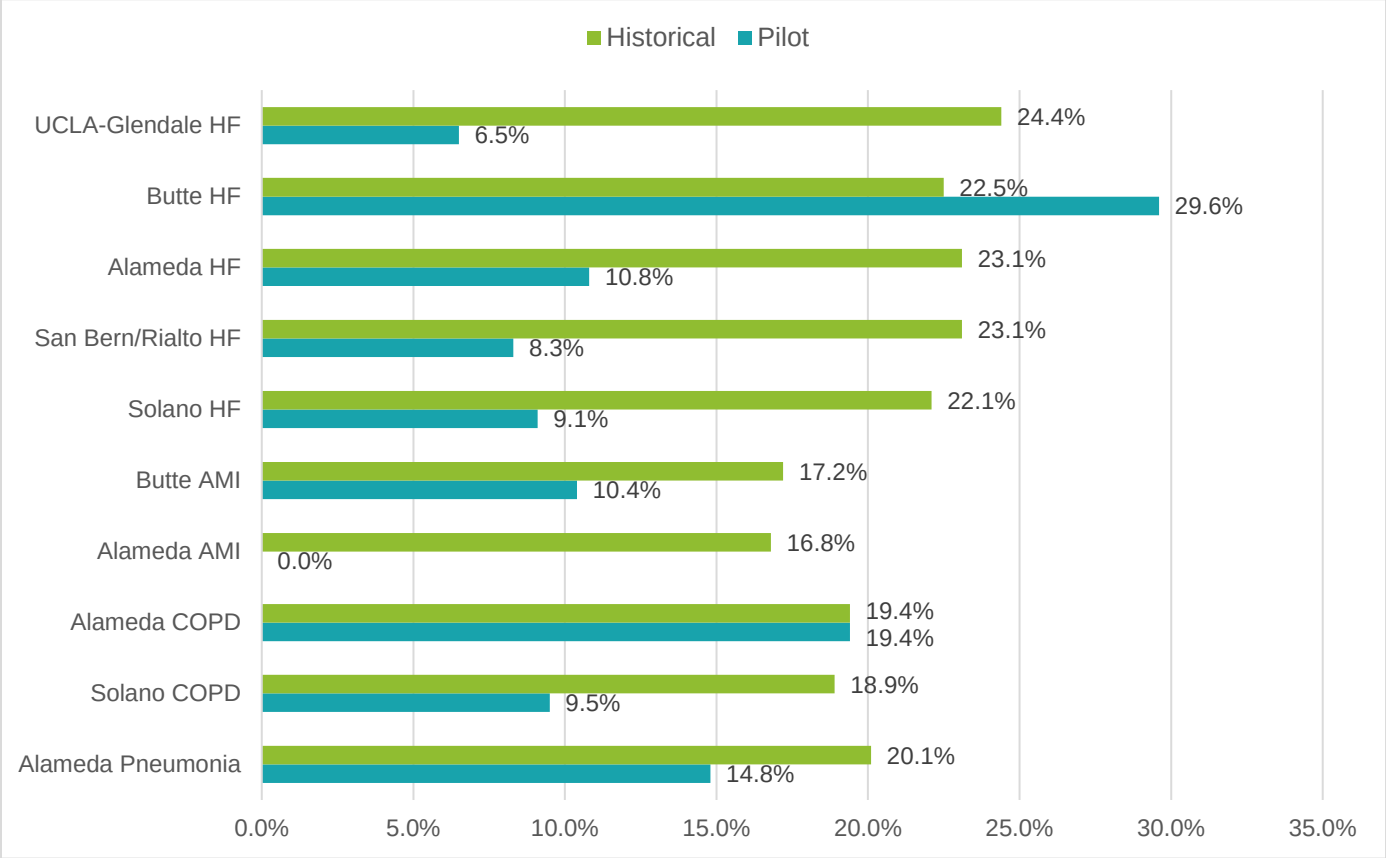
**Table 3. Readmissions within 30 Days for Post-Discharge, Short-Term Follow-Up Project Enrollees versus Partner Hospitals' 30-Day Readmission Rates, 2012-2015 (n = 1,801)**

| Diagnosis | Sponsoring Agency | Number of Patients Enrolled | Number Readmitted | Historical 30-Day Readmission Rate* | % Enrollees Readmitted* |
|---|---|---|---|---|---|
| Heart Failure | UCLA | 154 | 10 | 24.4% | 6.5%† |
| | Butte | 645 | 191 | 22.5% | 29.6%‡ |
| | Alameda | 37 | 4 | 23.1% | 10.8%† |
| | San Bernardino and Rialto | 228 | 19 | 23.1% | 8.3%† |
| | Solano | 121 | 11 | 22.1% | 9.1%† |
| | | | | | |
| Acute Myocardial Infarction | Butte | 356 | 37 | 17.2% | 10.4%† |
| | Alameda | 9 | 0 | 16.8% | 0.0%† |
| | | | | | |
| Chronic Obstructive Pulmonary Disease | Alameda | 31 | 6 | 19.4% | 19.4% |
| | Solano | 158 | 15 | 18.9% | 9.5%† |
| | | | | | |
| Pneumonia | Alameda | 27 | 4 | 20.1% | 14.8%† |

*Includes readmissions for any reason.
†30-day readmission rate for enrolled patients was *lower* than the historical 30-day readmission rate and the difference was statistically significant.
‡30-day readmission rate for enrolled patients was *higher* than the historical 30-day readmission rate and the difference was statistically significant.

Patients enrolled by all sites had lower rates of 30-day readmission than historical rates for their partner hospitals except Butte's heart failure patients and Alameda's chronic obstructive pulmonary disease patients. The change in Butte's protocol to require at least one home visit for every patient did not reduce its 30-day all-cause readmission rate for heart failure patients.

**Figure 3. Readmissions within 30 Days for Post-Discharge, Short-Term Follow-Up Project Enrollees versus Partner Hospitals' 30-Day Readmission Rates, 2012-2015 (Cumulative; n = 1,801 Patients)**




Another important indicator of the effectiveness of post-discharge projects is referral of patients to providers of other services to improve the patients' well-being. Through March 2020, community paramedics made at least 218 referrals to a wide range of service providers, using manuals of local resources that they 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 programs, food assistance agencies, housing assistance providers, transportation assistance agencies, and domestic violence resources. At least one community paramedic helped a patient enroll in Covered California to obtain health insurance. If community paramedics perceived the need as urgent and were concerned that a patient might not follow through on his or her own, they assisted the patient in obtaining services to address the need.

### *Potential Savings*

All of the post-discharge projects have potentially avoided costs for insurers by reducing 30-day all-cause readmissions among the patients they enrolled. Estimates of potential savings are based on differences between (1) rates of readmission among enrolled patients and historical readmission rates obtained from Medicare Hospital Compare. and (2) estimates of the cost of admissions for targeted diagnoses derived from OSHPD's public hospital inpatient discharge dataset. The evaluators estimate that the five post-discharge projects avoided potential costs of approximately $1.4 million through March 31, 2020. The amount of potential costs avoided ranged from a low of -$23,634 for Butte's project to a high of $489,702 for San Bernardino and Rialto's project

(see Table 4). Differences in potential savings across sites reflect differences in the total number of 30-day readmissions avoided and the cost of readmissions, which ranged from $11,562 for chronic obstructive pulmonary disease to $26,621 for acute myocardial infarction. Potential savings generated by Alameda's project may have been greater than the estimate reported. Savings associated with reductions in admissions for diabetes and sepsis could not be estimated, because Medicare Hospital Compare does not report data on historical rates of readmission for these conditions.

The majority of potential savings associated with the post-discharge projects would have accrued to Medicare because 61% of patients enrolled are Medicare beneficiaries. Potential savings would also have accrued to Medi-Cal because 26% of enrollees are Medi-Cal beneficiaries. Partner hospitals also may have benefitted if reductions in readmissions were sufficient to avert a Medicare penalty for excessive readmissions.

**Table 4. Potential Savings for Post-Discharge, Short-Term Follow-Up Projects**

| | UCLA – Glendale | Butte | Alameda* | San Bernardino and Rialto | Solano |
|---|---|---|---|---|---|
| Total Enrollment | 154 | 1,001 | 139 | 228 | 279 |
| Difference in Readmission Rates (percentage points) | -17.9 | +1.6 | -7.2 | -14.8 | -11.1 |
| Number of Readmissions Avoided | HF = 28 | HF = -46<br>AMI = 24 | HF = 5<br>AMI = 2<br>COPD = 0<br>Pneumonia = 1 | HF = 34 | HF= 15<br>COPD = 16 |
| Average Cost of Readmission | HF = $14,403 | HF = $14,403<br>AMI = $26,621 | HF = $14,403<br>AMI = $26,621<br>COPD = $11,562<br>Pneumonia = $14,923 | HF= $14,403 | HF = $14,403<br>COPD = $11,562 |
| **Total Potential Savings from Readmissions Avoided** | **$403,284** | **-$23,634** | **$140,180** | **$489,702** | **$408,878** |
| **Potential Savings per Enrollee** | **$2,619** | **-$24** | **$1,008** | **$2,148** | **$1,448** |

*Savings estimate does not include 31 Alameda patients who had diabetes or sepsis because Medicare Hospital Compare does not report historical 30-day readmission rates for these conditions.

An important limitation of this analysis is that it does not consider repeat visits to an ED within 30 days of hospital discharge or use of observation status. If the community paramedicine projects were associated with an increase in repeat ED visits or use of observation status, potential net savings associated with the post-discharge projects would be lower. Effects on ED visits within 30 days were not discussed due to a lack of readily available data on repeat ED visits to partner hospitals by persons who were eligible for the post-discharge projects but not enrolled. Medicare Hospital Compare, the source of historical data on 30-day readmission rates at partner hospitals, does not report rates of ED visits within 30 days of discharge.

The evaluation team did not compare 30-day ED revisit rates for participants to 30-day ED revisit rates reported in studies conducted in other hospitals, because the hospitals included in such studies may have patient populations that differ from those of participating hospitals in ways that could affect our conclusions. We did not attempt to

assess the number of patients placed on observation status because these patients can be difficult to track due to inconsistencies in availability of data on patients placed on observation status and the methods used to identify them.[4] Furthermore, recent research by the Medicare Payment Advisory Commission (MedPAC) finds that nationwide increases in observation stays and ED visits have been smaller than the decrease in readmissions.[5] If the hospitals that participated in the post-discharge projects are similar to hospitals nationwide, the reductions in readmissions that we observed are not fully offset by increases in observation stays and ED visits.

## 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, because community paramedics reconciled patients' prescriptions, reviewed the instructions for taking the medications and assisted patients with medication refills, if needed. Moreover, community paramedics have referred patients to providers of other services that can improve their ability to manage their conditions and their overall well-being. The projects potentially avoided costs, primarily for the Medicare and Medi-Cal programs.

## Frequent EMS User

**Highlights**

- The three Frequent EMS User projects enrolled 398 people between July 2015 and March 2020.
- The Frequent EMS User projects have linked clients to multiple types of providers of non-emergency services, including mental health providers, substance use treatment programs, food assistance programs, housing assistance programs, transportation assistance programs, and domestic violence resources.
- The projects potentially avoided costs of at least $966,140 by reducing ambulance transports and ED visits. A substantial share of potential savings accrued to ambulance transport agencies and hospitals because 59% of patients were uninsured.

### Description

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

The City of Alameda's Frequent EMS User project has enrolled patients since July 2015. San Diego's project enrolled patients from October 2015 to December 2016 but suspended operations in December 2017 due to lack of funding. The project began enrolling patients again in June 2019. San Francisco launched its Frequent EMS User pilot project in September 2018.

The Alameda and San Diego projects provide the same intensity of service to all patients they enroll. The types of services and the frequency with which they are delivered vary only due to differences in patients' needs. San Francisco's project prioritizes providing services to patients who have the largest numbers of ED visits at the time they are enrolled in the project because the project's leaders believe focusing on these patients will maximize the project's ability to reduce 911 calls and improve patients' outcomes. Community paramedics hold "case conferences" with staff of other agencies to identify and address the needs of these patients, which are often complex. Other patients enrolled in San Francisco's project receive less intensive services.

### Findings

The three Frequent EMS User projects enrolled 398 people from July 2015 through March 2020. The three projects enroll different populations of frequent EMS users. San Diego's project primarily enrolled persons with 20 or more ED visits per year. San Francisco's project enrolled persons who have had more than four ED visits in a single month. Alameda's project, which serves a city whose population is much smaller than San Diego's and San Francisco's populations,[6] was open to all persons referred by staff of the EMS agency or the partner hospital. San Diego's and San Francisco's enrollees were younger than Alameda's enrollees and were more likely to be uninsured or enrolled in Medi-Cal.

### *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*

San Diego's and Alameda's Frequent EMS User projects achieved large reductions in the number of 911 calls and ED visits among enrolled patients. Reductions in 911 calls were highly correlated with reductions in ED visits, because most 911 calls for frequent EMS users result in transport to an ED. Data on 911 calls were examined to estimate the projects' impact on numbers of 911 calls pre- and post-enrollment. Data on 911 calls and ED use during the month of enrollment were not analyzed, to allow time for the intervention to affect patients' utilization.

For San Diego's and Alameda's Frequent EMS User projects, data were analyzed for patients for whom data were available for at least 12 months prior to enrollment and for at least 12 months following enrollment. Among persons enrolled in San Diego's Frequent EMS User project during the time at which the community paramedics were initially on duty (November 2015 through December 2016) and for whom data are available for 12 months prior to enrollment and 12 months following enrollment (n = 37), the total number of 911 calls decreased from 955 to 625, a decrease of 35%. The average number of 911 calls per person decreased from 26 per year to 17 per year, and some enrollees had much larger decreases in 911 calls. Among persons enrolled in Alameda's Frequent EMS User project for whom data are available for 12 months prior to enrollment and 12 months following enrollment (n = 74), the total number of 911 calls decreased from 242 to 171, a decrease of 29%. The average number of 911 calls per person decreased from three calls per year to two calls per year. The difference in impact between the two projects reflects differences between the persons enrolled. San Diego's clients had substantially more 911 calls prior to enrollment than Alameda's clients, so there was greater room for improvement.

**Impact of COVID-19**

- Alameda's Frequent EMS User project has been able to obtain temporary housing for 21 clients because additional housing resources (i.e., FEMA trailers, hotel vouchers) have become available. San Francisco is also referring clients to hotels for shelter in place, isolation, and quarantine.
- CPs are no longer conducting in-person visits with people enrolled in San Diego's Frequent EMS User project because they have been diverted to Operation Shelter to Home, a partnership among multiple city agencies that provides homeless people with shelter at San Diego's convention center, monitors their health and provides them with access to medical and behavioral health services.
- CPs participating in San Francisco's Frequent EMS User project are now paired health professionals from the city's street medicine team (i.e., primary care physicians, psychiatrists, nurse practitioners, and social workers) 12 hours per day, 7 days per week. The teams screen homeless people for COVID-19 and evaluate people with medical complaints in shelter-in-place hotels and quarantine sites.
- San Francisco's CPs have also co-staffed a field-testing site for COVID-19 and an isolation and quarantine site with other types of health professionals, and are collaborating with other providers on plans for staffing field hospitals and skilled nursing facilities.

San Francisco's Frequent EMS User Project has assessed the project's impact on the number of transports to an ED among the subset of clients who the project's community paramedics manage most intensively. When a 911 call regarding one of the program's clients is placed, a community paramedic may go to the scene at the request of the paramedics on scene or may self-assign themselves to the call. Once on scene, the community paramedic

assesses the client and determines whether the client can be treated safely at an alternative destination (e.g., sobering center, urgent care clinic) and whether the appropriate alternative destination has capacity to treat the client. In some cases, transport to an alternative destination is not possible because the destination does not have capacity to accept the client, the client insists on being transported to an ED, the client needs medical care, or the client needs medical screening before transport to a treatment program for a substance use disorder. From January 2019 through March 2020, a total of 518 calls to 911 were placed on behalf of San Francisco's most intensively managed clients. During this time period, the project's community paramedics were able to divert 137 of these 911 calls (36%) away from an ED.

The Frequent EMS User projects also succeeded in linking patients to services that address the needs that led them to use the EMS system frequently. During their first visits with patients, community paramedics in Alameda, San Diego and San Francisco made 470 referrals to medical care providers, mental health providers, drug and alcohol treatment programs, food assistance programs, housing assistance programs, transportation assistance programs, domestic violence resources and other social services. They may have made additional referrals during subsequent visits because some patients were not interested in referrals initially.

In addition, community paramedics in San Diego transported Frequent EMS User patients to providers of these types of medical, behavioral health, and social services on 50 occasions to ensure that they obtained services. Community paramedics in San Francisco and Alameda also arrange transportation for patients to nonemergency service providers. Since San Francisco's project launched in September 2018, patients have been transported to non-ED service providers 520 times. In some cases, community paramedics have collaborated with staff of multiple service providers to go beyond routine care to meet patients' complex needs.[7]

Helping clients obtain housing is an important component of Frequent EMS User projects because many frequent EMS users are homeless. Community paramedics are uniquely positioned to assist homeless persons because they are often familiar with them prior to enrollment. They are also mobile and can be dispatched or consulted when one of their enrolled clients contacts 911, and they are familiar with the sites at which homeless persons congregate and can meet clients at any location.

### *Potential Savings*

Among persons enrolled in San Diego's project during the months in which community paramedics were on duty (November 2015 through December 2016) and for whom 12 months of data on 911 calls pre- and post-enrollment were available, the project reduced the number of 911 calls and ED visits by 330, avoiding potential costs of $551,760 (see Table 5). Similarly, most of the $318,388 in savings that San Francisco's project generated from January 2019 to March 2020 accrued to ambulance transport providers and hospitals because 82% of the project's enrollees were uninsured. From July 2015 through September 2019, Alameda's Frequent EMS User project avoided potential costs of $95,992. The majority of potential savings by Alameda's project would have accrued to Medicare because the majority of its patients are Medicare beneficiaries. From January 2019 through March 2020, San Francisco's Frequent EMS User project avoided potential costs of $318,388 by reducing transports to EDs among the clients that the community paramedics monitored closely. For San Diego and San Francisco's projects, a substantial percentage of potential savings from the reduction in ED visits would have accrued to ambulance transport providers and hospitals because large percentages of their enrollees were uninsured.

**Table 5. Potential Savings Associated with Frequent EMS User Projects**

| Variable | Alameda | San Diego | San Francisco |
|---|---|---|---|
| Total Enrollment | 82 | 65 | 251 |
| Number of Enrollees with 12 months or 6 months (San Francisco) of Data on 911 Calls Pre- and Post-Enrollment | 74 | 37 | Not applicable |
| Number of 911 calls January 2019 to March 2020 | Not applicable | Not applicable | 518 |
| Number of Transports and ED Visits Avoided | 71 | 330 | 137 |
| Average Cost of Ambulance Transport | $603 | $923 | $1,675 |
| Average Cost of ED Visit | $749 | $749 | $649 |
| Potential Savings from Ambulance Transports Avoided | $42,813 | $304,590 | $229,475 |
| Potential Savings from ED Visits Avoided | 53,179 | $247,170 | $88,913 |
| **Total Potential Savings** | **$95,992** | **$551,760** | **$318,388** |
| **Potential Savings per Patient Enrolled** | **$1,297** | **$14,912** | Not applicable* |

* Savings per patient enrolled cannot be estimated for San Francisco's project because San Francisco only compiled data on the subset of clients who its community paramedics monitor closely.

## Conclusion

The Frequent EMS User projects have achieved substantial reductions in 911 calls, transports and ED visits among the patients they have enrolled, often by linking patients with medical care, behavioral health, housing and social services. These reductions in 911 calls, transports, and ED visits have potentially avoided costs for public health insurance programs (i.e., Medicare and Medi-Cal) and health care providers.

## Directly Observed Therapy for Tuberculosis

**Highlights**

- The Directly Observed Therapy for Tuberculosis project enrolled 52 persons between June 2015 and March 2020.
- The community paramedics dispensed all but two (0.04%) doses of TB medications prescribed by the TB clinic's physician.
- One patient was hospitalized twice for intravenous treatment of TB meningitis that was diagnosed prior to enrollment in the pilot project. Eleven other patients were hospitalized for reasons unrelated to their TB.

### Description

Tuberculosis (TB) is a highly contagious disease treated with special antibiotic medications. A physician with expertise in TB treatment determines the number of medications and frequency of dosing. People with TB must take their medication as directed, because stopping treatment too soon or missing doses of medication decreases the likelihood they will be cured and increases the risk that they will develop a drug-resistant strain of TB that would be much harder to treat and to control in the community.[8] To ensure that people with TB take their medication as directed, TB treatment clinics often provide directly observed therapy (DOT). Under DOT, a health care worker gives a patient medication, observes the patient taking the medication and monitors the patient for side effects.

In Ventura County, public health officials asked the county's EMS provider to collaborate with the county's TB clinic to provide DOT, because the TB clinic does not have sufficient staff to provide DOT to all TB patients in the county. Ventura County covers a large geographic area, and it is not feasible for some patients to travel to the TB clinic for DOT. The TB clinic utilizes community health workers (CHWs) to administer DOT at remote locations, but the CHWs work only Mondays through Fridays and thus do not provide DOT on weekends. In addition, the CHWs are based in Oxnard, where the TB clinic is located, and have to drive as long as 60 minutes to reach some patients. In contrast, the community paramedics are available 24 hours per day, 7 days per week and are stationed throughout the county, so they usually can reach patients within 15 minutes. All TB medications that community paramedics dispense are prescribed by the physician who directs Ventura County's TB clinic. Any adjustments in medication regimens are made in collaboration with the TB physician and the TB clinic's public health nurses.

### Findings

Ventura's Directly Observed Therapy for Tuberculosis project enrolled 52 patients through March 2020. Because the management of tuberculosis often spans six to nine months,[6] the community paramedics usually carry a caseload of patients whom they treat for multiple months. Over the course of the pilot project, the community paramedics' caseload averaged five patients per month.

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

### *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.

Twelve patients enrolled in the pilot project have been hospitalized. One patient was hospitalized twice for TB meningitis, which had been diagnosed prior to enrollment in the program. The other eleven patients were hospitalized one time for a reason other than their TB diagnosis; one hospitalization was for a scheduled surgical procedure.

### *Effectiveness*

People with TB who received DOT from community paramedics were more likely to receive all doses of TB medication prescribed by the TB clinic physician than people who received DOT from the TB clinic's CHWs. Since the project was launched in June 2015, the community paramedics were unable to dispense only 0.06% of DOT treatments prescribed by the TB clinic physician (see Table 6). In contrast, the CHWs were unable to dispense 6.7% of prescribed DOT treatments. This difference is due primarily to the availability of community paramedics on nights and weekends. Availability on weekends ensures that patients have DOT seven days per week if needed, and availability in evenings improves compliance among patients who travel outside of Ventura County for work during business hours.

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

**Table 6. Instances of Non-Completion of Directly Observed Therapy among Patients Treated by Community Paramedics (Cumulative through First Quarter 2020)**

| | Community Paramedic Patients | TB Clinic Patients |
|---|---|---|
| Percentage of Times a Scheduled DOT was not Completed | 0.06% | 6.7% |
| Reasons Why Patient Did Not Complete Treatment | One patient went out of town without making prior arrangements for the DOT. The other was not home at the scheduled time and did not respond to phone calls in a timely manner. | Most missed doses occur on holidays and weekends, when the TB clinic was closed and CHWs were not available to treat patients outside the clinic. |

### *Potential Savings*

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

**Impact of COVID-19**

- Soon after the statewide shelter-in-place order was issued, Ventura County's public health department decided to cease providing DOT services in-person. All persons with TB in Ventura County are now being monitored by public health department staff via telemedicine.

### Conclusion

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

## Hospice

**Highlights**

- The Hospice project enrolled 401 persons between August 2015 and March 2020.
- Community paramedics collaborated successfully with nurses on the staffs of partner hospices to provide care consistent with patients' wishes.
- The percentage of partner hospices' patients transported to an ED after a 911 call decreased from 80% prior to the pilot project to 27% during the pilot project.
- The project has potentially avoided costs of $318,097 by reducing ambulance transports and ED visits.

### Description

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

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

Ventura County's Hospice project aims to prevent transports that are not consistent with hospice patients' wishes. This is especially important for hospice patients who reside in a residential care or skilled nursing facility. In those facilities, staff may call 911 without discussing the decision with the patient or family members.

In Ventura, if a 911 dispatcher or a first responder on scene determines that a person is under the care of a hospice agency participating in the pilot project, the dispatcher or first responder requests that a community paramedic come to the patient's home, which may be in a private residence, residential care facility, or skilled nursing facility. The community paramedics are supervisors who can respond to hospice calls while other paramedics respond to other 911 calls.

Once on scene, the community paramedic assesses the patient, talks with family members and caregivers and contacts a registered nurse employed by the hospice agency. The hospice nurse directs the community paramedic regarding what care to provide. Depending on the circumstances, the hospice nurse may ask the community paramedic to wait with the patient, family members and/or caregivers until the nurse can arrive on scene. The hospice nurse may also ask the community paramedic to administer pain medications to the patient that the hospice has provided in a "comfort care" pack. ***No hospice patient who requests transport to an ED is denied transportation.***

## Findings

Ventura's community paramedics responded to 401 calls made on behalf of patients of participating hospice agencies since the pilot project began in August 2015. Hospice patients, family members or staff of residential or skilled nursing facilities in which hospice patients resided initiated most 911 calls, but hospice nurses made some 911 calls during visits with patients. The reasons for 911 calls to which Ventura's community paramedics responded varied and included altered level of consciousness, cardiac arrest, choking, constipation, fall, seizure, shortness of breath, syncope, and family concern about hospice care.

### *Safety*

The evaluation found no evidence that the Hospice project harmed patients. After assessing in consultation with a hospice nurse, whether patients could remain at home under hospice care, the community paramedics' work consisted primarily of providing emotional support to the hospice patients and their families and administering medications in patients' "comfort care" packs until the hospice nurse could arrive and further evaluate the patient.

**Impact of COVID-19**

- Ventura's CPs continue to respond to 911 calls involving hospice patients. The volume of calls has not changed significantly since the COVID-19 pandemic began.

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

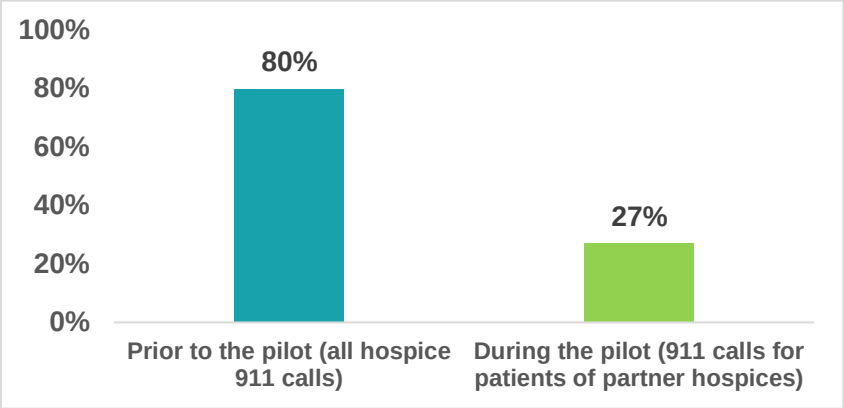
### *Effectiveness*

The project achieved its goal of honoring patients' wishes to remain in their homes by integrating EMS and hospice protocols. Figure 4 shows the impact of the pilot project on the percentage of 911 calls for hospice patients that resulted in transport of the patient to an ED. Prior to the launch of the pilot project, 80% of 911 calls for hospice patients resulted in the transport of a patient to an ED.[†] Among patients of partner hospices, the percentage of patients transported decreased to 27% after the pilot project was implemented. Although data on hospice revocation rates prior to the pilot project are not available, it is very likely that the large reduction in ED transports also led to a reduction in the percentage of patients of partner hospices whose benefits were revoked.

Community paramedics also alerted hospices and family members to patients' unmet needs for additional assistance. For example, the project's very first hospice call involved a patient who had fallen during the night while walking to the bathroom. With the patient's permission, the community paramedic who responded to the call contacted a family member, who arranged for the patient to have a caregiver at night as well as during the day to assist her with toileting and other needs.[9]

[†]The 80% rate of transport to an ED prior to the launch of the pilot project differs from the rate that AMR Ventura reported in its proposal to participate in the pilot project (42%). The 42% rate was based on a manual search of electronic records for 911 calls on which a specific box had been checked. The 80% estimate is derived from an electronic search of AMR Ventura's records to identify all records in which the term "hospice transport" appeared. The evaluation uses the latter rate because it reflects the results of a more thorough search of AMR Ventura's records.

**Figure 4. Percentage of 911 Calls for Hospice Patients That Result in Transport to an ED (Cumulative through First Quarter 2020)**




### *Potential Savings*

As indicated in Table 7, the Hospice project avoided potential costs of $318,097 ($793 per patient enrolled). These estimates are based on reductions in ambulance transports to an ED and ED visits. Potential savings could be higher than these estimates because some hospice patients who were transported to an ED were probably admitted to a hospital for inpatient care. However, cost avoidance associated with inpatient admissions could not be estimated because the pilot project was unable to obtain data from hospitals in Ventura County on the number of enrolled hospice patients transported to their EDs who were subsequently admitted to their hospitals.

**Table 7. Potential Savings Associated with the Hospice Community Paramedicine Project**

| Variable | Amount |
|---|---|
| Total Number of Patients Enrolled | 401 |
| Total Number of Transports and ED Visits Avoided (# of ED visits if baseline rate persisted − # during pilot project) | 211 |
| Average Cost of ED Transport Avoided | $520 |
| Average Cost of ED Visit Avoided | $989 |
| Potential Savings from ED Transports Avoided | $109,616 |
| Potential Savings from ED Visits Avoided | $208,481 |
| **Total Potential Savings** | **$318,097** |
| **Potential Savings per Patient Enrolled** | **$793** |

## 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 potentially reduces health care costs.

## Alternate Destination – Mental Health

### Highlights

- The Alternate Destination – Mental Health projects enrolled 4,017 persons between September 2015 and March 2020.
- The projects have enabled persons with mental health needs to obtain mental health services more quickly.
- 96.2% of patients transported to a mental health crisis center were treated safely and effectively in a crisis center. Eighty-six (2.1%) were transferred to an ED within six hours of transport to a mental health crisis center. Fifty-nine (1.7%) were transported to the crisis center but redirected to an ED, nine because they needed medication for opioid use disorder, which the crisis center does not stock. Most patients transported to an ED were treated in an ED and discharged or transferred to a mental health facility.
- The projects have potentially avoided $4.3 million in costs by reducing ED visits for medical clearance and subsequent ambulance transports to a mental health facility. In Stanislaus County, additional costs potentially could have been avoided if the county's mental health facility had more inpatient beds.

### Description

Many EDs in California are overcrowded. Some of the people they serve can be treated safely and effectively in other settings, including some who arrive at EDs via ambulance. Alternate destination pilot projects focus on transporting such patients to settings in which they can obtain appropriate care more efficiently. In California, the need for alternatives is particularly critical for people with mental health needs. Since 1995, the number of beds in inpatient psychiatric facilities in California has decreased by nearly 30%.[10] Patients with mental health needs routinely spend hours in an ED waiting for medical clearance. In some cases, they spend days in an ED waiting for a bed to become available in an inpatient psychiatric facility, without getting definitive mental health care.[11] 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.[12]

Alternate Destination – Mental Health projects provide an alternative to the ED for persons with mental health needs for whom 911 is called. Paramedics use standardized protocols to screen people with mental health needs to determine whether or not they also have emergent medical needs or are acutely intoxicated. Patients who only have mental health needs are transported to a mental health crisis center. After a patient arrives at the crisis center, mental health professionals on the crisis center staff evaluate the patient further to determine what mental health services he or she needs.

The Stanislaus County Alternate Destination – Mental Health project, the oldest of the four Alternate Destination – Mental Health projects, began enrolling patients in September 2015. The Santa Clara County's Emergency Services Agency initiated a pilot project in June 2018 in partnership with the Gilroy Fire Department. In late July 2018, the Central California Emergency Medical Services Agency launched a pilot project in Fresno County in partnership with American Ambulance. The City of Los Angeles Fire Department launched the fourth Alternate Destination – Mental Health pilot project in late June 2019.

Stanislaus' project utilizes community paramedics who have completed the full core community paramedic training and are also trained to use a protocol to screen people who are having a mental health crisis. Community paramedics are dispatched in response to 911 calls that a dispatcher believes involve mental health needs, or

when another paramedic or a law enforcement officer identifies a patient as having mental health needs. The community paramedics respond to these calls as needed in addition to responding to traditional 911 calls.

Los Angeles' project is staffed similarly. Paramedics who have been trained to assess mental health and sobering needs respond 911 calls in specific parts of the City of Los Angeles that concern a person who appears to be inebriated or having a mental health crisis, in addition to responding to traditional 911 calls.

The projects operated by the Santa Clara County Agency/Gilroy Fire Department and Central California EMS Agency/American Ambulance use a different staffing model. Both of these projects have trained all paramedics to assess patients' medical, mental health and substance use status. This model enables all paramedic crews that respond to 911 calls to assess patients for mental health needs and arrange transport for patients who meet eligibility criteria to a mental health crisis center.

Eligibility criteria vary across the four Alternate Destination – Mental Health projects. Gilroy enrolls only people with mental health needs who have been placed on an involuntary psychiatric hold, known in California as a 5150, by a law enforcement officer. These persons are required by law to obtain treatment. In addition to persons placed on a 5150 hold, Stanislaus, Fresno and Los Angeles enroll persons who voluntarily consent to receive mental health services. In Gilroy and Fresno, eligible patients on 5150 holds are transported to the mental health crisis center unless they need to be transported to an ED for medical care. In Stanislaus and Los Angeles, eligible patients on a 5150 hold are given the choice of transport to a mental health crisis center or an ED. In Stanislaus, Fresno and Los Angeles, other patients (i.e., patients not on a 5150 hold) who are eligible for transport to the mental health crisis center are offered the option to be transported there instead of to an ED.

In Stanislaus, eligibility for the pilot project is limited to adults who are uninsured or enrolled in Medi-Cal because the county inpatient psychiatric facility does not accept patients with other types of health insurance. A private psychiatric facility is available to persons in Stanislaus County who have Medicare or commercial health insurance. The projects in Gilroy, Fresno and Los Angeles accept all patients who meet criteria for transport to their counties' mental health crisis centers regardless of their health insurance status.

In addition to responding to 911 calls, community paramedics in Stanislaus are sometimes asked by mental health crisis center staff to provide medical screening to "walk-in" clients (i.e., persons not transported by ambulance). In the past, walk-in clients were sent to a nearby ED for medical clearance. Having community paramedics come to the crisis center to screen walk-in clients has enabled these clients to obtain medical screening more quickly and begin mental health treatment more quickly, if they do not have any acute medical needs.

**Findings**

The four Alternate Destination – Mental Health projects enrolled a total of 4,017 persons through March 2020. Fresno's project enrolled 3,404 people, the largest number of enrollees among the four projects. Stanislaus' project enrolled 450 persons, Gilroy's project enrolled 95 people, and Los Angeles' project enrolled 68 people.

**Impact of COVID-19**

- All of the Alternate Destination – Mental Health projects reported that the number of clients they serve has decreased since the COVID-19 pandemic began.
- All four projects have changed their infection control protocols to require more extensive use of personal protective equipment (PPE).
- Stanislaus's project now pre-screens patients for COVID-19 before determining whether they can be treated safely at the mental health crisis center.

### *Safety*

The evaluation team found no evidence that the Alternate Destination – Mental Health projects harmed patients. The community paramedics accurately screened patients to determine which of them could be safely transported directly to the mental health crisis center. Only 86 of the 4,017 patients enrolled in the project (2.1%) were transferred to an ED within six hours of arrival at the crisis center. These findings are consistent with the findings of a peer-reviewed publication regarding the first 1,000 people served by Stanislaus' project.[13]

Table 8 lists the reasons why the 86 patients were transferred to an ED. None of the transfers to an ED within six hours of admission involved a life-threatening condition, and only nine of the patients transferred were admitted for inpatient medical care. Forty-nine patients were discharged from an ED without transfer. Twenty-seven were subsequently transferred back to the mental health crisis center or to an inpatient psychiatric facility. One patient left an ED without being assessed by a clinician.

**Table 8. Reasons for Transfer to an ED within Six Hours of Admission to a Mental Health Crisis Center through First Quarter 2020 (86 of 4,017 Patients)**

| Reason for Secondary Transfer to an ED | # of Patients – Stanislaus | # of Patients – Gilroy | # of Patients – Fresno | # of Patients – Los Angeles |
|---|---|---|---|---|
| ***Secondary Transfers to an ED within Six Hours of Admission*** | | | | |
| Chest pain | 0 | 0 | 5 | 0 |
| Elevated blood pressure | 3 | 0 | 5 | 0 |
| Abdominal pain | 0 | 0 | 4 | 0 |
| Seizure | 0 | 0 | 4 | 0 |
| Alcohol intoxication with possible risk of alcohol withdrawal | 0 | 0 | 3 | 0 |
| Agitation | 2 | 0 | 0 | 0 |
| Coughs and chills | 0 | 0 | 2 | 0 |
| Elevated blood pressure and blood sugar | 0 | 0 | 2 | 0 |
| Elevated blood sugar | 0 | 0 | 2 | 0 |
| Methadone withdrawal or need for methadone | 0 | 0 | 2 | 0 |
| Sexual assault | 0 | 0 | 2 | 0 |
| Urinary incontinence | 2 | 0 | 0 | 0 |
| Abdominal pain with blood in stool | 0 | 0 | 1 | 0 |
| Abdominal pain with nausea and vomiting | 0 | 0 | 1 | 0 |
| Abdominal pain with symptoms of prostate problem or urinary tract infection | 0 | 0 | 1 | 0 |
| Abrasion, laceration, and back pain associated with recent assault | 0 | 0 | 1 | 0 |
| Abscess on arm | 0 | 0 | 1 | 0 |
| Back pain | 0 | 0 | 1 | 0 |
| Bed bug bites | 0 | 0 | 1 | 0 |
| Bleeding scab on scalp | 0 | 0 | 1 | 0 |

| | | | | |
|---|---|---|---|---|
| Blisters | 0 | 0 | 1 | 0 |
| Bloody nose | 0 | 0 | 1 | 0 |
| Body pain | 0 | 0 | 1 | 0 |
| Chest pain with nausea and vomiting | 0 | 0 | 1 | 0 |
| Confusion and inability to provide medical history | 0 | 0 | 1 | 0 |
| Dizziness plus ingestion of 5 aspiring and 5 to 10 laxatives | 0 | 0 | 1 | 0 |
| Elevated blood pressure and abscesses on feet | 0 | 0 | 1 | 0 |
| Foot pain | 0 | 0 | 1 | 0 |
| Foot pain and difficulty ambulating | 0 | 0 | 1 | 0 |
| Foreign object in vagina | 0 | 0 | 1 | 0 |
| Generalized weakness with history of chronic leg and back pain/weakness | 0 | 0 | 1 | 0 |
| Headache, bruising, and recent loss of consciousness | 0 | 0 | 1 | 0 |
| Heroin withdrawal | 0 | 0 | 1 | 0 |
| Lice | 0 | 0 | 1 | 0 |
| Neck pain | 0 | 0 | 1 | 0 |
| Neck and back pain | 0 | 0 | 1 | 0 |
| Patient came close to fainting | 0 | 0 | 1 | 0 |
| Patient reported ingestion of anti-psychotic medication with alcohol | 0 | 0 | 1 | 0 |
| Possible seizures secondary to alcohol withdrawal | 0 | 0 | 1 | 0 |
| Problem with nephrostomy tube | 0 | 0 | 1 | 0 |
| Rectal bleeding | 0 | 0 | 1 | 0 |
| Ringworm | 0 | 0 | 1 | 0 |
| Rule out allergic reaction to Haldol | 0 | 0 | 1 | 0 |
| Rule out dementia | 0 | 0 | 1 | 0 |
| Shortness of breath with cough and green sputum | 0 | 0 | 1 | 0 |
| Shoulder pain | 0 | 0 | 1 | 0 |
| Swollen ankle | 0 | 0 | 1 | 0 |
| Tachycardia and hypotension | 0 | 0 | 0 | 0 |
| Tachycardia and spider bite | 0 | 0 | 1 | 0 |
| Urinary incontinence and elevated heart rate | 0 | 0 | 1 | 0 |
| Urinary incontinence and unable to stand for more than 5 minutes | 0 | 0 | 1 | 0 |
| Vaginal and back pain | 0 | 0 | 1 | 0 |
| Wound on leg and leg pain | 0 | 0 | 1 | 0 |
| Patient had sleep apnea, and the county inpatient psychiatric facility did not have a | 1 | 0 | 0 | 0 |

| | | | | |
|---|---|---|---|---|
| continuous positive airway pressure (CPAP) machine | | | | |
| Patient taking blood thinner (Warfarin) that the mental health crisis center does not stock | 0 | 0 | 1 | 0 |
| Blood work needed secondary to mental health crisis center security guard getting a needle stick while going through patient's belongings | 0 | 0 | 1 | 0 |
| Change in patient condition | 1 | 0 | 0 | 0 |
| No capacity at psychiatric hospital | 1 | 0 | 0 | 0 |
| Law enforcement error – patient sent to mental health crisis center despite being on a 5150 hold for grave physical disability | 0 | 1 | 0 | 0 |
| **Total Number Transferred to an ED** | **10** | **1** | **75** | **0** |
| ***Rerouted Transfers (aka Continuous Transfers)*** | | | | |
| Patient needed medication not available at the crisis center | 0 | 0 | 9 | 0 |
| High blood sugar | 0 | 0 | 8 | 0 |
| Patient weighed too much to use recliner chairs | 0 | 0 | 4 | 0 |
| High blood pressure | 0 | 0 | 3 | 0 |
| Recent seizure | 0 | 0 | 3 | 0 |
| Alcohol consumption | 0 | 0 | 2 | 0 |
| Patient could not ambulate or transfer without assistance | 0 | 0 | 2 | 0 |
| Patient uncooperative | 0 | 0 | 2 | 0 |
| Crisis center policy that limits number of admissions to one per group home | 0 | 0 | 2 | 0 |
| Dementia | 0 | 0 | 2 | 0 |
| Abdominal pain and diarrhea | 0 | 0 | 1 | 0 |
| Fractured forearm in cast | 0 | 0 | 1 | 0 |
| High blood pressure and high blood sugar | 0 | 0 | 1 | 0 |
| Laceration potentially requiring sutures | 0 | 0 | 1 | 0 |
| Patient refused to have vital signs taken | 0 | 0 | 1 | 0 |
| Shoulder pain | 0 | 0 | 1 | 0 |
| Tachycardia | 0 | 0 | 1 | 0 |
| Tuberculosis | 0 | 0 | 1 | 0 |

| | | | | |
|---|---|---|---|---|
| Patient had colostomy bag | 0 | 0 | 1 | 0 |
| Patient had temperature of 100.4 degrees | 0 | 0 | 1 | 0 |
| Patient had a pacemaker | 0 | 0 | 1 | 0 |
| Patient had visual impairment | 0 | 0 | 1 | 0 |
| Patient on dialysis | 0 | 0 | 1 | 0 |
| Patient possibly ingested Xanax | 0 | 0 | 1 | 0 |
| Patient refused blood alcohol test | 0 | 0 | 1 | 0 |
| Patient had no mental health need | 0 | 0 | 1 | 0 |
| Patient filed legal complaint against crisis center | 0 | 0 | 1 | 0 |
| Patient had recent altercation with another patient admitted to the crisis center | 0 | 0 | 1 | 0 |
| Patient's girlfriend admitted to crisis center | 0 | 0 | 1 | 0 |
| Crisis center at capacity | 0 | 0 | 1 | 0 |
| **Total Number Rerouted to an ED** | **0** | **0** | **59** | **0** |
| **Total Patients Transferred or Rerouted to an ED** | **10** | **1** | **101** | **0** |

As indicated in Table 8, 59 patients (1.7%) were rerouted from Fresno's mental health crisis center to an ED (prior to admission). Thirteen patients were rerouted to an ED due to the lack of specific resources at the crisis center. Nine patients were rerouted because the crisis center did not have medications they needed. Seven of these patients were taking methadone or suboxone to treat opioid use disorder. Four patients who met the eligibility criteria for admission to the crisis center weighed too much to use the recliner chairs that the crisis center provides to patients safely. Other patients were rerouted because they did not meet the mental health crisis center's admission criteria. Twelve patients had blood sugar or blood pressure above thresholds for admission to the crisis center. Other reasons patients were rerouted include recent alcohol consumption, recent seizure, dementia, inability to ambulate or transfer without assistance, uncooperative behavior, and a crisis center policy under which only one client from a group home could be admitted at a time.

The Alternate Destination – Mental Health projects have also improved public safety. Law enforcement officers in Stanislaus County and Gilroy who were interviewed by the evaluation team stated that having community paramedics available enhanced their ability to respond effectively to persons with mental health needs because community paramedics are better prepared to address mental health needs and can arrange ambulance transports for mental health patients. This allows law enforcement officers to return to other law enforcement duties instead of transporting patients to an ED in their squad cars and waiting in the ED to transfer responsibility for the patient to a clinician.

### *Effectiveness*

Stanislaus' pilot project substantially reduced the rate at which 911 calls involving patients with mental health needs that resulted in a transport to an ED for medical screening. From the launch of Stanislaus' project in

September 2015 through September 2019, 29% mental health patients for whom 911 was called (450 of 1,491) were transported to the mental health crisis center instead of an ED. An additional 28% (n = 411) met the eligibility criteria and could have been transported to the crisis center if additional beds were available in the county's inpatient psychiatric facility or if the crisis center accepted patients who have a form of health insurance other than Medi-Cal. The community paramedics also determined that 37% people assessed (n = 553) were not eligible for transport to the mental health crisis center because they had a medical need, had vital signs outside parameters for admission to the crisis center, were intoxicated, violent, agitated or over age 65 years. Four percent (n = 67) met the medical criteria for admission to the mental health crisis center but were not admitted due to a history of disruptive behavior during previous admissions to the crisis center. Only two percent of eligible patients (n = 30) did not consent to be transported to the mental health crisis center.

Gilroy's and Fresno's pilot projects have also substantially reduced the rate at which patients with mental health needs are transported to an ED for medical screening. Since Gilroy's project began in June 2018, paramedics have screened a total of 218 persons on 5150 holds due to mental health concerns. Forty-four percent (95 patients) were transported to Santa Clara County's mental health crisis center or another mental health facility. Fifty-six percent (123 patients) were transported to an ED because they needed medical care or had vital signs outside parameters for admission to the crisis center. The crisis center did not turn away any eligible patients.

In Fresno, paramedics have screened 9,943 people with symptoms of a mental health crisis for whom 911 was called and transported 34% (3,404 patients) to Fresno County's mental health crisis center.

From June 2019 to June 2020, the Los Angeles project screened 302 people to determine whether they were eligible for transport to either a mental health crisis center or the city's sobering center. Twenty-seven percent were transported to a mental health crisis center.

### *Potential Savings*

As indicated in Table 9, the Alternate Destination – Mental Health projects potentially avoided an estimated $4,254,456 in costs ($1,059 per patient) because transporting a mental health patient to a crisis center avoids an ED visit and a secondary transport of a patient from an ED to an inpatient mental health facility. Nearly half of these potential savings would have accrued to the Medi-Cal program because 33% of patients enrolled in the projects (54% of those whose insurance status is known) were Medi-Cal beneficiaries.

**Table 9. Potential Savings Associated with the Alternate Destination – Mental Health Projects**

| Variable | Amount |
|---|---|
| Total Number of Patients Enrolled | 4.017 |
| Total Number of ED Visits Avoided | 3,911 |
| Average Cost of ED Transport Avoided | $554 |
| Average Cost of ED Visit Avoided | $546 |
| Potential Savings Associated with Mental Health Crisis Center Visits | **$4,302,100** |
| Potential Cost Associated with Ambulance Transport for Secondary Transfers to an ED | $47,644 |
| **Total Potential Savings (Net of Cost)** | **$4,254,456** |
| **Potential Savings per Patient Enrolled** | **$1,059** |

## Conclusion

The Alternate Destination – Mental Health projects demonstrate that community paramedics can perform medical screening examinations for persons with mental health needs and determine which of them can be transported directly to a mental health crisis center. Transporting these persons directly to a crisis center enables them to obtain mental health services more quickly, which is likely to improve their well-being. The projects also potentially avoid health care costs by reducing the number of persons transported to and assessed in an ED. A large proportion of these potential savings would accrue to Medi-Cal. For uninsured persons, the amount of uncompensated care provided by EDs would decrease.

## Alternate Destination – Urgent Care

### Highlights

- The three Alternate Destination – Urgent Care projects enrolled 48 patients between September 2015 and November 2017.
- All three of the Alternate Destination – Urgent Care projects closed in 2017 due to low enrollment.
- Most patients enrolled had a laceration or an isolated closed extremity injury.
- Patients did not experience any adverse outcomes. Two patients (4%) were transferred to an ED within six hours of admission to an urgent care center; nine (19%) were rerouted to an ED because the urgent care center declined to treat them.
- The projects potentially avoided costs of $3,640 because insurers pay urgent care centers less than EDs for treatment of eligible conditions.

### Description

Three pilot projects offered patients who have minor injuries or minor medical conditions the option of transportation to an urgent care center instead of to an ED for evaluation by a physician. Urgent care centers are walk-in clinics that treat persons with illnesses or injuries that can be evaluated and treated safely without the full range of resources available in an ED. California does not license urgent care centers as a distinct category of health care provider; they operate under the licenses of hospitals or of the physicians who operate them.[14] This means that there are no requirements regarding operating hours, equipment, or the types of medical services provided.

All three Alternate Destination – Urgent Care projects enrolled patients who had 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 enrolled patients who had generalized weakness. Patients were screened by paramedics on 911 response crews who had been trained to use a protocol that was developed by emergency physicians to determine whether transporting a patient to an urgent care center was an appropriate option. The protocols excluded patients with medical conditions that were emergent, complex or inappropriate for transport to an urgent care center.

If paramedics concluded that a patient could be treated safely at an urgent care center, the paramedics offered transport to an urgent care center approved by the jurisdiction's local emergency medical services agency (LEMSA). Urgent care centers approved by the LEMSAs 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. After transporting a patient to an urgent care center, paramedics were available to reroute the patient to an ED if a clinician at the urgent care center determined that the urgent care center could not treat the patient safely and appropriately. ***Patients who declined to be transported to an urgent care center were transported to an ED. These projects did not involve evaluation and release of patients by paramedics. All patients were transported to a facility where they were evaluated by a physician.***

### Impact of COVID-19

- The COVID-19 pandemic did not affect the Alternate Destination – Urgent Care projects because all of these projects closed in 2017.

### Findings

Forty-eight persons were enrolled in the three Alternate Destination – Urgent Care projects through November 2017. Orange County's project had the largest enrollment (34 patients), and Carlsbad's project had the smallest enrollment (two patients). UCLA's Alternate Destination – Urgent Care project closed in May 2017, and Carlsbad's and Orange County's projects closed in November 2017. All closures of Alternate Destination – Urgent Care projects were due to low enrollment.

There are multiple reasons why enrollment in the Alternate Destination – Urgent Care projects was substantially lower than anticipated. All three sites had fewer patients than expected who met all of the criteria for inclusion in the pilot project. In addition, many 911 calls occurred at times of the day during which urgent care centers were closed. In the case of Carlsbad's project, enrollment was limited to non-elderly adults who had insurance coverage through a single health plan.

Most of the patients enrolled had a laceration or an isolated closed extremity injury, such as a dislocation, sprain, or fracture (see Table 10).

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

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

#### *Safety*

The Alternate Destination – Urgent Care projects did not harm patients. Among the 48 patients enrolled in the Alternate Destination – Urgent Care projects, two patients (4%) were subsequently transferred to an ED within six hours of arrival at an urgent care center. In addition, nine patients (19%) were transported to an urgent care center but then rerouted to an ED because clinicians at the urgent care center declined to treat the patient. None of these patients had life-threatening conditions, and there were no adverse outcomes. The reasons for transport from an urgent care center to an ED are listed in Table 11. Additional detail about the two transfers to an ED within six hours of arrival at an urgent care center can be found in the initial public report on the community paramedicine pilot projects.[24]

**Table 11. Reasons for Transfer or Rerouting to an ED from an Urgent Care Center (11 of 48 Patients)**

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

### *Effectiveness*

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

### *Potential Savings*

Table 12 displays estimates of the potential savings associated with two of the three Alternate Destination – Urgent Care projects. Data for the third site are not included because it enrolled only two patients before it closed in November 2017. These projects potentially avoided costs of $3,640. The estimates of potential savings are based on estimates of the difference between the amounts insurers pay for treatment of the same condition in an ED and an urgent care center. Costs for ambulance transports were not reduced because no transports were avoided.

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

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

## Conclusion

More data are needed to draw firm conclusions about the Alternate Destination – Urgent Care concept. Paramedics participating in the Alternate Destination – Urgent Care projects have demonstrated capacity to evaluate patients according to triage protocols to determine whether they are candidates for treatment at an urgent care center. No patients experienced adverse outcomes. However, only 48 patients were enrolled across the three sites over 26 months, in large part because many people with eligible conditions called 911 at times at which urgent care centers were not open. In addition, two of the 48 patients enrolled were transferred to an ED following admission to an urgent care center, and nine were rerouted to an ED because the urgent care center declined to accept them. These findings suggest that for Alternate Destination – Urgent Care projects to offer a viable alternative to EDs, screening protocols will need to be more closely aligned with the capabilities of urgent care centers and the illnesses and injuries they are willing to treat. The savings generated were modest due to the low enrollment and the design of the projects, which changed only the destination to which patients were transported and did not reduce the number of transports.

## Alternate Destination – Sobering Center

### Highlights

- The three Alternate Destination – Sobering Center projects enrolled 2,765 patients from February 2017 through March 2020.
- 98.2% of San Francisco's patients (n = 2,717) were treated safely and effectively at the sobering center. Only 1.7% (n = 46) were transferred to an ED within six hours of admission to the sobering center. Only two patients (0.1%) were rerouted to an ED because the sobering center's registered nurses did not accept them.
- None of Los Angeles' patients were rerouted to an ED or transported to an ED within six hours of admission.
- San Francisco and Los Angeles' projects potentially avoided costs of $956,851 because the cost of treating intoxicated persons in the sobering center is less than the cost of treating them in an ED.
- The Gilroy Fire Department and the Santa Clara County Emergency Medical Services System launched an Alternate Destination – Sobering Center project in June 2018, but as of March 2020, the project had not enrolled any patients.

### Description

Acutely intoxicated persons are another population for whom alternatives to routine transport to an ED are needed. Nationwide, an estimated 9.7% of ED visits are due to inebriation.[15] In busy EDs, clinicians have little time to assist intoxicated patients unless they also have an acute medical need. They may not have time to counsel patients about their drinking or give them information about detoxification programs, case management or other resources.

Cities around the US have established sobering centers to care for these patients[16] because they are less expensive to operate than EDs and their staff are able to focus on the needs of intoxicated persons.[17] In February 2017, the City and County of San Francisco began a pilot project under which paramedics transport eligible persons directly to its sobering center. The sobering center has cared for over 50,000 persons since it opened in 2003. It serves people who are acutely intoxicated but do not have other urgent health care needs. The sobering center is open 24 hours per day, 7 days per week and staffed by registered nurses, who monitor patients throughout their stay. The registered nurses follow standardized procedures for treatment of a variety of medical and mental health conditions. The sobering center's staff also includes social workers who help patients obtain treatment for alcohol use disorders and mental health conditions, housing, Medi-Cal, Supplemental Social Security, and General Assistance. Most patients stay for 4 to 12 hours. Historically, approximately 33% of patients have been treated at the sobering center multiple times per year, and approximately 90% of patients have been homeless at the time that services are provided.[18]

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

Paramedics in San Francisco who have completed the full community paramedic training work with 911 response crews and the sobering center's staff to perform quality assurance reviews for patients transported to the sobering center. They are available to paramedics in the field by telephone or in person for consultation if they are unsure whether a patient is eligible for transport to the sobering center. In addition, the community paramedics collaborate with San Francisco's

Homeless Outreach Team (SFHOT) outreach workers to engage sobering center patients who are high utilizers of county health care services.

A second Alternate Destination – Sobering Center project began operating in June 2018. This project is a partnership between the Gilroy Fire Department and the Santa Clara County Emergency Medical Services System. All paramedics employed by the Gilroy Fire Department have completed training similar to the training completed by paramedics in San Francisco and use a similar protocol to determine whether a patient is eligible for transport to Santa Clara County's sobering center. If paramedics determine that a patient is eligible, the patient is offered transported to the county's sobering center instead of an ED.

The City of Los Angeles Fire Department's EMS Bureau launched the third Alternate Destination – Sobering Center in late June 2019. Eligible patients are transported directly to a sobering center operated by Exodus Recovery, Inc. The sobering center is a new facility that serves seriously inebriated adults who are not in need of the services of an ED. The project is staffed by teams of two paramedics who were trained to screen patients for transport to the sobering center or a mental health urgent care center using protocols similar to those used by other Alternate Destination – Sobering Center and Alternate Destination – Mental Health projects. These paramedics work ten hours per day four days per week.

**Findings**

San Francisco's Alternate Destination – Sobering Center project enrolled 2,674 patients from February 2017 through March 2020. Of the patients enrolled in the project, 384 (14%) have visited the sobering center more than once. As of March 2020, Gilroy and Santa Clara's Alternate Destination – Sobering Center pilot project had not enrolled any patients. Los Angeles' Alternate Destination – Sobering Center project enrolled 91 patients from June 2019 through March 2020. Three of Los Angele's patients (3%) have visited the sobering center more than once.

***Safety***

The community paramedics in San Francisco and the staff of the San Francisco sobering center review the records of all patients transported to the sobering center by ambulance. Cases that involve a secondary transport of a patient to an ED are also reviewed by a committee comprising the sobering center's deputy director, the sobering center's nurse coordinator, the San Francisco Emergency Medical Services Agency's medical director, and the San Francisco Fire Department's medical director. Los Angeles has implemented similar procedures for reviewing records for all patients transported to its sobering center.

The most common risk to sobering center patients is an unforeseen need for medical detoxification, which is difficult to predict initially among people with chronic alcohol consumption. A patient may also have taken another drug that paramedics cannot detect when they examine the patient in the field. Clients are monitored via comprehensive nursing protocols that assess for potential effects of other drugs, including the impact of sedating medications on orientation and respiratory status.

Among the 2,674 patients enrolled in San Francisco's Alternate Destination – Sobering Center project, 46 patients (1.7%) were transferred to an ED within six hours of admission to the sobering center. These secondary transfers were due to abdominal pain, agitation, alcohol withdrawal, chest pain, confusion, falls, hallucinations, seizures, suicidal ideation and tachypnea (i.e., rapid shallow breathing). (See Table 13). In 45 cases, the transfer to the ED could not have been avoided because the need for transfer was not evident when the paramedics assessed the patient in the field. One transfer that occurred shortly after San Francisco launched its project was potentially preventable. When the community paramedics reviewed records for the patient with tachypnea, they concluded that the patient's respiration rate in the field

had been outside the range for admission to the sobering center and that the paramedics on the 911 crew that transported this patient to the sobering center had not relayed this information to the registered nurse on duty. The community paramedics coached the 911 response crew and their supervisor on how to use a patient's respiration rate in the field to determine if a patient is eligible for transport to the sobering center.

**Table 13. Reasons for Transfer to an ED within Six Hours of Admission to a Sobering Center or Rerouting from the Sobering Center through First Quarter 2020 (48 of 2,765 Patients)**

| Reason for Transfer to an ED | Number of Patients |
|---|---|
| ***Secondary Transfers to an ED within Six Hours of Admission*** | |
| Fall | 11 |
| Alcohol withdrawal | 4 |
| Altered mental state | 4 |
| Suspected suicide attempt/suicidal intentions | 3 |
| Agitation | 2 |
| Chest pain, radiating | 2 |
| Chest pain with history of heart problem | 2 |
| Seizures/history of seizures | 2 |
| Abdominal pain at site of pre-existing hernia | 1 |
| Agitation with chest pain | 1 |
| Anxiety | 1 |
| Arm pain | 1 |
| Auditory hallucination | 1 |
| Chest/abdominal pain | 1 |
| Chronic obstructive pulmonary disease exacerbation | 1 |
| Client requested oxygen despite lack of respiratory distress | 1 |
| Low blood pressure | 1 |
| Low level of oxygen in the blood | 1 |
| Pleuritic chest pain | 1 |
| Pulmonary embolism | 1 |
| Suspected urinary retention | 1 |
| Tachypnea/increasing temperature | 1 |
| Vomiting | 1 |
| Vomiting dark brown blood | 1 |
| ***Rerouted Transfers (aka Continuous Transfers)*** | |
| Hypothermia/bradycardia | 1 |
| Small raised mass above left eyebrow with enlarged left pupil | 1 |
| **Total Patients Transferred or Rerouted to an ED** | **48** |

Two patients (0.1%) were rerouted from the sobering center to an ED per instructions issued by the registered nurse on duty at the sobering center. When one patient arrived at the sobering center, he had hypothermia and bradycardia, with a body temperature below the protocol threshold for admission to the sobering center. The registered nurse and paramedics attempted to rewarm the patient for 15 minutes. When their efforts were unsuccessful, the registered nurse directed the paramedics to reroute the patient to an ED. The other patient had a swelling above the left eyebrow and had one pupil larger than the other. The registered nurse on duty directed the paramedics to reroute the patient to an ED because the patient was unable to indicate whether this symptom had been evaluated in a medical facility.

Of the 48 patients who were either transferred or rerouted to an ED, 32 were treated in an ED and released. Four patients were medically cleared in the ED and transferred to a psychiatric ED. Five patients were admitted to a hospital for inpatient medical care. One inpatient admission was due to acute alcohol withdrawal symptoms that could not be controlled in the ED. Others were due to a low level of oxygen in the blood, chest pain with history of a heart problem, exacerbation of chronic obstructive pulmonary disease, and aspiration pneumonia. Six patients left an ED's waiting room without being seen. The disposition of one patient is unknown.

None of the 91 patients that Los Angeles' Alternate Destination – Sobering Center project has enrolled were transferred to an ED within six hours of admission to the sobering center or rerouted to an ED.

### *Effectiveness*

San Francisco and Los Angeles' Alternate Destination – Sobering Center project has reduced the number of intoxicated persons transported to an ED. Interviews with project leaders indicate that one of the greatest benefits of treating these clients in the sobering center is that the sobering center social workers are better able to connect clients with medical detoxification, social services, case management services and permanent housing. EDs have social workers, but they are not able to focus exclusively on intoxicated patients. In addition, the sobering center is equipped to provide withdrawal management for patients if a bed is available in a medical detoxification center, which helps patients cope with withdrawal and increases their willingness to complete detoxification.

Another strength of San Francisco's Alternate Destination – Sobering Center project is the use of paramedics in two complementary roles. Paramedics on 911 response crews can contact community paramedics for guidance if they are uncertain whether a patient meets the criteria for transport to the sobering center. Community paramedics review transports of patients to the sobering center and give 911 crews feedback on their use of the protocol for screening patients.

**Impact of COVID-19**

- Los Angeles' sobering center was converted to a COVID-19 respite care center for homeless persons in April 2020 and is not expected to reopen until after August 2020.
- San Francisco's sobering center has had to close twice because a patient tested positive for COVID-19. Staff and patients at risk for COVID-19 were tested and relocated to an isolation and quarantine site. San Francisco aims to reopen the sobering center soon.
- San Francisco's CPs were tasked with finding sobering center patients who had been exposed to the patients with COVID-19 and persuading them to be tested and quarantine. They also partnered with the sobering center's staff to operate the quarantine site.
- As people sheltering at the quarantine site have stabilized, CPs have worked with them to set goals and obtain resources, including detox facilities, primary care, and housing.

In addition, the community paramedics' partnership with the SFHOT outreach workers extends the project beyond transport to the sobering center to encompass outreach to high utilizers, to encourage them to seek treatment for their alcohol use disorder. This outreach is important because San Francisco has substantial services for homeless people with alcohol use disorders, but people may not know how to access these services or will not seek help on their own. Pairing community paramedics with homeless outreach workers leverages the strengths of both groups. Community paramedics contribute medical knowledge, the ability to access medical records and relationships with ambulance crews. Homeless outreach workers, many of whom are formerly homeless and/or in recovery from substance use disorders, can form closer relationships with clients due to their shared experience.

### *Potential Savings*

Table 14 displays estimates of potential savings associated with Los Angeles and San Francisco's Alternate Destination – Sobering Center projects. For this project, savings were due to the difference in the cost of caring for intoxicated persons in the sobering center versus an ED. For patients who were treated in the sobering center and released, savings were estimated by multiplying the number of patients by the difference between the cost of treating them in an ED and the cost of treating them in the sobering center ($385). These savings were offset by the cost of a sobering center visit and the cost of a second ambulance transport for the 46 patients who were transferred to an ED. Since San Francisco and Los Angeles launched their projects, they have generated $956,851 in potential savings ($346 per enrollee) due to the reduction in ED visits. Actual savings realized by insurers may have differed because the data used to estimate costs are not used for billing purposes.[16] The majority of potential savings accrued to Medi-Cal because sobering center staff estimate that 64% of the patients enrolled in the project are Medi-Cal beneficiaries. Costs for ambulance transports were not reduced because no transports were avoided.

**Table 14. Potential Savings Associated with San Francisco's Alternate Destination – Sobering Center Project**

| Variable | Amount |
|---|---|
| Total Number of Patients Enrolled | 2,765 |
| Total Number of ED Visits Avoided | 2,717 |
| Average Cost of Ambulance Transport | $1,675 |
| Average Cost of ED Visit | $649 |
| Average Cost of Sobering Center Visit | $264 |
| Potential Savings Associated with Sobering Center Visits | $1,046,045 |
| Number of Secondary Transfers to ED | 46 |
| Potential Cost Associated with Sobering Center Visit for Secondary Transfers to an ED | $12,144 |
| Potential Cost Associated with Ambulance Transport for Secondary Transfers to an ED | $77,050 |
| **Total Potential Savings (Net of Cost)** | **$956,851** |
| **Potential Savings per Patient Enrolled** | **$346** |

## Conclusion

Preliminary findings suggest that paramedics participating in the Alternate Destination – Sobering Center projects can accurately screen intoxicated patients to identify those who can be treated safely and effectively in a sobering center. To date San Francisco and Los Angeles' projects have resulted in the transport of 2,717 fewer persons to an ED. Only three patients (0.1% of all patients enrolled) who did not meet the eligibility criteria (i.e., the two patients rerouted from the sobering center to the ED and the patient accepted by the sobering center who had tachypnea) were transported to the sobering center. Only 46 patients (1.7%) were transferred to an ED subsequent to admission to the sobering center. There were no adverse outcomes from secondary transfers to an ED. The projects potentially reduced costs because providing care to intoxicated persons in the sobering center is less expensive than caring for them in an ED. In addition, the community paramedics participating in San Francisco's project provide valuable feedback to paramedics on 911 response crews and are collaborating effectively with homeless outreach workers to encourage people with chronic alcoholism to seek treatment.

## Summary and Conclusion

The community paramedicine pilot projects have demonstrated that specially trained paramedics can provide services beyond their traditional and current statutory scope of practice in California. No adverse outcome is attributable to any of these pilot projects. These projects are enhancing patients' well-being, improving the integration and efficiency of health services in the community, and reducing ambulance transports, ED visits and hospital readmissions. The majority of potential savings associated with these pilots are accruing to Medicare and Medi-Cal and to hospitals serving Medicare and Medi-Cal patients.

Specifically, the sites testing the seven concepts have demonstrated the following.

### Post-Discharge – Short-Term Follow-Up

- The Post-Discharge - Short-Term Follow-Up projects improved patients' ability to take medications as prescribed by their physicians, ensured that they understood discharge instructions, and that they had scheduled follow-up visits.
- All five Post-Discharge - Short-Term Follow-Up projects decreased hospital readmissions within 30 days of discharge for at least one of the diagnoses targeted. Butte's heart failure patients were the only group of patients whose 30-day readmission rate exceeded the partner hospital's historical all-cause readmission rate.
- The Post-Discharge - Short-Term Follow-Up projects avoided $1.4 million in potential costs for payers (primarily Medicare and Medi-Cal) and hospitals due to reductions in readmissions within 30 days of discharge. Participating hospitals also reduced their risk of incurring Medicare penalties for excessive readmissions.

### Frequent EMS User

- Community paramedics assisted patients in obtaining mental health services, substance use disorder treatment, housing and other nonemergency services that address the physical, psychological and social needs that led to their frequent EMS use.
- The Frequent EMS User projects have achieved substantial reductions in the number of 911 calls, ambulance transports and ED visits among enrolled patients.
- Alameda, San Diego, and San Francisco's projects avoided an estimated $966,140 in potential costs for payers by reducing 911 calls, ambulance transports and ED visits. San Diego's and San Francisco's projects also potentially decreased the amount of uncompensated care furnished by ambulance providers and EDs because large percentages of the patients enrolled in these projects were uninsured.

### Directly Observed Therapy for Tuberculosis

- Community paramedics dispensed appropriate doses of TB medications and monitored side effects and symptoms that could necessitate a change in the 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 community health workers. Receiving all doses prescribed by the TB clinic physician increases the likelihood that a patient will be treated successfully and will not spread TB to others or develop a drug-resistant strain of TB that would be much harder to treat and to control in the community.

### Hospice

- Community paramedics assessed hospice patients, provided psychosocial support and administered medications from the hospice patients' "comfort care" packs when necessary, in consultation with a hospice nurse.
- The Hospice project enhanced hospices' ability to honor patients' wishes to receive hospice services at home by markedly reducing rates of ambulance transports to an ED and ED visits.
- The reduction in unnecessary transports and ED visits potentially avoided costs for Medicare and other insurers. Expenditures for inpatient care were also potentially reduced because some ED visits for hospice patients result in an inpatient admission.

### Alternate Destination – Mental Health

- Across the four Alternate Destination – Mental Health projects, 27% to 44% of patients screened were transported to a mental health crisis center rather than an ED. In Stanislaus County, an additional 28% could have been transported to the crisis center if the county had more inpatient psychiatric beds or if the crisis center accepted people with private insurance or Medicare.
- 96.2% of patients who participated in the projects (3,872 of 4,017 patients) were treated safely and effectively at the mental health crisis center without the delay of a preliminary emergency department visit for medical screening. Only 2.1% of patients (n = 86) required subsequent transfer to the ED and only 1.7% (n = 59) were rerouted to an ED because they did not meet the mental health crisis center's admission criteria. None of the patients transferred to an ED experienced adverse outcomes.
- The projects also improved public safety because community paramedics could take responsibility for a person with mental health needs, which allowed law enforcement officers to return to law enforcement duties instead of transporting the person to an ED and waiting to transfer responsibility for the person to clinicians in the ED.
- The project avoided potential costs of $4.3 million for Medi-Cal and other payers by reducing ED visits and transfers of patients from EDs to psychiatric facilities. For uninsured persons, the amount of uncompensated care provided by EDs also decreased.

### Alternate Destination – Urgent Care

- Conclusions cannot be drawn about the impact of the Alternate Destination – Urgent Care projects due to low enrollment.
- Among patients who were enrolled, paramedics were able to screen patients according to protocol and identify those for whom transport to an urgent care center was an appropriate option.
- No patients experienced an adverse outcome, although two patients (4%) were transferred to an ED following admission to an urgent care center, and nine patients (19%) were rerouted to an ED because the urgent care center declined to accept them.
- 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 potentially yielded modest savings for payers because they pay less for treatment provided in urgent care centers than in EDs for the same illnesses and injuries.

### Alternate Destination – Sobering Center

- 98.2% percent of patients enrolled in San Francisco's Alternate Destination – Sobering Center projects (2,148 of 2,765 patients) were treated safely and effectively at the sobering center. Only 46 patients (1.7%) were transferred to an ED within six hours of admission to the sobering center, and only two (0.1%) were rerouted from the sobering center to an ED because the sobering center's registered nurses declined to accept them. Only five of the patients transferred to an ED was admitted to a hospital for inpatient medical care.

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

- San Francisco's project has avoided potential costs of $956,851 by substituting sobering center visits for ED visits. The majority of potential savings accrued to Medi-Cal because the majority of patients enrolled in the project were Medi-Cal beneficiaries.

- Los Angeles' Alternate Destination – Sobering Center project enrolled 91 people from June 2019 through March 2020 none of whom were rerouted to an ED or transported to an ED within six hours of admission to a sobering center.

### Conclusion

The California community paramedicine pilot projects were designed to integrate with existing health care resources and utilize the unique skills of paramedics and their round-the-clock availability. Findings from the evaluation indicate that Californians benefit from these innovative models of health care that leverage an existing workforce operating at all times under medical control – either directly or by protocols developed by physicians experienced in EMS and emergency care. No other health professionals were displaced. Instead, these pilot projects have demonstrated that community paramedics can partner with physicians, nurses, behavioral health professionals and social services workers to fill gaps in the health and social services safety net. In addition, several projects are playing important roles in their communities' response to the COVID-19 pandemic by expanding their services or pivoting to serve different populations. No adverse patient outcome is attributable to any of these pilot projects.

At least 34 states are operating community paramedicine programs,[2] and research conducted to date indicates that they are improving the efficiency and effectiveness of the health care system.[13,19-27] These findings suggest that the benefits of community paramedicine programs grow as they mature, solidify partnerships and find their optimal structure and niche. The evaluation of HWPP #173 yields consistent findings for six of the seven community paramedicine concepts tested. The Post-Discharge – Short-Term Follow-Up, Frequent EMS User, Directly Observed Therapy for Tuberculosis, Hospice, Alternate Destination – Mental Health and Alternate Destination – Sobering Center projects have improved patients' well-being and, in most cases, have yielded savings for payers and other parts of the health care system. The seventh concept, Alternate Destination – Urgent Care, shows potential, but the projects that tested this concept did not enroll sufficient numbers of persons to draw conclusions about effectiveness. These projects were closed in 2017. Further research involving a larger volume of patients transported to urgent care centers with wider ranges of services and expanded hours would be needed to determine whether this concept is effective.

If community paramedicine is implemented 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

ensure effectiveness and patient safety. The two-tiered system enables cities and counties to design and administer community paramedicine programs to meet local needs, while both local and state oversight and regulation ensure patient safety.

## Appendix A. Map of California Community Paramedicine Pilot Projects Currently Enrolling Patients

## Appendix B. Methods for Estimating Savings

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

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

### Post-Discharge – Short-Term Follow-Up

To generate estimates of savings, the differences between (1) the rates of readmission within 30 days of discharge among persons enrolled in the post-discharge projects and (2) historical 30-day readmission rates for partner hospitals were calculated. Historical readmission rates were obtained from Medicare Hospital Compare,[26] a system for reporting and publicly releasing data on the quality of care provided by Medicare-certified hospitals. Medicare Hospital 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.[27] These data were used to assess the projects' impact on 30-day readmission rates because all partner hospitals used similar methods to report the data to Medicare and because there was minimal overlap between the time period for which Hospital Compare data were collected and the implementation of the post-discharge projects.

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

### Frequent EMS User

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

For Alameda's and San Diego's Frequent EMS User projects, the number of ambulance transports and ED visits avoided was estimated by comparing the number of 911 calls made by enrolled patients during the 12 months

prior to their enrollment to the number of 911 calls made during the 12 months following enrollment. Calls made during the month of enrollment were excluded in recognition that the month of enrollment is a time of transition for patients. Data on 911 calls pre- and post-enrollment were available for 37 of the 46 enrollees in San Diego's project and 74 of the 82 enrollees in Alameda's project. The reduction in 911 calls over the 12 months post-enrollment was divided by 12 to estimate the numbers of 911 calls, ambulance transports, and ED visits avoided per month.

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

### Directly Observed Therapy for Tuberculosis

A quantitative analysis of savings associated with the project that provides directly observed therapy (DOT) for tuberculosis (TB) was not conducted due to challenges associated with estimating the impact of the project. As discussed in the body of the report, the project found that community paramedics missed a smaller percentage of prescribed DOT treatments than community health workers did (0.06% vs. 6.7%). However, we found no research that addressed the impact of a difference in adherence in a US population that compared groups of people with adherence rates of over 90%. In the absence of such research, we concluded that the most we could do would be to make directional statements about the potential impact of the increase in adherence on public health expenditures associated with investigation of close contacts of persons with TB and treating people infected by a noncompliant patient. We also make a directional statement about the impact of the use of community paramedics on the TB clinic's use of community health workers.

### Hospice

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

As indicated above in the description of the estimates of savings for the Frequent EMS User projects, data for ED cost estimates were obtained from the University of California Research Exchange (UC ReX) and reflect visits to EDs at UC 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 levels 4 and 5 visits was used because terminally ill patients are likely to have acute needs. Median reimbursement for levels 4 and 5 visits across all diagnoses was used in lieu of the costs

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

### Alternate Destination – Mental Health

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

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

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

### Alternate Destination – Urgent Care

Savings for the Alternate Destination – Urgent Care projects 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.[28] The difference between reimbursement for ED visits and urgent care center visits was multiplied by the number of persons enrolled in the Alternate Destination – Urgent Care projects to obtain an estimate of total savings.

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

As indicated above in the description of the estimates of savings for the Frequent EMS User projects, data for estimates of ED costs were obtained from the University of California Research Exchange (UC ReX) and reflect visits to EDs at UC medical centers in 2015. To estimate the cost of ED visits that do not result in a hospital admission, we applied the national average Medicare reimbursement rate for level 1 and level 2 ED visits. These levels were used because these projects enrolled people with minor illnesses or injuries. This rate was multiplied by 45% to estimate the average cost of treating people with minor illnesses or injuries in an urgent care center.

### Alternate Destination – Sobering Center

Savings for San Francisco's Alternate Destination – Sobering Center project were estimated by multiplying the numbers of ambulance transports and ED visits avoided per month by the cost of treating an intoxicated person with no co-morbidities in an ED. Costs for ambulance transports were included in the calculation only for patients who were secondarily transferred from the sobering center to an ED. The cost of initial transport to the sobering center was not included because the San Francisco Fire Department would have incurred the cost of an ambulance transport regardless of whether a patient was transported to an ED or the sobering center.

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

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