



PROJECT MUSE®

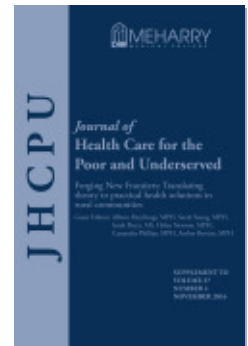
Emergency Medical Service-based Care Coordination for Three Rural Communities

Cara L. Pennel, Loida Tamayo, Rebecca Wells, Tenaya Sunbury

Journal of Health Care for the Poor and Underserved, Volume 27, Number 4, November 2016 Supplement, pp. 159-180 (Article)

Published by Johns Hopkins University Press

DOI: <https://doi.org/10.1353/hpu.2016.0178>



➔ *For additional information about this article*

<https://muse.jhu.edu/article/634885>

Emergency Medical Service-based Care Coordination for Three Rural Communities

Cara L. Pennel, DrPH, MPH

Loida Tamayo, PhD-c, MPH

Rebecca Wells, PhD, MHSA

Tenaya Sunbury, PhD, MS

Abstract: Providers in rural areas face challenges to increasing health care access, reducing costs, and improving health care quality and outcomes. One promising model is expanding paramedic roles to include non-emergency home visits to patients. Employing a comparative case study, this paper describes three Emergency Medical Services (EMS)-based care coordination programs that provide services to rural, underserved patients, who frequently use EMS/emergency departments. Across the three sites, four major themes emerged: (1) a shift in the paramedic and patient interactions from episodic, crisis-based to longer-term, ongoing relationships; (2) characteristics of rural context that both enabled and constrained paramedic care coordination programs; (3) impacts of care coordination including improvements in preventive care and disease self-management as well as peace of mind; and (4) concerns about programs' sustainability. Emergency Medical Service-based care coordination appears to be a promising model for addressing the health and social needs of rural residents who frequently use EMS.

Key words: Emergency Medical Services, care navigation, care coordination, rural health, frequent emergency department users.

Providers around the United States are experimenting with ways to increase access to health care services, improve health care quality and outcomes, reduce costs, and avoid inefficient use of resources for people with complex medical conditions. In particular, potentially preventable use of Emergency Medical Services (EMS) and emergency departments (ED) is inefficient and costly. Prior research has estimated that up to a quarter of United States emergency department (ED) visits could instead be provided in lower intensity settings such as outpatient care, thus generating annual savings exceeding \$4 billion.¹ In Texas, the cost of potentially preventable visits to

CARA L. PENNEL is associated with the Department of Preventive Medicine and Community Health, University of Texas Medical Branch. *LOIDA TAMAYO* is associated with the Department of Health Policy and Management, Texas A&M University School of Public Health. *REBECCA WELLS* is associated with the Department of Management, Policy and Community Health, University of Texas School of Public Health. *TENAYA SUNBURY* is associated with the Strategic Decision Support, Texas Health and Human Services Commission. Please send correspondence to Cara L. Pennel, Department of Preventive Medicine & Community Health, University of Texas Medical Branch, 301 University Blvd, Galveston, TX 77555-1050; Phone: (409) 772-2288; Email: clpennel@utmb.edu.

EDs in 2006 was estimated at \$1.2 billion.²⁻³ In general, ED visits are more common in rural areas.⁴ Preventable ED visits divert already limited EMS/ED resources from more urgent needs. More importantly, emergency services cannot provide patients with complex health and social issues the type of attention and resources they need. Improving prevention and disease management could further reduce ED use, and improve well-being, by facilitating health and thereby reducing emergent episodes.

Preventable ED use was sufficiently problematic that the Texas 82nd Legislature instructed the Health Human Services Commission (HHSC), through H.B. 1, 82nd Legislature, Regular Session, 2011, to submit “steps to reduce non-emergent ED use in Medicaid.”^{5[p.3]} According to the same report, “one of [Texas’] key strategies to reducing non-emergent ED use is to steer clients to more appropriate sources of care.”^{5[p.5]} Given the policy salience of ED use, it is unsurprising that initiatives to reduce care in this setting have been common in the state’s 1115(a) Medicaid Healthcare Transformation waiver. Section 1115 demonstration waivers offer states a myriad of program design choices that depart from existing federal rules, yet are consistent with the overall common goals of the Medicaid program to control costs while improving access and quality. Delivery System Reform Incentive Payment (DSRIP) are one such design choice incentivizing providers who agree to engage in improvement projects that align with the state’s reform objectives. Seven states currently operate DSRIP programs: California, Kansas, Massachusetts, New Jersey, New Mexico, New York, and Texas. Within Texas’s Medicaid 1115(a) Waiver, strategies to reduce ED use include care coordination programs, focused largely on medically complex and otherwise vulnerable populations.⁶ Patient care coordination services build on the theory of change that better coordination between and among patients and providers will improve use of preventive health care, and thus reduce emergent health needs.⁷

ED-related care coordination programs seek to shift care from emergent to preventive care settings, facilitate access to health-related services according to patient needs, and help patients manage their health more proactively and effectively.⁸⁻⁹ In addition, care coordination may address other factors leading to acute health episodes, such as housing instability and food insecurity.⁷⁻⁹ These programs may be most constructively examined as complex process innovations,¹⁰ which are embedded within providers’ relationships with other local health and human services providers as well as with patients. Care coordination is sometimes referred to as care navigation, care management, and case management.¹⁰⁻¹² In the current study contexts, care coordination teams identified patients who frequently used the hospital ED and/or EMS and assisted patients in meeting health and other needs in community settings.

Rural areas face significant disparities. Compared with metropolitan areas, rural populations have poorer health behaviors and outcomes, poorer self-reported health, lower income, and are more likely to be uninsured or enrolled in Medicare.¹³ Rural populations face shortages in primary and specialty health care services, including mental and behavioral health, as well as social service resources. Further, poverty rates, which exacerbate and reinforce health issues, are higher in rural areas and more concentrated in rural areas of the Southern United States.¹⁴

Due to the distinctive needs and issues rural communities face, new service delivery approaches may be necessary. This paper will report on innovative care coordination

programs using local Emergency Medical Services (EMS) to address the health and social needs of rural, underserved populations in Texas. EMS-based care coordination shares common characteristics with community paramedicine programs, including the use of paramedics to visit patients in their homes and facilitate services on a non-emergency basis.¹⁵⁻²⁰ The findings, conclusions, and recommendations are intended to inform hospitals, EMS providers, care coordination program leadership and staff, and policymakers who design, implement, manage, and fund EMS and health care systems.

Methods

This study is part of a larger comparative case study of 11 emergency department (ED)-related care coordination projects within Texas's Medicaid 1115(a) Healthcare Transformation Waiver. Purposive sampling of care coordination projects across the state of Texas comprised projects in rural as well as non-rural areas. Objectives included assessing how care coordination projects were implemented in different contexts, as well as what outcomes resulted. The larger sample also included projects based in hospitals and community mental health centers. The focus of this paper is three projects based in emergency medical services (EMS), all of which served rural populations.

Two researchers visited sites A, B, and C. Visits for sites A and B occurred in the winter of 2013–2014. The Site C care coordination project began subsequent to the other projects, and was visited in the winter of 2015–2016. Qualitative methods included semi-structured interviews and focus groups with paramedic care coordination staff and patients receiving care coordination services.

Sample and recruitment. Participants across the three sites included 18 staff (10 leadership and 8 paramedics care coordinators/other front line staff), 17 patients, and 4 patient family members. The research team asked a key contact at each site to recruit paramedics now serving in care coordination roles as well as any other staff knowledgeable about program operations. Program staff also provided rosters of adult patients receiving care coordination, from which the study team recruited patients. Study information was mailed or handed out by care coordination staff to patients, including the opportunity to opt out of being contacted. Members of the study team then called patients to invite them to participate. Patients were given a modest financial compensation for their time. The study team conducted member checks by sharing the paper with site contacts via email for the opportunity to review the paper, provide feedback, and offer clarifications or agreement with the themes. Contacts at two of the three sites reviewed the paper and agreed with the themes. All study processes were approved by the principal investigator's institution, University of Texas School of Public Health.

Data sources. Data sources were interviews and a focus group with care coordination staff, patients, and family members; the initial project proposals approved by the state and federal government for Medicaid waiver funding; project updates submitted to the state; and field notes taken by researchers during site visits. Separate semi-structured interview protocols were developed for use with project staff and patients and their family members, respectively. These protocols were adapted for the current study contexts from the Consolidated Framework for Implementation Research²¹⁻²² and

prior work on care coordination.^{23–24} Interview protocols were pilot tested and thereby clarified prior to data collection within this sample.

Interviews with project leadership focused on how each project originated and was structured. Interviews with paramedics related to what patients needed, care coordination activities during home visits, and how those new, non-emergent visits were addressing the reasons patients had been frequently using EMS/ED. In addition, the study team spoke with patients and family members at each site in order to get a different vantage point on care coordination. The study team conducted in-person interviews with patients in winter 2013–2014, and then modified the data collection approach to a patient focus group for the last site visit. The shift to this more deductive approach was made possible by findings from the research team's analyses of the initial interviews with patients and family. The focus group also enabled patients to share experiences with one another and respond to common, relevant elements of their health experiences. After completing informed consent, each discussion was audio recorded, when permitted; these recordings were then professionally transcribed and reviewed by a member of the research team for accuracy.

Data management and analysis. After de-identification, all files were uploaded into Atlas.ti version 7.5.10.²⁵ A family of documents was created for each site to facilitate within- and cross-case analyses. Within-case analysis began with the field notes taken during each site visit, including team member observations and interpretations, a structured case summary of each program's context, structure, and initial implementation, and a context chart visually depicting key service providers for each project (Figures 1, 2, and 3).²⁶ Members of the research team used start codes adapted from the Consolidated Framework for Implementation Research^{20–21} to code documents for each site; memoed to capture insights about the data, such as the effect of rurality on EMS care coordination, and discussed coding and memos in a series of weekly meetings. The group reviewed and discussed any divergent interpretations until reaching consensus. Codes were refined through constant comparisons with previous research on paramedic care coordination as well as with the current study data. For instance, prior research¹⁸ prompted the team to identify in current data as well the emergent themes of trust-building and long-term relationships between paramedics and patients, as well as the shift to non-traditional EMS roles and skills used. An example of code iteration through comparison to the study data was broadening the initial code for 'Patient Behavioral Health' to include peace of mind. The team also split out an emergent code for 'Home Visiting' from the original 'Nature of Health Care Coordination' code when the study team interpreted paramedic and patient comments to suggest that home visits were central to this model. The first three authors each analyzed one case to identify salient emergent themes, before the team identified those that applied across all three sites.

Results

Below is a descriptive profile of each site, including geographic and demographic community characteristics, how patients were identified for care coordination, description of patients served by care coordination, program structure, and services provided (see

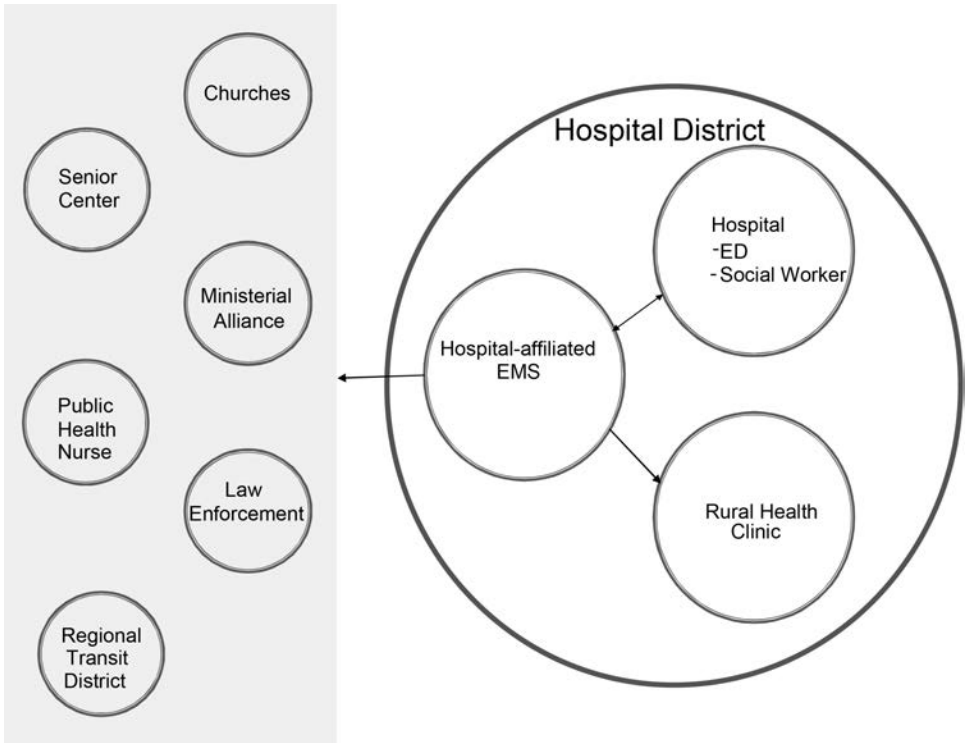


Figure 1. Site A context chart.

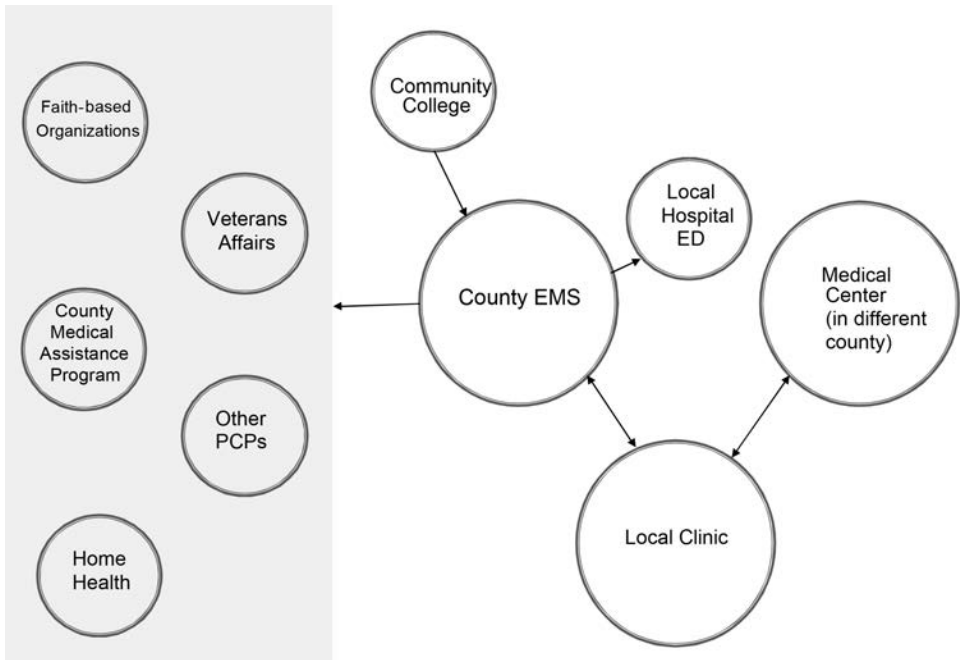


Figure 2. Site B context chart.

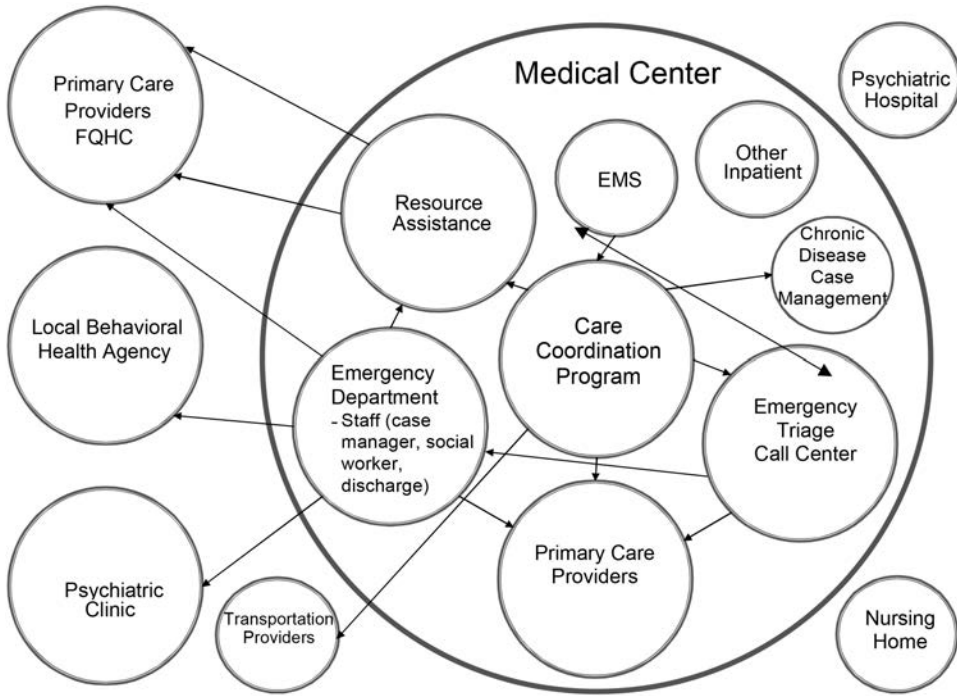


Figure 3. Site C context chart.

Table 1 for site and participant attributes). Next, the four major emergent themes are discussed. Findings are organized by most to least rural.

Descriptive profiles of the three sites. Site A is a critical access hospital with a rural service area of well over 1,000 square miles. The county is a designated Low Income Health Professional Shortage Area (HPSA) and Medically Underserved Area (MUA). Under 15% of the county population lives below the federal poverty level. Fewer than 1% of the county residents are Black and more than 60% are Hispanic. Rates of uninsured are slightly less than 30%.

At site A, the hospital's ED Registered Nurses refer patients to the EMS care coordination program when they see a need for follow-up services. Care coordination staff characterized most such patients as uninsured or enrolled in Medicaid. Common reasons for going to the ED included unmanaged health conditions such as diabetes. Table 2 includes illustrative examples of patients receiving care coordination at all sites, which were provided by care coordination staff.

Following ED nurse referrals, the paramedic care coordinator then conducts a home visit, during which he or she assesses the home for safety factors such as fire alarms, checks vitals such as blood sugar, and conducts other wellness checks. Paramedic care coordinators also identify any needs for additional services such as help with qualifying for disability payments or health insurance, financial assistance filling prescriptions, or appointments with medical providers. The lead paramedic care coordinator facilitates connections to community resources for non-clinical needs. During those subsequent home visits, paramedics focused on continued screening, monitoring, and

Table 1.

SITE AND PARTICIPANT ATTRIBUTES

	Texas	Site A	Site B	Site C
<i>Site Attributes</i>				
Land/Service Area (square miles)	268,820	>1,000	>500	>120,000 ^a
Population Density (per sq. mile)	96.3	~3.0	<60.0	<50.0 ^a (15.0 adjacent counties only)
County Designation (HPSA, MUA)		MUA	MUA	MUA (primary county partial; adjacent counties whole)
Persons in Poverty (%)	17.20%	Low-income HPSA	Special Population HPSA	HPSA
Uninsured (%)	19.1%	<15%	<20%	>20% ^a
Black or African American (%)	12.5%	<30%	<25%	<24% ^a
Hispanic or Latino (%)	38.6%	<1%	<20%	<5% ^a
White (%)	43.6%	>60%	>15%	>50% ^a
		<40%	<70%	<40% ^a
<i>Professional Attributes</i>				
Management		3	2	5
Paramedics		1	2	0
Other front line staff		1	1	3
Organizational Tenure (range and mean in years)		0.8-7.0 2.4	3.0-17.0 11.6	1.0-13.0 9.3

(Continued on p. 166)

Table 1. (continued)

	Texas	Site A	Site B	Site C
<i>Patient and Family Member Attributes</i>				
# Patients/Family Members Participated		3/1	5/1	9/2
Age (range and mean in years) ^b		28–57 40.3	51–77 63.3	32–63 48.8
Ethnicity ^b		2 Hispanic 1 White	2 Black 4 White	2 Black 4 Hispanic 4 White 1 Other
Formal Education ^b		2 High School 1 Some College	2 High School 3 Some College 1 Assoc/BS	4 Neither High School/GED 3 High School 3 Assoc/Some College (1 Missing)
Insurance-type ^b		2 Uninsured 1 Medicaid	1 Uninsured 1 Medicaid 2 Medicare	2 Uninsured 3 Medicaid-only 3 Medicaid + Medicare 1 Military 2 Other

^aIncludes adjacent counties served.

^bDemographic information was not collected for all family member.

Table 2.

ILLUSTRATIVE EXAMPLES OF PEOPLE RECEIVING CARE COORDINATION

Site	Patient Age	Patient Sex	Top Diagnoses	Patient Concerns	Care Coordination Services Provided and Outcomes
A	53	F	<ul style="list-style-type: none"> High blood sugar 	<ul style="list-style-type: none"> Spanish speaker only, but no Spanish speaker on the care coordination team 	<ul style="list-style-type: none"> Provided weekly wellness visits Helped fill her blood sugar prescription for 3 months Patient labeled “non-compliant” and was dropped from the program
A	50	F	<ul style="list-style-type: none"> High blood sugar 	<ul style="list-style-type: none"> Spanish speaker only, but no Spanish-speaker on the care coordination team 	<ul style="list-style-type: none"> EMS communicated with doctor regarding medication dose for patient Conducted routine wellness checks PCP increased medication dose for patient
A	58	M	<ul style="list-style-type: none"> Injured in accident Hypertension 	<ul style="list-style-type: none"> Patient did not have insurance Walked to appointments 	<ul style="list-style-type: none"> Conducted regular welfare checks (took vitals) Connected with hospital benefits counselor for Medicaid application Receives Medicaid Uses Medicaid transportation Able to get medications
B	78	M	<ul style="list-style-type: none"> Frontal lobe dysplasia Dementia Constant falls Skin disease 	<ul style="list-style-type: none"> Will not listen to his wife, but responds well to paramedic care coordinator Had previously called 911 every two weeks 	<ul style="list-style-type: none"> Provided in-home lift and wound care education Provided and installed bathroom chair/sliding bench Gave flu shot during a visit Paramedic has only been to house 2 times for 911 calls since enrollment
B	61	M	<ul style="list-style-type: none"> Diabetes 	<ul style="list-style-type: none"> Tried to stretch his insulin due to cost and lapse in insurance Some memory loss due to accident and head injury 	<ul style="list-style-type: none"> Diabetes illness and treatment education Provided financial assistance for medication and lancets Provided a spreadsheet to track all food intake and blood sugar No 911 calls since enrollment

(Continued on p. 168)

Table 2. (continued)

Site	Patient Age	Patient Sex	Top Diagnoses	Patient Concerns	Care Coordination Services Provided and Outcomes
B	62	F	<ul style="list-style-type: none"> Respiratory problems Anxiety 	<ul style="list-style-type: none"> Has no family She has oxygen at home, but still had trouble breathing and would call 911 	<ul style="list-style-type: none"> Primarily sit and talk with her to reduce anxiety Care coordinator sits with her for 30–45 minutes Reduced anxiety about her condition No 911 calls since enrollment
C	53	F	<ul style="list-style-type: none"> Diabetes Hypertension Back pain 	<ul style="list-style-type: none"> No reliable transportation No primary care physician 	<ul style="list-style-type: none"> Established primary care with local clinic Referred to dental clinic, payment assistance, diabetes program, and pharmacy program Provided bus passes & taxi vouchers Increased primary care use Decreased emergency department use Improved healthy behaviors Increased engagement with navigation team
C	32	M	<ul style="list-style-type: none"> Seizure disorder Depression 	<ul style="list-style-type: none"> Light smoker Illegal drug use No reliable transportation No primary care physician 	<ul style="list-style-type: none"> Established primary care with local clinic Referred to neuro specialist Provided bus passes & local transportation Increased appointment follow-up Decreased emergency department use Decreased drug use and smoking
C	31	F	<ul style="list-style-type: none"> Hypertension Osteoarthritis Chronic pain 	<ul style="list-style-type: none"> No reliable transportation No primary care established 	<ul style="list-style-type: none"> Referred to primary care clinic Provided medication financial assistance (100% covered) Assisted with transportation Increased medical appointment follow-up Decreased emergency department use Better management of chronic disease

health education, especially disease self-management. All Site A paramedics provide care coordination services when they are not responding to emergencies; patients do not have assigned paramedic care coordinators. Site A paramedic care coordination training entailed program discussions and ride-alongs with more experienced paramedic care coordinators, from which the Site A program was loosely modeled. The context charts in Figures 1–3 depict key service providers for each project.

The Site B care coordination program is based in a county Emergency Medical Services provider with a service area of over 500 square miles. The Site B county is designated as a Medically Underserved Area (MUA) county and a Special Population Health Professional Shortage Area (HPSA). Approximately 20% of the county population lives below the federal poverty level. According to Census estimates, about 20% of the county population identifies as Black. About 15% identify as Hispanic, and between 60 and 70% identify as White alone (not Hispanic or Latino). About 20% of the population is age 65 years or older, which is older than Texas as a whole (11% of whom are 65 or over). Rates of uninsured in the county are slightly less than 25%.

At Site B, 80% of the EMS call volume originates from within the county seat city limits, and 20% originates from outlying, remote areas. Patients enrolled in the care coordination program are identified by EMS based on the number of 9–1–1 calls the patient has made or from community agency referrals. Generally, care coordination staff reported that patients tend to have chronic respiratory issues like COPD, uncontrolled asthma, diabetes, and congestive heart failure. Care coordination staff also reported that patients often lack a primary care provider, insurance, and an understanding of their health conditions. While all paramedics received the extensive care coordination training (60 hours over 6 months), only three were selected as ‘advanced community paramedics,’ based largely on their interpersonal skills. During home visits, paramedics review medical history and medications and assess the home for health and safety hazards. Other services include picking up and delivering medications, providing health education, checking blood pressure and blood sugar, installing safety equipment (e.g., a shower slide), resolving health insurance problems, referring patients to primary care and specialty providers, and connecting patients to other local services through faith-based organizations and Veterans Affairs. Each patient has an assigned paramedic care coordinator, although the other two serve as back-ups, when the primary paramedic care coordinator is unavailable.

Site C is a teaching hospital located in a metropolitan area surrounded by rural counties that are classified as Health Professional Shortage Area (HPSA) and Medically Underserved Area (MUA) counties. Over 20% of the county population lives below the federal poverty level. Fewer than 10% of the county residents are Black and over 30% are Hispanic. Site C serves adjacent rural counties with Hispanic populations ranging from approximately 50% to 60%. Rates of uninsured in rural adjacent counties range from approximately 25–30%.

Site C patients enrolled in care coordination are identified based on the number of ED visits and 9-1-1 calls. Common medical issues include diabetes, asthma, chronic pain, and mental and behavioral health. Generally, patients are uninsured or enrolled in Medicaid. A paramedic, a social worker, and a nurse case manager, who make team-based home visits, staff the Site C care coordination team. Care coordination services

include checking vital signs, connecting patients with a primary care provider at the local Federally Qualified Health Center (FQHC), providing transportation through the FQHC or by providing vouchers, delivering medication, resolving health insurance problems, and generally providing social support. The program has recently started providing patients with incentives for reaching health-related goals. The Site C paramedic did not receive specific care coordination training, but this model was unique in that an interprofessional team provided care coordination services.

Emergent Themes. Across the three paramedic care coordination sites, four major themes emerged. These were: (1) a shift in the paramedic and patient interactions from episodic, crisis-based to longer-term, ongoing; (2) aspects of the rural environmental and social context that enabled and constrained paramedic care coordination programs; (3) impacts of care coordination including patient peace of mind as well as improved use of preventive health care and disease self-management; and (4) major concerns voiced about programs' sustainability.

Paramedic-patient relationships change from episodic to ongoing. Paramedics at all sites reported the transition from sporadic crisis-response to long-term, ongoing relationships as both challenging and rewarding. The nature of the care coordinator job, as well as the interactions with patients, differs from those entailed in a paramedic role. The shift in role required extensive training and different skill-sets. EMS Directors at two sites discussed some of these distinctions:

EMS Director at Site A: "Before the Community Paramedic Program they [paramedics] only focused on passer-byers. People off the interstate that got into a wreck, need a place to stay, or need some food in their belly. Things like that. It's never focused on the community."

EMS Director at Site B: "Paramedics in general are good at building a relationship over 90 seconds and then leaving. Meeting you in the break room and then leaving; that's what we're good at. Building a really good relationship that someone's gonna trust in and listen and that kinda stuff, it took a little training for us. . . . 'Well what's bleeding? What's hurting? What's new?' He's like, 'No, no. You can't do that.' [Laughter] 'Go in and talk to them about their day.'"

Paramedic care coordinators indicated it took time to establish a trusting relationship, which involved making multiple home visits and small talk, before addressing medical issues or other needs (e.g., transportation, medication, food accessibility, or insurance enrollment). Care coordinators and patients alike provided evidence of the importance of meeting in-person at patients' homes to talk, listen, and begin building a trusting relationship. Part of establishing this trust was demonstrating that paramedics believed in them and were not going to give up on these patients easily.

Paramedic Care Coordinator at Site B: "We're trying to be their friend first and foremost. Have them be able to open up to us and tell us things. Because sometimes they just may be embarrassed, and not want to say certain things. We want them to know that we're not going to judge them. We want to be there. That's a big part of it."

Care Coordinator at Site C: “Visiting them at home to establish the relationship—we have to talk about things totally not related to their health before they start talking about their health—going to their home a couple of times . . . Just continue to go reach people. Part of that is, you gotta continue to come back and prove to them that you’re gonna do that.”

Site C focus group participant: “They’ll always get back to you if you need to just talk. They’ll listen. I had to talk to [care coordinator] several times, and she just listened.”

Site C focus group participant: “They’re always there. They’re the only ones that have been to my house. They always make sure I have a number to call. They tell me to call them anytime. They check up on me.”

Both staff and patients suggested home visits were key to establishing relationships between EMS care coordination staff and patients and family members, as opposed to phone calls or patients seeing care coordinators in the hospital or other clinical environment. These visits enabled paramedics to build trust with patients and their families in a comfortable setting. Home visits allowed the added benefit of assessing the home environment for health and safety risks that would not be possible by phone or at the hospital.

EMS Director at Site A: “Home visits make it possible to assess for a range of factors that may affect health and safety. Do we need to look at getting them a fire alarm, or is there any safety issues? Okay, there is a safety issue, maybe it’s a—which we haven’t ran into, the issue of a handicap patient maybe needing a ramp.”

EMS Director at Site B: “What we found is the phone calls don’t work . . . because you pick up the phone, you say, ‘Hey I’m so and so with County EMS. We got this program through the [Site B hospital] and we’re working—they don’t want nothing to do with it because they feel like [we are] the government, ‘Oh, I don’t want you in my business.’ ‘How’d you figure that out?’ What we’ve found is they’re very eager to say, ‘Yeah, dad could really use that service,’ if we introduce them there [at their home]. It seems like it’s opening doors a little faster for the program.”

Paramedic Care Coordinator Site C: “We did learn very quickly the best impact or the best engagement we could get was going to be in their home on their terms. Then it also helped with that positive rapport.”

Both paramedics and patients characterized care coordinator visits as having a personal tone, with both EMS staff and patients alluding to the friendliness of the interactions and visits.

Paramedic Care Coordinator at Site B: “I would have to say it’s more personal to me, because I see all these people as part of my family.”

Patient at Site B: “He [paramedic care coordinator] tells us how things are at his house. He’s doing carpentry work too, and things like that. It just makes it more personal.”

Family member at Site B: “He [paramedic care coordinator] comes in and—my husband is real western oriented and [paramedic care coordinator]’s dad was too. They talk about horses. [Paramedic care coordinator] is his buddy. Now they’re buddies. They talk about horses and stuff like that.”

Family member at Site C: “They check up on her [patient at site C] and check up on the family, how the family’s handling it, how’s it going. They’re very supportive.”

Patient at Site C: “They keep track of you, whether it’s going to visit you or call you. They make an effort. ‘Hey, how are you doing? You all right?’”

Patient at Site C: “I usually wake up looking for them, hoping that they’re gonna come by.”

Even after care coordination ended, paramedics reported emphasizing their continued availability.

Paramedic Care Coordinator at Site A: “Once we graduate them [patients], we keep an eye on them . . . Even one patient we still see, because we don’t want to drop him yet . . . We just go sit in there, and we talk to them for 30 minutes, just once a week.”

EMS Director at Site B: “Actually, yeah, we kind of fix their problems, so to speak, and we know we’re not gonna totally fix their problems, but as they stop frequently using the ED for their primary care, we don’t want to continue to absorb our resources on that person. We’ve already fixed it. We’ll classify them as inactive and maybe just follow up once a quarter and see how they’re doing rather than going over there once a week when they’re doing fine.”

Rural contexts both enabling and constraining the nature of paramedic care coordination. In some respects, the paramedic care coordination projects in the current study appeared to build on distinctively rural strengths. One commonality of the three sites was the prominent role of churches and other faith-based organizations as community partners. Paramedic care coordination staff reported frequently calling on local churches and faith-based organizations to help their patients, thereby conserving 9-1-1 resources for more pressing emergencies. In so doing, they invoked an ethos of ‘small town’ shared obligation.²⁶ Comments from site A, which was the most rural of the three, most clearly exemplified this theme.

Paramedic Care Coordinator at Site A: “Churches are real big in small towns. We reached out to churches, and said, ‘Hey, we have this fellow. He keeps falling down. He’s pulling away our resources. Would you mind, sending your community members out there, those that live by him?’ ‘Cuz he didn’t live close [to EMS]. He lived out in the county. ‘Go in to check on him, and if he falls, even if it’s late, send a neighbor over there. Do the right, Christian thing or Baptist thing, and help him out.’”

EMS Director at Site B: “There’s two different faith-based organizations in our community. One of them out in the rural areas . . . it handles more of the outlying outside of [county seat] proper.”

Patient at Site B: “[Faith-based organization] helps in so many ways locally . . . They take care of people that are really down and out on their luck, plus they provide counseling to help people get through issues like that.”

Beyond the nature of local organizations, study participants described an ethos of shared obligation amongst members of the community too.

Paramedic Care Coordinator at Site A: “It’s a small town of 2,000 or so, a little bit more. They would take care of their own.”

Patient at Site A: “Even the nurses volunteered to come get me if I needed a ride somewhere.”

Rural context also seemed to facilitate personal knowledge of patients’ needs:

Administrator at Site A: “Being a rural community, we kind of know the personalities and how they’re going to react to doctors’ appointments or self-management type techniques.”

Care Coordinator at Site C: “I don’t know that all ER’s are like this, but having been down there on the front line, trust is the biggest thing. Trust to know that the navigators [care coordinators] know these patients. We know them well.”

While rural communities may benefit from small town generosity and familiarity, they may also be characterized by economic deprivation and insufficient health and human services (Table 1). At one site, leadership cited the combination of fiscally conservative local elected officials and a large service area as prompting the extension of EMS to care coordination.

Site B EMS Director: “The truth of the matter is we could not continue adding ambulances to our system to handle frequent fliers. It’s just, fiscally it was not gonna happen. That really is when that started—you find another way to help manage these call volumes and this way of doing healthcare, because we just can’t continue that road. I mean, I think that’s what the country’s trying to do. They just took it very localized and said, “For our 700 square miles, we are not going to be able to do this any longer.”

Professional interviews across all sites indicated disparities in education, income, and resources in the populations they serve, compared with metropolitan areas. Thus, these unmet patient needs are more challenging to address in the face of limited health and human services.

EMS Director at Site A: “If you drew [a line]—and you go [direction of closest big city] the lack of education that’s there is not very—it’s very poor.”

Site B EMS Director: “I really believe there’s some areas of our community that is almost third worldish poverty-wise. We go there on a routine basis on 9-1-1 calls . . . You’re

calling and trying to get in or you're going by to see. It's sham houses. You've got 50 electrical cords going to one socket or something. It's a nightmare of things to see."

Another apparent limitation of EMS care coordination in these three rural areas was the language difference between paramedics and many local residents. For Site B, it was important to the EMS Director to use existing local staff, known to patients: "That part's unique—what we wanted to do is take paramedics that were already in a community." However, study researchers questioned whether paramedic care coordinators were able to communicate effectively with patients with other language and more complex needs, including extreme poverty and those related to behavioral health.

Site B EMS Director: There are some issues for us in a rural county. I wish I had a great fix for that [helping patients with mental illness or substance abuse]. We have been traveling the country looking for good templates and best practices on that. From a first responder safety issue, the concern is with going and knocking on doors of MHMR [Mental Health and Mental Retardation (Community Mental Health Center)] homes and trying to do close medical monitoring. We're working on solutions for that. [EMS district in urban area] has a very, very good solution for it, but it comes at a very big price tag for rural providers because we just don't have those resources."

All three sites serve large Spanish-speaking populations, reported by one care coordinator as upward of 30% as speaking Spanish only. However, across the three sites, none of the paramedics or other care coordination staff spoke Spanish. This disconnect between paramedic and patient languages was arguably more important in the context of care coordination than in traditional, crisis-oriented EMS responses.

Paramedic Care Coordination Reported to Improve Health Care Use, Peace of Mind. Patients reported having improved access to health care services, including connections to primary care providers, dentists, mental health providers, other specialists, medication and medication assistance, and health insurance. Other local service providers connected with EMS care coordination included senior centers, health departments/public health nurses, local and regional transportation agencies, law enforcement officers who helped patients get financial assistance with transportation, Veterans Affairs, Medication Assistance Programs, nursing homes, and home health agencies (Figures 1–3).

Paramedic Care Coordinator Site A: "For a new patient we've had . . . I remember he started last year with us, and he was a Medicaid patient. He didn't have a car. He didn't have a vehicle. He had no way to get to his appointments so he would walk . . . We're like, 'Well, you have ways to get a ride.' He's like, 'Well, my Medicaid paperwork's not done.' 'Well, okay, well, let's see what we can do . . .'. [Hospital patient benefits counselor] helped get us in contact with him. He got his card in, and now he's able to call for transport. They'll come pick him up with the Medicaid, the bus over here and take him to the clinic or whatever his appointments needed."

Patient site B: "He and I discussed a lot of services here locally like [names a faith-based community resource], and I've been able to use some of their services. I had some depression problems going on too because of everything that was going on back then, and so actually he recommended I do counseling with them just about every week."

Patient Site C: “Last time I had a bad tooth, and he helped me. Got in contact for where I could go and get it pulled out.”

Patient at Site C: “If I need a prescription, they get it for me. I can’t pay for it. They got me covered.”

Some patients reported feeling greater peace of mind knowing that the paramedic care coordinators were available to help them, especially if they were uncertain as to whether a health issues was serious enough to call 9-1-1.

Patient at Site A: “I feel a lot safer . . . I’m not afraid that if I’m there by myself that if something happens we would call.”

Patient at Site B: “To know that they’re there and you can lean on them.”

Patient at Site C: “[Care coordinator 1] and [care coordinator 2], she’s been in ICU with us, too, a couple of times. I mean, they’ve been there. I mean, just to see her, but—and be supported as well. She’ll come out of there. They’re giving you a good word, ‘Everything’s gonna be all right.’”

Future sustainability tenuous. Professional interviews from all sites relayed expressions of appreciation of the EMS care coordination programs and generosity from community members. However, even the current infusion of Medicaid waiver funding combined with local good will and generosity left significant needs unmet.

Care Coordinator Site C: “I think we will need more navigators, community health workers, case managers, resources ‘cuz the patient population just keeps growing, and that’s great, but as there are more patients, you’re gonna need more resources in the form of staff, but also to the tangible things we talked of earlier, and money, you need more money, obviously, to provide the right things.”

Some program leaders also expressed concerns about how they would sustain paramedic care coordination programs at all after Texas’ Medicaid current waiver ends in September 2016. At the time of this publication, Texas was just granted a 15-month extension of the waiver, during which the Centers for Medicare and Medicaid Services will consider a requested five-year renewal. Whenever the Medicaid waiver ends, the state health and human services commission plans to incorporate waiver-related innovations into Medicaid managed care.²⁷ However, only 18% of Texans are enrolled in Medicaid.²⁸ Hence, future revenue after the Medicaid waiver ends was a major concern for EMS program leadership.

EMS director at Site A: “All their churchgoers are like, ‘We’re donating money. We love this community help.’ But is it one day going to come to an end . . .”

Care Coordinator at Site C: “I think you have to continue the resource of funding the three people [who staff the program], and then the funding of giving them resources they need, as far as an ambulance for the transportation, and then the [for purchasing

food and other necessities] cards, the bus passes, the phone cards, or [grocery store] card, or whatever of those top things that they need, just to get those people not to use your emergency center.”

Discussion

The current study focused on three innovative programs using Emergency Medical Services (EMS) staff in care coordinator roles to meet the needs of rural, underserved populations. Findings are reflective of community paramedicine programs found in other rural areas.¹⁶⁻²⁰ This article addresses a gap in the literature about how EMS roles can be expanded to address patients’ health and social needs more proactively and holistically than is possible in emergency services. Literature on programs tailored to high EMS/emergency department use populations in the United States has been scarce. A systematic review of community paramedicine programs found only 11 peer reviewed articles for programs, limited to Canada, the United Kingdom, and Australia.²

EMS-based care navigation programs are appropriate for rural and medically underserved communities, where “the gap between health care service demand and health care provider supply is widening the most,”^{2(p. 7)} traditional health care providers are lacking, and trained paramedics and other EMS staff may be underutilized.³ A care coordination program could offer EMS personnel in low-call-volume settings the opportunity to develop new and practice existing patient assessment skills,² while utilizing time between calls to address community health care needs.

While the research team found themes relating to broader determinants of health (e.g., assessment of home environment, transportation), the services offered in these three programs were more clinical in nature compared with other studies.¹⁹⁻²⁰ A possible reason for this could be the extent or severity of patients’ illnesses and economic situations enrolled in the EMS care coordination programs examined in the current study. In addition, the differing national contexts of prior related studies left questions of applicability to the United States.^{3,18} This could speak to the need for greater training in and emphasis on addressing broader determinants of health, disease prevention, and health promotion through EMS care coordination in these programs.

As in the current study, prior literature has found that sustainability is a common challenge for community paramedicine programs.^{2,20,29} The current study focuses on programs funded through the Texas 1115(a) Transformation Waiver. The current waiver ends in September 2016. Comments from some EMS care coordination program leaders suggest that these programs may end or become curtailed once funding is gone. Sustainability problems like these have been identified in other states, such as California, where operations ceased once funding concluded.²

Paramedic care coordination programs are largely supported by grants, local taxes, public health departments, ambulance services, healthcare insurers, and Accountable Care Organizations.²⁰ However, states and communities can help make programs sustainable. Minnesota passed legislation that authorized the state’s Medicaid program to reimburse paramedic care coordinators for specific services.²⁰ This could potentially extend to other public programs and private insurers. The shift from fee-for-service to value-based reimbursement could also present an opportunity to align EMS care

coordinators with teams of providers. In particular, Accountable Care Organizations and Patient Centered Medical Homes, community health centers, rural health clinics, hospitals, and other health care providers could employ EMS personnel while they are not responding on EMS calls.³⁰ Communities might also justify these programs on the basis of the savings they generate.¹⁵ One rural county in Colorado had health care cost savings of \$412,000 in 3 years.³¹ States can also bolster sustainability by incorporating programs into public systems. For instance, a rural community paramedicine program in New York is integrated into and funded by the state's Office for Aging.²⁰

This study had several limitations. First, these three study sites were all in Texas and varied in degree of rurality. Therefore, the findings may not be generalizable to other states and other rural contexts. While the case study design is not necessarily meant to be generalizable, these findings have transferability in other similar contexts.³² Transferability is otherwise strengthened by beginning with start codes adapted from the Consolidated Framework for Implementation Research, which is grounded in existing literature. All three programs were new, within their first year of implementation and in the first 5-year cycle of the 1115 Waiver. However, significant lessons were learned within each paramedic care coordination program, as well as within the larger DSRIP program, during this time period. Patients were relatively new to the EMS care coordination programs, so long-term outcomes could not be evaluated. The study team was reliant on the primary site contact to connect us with the most appropriate staff to interview and was not always able to interview all staff on the front lines of the programs. Finally, this study design does not allow for making causal inferences.

Future research should focus on identifying sustainable funding models, best practices for maximizing effectiveness, and areas for program improvement. Sustainability is imperative to policy and funding requirements as "funders want evidence of the sustainability of a program, but the community paramedicine programs are not able to develop to the point of sustainability without the funding and therefore cannot be rigorously evaluated."²⁰[p. 9] Such investments may help to address more proactively the needs of rural residents with complex conditions.

Acknowledgements

We would like to thank the funders, the Texas Health & Human Services Commission (HHSC) and the Centers for Medicare & Medicaid Services (CMS). The findings are those of the authors and do not necessarily represent the official position of HHSC or CMS. The authors thank everyone who participated in this study.

References

1. Weinick RM, Burns RM, Mehrotra A. Many emergency department visits could be managed at urgent care centers and retail clinics. *Health Aff (Millwood)*. 2010 Sep;29(9):1630–6. <http://dx.doi.org/10.1377/hlthaff.2009.0748> PMID:20820018
2. Kizer KW, Shore K, Moulin A. Community paramedicine: a promising model for

- integrating emergency and primary care. Sacramento, CA: UC David Institute for Population Health Improvement, 2013. Available at: https://www.ucdmc.ucdavis.edu/iph/publications/reports/resources/IPHI_CommunityParamedicineReport_Final%20070913.pdf.
3. Bigham BL, Kennedy SM, Drennan I, et al. Expanding paramedic scope of practice in the community: a systematic review of the literature. *Prehosp Emerg Care*. 2013 Jul-Sep;17(3):361–72.
<http://dx.doi.org/10.3109/10903127.2013.792890>
PMid:23734989
 4. Weiss AJ, Wier LM, Stocks C, et al. Overview of emergency department visits in the United States, 2011. Statistical Brief #174. Rockville, MD: Health care Cost and Utilization Project, 2014. Available at: <https://www.hcup-us.ahrq.gov/reports/statbriefs/sb174-Emergency-Department-Visits-Overview.pdf>.
 5. Texas Health and Human Services Commission. Rider 56 report: reducing nonemergent use of the emergency department in Medicaid. Atlanta, TX: Health and Human Services Commission, 2012. Available at: <http://www.hhsc.state.tx.us/reports/2013/Rider-56-Report.pdf>.
 6. Gusmano MK, Thompson FJ. An examination of Medicaid delivery system reform incentive payment initiatives under way in six states. *Health Aff (Millwood)*. 2015 Jul; 34(7):1162–9.
<http://dx.doi.org/10.1377/hlthaff.2015.0165>
PMid:26153311
 7. Kumar GS, Klein R. Effectiveness of case management strategies in reducing emergency department visits in frequent user patient populations: a systematic review. *J Emerg Med*. 2013 Mar;44(3):717–29. Epub 2012 Nov 29.
<http://dx.doi.org/10.1016/j.jemermed.2012.08.035>
PMid:23200765
 8. Shumway M, Boccellari A, O'Brien K, et al. Cost-effectiveness of clinical case management for ED frequent users: results of a randomized trial. *Am J Emerg Med*. 2008 Feb;26(2):155–64.
<http://dx.doi.org/10.1016/j.ajem.2007.04.021>
PMid:18272094
 9. Okin RL, Boccellari A, Azocar F, et al. The effects of clinical case management on hospital service use among ED frequent users. *Am J Emerg Med*. 2000 Sep;18(5):603–8.
<http://dx.doi.org/10.1053/ajem.2000.9292>
PMid:10999578
 10. Scott WR. Innovation in medical care organizations: a synthetic review. *Med Care Rev*. 1990 Summer;47(2):165–92.
<http://dx.doi.org/10.1177/107755879004700203>
PMid:10106771
 11. Texas Health and Human Services Commission. Centers for Medicare and Medicaid Services (CMS) Special Terms and Conditions (STCs). Atlanta, TX: Health and Human Services Commission, 2014. Available at: <https://www.hhsc.state.tx.us/1115-docs/DSRIP-Protocols.pdf>.
 12. Mion LC, Palmer RM, Meldon SW, et al. Case finding and referral model for emergency department elders: a randomized clinical trial. *Ann Emerg Med*. 2003 Jan;41(1):57–68.
<http://dx.doi.org/10.1067/mem.2003.3>
PMid:12514683

13. Bolin JN, Bellamy G. Rural healthy people 2020. College Station, TX: Southwest Rural Health Research Center, 2011. Available at: <http://sph.tamhsc.edu/srhrc/rhp2020.html>.
14. United States Department of Agriculture Economic Research Service (ERS). Geography of poverty. Washington, DC: ERS, 2012. Available at: <http://www.ers.usda.gov/topics/rural-economy-population/rural-poverty-well-being/geography-of-poverty.aspx>.
15. Kellermann AL, Saultz JW, Mehrotra A, et al. Primary care technicians: a solution to the primary care workforce gap. *Health Aff (Millwood)*. 2013 Nov; 32(11):1893–8. <http://dx.doi.org/10.1377/hlthaff.2013.0481>
PMid:24191077
16. O'Meara PF, Kendall D, Kendall L. Working together for a sustainable urgent care system: A case study from south eastern Australia. *Rural Remote Health*. 2004 Jul-Sep;4(3):312. Epub 2004 Sep 8.
PMid:15885018
17. O'Meara P, Tourle V, Stirling C, et al. Extending the paramedic role in rural Australia: A story of flexibility and innovation. *Rural Remote Health*. 2012;12(2):1978. Epub 2012 Apr 12.
PMid:22497586
18. O'Meara P, Ruest M, Stirling C. Community paramedicine: higher education as an enabling factor. *Australasian J Paramedicine*. 2014;11(2).
19. O'Meara P, Stirling C, Ruest M, et al. Community paramedicine model of care: an observational, ethnographic case study. *BMC Health Serv Res*. 2016 Feb 2;16:39. <http://dx.doi.org/10.1186/s12913-016-1282-0>
PMid:26842850 PMCid:PMC4739332
20. Pearson KB, Gale JA, Shaler G. Community paramedicine in rural areas: state and local findings and the role of the state Flex program. Portland, ME: University of Southern Maine, 2014. Available at: http://digitalcommons.usm.maine.edu/rural_hospitals/11/.
21. Damschroder LJ, Aron DC, Keith RE, et al. Fostering implementation of health services research findings into practice: a consolidated framework for advancing implementation science. *Implement Sci*. 2009 Aug 7;4:50. <http://dx.doi.org/10.1186/1748-5908-4-50>
PMid:19664226 PMCid:PMC2736161
22. Rojas Smith L, Ashok M, Morss Dy S, et al. Agency for Health care Research and Quality (AHRQ). Contextual frameworks for research on the implementation of complex system interventions. Rockville, MD: AHRQ, 2014. Available at: <https://effectivehealthcare.ahrq.gov/ehc/products/490/1882/contextual-frameworks-complex-interventions-report-140318.pdf>.
PMid:24783308
23. Issel LM, Anderson RA. Intensity of case managers' participation in organizational decision-making. *Res Nurs Health*. 2001 Oct;24(5):361–72. <http://dx.doi.org/10.1002/nur.1037>
PMid:11746066
24. Wells RS, Cilenti D, Issel LM. The political economy of a public health case management program's transition into medical homes. *Soc Sci Med*. 2015 Nov;145:98–106. Epub 2015 Oct 9. <http://dx.doi.org/10.1016/j.socscimed.2015.10.003>
PMid:26460509
25. Miles MB, Huberman AM, Salda-a, J. *Qualitative data analysis: a methods sourcebook*. 3rd ed. Thousand Oaks, CA: Sage Publications, 2014.

26. Falk I, Kilpatrick S. What is social capital? A study of interaction in a rural community. *Sociol Ruralis*. 2000 Jan;40(1):87–110.
<http://dx.doi.org/10.1111/1467-9523.00133>
27. Texas Health and Human Services Commission. 1115a Transformation Waiver Renewal. Atlanta, TX: Health and Human Services Commission, 2012. Available at: <http://www.hhsc.state.tx.us/waiver-renewal.shtml>.
28. Kaiser Family Foundation (KFF). Health insurance coverage of the total population: 2014 data. Washington, DC: KFF, 2014. Available at: <http://kff.org/other/state-indicator/total-population/>.
29. McGinnis KK. Rural and frontier emergency medical services: agenda for the future. Kansas City, MO: National Rural Health Association, 2004. Available at: <https://www.ruralcenter.org/sites/default/files/rfemsagenda.pdf>.
30. Patterson DG, Skillman SM. A national agenda for community paramedicine research. Seattle, WA: WWAMI Rural Health Research Center, University of Washington, 2013. Available at: http://depts.washington.edu/uwrhrc/uploads/CP_Agenda.pdf.
31. The Emergency Medical Association of Colorado (EMSAC). Community paramedic: a 2016 solution for medical service. Englewood, CO: EMSAC, 2016. Available at: <http://emsac.org/wp-content/uploads/2016/01/2016-Community-Paramedic-bullet-points.pdf>.
32. Guba EG, Lincoln YS. Fourth generation evaluation. Thousand Oaks, CA: Sage Publications, 1989.
PMCID:PMC304045