UCSF Health Workforce Research Center
on Long-Term Care

University of California
San Francisco

Research Report

Mobile Integrated Health Care - Community Paramedicine: A Resource for Community-Dwelling People at Risk for Needing Long-Term Care

Alicia LaFrance, MPH, MSW

Janet Coffman, MPP, PhD

November 15, 2016

This research was conducted through a Cooperative Agreement with the U.S. Bureau of Health Professions, National Center for Health Workforce Analysis. Opinions and recommendations do not necessarily represent those of the Bureau or other government agency.

Please cite as: Coffman, J., LaFrance, A. (2016). Mobile Integrated Health Care – Community Paramedicine: A Resource for Community-Dwelling People at Risk for Needing Long-Term Care. San Francisco, CA: UCSF Healthforce Center

UCSF Health Workforce Research Center, 3333 California Street, Suite 265, San Francisco, CA, 94118

Contact: Janet Coffman, MPP, PhD, janet.coffman@ucsf.edu, 415-476-2435

MIH-CP: A Resource for Community-Dwelling People at Risk for Needing Long-Term Care

Table of Contents

Table of Contents 2
Table of Figures 5
Table of Tables 5
Executive Summary 6
Introduction 6
Methods 6
Results 6
Landscape Analysis Findings 6
Case Study Findings 7
Conclusions and Recommendations 12
MIH-CP: A Resource for Community-Dwelling People at Risk for Needing Long-Term Care 13
Background 13
Methods 14
Landscape Analysis 14
Search Terms 14
Inclusion and Exclusion Criteria 14
Case Study Selection 14
Results 15
Landscape Analysis 15
Types of Community Paramedicine Interventions 15
Types of Organizations 15
Training 16
Partnerships 16
Sources of Funding 16
Outcomes 16
Case Studies 17
Introduction 17

Pittsburgh, PA: CONNECT Community Paramedicine Program 19
Program Description 19
Services Provided 20
Target Population 20
Staff, Training, and Personal Motivation 21
Referrals and Partnerships 21
Outcomes.....23
Facilitators of Success 23
Challenges.....23
Funding.....24
Wadena, MN: Tri-County Health Care Community Paramedicine 25
Program Description 25
Services Provided 26
Target Population 26
Staff, Training, Personal Motivation 26
Referrals and Partnerships 27
Outcomes.....28
Facilitators of Success 29
Challenges.....29
Funding 30
Fort Worth, TX: MedStar Mobile Healthcare Community Health Program ..31
Program Description 31
Services Provided 32
Target Population 33
Staff, Training, and Personal Motivation 33
Referrals and Partnerships 34
Outcomes.....36
Facilitators of Success 36
Challenges.....37
Funding.....38

New York, NY: Northwell Health Community Paramedicine 39
Program Description 39
Services Provided 40
Target Population 40
Staff, Training, and Personal Motivation 40
Referrals and Partnerships 42
Outcomes 43
Facilitators of Success 45
Challenges 45
Funding 46
Lessons Learned 47
Intervention Planning 47
Partnership Development 47
Communication 48
Assessment of Outcomes 48
Cross-Cutting Themes 48
Importance of Strong Partnerships 48
Impact of the Regulatory Environment 49
In-House Curriculum Development 49
Sustainable Funding 50
Shared Motivation and Goals of Care 50
Conclusions 50
Limitations 51
Recommendations 52
Acronyms Used in this Report 53
References 54

Table of Figures

Figure 1. Map of Case Study MIH-CP Programs 18

Table of Tables

Table 1. Key Attributes of MIH-CP Programs Profiled in this Report 8
Table 2. CONNECT Program Overview – Pittsburgh, PA.....19
Table 3. Tri-County CP Program Overview, Wadena MN.....25
Table 4. MedStar Program Overview, Fort Worth TX.....31
Table 5. Northwell CP Program Overview – New York NY 39

MIH-CP: A Resource for Community-Dwelling People at Risk for Needing Long-Term Care

Executive Summary

Introduction

Mobile integrated healthcare – community paramedicine (MIH-CP) is a new model of care that trains paramedics to deliver a broader range of services than traditional emergency response and transport of people to emergency departments (ED).[1] By 2014, more than 100 emergency medical services (EMS) agencies in 33 states and the District of Columbia had implemented one or more MIH-CP initiatives.[2] Some MIH-CP initiatives have potential to reduce demand for long-term care (LTC) by focusing on senior citizens and/or younger persons with debilitating chronic conditions.

This report summarizes the findings of a landscape analysis on MIH-CP programs that serve persons who currently need or who are at risk for receiving LTC and presents 4 examples of MIH-CP programs that serve these persons.

Methods

For our landscape analysis we conducted a search for gray literature resources and targeted searches of databases of peer-reviewed articles to identify US-based MIH-CP programs that are serving people at risk for needing LTC. From this list and consultations with experts in the field, we identified programs from 4 states for the case studies: Pennsylvania, Minnesota, Texas, and New York.

Results

Landscape Analysis Findings

- **Types of interventions**: MIH-CP programs that serve persons at risk for needing LTC provide an array of interventions, including chronic disease management, home visits, medication reconciliation, hospital discharge follow-up, and fall/risk prevention.

- **Types of organizations**: MIH-CP programs are housed in 3 types of agencies: fire departments, hospitals or medical centers, and privately owned EMS providers.
- **Training**: MIH-CP training is typically a combination of didactic courses and clinical supervision. Several programs utilize didactic training in community colleges, while others rely on staff of the organization operating the MIH-CP program and/or staff of partner agencies to provide in-house, didactic training that is tailored to their programs' needs.
- **Partnerships**: MIH-CP programs partner with a variety of organizations including hospice and home health agencies, primary care practices, and hospital care management departments.
- **Funding sources**: Most frequently, MIH-CP programs are funded through grants from philanthropic foundations. Other common forms of financial support are agency or internal budgets and grant funding from state government.
- **Outcomes**: Among sources that reported outcomes, the metrics most frequently reported were ED and hospital admission avoidance, ambulance transportation reduction, and cost savings resulting from intervention.

Case Study Findings

The table on the next page describes key attributes of the four MIH-CP programs for which case studies were conducted. Across the four case studies, major findings include the following.

- **Program settings**: Programs were located in three types of organizations.
    - Hospital-based non-transporting agency
    - Hospital EMS department
    - EMS agency
- **Scope of roles**: CP roles range from delivering services over a series of prescheduled visits to providing acute care on an as-needed basis.

Table 1. Key Attributes of MIH-CP Programs Profiled in this Report

Program	Program Setting	Number of CP Staff	Target Population	Estimated Number of Patients Served Annually	Sources of Funding
Pittsburgh, PA: CONNECT Community Paramedicine Program	Hospital-based, non-transporting CP agency in partnership with Allegheny County EMS Council and Congress of Neighboring Communities (CONNECT)	2 full-time and 7 part-time CPs	Allegheny County residents deemed medically vulnerable by a provider	150	Mix of grant funding and contracts with health plans; targeting future contracts with hospital partners
Wadena, MN: Tri-County Health Care Community Paramedicine	Hospital	8 part-time CPs	Patients identified by the hospital as frequent utilizers, recently discharged, having a chronic disease, needing home health services, and/or living in assisted living	300	Hospital budget, and some insurance reimbursement for CP patient encounters
Fort Worth, TX: MedStar Mobile Healthcare Community Health Program	Inter-governmental EMS agency	2 full-time MIH paramedics and 7 critical care paramedics	Two types: (1) High ED utilizers/ Persons at high risk for hospital readmission (2) Hospice and home health patients	724	Contracts with partnering healthcare providers
New York, NY: Northwell Health Community Paramedicine	Hospital	40 CP paramedics	Elderly, home-bound patients served by House Calls and hospice patients	465	A mix of grants, reimbursement from partners and Northwell Health's proprietary insurance plan

- **Target populations**: MIH-CP programs targeted various groups of persons at risk for needing LTC, including
    - Patients diagnosed with chronic conditions
    - Frequent users of ambulance or ED
    - Patients recently discharged from a hospital
    - Hospice and home health patients
    - Frail patients who have difficulty leaving their homes.

- **Scope of services**: All case study sites provide home visits but the specific services furnished vary with the CP program's mission.
    - Two sites link frequent 911 callers and other medically vulnerable persons to health care, health insurance, housing, social services, and transportation assistance.
    - Two sites provide patient education, medication reconciliation, and other disease management services to persons who are frequent 911 users or are discharged from a hospital with a chronic condition.
    - At two sites, CPs respond to acute needs of persons who are receiving home-based care, such as persons receiving home health or hospice care.

- **Didactic training for CPs**
    - Three sites had developed in-house training.
    - One site used a curriculum provided by a community college.
    - All sites provided supervised clinical training relevant to the needs of their target patient population.
    - All sites require CPs to shadow more experienced CPs before working independently.

- **Service/referral partnerships**: Each program had partnerships with one or more entities, including hospitals, primary care practices, home health and hospice agencies, social service organizations, Area Agencies on Aging, faith-based groups, and care coordination teams.

- **Primary outcome measures**: Outcomes assessed include
    - Avoidance of admissions to a hospital, ED and/or skilled nursing facility (SNF)
    - Reduction in number of missed medical appointments
    - Improvement in medication adherence
    - Reduction in rate of ambulance transports
    - Successful linkages to social services
    - Patient ability to successfully manage healthcare needs independently after intervention
    - Hospice revocation
    - Cost savings

- **Facilitators of programmatic success**
    - Maintaining a patient-centered approach
    - Customized, in-house, on-site training for CPs
    - CPs who are dedicated and able to work effectively with patients
    - High physician, nurse and CP buy-in
    - Productive, collaborative relationships with partners marked by trust and transparency
    - Collaborating with partners to develop operational processes and disseminate them to both CPs and partner agency staff

- **Facilitators of patient success:** Patient success was facilitated by CPs ability to help patients obtain
  - Insurance coverage
  - A primary care physician
  - A broader network of long-term supports
  - Transportation for medical appointments

- **Key challenges**
  - State regulations about paramedic scope of practice and state credentialing requirements for online medical control
  - Limitations of the local healthcare delivery system
  - Developing protocols at onset of program that were acceptable to all partners
  - Lack of resource to serve all eligible patients
  - Difficulty setting up appointments for hard-to-reach patients
  - Lack of congruence between the program's goals and some patients' goals for care

- **Sources of funding**: Sources of payment for services varied and included
  - Grants
  - Contracts with health plans
  - Insurance reimbursement
  - Reimbursement from partner hospital departments and hospital's proprietary insurance plan
  - Agency's own resources

Conclusions and Recommendations

Overwhelmingly, key informants were positive about CP programmatic endeavors and related key lessons learned. Key advice included:

- Exercise careful planning of CP scope of work and interventions prior to program implementation
- Establish partnerships and maintaining regular communications with partners
- Develop a plan to achieve financial sustainability
- Perform ongoing evaluation of performance on key metrics.

Cross-cutting themes across programs included:

- The importance of developing strong partnerships
- Attention to the regulatory environment
- Securing sustainable sources of funding
- The value of in-house training
- The importance of a paramedic workforce that is motivated to provide MIH-CP services

There is a limited yet growing body of evidence that MIH-CP programs can contribute positively to the well-being of individuals receiving or at risk for needing LTC. The 4 sites studied for this project revealed wide variation in approaches and services offered. All 4 MIH-CP programs fill important gaps in a fragmented healthcare delivery system for patients who need long-term care.

Multiple MIH-CP models may reduce ED utilization and potentially avoid or delay need for nursing home placement, long-term home health or homemaker services. As MIH-CP programs are established across the country, rigorous research will be needed to assess outcomes and evaluate the clinical effectiveness of MIH-CP interventions with these populations.

MIH-CP: A Resource for Community-Dwelling People at Risk for Needing Long-Term Care

Background

Mobile integrated healthcare – community paramedicine (MIH-CP) — is a term used to describe new models of care in which specially trained emergency medical technicians and paramedics (EMT-Ps) deliver a broader range of services than traditional emergency response and transport to an emergency department (ED).[1] Programs are primarily focused on reducing ED visits and hospitalizations and/or improving access to other health care and social services. For instance, some initiatives provide preventive services, such as home assessments and education to reduce the risk of falls, a major risk factor for home health and nursing home utilization. Other MIH-CP programs focus on senior citizens and/or younger persons with debilitating chronic conditions, helping them to manage chronic diseases, such as chronic obstructive pulmonary disorder, congestive heart failure, and diabetes. It is posited that these programs may reduce demand for long-term care (LTC) because better control of chronic conditions reduces the risk of physical disabilities that may generate LTC needs.

MIH-CP initiatives are usually designed to meet specific local needs and leverage partnerships among local health care providers. According to a survey conducted by the National Association of Emergency Medical Technicians (NAEMT), by 2014 more than 100 emergency medical services (EMS) agencies in 33 states and the District of Columbia had implemented one or more MIH-CP initiatives.[2]

The EMT-Ps who provide MIH-CP services are typically referred to as community paramedics (CPs) and receive standardized training in addition to customary EMT-P preparation. They work under the direction of physicians and in collaboration with staff of health and social services agencies in their communities.

This landscape analysis with case reports focuses on MIH-CP programs that serve persons at risk of needing long-term care. We describe the range of services provided, the training of EMT-Ps, and, where available, information about the outcomes these programs have achieved, as well as their funding sources. Particular emphasis is placed on relationships between MIH-CP programs and LTC providers in the communities they serve. Due to the dearth of peer-reviewed studies of MIH-CP programs, the report focuses

primarily on describing MIH-CP programs that serve persons at risk for needing LTC.

Methods

Landscape Analysis

We conducted a web-based search for gray literature resources on MIH-CP, including the National Association of Emergency Medical Technicians (NAEMT) Mobile Integrated Healthcare and Community Paramedicine Survey (2015) and Community Paramedicine Insights Forum (CPIF) webinars about active community paramedicine programs. We also performed targeted searches in PubMed, CINAHL, and Google Scholar to identify peer-reviewed articles. We reviewed the bibliographies of promising articles and reports for further reports and articles.

Search Terms

Search terms included community paramedicine, mobile integrated healthcare, advanced care paramedic, hospital emergency room paramedic, pre-hospital emergency care, paramedic practitioner, elderly paramedicine, new role paramedic, and long-term care paramedic. The search was limited to English language websites and abstracts of studies published in English.

Inclusion and Exclusion Criteria

Gray literature and peer-reviewed literature that met inclusion criteria included studies and reports of MIH-CP programs that explicitly indicated that they served persons at risk for long-term care as well as programs for persons with conditions that place them at risk for needing long-term care if not well controlled (e.g., chronic obstructive pulmonary disease, congestive heart failure, or diabetes). Programs and studies sited outside of the United States were excluded from this report.

Case Study Selection

We consulted gray and peer-reviewed literature and content experts in the field to identify U.S.-based candidates for case study selection, with the goal of broad representation of communities, geographic locations, patient populations, and program models.

Consenting agencies were sent a web-based survey that was completed by leaders of the MIH-CP program. The survey ensured uniform collection of information regarding program size, structure, and scope of services. Three to five semi-structured interviews were then conducted for each program. Interviewees included leadership, community paramedicine staff, and staff from external partnering agencies, such as home health agencies and skilled nursing facilities, to obtain the perspectives of multiple stakeholders. For one case study, we also relied on a peer reviewed article of 1 of its 2 CP initiatives that serve persons at risk for needing long-term care.[3]

Results

Landscape Analysis

Our targeted search yielded 58 gray literature resources and 28 peer-reviewed articles. An additional peer-reviewed article on 1 of the case study sites, Northwell Health, was published after the literature search was completed.[3] Among these, 23 gray literature resources and 9 peer-reviewed articles met the inclusion criteria. All of the peer-reviewed articles reported result from observational studies, specifically cross-sectional, retrospective cohort, and descriptive case studies. We identified no randomized controlled trials.

Types of Community Paramedicine Interventions

MIH-CP programs relevant to populations at risk of needing long-term care were characterized by an array of interventions in the gray literature. Programs often encompassed a combination of several approaches. Of the 23 gray literature resources, chronic disease management and home visits were the services most frequently offered. Medication reconciliation, hospital discharge follow-up, and fall/risk prevention followed closely behind. Least mentioned services included after-hours care for home health or hospice and mental health.

Types of Organizations

The MIH-CP programs that provided services to persons at risk for needing LTC were housed in 3 types of agencies: fire departments, hospitals or medical centers, and privately owned emergency medical services providers. We found that most programs were based in private agencies (11) and

hospitals or medical centers (10), with only 2 sources featuring programs operating out of a fire department.

Training

In general, the gray literature described MIH-CP training as a combination of didactic courses and clinical supervision. Several programs utilized didactic training in community colleges, while others had in-house didactic training provided by staff of the organization operating the MIH-CP program and/or staff of partner agencies. Some sources mentioned a clinical component in the training, through which paramedics learn to perform physician-ordered procedures for the target patient population.

Partnerships

Partnering to deliver services with community-based organizations was universal. Partners frequently included home health agencies, hospitals, and primary and specialty care physician practices. Often these partnerships were referral generating. Collaborations with public agencies such as the Department of Public Health and Area Agencies on Aging were also evident. Most of the literature did not provide detailed information about the nature and extent of partnerships. In some cases the partner's role may only have been to provide funding for the MIH-CP program.

Sources of Funding

We discovered multiple public/governmental and private sources of funding for MIH-CP programs. Most frequently, MIH-CP programs featured in gray literature resources were funded by foundation grants. Other common forms of financial support were agency or internal budgets and state grant funding such as from the state department of public health. Three featured agencies were funded by the Centers for Medicare and Medicaid Services (CMS) Innovations Grant. Nine programs did not specify sources of funding.

Outcomes

Approximately 50% (n=11) of gray literature resources mentioned outcomes of MIH-CP programs serving persons at risk of needing long-term care. Among sources that reported outcomes, the metrics most frequently reported were ED and hospital admission avoidance (8), ambulance transportation reduction (7), and cost savings resulting from intervention (5). Patient

satisfaction, hospice revocation, and medication adherence were also represented in the metrics.

The frequency with which the gray literature sources provided quantitative data on the various outcome measures varied. Among those that reported data, the following achievements were reported: a reduction of the volume of 911 calls, an increase in availability of bed-hours in EDs, a decrease in hospital readmission rates, a reduction in ambulance transport, fewer days in the hospital, and favorable patient and physician satisfaction.

Case Studies

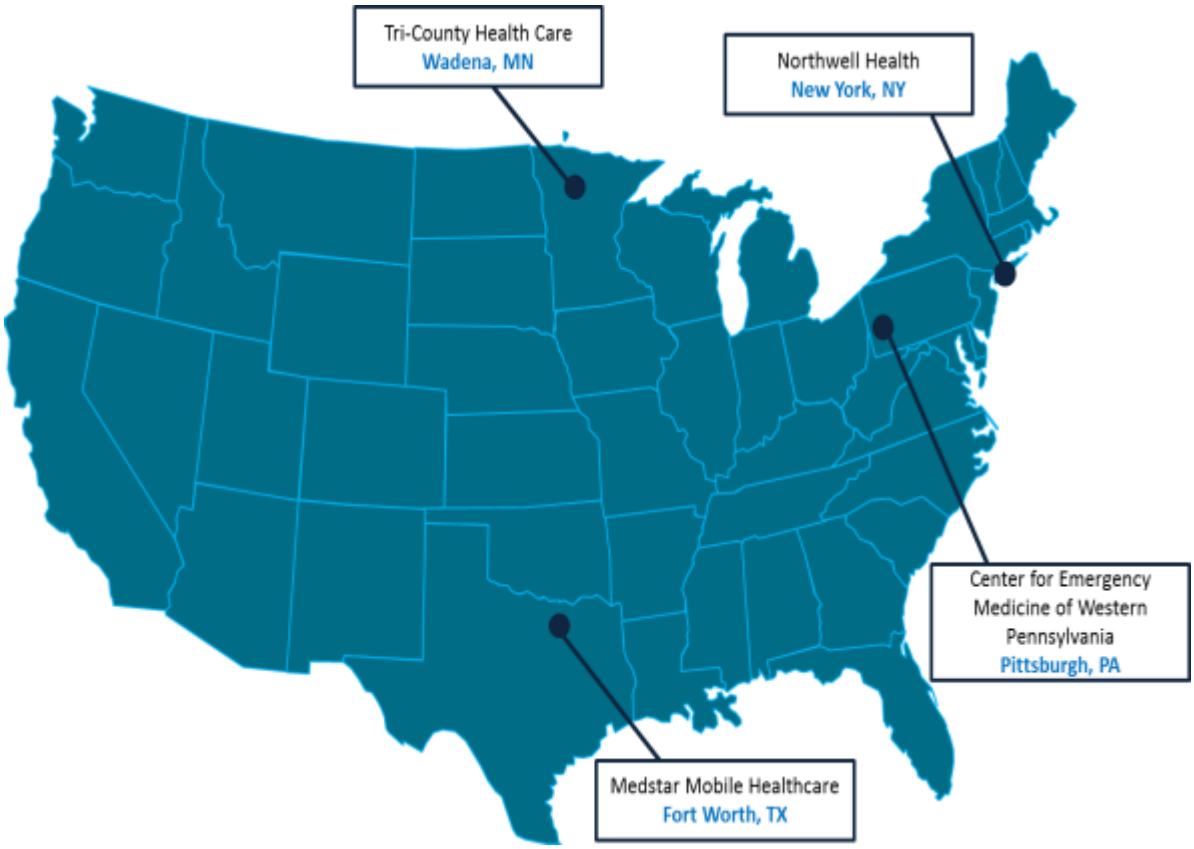
Introduction

With the goal of including broad geographic and demographic representation, 4 agencies with MIH-CP programs were selected: 1) Tri-County Health Care in Wadena, Minnesota; 2) Center for Emergency Medicine of Western Pennsylvania, Pittsburgh; 3) MedStar Mobile Healthcare in Fort Worth, Texas, and; 4) Northwell Health on Long Island, New York. These agencies span Midwest, Southwest, and Northeast regions of the U.S. (Figure 1). Two of the programs are situated in semi-urban areas (Pittsburgh, PA and Fort Worth, TX), and one is situated in a health system that covers urban and suburban areas (New York, NY metropolitan area). In contrast, the program in Wadena, MN is in a rural locale. The types of agencies operating MIH-CP programs are also diverse and include hospital, private ambulance, and non-profit settings.

Findings from interviews conducted with each of the agencies are summarized individually in the following order: Pennsylvania, Minnesota, Texas, New York. Among the cases, Pennsylvania is a quintessential community paramedicine program, with a public health-oriented, collaborative model of care that leverages the skills of paramedics and EMS systems to address community-specific healthcare gaps under limited medical control. The highlighted programs from Minnesota and Texas interweave MIH and CP interventions that encompass both home visits to help patients obtain education and resources to reduce healthcare utilization, and response to acute medical needs. At the other end of the spectrum, New York's program is the most illustrative of a model of mobile integrated health, as it integrates CP services with hospice care and home-based

medical care for frail senior citizens with chronic conditions and responds to these populations' acute medical needs under physician direction. Following the descriptions of the programs, we discuss cross-cutting themes from all four cases.

Figure 1. Map of Case Study MIH-CP Programs



Pittsburgh, PA: CONNECT Community Paramedicine Program

Table 2. CONNECT Program Overview – Pittsburgh, PA

Program Setting	Number of CP Staff	Training Require-ments*	Target Popula-tion	Estimated Number of Patients Served Annually	Partners	Sources of Funding
Hospital-based, non-transporting CP agency in partnership with Allegheny County EMS Council and Congress of Neighboring Communities (CONNECT)	2 full-time and 7 part-time CPs	1 week of didactic courses developed in-house plus shadowing experienced CPs	Allegheny County residents deemed medically vulnerable by a provider	150	Hospitals, Social service organizations, Area Agency on Aging, Faith-based groups, Home health agencies	Mix of grant funding and contracts with health plans; targeting future contracts with hospital partners

**beyond what state requires for licensure as a paramedic*

Program Description

The Center for Emergency Medicine of Western Pennsylvania, a hospital-based, non-transporting paramedic agency, has operated a community paramedic program since 2003. In 2013, the Center was asked to manage an initiative to provide community paramedic services to vulnerable persons in Allegheny County on behalf of the Allegheny County EMS Council (representing 44 EMS agencies) and a municipal government collaborative called the CONNECT (Congress of Neighboring Communities). The initiative was funded for 2 years by 2 major health systems in the area. The CONNECT program was established to address dual concerns: the financial burdens carried by EMS agencies in the county and the needs of Allegheny County's

vulnerable patients. It was designed to demonstrate the ability of paramedics to provide more than medical transportation to local health systems.

Services Provided

Services provided by the CONNECT program include assisting patients with chronic disease management, providing medication reconciliation, delivering education about the use of medical equipment, conducting home visits, providing transportation to medical appointments, and offering some mental and behavioral health support. CPs act as navigators for patients, connecting them to social services, public benefit resources, and physician providers in the community. The CPs tailor interventions to patient needs by conducting a comprehensive intake assessment to ascertain a patient's environment and social determinants of health. During the assessment, CPs use a patient-centered approach, inviting patients to define priority areas to work on. They also use motivational interviewing techniques to support adoption of new behaviors that may help patients achieve more optimal levels of health.

A patient may remain enrolled in the program as long as necessary to accomplish their goals. The program has no limitations on the number of home visits a patient may receive. Length of CP engagement with a patient may range from a single encounter to multiple home visits over 18 months, depending on the complexity of the patient's needs. Housing needs are a major predictor of the length of time a person receives CP services. Like many communities across the United States, Pittsburgh has a shortage of subsidized housing for low-income persons. CPs help patients who are homeless or precariously housed to navigate the lengthy and complex processes associated with obtaining subsidized housing.

Target Population

Patients who live in Allegheny County and are deemed medically vulnerable by a provider at the hospital, a health insurance care manager, or an EMS agency are eligible for the CONNECT program. Patients recently discharged or identified as frequent users of ambulance services or EDs are often targeted by the program. Typical characteristics of the population served by CONNECT include: average age 63 years, which is significant because these participants do not yet qualify for Medicare or benefits from the Area Agency on Aging (AAA); and 3 chronic illness diagnoses. Seventy percent have one or more mental health diagnoses. High blood pressure and high cholesterol are the most prevalent chronic medical conditions. Some patients also are

receiving hospice or home health services. In addition, many of these patients live alone (about 40%), and some are at risk of losing housing (about 5%). The most common patient priority areas are assistance with transportation, care coordination, and activities of daily living.

Staff, Training, and Personal Motivation

CONNECT employs two full-time and seven part-time CPs. The CPs have a diverse skillset, such as a background in advanced life support paramedicine, and some have prior experience working in home health settings.

Training consists of one week of didactic courses developed in-house and shadowing with experienced CPs for hands-on experience with patients. The training includes a brief overview of chronic disease management, although the majority of the curriculum focuses on themes involving the social determinants of health, mental health, and motivational interviewing. CONNECT also hosts *ad hoc* training sessions to keep CPs up to date on community resources and public benefits. Interviews of staff at CONNECT's hospital partner, The University of Pittsburgh Medical Center (UPMC), endorsed that CPs are adequately trained to work with patients referred to CONNECT.

CP interviewees attributed the appeal of becoming a CP to the opportunity it provides to offer preventative services. They also appreciated having the time and resources to help patients more fully than during 911 calls. Working as a CP is also more accommodating to previous work-related injuries because the work is less physically demanding. In the words of one paramedic who shared her motivation for becoming a CP: *"I … had previously gotten injured as a paramedic. Had 27 years with paramedicine on a truck, and I really missed the patient care aspect. I love to help people. I was attracted to this because I knew its potential to actually help people".*

Referrals and Partnerships

Sources of referrals to CONNECT include specialist physicians, acute care facilities, hospital social workers, hospital discharge planners, care managers from health insurance providers, and EMS personnel from other agencies in the county. The CONNECT program estimates 70-80% of referrals originate from hospitals. Hospital partners typically refer patients following inpatient stays, as these patients are deemed to be at a high risk for readmission. On occasion, social workers make referrals to CONNECT from outpatient clinics,

or make a referral post-hospital discharge in which the CPs will "cold call" the patient to introduce services and set up a home visit.

The CONNECT CP program enjoys close partnerships with myriad organizations, such as hospitals, social service organizations, the Area Agency on Aging, faith-based groups in the community and home health agencies. For this report, partner interviews were limited to UPMC's care management staff.

The partnership with UPMC hospital care coordination began 3 years ago with the inception of the CONNECT program. Care coordination social workers and care manager staff described being receptive to partnering with the program. They felt the program would be beneficial since they see many medically complex patients who often have mental health needs and who often do not have health insurance or an established primary care provider. Interviewees indicated that the program helps patients to meet psychosocial needs that physician practices are not able to address. Other perceived benefits from the partner perspective include the CP's knowledge and effectiveness in connecting patients with social services, as well as having an alternative for patients who need extra support but resist home health services or admission to a skilled nursing facility. CPs are authorized to share results of comprehensive intake assessments with UPMC staff as necessary, which facilitates smoother transitions of care.

Hospital and CP partners described a strong sense of collaboration. The partners coordinate during regularly scheduled monthly meetings to discuss current cases, past cases, and statistical data about accomplishments. Partners also communicate via telephone and collaborative software on an *ad hoc* basis.

CPs interviewees said home health agency staff were initially hesitant about collaborating with the CPs, but after they learned more about the program they have accepted the CPs with "open arms." There are limits to the number of visits home health agencies can offer to a patient under insurers' guidelines for reimbursement. The CONNECT program is not bound by these guidelines; thus, CP visits supplement visits from home health agency staff. CPs also help home health agencies obtain transportation and other non-medical services that patients need to continue living independently.

Outcomes

Definitions of patient success in the program are both medical and social in nature because social determinants exacerbate and compound the medical conditions. Primary outcome measures examined by the program include avoidance of admissions to the hospital, ED, and skilled nursing facilities, number of missed appointments, medication adherence, rate of ambulance transports, and number of patients successfully connected to social services. Other metrics that contribute to the sustainability of the program include cost savings, patient perception of quality of life, and sustained connection to supports after CONNECT interventions. The partnership has helped achieve a positive impact on outcomes that are important to the UPMC care coordination department, particularly readmission rates and repeat visits to EDs. UPMC reports that patients and families are highly receptive to the CP program and interventions. Key informants say CP case management/referral services, which include helping clients obtain health insurance, seem to have also significantly decreased the number of uninsured patients.

Facilitators of Success

Maintaining a patient-centered approach, in which both CONNECT and patient priorities are coordinated, is critical to realizing positive patient outcomes. CONNECT and UPMC interviewees provided an example of the program honoring both patient and healthcare interests. A patient, newly reliant on an electric wheelchair for mobility, set goals to achieve independence and ability to leave the home without assistance. The CONNECT program linked the patient with a community-based organization that built a ramp in the patient's home. The ramp not only helped the patient achieve the goal of increased independence, it also increased the patient's access to doctor appointments, which aligned with CONNECT's goals for the patient. UPMC partners mentioned being impressed with the way the CPs prioritized making visits to patients during hospitalizations to introduce the program and frequently initiated collaboration with UPMC staff.

Challenges

Challenges cited by CPs primarily related to the nature of providing direct service to individuals, and the overarching community context of the healthcare delivery system. CPs said experiencing "compassion fatigue" is a challenge of the work. Patient priorities are not always aligned with achieving and maintaining a better state of health, which can challenge CPs'

commitment to respect patient self-determination. CPs cope with these challenges by giving themselves permission to verbalize frustrations and offer supportive listening to one another.

The external environment also presents challenges. Allegheny County is the second most populous county in Pennsylvania and consists of over 100 municipalities. This has resulted in a proliferation of modes of delivering health services which are increasingly fragmented and difficult to navigate. Connecting patients with public benefits such as housing and transportation assistance is a lengthy and often convoluted process.

Challenges noted by UPMC partners were attributed to "growing pains" at the beginning of the partnership and external limiting factors. The growing pains were related to the CP's widening network and limited staffing, which resulted in delayed patient visits. The interviewees expressed that CPs have since grown in their capacity to successfully manage the volume of referrals and provide timely response. An external limitation to the partnership is not having access to each other's documentation regarding patient encounters. UPMC is hopeful that a technological solution will be implemented in the coming years.

Funding

The CONNECT program is currently supported by a mix of grant funding and contracts with health plans such as Highmark (the Blue Cross Blue Shield carrier in the region) and the UPMC Health Plan. The program is targeting future contracts with hospital partners.

Wadena, MN: Tri-County Health Care Community Paramedicine

Table 3. Tri-County CP Program Overview, Wadena MN

Program Setting	Number of CP Staff	Training Requirements*	Target Population	Estimated Number of Patients Served Annually	Partners	Sources of Funding
Hospital	8 part-time CPs	16 credit course on community paramedicine provided by a technical college plus shadowing experienced CPs	Patients identified by the hospital as frequent utilizers, recently discharged, have a chronic disease diagnosis, are in need of home health services, and/or live in assisted living facilities	300	Tri-County care coordination team and external home health agencies	Hospital budget, and some insurance reimburse-ment for CP patient encounters

**beyond what state requires for licensure as a paramedic*

Program Description

Tri-County Health Care is a hospital situated in a rural area in one of the poorest regions of Minnesota. Many people in the area have complex medical needs as well as difficulty accessing appropriate, timely healthcare. The Tri-County CP program developed as a response to the hospital's need to decrease demand on its ED. The program's goal is to proactively provide the care that residents needed. The CP program is operated by the hospital's EMS department. The program began by conducting scheduled visits to patients with chronic illness who frequently readmit to the hospital. The scope of the program later expanded to serve not only patients who frequently utilized the ED, but also those who need short-term home-based support.

Services Provided

Services provided by the CP program include assistance with chronic disease management, fall prevention, medication reconciliation, patient education, after-hours care for home health agencies and Tri-County Hospital's care coordination department, and case management and referrals to other providers. The CPs augment home health services during off-hours and immediately post-hospital discharge because home health agencies are not always able to schedule visits within the first day or two post-discharge. Having CPs provide in-home visits to bridge the gap between hospital discharge and initiation of home health services helps to reduce the risk that patients will be readmitted. The CPs also serve patients who are only covered for a limited number of home health visits but need additional support in the home as determined by the hospital's care coordination department. Specific services include providing wound care, changing and care of tracheostomies and feeding tubes, in-home blood draws to transport to the lab, and injecting medications. These activities take place during scheduled visits in the patient's home. The CP program schedules home visit appointments according to patient preference, to the extent possible. To ensure program activities stay within paramedic scope of practice, the medical director provides oversight and maintains communication with the referral network requesting CP services. When possible, CPs meet with patients at the hospital prior to discharge to orient them to the program.

Target Population

The program primarily targets patients that have been identified by the hospital as frequent utilizers, were recently discharged, have a chronic disease diagnosis, are in need of home health services, and/or live in assisted living facilities. Typical characteristics of patients served by the program are older adults of low socioeconomic status who have multiple chronic conditions. CPs provide enrolled patients with a telephone number to contact the CP program directly, and encourage patients to call in the event of a change in their condition between visits. Patient engagement with the CP program is terminated upon completion of services requested by referring doctor.

Staff, Training, Personal Motivation

Of the ten full-time paramedics the Tri-County EMS employs, eight are trained as CPs. The department has at least one CP on duty at all times. Due

to limited resources, Tri-County does not have a full-time designated CP, and CP paramedics must respond to 911 calls during their shifts in addition to completing scheduled CP visits. The program has a designated vehicle for CP visits. However, when a CP visit is requested after hours, or a patient is located a significant distance away, the CP will take the ambulance with an EMT partner to cover the call. This arrangement helps to ensure ability to continue to cover 911 calls during a CP response.

Required training for the Tri-County CP program consists of a three-month, 16-credit course on community paramedicine provided by a technical college. Most of the coursework is online and includes a clinical component in which community paramedic students pair up with a physician in the community to supervise and evaluate the students' performance of certain procedures. After coursework is completed, the Tri-County CP program requires newly trained CPs to shadow more experienced CPs before working independently. The duration of the shadowing component is dependent upon CPs' demonstrated competency in performing required treatment procedures.

Interviewees unanimously expressed that the technical college training seemed inadequate preparation for work as a CP in the field. CP interviewees reported the online courses covered many topics that were already familiar from paramedic training, and provided only limited training on new topics pertinent to CPs, such as disease processes and pharmacology. However the interviewees reported that Tri-County CP's requirement to have new CPs shadow experienced CPs makes up for the shortcomings of the didactic course. The first trained CPs did not have the opportunity to shadow experienced CPs, and relied heavily on the guidance of supportive hospital physicians, nurses, and medical directors whom they would call directly. They described these providers as receptive to CPs' calls because they saw the value of their work as a potential mechanism for decreasing demand on the ED.

Referrals and Partnerships

Referrals are primarily generated within the hospital network and typically come from treating physicians in the hospital's ED, inpatient units, and outpatient clinics, and from care coordinators and social workers. Interviewees reported that the frequency with which physicians make referrals varies depending on their familiarity with the CP program. Less frequently, CPs will request a CP intervention for a patient frequently served in the field by Tri-County EMS. The request is routed to the EMS medical

director, who reviews the EMS documentation on the patient and determines whether to authorize the referral.

Partners of the CP program include the Tri-County care coordination team and external home health agencies. The internal partnership was predicated on the CPs' need for referrals and care coordination's inability to provide a 24-hour registered nurse (RN) call service. After the first year of the CP program, the CPs initiated a partnership with a home health agency. Interviews with partners were limited to Tri-County staff members.

Care coordination and CP teams convene during weekly multidisciplinary meetings at the hospital. Home health agencies join this meeting at least once a month. Social workers on the care coordination team oversee and coordinate services provided by CPs and home health to ensure adequate patient support in the home. Having the social workers on the hospital's care coordination team mediate the relationship between CPs and home health agencies was seen as a benefit to the partnership because it helps to maintain the trust of home health agencies. CPs described being very sensitive about honoring the relationship with home health and not replacing their visits or reducing home health revenue.

The care coordination staff reported that benefits of the CP program included the program's ability to provide continual updates on patient status and immediate results of blood draws without requiring an outpatient appointment. Partnering with CPs also helps the care coordination team to convey to patients that members of the hospital's various teams are working together to help patients. The CP program has also relieved the care coordination team of the need to be on call during off hours. Further, the CP program represents an alternative care resource for patients unwilling to receive home health care.

Outcomes

Primary outcomes important to the CP program include hospitalization and ED avoidance, reduction in the number of ambulance transports, and improved patient medication adherence. Goals specific to care coordination partnership include reducing clinic visits, trips to the ED, and hospital admissions. Interviewees reported that the CP program has been effective at meeting these goals.

Facilitators of Success

Interviewees reported that 2 factors are critical to the success of the CP program: (1) having a network of hospital staff dedicated to the success of the program, and (2) having CPs that are able to work effectively with patients. According to interviewees, CPs make an effort to establish rapport with patients during the hospital admission, which facilitates increased receptivity to CP intervention post-discharge and patient motivation to adhere to plans of care. One key informant expressed that patients are often motivated to work with the CPs because, *"they don't want the [hospital bill] and they want to be cared for and know someone cares for them; it's these intangibles that really sell this program."* Factors contributing to the success of the partnerships from a care coordination perspective include physician acceptance and support of the program, and holding weekly multidisciplinary team meetings.

Challenges

Many challenges cited by interviewees were related to limited resources available to serve people who live across a large geographic area. For example, in the event of an unexpected CP call, estimated response time may be over an hour depending on the location of the patient. Program leadership indicated that providing a full-time CP staff would remedy this, although it is not currently a viable option because the agency is small.

Other challenges expressed by CP interviewees related to lack of a defined termination process with patients. Sometimes patients who have been served by the program will call asking for services more than a year post-intervention even after their referral goals have been completed and a doctor has determined they no longer need services. When this occurs, the program is limited to making referrals to resources in the community.

Challenges cited by partner interviewees included CPs initially not having the ability to document patient encounters in the electronic medical record, which hampered communication and ability to bill for an intervention – this issue was subsequently resolved. Another challenge is the threat to patient privacy caused by CP use of an ambulance or hospital-marked vehicle. Care coordination staff were concerned that patients might not want to have an ambulance in front of their homes because that could invite unwelcome questions from friends and neighbors. To achieve broader acceptance in the community, Tri-County EMS has made a concerted effort to promote the

program by informing the public about its services at community events and by meeting patients during inpatient stays prior to home visits. Partners interviewed also indicated that they have become less concerned as they have received abundant positive feedback from patients.

Funding

As an embedded program within the hospital EMS department, the CP program is financially supported by the hospital budget. The hospital is able to bill insurance for some CP in-person patient encounters; the reimbursement rate is a fixed amount per 15 minutes spent with a patient, plus drug administration, and blood draws. To receive payment from insurance plans, CP documentation in the medical record must reflect each service provided and the time spent with the patient and a physician order. In addition to funding from hospital budget and insurance billing, the CP program was recently awarded a 2-year grant from the Minnesota Department of Health to provide follow-up care to patients who were hospitalized due to a stroke.

Fort Worth, TX: MedStar Mobile Healthcare Community Health Program

Table 4. MedStar Program Overview, Fort Worth TX

Program Setting	Number of CP Staff	Training Requirements *	Target Population	Estimated Number of Patients Served Annually	Partners	Sources of Funding
Inter-governmental EMS agency	2 full-time MIH paramedics and 7 critical care paramedics	MIH paramedics = didactic and clinical in-house training, totaling about 180 hours Critical care paramedics = additional 100 hours of didactic in-house training after completion of MIH paramedic training	Two types: (1) High ED utilizers/ patients at high risk for readmission (2) Hospice and home health patients	724	Hospitals, home health agencies, hospice agencies	Contracts with partnering healthcare providers

**beyond what state requires for licensure as a paramedic*

Program Description

MedStar, an inter-governmental EMS agency that serves Fort Worth and 14 other member cities in North Central Texas, established its Mobile Healthcare Community Health Program in 2009. The program began by targeting patients who were frequent 911 users and provided regularly scheduled home visits to support patient medication adherence and patient follow-up with their primary care physician. MedStar began looking for ways to expand the program and conducted a needs assessment, seeking input from various agencies and healthcare providers to ascertain gaps in the healthcare system and needs of patients. Major needs identified included reducing readmissions among persons discharged from a hospital for a chronic condition. Local hospitals were interested in reducing readmissions because they wanted to improve patients' health and avoid financial penalties that Medicare imposes on hospitals with high rates of readmission within 30 days of discharge.

MedStar was able to leverage its experience providing home visits to frequent 911 users to develop a new home visiting program aimed at preventing readmissions. Other needs identified concerned home health and hospice agency patients who call 911 for assistance with needs that could be met in their homes. To address these needs, MedStar developed new partnerships with home health and hospice agencies under which CPs respond to calls from these patients.

Services Provided

MedStar's Mobile Healthcare Community Health Program provides comprehensive healthcare services to patients it directly serves in the community and refers patients to other community resources they may need. Services provided by MedStar are differentiated to better suit the needs of a particular patient type. Patients are segmented into 2 groups: (1) high utilizers and patients at high risk for unnecessary hospital readmission (hospital readmission avoidance patients), and (2) hospice and home health patients. All enrolled patients are flagged accordingly in the computer-aided dispatch center database, to pair patients with the appropriate MedStar services.

Services delivered to high utilizer and hospital readmission avoidance patients include chronic disease and illness management, medication reconciliation, education about proper use of medical equipment, fall prevention, mental/behavioral health support, and referrals to other healthcare providers. These services are delivered via a series of scheduled home visits. High utilizers receive 2 scheduled visits per week for a period of 90 days, plus unscheduled, acute support as needs arise. Readmission avoidance patients receive 2 scheduled visits per week for a period of 30 days plus unscheduled support as needed.

Services to home health and hospice patients are rendered primarily on an acute-needs basis. When home health or hospice patients call 911, the dispatch center's computer system alerts the dispatcher to their status. CPs are dispatched to respond to these calls. In addition, sometimes a home health agency will request a Medstar assessment visit in the event they are unable to conduct a home visit during off-hours or within 24 hours post hospital discharge.

Target Population

Characteristics of high utilizer and readmission avoidance patients typically include chronic disease diagnosis, being identified as a frequent user of ambulance or ED services, or having been recently discharged from a hospital. These patients often have insufficient health insurance coverage. Congestive heart failure (CHF), chronic obstructive pulmonary disease (COPD), diabetes, and asthma are common diagnoses for these patients. Interviewees also report that patients in the high-utilizer program frequently need community resources such as behavioral health services and transportation assistance.

Patients in the hospice and home health population are identified by partner agencies for enrollment with MedStar. These patients typically have a diagnosis of COPD, CHF, and/or have families with concerns about the patients' pain issues. Many of these patients are homebound, and a small percentage is at risk for admission to a skilled nursing facility.

Staff, Training, and Personal Motivation

MedStar currently has nine full-time paramedics who are trained to work in the Mobile Healthcare Community Health Program. The paramedics are divided into two groups that have different levels of training and serve different segments of Medstar's population: (1) two mobile integrated health (MIH) paramedics who focus on patients in the high utilizer and readmission avoidance programs, and; (2) seven critical care (CC) paramedics who prioritize episodic response to patients in all programs, with special focus on hospice and home health-enrolled patients. As demand for the program has increased, the staffing structure has expanded to include a few part-time paramedics who are trained to perform both MIH and CC paramedic roles. MIH paramedics work 12-hour shifts on four days of the week solely for scheduled home visits; CC paramedics are staffed at all hours every day of the week, and may also perform scheduled home visits, but only as a secondary role to fill in staffing needs.

The training curriculum for MIH paramedics consists of a combination of didactic and clinical time, totaling about 180 hours. To attain designation as a CC paramedic, an additional 100 hours of didactic training is required. All the training is modularized to cover the various target populations served and was developed in-house with the collaboration of partners. In addition to population-specific training, the curriculum also covers motivational

interviewing, resource identification, and care planning. The clinical component entails 96 hours of ride-alongs with hospice nurses, clinicians in cardiac care clinics, and rotations with partner home health nurses, social workers, and behavioral health specialists to provide the paramedics with exposure to target populations and specific approaches to caring for them. *Ad hoc* trainings are also incorporated according to expanding needs of target populations, such as Foley catheter placement and changing, and wound care, including use of wound vacuums.

Key informants who had experience working in an MIH or CC paramedic capacity indicated that the training for these roles was adequate. In the event that these paramedics encounter a situation that they feel unsure how to handle, there is sufficient support from patients' primary physicians and online medical directors who are always available to provide guidance. Interviewees' reasons for becoming an MIH or CC paramedic included a desire to make a long-term impact with patients frequently transported to the ED, an interest in filling in the gaps within the healthcare system, a desire to work innovatively and in a way that is in the best interest of patients, and a desire to move away from a limited ED transport response.

Both home health and hospice interviewees indicated that the CC paramedics are well-trained to work with their patients. The hospice partner admitted difficulties at the beginning of the partnership. To address these difficulties, MedStar and hospice decided to jointly bolster the training by expanding the curriculum provided to both paramedics and hospice nurses. Similarly, home health indicated the training has been refined as time has gone on to improve performance. The adjustments have primarily concerned communication protocols and the exchange of patient information.

Referrals and Partnerships

Primary sources of referrals are primary care and specialist physicians, hospital providers, home health, and hospice agencies. The paramedics also make referrals to various agencies and alert patients to public benefits such as discounted hospital-based health care programs for patients who are uninsured and have limited income. One key informant shared an example of a patient who did not have insurance and had two hospital admissions for a COPD exacerbation. Through MedStar, the patient was set up with discounted health insurance through the hospital and was later enrolled in Medicaid. Having Medicaid enable the patient to have a medical home with a

primary care physician, pulmonologist, and physical therapy, and to obtain care from a home health agency that accepted Medicaid.

For this report, partner interviews were limited to a home health partner and hospice partner. The relationship with the home health partner developed from the realization that some patients persistently dial 911 despite being instructed by home health nurses to call the home health agency's 24-hour registered nurse (RN) telephone line regarding a change in their health condition. A 911 response is costly to home health because of financial incentives from health plans to treat patients at the lowest appropriate level of care and to prevent hospital readmissions. At the beginning of the partnership, MedStar only provided services outside of home health agencies' business hours. Services later expanded to include *ad hoc* paramedic visits as requested by home health nurses in the event the agency was unable to conduct a home visit with a patient immediately post-hospital discharge.

Partnership with the hospice agency grew from the agency's desire to prevent hospice revocation. Similar to home health patients, patients in hospice often dial 911 instead of the 24-hour RN telephone line when faced with urgent medical concerns. The particular hospice agency interviewed for this report was actively seeking partners in the community to help with this issue and initiated contact with MedStar. At the beginning of the partnership, MedStar only provided services outside of the hospice's business hours. The partners decided to expand the scope of the partnership and added hospice medical control, enabling a paramedic to administer medications under the authorization of hospice physicians.

From home health and hospice perspectives, benefits of the partnership include the increased opportunity to solidify their relationship with hospitals providing patient referrals to their agencies. Reportedly, hospitals in MedStar's service area are narrowing their referral networks to include only agencies with low readmission rates, and partners perceive that they receive larger volumes of referrals as a result of the MedStar partnership. One partner interviewee added*, "It is really a win-win-win: for us, the hospital partners, and the patient and family."* A home health interviewee mentioned valuing the paramedics' ability to arrive on scene more quickly than an RN because earlier intervention usually prevents subsequent need for ambulance transport to the hospital. These partnerships have also benefited MedStar staff by giving paramedics greater opportunity to expand skillsets, work with new populations, and learn approaches from other health care professionals.

Examples of new paramedic skills developed through the partnership are inserting catheters and using wound vacuums.

Outcomes

Primary outcome measures for high utilizer and hospital readmission avoidance patients include avoidance of hospital and ER admissions, reduction in the number of missed appointments, reduction in the number of ambulance transports, improved medication adherence, and patient success managing healthcare needs independently after intervention.

For home health and hospice patients, the primary outcome measure is the percentage of CC paramedic visits that result in transport to an ED. Data from one home health partner indicates CC paramedic response is about 10-15% more effective at avoiding transport to the ED compared with no CC response. Hospice metrics indicate the partnership has reduced hospice revocation due to ED admissions by 31%. In numbers and anecdotally, partner hospices and home health agencies see the cost benefit to themselves and psychosocial benefit to the patients and families of having the option to be treated safely in their homes.

An important metric for both service areas is patient satisfaction. Home health partners report patients are highly receptive to the program, and hospice reports a 10% increase in patient satisfaction correlating with the inception of the MedStar partnership. According to one MedStar interviewee, *"The majority of them [patients] are very receptive, and are exhausted from going to the ED. That's their fall back and they don't know what else to do when they are experiencing shortness of breath, etcetera. We do follow-up surveys with them after they have completed enrollment and I believe the numbers are around 90-95% satisfaction rate."*

Facilitators of Success

Interviewees identified several facilitators of success in the high utilizer and readmission avoidance programs, including ability to link patients to insurance coverage and a primary care physician, helping patients establish a broader network of long-term supports, and providing access to medical transportation. These services help patients to control their conditions after intervention. Other success factors included regularly scheduled home visits and patient motivation to avoid hospital transport. In particular, twice per week visits were mentioned as paramount to achieving successful outcomes,

as visits are a means to reinforce medication adherence, monitor health issues, and collaborate with patients' physicians to discuss status and make adjustments to the plan of care.

In the realm of partnerships with hospices and home care agencies, interviewees described the success as hinging on productive, collaborative relationships marked by trust and transparency. Home health, hospice, and MedStar key informants alike reported a close, collaborative working relationship. The partners have established channels of scheduled and unscheduled communication among agency leaders, nurses, and paramedics. Both types of agencies reported having high levels of confidence in the relationship with MedStar. MedStar's sensitivity to avoid a duplication of services, willingness to admit mistakes, and collaborative approach to patient care were mentioned as factors that helped build the relationship. The leader of the hospice agency stated that the *"on-scene collaboration between our nurses and the paramedics is fantastic… it really works like we designed, and it has gotten better and better."* CPs interviewed provided similar positive feedback about relationships with hospice and home health nurses, describing continual communication as a predominant feature of the relationship; one CP added, *"I've witnessed nurses and paramedics don't get along, but that is not the case in this partnership, and it has gotten better over time -- it's an outstanding relationship that we have … the relationships have gelled because of the time we have spent together."*

The in-house, on-site training was also mentioned as a critical feature of success as it increases workers' understanding of partnership priorities and program protocols and creates a foundation for relationships among workers who collaborate on scene. In particular, interviewees mentioned time allotted to cross-training of staff from each partnering agency that entails one-on-one shadowing so that each member of the team is acquainted with the goals of the partnership and the role of each of the players.

Challenges

For the frequent 911 caller and readmission avoidance programs, current challenges cited by MedStar interviewees included difficulty setting up appointments for hard-to-reach patients. MedStar's computer-aided dispatch system is address-based, which can lead to problems locating patients who are in insecure housing situations. MIH paramedics also report difficulties connecting patients who have inadequate insurance to specialist physicians in a timely manner.

For the home health and hospice service programs, interviewees primarily mentioned challenges that occurred when the programs were first launched. These included developing an understanding of services within the scope of paramedic practice, providing adequate education about the program to newly enrolled patients, defining the roles of the paramedic and home care workers, and determining protocol for transitioning on-scene care upon nurse arrival. In addition, MedStar interviewees reported having to overcome personal misperceptions about hospice and home health agencies. Interviewees reported that many paramedics' perceptions were colored by their prior experiences of seeing very sick patients who reported long lapses of time between receiving home health and hospice visits from other area agencies, seemingly rendering patients even more medically fragile. Learning from home health and hospice partners has helped paramedics see that not all agencies are delinquent in providing care to their patients.

Ongoing challenges in the home health and hospice programs relate to timely onboarding and training of newly hired staff by MedStar and the partner home health and hospice agencies so that they are acquainted with partnership goals, communication protocols, and the partner agency staff with whom they will collaborate in the field. Other persistent challenges are keeping an up-to-date census of enrolled patients, understanding what falls within the scope of paramedic practice, and increasing patient compliance with calling the 24-hour RN telephone line instead of 911. Home health also indicated that CC paramedic staffing is the major challenge in the partnership because not every 911 call receives a CC paramedic response due to staffing limitations. The staffing issue is further compounded by the fact that MedStar's service area is smaller than that of the home health agency.

Funding

MedStar Mobile Healthcare Community Health Program is supported entirely by contracts with partnering healthcare providers. Both hospice and home health partners pay a capitated, flat fee per month of patient enrollment. The capitated rate includes response to 911 calls and other urgent requests for home visits, initial visit with patients, and two to three subsequent visits upon patient request. The capitated payment plan incentivizes maintenance of accurate enrollment lists, which helps the program effectively identify eligibility to receive services. Frequent 911 utilizer and readmission avoidance services are funded by contracts with hospitals who pay an enrollment fee for patients referred to the program.

New York, NY: Northwell Health Community Paramedicine

Table 5. Northwell CP Program Overview – New York NY

Program Setting	Number of CP Staff	Training Requirements*	Target Population	Estimated Number of Patients Served Annually	Partners	Sources of Funding
Hospital	40 CP para-medics	40 hours of in-house, didactic training plus prior experience as a Northwell critical care paramedic	Elderly, home-bound patients served by House Calls, and hospice patients	465	Internal partners: House Calls Program and Hospice	A mix of grants, reimbursement from partners and Northwell Health's proprietary insurance plan

**beyond what state requires for licensure as a paramedic*

Program Description

Northwell Health, a healthcare network covering Manhattan and Long Island, New York, established its community paramedicine program in October 2013. The program grew out of a partnership between Northwell's EMS department and its House Calls Program for frail patients who have difficulty leaving their home. The partnership was designed to remedy high ED utilization of the House Calls population during off-hours. Over time, the partnership evolved such that CPs now respond to urgent calls from House Calls patients at all hours of the day. Prior to this change, House Calls physicians and nurse practitioners responded to urgent calls. They sometimes had to cancel scheduled visits with patients or were unable to respond promptly to urgent calls because they were conducting scheduled visits in another neighborhood. Utilizing CPs for urgent calls enables House Calls physicians and nurse practitioners to focus on providing scheduled visits, with physicians stepping away only as needed to provide direction to CPs via audio or video conferencing. The CP program recently began a partnership with Northwell's hospice program.

Services Provided

Services provided by CPs consist primarily of chronic disease management, urgent care for House Calls and hospice patients, medication reconciliation, and transportation to the ED, as needed. Examples of services that CPs provide in the home to avoid transport to an ED include conducting a physical examination, obtaining vitals, monitoring CO2, taking electrocardiograms, and administering medications on the paramedic formulary. Sometimes CPs assist patients who have fallen, and while in the home they might provide fall prevention assessment and recommendation to decrease the risk of future falls. CPs may also receive requests to confirm the death of hospice patients so doctors can prepare a time-of-death certificate. CPs perform assessments and interventions under the direction of a House Calls or hospice physician using audio and/or video conference. The CP average time on scene is one hour.

Target Population

The target population is limited to Northwell House Calls and hospice patients. On average, House Calls patients are 83 years of age, are homebound, have 1 or more chronic conditions, and 5 limitations in activities of daily living.[3] Most patients are covered by Medicare and most need home health services or are at risk for SNF placement. Among 1,602 persons enrolled in House Calls between January 1, 2014, and April 30, 2015, 773 (48.3%) had at least 1 emergency response (CP or traditional EMS) with a median of 2 responses per person.[3]

Northwell Hospice patients are eligible if they live in a specific geographic region of the city, as defined by the funder that has awarded Northwell the grant to provide this service. Hospice patients are often end-stage for chronic diseases such as late-stage Alzheimer's Disease and dementia, Parkinson's Disease, heart failure, and cancer.

Staff, Training, and Personal Motivation

Northwell EMS employs about 40 CPs, which allows for around-the-clock CP coverage and ample flexibility to respond to both 911 calls and calls from patients enrolled in the hospice or House Calls CP program. The staffing pattern is well suited to the program's episodic response to persons with acute needs.

During the design phases of the program, leaders determined that community college training did not adequately match the goals of the CP program. Consequently, a team of Northwell physicians developed a modularized curriculum totaling 40 hours of education, covering topics such as health care policy, along with supervised clinical components relevant to the patient population, e.g., geriatric medicine. Interviewees described training as covering areas new to paramedics, such as the difference in treating chronic illness versus acute emergency situations. Physicians also obtain training to become credentialed as online medical controls (also known as medical direction) in order to legally provide guidance to CPs in the field. Interviewees reported that advantages of the in-house training include relevancy of curriculum to program target population and alignment with the physician-directed model of CP engagement with patients. An additional advantage is the modularized curriculum structure that it is well-suited to the addition of new partnerships.

Paramedic eligibility to pursue CP training includes prior experience as a critical care paramedic. The critical care paramedic designation is a credential that is internally defined by Northwell EMS. Certification is acquired by completing a course taught in the EMS department in combination with an MD-led credentialing process. This requirement originated with the program's abundantly cautious approach in the pilot phase to utilize only the most highly trained personnel.

Physicians rated the adequacy of CP training highly, indicating that CPs are successful in carrying out the role and demonstrate a strong understanding of the patient population. Additionally, physicians sense that CPs' motivations are aligned with theirs in wishing to serve patients in their homes. Physicians have noticed that many CPs are particularly drawn to using empathic conversation during times of crisis and have demonstrated skillfulness at incorporating an element of compassion and personal touch during patient encounters. A CP interviewee recommended that the training include more content about hospice treatment in the home setting and allocate more time to shadow hospice nurses to better prepare them to collaborate with hospice nurses and physicians.

Paramedic motivation for becoming a CP included the decreased physical demand, especially on aging or injured paramedics, as well as an alternative to avoid burnout or leaving the profession altogether. In addition, paramedics with several years in the field cite frustration with transporting patients to the hospital as the only option for patients with problems that could be more

effectively resolved in other ways. The motivation voiced by one paramedic was representative of others: *"as a paramedic, there is always this frustration with bringing people to the hospital that you know you really didn't have to bring to the hospital- knowing you could have helped their issue at home. And then you are taken to the hospitals by protocol and also to cover ourselves from lawyers more than what is in the patient's best interest. I felt like in my 8 years of seeing this, there had to be an alternative."*

Referrals and Partnerships

A CP response is triggered when a patient enrolled in Northwell's House Calls program calls the 24-hour nursing clinical call center. The RN assesses the acuity level and reviews the "patient goals of care" documented in the patient's medical record to determine the required level of response. Goals of care are patient-developed plans that define the preferred level of intervention in the event of a change of condition. Based on the acuity level and patient goals of care, the nurse triages the call. The nurse may dispatch a CP to the patient's home. Other options include asking the patient's physician to contact the patient or, if the condition is severe and the patient desires transport to an ED, initiating a standard 911 ambulance response. The most common medical conditions prompting CP referral include shortness of breath, a fall, or change in mental status. For patients experiencing cardiac arrest, the process triggers an ambulance response.[3] Requests for CP visits by hospice are activated by a hospice triage RN who receives emergent calls from hospice patients. This service is separate from the nurse triage service for House Calls but has a similar goal of dispatching CPs to assist patients with urgent needs in lieu of transporting them to an ED.

The relationship between the EMS and House Calls departments was forged based on shared interests in keeping patients safely at home, and minimizing transport to the ED. During the design phase of the CP program, plans were cemented in an elaborate, 60-page framework document that details both the work flow and the credentialing of paramedics and physicians. The program was designed with flexibility to add on new partners. For this report, interviews with partners were limited to the House Calls program.

The partnership with Northwell hospice started less than a year ago (2016). The partnership is funded by a grant from the Samuels Foundation and is piloting CP services to a subset of the hospice population that lives in a circumscribed area of Manhattan. EMS and Hospice partners intend to

expand the program to a larger population once leaders can more clearly ascertain the impact of the intervention.

From the House Calls perspective, partnership benefits include a decline in physician cancellation of regularly scheduled visits due to meeting urgent needs. CPs are well-equipped to assess the patient in a way that guides decision-making consistent with patient goals of care. For example, CPs have equipment to perform electrocardiograms in patients' homes. Without this diagnostic information, patients would have to be transferred to the ED more frequently, which is often outside of patient-developed goals of care. Another benefit is the 24-hour availability of the CPs to respond to patients' needs and support families, while the physicians work exclusively during standard business hours during weekdays. The CPs are able to stay on scene for a longer duration, which is conducive to providing supportive counseling for the family, confirming goals of care, and de-escalating situations more effectively than can typically be accomplished by telephone.

On an anecdotal level, a House Calls physician recalled a proud moment of the program in which they advised the CP how to carry out a conversation about end of life. The CP went above and beyond the physician's expectations in speaking with the family in a helpful, compassionate, and respectful manner. The physician described this as *"the most gratifying moment… that [CPs] are acting as our eyes, ears, and hands, [and] are actually thinking very similarly to how we [physicians] think."*

Benefits of the hospice partnership, from the CP leadership perspective, include the CPs' ability to arrive on the scene within ten to fifteen minutes of a call compared with a two-hour arrival time for hospice staff, ability to administer morphine, and savings in cost by preventing revocations.

Outcomes

Primary outcome measures of the program include avoidance of ambulance transports, ED visits, hospitalizations, and hospice revocation and cost savings. Other metrics tracked include response time, time with patients on scene, rate of ED admission post-CP intervention, measures of operational processes, physician referral rates to the ED, and patient and provider satisfaction. Some clinical measures are also in place, such as amount of medication administered and clinical error rates.

The House Calls program also collects data using post-intervention surveys administered to patients and physicians that ask whether they would have

traveled/admitted to the ED without the CP intervention; 91% of patients[3] and 70% of physicians indicate that the episode would have likely resulted in an ED admission without CP involvement. Future metrics the House Calls partners wish to measure are rates of CP response to patients who have "do not hospitalize" orders and/or New York State's Medical Orders for Life Sustaining Treatment, to assess whether nurses are more likely to triage calls from these patients to CPs.

Results reported thus far have been positive on all counts, and, perhaps most significant to the sustainability of the program, it has achieved a significant return on investment. A study of House Calls patients enrolled between January 2014 and April 2015 found that in 78% of cases in which a CP responded, the patient was assessed and treated in the home, resulting in a substantial reduction in transports and ED visits. The study's results also suggest that CPs, in consultation with physicians, are able to determine which patients can be treated safely and effectively in their homes and which need to be transported to a hospital. Only 1.7% of patients seen by CPs who were *not* transported to an ED were subsequently seen in an ED within 24 hours of the CP response. Among CP patients who were transported to an ED, 82.2% were admitted to a hospital, which suggests that most patients who were transported needed and wanted to be hospitalized.[3] Results may indicate that the CPs provide effective care to the patients they serve and that the clinical call center triage is effective in appropriate assignment of CP response to patient calls. While it is early in the partnership with hospice to draw conclusions about program effectiveness with that population, metrics on the small group of hospice patients served by CPs to date indicate effective results.

Thus far, House Calls patients who have received CP services have indicated high levels of satisfaction in their overall experience. The program also likely impacts the satisfaction of House Calls patients who are receiving prescheduled physician visits because these visits are less likely to be cancelled. Anecdotally, patients and providers have been extremely receptive to the program because they see how the program increases access to health care for a frail and vulnerable population. Interviewees shared stories of patients who, absent the intervention, tended to delay reporting symptoms until they became so severe that they had to be transported to an ED. With the option to have their acute needs treated in the home, patients seek help before symptoms reach a high level of severity.

Facilitators of Success

In addition to the benefits of being embedded within the Northwell healthcare system, the program attributes much of its success to having defined populations from the onset of program implementation. The well-defined, agreed-upon operational processes for House Calls' partnership with EMS and high physician and CP buy-in are also key to the partners' success. Defining the processes early in the partnership has cultivated what interviewees described as a "non-frustrating" work environnement. The nurses in the clinical call center also play a key role because they provide pertinent background information and advance directives from patients' electronic medical records during the conference calls with CPs and physicians. In addition, there is a shared sense of gratification from the work of the partnership itself.

An important aspect of the processes was their embodiment of a flexible human-centered approach that recognizes there are patients that may not fit into an established protocol. This is especially important to the patient population, as advanced care planning is a major driver of decision-making. Such an orientation respects the fact that patients often change their minds and may elect for a higher level of care than indicated by their advanced care planning.

Challenges

From the House Calls physician perspective, initial challenges revolved around physicians learning the legality of CP scope of practice and the procedures for engaging CPs. There are a number of services that often require ED transport that physicians feel could be avoided, such as removal and insertion of Foley catheters, but that CPs cannot legally provide under New York's paramedic scope of practice regulations. Physicians also described a learning curve in their discernment of the appropriate utilization of CPs versus traditional EMS response, taking into account the patient condition and goals of care. An ongoing constraint that the physicians are realizing is the time differential in a CP versus a regular EMS response; an EMS response is typically 7 minutes whereas a CP response is usually around 20 minutes due to the fact that not all Northwell paramedics are trained as CPs.

One of the most salient challenges mentioned by the CP program is achieving greater scale of the program, which is linked to its funding. Another

challenge relates to state regulations around paramedic scope of practice and state credentialing requirements for online medical control. As noted above, to comply with NY State's regulations, all House Calls physicians were credentialed as online medical control physicians. House Calls also utilizes nurse practitioners (NPs) to provide primary care. However, if a patient receives primary care through a NP, regulations prohibit CPs from taking orders from the patient's NP. Because of the limited number of physicians credentialed as online medical controls, CP interviewees say that sometimes there is a delay reaching a physician when the CP is on scene. Identifying a group of physicians with the right clinical expertise, credentialing them as online medical control physicians, and incorporating them into the program requires a significant time investment, but will be key to expanding the program.

Technological difficulties are also experienced. Sometimes cell service from a patient's home is inadequate to support voice and video simultaneously. Cell phone speakers are inadequate, making it difficult for patients to hear the physicians during the conference call. In addition, the CPs do not have direct access to a patient's electronic medical record; this necessitates that the nurse or physician with access to the patient record actually dictate critical information, such as medication allergies and contraindications. A CP interviewee noted that the nature of responsibilities requires CPs to multi-task and shift gears often, which, in the opinion of the CP, is less than ideal, as they simultaneously cover CP and EMS response.

The program desires to increase the scope of services delivered in the patient's home, such as incorporating technology that enables additional point-of-care testing capability, e.g., mobile CT scanners and equipment to perform chest x-rays and urine analysis. Conducting more tests in patients' homes would provide physicians with information that would enable them to make decisions more quickly. One physician said, *"it has been hard not having 100 percent of diagnostics you would want at the time of making decision. Sometimes that leads to patients going to the ED."*

Funding

Financial support for the CP program is derived from grants from funders such as the Samuels Foundation, self-funded research and development, and reimbursement from House Calls and the hospice department as well as Northwell Health's proprietary insurance plan. The CP service is able to bill the hospital for services for a fixed visit fee plus a variable amount

depending on the time spent on scene. In the coming years, the program plans to move away from reliance on grant awards and secure internal insurance as the primary funder, and further in the future perhaps negotiate contracts with parties outside Northwell Health. Aside from paramedic transport, the program is not able to directly bill Medicare for services it provides.

Lessons Learned

Overwhelmingly, key informants were positive about CP programmatic endeavors and related key lessons learned for agencies interested in starting such a program. First among these was to exercise careful planning of CP scope of work and interventions prior to program implementation, followed by establishing partnerships. Other themes related to planning for sustainability and the ongoing health of the program and partnerships by maintaining high levels of communication and performing ongoing evaluation of key metrics. Specific advice follows.

Intervention Planning

Thoughtful planning and program design was cited most frequently as the bedrock of achieving programmatic success. Specifically, interviewees characterized the following activities as important: defining a scope of work, developing a pipeline of workers, establishing partnerships, identifying outcomes measures, and securing sources of revenue. Great emphasis was placed on the need to establish CP training requirements beyond those required for paramedics. Curricula that cover pharmacology and incorporate an element of experiential practice were cited as beneficial.

Partnership Development

The second most frequently mentioned theme was related to partnership development. The success of CP programs is predicated on establishing partnerships. Establishing these at the outset provides an added advantage compared with starting the program just with a network of patients. Partnerships help define the target population and outcome measures and largely drive the program processes necessary to do the work. From a partner's perspective, honesty about what a program can deliver is important for building trust.

Communication

Interviewees affirmed the significance of communication, both in the context of partnerships and with patients. Establishing lines of communication, determining frequency of contact, and maintaining a constant flow of information within partnerships were all underscored. One partner of a CP program indicated that because of the strong communication from the CP program, there was a greater sense of trust, which rendered the partners more likely to make additional referrals to the program. Two CPs suggested that having access to partners' documentation of their shared patients greatly aids communication and service delivery. In addition, clarity of purpose in describing the program and the role of the various staff involved is important to patient buy-in.

Assessment of Outcomes

Two interviewees cited the importance of having a realistic set of outcomes, continually reviewing the metrics, and including patient feedback to achieve ongoing program improvement. From a partner perspective, being able to quantify the cost of a target area prior to partnership (e.g., readmission penalties) may help drive the need for partnership as well as define a payment model to contract for CP services to help address the issue.

Cross-Cutting Themes

Cross-cutting themes that emerged across all case study sites included the importance of partnership, attention to the regulatory environment, securing sustainable sources of funding, the value of in-house training, and a workforce that is motivated to pursue MIH-CP paramedic work that goes beyond the traditional 911 response.

Importance of Strong Partnerships

Each site spoke to the centrality of partnerships in defining program objectives, processes, target populations, and outcome measures. For Tri-County Health Care in Minnesota, CONNECT in Pennsylvania, and Northwell in New York, partnership with the hospital teams or units represent a source of referrals and a defined population. For MedStar in Texas, partnerships with various agencies define target patient populations of the program and are the source of revenue.

Partnership is important at the inter-personal level as well as the organizational level. CP interviewees emphasized the importance of having access to physicians when they were not sure how best to treat a patient. Physicians, nurses, and social workers at partner organizations appreciated that CPs were willing to take direction and eager to partner with them to address psychosocial as well as medical needs. Both CPs and partners cite the importance of maintaining communication through both formal and in*formal channels.*

Impact of the Regulatory Environment

The regulatory environment of the state concerning the scope of CP practice was apparent in several interviews across the four sites. Paramedic scope of practice is unique in each state, contributing to the particular activities possible in each program. For example, in New York it is not lawful for paramedics to insert Foley catheters, while in Texas it is. Partners often wanted the paramedics to perform services they felt would improve patient outcomes that fall outside their scope of practice because they did not know which services were in or out of scope.

In-House Curriculum Development

The value of in-house training was apparent in several of the interviews. Three of the four case study sites have developed their own curricula for didactic training because they determined that curriculum from external sources was insufficient to prepare their paramedics for practice as CPs. Sites that had developed in-house training often mentioned the training as contributor to the success. One site (Minnesota) relies on a curriculum provided by a community college but the CPs do not believe that it is adequate. Minnesota interviewees were dissatisfied with the training received from a local college because they reported that the content was largely incongruent with the work and population and duplicative of previous training.

All sites incorporate “shadowing” of experienced CPs and/or staff from partner agencies because they believe new CPs require “hands-on” training and need to learn about the scope and delivery of services provided by partner agencies. Several interviewees mentioned shadowing partnering collaborators such as hospice and home health nurses and physicians was particularly effective. Minnesota interviewees opined that that shadowing more experienced CPs was the most valuable aspect of training.

Sustainable Funding

All but one program (MedStar) discussed limitations of current payment structures for paramedic services. Although each site reported significant return on investment for the MIH-CP activities, these services are not typically reimbursed. Most health insurance plans only pay EMS agencies for transporting patients to hospitals. Perhaps the most successful funding structure is MedStar's, whereby all program services are paid for by negotiated contracts with partner agencies. This strategy is not a panacea, especially for programs housed in hospital emergency medical services departments because they have limited ability to forge external partnerships. The other three sites rely on a mix of internal organizational funds, grants, and reimbursement from health insurers. It remains to be seen whether Medicare's efforts to cultivate accountable care organizations and other alternatives to traditional fee-for-service reimbursement will provide additional sources of revenue for MIH-CP programs that serve Medicare beneficiaries.

Shared Motivation and Goals of Care

Lastly, the motivation to help patients beyond typical paramedic response was abundant among paramedics interviewed. Paramedics discussed various aspects of the MIH-CP work as appealing. Some interviewees viewed MIH-CP work as a way to avoid burnout and continue working in the profession. Especially as paramedics age or acquire injuries, MIH-CP offers a less physically demanding alternative to workers who desire to stay in the field. Some of the paramedics mentioned the frustration they witnessed with gaps in the healthcare system and an explicit desire to be part of the solution. Several interviewees mentioned having a sense that MIH-CP work was an opportunity to serve patients more holistically, in a manner that was in the patients' best interests, and that could yield long-term positive impact on patients' health.

Conclusions

There is a limited, yet growing body of evidence that MIH-CP programs can contribute positively to the well-being of individuals receiving or at risk for needing long-term care. The four sites studied for this project revealed wide variation in approaches and services offered. CP roles differed across states

according to state regulation of paramedic scope of practice and primary needs of the target populations. Despite these differences, all four MIH-CP programs fill important gaps in a fragmented healthcare delivery system for patients who are at risk of needing long-term care. Our findings suggest that MIH-CP programs are reducing transports of eligible patients to EDs by providing care in patients' homes and connecting patients to other resources, such as health insurance, housing, and transportation.

All 4 CP programs provide at least part of their CP training in-house to ensure that CPs have the knowledge and experience needed to provide the services their programs offer. Engaging in partnerships was deeply embedded into the approach of each of the MIH-CP programs. Partnering agencies expressed high regard for their MIH-CP partners, and valued the partnerships greatly. Establishing sustainable funding sources will be critical to maintaining these and other MIH-CP programs.

Limitations

Limitations of these findings include the small number of sites and variation in the number of interviews conducted across sites. Several sites that we approached about participating in the project did not respond. For two sites (New York and Pennsylvania), we were only able to conduct interviews with one key partner rather than multiple partners. Greater insight might be gained by interviewing several partners. For Minnesota, the partner was interviewed while a CP was in the room, which might have influenced the partners' responses. Another limitation is selection bias, as interviewees were selected by MIH-CP agency leadership. These persons were knowledgeable regarding the MIH-CP programs and likely supportive of them. It is possible that the CPs and staff of partner agencies who we interviewed may not be representative of all CPs or partner agency staff.

Another major limitation of this work is that we did not attempt to collect quantitative data on outcomes of MIH-CP programs that serve persons at risk for needing long-term care. We collected information on the metrics that sites self-select to assess their performance. Sites varied in the amount of quantitative data they provided regarding patient outcomes. In addition, differences in the populations served by MIH-CP and the services they provide limit the number of outcomes that can be compared across sites.

Recommendations

These four cases are illustrative of the wide variation in MIH-CP programs that care for persons who are at risk of needing long-term care, and the roles of state regulations, partners, and patient population in shaping those programs. They suggest that multiple models for serving this population can reduce ED utilization and potentially avoid or delay need for nursing home placement or long-term home health or homemaker services. Anecdotal information and responses to surveys of patients and families suggest that most embrace MIH-CP services.

EMS agencies that are contemplating starting an MIH-CP program should assess the needs of their communities and the receptiveness of prospective partners. EMS agencies also need to be well-versed in their states' scope of practice regulations to determine what services they can offer and need to educate partners that may not be familiar with these regulations. Identifying sources of revenue, such as partner agencies, philanthropic foundations, and insurers will be key to program sustainability. Our findings highlight the importance of frequent and open communication between partners to build trust and reinforce the shared commitment to working collaboratively to meet patients' needs.

As MIH-CP programs are established across the country, rigorous research will be needed to assess outcomes. Our literature search identified very few peer-reviewed studies of MIH-CP programs that provide care to persons at risk for needing long-term care. None of the published studies were randomized controlled trials, which will be needed to evaluate the clinical effectiveness of MIH-CP interventions with these populations. Rigorous and reproducible research on MIH-CP programs will provide the evidence that healthcare providers and policymakers need to make decisions about partnering with and funding these programs.

Acronyms Used in this Report

CC – Critical care

CHF – Congestive heart failure

CMS – Centers for Medicare and Medicaid Services

COPD – Chronic obstructive pulmonary disease

CP – Community paramedic or community paramedicine

CPIF – Community Paramedicine Insight Forum

CT – Computed tomography

ED – Emergency Department

EMS – Emergency Medical Services

EMT – Emergency Medical Technician

LTC – Long-term Care

MIH-CP – Mobile Integrated Healthcare – Community Paramedicine

NAEMT – National Association of Emergency Medical Technicians

NP – Nurse practitioner

RN – Registered nurse

SNF – Skilled nursing facility

UPMC – University of Pittsburgh Medical Center

References

1. Kizer, K.W., K Shore, A Moulin. Community Paramedicine: A Promising Model for Integrating Emergency and Primary Care. UC-Davis Institute for Population Health Improvement, July 2013. https://www.ucdmc.ucdavis.edu/iphi/publications/reports/resources/IPHI_CommunityParamedicineReport_Final 070913.pdf

2. National Association of Emergency Medical Technicians. *Mobile Integrated Healthcare and Community Paramedicine*. http://www.naemt.org/docs/default-source/MIH-CP/naemt-mih-cp-report.pdf

3. Abrashkin, K.A., J. Washko, J. Zhang, A. Poku, H. Kim, K.L. Smith. "Providing Acute Care at Home: Community Paramedics Enhance an Advanced Illness Management Program- Preliminary Data. *Journal of the American Geriatrics Society*. August 30, 2016. Epub ahead of print.