


## Improving the ED-to-Home Transition: The Community Paramedic–Delivered Care Transitions Intervention—Preliminary Findings

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**OBJECTIVES:** To describe a novel model of care that uses community-based paramedics to deliver a modified version of the evidence-based hospital-to-home Care Transitions Intervention (CTI) to a new context: the emergency department (ED)-to-home transition.

**DESIGN:** Single-blind randomized controlled trial.

**SETTING:** Three EDs in 2 cities.

**PARTICIPANTS:** Through June 2017, 422 individuals discharged home from the EDs who provided consent and were randomized to receive the modified CTI.

**INTERVENTION:** We modified the hospital-to-home CTI, applying it to the ED-to-home transition and delivering services through community paramedics, allowing the program to benefit from the unique attributes of paramedics to deliver care.

**MEASUREMENTS:** Through surveys of participants, medical record review, and documentation of activities by CTI coaches, we characterize the participants and program, including feasibility and acceptability.

**RESULTS:** Median age of participants was 70.7, 241 (57.1%) were female, and 385 (91.2%) were white. Coaches successfully completed 354 (83.9%) home visits and 92.7% of planned telephone follow-up for call 1, 90.9% for call 2, and 85.8% for call 3. We found high levels of acceptability among participants, with most participants (76.2%) and their caregivers (83.1%) reporting themselves likely or extremely likely to choose an ED featuring the CTI program in the future. Coaches reported delivering expected services during contact at least 88% of the time.

**CONCLUSION:** Although final conclusions about program effectiveness must await the results of the randomized controlled trial, the findings reported here are promising and provide preliminary support for an ED-to-home CTI Program's ability to improve outcomes. The coaches' identity as community paramedics is particularly noteworthy, because this is a unique role for this provider type. *J Am Geriatr Soc* 66:2213–2220, 2018.

**Key words:** care transitions; community paramedicine; emergency department; older adults

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The emergency department (ED) is a crucial source of care for the 43.3 million older adults living in the United States.<sup>1</sup> In 2013, older adults made 20.8 million ED visits, with the majority being discharged home.<sup>2</sup> The ED-to-home transition is frequently associated with adverse events. Studies have demonstrated that, within 30 days of an ED visit, up to 20% of older adults require

further ED care, are hospitalized or placed in a nursing home, or die.<sup>3–10</sup>

Suboptimal quality of care transitions is one critical factor that may contribute to these poor outcomes. The discharge process often fails to ensure that people leaving the ED understand essential next steps such as managing medications, obtaining follow-up care, and identifying symptoms that require immediate medical attention. Although the ED discharge process delivers oral and written instructions pertaining to these issues, it lasts on average only 4 minutes.<sup>11</sup> Not surprisingly, comprehension is deficient in 78% of individuals, regardless of age.<sup>12</sup> As few as 32% of individuals discharged from the ED follow up with their primary care provider in the 30 days after discharge.<sup>13,14</sup>

Interventions to improve the transition include telephone follow-up, discharge planning, case management, and comprehensive assessments, but few interventions have demonstrated a consistent and statistically significant benefit.<sup>13,15–19</sup> Furthermore, interventions that have been found to benefit are difficult to implement without interfering with care processes in the time-pressured ED, limiting widespread uptake and sustainability.

We describe an innovative approach to improve the ED-to-home transition. By modifying the Care Transitions Intervention (CTI), an evidence-based, commonly used hospital-to-home transitions program, to the ED-to-home context, we sought to improve this transition for older adults.<sup>20,21</sup> Using paramedics to serve as coaches who deliver the CTI leverages unique features of this type of care provider such as wide availability, advanced training, and community respect. We outline our modified ED-to-home CTI program and describe its feasibility, acceptability, and ability to support older adults transitioning from the ED to home. We conclude by discussing lessons learned from this intervention.

## MODEL OF CARE

### Program Setting and Research Context

We implemented the ED-to-home CTI program in Dane County, Wisconsin, and Monroe County, New York, in the context of a randomized controlled trial evaluating its effectiveness. The study began in January 2016 in Monroe County (two EDs) and February 2016 in Dane County (one ED) and will continue through 2019.

In the trial, individuals age 60 and older discharged home from the ED are approached and, if they consent to participate, randomized to the CTI program or usual care. The core investigators are blinded to who receives the intervention. Staff are blinded unless a participant reveals that he or she received coaching. One informal caregiver per participant who is present may participate. We survey all participants in the ED to determine demographic and clinical characteristics and 4 and 30 days after discharge to ask about healthcare use and opinions. We survey caregivers in the ED to determine demographic characteristics and 30 days after discharge to ask their opinions about the program. We also review medical records of participants to measure healthcare use. Participants do not have

to arrive at the ED through the ambulance-based emergency medical services (EMS) system. Thus, although it is possible that the program paramedics provide EMS services in the context of a 911 call for control group participants, it is unlikely because of the large number of paramedics in the affiliated program agencies. The University of Wisconsin and University of Rochester institutional review boards approved the study with written informed consent.

### A Pragmatic Application of the CTI to the ED-to-Home Context

The hospital-to-home CTI program is a 4-week program supporting people discharged from the hospital, with a trained coach providing one in-person visit in the hospital before discharge, one in-person home visit, and up to 3 telephone calls.<sup>21</sup> During these encounters, the coach uses motivational interviewing techniques, behavior modelling, skill transfer, and role playing to improve self-management. Areas of focus include effective medication management, primary care provider follow-up, red flag awareness, and maintenance of a personal health record. Coaches do not deliver services (e.g., make appointments). We made 2 changes to the CTI, driven by pragmatic considerations described below. By retaining other CTI features, we pursued a balance between modifications necessary for success in the ED-to-home transition and preservation of characteristics of the validated CTI.

Through discussions among members of the research team, which includes CTI experts, geriatricians, emergency physicians, EMS physicians, and paramedics, we first determined that the in-person coach visit in the ED would be impractical. Therefore, we briefly introduce the program in the ED as part of obtaining consent and schedule a home visit to occur soon after ED discharge, ideally within 48 hours.

Second, we centered program delivery on paramedics instead of nurses, as used in the original validation.<sup>20</sup> Paramedics were chosen because, if implemented broadly, an ED-to-home CTI program would require home visits to occur in urban, suburban, and rural communities, on any day of the week. The wide availability of the EMS system fits such demanding requirements. The national movement to leverage the EMS system and paramedics to improve community health, known as community paramedicine, has resulted in many EMS agencies displaying interest in such activities.<sup>22</sup> Accordingly, we work with the Madison Fire Department in Dane County and CHS Mobile Integrated Healthcare in Monroe County to supply and manage the program's community paramedic coaches.

EMS providers possess certifications at different levels. For this program, we chose to use paramedics, because they require the greatest training (approximately 1,500 hours) to achieve certification. We considered EMS providers with other certifications but decided to include staff with a greater depth of healthcare experience and training. Paramedics at either agency were able to apply to participate in this first study. Agency leadership and research staff interviewed applicants and chose a team of 4 in each city to receive training and serve as community paramedic coaches.

### Community Paramedic Coach Training

The CTI requires that paramedics shift from solving problems (e.g., when the person is not breathing, intubate) to coaching. Thus, we provided specific training to reinforce the knowledge, skills, and attitudes necessary for successful coaching through a curriculum for participating community paramedics (Table 1). Because we used paramedics, we did not feel the need to provide medical education other than in aging-specific topics. We required coaches to read certain material; watch some video podcasts; and participate in experiences such as shadowing a CTI coach, emergency physician, and geriatrician; participate in simulation and mentored coaching; and complete the standard in-person CTI training by the Care Transitions Program (University of Colorado-Denver, Aurora, CO).<sup>23</sup> An evaluation of this training program has been published.<sup>24</sup> We also provided continuing education through regular review sessions that discussed patients and challenges that coaches encountered and annual trainings from the Care Transitions Program to reinforce concepts.

#### Program Features: Enrollment

Study participants were community-dwelling older adults (aged ≥60) who lived in Dane or Monroe County and received primary care from either university-associated health system. We avoided focusing on specific subgroups because a study aim is to determine which types of individuals would benefit from the ED-to-home CTI.

Integrating the CTI into the fast-paced ED environment required coordination with ED operations. We queried each eligible individual’s ED care provider to determine whether he or she would be discharged home. Research assistants approached individuals who were likely to be discharged home and obtained informed consent to participate from the individuals or his or her legally authorized representative. To minimize program attrition, research assistants scheduled the home visit in

the ED and gave participants a card with the coach’s photograph and scheduled visit time. We provided the coach with the participant’s demographic information and ED discharge instructions (included in the AfterVisit Summary: Epic Corporation, Verona, WI) but not the physician note, because the program’s purpose is coaching rather than direct medical care.

#### Program Features: Home Visit

Paramedic coaches traveled to the participant in a marked vehicle and in uniform but without emergency medical equipment. This approach differentiated coaching from delivery of direct medical care. For personal safety, coaches checked public safety databases for any alerts (e.g., violent dogs). They called the participant shortly before the visit to ensure that he or she was home and that the visit time was still convenient. Such contact eliminated unnecessary travel and served as a reminder. Upon arrival at the residence, if coaches identified an emergency situation, they were to contact a physician member of the study team at each site and, if necessary, request an ambulance, although this has not happened.

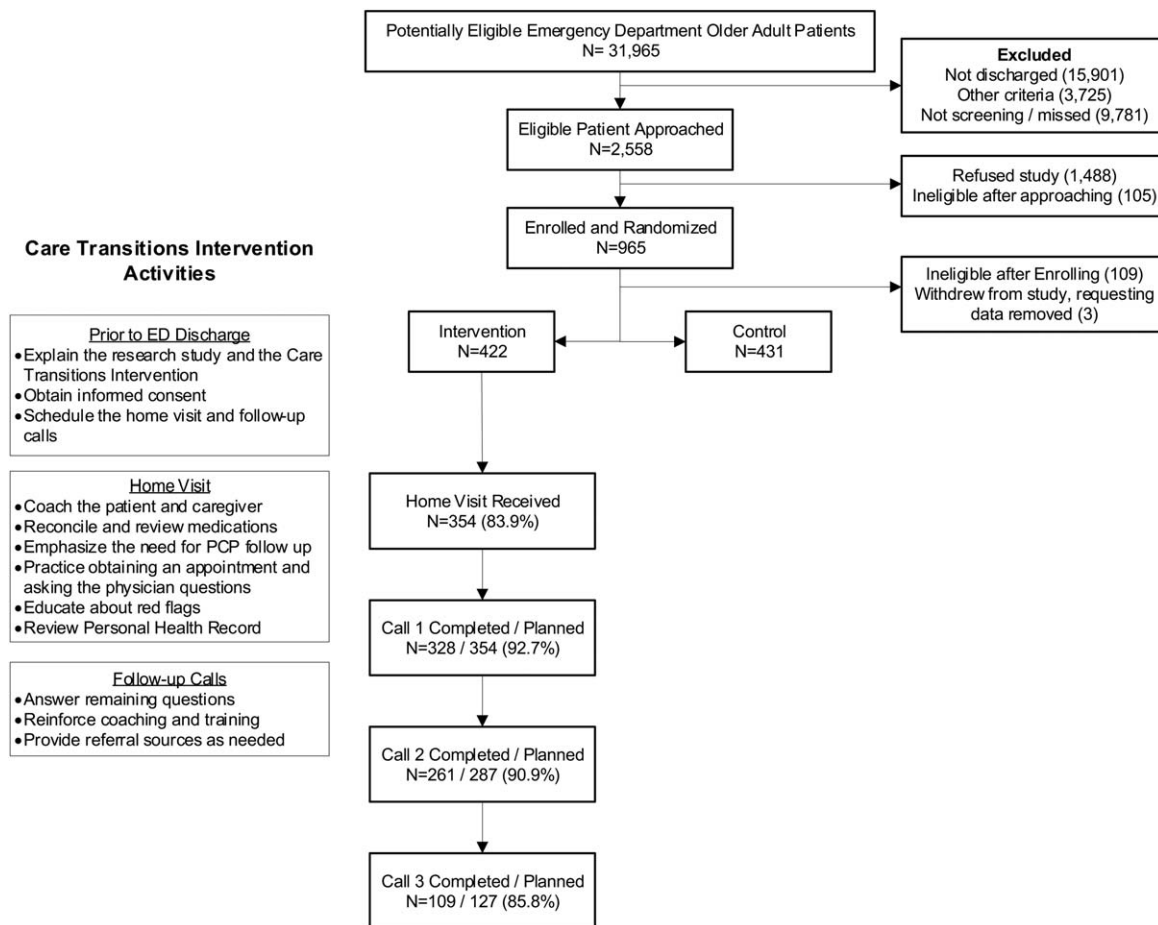
During the visit, coaches delivered the CTI as detailed in the Care Transitions Program.<sup>20,21</sup> Each participant’s personal goals, which may be related to the reason for his or her ED visit, determined the agenda for the visit. Conversations during the coaching visit included the reconciliation of medications using a medication discrepancy tool, maintaining the personal health record to facilitate communication, understanding the role of follow-up visits, and demonstrating awareness of red flags.<sup>20,21,31,32</sup>

#### Program Features: Follow-Up

Coaches performed up to 3 follow-up telephone calls, supporting participants by discussing progress towards their

**Table 1. Community Paramedic Coach Training Curriculum**

Topic	Time	Resources
Care Transitions Intervention	10–12 hours	Care Transitions Program® <ul style="list-style-type: none"> <li>• Website review: <a href="http://caretransitions.org">http://caretransitions.org</a></li> <li>• Completion of Web-based Introduction to Coach Training Unit, Sections 1–4 to introduces trainees to Care Transitions Intervention concepts and how to deliver training</li> </ul>
Coaching	1 day + travel 10–15 hours	Onsite training at University of Colorado: <a href="https://caretransitions.org/about-our-training/">https://caretransitions.org/about-our-training/</a> Motivational interviewing training and mentored coaching training <ul style="list-style-type: none"> <li>• Class on motivational interviewing</li> <li>• Coach shadowing, 1–2 home visits</li> <li>• Mentored coaching, 1–2 visits</li> </ul>
Geriatrics	4 hours 6 hours	Readings on caring for older adults Video podcasts on caring for older adults to better understand clinical concerns they face <ul style="list-style-type: none"> <li>• e.g., <a href="https://www.mlrems.org/training/cme-vodcasts/">https://www.mlrems.org/training/cme-vodcasts/</a></li> </ul> Geriatrician shadowing to understand clinical concerns older adults face and learn about aging concepts such as delirium and dementia
ED discharge process	6 hours 2 hours	Shadowing ED physician and patient, particularly to observe ED discharge processes Readings on failures of ED discharge process to understand resulting challenges Review patient discharge handouts to gain familiarity with discharge information
Community paramedicine	2 hours	Readings on role of community paramedicine to understand concepts underlying community paramedicine



**Figure 1.** Flow of subjects through the study, with detail regarding Care Transitions Intervention activities.

goals, recapping encounters with health professionals, and reinforcing previous discussions. We did not require that coaches complete 3 calls with all participants. We gave coaches, in conjunction with participants, the discretion to determine whether additional calls would have value. Coaches logged each home visit and telephone call.

## Evaluation

Our preliminary evaluation of the ED-to-home CTI program focuses on feasibility, which we defined as the ability to enroll and retain participants and complete recommended contacts; acceptability, which we defined as satisfaction with the program; and fidelity to the CTI model. We first report characteristics of intervention-group participants, including Generalized Anxiety Disorder-2,<sup>25</sup> Patient Health Questionnaire-9,<sup>26</sup> Patient-Reported Outcomes Measurement Information System Social Isolation,<sup>27</sup> Blessed Orientation-Memory-Concentration,<sup>28</sup> and Perceived Health Competence Scale<sup>29</sup> scores and activity of daily living deficiencies.<sup>30</sup> To evaluate feasibility, we report overall eligibility and enrollment rates as of June 2017, proportion of coaching home visits and telephone calls completed, and program operational information (e.g., time metrics). For acceptability, we provide participant- and caregiver-reported satisfaction on surveys.

To evaluate program fidelity, we characterize the data on coaching services delivered to participants originating in logs that coaches completed, as well as frequency and duration of calls. Finally, we present outcomes regarding medication discrepancies through the Medication Discrepancy Tool,<sup>31</sup> physician follow-up, participant activation through the Perceived Health Competence Scale,<sup>32</sup> and the quality of the care transition through the Care Transitions Measure-3 (range 0–100, higher scores indicate a better transition).<sup>33</sup> Evaluation data pertain to the period from program start to June 30, 2017 (University of Wisconsin) or June 28, 2017 (University of Rochester).

## RESULTS

Of the 2,558 individuals approached, 853 were eligible, enrolled, and randomized, with 422 allocated to receive the CTI Program (Figure 1), 98 caregivers consented to participate. Table 2 characterizes these groups and describes posttransition outcomes, including physician follow-up.

Figure 1 and Table 3 provide measures of program feasibility. Coaches successfully completed home visits and telephone coaching at high rates. On average, the home visit required nearly 1 hour, and preparation travel time required an additional hour. We asked the paramedic coaches whether the initial home visit had to be an in-person visit,

Table 2. Characteristics of Intervention Participants and Caregivers and Program Outcomes

Characteristics and Outcomes	Participants, n = 422	Caregivers, n = 98
<b>Characteristic</b>		
Age, median (IQR)	70.7 (64.8–79.3)	67.5 (61.9–73.5)
Female, n (%)	241 (57.1)	56 (60.2)
White, n (%)	385 (91.2)	91 (92.9)
Hispanic, n (%)	4 (0.9)	0 (0.0)
Married, n (%)	241 (57.1)	83 (84.7)
Education >high school, n (%)	336 (79.6)	90 (91.8)
Lives alone, n (%)	139 (32.9)	
<b>Self-reported comorbidities, n (%)</b>		
Heart disease	146 (34.6)	
Depression	125 (29.6)	
Asthma, chronic obstructive pulmonary disease	89 (21.1)	
Diabetes	89 (21.1)	
Cancer	78 (18.5)	
Stroke	32 (7.6)	
Dementia	19 (4.5)	
Generalized Anxiety Disorder-2 score, median (IQR)	1 (0–2)	
Categorized with anxiety disorder, n (%)	59 (14.0)	
Patient Health Questionnaire-9 Score, median (IQR)	3 (1–6)	
Categorized with moderate depression or greater, n (%)	62 (14.7)	
<b>Patient-Reported Outcomes Measurement Information System Social Isolation, median (IQR)</b>		
Categorized with medium or high isolation, n (%)	298 (70.6)	
<b>Number of ADL deficiencies, median (IQR)</b>		
≥1 ADL deficiencies	172 (40.8)	
<b>Blessed Orientation-Memory-Concentration Test results, n (%)</b>		
Normal	337 (79.9)	
Questionable impairment or impaired	77 (18.3)	
Unable to complete	8 (1.9)	
<b>Outcome</b>		
Physician follow-up within 4 days of ED visit (N = 354)	129 (38.9)	
Physician follow-up within 30 days of ED visit (N = 320)	282 (88.7)	
<b>Patient activation assessment, score, mean ± SD</b>		
Home visit (n = 354)	5.97 (1.68)	
Call 1 (n = 328)	7.22 (1.67)	
Call 2 (n = 261)	7.79 (1.72)	
Call 3 (n = 109)	7.70 (1.72)	
<b>Care Transitions Measure-3 (4-day follow-up, agree or strongly agree) (n = 354)</b>		
Mean ± SD	85.9 (15.9)	
Health preferences considered in the hospital, n (%)	298 (84.7)	
Purpose of medications understood, n (%)	335 (95.2)	
Understood responsibility to manage health, n (%)	340 (96.5)	

IQR = interquartile range; ADL = activity of daily living; ED = emergency department; SD = standard deviation.

as opposed to a telephone call. For 324 (91.5%) participants, the coaches responded that they felt that a telephone call could not replace the initial home visit.

Participants reported that the CTI program was highly acceptable, with 244 participants (76.2%) and 69 caregivers (83.1%) reporting being likely or extremely likely in the future to choose an ED with the CTI program over one without.

Finally, we report the services delivered as part of the CTI in Table 3. Fidelity with the CTI services were greater than 90% on all measures except one.

## DISCUSSION

We found that delivering the CTI for the ED-to-home transition is feasible and acceptable (Table 3). Particularly

notable is the CTI coaches' identity as community paramedics, because this is the first published evaluation of them in this role. Although the effectiveness of the program will be unclear until the results of the randomized controlled trial become available, the findings reported herein are promising and provide preliminary support for an ED-to-home CTI Program.

Care transitions have been focused on as a way to improve care.<sup>4–10,34</sup> The CTI was developed to address hazards during the hospital-to-home transition through coaching, and it was found that this approach reduced hospital readmissions and costs.<sup>35,36</sup> This success accounts for our approach to applying the CTI approach to the ED-to-home context and making as few changes as possible. Coaches successfully provided coaching in the focus areas (Table 3) and identified common needs (e.g., medication

**Table 3. Care Transitions Intervention Program Activity and Services Delivered**

Characteristic	Value
Timing of home visit, hours after discharge from ED (n = 354)	
≤48	320 (90.3)
≤72	33 (9.3)
Home visit effort, minutes, mean ± SD (n = 354)	
Preparation	9.7 ± 6.5
Coaching	54.0 ± 16.7
Driving	40.9 ± 18.9
Postvisit documentation	22.4 ± 11.8
Follow-up call 1 effort, minutes, mean ± SD (n = 328)	
Preparation	5.2 ± 2.9
Coaching	11.1 ± 5.1
Postvisit documentation	11.9 ± 5.8
Follow-up call 2 effort, minutes, mean ± SD (n = 261)	
Preparation	5.1 ± 2.8
Coaching	10.7 ± 4.8
Postvisit documentation	11.4 ± 4.4
Follow-up call 3 effort, minutes, mean ± SD (n = 109)	
Preparation	5.2 ± 2.4
Coaching	10.8 ± 4.5
Postvisit documentation	11.3 ± 3.4
Services provided during home visit, n (%) (n = 354)	
Discuss participant's personal goals	349 (98.6)
Medication management and discrepancy review	337 (95.2)
Develop, update personal health record	343 (96.3)
Discuss physician follow-up	327 (92.3)
Discuss what to do if red flags arise	347 (98.0)
Participants with ≥1 medication discrepancy, n (%)	119 (33.6)
Factors contributing to medication discrepancy, n (%) (n = 348)	
Conflicting information from different sources	139 (39.9)
Discharge instructions incomplete or inaccurate	65 (18.6)
Intentional nonadherence	58 (16.7)
Did not need prescription	40 (11.5)
Services provided during follow-up call 1, n (%) (n = 328)	
Discuss participant's personal goals	318 (97.0)
Medication management and discrepancy review	304 (92.7)
Develop, update personal health record	304 (92.7)
Discuss physician follow-up	305 (93.0)
Discuss what to do if red flags arise	304 (92.7)
Services provided during follow-up call 2, n (%) (n = 261)	
Discuss participant's personal goals	252 (96.6)
Medication management and discrepancy review	242 (92.7)
Develop, update personal health record	239 (91.6)
Discuss physician follow-up	241 (92.3)
Discuss what to do if red flags arise	232 (88.9)
Services provided during follow-up call 3, n (%) (n = 109)	
Discuss participant's personal goals	107 (98.2)
Medication management and discrepancy review	105 (96.3)
Develop, update personal health record	105 (96.3)
Discuss physician follow-up	104 (95.5)
Discuss what to do if red flags arise	100 (91.7)

SD = standard deviation.

discrepancies, Table 3). These findings generally indicate strong fidelity to the program.

Other researchers have worked to improve the ED-to-home transition by identifying problems and directly

addressing them but have encountered challenges related to the feasibility and effectiveness of their programs. For instance, although a discharge planning and follow-up program that lasted 30 minutes per person during the ED stay increased satisfaction, it did not decrease ED revisits within 14 days.<sup>17</sup> A number of other researchers have similarly developed and implemented assessment and intervention programs only to find no significant decrease in ED revisits<sup>18,19,37,38</sup> In contrast, a promising ED-to-home intervention has been modeled on the CTI using coaches from community area agencies on aging.<sup>39</sup> Although the exact details of the modification have not been published, a randomized controlled trial with 69 subjects found that those receiving the intervention had greater activation, although outcomes such as ED revisits were not reported. Finally, the concept of a geriatric ED has received much attention in discussions on how to improve care for older adults in the ED.<sup>3,40</sup> Although this concept has face validity, the only study assessing outcomes found only a negligible reduction in the ED revisit rate.<sup>41</sup>

Our approach of delivering the ED-to-home CTI program using community paramedics is novel. Community paramedics have already acted to deliver acute illness care, to screen for conditions, and to help people navigate the healthcare system.<sup>42–45</sup> To our knowledge, this is the first use of community paramedics in the CTI coaching role, suggesting that an additional type of healthcare provider may serve successfully as a CTI coach. Given their presence in most communities, the availability of paramedics to provide these services adds to the ability to deliver the ED-to-home CTI program in underserved communities.<sup>46</sup>

Through our experiences in developing and implementing the ED-to-home CTI program, we have found 4 important things that must be considered. First, community paramedic coaches must be chosen for their commitment to the program and the approach. They then require training to deliver the CTI services, which differ significantly from the typical services that EMS providers offer. Although we did not experience significant challenges with this frame shift to coaching, an organization replicating our approach should be cognizant of this potential challenge and ensure careful selection of coaches such that the knowledge, skills, and attitudes of those placed in this role are sufficient to ensure success of the program. Additionally, future iterations of this program should consider using EMS providers with alternate certifications, because their EMS training may be sufficient, would reduce costs, and would make the program easier to implement more broadly in communities with fewer paramedics, such as rural settings.

Second, the ED-to-home CTI program must work closely with EDs and health systems to establish an efficient process of identifying participants, presenting the program, communicating the necessary information to the coaches, and notifying primary care providers. Likewise, we recommend working with strong EMS agencies with a commitment to community paramedicine training and programs. This mission alignment will help overcome the inevitable challenges that arise in any novel endeavor. For instance, in this study, research assistants scheduled home visits. This scheduling process will be a challenge without

close collaboration between researchers and EMS agencies.

Third, delivering the CTI program involves significant effort; each person requires almost 3 hours of coach time, including preparation and travel. Although leveraging the existing EMS infrastructure may reduce the cost of the ED-to-home CTI program, the cost will remain significant and pose a major challenge, even if insurance plans agree to cover the service. We hope our research can help target individuals most able to benefit from this program. To manage costs and maximize the number of people who can benefit from services, efficiency needs to be maximized. For instance, the CTI program is based on a home visit, and the coaches for this program feel strongly about the value of the home visit, reporting that a telephone call could have been substituted for it only 9% of the time. In future work, we need to consider whether a home visit is necessary for all individuals or whether a telephone call or video conferencing would suffice, given local circumstances and goals.

Finally, if we demonstrate that a community paramedic-delivered ED-to-home CTI program is effective, sustainability will be a major consideration for those establishing similar programs. We recommend working closely with local funders, including insurers and accountable care organizations. These groups will accrue cost benefits and may express willingness to serve as future funding resources for such programs.

### Limitations

Although we document the feasibility and acceptability of an ED-to-home CTI program delivered through community paramedics, we do not demonstrate effectiveness. Also, this program took place in 2 mid-sized communities, and it may have limited generalizability to other communities (e.g., rural, large urban cities), populations (e.g., homeless, institutionalized), or interventions, as well as to other types of coaches.

### Conclusion

This program addresses the critically important need to improve the ED-to-home transition by translating the validated hospital-to-home CTI to a new setting. By leveraging community paramedics as CTI coaches, we demonstrate a model of care with characteristics to enhance implementation in a difficult transition period and in communities with limited healthcare resources.

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### REFERENCES

1. U.S. Census Bureau. Selected Social Characteristics in the United States (online). Available at [https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS\\_15\\_5YR\\_DP02&src=pt](https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_15_5YR_DP02&src=pt) Accessed November 24, 2017.
2. Rui P, Kang K, Albert M. National Hospital Ambulatory Medical Care Survey: 2013 Emergency Department Summary Tables (online). Available at [http://www.cdc.gov/nchs/data/ahcd/nhamcs\\_emergency/2013\\_ed\\_web\\_tables.pdf](http://www.cdc.gov/nchs/data/ahcd/nhamcs_emergency/2013_ed_web_tables.pdf) Accessed October 14, 2017.
3. Hwang U, Shah MN, Han JH et al. Transforming emergency care for older adults. *Health Aff Proj Hope* 2013;32:2116–2121.
4. McCusker J, Cardin S, Bellavance F et al. Return to the emergency department among elders: Patterns and predictors. *Acad Emerg Med* 2000;7:249–259.
5. Caplan GA, Brown A, Croker WD et al. Risk of admission within 4 weeks of discharge of elderly patients from the emergency department—the DEED study. *Age Ageing* 1998;27:697–702.
6. Friedmann PD, Jin L, Karrison TG et al. Early revisit, hospitalization, or death among older persons discharged from the ED. *Am J Emerg Med* 2001;19:125–129.
7. Hastings SN, Oddone EZ, Fillenbaum G et al. Frequency and predictors of adverse health outcomes in older Medicare beneficiaries discharged from the emergency department. *Med Care* 2008;46:771–777.
8. Moons P, De Ridder K, Geyskens K et al. Screening for risk of readmission of patients aged 65 years and above after discharge from the emergency department: Predictive value of four instruments. *Eur J Emerg Med* 2007;14:315–323.
9. Hastings SN, Schmader KE, Sloane RJ et al. Adverse health outcomes after discharge from the emergency department—incidence and risk factors in a veteran population. *J Gen Intern Med* 2007;22:1527–1531.
10. Lowenstein SR, Crescenzi CA, Kern DC et al. Care of the elderly in the emergency department. *Ann Emerg Med* 1986;15:528–535.
11. Vashi A, Rhodes KV. “Sign right here and you’re good to go”: A content analysis of audiotaped emergency department discharge instructions. *Ann Emerg Med* 2011;57:315–322.
12. Engel KG, Heisler M, Smith DM et al. Patient comprehension of emergency department care and instructions: Are patients aware of when they do not understand? *Ann Emerg Med* 2009;53:454–461.
13. Katz EB, Carrier ER, Umscheid CA et al. Comparative effectiveness of care coordination interventions in the emergency department: A systematic review. *Ann Emerg Med* 2012;60:12–23.
14. Barlas D, Homan CS, Rakowski J et al. How well do patients obtain short term follow up after discharge from the emergency department. *Ann Emerg Med* 1999;34:610–614.
15. Biese KJ, Busby-Whitehead J, Cai J et al. Telephone follow-up for older adults discharged to home from the emergency department: A pragmatic randomized controlled trial. *J Am Geriatr Soc* 2018;66:452–458.
16. Caplan GA, Williams AJ, Daly B et al. A randomized, controlled trial of comprehensive geriatric assessment and multidisciplinary intervention after discharge of elderly from the emergency department—the DEED II study. *J Am Geriatr Soc* 2004;52:1417–1423.
17. Guttman A, Afilalo M, Guttman R et al. An emergency department-based nurse discharge coordinator for elder patients: Does it make a difference? *Acad Emerg Med* 2004;11:1318–1327.
18. 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;41:57–68.
19. McCusker J, Dendukuri N, Tousignant P et al. Rapid two-stage emergency department intervention for seniors: Impact on continuity of care. *Acad Emerg Med* 2003;10:233–243.

20. Coleman EA, Parry C, Chalmers S et al. The care transitions intervention: Results of a randomized controlled trial. *Arch Intern Med* 2006;166:1822–1828.
21. Coleman EA, Smith JD, Frank JC et al. Preparing patients and caregivers to participate in care delivered across settings: The Care Transitions Intervention. *J Am Geriatr Soc* 2004;52:1817–1825.
22. Choi BY, Blumberg C, Williams K. Mobile integrated health care and community paramedicine: An emerging emergency medical services concept. *Ann Emerg Med* 2016;67:361–366.
23. The Care Transitions Program. About Our Training (online). Available at <https://caretransitions.org/about-our-training/> Accessed March 24, 2018.
24. Lau HS, Hollander MM, Cushman JT et al. A qualitative evaluation of the coach training within a community paramedicine care transitions intervention. *Prehosp Emerg Care* 2018 Feb 12:1-8. doi: 10.1080/10903127.2017.1419325. [Epub ahead of print]
25. Wild B, Eckl A, Herzog W et al. Assessing generalized anxiety disorder in elderly people using the GAD-7 and GAD-2 scales: Results of a validation study. *Am J Geriatr Psychiatry*. 2014;22:1029–1038.
26. Kroenke K, Spitzer RL, Williams JBW. The PHQ-9: Validity of a brief depression severity measure. *J Gen Intern Med* 2001;16:606–613.
27. PROMIS Short Form v2.0 (online). Available at <http://www.healthmeasures.net/search-viewmeasures?task=Search.search> Accessed March 23, 2018.
28. Katzman R, Brown T, Fuld P et al. Validation of a short orientation-memory-concentration test of cognitive impairment. *Am Psychiatry* 1983; 140:734–739.
29. Smith MS, Wallston KA, Smith CA. The development and validation of the Perceived Health Competence Scale. *Health Educ Res* 1995;10:51–64.
30. Katz S, Downs TD, Cash HR et al. Progress in development of ADL. *Gerontologist* 1970;10:20–30.
31. Smith JD, Coleman EA, Min SJ. A new tool for identifying discrepancies in postacute medications for community-dwelling older adults. *Am J Geriatr Pharmacother* 2004;2:141–148.
32. Smith MS, Wallston KA, Smith CA. The development and validation of the Perceived Health Competence Scale. *Health Educ Res* 1995;10:51–64.
33. Coleman EA, Mahoney E, Parry C. Assessing the quality of preparation for posthospital care from the patient's perspective. *The Care Transitions Measure*. *Med Care* 2005;43:246–255.
34. National Transitions of Care Council (online). Available at <http://www.ntocc.org/> Accessed November 24, 2017.
35. Coleman EA, Smith JD, Frank JC et al. Development and testing of a measure designed to assess the quality of care transitions. *Int J Integr Care* 2002;2:e02.
36. Coleman EA, Berenson RA. Lost in transition: Challenges and opportunities for improving the quality of transitional care. *Ann Intern Med* 2004; 141:533–536.
37. Runciman P, Currie CT, Nicol M et al. Discharge of elderly people from an accident and emergency department: Evaluation of health visitor follow-up. *J Adv Nurs* 1996;24:711–718.
38. Miller DK, Lewis LM, Nork MJ et al. Controlled trial of a geriatric case finding and liaison service in an emergency department. *J Am Geriatr Soc* 1996;44:513–520.
39. Schumacher JR, Lutz BJ, Hall AG et al. Feasibility of an ED-to-home intervention to engage patients: A mixed-methods investigation. *West J Emerg Med* 2017;18:743–751.
40. Rosenberg M, Rosenberg L. Improving outcomes of elderly patients presenting to the emergency department. *Ann Emerg Med* 2011;58:4979–4981.
41. Hwang U, Dresden SM, Rosenberg MS et al. Geriatric emergency department innovations: Transitional care nurses and hospital use. *J Am Geriatr Soc* 2018;66:459–466.
42. O'Meara P, Stirling C, Ruest M et al. Community paramedicine model of care: An observational, ethnographic case study. *BMC Health Serv Res* 2016;16:39.
43. Shah MN, Schoenwetter DJ. Community paramedicine: The Geisinger experience. In: Wiler J, Pines J, Ward M, eds. *Value and Quality Innovations in Acute and Emergency Care*. Cambridge, UK: Cambridge University Press; 2017:186–194.
44. Nejtek VA, Aryal S, Talari D et al. A pilot mobile integrated healthcare program for frequent utilizers of emergency department services. *Am J Emerg Med* 2017;35:1702–1705.
45. Tadros, AS, Castillo EM, Chan TC et al. Effects of an emergency medical services-based resource access program on frequent users of health services. *Prehosp Emerg Care* 2012;16:541–547.
46. Tavares W, Drennan I, Van Diepen K et al. Building capacity in healthcare by reexamining clinical services in paramedicine. *Prehosp Emerg Care* 2017;21:652–661.