



Emergency Medical Technicians' Perspectives on a Telehealth Facilitator Role to Expand Home-Based Primary Care: Pilot Study Results

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Keywords: emergency medical technicians; EMT career; EMS role expansion; home-based primary care; older adults; telehealth

Section: Use Cases/Pilots/Methodologies

Objective: *A growing body of literature supports telehealth-enabled emergency medical services (EMS) personnel acting in expanded roles in the pre-hospital setting. While paramedic-based community programs have shown great promise, emergency medical technicians (EMTs), who make up a larger percentage of the total number of nationally certified EMS personnel and generally have fewer options for career growth, are far less utilized. We investigated EMTs' perspectives on working as telehealth-enabled primary care provider extenders in a pilot program within a home-based primary care program.*

Design: *Two semi-structured joint interviews were conducted with EMTs who participated in a pilot program. A deductive thematic analysis approach was used to analyze the qualitative data from the interview transcripts.*

Setting: *A home-based primary care program and EMS agency in downstate New York.*

Participants: *Four EMTs.*

Intervention: *The model, called the Mobile Telemedicine Technician program, utilized EMTs with additional training as telehealth facilitators to examine patients in the home and connect*

them with their centrally located primary care providers.

Main outcome measure: *Qualitative data from two joint interviews with EMT participants.*

Results: *The EMTs' sentiments from the joint interviews were generally positive in regard to program structure, EMT responsibilities as physician extenders, and having an expanded role in the primary care practice. Three themes emerged from the joint interviews: (1) perceptions of the Mobile Telemedicine Technician model, (2) EMT career mobility, and (3) considerations for future iterations and similar programs.*

Conclusions: *While the sample size was small, this preliminary study of EMTs' perceptions of an enhanced, telehealth-enabled role in home-based primary care supports its further study as an additional role for these EMS-trained personnel. Compared to traditional EMS work, this model provided a less physically demanding option that encouraged building clinical expertise and relationships with patients. The results also elucidated the desire for expanding models of this kind and opportunities to learn new concepts like palliative care medicine. Models such as the Mobile Telemedicine Technician program may serve to increase the home-based primary care program workforce while also offering additional career options for EMTs. However, regulatory changes will be necessary for the long-term sustainability of this and other innovative EMT-based models.*

In the United States, inefficiencies in care delivery result in high costs to patients and healthcare systems. The Institute of Medicine (IOM) estimates that 30% of the US annual healthcare budget is wasted on unnecessary services, inefficient delivery, excessive administrative costs, and prevention failures (1).

This is particularly salient for the frail, older adult population, which constitutes 4% of the Medicare beneficiary population, yet accounts for 44% of potentially preventable costs (2). This disproportionate cost share can be partly attributed to the difficulties experienced by older adults with advanced illness in accessing outpatient care services. Barriers to accessing appropriate levels of care can lead to high, unnecessary use of emergency medical services (EMS), and emergency departments (3). In the United States, EMS treat 5–10% of the US population but less than 3% of the calls involve life-threatening injury or illness (3). Although the number is hard to quantify, reports indicate that between 11 and 61% of Medicare transports are avoidable; patients could be safely treated in alternative settings like in-home or primary/urgent care facilities (4–6).

Treating individuals in appropriate care settings can potentially improve patient experience and population health while reducing the per capita cost of health care and satisfying the Institute of Healthcare Improvement's Triple Aim (7). While community-based programs using paramedics have shown great promise, emergency medical technicians (EMTs), who make up the majority of the nationally certified EMS personnel (70.4% EMT and Advanced EMT compared to 26.5% paramedics), have been far less utilized (8–11). Compared to paramedics, EMTs have fewer training hours, a more limited scope of practice, fewer options for career advancement, and higher rates of turnover (12). Given the greater percentage of nationally certified EMTs and a scope of practice that includes physical exam, oxygen administration, and blood glucose monitoring, significant opportunities may exist to leverage this workforce in different settings to expand access to underserved communities at a lower cost than the more commonly used paramedic workforce.

Results of a telehealth care delivery model utilizing EMTs as primary care provider (PCP) extenders within Northwell Health's home-based primary care (HBPC) program were previously published. This model, called the Mobile Telemedicine Technician (MTT) program, used EMTs with additional training as telehealth facilitators to provide physical exams and environmental assessments in the home and to connect with the patients' centrally located PCP. Care delivered through this model maintained high patient, EMT, and provider satisfaction and showed potential to increase the number of patients the PCP was able to care for in the home (13).

Beyond satisfaction scores, there are few, if any, reports of EMTs' perspectives on operating in telehealth-based expanded and nontraditional roles. This investigation utilized a deductive thematic analysis of joint interviews with EMTs who participated in Northwell Health's MTT program as a case study to begin understanding the perspectives of EMTs working within a home-based model of care.

SETTING

Northwell Health's HBPC program and EMS agency are part of a large integrated delivery network in downstate New York that includes 23 hospitals and over 750 ambulatory care sites, a certified home health agency and a hospice agency. The HBPC program serves homebound individuals with multiple chronic conditions in Queens and Long Island and serves approximately 2,000 unique individuals annually with an average age of 85; 71% have five to six activities of daily living dependencies.

The MTT program started in July 2019 as a pilot with one physician's patient panel of 200 enrolled patients in the HBPC program. The program used telehealth-enabled EMTs, working under the guidance of the patients' PCP, to address

nonemergent, acute changes in conditions. A detailed program description, EMT training details, and preliminary program results were published previously (13). EMTs were selected for this role as they are accustomed to working in a mobile environment with remote physician collaboration. Moreover, Northwell Health's community paramedicine program, a program utilizing paramedics for unscheduled urgent and emergent responses, has been a long-standing partner of the HBPC program, having deployed nearly 5,000 responses since 2013 (14–16).

The four EMTs selected for participation in the MTT program were male, with an average age of 39.75 years (range 33–51 years) and an average of 18.25 years of EMT experience (range 15–24 years). Within a year, they completed a combined total of over 300 visits in the MTT model. The EMTs used their personal vehicles to travel to each patient's home and, following an assessment and physical exam, connected with the patient's PCP via a Health Insurance Portability and Accountability Act of 1996 (HIPAA)-compliant tablet and software (American Well, Boston, MA) that was issued by the program to conduct the telehealth visit. Centrally located physicians also utilized a HIPAA-compliant computer with the same telehealth software as the EMTs. During the two-way facilitated telehealth visit, the PCP could interact with both the EMT and the patient and caregiver and could direct further evaluation and care plan changes as indicated by the patient's condition.

This project was evaluated by our institution's Institutional Review Board and deemed as quality improvement.

METHODS

The EMTs' perceptions, impressions, and experience of the MTT program were assessed through semi-structured joint interviews. Two semi-structured interviews were conducted with

two EMTs per interview ($n = 4$). All EMTs who participated in the MTT program were included in these interviews (100% participation). The interview guide is included in Appendix A.

The joint interviews were each 1 to 1.5 h in length, consisted of the same set of open-ended questions, and were conducted in a private room. Questions focused on experience of participating in the MTT program, including advantages and disadvantages, ways to improve and expand, EMS career outlook, and potential career opportunities provided by the program. The conversations were recorded and professionally transcribed. The EMTs were compensated for their time and verbally consented to participate in the interview and to be recorded.

A deductive thematic analysis approach was used to analyze the joint interview transcripts. The research team developed codes based on the interview content and the transcripts were manually coded individually by three research team members. Discrepancies were discussed until the team members reached consensus. Finally, the codes were grouped into three high-level themes based on identified patterns in the codes (Table 1). MTT in the table refers to EMTs who completed the pilot program.

RESULTS

The EMTs' sentiments from the joint interviews were in the majority positive regarding program structure, EMT responsibilities as physician extenders, and having an expanded role in HBPC. Three themes emerged from the joint interviews: (1) perceptions of the MTT model, (2) EMT career mobility, and (3) considerations for future iterations and similar programs.

Theme 1—Perceptions of the MTT model

- Code(s): Patient engagement and building relationships

While participating EMT value helping people in their communities through their traditional EMS roles, they do not often get a chance to build relationships with patients. The MTT program provides an opportunity for relationship building because of the consistent schedule and additional time clinicians can spend with patients on HBPC assignments.

'[...] now you get to build a rapport with them because I've seen some of them several times. They call for you by name [...] and you get to build that relationship with that person.' (Participant 4)

'You get the sense to understand them better, you get to know when they're truly not themselves, and there is something more serious going on than your regular run-of-the-mill EMS response'. (Participant 2)

- Code(s): The benefits of consistency, consideration, and valued experiences

The EMTs appreciated the regularity and consistency in patient scheduling. They also appreciated the efficient commuting routes mapped out by administrative staff prior to the visits. Furthermore, the MTTs felt their clinical expertise was valued and relied upon by patients and providers.

'The doctors that we talk with value our opinion and our assessment, which is nice. It makes you feel like you're actually being part of a team'. (Participant 2)

'I love the patients and what we're learning. I think for me, it's given me a new appreciation for this population. One of the things that I've noticed is from an EMS standpoint, we engage older people

Table 1. Interview codebook

Theme	Code	Definition
Perceptions of the MTT model	MTT Benefits	MTT refers to aspects of their current role as an MTT that are positive or beneficial (e.g., helpful, better, greater, enjoyable).
	Patient Engagement	MTT refers to their clinical encounters with patients during an MTT workday. This can be a general statement or a specific clinical encounter (e.g., clinical skills, medical assessments, spending more time talking with patients about their medical needs/concerns).
	Relationship Building	MTT refers to getting to know patients on a more personal level, including anything that hints at personal relationships.
	Autonomy	MTT refers to their autonomy, independence, or lack thereof in their current EMT or MTT positions.
	Valued Experience	MTT explicitly refers to their experience of feeling valued within their role of MTT or EMT. (Related commentary may include appreciation, trust, usefulness, or respect.)
	Peer MTT Sentiments	MTT refers to their peers' thoughts, views, and/or assumptions about the MTT pilot program.
	EMT Career Mobility	Physical Demands
EMT Career Mobility		MTT refers to the career options or job opportunities that are or have been available to them as EMTs in the EMS agency, or any mention of a lack of career options.
EMT Career Outlook		MTT references their personal career outlook. Their own interpretation of their future as an EMT or of the EMS field in general. This can include the opinion of their peers or assumptions based on their peers' experiences.
EMT Career Challenges		MTT expressed challenges they personally face as EMTs and the challenges their peers have expressed as well.
Undervalued Experience		MTT explicitly refers to their experience of feeling undervalued within their role of MTT or EMT. (Related commentary may include lack of appreciation, trust, usefulness, or respect.)
Considerations for Future Iterations and Similar Programs	Considerations for Similar Programs	MTT expresses the characteristics and/or structural components that other programs should consider incorporating (e.g., structural components such as number of providers, MTTs, scheduling; or job characteristics such as flexibility, transportation, work hours).
	MTT Scheduling	MTT commentary on scheduling for their current MTT workday (e.g., scheduling structure, flexibility, satisfaction). May overlap with areas for improvement.
	Areas for Improvement	MTT expresses areas or ways in which the current MTT program or model can be improved (e.g., types of visits, number of visits, business hours, staffing, mode of transportation).
	Expansion	MTTs convey their desired expansion plan for the current House Calls MTT program.

and we take them to the hospital. Even if we feel that they should stay at home, our goal is always get them to the hospital [in the traditional EMS role]'. (Participant 3)

- Code(s): More autonomy and flexibility in their schedules

The EMTs mentioned that the nature of the MTT program afforded them more flexibility and control over their schedule compared to traditional EMS work.

'I definitely like the flexibility and the mobility of the program. It's my skillset used in a different way than I used it before, which is an interesting take on my experience, using what I've learned in my 15 years as an EMT and for a different purpose, which I think is one of the unique things about this program which I'm quite enjoying'. (Participant 1)

'I think the scheduling works great [...] it's usually five to six patients a day. It gives us enough time to actually sit down, really assess, assess the living conditions as well, making sure there's no issues that can be resolved right then and there'. (Participant 2)

Theme 2—EMT career mobility

- Code(s): Limited EMT career outlook and mobility

The joint interviews illuminated the limited EMT career options for those who may not want or cannot afford to obtain paramedic licensure. According to the interviewed EMTs' experience, EMTs are not always compensated for years of experience with increased pay, benefits, or career progression. The EMTs felt the MTT program offered a new path for career progression.

'EMTs and paramedics were always thought of as a stepping stone. I prefer to think of an EMT as a career. As someone that's been doing it, I want this to be my career. However, you can't sustain working 60 hours a week'. (Participant 1)

'[...] they [EMTs] want to try different things, they want to expand their career. If the paramedic program is not financially available for them, this [MTT program] is another step for them to make not as much money, but a decent amount, but also to keep that clinical experience that makes them feel like a clinician'. (Participant 2)

'Well, I think as [a] future career option, yeah, it'd be great. And I think that you can train people for this. They can get their base exam, become a tech, and then move into this'. (Participant 3)

- Code(s): Physical demands and challenges of EMT career

The EMTs discussed the trend of leaving the industry prematurely due to the intense physicality of traditional EMS work and likelihood of sustaining permanent injuries. The EMTs expressed dedication to their EMS jobs and the desire to continue working as an EMT even though their bodies are taxed. The MTT program, as currently designed, does not require transporting or lifting patients. Therefore, it is a viable option for EMTs who are older or with sustained injuries to use the full scope of their expertise without the continued stress on their body.

'I see why a lot of my colleagues have done that, have transitioned into other fields. As you start to hit 35, 40 years old, you can't do it the way you did when you

were 20, which is just how your body works. I understand why other people leave this field... don't get me wrong, there are EMTs and paramedics that are doing this well into their 50s and 60s and great for them. But unfortunately, the majority of us don't make it past their mid-40s. Just can't do it'. (Participant 1)

'In an emergency situation, you're responding to a scene, you have to get there quickly but safely, you have to worry about other cars getting out, not getting hit. And then when you get there, you have patients that are hysterical, you have family members that are hysterical'. (Participant 2)

Theme 3 – Considerations for future iterations and similar programs

- Code(s): Areas for improvement

The interviewed EMTs felt that using their personal vehicles deterred other EMTs from applying to the MTT position. Moreover, programs using EMTs should have the flexibility to coordinate EMS shifts with program scheduling. EMS shifts can often operate outside of primary care office hours, and many EMTs have multiple jobs.

'EMS is unfortunately a low-paying job where most providers are working two, three jobs at a time, whereas if you made this a job that is able to make a livable wage, they would be more flexible'. (Participant 2)

'You're going to want to attract more of the senior EMTs that are used to that kind of work schedule and used to that kind of lifestyle where they're only working three days a week. Three 13s or three 12-hour shifts'. (Participant 1)

DISCUSSION

This pilot study of EMTs' perceptions of an enhanced, telehealth-enabled physician-extender role in HBPC demonstrated majority positive impressions of program participation and potential for additional opportunities for EMT career growth. Compared with traditional EMS work, this role provided a less physically demanding option for EMTs to continue practicing and building clinical skills and socially support homebound patients. The EMTs expressed having more autonomy in their work and appreciated the consistency and flexibility in scheduling, especially considering they, as many of their colleagues, hold multiple jobs. The results also elucidate the desire for expanding models of this kind and opportunities to learn new concepts like palliative care. Utilizing EMTs in innovative capacities could increase the HBPC workforce and help retain clinicians who might ordinarily age out prematurely or turn over due to the physical demands of traditional EMS work. Areas for improvement in future iterations of the model were mainly logistical and included dissatisfaction with the use of private vehicles as well as considerations for working fewer, longer shifts as is common in traditional EMS schedules.

To our knowledge, this is the first study to provide qualitative data on EMT perspectives on telehealth-enabled expanded roles for EMS personnel. Additional studies have evaluated EMTs equipped with telehealth to provide care to patients with nonurgent conditions as well as in emergency situations, mainly stroke and acute cardiovascular care (17–19). The impact of telehealth-equipped paramedics in a community paramedicine program on hospital transport rates in a home-based primary care program has additionally been reported (16). Overall, novel roles for telehealth-enabled EMS personnel show great promise from a system standpoint, but whether these roles attract additional individuals

to the EMS field or retain a workforce at high risk of turnover has yet to be seen and further study is warranted.

This study is limited mainly by the small sample size of participating EMTs. Small pilot programs may allow participants to work in different conditions than they would experience in larger programs, and this may have an impact on their perception of the experience and their role in the program. Future studies should evaluate larger sample sizes of EMTs working in expanded, telehealth-enabled roles. Furthermore, while this pilot program previously reported on additional preliminary results, it was not powered to fully evaluate the medical, financial, and patient satisfaction impacts of adding EMTs as part of the care team. If a program cannot perform in these realms, the perception or interest of EMTs as participants will be moot.

For EMTs to participate as care team members in HBPC and other nontraditional, community-based roles, significant regulatory changes will be needed for financial sustainability. Presently, EMSs are only financially covered by insurance when a patient is transported to the emergency room (20). When an individual remains home, there is no funding available to sustain the EMS agency. Moreover, home-visit codes that are billed by HBPC providers are not available to EMS personnel. Novel programs, such as the Centers for Medicare & Medicaid Services' Emergency Triage, Treat and Transport (ET3), have recently launched and are evaluating the potential for payment to sustain treatment at alternative loci of care outside of the emergency room (21). Regulatory and financial changes that may result from the study of this program, as well as additional smaller programs evaluating community-based care models, will be critical in expanding the role of EMTs and EMS personnel in nontransport, community-based care.

CONCLUSION

We studied the perspectives of telehealth-enabled EMTs acting in a PCP extender role within a HBPC program. The program was implemented to meet the growing demand for in-home primary care services in the older adult population. This analysis found the model was viewed favorably by participating EMTs who found professional satisfaction in working with patients in the home and viewed this model as a potential new career option. In a profession with limited opportunities for growth as well as high rates of turnover due to physical demands, models such as these could serve to retain EMTs in the health professions field beyond their typical career trajectory. Additional study is warranted to elucidate EMT perspectives on new models of care and on the capacity of such programs to meet the needs of both patient care and the retention of EMS personnel in the medical field. These types of models, however, have limited capacity to expand under current reimbursement structures that only allow for payment to EMS agencies for hospital transport. Continued and permanent regulatory changes will be necessary for long-term sustainability of this and other innovative EMT-based models.

Conflict of interest and funding

The authors have no conflicts of interest to disclose with the exception of J. Washko who provides consulting relating to emergency medical services. Funding for this study was provided by a grant from the Gary and Mary West Health Institute.

Contributors' contributions

Abrashkin, Slaboda, Berkowitz, and Washko: program concept, study design, and manuscript drafting; McBride, Latus-Olaifa, Abel-Bey; and Ball: critical revisions; Latus-Olaifa and McBride: manuscript drafting, data synthesis, and interpretation.

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Appendix A. MTT Joint Interview Guide

MTT Expansion Focus Group Instructions

Script: [SAY] Thank you so much for agreeing to be interviewed for this project.

We are seeking your perspective and opinions on the Mobile Telemedicine Technician (MTT) program. We are hoping to learn more from you about your unique thoughts and experiences as a MTT contributing to the program. Thank you for agreeing to participate, and a reminder this focus group will be recorded and transcribed in order to thoroughly interpret your views. Are you willing to participate in this focus group? Do we have your permission to record this discussion?

1. Please tell me about your experience with the MTT program

Probes:

- What do you like most about the program?
- What do you least like about the program?
- What are the successes?
- What are the failures?
- Name a particular instance that a MTT session was successful.
- Name a particular MTT instance that could have been improved.
- Has the technology been inappropriate for the level of care needed?

2. How has the MTT program impacted your career?

Probes:

- Your outlook as an EMT?
- Have your colleagues commented on the MTT program/your role?
- What are notable trends in the EMS industry?

3. What are your thoughts on Mobile Telemedicine Technician as a career option?

Probes:

- What characteristics are important for this type of role? I.e. scheduling, flexibility, availability, etc.
- What is most important for this role to be enjoyable?
- What are your colleague's thoughts about EMS career paths or opportunities?

4. What has changed in terms of your workload with the addition of the MTT program?

Probes:

- During each of the MTT cycles
- During the rest of your work week
- How many more patients do you think can be realistically added to the day?

5. If you were designing the MTT program, how would you do it?

Probes:

- What would be different?
- Would you expand it to more days?
- What are your thoughts about additional training? Types of training?
- Would additional training be a barrier or benefit for EMTs interested in this type of role?
- What should other programs consider important in designing a similar program?

6. In your opinion, what would be an ideal expansion plan for the MTT program?

7. Is there anything else you would like me to know about your experiences as MTT?