EMERGENCY TRIAGE, TREAT, AND TRANSPORT (ET3) MODEL

Final Evaluation Report

January 2025

Center for Medicare and Medicaid Innovation
Centers for Medicare & Medicaid Services

Emergency Triage, Treat, and Transport (ET3) Model Final Evaluation Report

ACKNOWLEDGMENTS

The ET3 evaluation received helpful assistance and comments for this report from Shannon Flood, Alexis Lilly, Marvin Nichols, Kelsey Weaver, Dan Muldoon, and David Dietz. Booz-Allen Hamilton under the ET3 Implementation and Monitoring Contract (HHSM-500-2014-00030I) provided support in assembling the analytic files for this report.

FEDERAL PROJECT EVALUATION LEAD

Woolton Lee, PhD
Research and Rapid Cycle Evaluation Group (RREG),
Center for Medicare and Medicaid Innovation (CMS Innovation Center),
Centers for Medicare & Medicaid Services (CMS)

TABLE OF CONTENTS

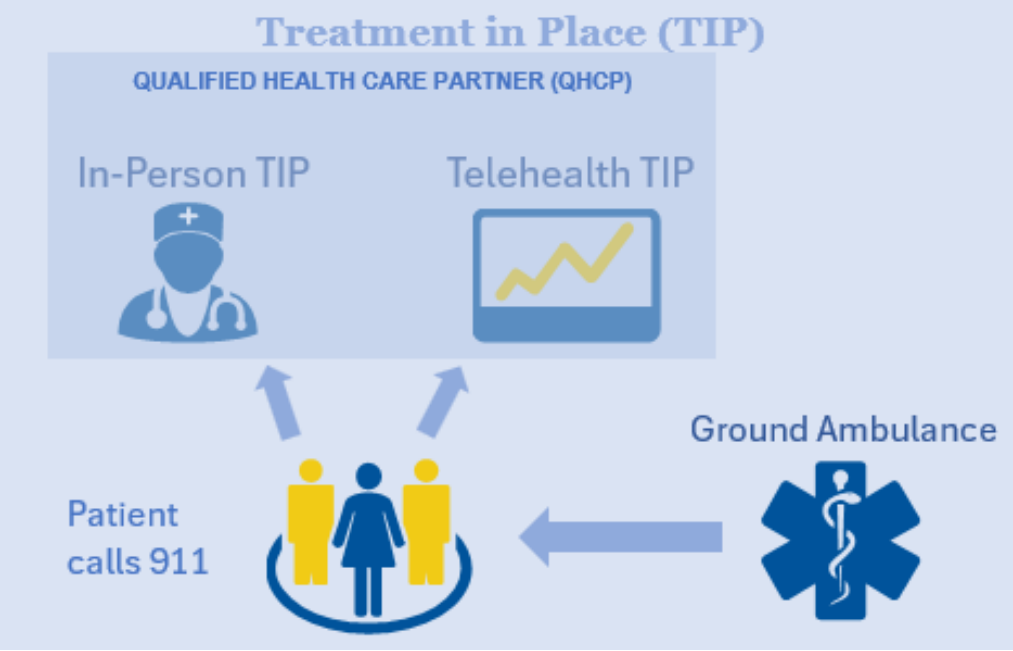
EXECUTIVE SUMMARY

The Emergency Triage, Treat, and Transport (ET3) Model was a voluntary payment model whereby ground ambulance suppliers and providers could initiate and facilitate treatment in place (TIP) or provide transport to an alternative destination (TAD) to eligible and consenting Medicare fee-for-service (FFS) beneficiaries in place of transport to a hospital emergency department (ED) or other covered destination following a 911 call. This document presents quantitative and qualitative results from the evaluation of the ET3 Model across the model's three-year performance period which began on January 1, 2021, and ended on December 31, 2023.

The ET3 Model was a departure from typical emergency medical service (EMS) delivery in the United States over the past 40-50 years and was designed to reduce avoidable transports to EDs by providing TIP or TAD as alternatives. Under the model, a patient's 911 call would be followed by dispatch of an ambulance with EMS personnel who would assess the patient's status and determine next steps. They could offer one of two interventions under the ET3 model:

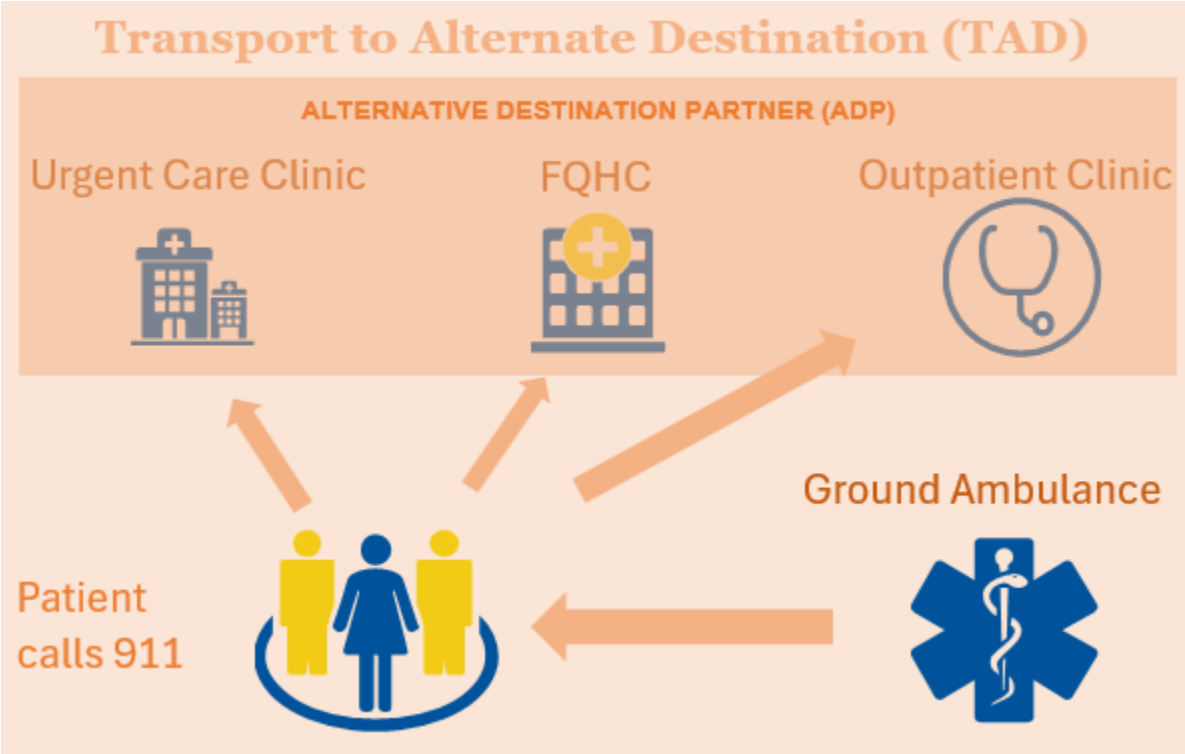
> **Treatment in Place (TIP):** Per the use of established protocols, an ambulance crew who determined that a patient could safely be treated in place outside of the ED setting could facilitate TIP to consenting patients. Patients who consented to TIP would receive covered health services either in-person or via telehealth from a health care partner who had entered into a written arrangement with the ET3 participant.

EXHIBIT ES1. TREATMENT IN PLACE (TIP) UNDER THE ET3 MODEL



Transport to Alternative Destination (TAD): Per the use of established clinical protocols, EMS ambulance personnel determining that a patient could be safely treated at a location other than the ED could facilitate TAD for consenting patients. Consenting patients were transported to alternative destinations such as an urgent care clinic, federally qualified health center (FQHC), outpatient clinic, or other alternative destination partner (ADP) that could meet the health care needs of the patient and had entered into a written arrangement with the ET3 participant.

EXHIBIT ES2. TRANSPORT TO ALTERNATIVE DESTINATION (TAD) UNDER THE ET3 MODEL



ET3 Evaluation's Design and Referent Group

The ET3 evaluation used a cross-sectional design with a referent group to assess differences in outcomes associated with ET3 interventions. The evaluation's unit of analysis is an EMS episode including ground ambulance services and health services provided by an ET3 partner with the index date being the date of the claim for ground ambulance services. EMS episodes may be TIP, TAD or low acuity ED episodes.[1] Differences in four outcomes associated with delivery of ET3 interventions were evaluated: Medicare Parts A and B spending; all-cause hospitalization; all-cause mortality; and all-cause ED visits following the index event of an EMS episode. Outcomes were assessed on a *same-day+1* basis for services incurred on the index date and the following calendar day, and separately on a *five-day* basis for services incurred on the index date and during the five calendar days after the index date.

[1] Low acuity ED episodes are EMS episodes with ground ambulance transport and ED visits categorized as low acuity, meaning they could have been treated in a primary care setting (Jeffrey et al., 2016).

The evaluation analyzed TIP and TAD interventions descriptively but used statistical modeling only for TIP interventions because of the limited number of TAD interventions (N=257). Participant clinical protocols would have specified criteria for identifying persons safe for treatment outside of an ED setting. Ideally, a comparison group for ET3 interventions would approximate outcomes had an ET3 intervention not occurred for persons deemed to be safe for treatment outside an ED. Clinical protocols determining patient eligibility for TIP or TAD vary between participants and patient characteristics were not observable to the evaluation. Instead, the ET3 evaluation used matched low acuity ED visits with evidence of primary care treatability as its referent group to approximate outcomes that would have occurred in the absence of ET3 interventions.[2] Matched low acuity ED visits included in the referent group were identified from the local service areas of active participants that delivered at least one or more ET3 interventions during the model's performance period. Exact beneficiary matching on demographic, coverage, and socioeconomic characteristics was used to improve comparability between patients in the referent group and TIP recipients. Entropy balancing on clinical characteristics was also used improve balance between TIP interventions and TIP-matched low acuity ED episodes.

Because TIP recipients were deemed safe for treatment outside an ED setting while patients with low acuity ED visits were not eligible for TIP, the latter is referred as a referent group because patients in it may have higher unmeasured patient acuity relative to TIP recipients. Given the cross-sectional design and limitations in the counterfactual used in this evaluation, differences in outcomes associated with statistical analyses of TIP interventions cannot be interpreted as causally related to the ET3 Model. Lower averages or rates for hospitalizations, ED visits, and mortality after TIP compared to the referent group may be due to higher unmeasured acuity in the referent group.

Model Participation and Delivery of ET3 Interventions

Only 38 percent of 185 ambulance organizations that participated in the model were active participants that delivered at least one or more ET3 interventions. On average, ET3 interventions made up less than 1% of an active participant's annual Medicare FFS ambulance transports.

One-hundred-eighty-five ambulance suppliers and hospital-based ambulance providers maintained a signed participation agreement in the model for at least one month or more. Among these participants, 70 or approximately 38 percent, delivered one or more paid ET3 interventions during the model. These 70 participants are referred to in this report as *active participants* and are the focus of this report (See Exhibit ES1). Participants with a signed model participation agreement for one month or more with no ET3 interventions during the model's three-year duration are referred to as *non-active participants*.

TIP interventions accounted for over 90% of ET3 interventions, with over 75% of TIP interventions concentrated among eight higher volume participants (Exhibit ES1). Most TAD interventions were delivered by active participants that delivered fewer than 100 ET3 interventions.

TIP interventions numbered 3,161, or 92%, of all ET3 interventions, with TAD interventions accounting for the remaining 257. Among active participants, eight (8) participants delivered at

[2] The approach for identifying primary care treatable ED visits was developed and tested on Medicare claims by researchers at the University of Minnesota (Jeffrey et al., 2016). The health services literature includes several approaches for identifying avoidable or low acuity ED visits. See Introductory chapter and the report's Technical Appendix B for more details.

least 100 ET3 interventions and are hereafter referred as *higher volume participants*. Active participants that delivered fewer than 100 ET3 interventions during the model's three-year performance period are hereafter referred to as *other active participants.*

EXHIBIT ES3. PARTICIPANTS AND DELIVERY OF TIP & TAD INTERVENTIONS, 2021-2023

Category	Participants	TAD Interventions	TIP Interventions
All:	185	257	3,161
Non-Active:	113	0	0
Active:	70	257	3,161
Higher Volume, ≥ 100 ET3 Interventions:	8	58	2,426
Other Active, <100 ET3 Interventions:	62	199	735

Participant Implementation Challenges

The ET3 evaluation reviewed survey data collected by the model's learning system, implementation plans, and model reports, as well as interviewed participants to identify core themes reflecting delivery of few ET3 interventions. These themes are summarized below.

Implementation challenges related to the Coronavirus Disease 2019 (COVID-19) PHE limited the number of ET3 interventions delivered under the model.

The COVID-19 Public Health Emergency (PHE) contributed considerable difficulties to the implementation and delivery of ET3 interventions. These difficulties included participants having to delay implementation of ET3 because of local community or state needs, healthcare partners having reduced capacity to receive patients from staff being diverted to address needs caused by the PHE, and for some participants sharp declines in 911 calls as patients avoided contact with local health systems to reduce the risk of contracting the disease.

Key Point:

Patients in an emergency medical situation tended to avoid departing from typical EMS care in an ED because of unfamiliarity with TIP and TAD services. Participants reported that health care providers tended to avoid operations for TIP/TAD because of unfamiliarity or uncertainty with these arrangements. This [collective] avoidance contributed to participant challenges in implementation or delivery of ET3 interventions.

In surveys and interviews, ET3 participants reported that patient refusals limited delivery of ET3 Interventions.

Patients in an emergency medical situation tended to avoid departing from typical EMS care in an ED because of unfamiliarity with TIP and TAD services. Given the potential risk to health,

patients may have been uncertain whether these ED alternatives were legitimate and safe, or that the quality of services were similar to ED care. Had patients been familiarized with TIP and TAD in a non-emergent setting in advance, they may have been more open to consenting to these services in an emergency.

Implementation challenges also arose because providers and EMS ambulance personnel avoided TIP or TAD because of operational unfamiliarity.

Participants reported that health care providers tended to avoid operations for TIP/TAD because of unfamiliarity or uncertainty with these arrangements.[3] This avoidance contributed to participant challenges in implementation or delivery of ET3 interventions. Participants reported that some health care providers expressed uncertainty about the legitimacy of TIP and TAD as services because they were not familiar with them. Other providers were concerned about operational risks such as receiving acutely ill patients they were not equipped to manage, not knowing when patients would arrive, or the potential that patients would need transportation back to their residence.

Participants reported disengagement among EMS ambulance personnel limited delivery of ET3 interventions. Interviews with participants suggest that the extent of disengagement among a participant's EMS ambulance personnel varied across ET3 participants. Participant reports of EMS ambulance staff disengagement included experiences where staff resistance was greater when the participant started delivery of ET3 interventions but declined and eventually plateaued over time. A separate participant noted that challenges with EMS staff were limited to roughly one fifth of personnel with most of their staff being enthusiastic about delivering ET3. Reasons for disengagement among a participant's EMS ambulance personnel may reflect different concerns. Participants reported that reasons included changes in procedures for delivering TIP or TAD compared to procedures in standard EMS responses; concerns about patient out-of-pocket costs; or uncertainty about how to address questions from patients.

The combination of difficulty in obtaining agreements with alternative destination partners (ADPs) and ADPs with limited capacity or availability to receive TAD patients was seen as the primary challenge that limited TAD delivery. EMS ambulance personnel disengagement and patient refusals seemed to have also limited TAD delivery.

[3] Lack of provider or EMS ambulance personnel "buy-in" may reflect unfamiliarity with operational risks associated with TIP or TAD. This was a frequent response in open-ended participant survey responses describing the most challenging aspects of TIP or TAD implementation in the model's learning system surveys of participant organizations. The ET3 Model's prohibition on marketing prevented ET3 participants from activities that could have familiarized health care providers and patients with TAD in advance and attenuated problems with unfamiliarity.

COVID-19 contributed to difficulties in acquiring ADPs with sufficient capacity for TAD patients as did provider perceptions of legal or operational concerns. Approximately half (51%) of respondents to the ET3 Learning System's Needs Assessment Survey reported that acquiring agreements with healthcare partners for TAD and limited ADP availability and capacity to accept patients was the most challenging aspect of TAD implementation. EMS personnel disengagement was reported as the most challenging aspect of TAD implementation by 24 percent of participants and patient refusals were cited as most challenging by 13 percent.

Key Point:

The combination of difficulty obtaining agreements with Alternative Destination Partners (ADPs) and limited ADP availability and capacity to accept TAD patients was seen as the **primary challenge** that limited TAD delivery.

TIP delivery was limited by EMS ambulance personnel disengagement; patient refusals due to lack of familiarity with TIP; problems in technology installation, connectivity, or information access; and securing health care partners for TIP.

Participants reported different aspects of TIP implementation and delivery as being the most challenging, with the three most common aspects being EMS ambulance personnel disengagement (32 percent), patient refusals (23 percent), and technology installation, connectivity limiting telehealth use, and difficulty in information access (22 percent). A more limited share of participants (13 percent) reported difficulty in securing health care partners for TIP as the most challenging aspect of TIP implementation.

EMS Personnel: Participants reported resistance or disengagement from EMS personnel reflected concerns with the necessary changes in process for TIP relative to how EMS has been delivered in the United States historically. Examples of the changes needed to implement TIP include the implementation of protocols for patient assessment per TIP clinical protocols to determine ED triage; engaging patients to offer TIP and address questions; secondary physician review to confirm ED triage is unnecessary; and contacting TIP partners to confirm their availability and that they would be able to treat specific patients. EMS personnel opposition to or disengagement from TIP delivery were sometimes related to disagreement or concerns such as out-of-pocket costs for patients; because secondary physician review overturned an ED triage decision; or perceiving the

Key Point:

Participants reported resistance or disengagement from EMS personnel as a pervasive issue. TIP interventions were seen as a major change relative to how EMS has been delivered in the United States historically and some personnel were not comfortable with this change.

patient could have been transported to ED in the time taken by obtaining a physician for a telehealth visit.

Patients: In surveys, participants reported that eligible patients declined TIP interventions due to what they believed was lack of familiarity with TIP. In interviews, higher volume participants reported patient refusal rates ranging from 40% to slightly over 80%. One participant reported that in a medical emergency, patients generally expect to be transported to a hospital emergency room and are uncomfortable with this expectation being unmet. In surveys and interviews, participants reported the patient community's lack of familiarity with TIP services contributed to refusals of these interventions in emergency medical situations. Familiarizing patient communities with TIP interventions in advance in a non-emergent context before onset of an emergency medical situation may encourage greater use.

Technological Issues Connecting to Qualified Health Care Partners (QHCPs) for TIP: Technology installation, connectivity, and information access issues related to interoperability limited provision of TIP interventions. The vast majority of TIP interventions delivered under the model included telehealth visits rather than in-person services. In surveys and interviews, participants reported difficulties with the technology allowing reliable communication with QHCPs. These difficulties included hardware/software installation problems; establishing or maintaining connectivity, especially in more rural areas; or system specific challenges preventing needed access to patient or provider information.

Recruitment of QHCPs: Lastly, difficulty in securing health care partners for TIP was reported as a challenge for some participants. Thirteen percent of ET3 participants responding to the model's Needs Assessment Survey reported difficulty in securing health care partners as the most challenging aspect of implementing TIP.

Features of Higher Volume Participants That Appear to Have Contributed to Their Success

A related aim of the evaluation's qualitative interviews was to identify relevant organization and contextual factors that may have contributed to higher volume participants' ability to deliver larger numbers of paid interventions relative to other observably similar ET3 participants. Key findings using data from qualitative interviews, learning system surveys, implementation plans, descriptive and quantitative analyses are summarized below.

The eight higher volume participants who delivered 100 or more ET3 Interventions were diverse. Participants included very small, mid-sized and very large organizations. Six of the participants predominantly serviced urban areas, and two primarily serviced rural areas.

Review of higher volume participant data suggests successful implementation and delivery of ET3 interventions was not necessarily limited to large, well-resourced participants, or to small nimble organizations with the flexibility to quickly adapt under difficult conditions. The eight higher volume participants primarily serviced urban areas, and among EMS organization types, were over-represented by third service public safety organizations (N=4) but also included fire

departments (N=2), a hospital-based ambulance provider, and a private agency (Section 1 of chapter II describes EMS organization types).[4]

Higher volume participants successfully leveraged organizational advantages and may have prioritized model implementation.

These organizations appear to have shared a commitment to implementing the ET3 Model. Some participants attributed success in ET3 intervention delivery to organizational size advantages such as greater staff bandwidth, allowing maintenance of relationships with health care providers and payers over time that could be called upon when implementing the model. Participants also noted advantages from organizational scale for management of EMS ambulance personnel. The evaluation was not able to interview small higher volume participants, but their ability to deliver higher volumes of ET3 interventions may reflect the influence of organizational leaders committed to implementing the ET3 Model.

A Successful Strategy: Standardized Protocols

Higher volume participants identified their delivery of higher volumes of TIP interventions was possible because they required EMS ambulance personnel to offer ET3 interventions to all eligible patients as standard protocol. They also implemented regular monitoring and management of EMS personnel engagement of this requirement over time.

In interviews, two higher volume participants asserted that using a standard protocol requiring EMS ambulance personnel to deliver ET3 interventions to all eligible patients contributed to greater delivery of ET3 interventions.

Interviews with two participants who delivered more than 100 interventions over the life of the model provided an interesting approach to how they were able to obtain these numbers: they reported requiring EMS ambulance personnel to deliver ET3 interventions to all applicable patients whenever possible. These participants reported regularly monitoring ambulance crews paired with periodic training and retraining of crews to ensure consistency in the delivery of these interventions. Participants also reported having management engage and work to resolve disagreements or concerns from EMS personnel. While the evaluation could not confirm application of this requirement among all higher volume participants, participant implementation plans suggest at least half of higher volume participants may have applied similar requirements.

Characteristics of TIP and TAD Interventions

Recipients of TIP interventions were predominantly aged Medicare beneficiaries among whom over two-thirds were age 70 or older.

[4] Third service public safety organizations are governmental agencies responsible for the provision of EMS services and may be operated by a city, county, or regional organizations covering multiple counties or cities.

Over 80% of TIP interventions were attributed to aged patients with high prevalence of chronic endocrine, heart, and circulatory conditions. Socioeconomically, about one quarter (24%) of aged TIP patients were dually eligible for Medicare and Medicaid or received LIS. Less than 20% of TIP recipients were disabled beneficiaries under age 65, more than 80% of whom were either dually eligible for Medicare and Medicaid or receiving Part D Low-Income Subsidy (LIS) support. Non-aged TIP recipients exhibited higher prevalence of chronic circulatory, pulmonary, heart and endocrine conditions, ranging from 20% to near 70%, as well as higher prevalence of depression (51%), bipolar disorder (22%), and schizophrenia (19%) compared to elderly TIP recipients.

Among 233 TAD recipients, most (62%) were aged Medicare beneficiaries, but over one third (38%) were disabled Medicare beneficiaries with high rates of severe mental illnesses.

Over forty percent of TAD intervention were attributed to disabled Medicare beneficiaries nearly all of whom are either dually eligible or recipients of LIS support. Disabled TAD patients had higher rates of mental or substance abuse related illnesses such as depression (71%), schizophrenia (60%), bipolar disorder (48%), or alcohol use disorder (30%) and lower rates of circulatory, endocrine, or heart-related chronic conditions compared to elderly TAD recipients.

To identify differences or similarities in conditions prevailing in TIP and TAD interventions, the ET3 evaluation used the Agency for Healthcare Research and Quality's (AHRQ) Clinical Condition Software Refined (CCSR) classification system. This system groups diagnoses into a smaller number of more clinically meaningful clinical categories hereafter referred as CCSR condition categories. Diagnosis codes on all claims in a TIP or TAD intervention within five days after the index date were used to flag applicable CCSR categories.

The three most commonly occurring CCSR condition categories in TAD interventions included injury or poisoning, mental or behavioral disorders and musculoskeletal system conditions. For TIP, the most common CCSR categories were circulatory system conditions, endocrine system conditions, and musculoskeletal system conditions.

TAD interventions following a 911 call most commonly involved health services for injury or poisoning; mental or behavioral disorders; or musculoskeletal system conditions. These conditions are consistent with the high proportion of TAD interventions (41%) provided to disabled beneficiaries with high rates of mental illness. The most common CCSR categories for TIP interventions included circulatory system conditions, endocrine system conditions, and injury or poisoning. Over 80% of TIP interventions were provided to aged Medicare beneficiaries with high rates of heart disease and diabetes as noted previously.

Unadjusted Descriptive Outcomes of TIP and TAD Interventions

Comparisons of outcome differences between TIP, TAD, and matched low acuity ED episodes are presented in this section. Findings listed in this section of the executive summary are based on Exhibits 10 through 19 in chapter IV of this report.

Assuming that an ED visit would have occurred absent TIP or TAD, these interventions may have been associated with between 70 percent and 85 percent fewer ED visits.

Follow-up ED visits occurred on a same-day+1 basis in 15 percent of ET3 interventions and 30 percent on a five-day basis. If it is assumed that an ED visit would have occurred in the absence of an ET3 intervention, provision of ET3 interventions were associated with between 70 percent and 85 percent fewer ED visits. The upper and lower bounds for prevented ED visits reflects uncertainty in the proportion of ET3 interventions that would have resulted in an ED visit if the intervention had not been provided.

On an unadjusted basis, the rate of hospitalization following TAD was higher than after TIP, suggesting TAD patients have higher clinical acuity than TIP patients. This result is also consistent with clinical protocols used to determine patient need for ED transport.

TIP and TAD recipients are patients that were deemed safe for treatment outside the ED setting. TAD patients may have more commonly met criteria implying ED transport was needed, whereas TIP patients were deemed safe for treatment outside of the ED setting. Therefore, TIP patients would on average, be expected to have lower acuity relative to TAD patients. On a same-day+1 basis, hospitalizations following TIP occurred in 1.7 percent of cases but 7 percent of cases after TAD ($p<0.01$). On a five-day basis, 11.5 percent of TIP interventions were followed by a hospitalization whereas hospitalizations occurred in 24.5 percent of TAD interventions ($p<0.01$).

TIP interventions provided by higher volume participants had lower rates of follow-up ED visits and hospitalizations than TIP by other active participants ($p<0.01$).

The unadjusted rate of ED visits after TIP from higher volume participants was lower than other active participants (same day: 11 percent vs 21 percent, not significant; 5-day: 26 percent vs 36 percent, $p<0.10$). The unadjusted rate of hospitalization following TIP was higher for other active participants than for higher volume participants (same-day+1: 1.5 percent versus 2.4%, $p<0.05$; 5-day: 10.8% versus 13.7%, $p<0.05$).

On average, Medicare Parts A and B spending for TIP interventions were lower but not statistically different than TAD.

Unadjusted Medicare Parts A and B spending on a same-day+1 basis was $512 for TIP and $759 for TAD. On a five day basis, spending averaged $922 for TIP and $1,274 for TAD.

Regression Adjusted Differences in Medicare Parts A and B Spending, All-Cause Hospitalizations, All-Cause Mortality, and All-Cause ED Visits Associated with TIP Interventions

Key findings from cross-sectional regression analysis of TIP interventions with low acuity ED episodes as the referent group are presented below and in chapter V of this report. Statistical analysis of TAD interventions was not performed because of their limited sample size. Results for TIP are presented as the regression adjusted difference of a given outcome, which is the adjusted outcome after TIP minus the adjusted outcome for matched low acuity ED episodes. Because of the cross-sectional design used, the results reported here should be interpreted with caution because the adjusted difference between TIP interventions and low acuity ED episodes may not be solely due to the ET3 Model. Appendix B in the report's technical appendix provides details of the methodology used in this analysis.

Overall, the adjusted difference for follow-up ED visits after TIP (N=3,161) was positive, large and significant indicating ED visits after TIP occurred at a higher rate than after matched low acuity ED episodes. The higher rate of ED visits following TIP may reflect direction from a TIP healthcare partner, patient initiative, or an adverse event.

The adjusted risk of follow-up ED visits after TIP was higher than ED visits after matched low acuity ED episodes for same-day+1 and five-day. The higher risk of follow-up ED visits may reflect four different causes. Some follow-up ED visits may have resulted per direction from TIP health care partners. For example, TIP partners may have counseled patients to seek ED care if symptoms or problems persist beyond a specified time frame. TIP partners may also have directed patients to seek ED care immediately. Alternatively, patients that initially accepted TIP may have used follow-up ED services because of behavioral expectations associated with medical emergencies (Pringle et al., 2005).[5] Follow-up ED visits after TIP interventions may also be adverse medical events that are related or unrelated to the preceding TIP intervention.

The adjusted difference for follow-up ED visits after TIP was non-significantly smaller for higher volume participants compared to other active participants.

Both higher volume and other active participants exhibited a higher risk of follow-up ED visits than low acuity ED episodes. However, the risk of follow-up ED visits after TIP by higher volume participants was lower than after TIP by other active participants. This pattern suggests higher volume participants may have been more successful in identifying lower acuity patients and triaging them for TIP interventions while transporting higher acuity patients to ED compared to other active participants.

Overall, TIP interventions (N=3,161) were associated with a higher risk of all-cause hospitalizations within five days after index compared to TIP-matched low acuity ED episodes. The adjusted difference for risk of hospitalization after TIP was non-significantly lower for higher volume participants compared to other active participants.

The risk of hospitalization after TIP was elevated and significant compared to referent group ED episodes. The elevated hospitalization rate after TIP may reflect inappropriate triage of patients into TIP, since recipients of low acuity ED episodes would on average, be expected to have greater clinical severity than TIP recipients. This finding suggests continued effort to improve identification of patients most appropriate for TIP versus the ED setting may be needed. The adjusted difference for hospitalization for TIP by higher volume participants was lower than the adjusted difference for other active participants, suggesting higher volume participants were more successful in accurately identifying lower acuity patients and triaging them to TIP compared to other active participants.

Overall, the adjusted difference for patient mortality was not different from zero either on a same-day+1 or five-day basis. Higher volume participants had a negative and non-significant adjusted difference for patient mortality, indicating mortality after TIP from higher volume participants was

[5] Pringle et al., (2005) surveyed patients treated in one urban hospital ED and found patients in EMS incidents not transported to ED exhibited a high likelihood of seeking ED care after EMS personnel left the scene irrespective of whether the patient refused transport or emergency medical technicians (EMTs) declined transport.

non-significantly lower than matched low acuity ED episodes. Other active participants had a positive, small and significant risk of mortality within five days after TIP compared to low acuity ED episodes.

The risk of patient mortality after TIP interventions (N=3,161) was not statistically different than after low acuity ED episodes. Patient mortality following TIP from higher volume participants was lower than mortality after TIP-matched low acuity ED episodes. By comparison, TIP from other active participants exhibited a small but statistically higher risk of patient mortality after TIP. This pattern also suggests organizational characteristics of higher volume participants such as processes used to identify and triage patients were more accurate than in other active participants.

Lower risk of follow-up ED visit, hospitalization, and mortality among TIP by higher volume participants may reflect procedures participants used to ensure accurate patient triage such as requiring EMS ambulance personnel to use secondary physician review (or similar screens) of patients deemed eligible for TIP services. Other unmeasured organizational differences may have also contributed to the observed difference.

Adjusted differences for follow-up ED visits, hospitalization and mortality after TIP interventions suggest higher volume participants may have used secondary screens or other procedures to ensure appropriate patient triage into TIP interventions. The health services literature suggests the rate of under triaging patients, or deeming a patient does not require ED transport when such transport would be more appropriate among paramedics ranges from approximately 11 percent to 20 percent (Gratton et al., 2003; Brown et al., 2009; Millin et al., 2011; Neeki et al., 2017). Two higher volume participants that were interviewed reported requiring EMS ambulance personnel to use secondary physician review to confirm cases where a patient was initially deemed eligible for TIP. Review of implementation plans for other higher volume participants suggests four of the remaining six may have used secondary physician review or other similar procedures to prevent under-triage of patients to EDs. Other organizational differences may also have contributed to the observed lower risk among higher volume participants.

Conclusion

Appropriately identifying and triaging unnecessary ED visits could reduce the strain on ED services that many communities experience. The ET3 Model was designed to reduce the volume of unnecessary ED visits by identifying patients that could safely be treated outside of the ED setting. Studies suggest that on average 30% to 40% of ED visits may be safely treated in a lower acuity setting (Uscher-Pines et al., 2013). In theory, the ET3 Model appears to have some potential as a component of a broader strategy to reduce population reliance on EDs as a primary access point for health services. Such a strategy would include enhancing access and support for primary care services in addition to incorporating ET3-like processes whereby appropriate patients are triaged to settings other than an ED.[6] Strengthening local access and delivery of primary care services could also broaden avenues for ET3-like interventions.

However, the experience of the ET3 Model showed that despite robust participation, delivery of ET3 interventions were severely limited by challenges to ET3 implementation and delivery. While the PHE

[6] A variety of Innovation Center models have tested approaches to bolstering primary care access including the Comprehensive Primary Care (CPC) Model, CPC+, Pioneer ACO Model, and Next Generation ACO Model.

contributed significantly to delays in implementation and delivery, system-wide implementation challenges related to avoidance of TIP and TAD interventions appear to have played a substantial role in limiting delivery of ET3 interventions. Had patient communities and providers in the localities of ET3 participants been familiarized with TAD and TIP well in advance of the model's start, delivery may have been higher, though it is unclear how much of an increase would have occurred.

Successful ET3 intervention delivery over time may reflect both participant capacity to implement and deliver ET3 interventions as well as a local market context that supports implementation and delivery. The two large-sized higher volume participants that delivered the most ET3 interventions noted successful delivery of interventions required significant organizational resources, including relationship building with providers and payers; staff bandwidth; infrastructure and equipment; and training and retraining of EMS ambulance personnel. The eight higher volume participants included small rural organizations and medium-sized rural and urban organizations, which suggests organizational size did not necessarily limit an organization's ability to implement and deliver these interventions.

The pattern of results for TIP suggests some potential for reducing patient volume on EDs but the results also suggest that refinement of processes used to identify patients safe for TIP as well as delivery of TIP services may be needed. The risk of ED follow-up after TIP was notably higher than after low acuity ED episodes. However, ED follow-up after TIP may not reflect adverse health events since QHCPs may direct patients to seek ED care if symptoms persist beyond a specified time frame. Compared to patients with low acuity ED episodes, TIP interventions had a higher risk of hospitalization within five days after delivery. The estimated risk was smaller for TIP from higher volume participants than other active participants which suggests these organizations may offer insights for implementation and delivery. Additional research would be needed to confirm associations between operational practices in higher volume participants and the outcomes found in this evaluation.

I. INTRODUCTION

The Emergency Triage, Treat, and Transport (ET3) Model was a voluntary payment model whereby ground ambulance suppliers and providers could initiate and facilitate treatment in place (TIP) or provide transport to alternative destination (TAD) to eligible and consenting Medicare fee-for-service (FFS) beneficiaries in place of transport to a hospital emergency department (ED) or other covered destination following a 911 call. Section 1115A of the Social Security Act (as added by section 3021 of the Affordable Care Act) authorizes the CMS Innovation Center to test innovative payment and service delivery models to reduce Medicare, Medicaid, and Children's Health Insurance Program (CHIP) expenditures while preserving or enhancing the quality of beneficiaries' care. The ET3 Model was tested under this authority.

1. *Evaluation of the Emergency Triage, Treat, and Transport Model and Purpose of this Document*

KEY TERMS

- ***Active Participants***: ET3 Participants that delivered at least one or more ET3 interventions during the model's three year performance period.
- ***Higher Volume Participants***: ET3 Participants that delivered at least 100 or more ET3 interventions during the model's three year performance period.

This document presents results from the evaluation of the ET3 Model across the model's three-year performance period which began on January 1, 2021, and ended on December 31, 2023. This document was created to satisfy statutory requirements for the timely release of evaluation results for Innovation Center models under the Affordable Care Act (ACA).[7] The ET3 evaluation was completed by the Innovation Center and includes a quantitative descriptive analysis as well as a qualitative analysis.

Analysis for the ET3 evaluation addressed three broad research questions:

1) How were the characteristics of ET3 participants that delivered ET3 interventions similar or different from participants that did not deliver and bill CMS for any ET3 interventions?

   1a) What challenges or barriers impeded the delivery of ET3 interventions?

   1b) What characteristics of higher volume ET3 participants that delivered at least 100 ET3 interventions appear to have contributed to their ability to deliver more ET3 interventions?

[7] The Secretary shall conduct an evaluation of each model tested under this subsection. Such evaluation shall include an analysis of (i) the quality of care furnished under the model, including the measurement of patient-level outcomes and patient-centeredness criteria determined appropriate by the Secretary; and (ii)the changes in spending under the applicable subchapters by reason of the model. (B) Information The Secretary shall make the results of each evaluation under this paragraph available to the public in a timely fashion.

2) How did the risk of all-cause hospitalizations and all-cause death following ET3 interventions compare to patients who had low acuity ED visits?

    2a) To what extent were ET3 interventions successful in preventing ED visits?

3) How did average Medicare Parts A and B spending for patients that received ET3 interventions compare to patients who had low acuity ED visits?

Section 2 of this introductory chapter describes the ET3 evaluation's design, the referent group of patients who had low acuity ED visits used in its analysis, and the rationale for the referent group. Section 3 describes the ET3 Model, its features, criteria used to select ET3 participants and steps that were taken in the model's initial years in response to challenges posed by the COVID-19 Public Health Emergency. Section 3 also describes the delivery of emergency medical services (EMS) in the ET3 Model and outside the model. The introduction concludes by describing the evaluation's conceptual framework.

The remainder of this report contains five chapters.

- Chapter II presents descriptive characteristics of ET3 participants, including the volume of ambulance transports provided to FFS Medicare beneficiaries.
- Chapter III describes characteristics of TIP and TAD interventions delivered under the ET3 Model, characteristics, including common clinical conditions, of patients who received TIP or TAD interventions.
- Chapter IV describes outcomes associated with TIP and TAD interventions.
- Chapter V presents the results of statistical analyses of TIP interventions. Because of their limited sample size, only univariate statistics were used to examine TAD interventions.
- Chapter VI concludes the report.

2. *Evaluation Design and ET3 Evaluation's Referent Group*

The ET3 evaluation's analysis characterized the direction and size of the ET3 Model's associations with Medicare Parts A and B spending, all-cause ED visits, all-cause hospitalizations, and all-cause patient mortality. Because a limited number of ET3 interventions were delivered under the model, the analysis was cross-sectional with a mutually exclusive referent group of low acuity ED episodes. The referent group was selected to approximate outcomes in the absence of ET3 interventions and is described in more detail below. Results of differences associated with the model are presented as qualitative labels reflecting direction (higher, lower, no difference) and size (modest, moderate, substantial) derived from the average of the difference of ET3 episodes minus referent episodes. This approach was used because: 1) the analytic design was cross sectional and does not account for factors that may have influenced outcomes such as secular trends or events preceding or coinciding with the model's start; and 2) persons with low acuity ED episodes may have some unmeasured differences compared to recipients of ET3 interventions. We therefore refer to comparators in this evaluation as the referent group instead of a comparison group.

The unit of analysis for the evaluation was structured as an EMS episode, which was defined to include FFS claims for ground ambulance services and health care services provided. The date of ground ambulance services was used as the index event initiating an EMS episode. As discussed in more detail

below, the evaluation utilized emergency ground ambulance transports to low acuity ED visits (referred to hereafter as low acuity ED episodes) as a referent group for purposes of approximating outcomes that would have occurred in the absence of ET3 interventions. EMS episodes where the index event is an ET3 intervention include Medicare FFS claims for ground ambulance services facilitating TIP or transport in the case of TAD, as well as Medicare FFS claims for health care services provided by ET3 partners. Low acuity ED episodes are EMS episodes where the index event is an emergency ground ambulance transport and low acuity ED visit, similarly, include claims for the ambulance transport and the ED visit.

Approach Used to Define Low Acuity ED Visit Encounters

The ET3 Model tested whether participating ambulance suppliers and providers could:

1. Reliably identify patients from 911 calls who could be treated in lower acuity settings than an ED; and
2. Appropriately triage eligible and consenting patients to ED alternatives.

Conceptually, patients eligible for an ET3 intervention were those whose medical care could be appropriately addressed in a lower acuity setting such as an urgent care clinic, outpatient clinic, or by EMS ambulance personnel facilitating a virtual or in-person visit with a health care practitioner. Because the model was designed to identify lower acuity patients with a greater likelihood of being safely treated outside an ED, we expect that in the absence of an ET3 intervention, patients would likely have been transported to an ED and received health services in that setting.

Participant clinical protocols specified criteria for identifying persons safe for treatment outside of the ED setting. Participant organizations could tailor their ET3 interventions around conditions such as heart failure or mental illness and specified eligibility criteria for TIP and TAD in their clinical protocols. Ideally, it would have been possible to construct a comparison group for recipients of ET3 interventions by identifying patients with an ED visit who was eligible for treatment outside of the ED setting.

However, data on patient eligibility criteria for TIP or TAD was not available in claims.[8] To approximate outcomes in the absence of ET3 interventions, the ET3 evaluation used a referent group structured as emergency ground ambulance transports and primary care treatable ED visits (Jeffrey et al., 2016). In this report, we refer to EMS episodes in the referent group as low acuity ED episodes.

The health services literature includes several approaches for categorizing ED visits as “avoidable,” “nonurgent,” “low acuity,” or “primary care treatable.” While studies indicate a sizeable share of visits to emergency departments may be ‘avoidable’ or ‘non-emergent’, there is variation in ED visits categorized as such due to differences in study populations, contextual settings, study designs, and study definitions of low acuity ED visits. One systematic review suggests that at least 30% of ED visits may be potentially avoidable or nonurgent. This review found that on average across 26 studies, 37% of ED visits were nonurgent, with estimates of nonurgent ED visits varying from 8% to 62% between studies (Uscher-Pines et al., 2013). A more recent comparison of study algorithms for detecting low acuity ED visits found the rate of low acuity ED visits for patients aged 65 and above ranged from 3.5% to 24.9% (Chen et al., 2022). Similarly, a separate study comparing alternative algorithms for detecting non-emergent or

[8] Attempts to match EMS Electronic Patient Care data to Medicare claims showed limited match rates and there were concerns about the reliability of the data.

primary care treatable ED visits by Medicare patients found 17.5% of ED visits were primary care treatable according to one approach and 28.7% were non-emergent according to a separate algorithm (Jeffrey et al., 2016).

Appendix B of this document provides a detailed description of the data and methods for the ET3 evaluation and includes a description of the approach used to identify low acuity ED episodes used in the referent group for the evaluation. Following Jeffrey et al. (2016), ED visits that do not include an inpatient admission and that satisfy one of the following conditions are categorized as primary care treatable:

- Contain Current Procedural Terminology (CPT) code 99281; or
- Contain CPT 99282 or 99283 without Healthcare Common Procedural Coding System (HCPCS) codes that indicate the necessity of an ED visit (see Appendix Exhibit B.2.).

To identify the initial population of low acuity ED episodes, ambulance transports to low acuity ED visits in the service areas of active participants were retained for analysis.

To bolster the comparability of persons with low acuity ED episodes, two other restrictions were applied to the sample of non-ET3 patients. First, after calculating Medicare Parts A and B spending for each EMS episode on same-day+1 and 5 days, the top 5 percent of beneficiaries for spending in each time horizon were excluded. Second, beneficiaries with low acuity ED episodes were retained only if they matched exactly with at least one ET3 beneficiary on gender; age group; race/ethnicity group; disability & end stage renal disease (ESRD) status; and dual eligibility, Medicare Part D LIS status, and full Medicare supplemental coverage during calendar years 2021-2023.

3. *Description of the ET3 Model and ET3 Evaluation's Conceptual Framework*

Design and Features of the ET3 Model

The ET3 Model's focal population was Medicare FFS beneficiaries who called 911 seeking emergency medical assistance. The ET3 Model was designed as a five-year payment model with a two-pronged approach for improving the quality of care and lowering costs to Medicare by reducing avoidable ground ambulance transports to EDs, thus decreasing avoidable ED visits. Its design was intended to advance provision of person-centered care, encourage appropriate utilization of services to meet health care needs effectively, and increase the EMS system's efficiency to more readily respond to and focus on high-acuity cases. Other key aims included regional uptake of the use of TIP and TAD interventions as well as multi-payer adoption to support sustainability across the model's performance period. The original model design consisted of two components:

- **Ambulance Payment component (5-year performance period):** Under this component, when a participating Medicare-enrolled ground ambulance service supplier or hospital-owned ground ambulance provider responded to a 911 call and determined that a Medicare FFS beneficiary may be safely treated at a lower acuity alternative destination, or safely treated in place at the scene of the 911 emergency response, the participant may have offered TAD via an alternative destination provider (ADP), or have initiated and facilitated TIP with a qualified health care partner (QHCP), either on the scene or via telehealth. Medicare Part B Ambulance Fee Schedule

(AFS) regulations have historically only allowed payment for medically necessary emergency ground ambulance transports when beneficiaries are transported to hospitals and skilled nursing facilities. Most beneficiaries who call 911 with a medical emergency are therefore transported to one of these facilities, and most often to a hospital ED, even when a lower-acuity destination may more appropriately meet an individual's needs.

- **Medical Triage Line (MTL) component (2-year performance period):** Through cooperative agreement funding, this component was designed to allow Public Safety Answering Points (PSAPs) (e.g., 9-1-1 call centers) to establish or expand a medical triage line allowing them to redirect 911 callers with non-emergency conditions to appropriate care alternatives. The intervention was designed to test whether the establishment or expansion of MTLs integrated with the PSAP would reduce inappropriate use of emergency ambulance services and increase efficiency in EMS in geographic regions where the Ambulance Payment Component of the Model had been implemented. The Notice of Funding Opportunity (NOFO), issued on March 12, 2021, was intended to award up to 40 cooperative agreements totaling $34 million to state and local governments in geographic regions where the ambulance payment component of the Model was implemented and preference was given to those in areas with significant opportunities for impact, either due to large geographic areas or with a degree of population density.

  On September 13, 2021, the Innovation Center announced its removal of the MTL component of the Model due to an insufficient number of applications received in response to the NOFO, which would lead to an inability to adequately assess whether medical triage lines would influence the quality of care for beneficiaries.

Selection of Participants and the COVID-19 Public Health Emergency

The participants of the ET3 Model were Medicare-enrolled ambulance service suppliers and hospital-owned ambulance providers. Upon arriving on the scene of a 911 emergency response, participating ambulance suppliers and providers may triage Medicare FFS beneficiaries to one of the model's interventions based on participant-developed clinical protocols. As part of a multi-payer alignment strategy, the Innovation Center encouraged ET3 Model participants to partner with additional payers, including state Medicaid agencies and commercial insurers, to reimburse the provision of similar interventions to all people in their geographic areas.

Participants for the ET3 Model were selected by a review panel who objectively scored applications based upon the applicants' ability to:

- Demonstrate established partnerships with alternative transport destination sites (e.g., letters of support and a draft memorandum of understanding (MOU) with such sites);
- Operate within a region where at least 15,000 Medicare FFS emergency (unscheduled) ground ambulance transports occur per year;
- Contract with other payers, including state Medicaid, in the region for the interventions described in the model;
- Facilitate TIP with a QHCP, and indicate whether TIP would be delivered in-person or via telehealth;

- Comply with robust data-sharing and/or interoperability requirements as outlined in the Request for Applications (RFA); and
- Demonstrate that their region was well-positioned for the development and implementation of a medical triage line.

While applicants were not required to establish multi-payer participation, they were encouraged to establish relationships with other payers or arrangements based on state, regional, or local scope of practice laws. Participants selected for the ET3 Model needed preparation time in advance of implementing the ET3 model interventions. Critical activities that participants performed between announcement of participant selection included the following:

- Development of protocols for treatment-in-place and transport to alternate destination
- Training of EMS ambulance personnel in protocols to be used for ET3 interventions prior to initiating delivery
- Formation of formal partnerships and communication procedures with ADPs and QHCPs
- Establishment of data-sharing infrastructure

Timely and successful implementation of the model depended on participants completing these activities before the model's start date.

The COVID-19 Public Health Emergency (PHE) delayed participants' ability to comply with model timelines and requirements and created difficulties in the implementation and delivery of ET3 Model interventions. The model was originally scheduled to start on January 1, 2020; however, participants were not announced until February 27, 2020, and therefore the start date was extended to March 10, 2020. Additionally, due to the substantial impact of the COVID-19 PHE on ambulance providers and suppliers given their role as first-line safety net providers in their communities, the model's start date was further delayed, to January 1, 2021, based on participant feedback as well as a CMS hosted listening session.

Medicare made payment flexibilities available to ambulance providers and suppliers because of challenges created by the COVID-19 PHE. To accommodate participants who might want to use flexibilities under the COVID-19 PHE, the Innovation Center issued a revised participation agreement on October 9, 2020, that allowed for a one-year ramp-up period as well as the ability to use the PHE flexibility to transport to the expanded list of covered destinations while participating in the ET3 Model. The timing of the following flexibilities overlapped in whole or in part with ET3 Model interventions available under the Ambulance Payment component of the model:

- Interim Final Rule with Comment Period (IFC) Flexibilities: In March 2020, CMS issued an IFC that expanded the list of allowable destinations for ambulance transports during the PHE. This flexibility allowed payment for alternative transports for the duration of the PHE and duplicated the ET3 TAD intervention.
- American Rescue Plan Act (ARPA) Waiver: On May 5, 2021, Medicare released the Ambulance treatment in place waiver authorized under the ARPA which provides payment for treatment in place separately from the ET3 Model. ARPA allowed payment for treatment in place by ground ambulance personnel in response to a 911 call if the beneficiary qualified for a medically necessary emergency ambulance transport. By contrast, the ET3 TIP intervention did not require

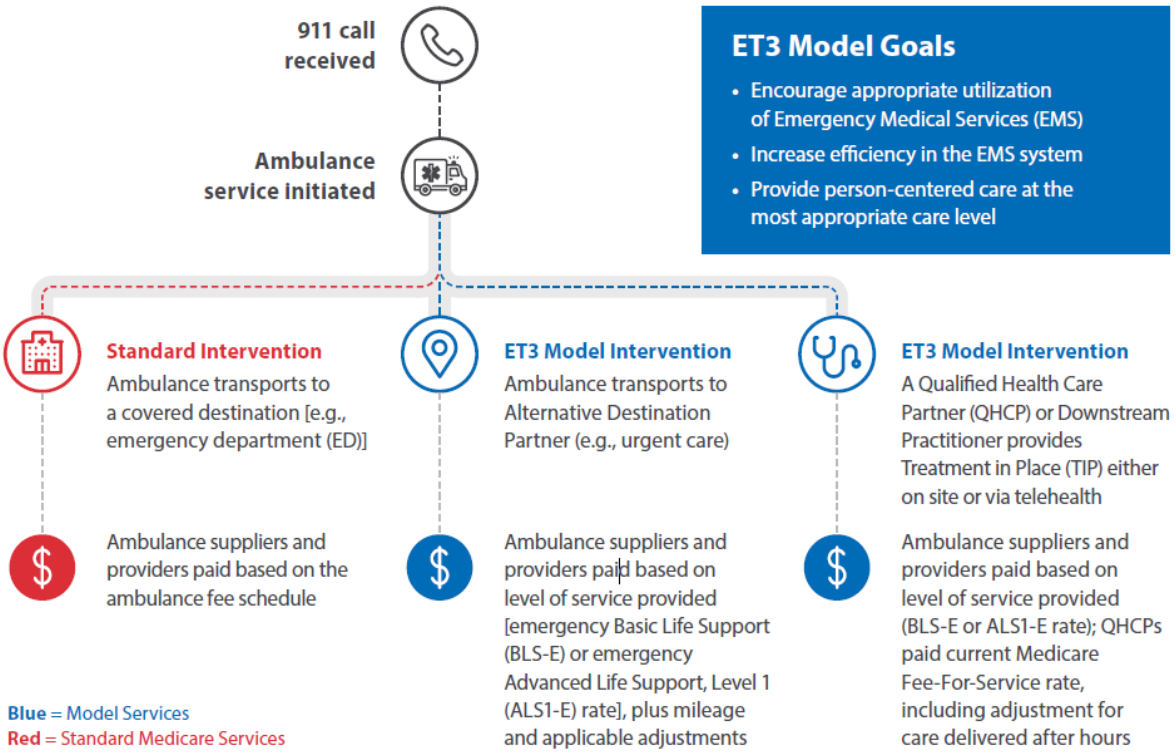
the beneficiary to qualify for a medically necessary emergency ambulance transport. Rather, the medical necessity requirement that applied to ET3 TIP is related to any medically necessary covered service, emergent or not, that is deemed appropriate to the patient's condition and is furnished by a Medicare-enrolled provider either onsite or via telehealth.

Emergency Medical Service Delivery under the ET3 Model

The alternatives to treatment in EDs offered under the ET3 model were a departure from how EMS has been delivered in the United States over the past 40-50 years. Standard Medicare services in Exhibit 1 (in red) illustrate typical EMS delivery in the United States against TIP and TAD interventions delivered by ET3 Model participants. A 911 call center responding to a 911 call requesting assistance would obtain or identify the address from the caller and dispatch an ambulance staffed with EMS personnel to the caller's location. Once the EMS ambulance crew arrives at the caller's location, they provide assistance or stabilization as applicable, and utilizing pre-determined clinical protocols, determine appropriateness of transport for the patient to an ED. Transport to an ED may still occur if the patient is not deemed to require transport to ED, and the patient requests transport to ED. EMS personnel may perform services that assist or stabilize a patient without transport to an ED, as allowable under their licensure, but payment under Medicare Part B is only applicable for transports to ED.

Under the ET3 Model, initial emergency contact and assessment of the patient's status follow as described in the preceding paragraph. Based on participant -developed clinical protocols, patients eligible for TAD may have been offered the option of being transported to an alternative destination instead of an ED. Alternative destinations may have included an urgent care clinic, federally qualified health center (FQHC), or other applicable Medicare enrolled alternative destination site that could furnish appropriate services and had previously agreed to serve as an ADP. If the patient consented, they were transported to the applicable ADP. If EMS ambulance personnel assessing the patient determined, through the use of participant-developed clinical protocols, that TIP was appropriate, then the patient may have been offered TIP. Some ET3 participants required EMS ambulance personnel offering an ET3 intervention to consult a physician or non-physician practitioner during a TIP triage decision to reduce the risk of under triaging a patient. If, as part of this consult, it was determined that the triage decision to offer an ET3 intervention was appropriate, and the patient accepted the TIP intervention, then the EMS personnel most commonly initiated and facilitated a telehealth visit with a Medicare-enrolled health care practitioner that had previously agreed to serve as a QHCP. Regarding both TIP and TAD interventions, patients could have declined either and requested to be transported to an ED even if the patient may not have met medical necessity criteria.

EXHIBIT 1. PROCESS FOR DELIVERY OF EMERGENCY MEDICAL SERVICES UNDER THE ET3 MODEL



Conceptual Framework

The ET3 Model provided incentives that encouraged participant organizations to deliver ET3 interventions and submit properly billed claims for those services. Appendix Exhibit C1 presents the conceptual framework for the ET3 evaluation. The ET3 Model provided neutral or upside payment incentives for participants to deliver and properly bill for ET3 interventions, realize savings for Medicare in intervention delivery, and comply with the model's programmatic requirements. Participating organizations received a performance based payment (PBP) for delivering at least 20 ET3 interventions that were properly billed and paid,[9] providing ET3 interventions with Medicare payments with lower than expected Medicare spending for an ED visit, and having no programmatic compliance issues or open corrective actions at the time of PBP calculation. ET3 participants that met the aforementioned criteria received incentive payments that ranged from 0-3 percent of Medicare payments for properly billed and paid ET3 intervention claims accumulated during a participant's preceding year in the model. FFS Medicare claims payments for ET3 interventions were set so that participants would not have a financial incentive favoring delivery of ET3 interventions over ambulance transports or vice versa.

[9] Properly billed and paid ET3 intervention claims include all codes and criteria for billing per CMS guidance in the ET3 Model's participation agreement, with the NPI for the claim and associated ET3 partner claim being listed on the participant's list of health care partners for the ET3 Model. Associated ET3 intervention participant and partner claims are adjudicated and paid by Medicare carriers. The 20 ET3 intervention threshold requirement was waived for participants that had less than 2,000 Medicare FFS ambulance transports in the preceding calendar year.

Participant organizations experienced many unanticipated challenges or difficulties in implementation. Some ET3 participant challenges limiting delivery of ET3 interventions stemmed from the COVID-19 PHE, which caused delays in participants' ability to meet model deadlines and constrained participant resources available for implementing the model. Separately, implementation difficulties pertaining to individual participant contexts also limited delivery of ET3 interventions. These challenges included patient refusals to accept ET3 interventions; difficulty in securing partnerships with health care providers; health care workforce shortages; connectivity problems in telehealth or communications with providers; and resistance or disengagement from EMS ambulance staff.

The success or failure of participant organizations to deliver ET3 interventions would have reflected differences in organizational effort and the extent of implementation difficulties experienced. Variation in organizational effort and resources devoted towards ET3 implementation and intervention delivery would have varied by the priority a participant's leadership placed on model implementation and the difficulty of ET3 implementation challenges. The availability of organizational resources includes characteristics such as budgetary constraints, work culture, extant staff, infrastructure, and equipment. Contextual factors related to the difficulty of challenges may have included staff openness to changes in delivery or using ET3 interventions; the ease or difficulty of entering into written arrangements with health care partners; health care partner availability to receive TAD or TIP interventions; turnover in participant leadership; and receptivity of non-Medicare payers to providing reimbursement for ET3-like encounters.

Differences in outcomes such as Medicare spending or risk of hospitalization associated with the ET3 Model would not be generalizable beyond ET3 participants with ET3 interventions. The aforementioned implementation challenges may have induced selection of organizations better positioned to implement and deliver the model's interventions. Chapter 2 of this report compares and describes differences in the characteristics of ET3 participants that were successful in delivering ET3 interventions versus the characteristics of all ET3 participants. Per the ET3 Model's design, ET3 participants tailored TAD or TIP interventions to mesh with a respective organization's strategic objectives such as structuring TAD interventions for populations with severe mental illness, or tailoring TIP services for the needs of patients in a participant's rural community. Participant implementation choices of focal patient populations, protocols to be followed by EMS ambulance personnel, procedures in selecting ADPs and QHCPs, and other aspects may have contributed to differences in outcomes at the participant level. Differences in outcomes for the ET3 Model would therefore reflect the collective experience of participants that delivered ET3 interventions.

Because the ET3 Model was designed to identify and serve patients who could be safely treated outside an ED setting, participant determined processes used in delivery of ET3 interventions may have induced selection of healthier patients for ET3 interventions compared to patients with low acuity ED episodes in a participant's locality. Under the approach used in the ET3 Model, selection of healthier patients for ET3 interventions may have occurred in at least four ways: via EMS personnel implementation of clinical protocols; through patient refusals; through procedures required by participants to prevent under-triage to an ED; or health care partner acceptance/decline of patients for TAD or TIP. The ET3 Model's aim was to identify patients that could be treated in lower acuity settings than an ED or other covered destination and triage those patients to appropriate, lower acuity settings. Consequently, participant clinical protocols would have been specified so that EMS personnel could identify less acute or less complex

patients and offer TIP or TAD as appropriate. A second avenue was patient consent. Selection could occur if patients declining ET3 interventions are systematically more acute or complex than those accepting interventions. For relatively more complex or acute patients, the patient or their family members may be aware of clinical risks that are not apparent to EMS ambulance personnel and so decline an ET3 intervention. The third avenue includes processes such as secondary physician review of EMS triage decisions if a patient is not deemed to require ED transport to prevent under-triage of patients to an ED. Because these kinds of procedures are designed to identify higher acuity patients that should be sent to an ED and triage them accordingly, their application would be expected to induce favorable selection of patients provided TIP. The last avenue where patient selection could occur is if health care partners decline relatively sicker patients consenting to TAD or TIP. EMS personnel would typically contact health care partners in advance to confirm availability and ability to provide Medicare-covered services prior to transporting the patient or proceeding with in-person treatment in place or a telehealth visit. If a participant's health care partners systematically declined patients with indications of higher acuity, ET3 interventions would have been delivered to relatively lower acuity patients.

II. CHARACTERISTICS OF ET3 MODEL PARTICIPANTS

Key Points in This Chapter

Characteristics of Participants and ET3 Intervention Delivery:

- The 185 ambulance supplier or provider organizations participating in the ET3 Model included private agencies (50 percent), city/county fire departments (25 percent), hospital-based providers (14 percent), and third service public safety organizations (11 percent). Most organizations (86 percent) disproportionately serviced urban areas, with 12 percent primarily servicing rural areas.
- Active participants delivering one or more paid ET3 interventions were similar to all ET3 participants in terms of type of areas serviced, but third service public safety organizations were more common (25 percent vs 11 percent) and larger-sized organizations made up a higher proportion than all ET3 participants.
- Delivery of paid ET3 interventions was limited, with approximately 62 percent of participant organizations delivering no interventions during the model's performance period. Among active participants, ET3 interventions, on average made up less than 1% of annual Medicare FFS ground ambulance transports.
- ET3 intervention delivery was concentrated among eight higher volume participants who delivered 100 or more interventions during the model's performance period and accounted for nearly three-quarters of the 3,418 paid ET3 interventions delivered.
- Higher volume participants included very large (>12,000 Medicare FFS ambulance transports per year), very small (0-4,000 Medicare FFS ambulance transports per year), and medium-sized (4,000-6,000) organizations; disproportionately serviced urban areas with some servicing rural areas; and a high share (50 percent) were third service public safety organizations.

Challenges in TIP and TAD Implementation & Delivery:

- The COVID-19 PHE and implementation challenges related to provider, patient, and EMS ambulance personnel avoidance of ET3 interventions contributed to limited delivery under the model. Avoidance of TIP and TAD reflected conceptual or operational unfamiliarity with these services.
- Participant surveys and interviews suggest TAD implementation and delivery was primarily hindered by difficulties in securing signed arrangements with alternative destination sites for TAD, and availability of existing alternative destination partners (ADPs). Other challenges to TAD implementation and delivery included EMS ambulance personnel disengagement and patient refusals to use TAD.
- Challenges to TIP implementation and delivery included EMS ambulance personnel disengagement reflecting unfamiliarity with new clinical protocols or procedures; patient refusals of TIP because of unfamiliarity; and difficulty in hardware/software installation, connectivity, and access to information.

Characteristics of Higher Volume Participants that Appear To have Contributed to Success:

- Larger-sized higher volume participants reported leveraging organizational advantages to maintain relationships with providers, address issues contributing to disengagement among EMS staff and may have placed greater priority on model implementation.
- Some higher volume participants reported requiring EMS ambulance personnel to deliver ET3 interventions to all eligible patients with regular monitoring and management of EMS personnel. The stated this was a key factor in ensuring delivery of higher ET3 interventions over time.

This chapter presents organizational characteristics of ET3 Model participants in terms of EMS operational model type, organization size in terms of annual volume of FFS Medicare ground ambulance transports, and type of areas (urban vs rural) serviced in terms of ambulance transport volume. The chapter includes description of implementation challenges that contributed to limited delivery of ET3 intervention volumes and distinguishing organizational characteristics of higher volume participants that appear to have been important in delivering model interventions.

- Section 1 presents the characteristics of all ET3 Model participants, active participants, and higher volume participants.
- Section 2 summarizes the challenges participants faced in realizing higher ET3 intervention volumes and higher volume participant perceptions of important characteristics that contributed to success in delivering ET3 interventions.

1. *Organization Characteristics of ET3 Participants*

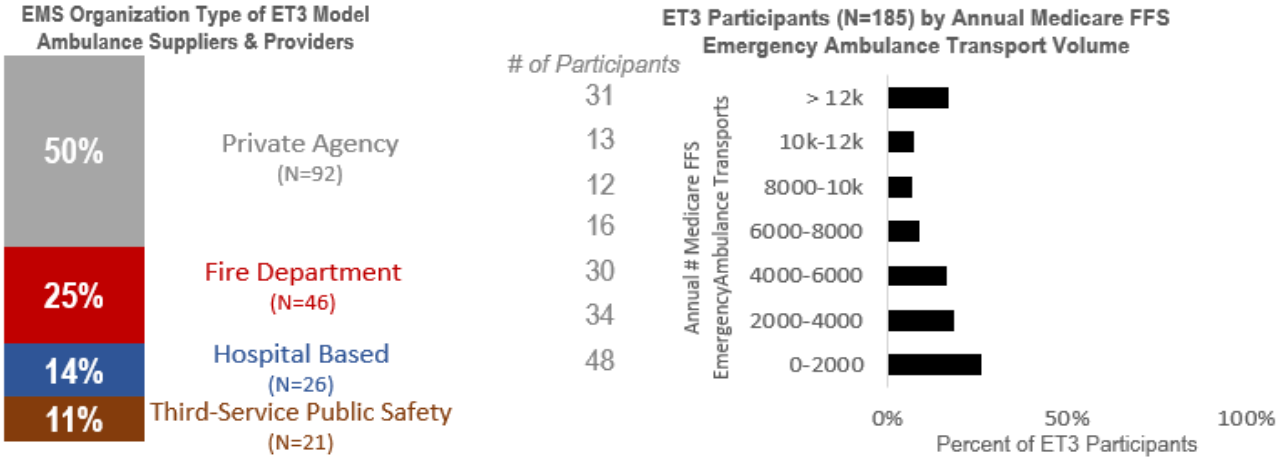
All ET3 Model Participants

One hundred eighty-five ET3 participants maintained a signed model participation agreement for one month or more. Organizationally, half of participants were private agencies, one quarter were fire departments, 14 percent were hospital ambulance suppliers, and 11 percent were third party public

safety organizations. ET3 participants included a variety of types of EMS organizations. To facilitate examination of ET3 Model participants by organizational attributes, the model's Implementation and Monitoring Contractor (IMC) categorized participants into one of four EMS organization types. 1) Fire Departments: public agencies participating in the ET3 Model were categorized as Fire Departments or Fire Protection Districts under the auspices of city or county governments. 2) Third Party Public Safety: Governmental agencies responsible for the provision of EMS services that may be operated by city, county, or regional organizations covering multiple counties or cities such as the Metropolitan Area EMS Authority. 3) Private Agency: For-profit and not-for-profit private ambulance companies that may include emergency, non-emergency transportation, and public safety answering points such as 911 call centers. And 4) Hospital Based: Ambulance providers owned and operated by hospitals or hospital systems directly or free- standing ambulance companies owned by hospital systems. Half of the participants in the ET3 Model were private agencies (N=92) nearly all (90%) of which were for-profit, with eight private agencies being not-for-profit. Public fire departments accounted for roughly a quarter (N=46) of all participants. Hospital-based ambulance companies consisted of less than 14% of participants (N=26), while third-service public safety organizations accounted for 11% of participants (N=21).

ET3 participants ranged in size from 0-2,000 Medicare FFS ambulance transports per year to over 12,000 ambulance transports per year. Nearly 70 percent of participants averaged 6,000-8,000 ambulance transports per year or less. The evaluation used a participant's average annual volume of Medicare FFS ground ambulance transports during the model's three-year performance period as a measure of the size of participant organizations. Organizations with a larger number of EMS ambulance personnel and related staff, and more transport vehicles would be expected to possess greater capacity for providing larger volumes of emergency ground ambulance transports annually. Differences in participant capacity for delivering emergency ground ambulance transports annually varied widely, with over a fifth of participants delivering 10,000 or more Medicare FFS ground ambulance transports annually, while 60 percent of participants (N=112) had 6,000 or fewer ground ambulance transports per year. Exhibit 2 presents the distribution of ET3 participants by annual volume of Medicare FFS emergency ground ambulance transports. The pattern of a cluster of large-sized participant organizations with 10,000 or more ambulance transports annually and many smaller-sized organizations averaging 6,000 or fewer transports is also observed when ET3 participants are examined separately by each EMS model type (Appendix Exhibit D1).

EXHIBIT 2. DISTRIBUTION OF ANNUAL VOLUME OF MEDICARE FFS EMERGENCY GROUND AMBULANCE TRANSPORTS AND EMS MODEL TYPE OF ET3 PARTICIPANTS (N=185)



Participants were categorized into five mutually exclusive groups by the proportion of annual Medicare FFS ground ambulance transports to an urban or rural pick-up ZIP code during the model's three year period (Exhibit 3). Participants were categorized as rural if 90% or more of total Medicare FFS ambulance transports during the model's three-year period were provided to rural areas, or conversely as urban if 90% of total ambulance transports were provided to urban areas. Lastly, participants were categorized as dual if both urban and rural locations accounted for between 40% and 60% of annual FFS Medicare ambulance transport volume.

Over 85 percent of ET3 participants were urban or urban-focused. Twelve percent of participants serviced rural (>=90 percent of annual ambulance transports) areas or were rural-focused. A small share (2 percent) were dual servicers, ranging between 40 to 60 percent of ambulance transports per year to both urban and rural areas. For over three quarters of ET3 participants (78%, N=144), at least 90 percent of annual Medicare FFS ground ambulance transport volume during the model's three-year period was to urban areas. Twenty-two out of 185 participants (11%) were rural servicing participants, with at least 90 percent of annual Medicare FFS ground ambulance transports responding to calls in rural pick-up ZIP codes. Urban participants' annual Medicare FFS ground ambulance transport volumes varied widely ranging from 54 to 52,776 per year with most concentrated near the east coast. Urban participants included 22 hailing from the state of New York, 18 from the state of California, and 12 from the state of Texas. Thirteen out of 20 rural participants were private agencies averaging 16 to 5,916 FFS Medicare ground ambulance transports per year. Most rural participants were from states west of the Mississippi River (AZ, CA, CO, TX). The 15 urban-focused participants were distributed in the South (N=5: LA, TX, VA) and included participants in the Midwest (N=4: WI, MN, MI), West (N=3: AZ, CA), and Northeast (N=3: NY, PA, NH). These participants averaged low to high annual FFS Medicare ground ambulance transport volumes ranging from 1,708 to 64,395. The two rural-focused participants were from New Mexico and Texas and averaged annual Medicare FFS ground ambulance transports ranging from 4,765 to 17,344. The three participants dually servicing rural and urban locations were from Hawaii, South Carolina, and Alabama and were of moderate size, averaging 5,989 to 10,572 ground ambulance transports per year. Exhibit 3 presents the types of service areas for all ET3 participants.

EXHIBIT 3. AREAS SERVICED: CATEGORIZATION OF ET3 PARTICIPANTS (N=185) BY PERCENT OF ANNUAL MEDICARE FFS GROUND AMBULANCE TRANSPORT VOLUME PROVIDED TO URBAN OR RURAL LOCATIONS

Category	Number of Participants	Percent of Participants	Percent of Annual Medicare FFS Ambulance Transports to Rural Areas	Percent of Annual Medicare FFS Ambulance Transports to Urban Areas
Rural	20	11%	>= 90%	<10%
Urban	144	78%	< 10%	>= 90%
Rural focused	2	1%	>= 60% & <90%	>=10% & <40%
Urban focused	15	8%	>=10% & <40%	>= 60% & <90%
Dual	3	2%	>= 40% & <60%	>= 40% & <60%

Notes: Exhibit includes all ET3 Participants with a signed participation agreement that remained in the model for 1 month or more. Count of participants in the table totals 184 because one participant's annual ambulance volume data was not available.

Active Participants and Higher Volume Participants

Among the 185 ET3 participants, there were 70 active participants that delivered one or more ET3 interventions during the model's performance period and are the primary focus of the ET3 evaluation. ET3 participants delivering one or more ET3 interventions totaling 3,418 paid ET3 interventions during the model's three-year performance period (2021-2023) included 72 participants or 38% out of the 185 participant organizations in the model. Among participants that delivered one or more ET3 interventions, two participants submitted only Medicare Part A claims, therefore the ZIP code of a patient's pick-up location was not available in Medicare Part B claims. Due to the fact the pick-up ZIP code of a participant's ground ambulance transports was used to define participant service areas and comparators for the evaluation, participants without information on a patient's pick-up location were excluded from the evaluation of the model.[10]

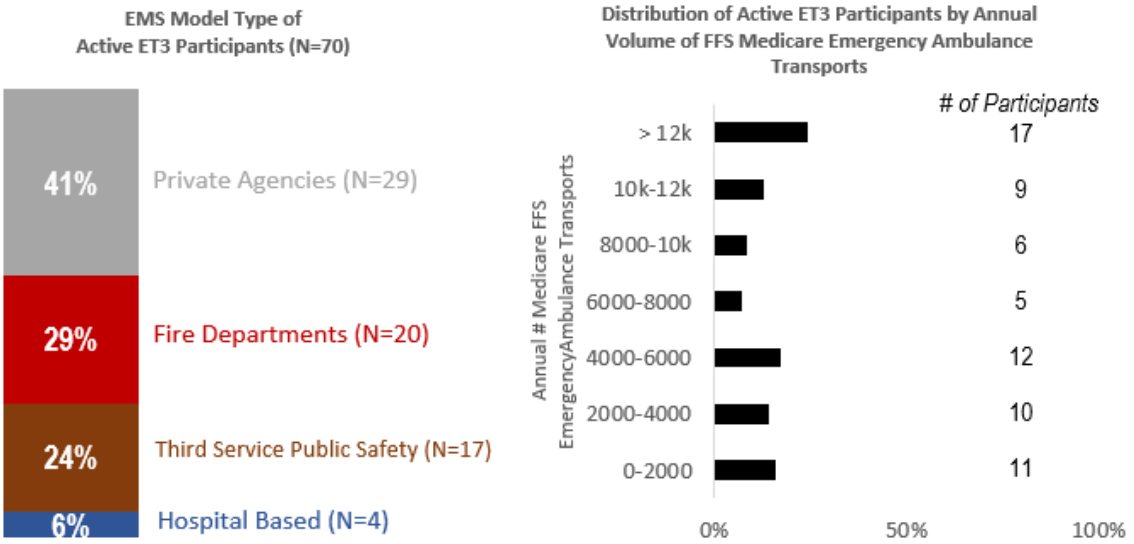
A larger share (24 percent) of active participants were third service public safety organizations and a smaller share were private agencies compared to all ET3 participants. Unlike the full set of ET3 participants, third service public safety organizations accounted for nearly a quarter (24 percent) of active participants. Private agencies, which composed half of all ET3 participants made up a smaller share (41 percent) of active participants, while fire departments, which composed one quarter of all participants accounted for 29 percent of active participants (See Exhibit 4).

Larger ambulance supplier/provider organizations (averaging 8,000 or more ambulance transports per year) made up a larger share (46 percent) of active participants compared to all ET3 participants. Smaller ambulance organizations made up a smaller share of active participants compared to all ET3 participants. Ambulance organizations averaging 6,000-8,000 Medicare FFS ambulance transports annually accounted for 54 percent of active participants compared to nearly 70 percent of all ET3 participants (See Exhibits 2 & 4). By comparison, larger ambulance organizations (8,000 or more

[10] Participant service areas were defined as collections of ZIP codes where Medicare FFS ambulance transports occurred during the three year period of the ET3 Model. See Appendix B of the report for more details.

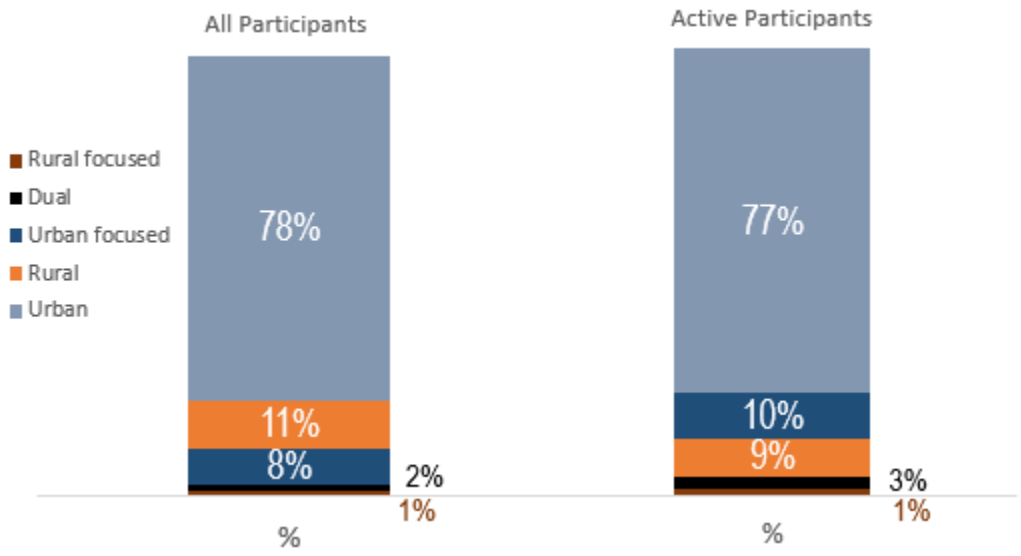
Medicare FFS ambulance transports per year) accounted for nearly half (46 percent) of all active participants, whereas these organizations made up 31 percent of all ET3 participants.

EXHIBIT 4. EMS MODEL TYPE AND ANNUAL VOLUME OF MEDICARE FFS EMERGENCY GROUND AMBULANCE TRANSPORTS OF ACTIVE PARTICIPANTS



The distribution of active participants servicing urban or rural areas were similar to all ET3 participants. Active participants' volume of Medicare FFS ambulance transports to urban and rural areas was similar to proportions for all ET3 participants, with 77% of active participants having 90% or more of ambulance transports servicing urban areas and 9% of participants having 90% of transport volumes to rural areas (Exhibit 5).

EXHIBIT 5. COMPARISON OF TYPE OF AREAS SERVICED BETWEEN ALL ET3 PARTICIPANTS (N=185) AND ACTIVE PARTICIPANTS (N=70)

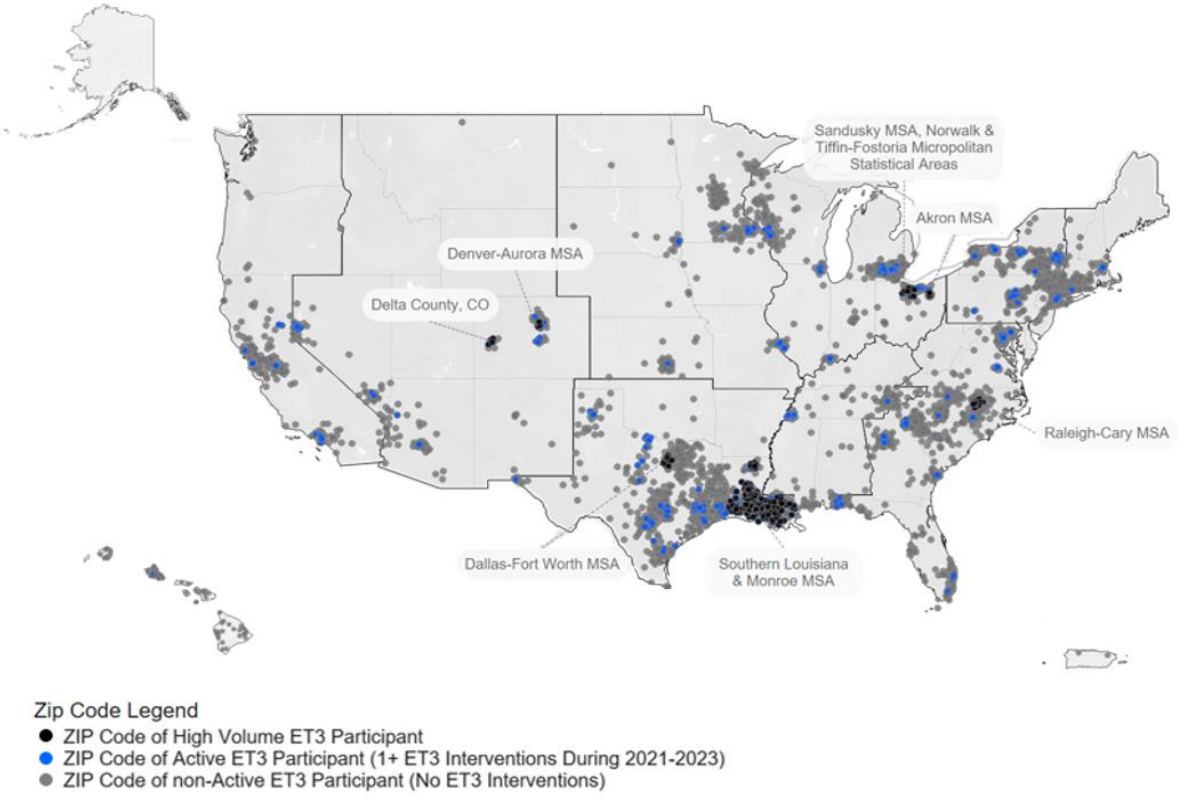


Delivery of ET3 interventions was concentrated among eight higher volume participants that accounted for nearly three quarters of all ET3 interventions delivered by active participants. Eight active participants accounted for 2,484 or 73% of all ET3 interventions delivered during the three-year period. Active participants averaged 12.2 ET3 interventions per year and among active participants, 65 of the 70 averaged less than 50 ET3 interventions per year.

Higher volume participants (N=8) included very small (N=4) and very large organizations (N=3), were primarily made up of third service public safety organizations (N=4), and mostly serviced urban areas (N=6) with two participants servicing rural areas. Four of the eight higher volume participants were small organizations averaging fewer than 4,000 Medicare FFS ambulance transports per year and one was medium sized (4,000-6,000 transports per year). This pattern suggests organizational scale was not an impediment to successfully delivering at least 100 ET3 interventions during the model's three-year performance period. Half of the eight participants were third service public safety organizations, and other participants included two fire departments, a hospital-based ambulance provider, and a private agency. Six of the eight higher volume participants predominantly serviced urban areas and two serviced rural areas.

The geographic distribution of active participants included concentrations across Mid-Atlantic and South-Atlantic states; Texas and Louisiana; Mid-Western states; and the west coast including Nevada, Arizona and Colorado. Higher volume participants were located in Texas, Louisiana, Colorado, North Carolina, and Ohio. Exhibit 6 presents the ZIP code service areas of ET3 participants with the service area ZIP codes of active participants denoted by blue dots and high volume ET3 participants by black dots. The service areas of active participants included concentrations in states along the east coast, in the Midwest, areas in Texas and Louisiana, California, Colorado, and Arizona. Exhibit 6 also lists the geographic regions containing the service areas of the eight higher volume ET3 participants. While these areas are mostly urban, they include some highly rural areas.

EXHIBIT 6. ZIP CODE SERVICE AREAS OF HIGHER VOLUME ET3 PARTICIPANTS, ACTIVE PARTICIPANTS, AND NON-ACTIVE PARTICIPANTS



Census Division	Number of Non-Active Participants	Number of Active Participants	Number of Higher Volume ET3 Participants
New England	8	2	0
Middle Atlantic	22	9	0
South Atlantic	16	15	1
East South Central	3	2	0
East North Central	12	10	2
West South Central	12	11	3
West North Central	0	5	0
Mountain	24	10	2
Pacific	18	6	0

Notes: Exhibit includes all ET3 Participants with a signed participation agreement that remained in the model for 1 month or more. High volume participants are a subgroup of active participants.

2. Participant Challenges Delivering ET3 Interventions and Characteristics Distinguishing Higher Volume ET3 Participants

Interviews with Higher Volume Participants and Matched Non-Active Participants

As the descriptive results above demonstrate, delivery of ET3 interventions was substantially limited with less than ten participants out of 185 accounting for nearly three-quarters of all paid ET3 interventions delivered during the model's three-year performance period. Among active participants, ET3 intervention volume accounted for less than 1% of annual Medicare FFS ground ambulance transports. To identify the primary implementation challenges that contributed to this pattern, the ET3 evaluation reviewed data from Needs Assessment Surveys conducted by the ET3 Model's learning system contractor and the final quarterly monitoring report for the model.

Review of this data identified four operational challenges participants faced in realizing higher ET3 intervention volumes: 1) securing healthcare providers serving as partners for ET3 interventions; 2) EMS personnel issues impeding delivery of ET3 interventions; 3) patient refusals to receive ET3 interventions; and 4) difficulties related to technology installation, connectivity in encounter delivery, or interoperability or information access.

The ET3 evaluation identified seven higher volume participants, and seven low/zero volume participants matched on select observable characteristics to conduct supplemental informational interviews for further understanding barriers and challenges contributing to limited ET3 intervention delivery in the ET3 Model. These interviews were also used to distill organizational and contextual factors that allowed higher volume participants to deliver larger ET3 intervention volumes.[11] The seven low/zero volume ET3 participants were matched to the seven higher volume participants on the following dimensions:

- Geographic location: Wherever possible, comparator participants were drawn from the same state or locality proximate to a higher volume participant's location;
- Number of paid Medicare fee-for-service (FFS) claims for ground ambulance transports to an ED per year during the model's performance period: ET3 participants were grouped into deciles using the number of ground ambulance transports to an ED. Where possible, comparator organizations belonging to the same decile of ground ambulance transport volume were chosen;
- EMS operational model type: Wherever possible comparator organizations with the same EMS model type were selected; and

[11] The seven participants and their matched comparators were contacted via email by ET3 Model team staff, and among the 14 participants contacted, five responded, and four interviews were successfully completed during September and October 2023.

- Completion of the learning system's calendar year 2022 Needs Assessment Survey.

Higher volume participants included two very large sized (>12,000 annual Medicare FFS ambulance transports) organizations and low/zero volume participants included one medium-sized (4,000-6,000 Annual Medicare FFS Ambulance Transports) and one large-sized participant (8,000-10,000 Annual FFS Medicare Ambulance Transports). Data from interviews, Needs Assessment Survey data, monitoring reports, implementation plans, descriptive analyses, and the quantitative analysis were used to identify key themes relating to implementation challenges and organizational characteristics distinguishing higher volume participants from other participants.

Key Point:

Low delivery of ET3 interventions were related to challenges in ET3 intervention delivery reflecting low acceptance/buy-in of ET3 interventions among patients and providers in a participant's locality and its EMS personnel [and]…the COVID-19 public health emergency.

Key Point:

Patients in an emergency medical situation tended to avoid departing from typical EMS care in an ED because of unfamiliarity with TIP and TAD concepts. Had patients been familiarized with TIP and TAD in advance in a non-emergent setting they may have been more open to these services in an emergency.

PHE and Avoidance of TIP and TAD Due to Unfamiliarity Created Challenges to ET3 Implementation

COVID-19 PHE and implementation challenges related to unfamiliarity and avoidance of TIP and TAD limited participant delivery of ET3 interventions.
While the COVID-19 PHE contributed considerable difficulties to delivering ET3 interventions, implementation challenges also played a prominent role in limiting ET3 intervention delivery. In surveys and interviews participants reported that patients, health care providers, and EMS ambulance personnel tended to avoid using or operationalizing ET3 interventions because of lack of conceptual or operational familiarity with TIP or TAD.

Reasons for unfamiliarity and avoidance of ET3 interventions were different for patients, healthcare providers, and EMS ambulance personnel.
Patients in an emergency medical situation tended to avoid departing from typical EMS care in an ED because of unfamiliarity with TIP and TAD services. Given the potential risk to health, patients may have been uncertain whether these ED alternatives were legitimate and safe, or the quality of services was comparable with care delivered in an ED. Had patients been familiarized with TIP and TAD in advance in a non-emergent setting they may have been more open to these services in an emergency. Participants reported that in discussions healthcare providers expressed concerns about operational risks such as receiving high acuity patients they were not equipped to manage even though clinical protocols would be designed to identify lower

Patients, health care providers, or EMS ambulance personnel tended to avoid TIP or TAD because of conceptual or operational unfamiliarity with these services.

acuity patients for interventions. Operational risks healthcare providers cited as concerns may be perceived or real but suggest a lack of procedural/operational familiarity with TIP and TAD. As a result of these concerns healthcare providers were reluctant to serve as an ADP or QHCP; accept patients for ET3 interventions after signing an arrangement with the ET3 Participant; or apply operational changes facilitating TIP/TAD delivery. Participants reported that EMS ambulance personnel sometimes tended to disengage from offering ET3 interventions because of unfamiliarity in applying procedures or protocols for TIP or TAD. Participants also reported difficulty in consistently following protocols for ET3 intervention delivery or difficulty because EMS staff were uncertain in applying participant defined procedures or protocols.

Barriers and Challenges to Delivering TAD Interventions

Participant data indicated acquiring arrangements with ADPs and having ADPs with the capacity and availability to receive TAD patients was the most prominent obstacle impeding TAD delivery. Many ADPs experienced reduced capacity for serving TAD patients because of the COVID-19 PHE. Approximately half (51%) of respondents to the ET3 Learning System's Needs Assessment Survey reported that securing arrangements with alternative destination partners and limited availability of existing ADPs was the most challenging aspect of TAD implementation and delivery. A large-sized (8,000-10,000 Medicare FFS Ambulance Transports) participant reported that the COVID-19 PHE reduced the capacity of an existing ADP, which in turn limited the participant's ability to deliver TAD interventions. Large (8,000-10,000 Medicare FFS Ambulance Transports) and medium sized (4,000-6,000 Medicare FFS Ambulance Transports) participants reported facility-based providers were concerned about adequate capacity to care for patients because of uncertainty of when patients would arrive or because of receiving excess severely acute or complex patients. Providers also raised concerns that patients might need transport back to their homes after treatment. For providers affiliated with hospitals, there was concern that laws such as the Emergency Medical Treatment and Active Labor Act (EMTALA) of 1986 might restrict their ability to decline a patient they were not adequately equipped to manage. In open ended survey responses, participants also reported alternative destinations with sufficient availability or willingness to accept patients as partner-related problems in implementing TAD.

Some potential ADPs were unfamiliar with TAD concepts and were reluctant to serve as ADPs because of uncertainty about the legitimacy of these services. One medium-sized (4,000-6,000 Medicare FFS Ambulance Transports) participant reported providers were not open to entering into written arrangements because they were unfamiliar with TAD intervention concepts. The participant indicated having to educate providers contributed to having many inactive providers at the start of the model which delayed delivery of TAD interventions.

EMS ambulance personnel issues also contributed to difficulties in TAD implementation and delivery. Among respondents to the learning system's Needs Assessment Survey, 24% reported EMS personnel issues as the most challenging aspect in TAD implementation. Interviews with participants suggest EMS personnel issues varied between organizations, with some larger organizations reporting no opposition to TAD delivery or enthusiasm among 80% of EMS personnel and reservation among the remaining 20%. A medium-sized participant reported encountering cultural/behavioral resistance among employee and contracted EMS personnel as ET3 intervention delivery began but this opposition plateaued as delivery continued over time. This participant reported that opposition among EMS personnel reflected changes in procedures that could include: patient assessment for TAD, obtaining patient consent, assuring the patient that quality of care would not be diminished because they are not seen in an ED, and confirming availability of an ADP prior to transport.

Participants perceived that patient unfamiliarity with TAD led to refusals limiting delivery. Refusals of TAD interventions by patients eligible to receive them were reported as the most challenging aspect of implementing TAD by 13% of survey respondents. Participants reported that patient refusals generally reflected lack of familiarity with TAD concepts. In some cases, patients were concerned about the standard of care provided in an ED alternative such as TAD relative to care in an ED.

Barriers and Challenges to Delivering TIP Interventions

Lack of EMS personnel buy-in, familiarity with TIP, and appropriate implementation limited TIP delivery. In surveys and interviews, participants reported EMS personnel issues sometimes among a minority of EMS staff, slowed or impeded delivery of TIP interventions. About one third of respondents (32%) reported issues related to EMS staff buy-in; familiarity with TIP and its use; and appropriate implementation by EMS ambulance personnel was the most challenging aspect of TIP implementation. In interviews, participants reported resistance or disengagement from EMS personnel reflected changes in process for TIP relative to how EMS has been delivered in the United States historically. These changes included assessing patients per clinical protocols to determine ED triage; secondary physician review to confirm ED triage was unnecessary; engaging eligible patients with an offer for an ET3 Intervention and addressing questions; and contacting health care partners to confirm availability and acceptance of patients. Besides adapting to different clinical protocols and processes, EMS personnel disengaged from, TIP delivery because of disagreement or concerns with existing procedures. From interviews, these reasons included concerns about out-of-pocket costs for patients; frustration because secondary physician review overturned an ED triage decision; delays in obtaining a physician for a telehealth visit; or the requirement for secondary review to confirm ED triage was unnecessary.

Participants perceived that eligible patients declined TIP interventions due to unfamiliarity with TIP. ET3 participants reported that patient refusals of TIP interventions were an important barrier limiting delivery of these services. In surveys, 23% of respondents indicated patient refusals were the most challenging aspect of TIP implementation. In interviews, higher volume participants reported patient refusals ranged from 40% to nearly 84%. One participant reported that in a medical emergency, patients generally have the expectation of being transported to a hospital emergency room and were uncomfortable with this expectation being unmet. A separate participant reported that patient refusals reflected the belief that quality of care during an ET3 intervention would be lower than care in an ED. In surveys and interviews, participants reported the patient community's lack of familiarity with TIP services contributed to refusals of these encounters in emergency medical situations.

Technology installation, connectivity, and information access issues related to interoperability limited provision of TIP interventions. The vast majority of TIP interventions delivered under the model included telehealth visits rather than in-person services. In surveys and interviews, participants reported difficulties with the technology allowing reliable communication with QHCPs. These difficulties included hardware/software installation problems; establishing or maintaining connectivity, especially in more rural areas; or system specific challenges preventing needed access to patient or provider information. Twenty-one percent of Needs Assessment Survey respondents indicated technology installation, connectivity limiting telehealth use, and difficulty in information access were the most challenging aspect of TIP implementation. In interviews, one participant noted challenges with connectivity required

better hardware such as tablets that would allow more reliable connections. A separate participant reported technical challenges and difficulties with EMS personnel using the technology.

Difficulty in securing health care partners for TIP was not as common a problem as for TAD. Difficulty in securing written arrangements with health care partners for TIP was reported as a challenge for some participants. Thirteen percent of ET3 participants responding to the Needs Assessment Survey reported difficulty in securing health care partners as the most challenging aspect of implementing TIP. In interviews, one participant reported some practitioners were reticent to serve as QHCPs because of unfamiliarity with TIP as a concept and uncertainty about its legitimacy.

Characteristics of Higher Volume Participants

Interviews with two very large-sized (>12,000 annual Medicare FFS ambulance transports) higher volume participants emphasized two themes of organizations that were successful in delivering higher numbers of ET3 interventions. These themes were:

- *(First Theme) ET3 intervention delivery requires significant organizational effort and resources, and advantages from organizational scale may be leveraged to significantly smooth difficulties.* Successful delivery of ET3 interventions requires substantial effort and time from EMS ambulance personnel and non-EMS staff; training/retraining of ambulance personnel; acquisition of equipment or software; and relationship building with providers and payers. Organizational scale advantages include larger numbers of staff, some of whom could maintain relationships with providers and non-Medicare payers providing avenues for setting up arrangements with partners. Relationships with payers may also allow opportunities to inform non-Medicare payers of savings from using alternatives to ED. TIP and TAD required changes in clinical protocols and procedures for EMS personnel relative to typical EMS delivery in the United States. Because TIP and TAD were also being piloted across participants, additional changes in protocols and procedures over time would have occurred as operational insights are gained via sustained implementation and delivery. These changes required training and retraining of EMS ambulance personnel prior to encounter delivery and over time to maintain fidelity in implementation, familiarize staff to ongoing changes, and to address concerns or problems that may arise.
- *(Second Theme) An innovation focused organizational culture and procedures supporting implementation and delivery of new approaches for EMS were key characteristics that support ET3 implementation and delivery.* This theme reflects a number of organizational values and practices that contributed to success in implementing and delivering ET3 interventions. First, a culture of innovation among organization staff and leadership with a willingness to try novel approaches to EMS delivery. Second, implementation of ET3 were structured to be highly reliant upon input and direction from staff delivering TIP or TAD. For example, staff developing processes for TIP and installing hardware or software for TIP would be highly reliant on EMS ambulance personnel delivering TIP. Third, ET3 intervention delivery was incorporated into protocols for EMS personnel so that all EMS ambulance personnel were required to deliver them. Because TIP and TAD have important differences from how EMS has been delivered for decades, voluntary approaches appear very unlikely to result in higher delivery volumes. Fourth, a strong emphasis on collaborative employee feedback in implementing new practices or ideas to make it easier for employees to implement innovations.

Higher volume ET3 participants included three very large ambulance suppliers or providers, one medium-sized ambulance provider, and four very small organizations averaging less than 4,000 Medicare FFS ambulance transports per year. While interviews with these smaller participants were not obtained, their achievement of higher volume participant thresholds may reflect leaders within these smaller organizations that were committed to implementation of the ET3 Model and value-based care more generally.

Higher volume participants (N=8) successfully delivering larger volumes of ET3 Model interventions despite the aforementioned challenges appeared to leverage organizational advantages and may have placed greater priority on model implementation. These participants included very small, mid-sized and very large organizations with most (N=6) servicing urban areas and two predominantly servicing rural areas. Review of data for higher volume participants suggests successful implementation and delivery of ET3 interventions was not necessarily limited to large, well-resourced participants, or to small nimble organizations with the flexibility to quickly adapt under difficult conditions. The eight higher volume participants primarily serviced urban areas, and among EMS organization types were over-represented by third service public safety organizations (N=4), but also included fire departments (N=2), a hospital-based ambulance provider, and a private agency (Section 1 of chapter II describes EMS organization types).[12] Interviews with higher volume participants only included very large sized participants. In these interviews, participants attributed success in ET3 intervention delivery despite implementation challenges to organizational size advantages such as greater staff bandwidth allowing maintenance of relationships with health care providers and payers over time that could be called upon when implementing the model. Participants also noted advantages from organizational scale for management of EMS ambulance personnel. While large (> 12,000 ambulance transports per year) higher volume participants accounted for close to two-thirds of encounters from higher volume participants, ET3 interventions accounted for 1% or less of total ambulance service volume among very large higher volume participants. By comparison, ET3 interventions accounted for between 2.5% and 6.3% of annual ambulance volume among the four very small higher volume participants (< 4000 annual Medicare ambulance transports). While the evaluation was not able to interview these smaller participants, their success may reflect the influence of organizational leaders committed to implementing the ET3 Model.

Requiring EMS ambulance personnel to deliver ET3 interventions to all eligible patients with regular monitoring and management of EMS personnel may have been a key factor in ensuring delivery of higher ET3 interventions over time. The evaluation could not definitively confirm that no other active participants used this requirement of EMS personnel. Implementation plans for other active participants suggest few, if any, used this requirement for EMS personnel. Delivery of TIP interventions included implementation of TIP clinical protocols; trained and engaged EMS ambulance personnel; reliable equipment for telehealth and/or processes for in-person TIP delivery; TIP offers to eligible patients; TIP acceptance by eligible patients; and acceptance for treatment by QHCPs. In interviews, higher volume participants reported requiring EMS ambulance personnel to offer ET3 interventions to all applicable patients whenever possible. These participants reported regularly monitoring ambulance crews paired with periodic training and retraining of crews to ensure consistency in the offer of ET3 interventions. Participants also reported having management engage and work to resolve disagreements or concerns from EMS personnel. In addition, investment in equipment needed for reliable TIP telehealth delivery would have contributed to the ability to deliver TIP more consistently across locales and potentially limited instances where difficulty in connectivity for TIP telehealth contributed to patients being inclined to use an ED. While the evaluation could not confirm application of this requirement among other higher volume participants, participant implementation plans suggest three of the remaining six higher volume participants may have applied similar requirements.

[12] Third service public safety organizations are governmental agencies responsible for the provision of EMS services and may be operated by a city, county, or regional organizations covering multiple counties or cities.

III. CHARACTERISTICS OF TIP AND TAD INTERVENTIONS

Key Points in This Chapter

TIP interventions:

- TIP recipients were disproportionately aged Medicare beneficiaries (85 percent) with one-quarter having indications of socioeconomic vulnerability (dually eligible or LIS), and 41 percent exhibiting high to severe comorbidity (Charlson index >=5). This group exhibited low rates (<5 percent) of mental illness with the exception of depression.
- Less than one fifth of TIP recipients were disabled Medicare beneficiaries who were predominantly (81 percent) dually eligible or recipients of LIS support. Forty-one percent of these TIP recipients had high to severe comorbidity (Charlson index >=5) with higher prevalence of chronic mental illnesses than their aged counterparts.
- CCSR condition categories for circulatory (CIR), metabolic (END), musculoskeletal (MUS), and injury (INJ) related conditions accounted for 82 percent of TIP interventions.
- Examples of individual conditions among TIP interventions include hypertension; diabetes mellitus with complications; musculoskeletal pain not low backpain; chronic obstructive pulmonary disease (COPD) and bronchiectasis; and nervous system pain and pain syndromes.

TAD interventions:

- Sixty-two percent of TAD recipients were aged Medicare beneficiaries with 35 percent having high to severe comorbidity (Charlson index >=5). Forty-one percent of aged TAD recipients had a new diagnosis of injury or poisoning, and one quarter had a newly diagnosed circulatory system condition.
- Approximately 38 percent of TAD recipients were disabled Medicare beneficiaries, with nearly all being dually eligible or LIS support recipients with 49 percent or more exhibiting severe mental illness. This group had the smallest share (26 percent) of persons with high or greater comorbidity (Charlson Index >=5).
- Three-quarters of TAD interventions were delivered by other active participants. This indicates that participants who were higher volume for TIP interventions were not necessarily higher volume for TAD interventions.

- CCSR condition categories for injury (INJ), mental (MBD), and musculoskeletal (MUS) system related conditions were present in 89 percent of TAD interventions delivered under the model.

This chapter of the report describes demographic, socioeconomic and clinical conditions among recipients of TIP and TAD interventions as well as patients with an EMS episode in an ED after declining an ET3 intervention. Presentation of clinical conditions in this chapter uses data from the chronic condition warehouse (CCW) and diagnoses identified from International Classification of Disease version 10 (ICD10) diagnosis codes on Medicare claims. Diagnoses in recipients of ET3 interventions are presented as categories from the Agency for Healthcare Research and Quality's (AHRQ) Clinical Condition Software Refined (CCSR). The CCSR was developed by AHRQ to organize and categorize ICD10 diagnosis codes into a smaller number of more clinically meaningful categories (see Appendix B for an overview of the CCSR).

1. Characteristics of TIP and TAD Intervention Recipients and Patients with ED Episodes After Declining ET3 Interventions

In this section of the chapter, we present characteristics of three groups of patients: recipients of TIP, recipients of TAD, and beneficiaries that refused ET3 interventions. Frequencies for patients in each of these groups and TIP, TAD, or ED visits are presented in Exhibit 7. We present characteristics of aged and non-aged patients within each group noting differences and similarities in age distributions, dual eligibility and LIS status to characterize socioeconomic status, and differences in prevalence of chronic conditions. Patients in these groups may have diseases or conditions that are developing over time. To assess this possibility across the aforementioned groups, the evaluation also examined the prevalence of newly diagnosed conditions present at the time of index event that were not present one year prior to the index event.[13]

EXHIBIT 7. COUNTS OF BENEFICIARIES AND EMS EPISODES FOR RECIPI`ENTS OF TIP, TAD, OR ED VISIT AFTER PATIENT REFUSED AN ET3 INTERVENTION

Patient Category	# Interventions to Aged Beneficiaries	# Beneficiaries who are Aged	# Interventions to Disabled Beneficiaries	# Beneficiaries who are Disabled
TIP	2,622	2,317	539	423
TAD	152	144	105	89
ED Visits Following ET3 Refusal	486	450	241	176

[13] Index event is a TIP, TAD or ED visit following patient refusal of an ET3 intervention. Diagnosis codes from claims delivered on the date of the index service up to and including 5 days after the date of the index service were screened against diagnosis codes present one year prior to identify conditions newly present relative to one year prior to the index event.

The volume of TIP interventions was significantly higher than TAD interventions, with the former accounting for nearly all (92 percent, N=3,161) of the 3,418 ET3 interventions delivered under the model. As described in the preceding chapter, the combination of difficulty in securing health care partner arrangements and ADP capacity to receive patients appears to have limited delivery of TAD compared to TIP interventions. Other challenges contributing to the limited number of TAD interventions included resistance from EMS ambulance personnel, and patient refusals. ED visits after refusing ET3 interventions were identified from Medicare claims using a non-payable reporting field primarily used by select ET3 participants. Occurrence of claims for ED visits after a patient refused an ET3 intervention were voluntarily reported by ET3 participants and do not reflect the universe of ET3 intervention refusals.

Characteristics of TIP Recipients

Approximately 85 percent of TIP recipients were aged Medicare beneficiaries of whom 25 percent were dually eligible or LIS recipients, 41 percent exhibited high to severe comorbidity (Charlson index >=5). This group exhibited low rates (<5 percent) of mental illness with the exception of depression.

Most (62 percent) aged TIP recipients had moderate to severe comorbidity (Charlson index >=3) with 64 percent categorized as prefrail or mildly frail. Less than half a percentage point was moderately to severely frail (Appendix Exhibit E2). Over two-thirds of TIP interventions (70 percent) were to beneficiaries aged 70 and above and less than one quarter were dually eligible or recipients of Medicare Part D's low-income subsidy (LIS) program (Appendix Exhibit E1). White patients accounted for nearly 80 percent of aged TIP recipients followed by black patients (16 percent) and other race patients (5 percent). Among TIP interventions to aged patients, the prevalence of endocrine, heart or circulatory conditions ranged from 24 percent to 81 percent, while the prevalence of mental conditions was 5 percent or less with the exception of depression (See Appendix Exhibit E3). Prevalence of new conditions at time of TIP intervention compared to one year prior, ranged from neoplasms (1 percent) to factors affecting health status (19 percent) and injuries or poisoning (18 percent).

Less than one fifth of TIP recipients were non-aged Medicare beneficiaries who were predominantly dually eligible or recipients of LIS support. Forty-one percent of non-aged TIP recipients had high to severe comorbidity (Charlson index >=5) with higher prevalence of chronic mental illnesses than their aged counterparts.

Non-aged TIP recipients were predominantly (81 percent) dually eligible or LIS (Appendix Exhibit E1). Prevalence of circulatory, heart and endocrine conditions for non-aged TIP recipients was somewhat lower than aged TIP recipients, ranging from atrial fibrillation (8 percent) to hypertension (66 percent). These patients had significantly higher prevalence of chronic mental illnesses including depression (51 percent), bipolar disorder (22 percent), and alcohol use disorder (8 percent) (Appendix Exhibit E3). White patients accounted for 60 percent of non-aged TIP recipients, with black patients accounting for 32 percent, and other race patients accounting for 7 percent. Close to two-thirds (62 percent) of non-aged TIP recipients were categorized as prefrail or mildly frail, with 58% having moderate to severe comorbidity (Charlson index >=3) (see Appendix Exhibit E2). Prevalence of newly diagnosed conditions at TIP receipt compared to one year prior ranged from skin diseases (4 percent) to injury or poisoning (13 percent).

Characteristics of TAD Recipients

Sixty-two percent of TAD recipients were aged Medicare beneficiaries with 35 percent having high to severe comorbidity (Charlson index >=5). Forty-one percent of aged TAD recipients had a new diagnosis of injury or poisoning and one quarter had a newly diagnosed circulatory system condition.

Aged TAD recipients accounted for 61 percent of patients that received TAD interventions. Nearly 80 percent of aged TAD recipients were white, 16 percent were black, and 5 percent were other race (See Appendix Exhibit E5). Over one-third of aged TAD recipients (35 percent) were dually eligible or recipients of LIS support and 3 percent of aged TAD recipients were disabled or ESRD. Fifty-one percent of aged TAD recipients exhibited moderate to severe comorbidity (Charlson index >=3) and 62 percent were categorized as prefrail or mildly frail (Appendix Exhibit E6). Prevalence of chronic heart, endocrine, or circulatory conditions among aged TAD recipients is presented in Appendix Exhibit E7 ranged from hypothyroidism (11 percent) to hypertension (78 percent) while mental health conditions ranged from ADHD and conduct disorders (1 percent) to depression (35 percent). Prevalence of new conditions relative to one year prior to TAD intervention is presented in Appendix Exhibit E8 and ranged from neoplasms (1 percent) to Injury, poisoning or other external causes (41 percent).

Approximately 38 percent of TAD recipients were non-aged disabled Medicare beneficiaries, with nearly all dually eligible or LIS recipients and 49 percent or more exhibiting severe mental illness. This group had the smallest share (26 percent) of persons with high or greater comorbidity (Charlson Index >=5).

Nearly all (90 percent) of non-aged disabled TAD recipients were dually eligible or recipients of LIS support (Appendix Exhibit E5. The racial make-up of non-aged TAD recipients was approximately half (54 percent) white, one quarter black (25 percent) and remaining other race (13 percent). Approximately one third (31 percent) of non-aged TAD recipients had moderate or severe comorbidity and 71 percent were categorized as prefrail or mildly frail (see Appendix Exhibit E6). Appendix Exhibit E7 presents the prevalence of mental illnesses among non-aged TAD recipients, which ranged from ADHD and other conduct disorders (17 percent) to depression (71 percent) and included schizophrenia (60 percent) and bipolar disorder (48 percent). Chronic circulatory, heart, or endocrine conditions in this population ranged from atrial fibrillation (2 percent) to hypertension (58 percent). Appendix Exhibit E8 presents the prevalence of new diagnoses at TAD intervention delivery compared to one year prior. These conditions ranged from infectious and parasitic diseases (2 percent) to mental, behavioral and developmental disorders (23 percent).

Characteristics of Patients with an ED Visit After Refusing an ET3 Intervention

Nearly three-quarters of beneficiaries with an ED visit after refusing an ET3 intervention were aged Medicare beneficiaries (72 percent). Near half (48 percent) of these patients had high or greater comorbidity (Charlson Index >=5) and 24 percent or more had a chronic heart, circulatory, or endocrine condition.[14]

[14] EMS episodes for patients with an ED visit after refusing an ET3 intervention included all ED visits regardless of whether the ED visit was classified as low acuity per the Jeffreys et al., (2016) definition.

Aged Medicare beneficiaries accounted for over 70 percent of transports with an ED visit after patient refusal of an ET3 intervention. Over one-third of these patients were dually eligible or LIS recipients with patients being predominantly white (73 percent) with the remaining population served black (19 percent) and other race (7 percent) patients (Appendix Exhibit E9). Near half of aged patients in this group had high or severe comorbidity (Charlson index >=5) and 13 percent or more were categorized as mild or greater frailty (see Appendix Exhibit E10). Twenty-four percent or more of aged patients in this group exhibited circulatory, heart, or endocrine conditions ranging from atrial fibrillation (24 percent) to hypertension (83 percent) and included ischemic heart disease (33 percent), heart failure (35 percent), and chronic kidney disease (38 percent) (see Appendix Exhibit E11).

Over one quarter of patients with a transport to the ED after refusing an ET3 intervention were non-aged disabled patients. These patients were largely (85 percent) dually eligible or LIS recipients. Most of this group was white (51 percent) and near half (48 percent) exhibited high or severe comorbidity (Charlson index >=5).

Among disabled Medicare beneficiaries with an ED visit after refusing an ET3 intervention, 51 percent were white, 34 percent were black, and 13 percent were other race. Eighty-four percent of beneficiaries in this group were dually eligible or LIS recipients. Nearly half of patients in this group had high comorbidity or greater (Charlson index >=5) and 15 percent or more were categorized with mild or greater frailty (Appendix Exhibit E10). Types of mental illness in this group ranged from ADHD and other conduct disorders (10 percent) to depression (62 percent), and included bipolar disorder (31 percent), alcohol use disorder (19 percent), and schizophrenia (38 percent) (see Appendix Exhibit E11). Prevalence of chronic circulatory, heart, and endocrine conditions in this group ranged from atrial fibrillation (9 percent) to hypertension (68 percent) and included heart failure (27 percent), chronic kidney disease (28 percent), ischemic heart disease (24 percent).

2. Clinical Conditions Common Among TIP and TAD Interventions

This section uses AHRQ CCSR body system categories to present common diagnostic conditions identified during health services delivery for TIP and TAD interventions. The AHRQ CCSR includes 22 diagnostic categories which correspond with different body systems or diseases ranging from Diseases of the blood and blood-forming organs (BLD) to congenital malformations, deformations and chromosomal abnormalities (MAL). Appendix B in the technical appendix for this report describes the AHRQ CCSR in more detail and Appendix Exhibit B3 lists the 22 diagnostic categories in the CCSR. The AHRQ CCSR includes categories with a clear diagnosis such as diseases of the nervous system (NVS) and one category for symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified (SYM) which does not provide an informative diagnosis. While the SYM clinical category was typically the most commonly identified category among claims for TIP, TAD, and referent group EMS episodes, because it was diagnostically uninformative it was omitted in the data reported in this subsection. Among the 22 CCSR condition categories, categories for pregnancy (PRG) and perinatal conditions (PNL) were also excluded from the analysis because these categories did not occur with any frequency in the data for this report.

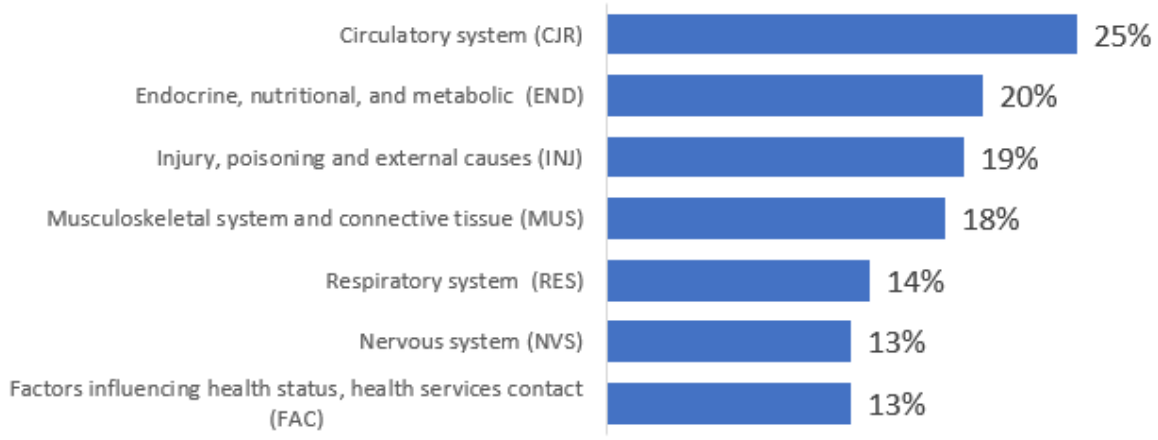
Care should be taken in interpreting the findings in this section because some results are based on small sample sizes (e.g., TAD) and are likely sensitive to changes in implementation approaches, characteristics of the local population and other contextual characteristics.

Common Conditions Among TIP Interventions

CCSR condition categories for circulatory (CIR), metabolic (END), musculoskeletal (MUS), and injury (INJ) related conditions accounted for 82 percent of TIP interventions. Circulatory conditions (CIR) (26 percent), injuries (INJ) (20 percent), and metabolic disorders (END) (19 percent) were the three most common categories occurring in TIP interventions for aged patients. By comparison, metabolic conditions (END) (22 percent), circulatory system diseases (CIR) (19 percent), and respiratory system conditions (RSP) (19 percent) were the top three categories among TIP interventions delivered to non-aged patients.

Exhibit 8 presents the seven most common clinical condition categories for TIP recipients. The four top conditions in Exhibit 8 are also the most common condition categories for aged TIP recipients, who account for over 80 percent of TIP episodes. Circulatory conditions such as hypertension, ischemic heart disease or heart failure was the most common condition in relation to TIP interventions. Endocrine or metabolic conditions such as diabetes, thyroid disorders or obesity were the second most common type of condition among TIP interventions. Each CCSR clinical condition category covers a large array of conditions and diseases present across TIP interventions. To further illustrate the clinical conditions in the CCSR categories, the evaluation also identified the three most frequently occurring conditions within each CCSR category listed in Exhibit 8.

EXHIBIT 8. SEVEN MOST COMMON CLINICAL CONDITION CATEGORIES SEEN FOLLOWING TIP INTERVENTIONS (N=3,161)



Notes: Sum of percentages is greater than 100% because individual EMS episodes may be assigned to more than one CCSR condition category. Condition categories presented in the chart are the seven most common among TIP interventions excluding SYM which is diagnostically uninformative. See section B of the Technical Appendix for additional details.

Illustrative individual conditions of CCSR clinical condition categories most frequently occurring among TIP interventions included hypertension; diabetes mellitus with complications; musculoskeletal pain not low backpain; chronic obstructive pulmonary disease (COPD) and bronchiectasis; and nervous system pain and pain syndromes.

Appendix Exhibit E13 presents the three most commonly occurring clinical conditions within each condition category. Commonly occurring individual conditions for TIP interventions for aged versus non-aged patients exhibited some similarities and differences. Diabetes mellitus with and without complication and musculoskeletal pain not low backpain were the two most commonly occurring individual conditions in TIP interventions for both types of patients. After these conditions, the next three most commonly occurring conditions among TIP interventions for aged patients were essential hypertension, unspecified injury and non-specific chest pain. For non-aged patients, the next three most commonly occurring conditions were COPD and bronchiectasis; nonspecific chest pain; and specified and unspecified endocrine disorders.

Clinical Conditions Common Among TAD Interventions

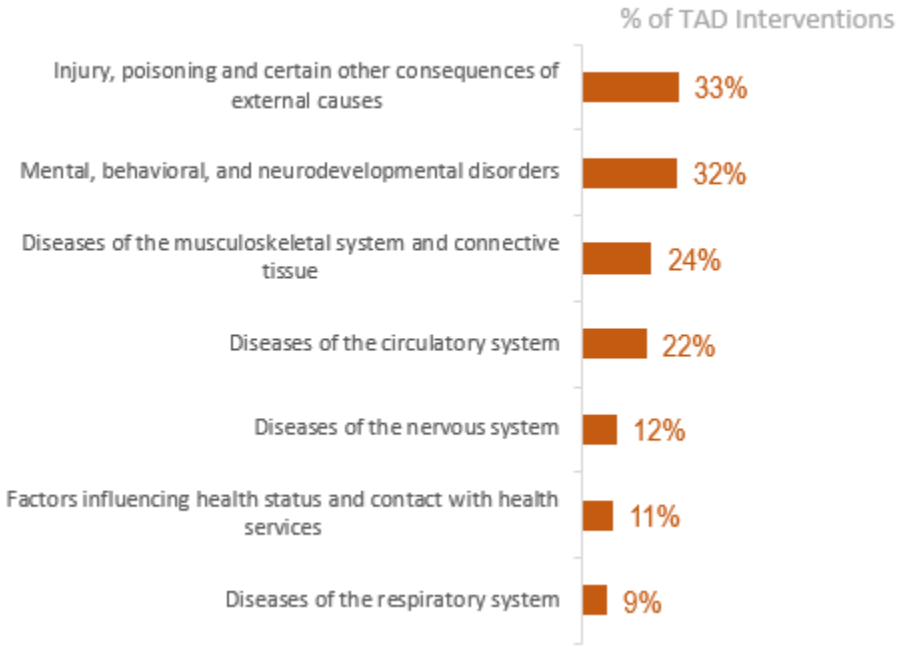
TAD interventions included transport to urgent care clinics, FQHCs, and community mental health centers (CMHCs). As noted in earlier chapters, the small number of TAD interventions (N=257) delivered under the model appears to reflect participant difficulty in acquiring arrangements with local alternative destination sites to serve as ADPs or limited availability among existing ADPs to accept patients. Other active participants accounted for over three quarters (77 percent, N=199) of TAD interventions under the model, with remaining TAD interventions provided by higher volume participants (N=58).

CCSR condition categories for Injury (INJ), mental (MBD), and musculoskeletal (MUS) system related conditions were present in 89 percent of TAD interventions delivered under the model. The injury (INJ) category occurred in nearly half (48 percent) of TAD interventions for aged TAD recipients while the mental (MBD) condition category occurred in the majority (61 percent) of TAD interventions for non-aged recipients. Exhibit 9 presents the seven most common CCSR categories across the 257 TAD interventions that were delivered during the life of the ET3 Model. Nearly two-thirds of TAD interventions included injury, poisoning (INJ); or mental and behavioral disorders (MBD). Musculoskeletal system-related conditions (MUS) and circulatory system (CIR) conditions were involved in near one-half of all TAD interventions. Collectively, nervous system diseases (NVS); contact with the health care system (FAC) or conditions related to the respiratory system (RSP) were related to just under one-third of all TAD interventions. Injuries, poisoning and other results of external causes (INJ) was present in near half (48 percent) of TAD interventions for aged patients. Mental, behavioral, and neurodevelopmental conditions (MBD) was present in the majority (61 percent) of TAD interventions for non-aged TAD recipients.

Illustrative conditions in CCSR categories most frequently occurring among TAD interventions include: unspecified injury; schizophrenia spectrum and other psychotic disorders; suicidal ideation/attempt/intentional self-harm; musculoskeletal pain, not low back pain; nonspecific chest pain; essential hypertension; and pneumonia. Appendix Exhibit E14 lists the three most commonly occurring individual conditions within each CCSR clinical condition category presented in Exhibit 9. Individual conditions common among TAD interventions to aged patients differed from those to non-

aged patients. The two conditions most commonly occurring among TAD interventions for aged patients included unspecified injury (INJ); and Musculoskeletal pain, not low back pain (MUS). For TAD interventions delivered to non-aged patients, the two most commonly occurring conditions included schizophrenia spectrum and other psychotic disorders (MBD) and Suicidal ideation/attempt/intentional self-harm (MBD).

EXHIBIT 9. SEVEN MOST COMMON DIAGNOSTIC CCSR CLINICAL CONDITION CATEGORIES AMONG TAD INTERVENTIONS (N=257)



Notes: CCSR condition categories presented are seven most common among TAD interventions. Sum of percentages is greater than 100% because individual episodes may be assigned to more than one CCSR condition category. See section B of the Technical Appendix for additional details.

IV. DESCRIPTIVE OUTCOMES

Key Points in This Chapter

Unadjusted Outcomes following TIP Interventions

All-Cause Emergency Department (ED) Visits

- ED visits within 5 days after a TIP (N=3,161) occurred in 28 percent of cases.
- Participant clinical protocols were designed to identify lower acuity patients safe for treatment outside the ED setting who are appropriate for TIP. Assuming a follow-up ED visit would have occurred if TIP had not been provided, TIP appears to have reduced all-cause ED use in 72 percent of cases.
- The unadjusted rate of ED visits after TIP from higher volume participants was lower than for other active participants.

All-Cause Hospitalizations

- Hospitalizations following TIP interventions were examined as an assessment of quality.
- The unadjusted rate of hospitalization following TIP was higher for other active participants than for higher volume participants.
- Aged Medicare beneficiaries who received TIP had higher unadjusted 5-day hospitalization rates compared to disabled Medicare beneficiaries (12 percent vs 8.5 percent, $p<0.05$).

Medicare Parts A and B Spending

- Unadjusted Medicare Parts A and B spending for TIP interventions averaged $512 per intervention for same-day+1 and was $922 per intervention for five-day.
- Unadjusted Medicare spending per TIP intervention for same-day+1 was lower for TIP interventions delivered by higher volume participants compared to TIP provided by other active participants.

Unadjusted Outcomes following TAD Interventions

All-Cause Emergency Department Visits

- Over one third (34 percent) of TAD interventions had a same-day+1 follow-up ED visit and over half (51 percent) of TAD interventions had a follow-up ED visit within 5 days after index.
- The rate of ED visits after TAD interventions provided by higher ET3 volume participants was not significantly different than for other active participants who delivered less than 100 ET3 interventions.
- Among the limited number of TAD interventions delivered (N=257) only the mental or behavioral disorders (MBD) category had sufficient numbers to calculate a follow-up ED visit rate. Sixty percent of TAD interventions in this category had a follow-up ED visit.

All-Cause Hospitalizations

- A very limited number of TAD interventions were delivered (N=257) and hospitalizations after TAD occurred at a fairly high rate.

Medicare Parts A & B Spending

- Unadjusted Medicare Parts A and B spending for TAD interventions were not significantly different between aged recipients versus disabled recipients.

This chapter presents unadjusted descriptive data for all-cause ED visits, all-cause hospitalizations, all-cause patient mortality, and Medicare Parts A & B spending separately for TIP and TAD interventions delivered under the ET3 Model.[15] Descriptive analyses presented here compare outcomes for aged and disabled Medicare beneficiaries as well as outcomes for recipients of ET3 interventions from higher volume versus other active participants. The ET3 evaluation also examined ED visit and hospitalization outcomes by CCSR condition categories to identify condition categories where these outcomes occurred more frequently.[16]

Some caution should be taken in interpreting the results in this chapter relating rates of health care outcomes particularly for TAD interventions and individual CCSR clinical condition categories. TAD and individual CCSR clinical condition categories may have higher rates of hospitalizations because of aspects of care delivery, patient acuity, or smaller numbers of cases.

1. *Outcomes Following TIP Interventions*

This section presents rates of healthcare outcomes and average Medicare Parts A and B spending for TIP interventions. TIP interventions under the ET3 Model were provided to patients deemed eligible to receive services safely outside of an ED per an ET3 participant's clinical protocols. Outcomes are

[15] Identification of all-cause ED visits followed the approach used by Venkatesh et al., (2016) to prevent treating claims associated with the same ED visit as separate ED visits.

[16] Because intervention counts were low in some condition categories, we restricted this analysis to only the seven CCSR condition categories with the highest frequency and that had at least 50 cases in the denominator and numerator.

presented with consideration of differences between aged and disabled patient populations as well as by higher volume or other active participant. Over 80 percent of TIP recipients were aged beneficiaries with higher prevalence of heart, circulatory, or endocrine conditions and lower prevalence of severe mental illnesses. The remaining 17 percent of TIP interventions went to disabled beneficiaries with a higher prevalence of mental illness and higher likelihood of poverty. TIP intervention delivery was also concentrated among higher volume participants, who accounted for over three-quarters of TIP interventions.

All-Cause Emergency Department (ED) Visits

TIP interventions were followed by an ED visit within 5 days in 28 percent of cases.

Approximately 13 percent of TIP interventions were followed by an ED visit on or one day after the index date. All-cause ED use following delivery of a TIP intervention may have occurred for different reasons and may not necessarily reflect an adverse event related to a prior TIP intervention. The QHCP providing covered services as part of a TIP intervention may have counseled the patient to go to ED if symptoms did not resolve after a specified time period. Patients may have voluntarily returned to an ED because of unmet expectations of receiving health care treatment in an ED setting (Pringle et al., 2005). ED visits after TIP may include cases where a patient was under-triaged and should have been transported to an ED. ED visits following TIP may also include necessary ED services for medical issues unrelated to the preceding TIP intervention.

Participant clinical protocols were designed to identify lower acuity patients safe for treatment outside the ED setting who are appropriate for TIP. Assuming an ED visit would have occurred absent a TIP intervention, TIP appears to have reduced ED use in up to 72 percent of cases. TIP recipients are those who dialed 911 in response to a medical emergency but were deemed protocol eligible and safe for treatment outside an ED. Across TIP interventions delivered under the ET3 Model, TIP recipients used the ED on the same day or one day after in 13 percent of interventions (see Exhibit 10). Subsequent ED use occurred in 28 percent of TIP interventions up to five days after the date of TIP. It is unclear what proportion of TIP interventions would have resulted in an ED visit had TIP not been provided but under the assumption that an ED visit would have occurred absent a TIP, the above estimates imply that these interventions prevented ED use in up to 72 percent of cases.

The unadjusted rate of ED visits after TIP from higher volume participants was lower than other active participants for same-day+1 (11 percent vs 21 percent, not significant) and for 5-day (26 percent vs 36 percent, $p<0.10$) ED visits. Exhibit 10 presents rates of all-cause ED visits for TIP interventions provided by higher volume and other active participants who provided less than 100 interventions. Same-day+1 ED use following TIP was lower (11 percent vs 21 percent) for higher volume participants than other active participants, although the difference was not statistically significant. The rate of 5-day ED visits for higher volume TIP interventions was lower and statistically significant. The lower rate of ED use among higher volume participants may reflect better engagement and training of EMS ambulance personnel by these participants or other participant specific factors such as patient screening criteria in participant clinical protocols or requiring use of secondary physician review when a patient is deemed not to require transport to an ED.

EXHIBIT 10. UNADJUSTED RATE OF ALL-CAUSE EMERGENCY DEPARTMENT (ED) VISITS FOLLOWING DELIVERY OF TIP INTERVENTIONS BY PATIENT AGED/DISABLED STATUS AND BY ET3 HIGHER VOLUME STATUS

Category	#	Percent of TIP Interventions with a follow-up ED Visit within Same-Day+1	Percent of TIP Interventions with a follow-up ED Visit within Five Days
All TIP interventions	3,161	13.3%	28.0%
TIP interventions:			
Aged Patients	2,622	13.2% [1]	27.3% [1]
Disabled Patients	539	13.9% [1]	31.2% [1]
Provided by Higher Volume Participants	2,426	10.9% [1]	25.5% [2]
Provided by Other Active Participants	735	21.2% [1]	36.1% [2]

Notes:

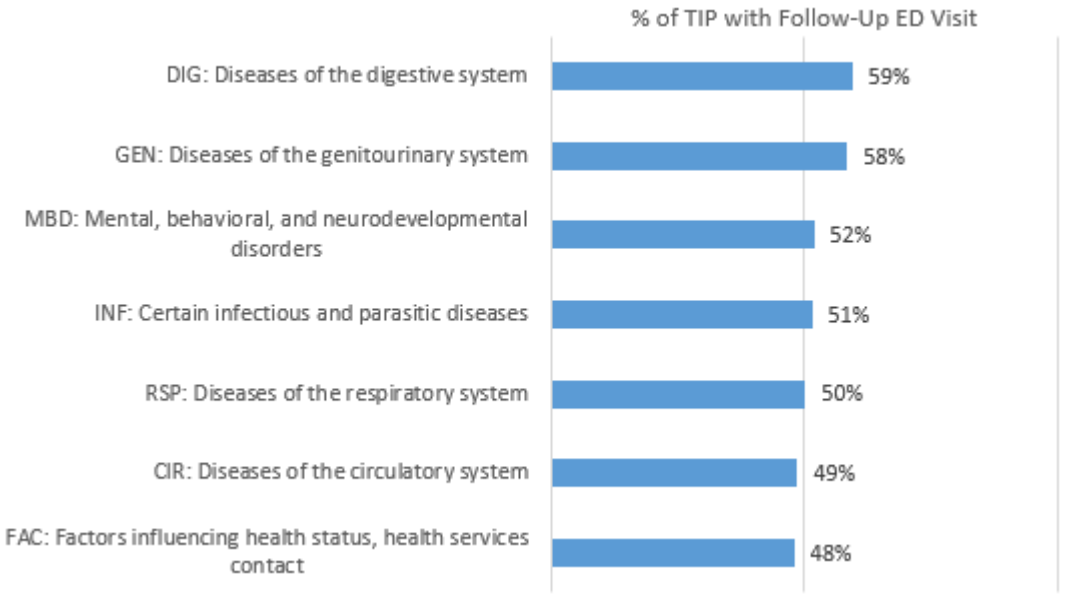
[1] No significant difference in follow-up ED visits between aged and disabled TIP recipients. There was no significant difference in same-day+1 follow-up ED visits between higher volume and other active participants.

[2] 5-day ED visit rate for higher volume participants is lower than other active participants at the 10% level.

Among the seven most commonly occurring CCSR categories in TIP interventions followed by an ED visit, circulatory system conditions occurred much more frequently than other categories.

Exhibit 11 presents comparison of the seven CCSR condition categories with the highest subsequent ED visit rate after index event for TIP interventions. ED visits within 5 days of TIP occurred for over one quarter (28%) of TIP interventions. TIP CCSR categories where subsequent ED visits were most common included digestive system related conditions, genitourinary system, blood and immune system conditions, mental and behavioral disorders, infectious disease, respiratory system conditions, and circulatory system conditions. Appendix Exhibit F1 lists the three most common individual conditions for CCSR categories in TIP interventions with a follow-up ED visit. While low acuity ED episodes are expected to have somewhat higher acuity than TIP interventions, acuity differences if present are not apparent from the most commonly occurring individual conditions identified. The most frequently occurring individual conditions associated with subsequent ED follow up (starting with the most frequent) were nonspecific chest pain (CIR), essential hypertension (CIR), coronavirus disease 2019 (COVID-19) (INF), cardiac dysrhythmias (CIR), and urinary tract infections (GEN).

EXHIBIT 11. SEVEN MOST FREQUENT CCSR CONDITION CATEGORIES IN TIP INTERVENTIONS WITH A FOLLOW-UP ED VISIT WITHIN 5 DAYS



Notes: AHRQ CCSR categories listed are the seven with the highest 5-day all-cause ED visit rates with at least 50 TIP interventions in the ratio denominator and numerator.

All-Cause Hospitalizations

Hospitalizations following TIP interventions were examined as an assessment of quality. Hospitalizations on the index date or one day after for TIP occurred in 1.7 percent of cases ($p<0.01$). Hospitalizations within five days after the index date occurred in 11.5 percent of TIP interventions a larger difference that may reflect under-triage of patients ($p<0.01$).

The unadjusted rate of hospitalization following TIP was higher for active participants that provided fewer than 100 interventions than for higher volume participants (same-day+1: 1.5 percent versus 2.4%, $p<0.05$; 5-day: 10.8% versus 13.7%, $p<0.05$). Exhibit 12 presents the same-day+1 and 5-day rate of hospitalization following delivery of TIP. The observed difference in hospitalization rate between higher volume and other active participants may reflect differences in implementation of TIP related to organizational characteristics and observed or unobserved differences in the comorbidity or acuity of TIP recipients. Participants that delivered larger volumes of TIP interventions over time may have refined operational processes over time to improve identifying patients for TIP versus those more appropriate for treatment in an ED.

Aged patients exhibited higher unadjusted 5-day hospitalization rates compared to disabled patients. Five-day hospitalization rates for aged patients were higher than rates for disabled patients (Exhibit 12). While aged and disabled TIP recipients exhibited similar rates of comorbidity and frailty, these patients had somewhat higher rates of chronic circulatory, heart and endocrine conditions (Appendix Exhibits E3-E4). Aged TIP recipients also exhibited modestly higher rates of new diagnoses across 11 CCSR condition

categories relative to one year prior to the date of TIP delivery which may indicate unreported and developing conditions within this group. Nearly three quarters of patients that experienced a hospitalization within 5 days of TIP intervention were age 70 or older and half (53 percent) had high or severe comorbidity (mean Charlson index>=5).

EXHIBIT 12. ALL-CAUSE HOSPITALIZATIONS FOLLOWING TIP INTERVENTIONS BY PATIENT AGED/DISABLED STATUS AND BY ET3 HIGHER VOLUME STATUS

Category	#	Percent of TIP interventions with a Hospitalization within same-day +1	Percent of TIP interventions with a Hospitalization within Five Days
All TIP interventions	3,161	1.7%	11.5%
TIP interventions:			
Aged Patients	2,622	1.8% [1]	12.1% [2]
Disabled Patients	539	1.3% [1]	8.5% [2]
Provided by Higher Volume Participants	2,426	1.5% [3]	10.8% [3]
Provided by Other Active Participants	735	2.4% [3]	13.7% [3]

Notes:

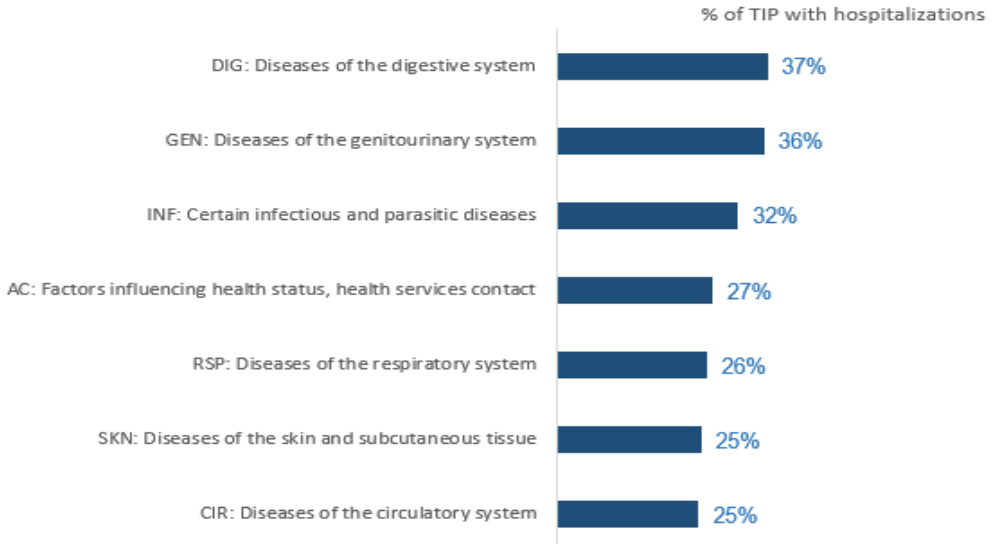
[1] No significant difference in risk of same-day+1 hospitalization between aged and disabled TIP recipients.

[2] Aged patients had a higher risk of hospitalization than disabled TIP recipients at the 1% level.

[3] Risk of same-Day+1 and 5-Day hospitalization was lower for higher volume participants than rates other active participants at the 5% level or better.

Among the seven most commonly occurring CCSR categories in TIP interventions followed by a hospitalization, circulatory system conditions occurred much more frequently than other categories. The seven CCSR condition categories with the highest 5-day hospitalization rates following a TIP intervention are presented in Exhibit 13. Among the CCSR categories in the exhibit, hospitalization rates ranged from 25 percent to 38 percent. The seven most frequently occurring CCSR categories in TIP interventions with a hospitalization included circulatory system conditions (CIR), which was the most frequent, followed by diseases in the respiratory system (RSP), contact with the health system (FAC), genitourinary system (GEN), Infectious and parasitic diseases (INF), digestive system (DIG), and skin or subcutaneous tissue (SKN). Appendix Exhibit F2 lists the three most common individual conditions occurring in each of these CCSR categories. The most commonly occurring individual conditions in TIP interventions that was followed by a hospitalization within 5 days was nonspecific chest pain; followed by exposure, encounters, screening or contact with infectious disease; acute and unspecified renal failure; cardiac dysrhythmias; and urinary tract infections.

EXHIBIT 13. SEVEN MOST FREQUENTLY OCCURRING CCSR CLINICAL CONDITION CATEGORIES IN TIP INTERVENTIONS WITH A HOSPITALIZATION WITHIN FIVE DAYS



Notes: AHRQ CCSR condition categories are the seven with the highest 5-day all-cause hospitalization rate with at least 50 TIP interventions in the ratio numerator and denominator.

All-Cause Patient Mortality

TIP interventions delivered by higher volume participants exhibited non-significantly lower mortality rates (same-day+1: 0.2 vs 1.1 percent, not significant; 5-day: 1.4 vs 2.2 percent, not significant) compared to interventions delivered by other active participants. Patient mortality following TIP interventions delivered by higher volume participants were lower than mortality after TIP interventions delivered by other active participants. Exhibit 14 presents unadjusted patient mortality rates for all TIP interventions and select patient subgroups. Differences in mortality rates were not statistically significant. Mortality following TIP interventions occurred primarily among patients age 70 or over.

EXHIBIT 14. ALL-CAUSE PATIENT MORTALITY FOLLOWING TIP INTERVENTIONS BY PATIENT AGED/DISABLED STATUS AND PARTICIPANT HIGHER VOLUME STATUS

Category	#	Percent of TIP Interventions with Patient Mortality within same-day+1	Percent of TIP interventions followed by Patient Mortality within five days
All TIP interventions	3,161	0.4%	1.6%
TIP interventions for:			
Aged Patients	2,622	0.4% [1]	1.8% [1]
Disabled Patients	539	0.6% [1]	0.6% [1]
Provided by Higher Volume Participants	2,426	0.2% [1]	1.4% [1]
Provided by Other Active Participants	735	1.1% [1]	2.2% [1]

Notes:

[1] Rates of patient mortality after TIP were not significantly different between aged versus disabled patients or between higher volume and other active participants.

Medicare Parts A and B Spending

Unadjusted Medicare Parts A and B spending for TIP interventions averaged $512 per intervention for same-day+1 and was $922 per intervention for five-day.

Unadjusted Medicare spending per TIP intervention for same-day+1 ($497 vs $565, p<0.05) and 5-day ($906 vs $974, p<0.05) was lower for TIP interventions delivered by higher volume participants compared to TIP provided by other active participants. Exhibit 15 presents average Medicare parts A and B spending on a same-day+1 and five-day basis for all TIP interventions and select subgroups. Medicare spending per TIP intervention was lower when provided by higher volume participants compared to TIP interventions provided by other active participants. Lower spending in TIP interventions from higher volume participants may reflect operational efficiencies gained over time as EMS ambulance personnel and participants accumulate experience in providing TIP interventions.

EXHIBIT 15. AVERAGE MEDICARE PARTS A AND B SPENDING ASSOCIATED WITH TIP INTERVENTIONS BY PATIENT AGED/DISABILITY STATUS AND PARTICIPANT HIGHER VOLUME STATUS

Category	#	Average TIP intervention Medicare Parts A & B Spending, Same-Day+1	Standard deviation of TIP intervention Medicare Parts A & B Spending, Same-day+1	Average TIP intervention Medicare Parts A & B Spending, Five-Day	Standard deviation of TIP intervention Medicare Parts A & B Spending, Five-day
All TIP interventions	3,159 §	$512	$365	$922	$976
TIP interventions for:					
Aged Patients	2,620 §	$509 [1]	$353	$908 [1]	$949
Disabled Patients	538 §	$532 [1]	$420	$992 [1]	$1,099
Provided by Higher Volume Participants	2,425 §	$497 [2]	$331	$906 [2]	$977
Provided by Other Active Participants	733 §	$565 [2]	$457	$975 [2]	$973

Notes: The "#" column contains the number of TIP interventions included.

§ TIP interventions with missing expenditure values were excluded.

[1] Average Medicare parts A & B spending for aged patients was not significantly different than spending for disabled patients.

[2] Average Medicare parts A & B spending for TIP from higher volume participants was lower than other active participants on a same-day+1 and five-day basis at the 5% level or better.

2. *Outcomes following TAD Interventions*

This section presents all-cause ED visits, all-cause hospitalizations, and Medicare Parts A and B spending for TAD interventions provided under the ET3 Model. There were no instances of patient mortality among TAD interventions. As noted in preceding chapters, delivery of TAD interventions (N=257) appears to have been primarily limited by participant difficulties in obtaining written arrangements with alternative destination sites and limited capacity to accept patients among a participant's existing ADPs. Patients eligible to be offered TAD were deemed safe for treatment in a location other than an ED. Slightly over 60 percent of TAD interventions went to aged Medicare beneficiaries while nearly 40 percent went to disabled Medicare beneficiaries. Three-quarters of TAD interventions were delivered by other active participants that delivered fewer than 100 ET3 interventions during the model's duration, while slightly over one-fifth of TAD interventions were delivered by higher volume participants.

All-Cause Emergency Department Visits

Over one third (34 percent) of TAD interventions had a same-day+1 follow-up ED visit and over half (51 percent) of TAD interventions had a follow-up ED visit within 5 days after the index date. By definition, TAD recipients met medical necessity criteria for ED transport and would be more likely to have acute conditions requiring immediate medical attention compared to patients eligible for TIP. Exhibit 16 presents unadjusted descriptive data for follow-up ED visits after TAD. Delivery of TAD interventions was followed by fairly high rates of ED visits with over one-third of TAD interventions with an ED visit on the same-day+1, and over half of TAD interventions having an ED visit occurring within the 5 days following the date of TAD intervention. ED visits after a TAD intervention may have resulted because examination at the alternate destination site indicated the patient should go to an ED. ED visits after TAD may also be appropriate and necessary care unrelated to issues that led the prior TAD intervention.

The rate of ED visits after TAD from higher volume participants was not statistically different than for TAD provided by other active participants (same-day+1: 32 percent vs 38 percent, not significant; five-day: 48 percent vs 52 percent, not significant). The occurrence of ED visits following TAD by higher volume participants was not statistically higher than after TAD provided by other active participants. Unlike TIP, delivery of TAD interventions under the model was extremely low (N=257), potentially limiting any improvements in delivery that participant organizations might have accrued through experience in delivering this service.

EXHIBIT 16. ALL-CAUSE ED VISITS FOLLOWING TAD INTERVENTIONS BY PATIENT AGED/DISABILITY STATUS AND PARTICIPANT HIGHER VOLUME STATUS

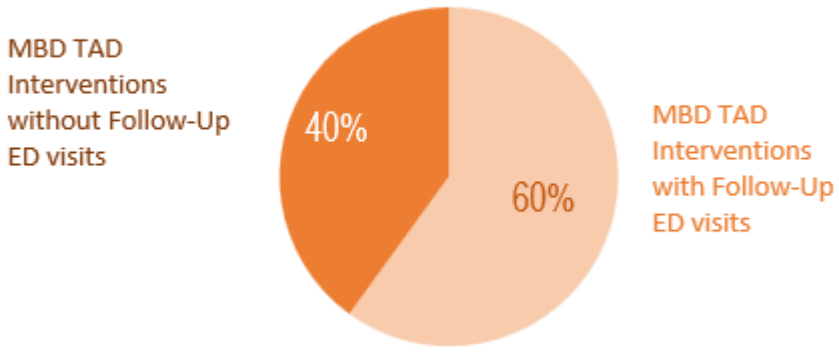
Category	#	Percent of TAD Interventions With Follow-Up ED Visit, Same-Day+1	Percent of TAD Interventions With Follow-Up ED Visit, 5-Day
All TAD interventions	257	34%	51%
TAD interventions for:			
Aged Patients	152	32% [1]	47% [1]
Disabled Patients	105	38% [1]	56% [1]
Provided by Higher Volume Participants	58	38% [1]	48% [1]
Provided by Other Active Participants	199	33% [1]	52% [1]

Notes:

[1] No significant difference in follow-up ED visits after TAD interventions between aged patients versus disabled patients and between TAD interventions from higher volume and other active participants.

TAD interventions in the mental or behavioral disorders (MBD) category exhibited a 60 percent follow-up ED visit rate. Injury and poisoning (INJ) and mental and behavioral disorder (MBD) account for nearly two-thirds of TAD interventions. In examining CCSR categories for TAD, only the MBD category included sufficient numbers of interventions (N=83) to be considered reliable for reporting (See Exhibit 17). The high rate of follow-up ED visits after TAD interventions may reflect a number of factors. The most common condition for TAD interventions with ED visits in this CCSR category was schizophrenia and follow-up ED visits may have reflected patient need for treatment. Alternatively, the high follow-up ED visit rates after TAD interventions in this category may reflect health care provider direction to seek ED care. Appendix Exhibit F3 presents the three most commonly occurring individual conditions in the MBD CCSR category. Among TAD interventions schizophrenia spectrum and other psychotic disorders accounted for 20 percent or more of TAD interventions in the MBD category.

EXHIBIT 17. RATE OF FOLLOW-UP ED VISITS FOR TAD INTERVENTIONS WITH MENTAL, BEHAVIORAL AND NEURODEVELOPMENTAL DISORDERS (MBD) CCSR CONDITION CATEGORY WITHIN FIVE DAYS OF TAD



Notes: AHRQ CCSR categories listed are the seven with the highest 5-day all-cause ED visit rates with at least 50 TIP interventions in the ratio denominator and numerator.

Hospitalizations

Very few TAD interventions were delivered (N=257), and hospitalizations after TAD occurred at a fairly high rate (same-day+1: 7 percent; five-day: 25 percent). Patients receiving TAD met medical necessity criteria for ED transport and were deemed safe for treatment outside the ED from a TAD partner such as an urgent care clinic or FQHC. Exhibit 18 presents descriptive data for TAD interventions delivered during the model's duration. Rates of hospitalization after TAD was 7 percent for same-day+1 and 25 percent within five days after TAD. Hospitalizations following TAD may have resulted per direction of TAD partners or may have occurred because a TAD patient should have been triaged to an ED.

EXHIBIT 18. HOSPITALIZATION RATE FOLLOWING TAD INTERVENTIONS BY PATIENT AGED/DISABILITY STATUS AND PARTICIPANT HIGHER VOLUME STATUS

Category	#	Percent of TAD interventions With Hospitalizations, Same-Day+1	Percent of TAD interventions With Hospitalizations, 5-Day
All TAD interventions	257	7%	25%
TAD interventions for:			
Aged Patients	152	6% [1]	25% [1]
Disabled Patients	105	9% [1]	24% [1]
Provided by Higher Volume Participants	58	16% [1]	43% [2]
Provided by Other Active Participants	199	5% [1]	19% [2]

Notes:

[1] No significant difference in risk of hospitalization between aged and disabled patients for same-day+1 and five-day. There was no difference in risk of hospitalization after TAD between higher volume and other active participants for same-day+1.

[2] Risk of hospitalization within 5 days after TAD intervention from higher volume participants was higher than other active participants at the 5% level.

Medicare Parts A & B Spending

Unadjusted Medicare Parts A and B spending for TAD interventions were not significantly different between aged recipients versus disabled recipients on a same-day+1 basis ($792 vs $705, not significant) or on a 5-day basis ($1,272 vs $1,264, not significant). Average Medicare Parts A and B spending for TAD interventions was lower for aged recipients than disabled TAD recipients but the difference was not statistically significant (Exhibit 19).

EXHIBIT 19. AVERAGE MEDICARE PARTS A AND B SPENDING ASSOCIATED WITH TAD INTERVENTIONS BY PATIENT AGED/DISABILITY STATUS AND PARTICIPANT HIGHER VOLUME STATUS

Category	#	Average TAD Medicare Parts A & B Spending, Same-Day+1	Std Dev of TAD Medicare Parts A & B Spending, Same-Day+1	Average TAD Medicare Parts A & B Spending, 5-Day	Std Dev of TAD Medicare Parts A & B Spending, 5-Day
All TAD interventions	256 §	$759	$519	$1,274	$985
TAD interventions for:					
Aged Patients	152 §	$792 [1]	$456	$1,272 [1]	$898
Disabled Patients	105 §	$705 [1]	$601	$1,264 [1]	$1,106
Provided by Higher Volume Participants	58 §	$671 [2]	$388	$1,030 [2]	$662
Provided by Other Active Participants	198 §	$785 [2]	$550	$1,345 [2]	$1,052

Notes: The "#" column contains the number of TAD interventions.

§ TAD interventions with missing expenditures were excluded from this calculation.

[1] No significant difference in the Medicare Parts A and B spending average between aged versus disabled patients.

[2] Difference in Medicare Parts A and B spending average is significant at the 5% level for higher volume and other active participants.

V. RISK ADJUSTED OUTCOMES FOLLOWING TIP INTERVENTIONS

Key Points in This Chapter

All-Cause ED visits:

- Follow-up ED visits after TIP (N=3,161) were higher than after low acuity ED episodes by a large difference. The higher follow-up ED visits may be due to QHCP direction to patients, patient (or family/caregiver) initiative, or adverse events that may or may not be related to the preceding TIP.
- Higher volume participants had a lower adjusted difference for risk of follow-up ED visits than other active participants. This difference suggests patients selected for TIP by higher volume participants were more appropriately triaged than TIP patients selected by other active participants.

All-Cause Hospitalization Rates:

- TIP interventions (N=3,161) were associated with an elevated risk of hospitalization within five days compared to TIP-matched low acuity ED episodes.
- Higher volume participants had a lower adjusted difference for risk of hospitalization than other active participants.

All-Cause Patient Mortality:

- Overall, there was no difference in patient mortality between TIP interventions (N=3,161) and low acuity ED episodes.
- The adjusted difference for patient mortality after TIP from higher volume participants was negative while TIP from other active participants had a small and positive risk of mortality compared to low acuity ED episodes.

- Lower risk of follow-up ED visit, hospitalization, and mortality after TIP by higher volume participants may reflect procedures used to ensure accurate patient triage such as requiring EMS ambulance personnel to use secondary physician review of TIP patients deemed not to require ED transport.

Spending:

- Assuming a low acuity ED visit would have occurred in the absence of TIP, Medicare Parts A & B spending was moderately lower for TIP interventions (N=3,161) compared to TIP-matched low acuity ED episodes.

This chapter presents regression adjusted differences in Medicare Parts A and B spending, all-cause hospitalizations, all-cause patient mortality, and all-cause ED visits following delivery of TIP using TIP-matched low acuity ED episodes. TAD interventions were not analyzed because of limited sample size (N=257). TIP specific referent group encounters were created by identifying low acuity ED episodes whose recipients match on demographic, socioeconomic, and coverage attributes of TIP recipients. Appendix G includes observed characteristics of TIP episodes (N=3,161) against TIP matched low acuity ED episodes (N=32,408).

Cross sectional regressions were used to calculate differences between TIP and TIP matched low acuity ED episodes adjusted for demographic, socioeconomic, coverage and clinical characteristics including frailty and comorbidity (Glasheen et al. 2019; Kim et al., 2019).

The adjusted difference was used to estimate effects associated with the ET3 Model.

Adjusted Difference =
(Adj. TIP intervention) – (Adj. Low acuity ED episode)

The adjusted difference for a given outcome was calculated as the average of adjusted TIP interventions minus adjusted TIP-matched low acuity ED episodes. Results of this analysis are presented in this chapter as labels to facilitate interpretation. Differences that are positive and significant at the 5% level or better are denoted as 'higher,' reflecting a higher average or rate in the TIP group relative to the referent group. Negative differences significant at the 5% level or better are denoted as 'lower' reflecting a lower average in the TIP intervention group relative to the referent group. Estimates not significant at the 5% level or better, are denoted as 'no difference'. To characterize magnitudes, estimates with a percent adjusted difference ranging from >0% to <=15% are denoted as 'modest', estimates ranging from >15% to <=50% are denoted as 'moderate' and estimates >50% are denoted as 'large'. Appendix B of this report describes the methodology used to calculate these results.

! Because of the cross-sectional design used in the evaluation, statistically significant differences between TIP interventions and TIP-matched low acuity ED episodes may not be solely due to the ET3 Model.

Because of the cross-sectional design used in the evaluation, statistically significant differences between TIP interventions and TIP-matched low acuity ED episodes may not be solely due to the ET3 Model. Differences in Medicare spending, risk of hospitalization, mortality, or ED visits after receipt of TIP interventions are associations and cannot be causally attributed to TIP interventions.

1. Differences in Medicare Parts A and B Spending, Follow-Up ED Visits, Risk of Hospitalization, & Mortality After TIP Interventions

The adjusted difference for follow-up ED visits was positive, large and significant indicating follow-up ED visits after TIP occurred at a higher rate than after low acuity ED episodes by a large amount ($p<0.01$). Patients were significantly more likely to go to ED after receipt of a TIP intervention than after receipt of a low acuity ED episode. Follow-up ED visits after TIP may be due to different reasons. These reasons include patients taking initiative to seek ED care because of unmet expectations from not receiving treatment in an ED setting (Pringle et al., 2005), direction from QHCPs to seek care in an ED if symptoms or problems do not resolve within a specified time frame, because of adverse events unrelated to TIP care, or adverse events unrelated to TIP care.

Hospitalizations within five days after TIP interventions were higher than after TIP-matched low acuity ED episodes by a large amount. The adjusted difference for hospitalizations for same-day+1 was not statistically significant indicating the risk of hospitalization between TIP versus TIP-matched low acuity ED episodes was not different. TIP recipients had a higher rate of hospitalization occurring within 5 days after the date of TIP intervention, compared to low acuity ED episodes. TIP recipients would be expected to be lower acuity relative to recipients of low acuity ED episodes so the higher risk of hospitalization may indicate patients triaged for TIP who may have been more appropriate for treatment in an ED.

The adjusted difference for patient mortality was small and not significant indicating the risk of mortality was not different between TIP interventions and low acuity ED episodes. Patient mortality was an infrequent event following delivery of TIP and TIP-matched low acuity ED episodes. The difference in patient mortality between TIP and TIP-matched low acuity ED episodes was small and not statistically significant from zero for same-day+1 and five-day.

Assuming a low acuity ED visit would have occurred in the absence of TIP, the adjusted difference for Medicare Parts A & B spending implies moderately lower Medicare spending for TIP interventions compared to TIP-matched low acuity ED episodes. Overall, TIP interventions were associated with moderately lower (15%-50% of spending average among TIP-matched low acuity ED episodes) Medicare Parts A and B spending compared to TIP-matched low acuity ED episodes (see Exhibit 20). TIP interventions were provided to consenting patients that were deemed protocol eligible for treatment outside of an ED and may have lower acuity compared to recipients of low acuity ED episodes. Lower spending among TIP interventions may be due to lower relative acuity of TIP patients and the occurrence of fewer ED visits among TIP interventions compared to low acuity ED episodes.

EXHIBIT 20. ADJUSTED DIFFERENCE OF ET3 EVALUATION OUTCOMES FOR TIP INTERVENTIONS (N=3,161)

	Same-day+1	*5-day*
Medicare Parts A and B spending	Moderate & Lower	Moderate & Lower
All-Cause Follow-up ED Visit	Large & Higher	Large & Higher
All-Cause Hospitalization	No Difference	Large & Higher
All-Cause Patient Mortality	No Difference	No Difference

Notes: Cell entries are the average of adjusted TIP interventions minus adjusted TIP-matched low acuity ED episodes. "Same-day+1" indicates outcome event occurred on same date as the index event or one day after. "5-day" indicates outcome event occurred within five days after the index date.

Orange cells denote higher values for TIP interventions than the referent group at the 5% level or greater.
Green cells denote lower values for TIP interventions than the referent group at the 5% level or greater.

"Modest" denotes differences that are 0%-15% of average spending for matched low acuity ED episodes, "moderate" denotes differences that are 15%-50% of average referent group spending, and
"large" denotes differences that >50% of average spending for referent encounters. See Appendix B for a description of methods.

2. *Differences in Outcomes After TIP by Higher Volume (≥100 ET3 Interventions) and Other Active (<100 ET3 Interventions) Participants*

Because over three quarters of TIP interventions were concentrated among eight higher volume participants, TIP interventions were also analyzed separately for active participants that delivered at least 100 ET3 interventions during the model's duration versus active participants that delivered fewer than 100. Higher volume participants may have refined training procedures for EMS ambulance personnel for TIP or processes used to identify patients eligible for TIP after accumulating experience delivering these services which may explain better results for some outcomes.

Higher volume participants had a lower adjusted difference for risk of follow-up ED visits than other active participants. On a same-day+1 basis, the risk of follow-up ED visits was not different between higher volume participants and matched low acuity ED episodes at the 5% level, while other active participants had higher follow-up ED visits compared to low acuity ED episodes by a large difference ($p<0.05$). Both higher volume and other active participants exhibited a positive and significant adjusted difference for follow-up ED visits within five days of TIP. However, the adjusted difference for higher

volume participants was smaller than for other active participants.[17] Analyses testing the sensitivity of these results for higher volume and other active participants and their respective matched low acuity ED episodes showed consistent results. Lower ED follow-up after a TIP intervention by higher volume participants is suggestive of more appropriate triage of patients, with patients having relatively higher acuity being transported to the ED and lower acuity patients receiving TIP. The higher adjusted difference for other active participants suggests these participants' triage of patients may have been less appropriate, resulting in a larger share of TIP recipients needing and seeking additional care.

Higher volume participants had a lower adjusted difference for risk of hospitalization than other active participants. The evaluation's main regression results presented in Exhibit 21 show there was no statistical difference in the risk of hospitalization between TIP by higher volume participants compared to low acuity ED visits whereas TIP by other active participants exhibited an elevated risk of hospitalization compared to referent group episodes. The adjusted difference for risk of hospitalization was smaller for higher volume participants than other active participants for same-day+1 and five-day.[18] The higher hospitalization rate following provision of TIP by other active participants could have resulted from triaging patients to TIP who should have been triaged to an ED. This finding is concerning because on average, TIP patients would be expected to have lower clinical acuity than patients transported and seen in an ED. Sensitivity analyses were mostly consistent with these results but showed that the adjusted difference for risk of hospitalization by higher volume participants was positive and significant at the 5% level, indicating that while higher volume participants had a lower risk of hospitalization within 5 days than other active participants, it was still elevated compared to low acuity ED episodes in the localities of these organizations. The experience from delivering larger volumes of TIP interventions combined with careful review of data over time may have helped higher volume participants identify refinements in clinical protocols and training of EMS ambulance personnel enabling identification of patients who may appear to have non-urgent conditions but should be triaged to an ED rather than TIP.

The adjusted difference for patient mortality after TIP from higher volume participants was negative while TIP from other active participants had a small but statistically higher risk of mortality compared to low acuity ED episodes. The risk of mortality after TIP provided by higher volume participants was lower compared to low acuity ED episodes for same-day+1 (significant at the 10% level) and five-day (not significant). By comparison, the adjusted difference for patient mortality after TIP provided by other active participants showed a small and positive rate for same-day+1 (not significant) and five-day (significant at 5% level). The higher risk of mortality within 5 days for TIP provided by other active participants compared to higher volume participants may also reflect less appropriate triage of patients for TIP or other procedures used in delivering TIP by other active participants. Sensitivity analyses specific to higher volume and other active participants showed similar results that were not materially different from the main results.

[17] To test the sensitivity of these results the evaluation also estimated regression models restricted to only TIP by higher volume participants with low acuity ED episodes matched to higher volume participants and separately models restricted to only TIP by other active participants and their respective matched low acuity ED episodes.

[18] The adjusted difference for hospitalization on same-day+1 after TIP by higher volume participants was negative and not significantly different from zero at the 5% level.

EXHIBIT 21. COMPARISON OF ADJUSTED DIFFERENCES FOR TIP INTERVENTIONS PROVIDED BY HIGHER VOLUME VERSUS OTHER ACTIVE PARTICIPANTS

Outcome	TIP Interventions by Higher Volume Participants, *Same-day+1*	TIP Interventions by Higher Volume Participants, *5-day*	TIP Interventions by Other Active Participants, *Same-day+1*	TIP Interventions by Other Active Participants, *5-day*
Medicare Parts A and B spending	Moderate & Lower	Moderate & Lower	Moderate & Lower	Moderate & Lower
All-Cause Follow-up ED Visit	No Difference	Large & Higher	Large & Higher	Large & Higher
All-Cause Hospitalization	No Difference	No Difference	Large & Higher	Large & Higher
All-Cause Patient Mortality	No Difference	No Difference	No Difference	Large & Higher

Notes: Table results are from regression models including TIP from higher volume and other active participants. Cell entries are labels for adjusted TIP interventions minus adjusted TIP-matched low acuity ED episodes. "Same-day+1" indicates outcome event occurred on same date as the index event or one day after. "5-day" indicates outcome event occurred within five days after the index date.

Orange cells denote higher values for TIP interventions than the referent group significant at the 5% level or greater.
Green cells denote lower values for TIP interventions than the referent group significant at the 5% level or greater.

"Modest" denotes differences that are 0%-15% of average spending for matched low acuity ED episodes,
"moderate" denotes differences that are 15%-50% of average referent group spending, and
"large" denotes differences that >50% of average spending for referent encounters.

See Appendix B for a description of methods.

The lower risk of follow-up ED visits, hospitalizations and mortality among TIP interventions by higher volume participants may reflect processes in these organizations such as requiring EMS ambulance personnel to use secondary physician review of patients eligible for TIP. Differences in the processes used by higher volume organizations may have contributed to better outcomes compared to other active participants. For example, these organizations may have included processes to improve identification of patients appropriate for TIP versus those considered to require ED transport. Studies comparing EMT and emergency physician determinations of patient need for ED transport vary with somewhat higher agreement for trauma cases or critical care patients and lower agreement for non-urgent cases (Fraess-Phillips 2016). Rates of categorizing patients as not requiring ED transport when such transport would be more appropriate for paramedics range from approximately 11 percent to 20 percent (Gratton et al., 2003; Brown et al., 2009; Millin et al., 2011; Neeki et al., 2017). This implies that for non-urgent cases, there is a higher risk that EMS ambulance personnel may incorrectly identify a patient as not requiring transport to ED when ED transport would be more appropriate. In interviews, some higher volume participants reported requiring their EMS ambulance personnel to use secondary physician review where a patient was initially deemed eligible for TIP. For higher volume participants that were not interviewed review of implementation plans suggests six of the eight higher volume participants used procedures to

screen patients for appropriateness of TIP interventions. Higher volume participants may have refined patient screens or clinical protocols for TIP interventions after accumulating experience in delivering these services over time which may have contributed to lower rates of follow-up ED visits, hospitalizations and mortality. Other organizational processes including adjustments in equipment or training of EMS ambulance personnel may also have contributed to the observed difference.

For both higher volume and other active participants, Medicare Parts A and B spending for TIP was moderately lower compared to low acuity ED episodes. Estimates suggest TIP interventions by higher volume participants may realize smaller amounts of savings per intervention relative to TIP interventions by other active participants. TIP interventions by higher volume and other active participants exhibited lower Medicare Parts A and B spending compared to low acuity ED episodes in their respective service areas. Observed differences in spending per episode between higher volume and other active participants appear to partly reflect differences in the local cost of ED visits as well as differences in the level of spending. For higher volume participants, lower spending may reflect efficiencies from experience.

VI. CONCLUSION

Key Points in This Chapter

- Findings from the ET3 Model evaluation suggest some potential as a component of a broader strategy to reduce population reliance on ED departments as a primary access point for health services. Such a strategy would need to include enhancing the local capacity for delivering primary care services in addition to incorporating ET3-like processes whereby appropriate patients are triaged to settings other than an ED.
- Implementation challenges related to the COVID-19 PHE and avoidance of TIP and TAD services severely limited delivery of ET3 interventions over the model's duration. Patients without prior familiarization to TIP and TAD experiencing a medical emergency appear highly unlikely to consent to these ED alternatives. Themes from the evaluation's qualitative analysis suggest familiarizing healthcare providers could have reduced implementation challenges for participants as well.
- The experience of higher volume participant organizations despite implementation challenges suggests implementation is possible in certain contexts and organizations. Additional research could confirm the aspects of higher volume organizations primarily responsible for better outcomes observed in this evaluation.
- This evaluation had limited qualitative information about small ambulance suppliers and providers. Further study would be needed to better understand the challenges and opportunities that could support the ability of smaller organizations to implement and deliver ET3 interventions.
- Results for TIP interventions suggest room for improving the processes used to identify patients appropriate for TIP given these patients experienced a higher risk of hospitalization within five days.

1. *Key Themes*

The ET3 Model was designed to test the effects of TIP and TAD as alternatives to transport to an ED or other covered destination when patients deemed appropriate and eligible for these interventions consented to their use and were triaged based on clinical protocols. These alternatives were a departure from how typical EMS has been delivered in the United States over the past 40-50 years from the perspective of patients who are in emergency medical situations, practitioners providing support for EMS personnel responding to 911 calls, and EMS ambulance personnel. The evaluation of the model strongly suggests patients eligible for TIP or TAD in the midst of a medical emergency are unlikely to opt for treatment or health services from them if they are not familiar with these services. Unless patients are familiarized with these alternatives in advance in a non-emergent context, it appears likely that a

very high proportion will remain unwilling to use these alternatives. Healthcare providers would need to be familiarized with operation of delivering TIP and TAD such as the characteristics of patients that would be identified, and procedures for accepting patients.

Appropriately identifying and triaging unnecessary ED visits could reduce the strain on ED services that many communities experience. The ET3 Model was designed to reduce the volume of unnecessary ED visits by identifying patients that could safely be treated outside of the ED setting. Studies suggest that on average 30% to 40% of ED visits may be safely treated in a lower acuity setting (Uscher-Pines et al., 2013). In theory, the ET3 Model appears to have some potential as a component of a broader strategy to reduce population reliance on ED departments as a primary access point for health services. Such a strategy would include enhancing access to primary care services to improve regular use in addition to incorporating ET3-like processes whereby appropriate patients are triaged to settings other than an ED.[19] Strengthening local access and delivery of primary care services could also broaden avenues for ET3 like interventions.

However, the experience of the ET3 Model showed that despite robust participation among ambulance suppliers and providers, delivery of ET3 interventions was severely limited by challenges to ET3 implementation and delivery. Less than 40% of 185 participants delivered any ET3 interventions and among those that did deliver interventions, ET3 interventions accounted for on average, less than 1% of annual Medicare FFS ambulance transport volume. While the PHE contributed significantly to delays in implementation and delivery, system-wide implementation challenges related to avoidance of ET3 interventions also appear to have played a substantial role in limiting delivery. Had patient communities and providers in the localities of ET3 participants been familiarized with TAD and TIP well in advance of implementation and delivery of ET3 interventions, it appears delivery would have been higher, though it is unclear how much of an increase would have occurred. If familiarization of local health system actors to TAD and TIP had taken place in advance, it is also unclear whether increases in ET3 intervention delivery would have predominantly occurred among higher volume participants, active participants, or if current non-active participants would have also delivered interventions.

Nearly all ET3 interventions delivered were TIP and over three quarters of TIP interventions were delivered by eight higher volume participant organizations suggesting that implementation and delivery is possible under certain circumstances. Higher volume participants were diverse, including both large-sized and small-sized organizations, with most (six of eight) servicing urban areas, with representation of all EMS organization types and overrepresentation by third service public safety organizations. The two largest organizations in the higher volume group also delivered substantially higher numbers of ET3 interventions, so while size may not be a limiting factor, it appears to be an important influence of an organization's capacity to deliver these services. Additional research is needed to understand conditions and policies that support the ability of smaller organizations to implement and deliver interventions.

Results for TIP under the ET3 Model suggests TIP may provide an avenue for reducing patient volume on EDs but suggests that refinement of processes used to identify patients safe for TIP and possibly delivery of TIP services is needed. Analyses using low acuity ED episodes as the referent for TIP, showed a higher risk of follow-up ED visits, and hospitalization. This result raises concerns because patients transported to

[19] A variety of Innovation Center models have tested approaches to bolstering primary care access including the Comprehensive Primary Care (CPC) Model, CPC+, Pioneer ACO Model, and Next Generation ACO Model.

ED would on average be expected to have higher acuity than TIP patients. Even when analysis of TIP outcomes was separated for higher volume and other active participants, the results showed a small but statistically higher risk of hospitalization for higher volume participants. Differences in risk of hospitalization between higher volume and other active participants may reflect organizational features of higher volume participants. For example, some higher volume participants may not have required secondary review of patients initially deemed to safe for treatment outside of ED and as a result, under-triaged patients to ED. Differences in outcomes between higher volume and other active participants provides suggestive evidence that procedures or other characteristics of higher volume participants contributed to better outcomes. Additional research would be needed to confirm what practices or operations of higher volume participants contributed to better outcomes.

2. *Limitations*

This evaluation is subject to limitations. First, analysis of the results of TIP interventions were from a cross-sectional design with a referent group which has a greater risk of bias due to unmeasured differences than a design that uses changes over time to identify effects. Estimates of differences associated with TIP interventions may change materially if a quasi-experimental approach such as a difference in difference is used. Second, persons in the referent group were deemed to require ED transport per participant defined clinical protocols and therefore ineligible for TIP or TAD, whereas TIP or TAD patients by definition were considered safe for treatment outside of the ED setting.[20] Because this characteristic was unmeasured, referent group patients may have higher unmeasured acuity than recipients of ET3 interventions which could have biased results in favor of the model. Third, because of the limited sample size of TAD interventions, statistical analysis of these services was not performed. Fourth, interviews of ET3 participants did not include any small organizations in the model which limited the evaluation's ability to characterize challenges and opportunities specific to small ambulance organizations seeking to implement and deliver ET3 services.

[20] Patients transported to an ED with an ED visit may include patients that did not meet medical necessity criteria for ED transport who preferred to be transported and to receive health care in an ED setting.

REFERENCES

1. Brown, Lawrence H., Hubble, Michael W., Cone, David C., Millin, Michael G., Schwartz, Brian, Patternson, Daniel, Greenberg, Brad, Richards, Michael E. (2009). Paramedic Determinations of Medical Necessity: A Meta-Analysis. *Prehospital Emergency Care*. 13(4): 516-527.
2. Chen, Angela T., Muralidharan, Madhavi, Friedman, Ari B. (2022). Algorithms identifying low acuity emergency department visits: A review and validation study. *Health Services Research.* 57: 979-989.
3. Fraess-Phillips, Alex J. (2016). Can Paramedics Safety Refuse Transport of Non-Urgent Patients? *Prehospital and Disaster Medicine.* 31(6): 667-674.
4. Glasheen, William P., Cordier, Tristan, Gumpina, Rajiv, Haugh, Gil, Davis, Jared, Renda, Andrew. (2019). Charlson Comorbidity Index: ICD-9 Update and ICD-10 Translation. *American Health & Drug Benefits*. 12(4): 188-197.
5. Gratton, Matthew C., Ellison, Stefanie R., Hunt, Jason, Ma, O. John. (2003). Prospective Determination of Medical Necessity for an Ambulance Transport by Paramedics. *Prehospital Emergency Care.* 7(4): 466-469.
6. Jeffrey, Molly Moore, Bellolio, M Femanda, Wolfson, Julian, Abraham, Jean M., Dowd, Bryan E., Kane, Robert L. (2016). Validation of an algorithm to determine the primary care treatability of emergency department visits. *BMJ Open*.
7. Kim, Dae Hyun, Glynn, Robert J., Avorn, Jerry, Lipsitz, Lewis A., Rockwood, Kenneth, Pawar, Ajinkya, Schneeweiss, Sebastian. (2019). Validation of a Claims Based Frailty Index Against Physical Performance and Adverse Health Outcomes in the Health and Retirement Study. *Journals of Gerontology: Medical Sciences.* 74(8): 1271-1276.
8. Millin, Michael G., Brown, Lawrence H., Schwartz, Brian. (2011). EMS Provider Determinations of Necessity for Transport and Reimbursement for EMS Response, Medical Care, and Transport: Combined Resource Document for the National Association of EMS Physicians Position Statements. 15(4): 562-569.
9. Neeki, Michael M., Dong, Fanglong, Avera, Leigh, Than, Tan, Borger, Rodney, Powell, Joe, Vaezazizi, Reza, Pitts, Richard. (2017). Alternative Destination Transport? The Role of Paramedics in Optimal Use of the Emergency Department. *Western Journal of Emergency Medicine*. 17(6): 690-697.
10. Venkatesh, Arjun K., Mei, Hao, Kocher, Keith E., Granovsky, Michael, Obermeyer, Ziad, Spatz, Erica S., Rothenberg, Craig, Krumholz, Harlan M. (2016). Identification of Emergency Department Visits in Medicare Administrative Claims: Approaches and Implications. *Academic Emergency Medicine*. 24(4); 422-431.
11. Uscher-Pines, Lori, Pines, Jesse, Kellermann, Arthur, Gillen, Emily, Mehrotra, Ateev. (2013). Emergency Department Visits for Nonurgent Conditions: Systematic Literature Review. *American Journal of Managed Care*. 19(1): 47-59.
12. Pringle, Robert P., Carden, Donna L., Xiao, Feng, Graham, Derrel D. (2005) Outcomes of Patients not Transported After Calling 911. *Journal of Emergency Medicine.*28(4): 449-454.